

# *Platyceps rhodorachis* (JAN, 1863) – a study of the racer genus *Platyceps* BLYTH, 1860 east of the Tigris (Reptilia: Squamata: Colubridae)

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Accepted 6.x.2014.

Published online at [www.senckenberg.de/vertebrate-zoology](http://www.senckenberg.de/vertebrate-zoology) on 5.xii.2014.

## Abstract

*Platyceps rhodorachis* (JAN, 1863) is a euryoecious polytypic racer distributed from NE Iraq to Central Asia (Kyrgyzstan) and the Himalayas (probably westernmost Nepal). The nominotypical subspecies, occupying most of the species' range, is polymorphic. The typical (striped) phenotype is absent from certain peripheral areas. Notable geographic variation is observed in the number of ventrals, subcaudals, dorsal scales, or maxillary teeth and in the colour pattern. *P. r. ladacensis* (ANDERSON, 1871) is only found from the eastern Hindu Kush into northern Himachal Pradesh (India). Its presence south of the Zaskar Range requires confirmation and the status of the Ladakh Cliff Racer is debatable. The identity and systematic position of racers from the vicinity of Ahvaz (Khuzestan) as well as Arabian and southern Red Sea populations commonly assigned to *P. rhodorachis* pend further investigation.

*Platyceps semifasciatus* BLYTH, 1860 is a senior subjective synonym of *P. rhodorachis* (nomen protectum, valid type species of *Platyceps* BLYTH). *P. ventromaculatus* (GRAY, 1834) from the Makran coast to low-lying NW India and Nepal, for a long time confused with Jan's Cliff Racer (*P. rhodorachis* sensu stricto), is a mostly parapatric species. Two new taxa of the *rhodorachis* species group from montane NE Baluchistan Province (*P. noeli* sp. nov.) and the southern Indus Plain (*P. sindhensis* sp. nov.) are described. Another racer taxon from northern Azad Jammu and Kashmir remains undesigned. Distinctive morphological character states for *P. rhodorachis* vis-à-vis the southeast Mediterraneo-Iranian *P. najadum* (EICHWALD, 1831), *P. karelini* (BRANDT, 1838) from Libya to the Lake Balqash area and inland SW Pakistan (hybridises in places with *P. r. rhodorachis*), Baluch endemics including *P. mintonorum* (MERTENS, 1969), and Sindian species (*sindhensis*, *ventromaculatus*) are elaborated. An identification key embracing the Indian *P. bholanathi* (SHARMA, 1976) and *P. gracilis* (GÜNTHER, 1862) as well as a review of *Platyceps* BLYTH are provided. This genus is currently comprised of twenty-three mainly southern Palaearctic and Afrotropical as well as two Indian species referred to three (*florulentus*, *najadum*, *rhodorachis*-*ventromaculatus*) evolutionary lineages.

## Kurzfassung

*Platyceps rhodorachis* (JAN, 1863) ist eine euryöke polytypische Zornnatter, die vom Nordosten des Irak bis Zentralasien (Kirgisistan) und dem Himalaya (wahrscheinlich westlichstes Nepal) heimisch ist. Die nominotypische Unterart, welche den größten Teil des Artareals bewohnt, ist polymorph. Der typische (gestreifte) Phänotypus fehlt in gewissen Randregionen. Bemerkenswerte geographische Variation findet sich bei der Anzahl Ventralia, Subcaudalia, Dorsalreihen und Maxillarzähne oder in der Zeichnung. *P. r. ladacensis* (ANDERSON, 1871) ist auf den östlichen Hindu Kush bis ins nördliche Himachal Pradesh (Indien) beschränkt. Dessen Vorkommen südlich der Zaskarkette bedarf der Bestätigung, und der Status der Ladakh Zornnatter bleibt ungeklärt. Die Identität und systematische Stellung von Vertretern der *rhodorachis*-Gruppe aus der Umgebung von Ahvaz (Chusistan) sowie gemeinhin zu *P. rhodorachis* gestellte Populationen aus Arabien und dem südlichen Roten Meer erfordern weitere Untersuchungen.

*Platyceps semifasciatus* BLYTH, 1860 ist ein älteres subjektives Synonym von *P. rhodorachis* (nomen protectum, gültige Typusart von *Platyceps* BLYTH). *P. ventromaculatus* (GRAY, 1834) von der Makranküste bis zu den tiefer gelegenen Gebieten in NW Indien und Nepal ist eine größtenteils parapatrische Art, die lange Zeit mit Jan's Zornnatter (*P. rhodorachis* sensu stricto) verwechselt wurde. Zwei neue Taxa des *rhodorachis* Artenkreises aus dem gebirgigen Nordosten der Provinz Baluchistan (*P. noeli* sp. nov.) und der südlichen Indusebene (*P. sindhensis* sp. nov.) werden beschrieben. Eine weitere Form aus dem nördlichen Azad Jammu und Kaschmir bleibt taxonomisch unbehandelt. Morphologische Merkmalszustände erlauben eine klare Unterscheidung von *P. rhodorachis* gegenüber dem SO mediterrano-iranischen *P. najadum* (EICHWALD, 1831), *P. karelini* (BRANDT, 1838) aus Libyen bis zum Balqaschsee und dem Inneren von SW Pakistan (hybridisiert stellenweise mit

*P. r. rhodorachis*), Endemiten aus Baluchistan einschließlich *P. mintonorum* (MERTENS, 1969) sowie sindischen Arten (*sindhensis*, *ventromaculatus*). Die Studie präsentiert einen Bestimmungsschlüssel inklusive *P. bholanathi* (SHARMA, 1976) und *P. gracilis* (GÜNTHER, 1862) aus Indien sowie eine Übersicht zu *Platyceps* BLYTH. Diese Gattung umfasst gegenwärtig 23 hauptsächlich südpaläarktische und afrotropische sowie zwei indische Arten, die sich in drei Evolutionslinien (*florulentus*, *najadum*, *rhodorachis-ventromaculatus*) gruppieren.

## Key words

[*Zamenis*] *rhodorachis* JAN (nomen protectum), [*Platyceps*] *semifasciatus* BLYTH (nomen oblitum), *P. r. ladacensis* (ANDERSON), systematics, morphology, distribution, biogeography, hybridization, relationships, *Platyceps* spp. (*bholanathi*, *gracilis*, *karelini* ssp., *mintonorum*, *noeli* sp. nov., *najadum* ssp., *sindhensis* sp. nov., *ventromaculatus*), *P. perreti* comb. nov., *P. variabilis* ssp. (*P. v. manseri*, *P. v. thomasi*).

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## Introduction

JAN (1863) described *Zamenis rhodorachis* on the basis of several specimens recovered in Fars, southwestern Iran. Its defining trait is the eponymous red vertebral stripe running down the trunk. A few years later, ANDERSON (1871) introduced *Z. ladacensis* for a racer with broad transverse blotches from peripheral NW India (Ladakh). Together with other nominal species, BLANFORD (1876) referred both taxa to *Z. ventrimaculatus* [sic].

BOULENGER (1889, 1892, 1893) considered *Coluber ventromaculatus* GRAY, 1834 and *Zamenis rhodorachis* JAN, 1863 specifically distinct, and *Z. ladacensis* ANDERSON, 1871 a junior synonym of the latter. WALL (1914) revitalised the idea that *rhodorachis* and *ventromaculatus* were conspecific. In reality, they are valid species and belong to the mostly Saharo-Turano-Sindian and Afro-tropical racer genus *Platyceps* BLYTH, 1860 resurrected by INGER & CLARK (1943). Unfortunately, their partition of Old World racers (*Coluber* auct.) into several genera had not been accepted until the current century with respect to *Platyceps* Blyth.

Confusion regarding *Platyceps rhodorachis* and *P. ventromaculatus* did by no means come to an end when TEREENTJEV & CHERNOV (1936) realised that all earlier reports of *Zamenis ventrimaculatus* [sic] from Central Asia in fact belonged to the non-striped phenotype of Jan's Cliff Racer (*P. rhodorachis*, see also CHERNOV, 1934). Indeed, researchers dedicated to the southeastern Palaearctic herpetofauna became conscious that the systematics of *rhodorachis* auct. and related taxa including *P. k. karelini* (BRANDT, 1838) from the eastern Caspian coast to Baluchistan were puzzling and identification often problematic even within comparatively small areas (e.g., LEVITON, 1959; LEVITON & ANDERSON, 1961; MINTON, 1966; MERTENS, 1969). Strangely enough, many herpetologists used trinomina (mostly as *Coluber rhodorachis ladacensis*) to denote the patterned morph of *P. rhodorachis*, which is found alongside the typical phenotype over a good part of the species' distribution range. In an attempt to elucidate the intricacy surrounding *P. karelini*, *P. rhodorachis*, *P. ventromaculatus* as well as *P. mintonorum* (MERTENS, 1969), KHAN (1997) largely followed the systematic concept of WALL (1914). Certainly, the descriptions of new taxa by KHAN & KHAN (2000) did little to unravel the muddle, enhance awareness, or improve our understanding of these racers.

Since the days of Giorgio Jan, innumerable specimens of the *Platyceps rhodorachis-ventromaculatus* complex have accrued in scientific collections and, on occasion, their eventual examination and evaluation has contributed to a better appreciation of the situation in limited areas. More often than not, however, investigations started from preconceived notions with little bearing on morphological variation and biogeographical considerations, which led to enormous taxonomical disarray. Large distribution ranges and rampant variability of certain characters, scant material from crucial areas, and

inaccessibility of some due to the current state of affairs, combined with often vague locality records, deficient or partly defective original descriptions, the lack of reliable comparative data, and last but not least the existence of hybrids made it for a long time nigh on impossible to achieve pivotal progress, viz. come to a sincere appraisal of the systematics and relationships within this complicate racer group. Recent articles and this study hopefully go some way toward alleviating these deficiencies.

It took the senior author roughly 25 years of investigations into the arduous but intriguing topic of the systematics, taxonomy, and evolution of Old World racers and related clusters to assess the genus *Platyceps* BLYTH, 1860 and elaborate the sine qua non for a wholehearted revision of the intricate *P. rhodorachis-ventromaculatus* complex, and the former species in particular. *P. rhodorachis* auct. (as *Coluber* LINNAEUS, 1758 or *Zamenis* WAGLER, 1830) was understood to inhabit a vast area encompassing the semi-arid belt from the Ahaggar (Hoggar) Mountains in southern Algeria to Somalia and the Arabian Peninsula, and from Iran and the Caspian Region to Kyrgyzstan and northern India. Cliff racers from the western central Sahara and N Chad to the southern Jordan Rift (*P. saharicus* SCHÄTTI & MCCARTHY, 2004) or a population recently discovered in Djibouti (*P. afarensis* SCHÄTTI & INEICH, 2004), however, belong to species different from *P. rhodorachis* (JAN, 1863). The taxonomic allocation and status of *P. rhodorachis subniger* (BOETTGER, 1893) from the Eritrean littoral to the Horn of Africa as well as Arabian populations usually referred to *P. rhodorachis* remain unclear for the time being (SCHÄTTI & MCCARTHY, 2004; SCHÄTTI, 2006a). A serious attempt to resolve the problems of the *rhodorachis* species group undoubtedly requires a careful approach of the closely related eastern *P. karelini*, *P. mintonorum*, and *P. ventromaculatus* (e.g., SCHÄTTI & STUTZ, 2005; SCHÄTTI, 2006b; SCHÄTTI & SCHMITZ, 2006; SCHÄTTI *et al.*, 2010a, 2012). The present contribution investigates the intraspecific variation, distribution, and systematics of Jan's Cliff Racer from Kurdistan and the Shatt al-Arab area to the western portions of the Tien Shan and the Himalayas, and provides an evaluation of all taxa of the *rhodorachis-ventromaculatus* complex from Iraq to Turan, the Pamir, and Nepal.

## Methodology

### Material

Altogether, 275 specimens catalogued in institutional collections as Jan's Cliff Racer from the area under consideration have been examined over the years. This figure includes a substantial number of other *Platyceps* spp. (*karelini*, *mintonorum*, *najadum*, and *ventromaculatus*) and some hybrids. At the same time, preserved material registered under species different from *P. rhodorachis* studied

in the context of earlier contributions to these taxa turned out to belong to racers dealt with in the descriptive and analytical parts of the present study. Leaving aside four desiccated juveniles (ZFMK 31604–07, see Systematic Review: fourth smallprint) and an extremely damaged individual (ZISP 13556), this resulted in 228 *P. rhodorachis*, ten genuine hybrids (Appendices A–B), three probable crossbreeds, ten snakes which represent two as yet undescribed species, and six cases pending allocation. Taking into account three BNHM cliff racers and twenty-four specimens examined by other herpetologists amounts to a working sample of 284 *P. rhodorachis*, hybrids, new species, and provisionally assigned or unidentified racers, including two belonging to a probably new taxon, for which miscellaneous morphological data has been ascertained during this project. That figure does not account for a reputed “type” (ZSI 7274, see *P. rhodorachis ladacensis*, Fig. 12A) nor IRSNB 2027, the holotype of *Zamenis rhodorachis* [sic] var. *tessellata* WERNER, 1909 (see Affinities: second smallprint).

Unfortunately, the loan of *Platyceps* spp. from Indian institutions (BNHM, ZSI) has been impracticable due to the country’s legislation. Despite repeated requests, we have received no reply from the board or staff of the Zoological Survey of India as to their holdings of *Platyceps* BLYTH or more specific information, in particular regarding the type material of *Gonyosoma dorsale* ANDERSON, *Platyceps semifasciatus* BLYTH, and *Zamenis ladacensis* ANDERSON. Photographs of the holotype of *P. semifasciatus* (ZSI 7240) and the supposed “type” of *Z. ladacensis* (ZSI 7274, Fig. 12A) shot by Indraneil Das and Pratyush Mohapatra, respectively, give an impression of their state of conservation and general aspect. In the case of ZSI 7274, the photos allowed to ascertain some head scale conditions and the number of ventrals. Body scales (ventrals, subcaudals) of three *P. rhodorachis* deposited in the Bombay Natural History Museum (BNHM 539, 565, 621) were determined from photos (dorsal and ventral views) taken by Varad B. Giri. A male *rhodorachis* from the vicinity of Pithoragarh (Uttarakhand, Fig. 5E), originally identified from a photo and subsequently examined by Ashok Captain (SCHÄTTI & SCHMITZ, 2006: footnote 4), is not at present housed in an institutional collection (in litt.). Abhijit Das sent three fixed-images of a specimen filmed at Simla in Himachal Pradesh by Ramesh Chinnasamy. Rafaqat Masroor, Mahdi Kazemi, and Farhang Torki provided head scale data as well as ventral and subcaudal counts of ten Pakistani racers (PMNH material incl. four provisionally assigned or unidentified racers, see Incertae Sedis) and, respectively, eight Iranian *rhodorachis* (mostly unsexed, no scale data available for FTHR 15303, Fig. 3D) specified in Appendix A (documented by photos except in the case of two MKQ specimens). Lateral head views are also at hand for five NMP individuals from Iran (4) and SE Uzbekistan (including a photograph showing the dorsal colour pattern of the complete animal) studied by Jifí Moravec.

Institutions with their acronyms used in the text are: American Museum of Natural History, New York (AMNH), The Natural History Museum, London (BMNH, former British Museum [Natural History]), Bombay Natural History Museum, Mumbai [Bombay] (BNHM), California Academy of Sciences, San Francisco (CAS, incl. Stanford University [SU] holdings), Department of Biological and Medical Sciences, Qazaqstan Respublikasynyn Ulttyk Ğylym, Almaty (DBQA, Academy of Sciences), Field Museum of Natural History, Chicago (FMNH),

Farhang Torki Ecology and Herpetology Center for Research, Nurabad (Lorestan, FTHR), Georgian National Museum, Tbilisi (GNM, keeping the collections of the former Caucasian Museum), Zoological Museum, Hebrew University, Jerusalem (HUJ), Institute of Biology and Soil Sciences, Kyrgyz Respublikasynyn Uluttuk Ilimder Akademijasy, Bishkek (IBKB, National Academy of Sciences), Institute of Flora and Fauna, Ozbekiston Respublikasi Fanlar Akademiyasi, Toshkent (Tashkent, IFUT, Academy of Sciences), Iraq Museum of Natural History, University of Baghdad (IMNH), Institut Royal des Sciences Naturelles de Belgique, Bruxelles (Brussels, IRSNB), Institute of Zoology, Türkmenistanyn Ylymlar Akademiyasy, Ashgabat (IZTA, Academy of Sciences), Museum of Comparative Zoology, Harvard University, Cambridge (MCZ), Muséum d’Histoire naturelle, Genève (Geneva, MHNG), Collection of Mahdi Kazemi, Qom (MKQ), Zoologicheskij Muzej, Sankt-Peterburgskij Gosudarstvennyj Universitet (MSPGU, Saint Petersburg State University), Department of Zoology, Moravske Muzeum, Brno (MMB), Zoologicheskij Muzej, Moskovskij Gosudarstvennyj Universitet (MMGU, Moscow State University, ‘M. V. Lomonosov’), Muze-ye Melli-ye Tarikh-e Tabii, Tehran (Teheran, MMTT), Muséum national d’Histoire naturelle, Paris (MNHN), Collection of Muhammad S. Khan (MSK), Museo Civico di Storia Naturale ‘Giacomo Doria’, Genoa (Genova, MSNG), Museo Civico di Storia Naturale, Milano (Milan, MSNM), Zoologicheskij Muzej, Samarqandskij Gosudarstvennyj Universitet (MSGU, Samarqand State University; ‘Darwinovskogo Muzeja Biofaka UzGU’, DAL, 1936), Staatliches Museum für Tierkunde, Dresden (MTD), Zoologiska museet, Lunds Universitet (Lund, MZLU), Museo Zoologico dell’Università degli Studi ‘La Specola’, Firenze (Florence, MZUF), Museo ed Istituto di Zoologia sistematica della Università, Torino (Turin, MZUT, now housed in the Museo Regionale di Scienze Naturali, Torino), Naturhistoriska Riksmuseet, Göteborgs Universitet (NHMG), Naturhistorisches Museum, Basel (NMB), Department of Zoology, Národní (National) Muzeum, Praha (Prague, NMP, ‘6V’ series), Natuurmuseum, Rotterdam (NMR), Naturhistorisches Museum, Wien (Vienna, NMW), Pakistan Museum of Natural History, Islamabad (PMNH), Zoological Museum, Razi University, Kermanshah (RUZM, ‘CP’ series), Collection of Sherman A. Minton, Jr. (SAM), Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt on the Main (SMF), Staatliches Museum für Naturkunde, Stuttgart (SMNS), Department of Zoology, Slovakian National Museum, Bratislava (SNMB), Department of Biology, Hakim Sabzevari University (Sabzevar, TMUS [“SUHC”], former Tarbiat Moallem University), Museum of Zoology, University of Michigan, Ann Arbor (UMMZ), National Museum of Natural History (Smithsonian Institution, ‘United States National Museum’), Washington (USNM), Zoological Museum, International Center for Science, High Technology, and Environmental Science, Kerman (ZCSK), Zoologisches Forschungsmuseum Alexander Koenig, Bonn (ZFMK), Zoological Institute, National Academy



of the Ukraine, Kiev (ZIK), Zoological Institute, Russian Academy of Sciences, Saint Petersburg (ZISP), Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Berlin (ZMB, former Zoologisches Museum), Zoologische Staatssammlung, München (Munich, ZSM), and Zoological Survey of India, Kolkata [Calcutta] (ZSI, keeping the Indian Museum, and former Museum of the Asiatic Society of Bengal, ‘Reptile Registry’).

## External Data

The incorporation of numerical values from sources other than the examined material is a tightrope walk between the quest for increasing sample sizes and, in extreme cases, a distortion of facts (or, at the very least, a dilution of strict databases). Apart from potential confusion with *Platycephalus* spp. distinct from *P. rhodorachis*, the inclusion of discrete counts and character states from studies by peers is, if nothing else, a delicate undertaking because it bears the risk of absorbing data obtained through different methods and/or with variant terminology. For these reasons, literature records underwent a rigorous selection process.

Reliable individual body scale counts for samples not examined by us are relatively scarce in view of the abundance of publications on Jan’s Cliff Racer. Trustworthy ventral data is available for 41 *Platycephalus rhodorachis* (incl. one from Kurdistan, two *P. r. ladacensis*, and three intergrades), a supposed *P. karelini* × *P. rhodorachis* hybrid, and WERNER’s (1929a) unlocated racer of questionable origin and identity (see footnote 7). Without taking account of the latter report, the gender is indicated in 19 cases (WALL, 1911b [15 incl. BMNH 1910.7.12.2]; SMITH, 1943 [*P. r. ladacensis*, see Morphology: smallprint]; KHAN, 1986; MULDER, 2002; AFRASIAB & MOHAMAD, 2011) and inferred from circumstantial evidence in the case of STOLICZKA’s (1872) largest specimen (♂, see Dimensions). With respect to subcaudals, the situation is aggravated because “it is not always easy to be certain whether or not there has been actual loss of scutes” (PARKER, 1949). Slightly injured tail tips sometimes seem to heal neatly and even the terminal spine can be restored to some degree. This is detected only upon closer examination. Therefore, great care was taken when incorporating external subcaudal data and we meticulously discarded counts that were at least five scales lower than observed in unquestionably intact tails within the respective geographic group (see Samples and Characters incl. Fig. 15, Tabs 2–3). Twenty-one *rhodorachis* spp. and one supposed *karelini* × *rhodorachis* from literature have been considered (Appendix C).

Ventral data is available for a total of 316 *Platycephalus rhodorachis* spp. (without BMNH 1886.9.21.100, FMNH 74615 and 161185, FTHR 15303, MHNG 2443.32, MZUF 23942, MZLU 3036, ZFMK 8645, 31671, 84787, ZISP 11790, and 13556, see Appendix A), hybrids, new species as well as provisionally assigned and unidentified racers. Many numerical values in literature as, for in-

stance, ANDERSON’s (1963) count for CAS 86586 from Khuzestan (“240”) with 237 ventrals include preventrals (see discussion of Ahvaz sample under Geographic Variation). With regard to subcaudals, CHERNOV (1959: footnote p. 144) drew attention to probably incorrect low figures haunting the pertinent literature based on incomplete tails (e.g., 92–98 in DAL, 1936). Certainly, WALL’s (1914: 42) minimum of 82 subcaudals is wrong. Male no. 7 from “Chitral” (WALL, 1911b) is BMNH 1910.7.12.2 as evidenced by, for example, the number of ventrals (208). The exceedingly high subcaudal count of 147 for a juvenile from Peshawar (MINTON, 1966) is erroneous and the discrepancy of ten scales (see Geographic Variation: first smallprint) illustrates the need for caution in the handling of external data (see also Systematic Review: second smallprint).

Indications in literature are equally problematical regarding the number of dorsal scale rows at various positions along the trunk. WALL’s (1911b) formulae, for instance, give the anterior and posterior reductions “2 heads-length after head” and “2 heads-lengths [sic] before vent.” MINTON (1966) ascertained these fusions at a vague “neck” level and “just anterior to vent” where the number of rows often differs from our standard position defined in the next chapter. This may also be the case with a slightly elevated count (14) reported by DAL (1936).

The inclusion of data derived from sources other than the examined material is particularly vexing when it comes to the dorsal colour pattern and number of maxillary teeth. As explained in the next chapter (second smallprint), the permanency of the reddish vertebral stripe in preserved animals depends on various factors. In the absence of specific indications, its presence in certain specimens was inferred from circumstantial evidence including, when applicable, a consistent taxonomic concept adhered to by the respective author (trinomina, see Subspecies) or information from secondary literature (e.g., CHERNOV, 1959; BOGDANOV, 1962; SHAMMAKOV, 1981; ATAJEV, 1985). In particular, a unicoloured (“einfarbig”) *Platycephalus rhodorachis* from Kerman (WERNER, 1895) and further specimens from Iran notified by the same author (see Systematic Review: fourth smallprint) or WETTSTEIN (1951: “typische Stücke der einfärbigen Form”) belong to the striped phenotype (see Appendix D). With regard to dentition, “nine” maxillary teeth as indicated for the presumed holotype of *Zamenis ladacensis* (ANDERSON, 1871b) certainly do not account for missing ones. As noted earlier (SCHÄTTI & SCHMITZ, 2006), osteological features (presence or absence of a maxillary gap, size of postdiastemal teeth, and certain dental counts) reported by WALL (1911a–b, 1914) are incorrect. More trustworthy data derives from skulls and additional specimens from “Chitral” (WALL, 1911b, 1914: 43).

A part of Frank Wall’s osteological collection of *Zamenis ventrimaculatus* [sic] auct. including vertebrae of unknown geographic origin (BMNH 1930.5.8.398) is stored in The Natural History Museum (BMNH 1930.5.8.392–99). Three skulls of this series are from Chitral *Platycephalus rhodorachis* (-.392–94, viz. no. 1, 8 and 16 in WALL, 1911b: Tab.). Two (-.395–96) registered as from “Lamgarrah” and “Sukkur, Almora District” inspire certain doubts as to their respective origin and may have been mixed up. The “Basra” cranium (-.397) most probably belongs to Chesney’s Racer. BMNH 1930.5.8.399 from NW Punjab is historically relevant (see Systematic Review incl. third smallprint).

In the case of ecological information, often hawked in subsequent compilations, we did our best to credit the original source. General comments, remarks deemed not to be based on authentic observation, many data concerning diurnal activity cycles or ambient temperatures, shedding periods, and topics such as enemies or parasites are not incorporated or dealt with.

## Methods and Definitions

Head measurements have been taken with a calliper (see Appendices A–B). The head length (hl) is in a straight line from the anterior tip of the rostral to the posterior border of the interparietal suture. The head width (hw) equals the distance between the outer edge of the supraoculars at the centre of the orbit. The frontal length (fl) is along the midline from the anterior tip to the posterior border, and its width (fw) equals the maximum distance between the lateral projections. The internasal-prefrontal (inp) and parietal (pl) lengths have been measured along the median suture of these paired shields. The nostril-eye distance (dne) is the shortest span from the posterior margin of the nose opening to the orbit. ‘Subocular’ is shorthand for the anterior subocular scale. The presubocular is situated between the subocular, loreal (sometimes not in contact), and supralabials. Its frequency is given as a percentage of the right and left side counts of all specimens with pertinent data combined. This also applies to the occurrence of a postsubocular or divided preocular in the case of *Platyceps ventromaculatus* and *P. mintonorum*, respectively. ‘Body scales’ include ventrals, subcaudals, and dorsals. ‘Total body scales’ encompass the combined number of ventrals and subcaudals. The abbreviations ‘dsr’ and ‘msr’ stand for dorsal scale rows and midbody rows, respectively. Numbers in parenthesis (e.g., supralabials, dsr, dentition) indicate observed intraspecific variation. A slash separates right and left side counts of bilateral head scales, position of reduction, number of subcaudals, or maxillary teeth. The dorsal formula expresses the number of transverse rows at the 15<sup>th</sup> ventral, midbody (50%ven), and five ventrals prior to the anal scute. ‘Reduction’ (or ‘fusion’) refers to a bilateral decrease of dsr. Their position along the trunk is given as a percentage of the total number of ventrals (%ven) based on the average of the right and left side counts. ‘Regular’ are those reductions present within the 19–19–13 dsr segment, irrespective of a possibly lower or higher count between the neck and midbody (i.e., the third regular reduction in a specimen with 21 msr is from 15 to 13 dsr, not 17–15). Anterior fusions comprise the first and second steps (19–15 dsr). Transverse positions lie lateral (or low), paravertebral (high), or median, viz. involving the vertebral row; ‘mixed’ means that different levels participate in a specific bilateral decrease of dsr.

The box plot diagrams showing the variation of ventrals, subcaudals, and their sum (Figs 16–18) set the whiskers at 1.5 times the range between the first and third quartiles. Lateral (paravertebral) levels of fusions or additions are positioned at less than 62.5%

(≥ 62.5%) in terms of the one-sided number of dsr (without vertebral row) in front of the change. In other words, reductions from 13 to 11 (17 to 15) dsr, or an increase to 15, involving row 4 (5) are paravertebral (66% and 62.5%, resp.); an addition from 11 to 13 (preanal increase) with the participation of the third row is lateral (60%).

Two main phenotypes occur in *Platyceps rhodorachis* (nominotypical subspecies), striped or typical and non-striped or patterned. The former manifests a reddish vertebral line on a unicoloured dorsum. The patterned morph displays transverse bands or bars (blotched phase), either running over both flanks or limited to the mid-dorsal segment and alternating with one or two series of lateral markings, or shows roundish, square or short semi-rectangular spots usually arranged in five to six rows down the forebody. ‘Chequered’ denotes juxtaposed marks confluent along the spine and forming a pattern resembling a zipper. One or several broad complete bands on the nape and extending across both flanks are referred to as collar(s). Some *Platyceps* spp. treated in the Comparative Part exhibit, or at least occasionally feature, a median nuchal streak (very rare in *P. rhodorachis*).

A semantic distinction is made hereafter between comparatively broad ‘cross-bands’ versus more separated and/or narrower ‘cross-bars’. Depending on the physiological state (e.g., immediately prior to shedding) and general condition of dead specimens, agent and way of preservation, or place of storage (e.g., exposure to direct sunlight), the vertebral stripe of the typical phenotype may fade and finally become imperceptible with the passing of time. Thus, it is sometimes simply impossible, or at best a matter of guesswork, to ascertain beyond doubt whether a spinal line was present in life or not (e.g., ZFMK 31603, ZISP 17210 or 17223, see BOGDANOV, 1953). Plain specimens are virtually devoid of any dorsal colour pattern. The qualifying term for this morph is equivalent to ‘unicolored’ (MINTON, 1966: 47, Pl. 25.2) or ‘uniform’ as used by MINTON (1966: 122), ANDERSON & LEVITON (1969), and CLARK *et al.* (1969).

Maxillary and dentary teeth have most often been examined only on one (usually right) dentigerous bone. Complete tooth data for MHNG 2718.17–18 were obtained through X-ray computed tomography and visualised as described in MAHLOW *et al.* (2013). Numerical values for the palatine and pterygoid rely on a few observations (see Osteology and Anatomy). Vertebra proportions are based on four measures (length of centrum, minimum width of neural arch, length of neural crest, and width across prezygapophyses between exterior edge of articular facets) defined in SCHÄTTI & UTIGER (2001). The length of the hemipenis (in situ), the insertion of the retractor muscle, and the longitudinal position of organs are indicated in absolute numbers of subcaudals or ventrals, respectively, and as a percentage thereof (%ven, %subc).

## Taxa and Authors

The *Platyceps rhodorachis* species group as currently understood embraces the name-giving taxon, *P. afarensis* SCHÄTTI & INEICH, *P. rhodorachis subniger* (BOETTGER),

*P. saharicus* SCHÄTTI & MCCARTHY, and ‘*Platyceps* sp. *incertae sedis*’ sensu SCHÄTTI & MCCARTHY (2004). The *rhodorachis-ventromaculatus* complex comprises *P. karelini*, *P. mintonorum*, *P. ventromaculatus* (sensu stricto), and the *rhodorachis* group. Vernacular names are used as alternatives for monotypic species (Gray’s and Minton’s Racer) or the nominotypical subspecies, viz. Eichwald’s (*P. n. najadum*) and Karelin’s Racer (versus Chesney’s and Rogers’s Racer). *P. rhodorachis* or Jan’s Cliff Racer is made up of the Common and Ladakh Cliff Racer, which are accurate equivalents of *P. r. rhodorachis* and *P. r. ladacensis*. The term cliff racer(s) either denotes the three recognised forms of *P. rhodorachis* including Kurdish populations (*P. cf. r. rhodorachis*) or one or several taxa from the Sahara and the Horn of Africa to the Himalayas hitherto referred to *rhodorachis* auct.

The author and year of the description of taxa are usually cited upon their first appearance in the text and, sometimes, repeated where considered appropriate, required to be consistent with other quotations, or necessary to comprehend the taxonomic context. The chresonyms are far from complete, actually a vain endeavour in view of the surfeit of existing publications. The entries annotate references presenting new samples or collecting sites, illustrations, and other relevant information (e.g., distribution, ecology) as well as works essential for the understanding of the taxonomical history of the respective racer. Specimens and accession numbers are quoted upon their first mention in literature. Specified material not examined by us is cited in brackets. Question marks in the chresonymy denote entries or localities that may refer to *Platyceps* spp. other than the taxon in question. One inaccessible article of unknown title by SHUKUROV (1951) reporting *P. rhodorachis* from Turkmenistan is credited under a secondary reference (KARTASHEV, 1955).

A frog (*Rana* [= *Euphylyctis*] *cyanophlyctis* SCHNEIDER) as well as some lizard and four snake species (*Ablepharus deserti* STRAUCH, *A. pannonicus* FITZINGER, *Agama* [= *Calotes*] *versicolor* DAUDIN, *Eremias nikolskii* BEDRIAGA, *Gymnodactylus* [= *Tenuidactylus*] *caspicus* EICHWALD, G. [= *Tenuidactylus*] *fedtschenkoi* STRAUCH, G. [= *Mediodactylus*] *russowii* STRAUCH, G. [= *Altiphylax*] *stoliczkai* STEINDACHNER, *Lacerta* [= *Trachylepis*] *aurata* LINNAEUS, *L. sanguinolenta* PALLAS [=*Trapelus sanguinolentus*], *Scincus* [= *Eumeces*] *schneiderii* DAUDIN, *Stellio caucasicus* EICHWALD [=*Laudakia caucasia*]; *Coluber* [= *Psammophis*] *schokari* FORSKÅL, *Pseudoboa carinata* SCHNEIDER [=*Echis carinatus*], *Stenostoma* (*Ramphostoma*) *macrorhynchum* JAN IN JAN & SORDELLI [=*Myriopholis macrorhyncha*], *Zamenis* [= *Spalerosophis*] *arenarius* BOULENGER mentioned under Ecology (food items and predators) or *Coluber mucosus* LINNAEUS [=*Ptyas mucosa*], a mis-labelling by CASIMIR (1971), are not fully credited nor their original descriptions cited in the References. This also applies to unspecified prey, in particular lacertid lizards of the genera *Eremias* FITZINGER in WIEGMANN and *Mesalina* GRAY.

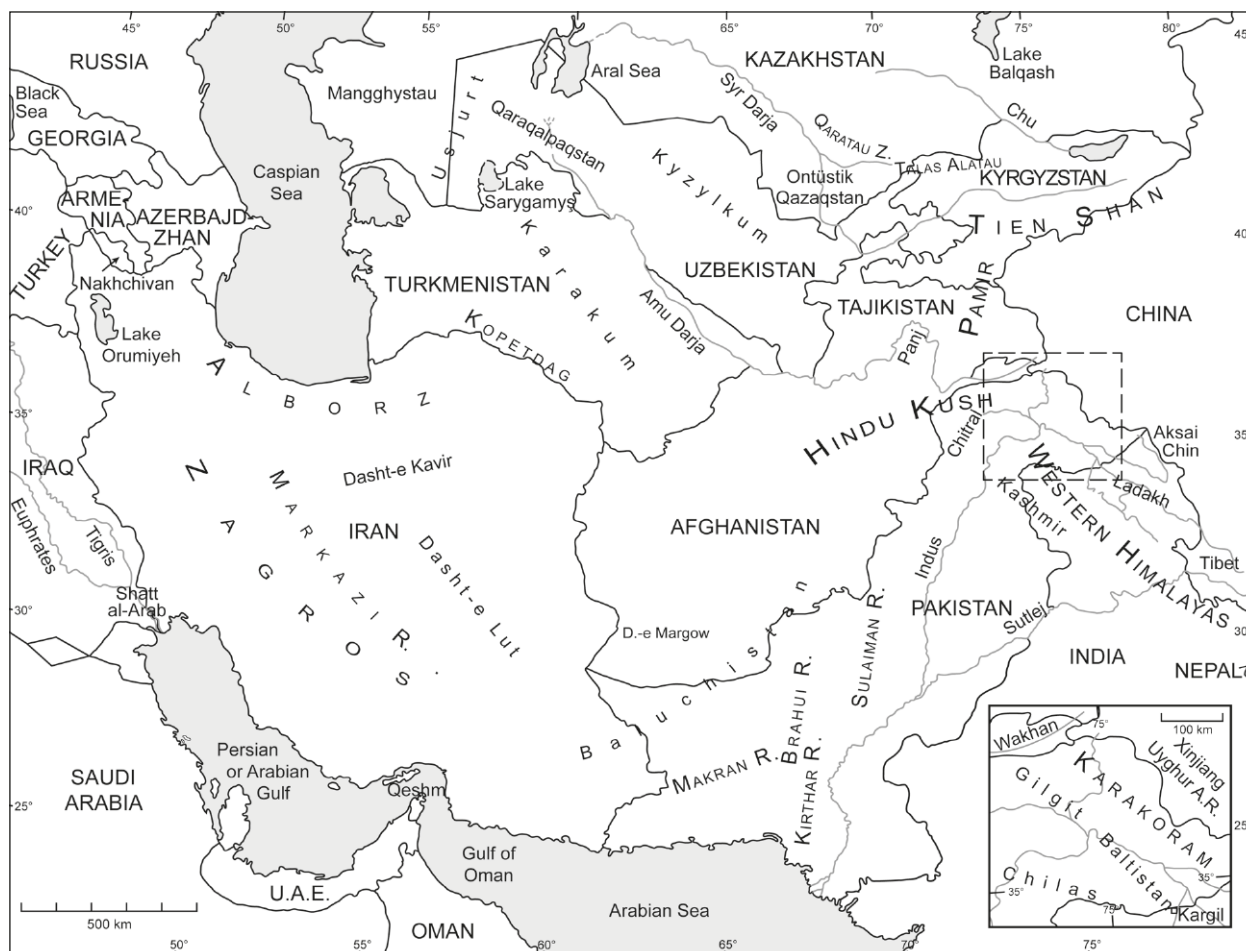
The transcription of Cyrillic names (authors, localities, and other geographic terms) in basic references (e.g., ANDERSON, 1999; LEVITON & ANDERSON, 2010) is inconsistent. We place emphasis on the distinction of the letters *з* (as *z*) and *ц* (*cz* instead of *z*) or the application of the wye for *ы* and *я* (instead of *y*) in the case of *ў* (versus *u*, viz. *i*). Importance is also given to the umlauts *ë* (*jo*),

*я* (*ja*), and *ю* (*ju*) as well as phonetics including endings preceded by certain vowels (in particular -*ejev* instead of -*eev*). Explicitly, we do not take account of Russian and former Soviet authors’ anglicised names encountered in literature but meticulously adhere to the described system throughout the whole text (e.g., ALESZCZENKO vs. ALESHCHENKO, CZELLARIUS vs. TSELLARIUS, DAREVSKIJ vs. DAREVSKY, JEREMCHENKO vs. EREMCHENKO, KOLBIN-CZEV vs. KOLBINTSEV, MAKEJEV vs. MAKEEV, NIKOLSKIJ vs. NIKOLSKY) and prevent the usage of incoherently variable spelling of personal names in non-Cyrillic publications (e.g., ATAJEV instead of ATAEV or ATAYEV, CZAREVSKIJ vs. CAREVSKIJ, TZAREVSKIJ or TZAREWSKY, TUNJEV for TUNIEV and TUNIEV, or ZARUDNYJ vs. SARUDNY and ZARUDNY).

## Geographic Terms

The Western Himalayas extend from Gilgit to Uttarakhand (former Uttaranchal). The Karakoram (Karakorum) runs from NE Ghizar to the headwaters of the Shyok along the Chinese-Indian border (Aksai Chin, Fig. 1). The Sivalik (Shiwalik, etc.) Range, the southernmost orogenic element of the Himalayan System, extends from Kashmir south of the Pir Panjal to Sikkim. The eastern Nepalese sector, to the south of the Mahabharat Range (Lesser Himalaya), is referred to as the Churia Hills. Kashmir as used in the following text denotes Azad Jammu and Kashmir (Pakistan) and a section of Jammu and Kashmir State (India), specifically excluding Gilgit-Baltistan and Ladakh. The latter region is confined to Indian territory and comprised of the Zaskar (or Zaskar) Mountains east of the Suru River in Kargil District. The Upper Indus is upstream of the confluence with the Shyok, and the lower course south of the Chilas-Khyber Pakhtunkhwa (former Northwest Frontier Province) border. The southern Indus Plain is beyond 30°N latitude. The Brahui Range extends from east of Khuzdar north to the Quetta area and bends sharply southeast (Ziarat Mountains) towards Sibi. The Baluchistan Region is made up of Afghan territory (Nimruz Province, southern Helmand, and Kandahar west and south of the capital) including the Dasht-e Margow (M. Desert) as well as Baluchistan Province (Pakistan) and Sistan-ve Baluchestan (Iran). Makran encompasses Gwadar, Kech, and Panjgur Districts south of the central watershed (Makran Range) in western Baluchistan Province. Afghan provinces (wilāyatuna, sing. wilāyat) and Pakistani districts (izla, sing. zillah) are in accordance with the administrative entities established by recent, but maybe not the latest, reforms. ‘Gulf’ is shorthand for the Persian or Arabian Gulf. Iranian districts constitute a county (shahrestan). ‘Boyerahmad’ is Boyer Ahmadi-ye Sardis-ve Kohkiluyeh. Former Khorasan Province (Ostan-e K.) is subdivided into Khorasan-e Shomali (North K.), Razavi (Central K., named after Emam Reza), and Jonubi (South K.). The Markazi (meaning ‘Central’) Range runs from south of Qom through western Yazd to the Kerman-Sistan-ve Baluchestan border (Kuh-e Jabal-e Barez area, attaining almost 3,500 m) and separates the





**Fig. 1.** Area covered by this study and relevant geomorphological features.

western portion of the Central Plateau from the desert basin to the east. The southern Zagros extends from Shiraz to Kerman Province. The Kabir Kuh Mountains west of the Karkheh drainage system in Ilam do not belong to the Zagros Range proper. The Kurdish Region as understood hereafter is made up of Azarbayjan-e Sharqi (West A.) and Kurdistan Provinces in Iran as well as three Governorates in Iraq (Arbil, As-Sulaymaniyah, Dahuk). For the sake of convenience, and in accordance with general usage in herpetological literature by recent local authors, Kopetdag as used in this study denotes the mountain range in Turkmenistan (Köpetdag Gershi) west of ca. 58°30'E longitude, excluding the northern Khorasan extensions.

To the west, the Karakoram borders Chitral (Mastuj Tehsil), the northernmost district of Khyber Pakhtunkhwa from Drosh Tehsil (Borough) to the Wakhan Corridor in Badakhshan, Afghanistan. Gilgit-Baltistan or Pakistan's Northern Areas include Astore, Diamir, Ghizar, and Gilgit (these four districts made up the former Gilgit Agency) as well as Ghanche and Skardu (Baltistan). Gilgit as employed hereafter encompasses Ghizar (western section), Gilgit proper, and Hunza-Nagar. Hunza is identical with Gojal Tehsil bordering the Xinjiang Uyghur Autonomous Region, China. Chilas comprises Astore and Diamir (Fig. 1: inset). To the southeast, Baltistan encroaches upon territory under Indian control. We follow HENDERSON & HUME (1873) or BLANFORD (1878a) apropos the Baltistan-Kashmir division along the Zoji Ridge, viz. the Zoji La (or Zozila [pass], 34°17'N 75°29'E, 3,847 m above sea

level) between Baltal (Kashmir) and Matayan (Baltistan). Historically, Ladakh is "Western Tibet" (GÜNTHER, 1860 ["Ladak, Tibet"]; STEINDACHNER, 1867; STOLICZKA, 1866a ["West-Tibet"], 1866b; BLANFORD, 1878a–b) embracing areas of the Xinjiang Uyghur A. R. (e.g., Aksai Chin). "Ladák" or variant spelling as used during the British dominion included, for instance, the Dras region (Drās, 34°27'N 75°46'E, ca. 3,280 m a.s.l.) between the Zoji La and Kargil (34°34'N 76°06'E). BLANFORD (1878b) defined "[t]he Ladák range [...] along the northern (or north-eastern) bank of the Indus, and separating its valley from that of the Shayok", specifically excluding the "Záskar range". The Shyok Valley is separated from Ladakh proper by altitudes above 5,000 m. Zaskar covers the high-altitude areas draining into the Upper Indus, viz. east of the Suru-Stod watershed (Figs 1, 9 and 11), along the ridge of the Great Himalaya Range east to the Chinese border (Tibet), and south of the Ladakh Valley. Lahaul comprises Zaskar and the Chandra Valley flanked by the Pir Panjal and the Great Himalaya. The "upper Indus Basin" as indicated by MINTON (1966: map 5) corresponds to the area between ca. 30°N latitude and Chilas but the text demonstrates that this term was applied to more northern areas (see Distribution: last smallprint).

Regions, rivers, and mountain ranges in Central Asia stretching over more than one country of the former USSR (e.g., Amu Darja, Chu River [Chuy, Shu], Fergana Valley, Surkhandarja River, Syr Darja, Zeravshan Mountains) are in Cyrillic transcript from Russian (see Taxa and Authors) but native appellations for localities and other geographic names are respected in Kazakhstan (e.g.,



Lake Balqash [B. Köli] versus Balkhash, Mangghystau instead of Mangystau Province, Taraz rather than Zhambyl [Dzhambul] City), Kyrgyzstan (e.g., Suusamy-Too vs. Susamyr Tau or Khrebet S., Mayлуу-Suu or Mayli-Say vs. Majli-Saj), Tajikistan (e.g., Hisor Tizmasi [Range] vs. Gissar Mountains, Kuhistoni Badakhshon vs. Gorno-Badakhshan, Surkhakchashma vs. Surkha Cheshme), Turkmenistan (e.g., Ashgabat vs. Ashkhabad etc., Balkanabat vs. Nebitdag, Bayramali vs. Bajram Ali, Çäçe vs. Chacha [Valley], Garrygala vs. Karakala or Kara Kala, Gyzylarbat vs. Kyzyl Arvat, Köýtendag vs. Kugitang Mountains or Kugintangtau, Sarygamyş [Depression and Lake] vs. Sarykamys, Şarlawuk vs. Sharlauk, Sharlavuk, Sharlawuk or Sharlouk, Utsch-Adshi vs. Uch Adzhi), and Uzbekistan (e.g., Buxoro vs. Bukhara, Chirchiq vs. Chirchik, Jizzax Viloyati [Province] vs. Jizzakh, Qaraqalpaqstan [Respublikasi] vs. Karakalpakstan, Surxondaryo Viloyati vs. Surkhandarja, Toshkent vs. Tashkent). Conventional usage is followed in the case of the names of these countries (instead of the official Kyrgyz, Ozbekiston, Qazaqstan, Tojikiston, and Türkmenistan Republics) as well as a few other established geographic terms such as Greater Balkan Mountains (Khrebet Bolshoj Balkhan) vs. Uly Balkan Gershi or Karakum vs. Garagum (Desert). The Panj (Tajik pronunciation instead of Pjandzh, Pyandzh etc.) is from the confluence of the Pamir and Wakhan Rivers along the Afghan-Tajik border as far as the junction with the Vakhsh in Kathlon Province, forming the Amu Darja. The Fergana Valley stretches from the Lower Naryn in Kyrgyzstan through easternmost Uzbekistan (Andijon, Fargona, and Namangan) to Khujand in northern Sughd Province of Tajikistan. The Naryn and Qoradaryo (Kara-Darya in Kyrgyzstan) create the Syr Darja southeast of Namangan (border with Andijon Viloyati). Tien Shan (incl. Qaratau Zhotasy [Karatau], Talas Alatau, and Zeravshan Range in Kazakhstan, Kyrgyzstan, and Uzbekistan, resp.) is given preference over Tjan-Shan.

Apart from umlauts and personal names, diacritics are utilised in words of the Turkic language group including Kazakh and Turkmen. Except for the References and some quotations of localities and other geographic terms in transcript from Farsi (mostly in connection with early relevant, but often vague, citations), diacritical marks are used in rare cases of place names transcribed from Arabic characters (incl. Farsi and Urdu) or in the case of “Bügti” (ANDERSON, 1895) and “Záskar” (BLANFORD, 1878b), which is of Tibetan origin. This is done in an attempt to enable the interested reader to identify these places in adequate references including websites (see Localities).

In a country like Afghanistan, it is impossible to take into account all major ethnic groups and languages. We refrained from, for instance, Baluchi pronunciation (e.g., “Balochistan”), made an effort to standardise the spelling of geographic terms to a certain extent, and use official (or at least locally prevalent) place names, for example Khulm (Kholm) rather than Tashqorghon (Tashkurghan). The appellation of some Indian localities such as Pune (instead of Poona), Simla (Shimla), and Subathu (Sabathu) follows WHITAKER & CAPTAIN (2004).

Intentionally varying spelling takes into consideration linguistic (phonetic) differences between basically identical names as, for example, Azarbayjan-e Gharbi (East Azarbayjan) and Azarbayjan-e Sharqi (West A.) Provinces (Iran) versus Azerbajdzhan Republic, Badghis (Wilāyat B., Afghanistan) vs. Badkhyz (Turkmenistan), Fargona (Viloyati, Uzbekistan) vs. Fergana (Valley, see above), Jalalabad (Town, Afghanistan) vs. Jalal-Abad (Town and Province [Oblast], Kyrgyzstan), Kurdistan (Kurdistan) in Iran (Iraq), Konar River (and Province) in Afghanistan vs. Kunar (Pakistan), Murgab (Morghab [Darya-ye M.]) Valley in Turkmenistan (Afghanistan), Poonch (Town, India) vs. Punch (District, Pakistan) in Kashmir, or Serakhs (Iran) vs. Sarahs (Sarakhs, Turkmenistan).

## Localities

Coordinates of collecting sites and other geographic features are mostly derived from the Gazetteers of the U.S. Board on Geographic Names, the Geonet database (<http://earth-info.nima.mil>), or [www.geonames.org](http://www.geonames.org). They are annotated at the appropriate place, usually with the related reference in the chresonymy at the beginning of each systematic chapter (literature records) or in Appendices A–B (examined material), the corresponding section of both new species, and in Appendix E for *Platyceps* spp. other than Jan’s Cliff Racer. In some cases, the precise position of a site relies on information from earlier authors (e.g., LEVITON & ANDERSON, 1969; MERTENS, 1969) including notes received from the collectors, or file entries and field tags. ZARUDNYJ’S (1898, 1902) itineraries, one of his ornithological articles (ZARUDNYJ & HÄRMS, 1913), and ADAMEC’S (1973–1989) gazetteers have been used to trace certain localities in Khuzestan, Fars, eastern Iran, and Afghanistan cited in BLANFORD (1876), BOULENGER (1893), NIKOLSKIJ (1897–1905), and WERNER (1917). In a few instances, our search for older names started with atlases from that epoch and other cartographic documentation to locate their approximate positions and pinpoint them with more detailed recent maps.

“Húng” (BLANFORD, 1876) is identified with Hang-e Sofla (Hownag, 26°25’N 62°08’E) in SE Sistan-ve Baluchestan (Iran); two places with the same name (Hong, Hang) are situated nearby (26°30’N 62°13–14’E). “Sargado”, “Saargad”, or “Sargadin” (NIKOLSKIJ, 1900, 1905, 1916) is Sarhad in Zahedan and northern Iranshahr Counties, N Sistan-ve Baluchestan. The “highlands of the Sarhad” (GABRIEL, 1938: 200) lie between roughly 28–30°N latitude and 60–62°E longitude (ALCOCK & FINN, 1897: map; ADAMEC, 1988) or 27°50’–30°00’N 60°00’–60°50’E according to ANDERSON (1999: “Sargad Region”). “Nusret-abad in Persia” (NIKOLSKIJ, 1916) cannot be unequivocally assigned because Nikolaj Aleksejevich Zarudnyj visited at least two places with this frequent name in southern Khorasan and Sistan-ve Baluchestan during his 1901 expedition. Similarly, LATIFI’S (1991 [1985]) “Ghezelbalagh” (Qezel Bolaq, Kurdistan) is

ambiguous (35°48'N 46°46'E or 36°14'N 47°15'E) and arbitrarily positioned at 36°00'N 47°00'E.

Unlocated springs in Turkmenistan are “Nazar-Ekrem” (LAPTEV, 1934) plotted in the Balkanabat area (Greater Balkan Mountains) by SHAMMAKOV (1981: Fig. 59) and ATAJEV (1985: Fig. 71) or “Kujundzhik” (SHAMMAKOV, 1968) in the Kyurendag (see second smallprint under Distribution regarding Köşyukli Islet). For the sake of completeness, map entries in BANNIKOV *et al.* (1977) and SAID-ALIEV (1979) are accounted for, though some are subject to reservation because they may be based on vague or dubious reports. Various records of Tajik *Platyceps rhodorachis* (e.g., Obikiik in the “Aruktau” and the Romit Reserve ca. 50 km northeast of Dushanbe) including, for instance, the presence along the Varzob (CHERNOV, 1959) are not shown in SAID-ALIEV (1979: Fig. 48). Vice versa, several mapped collecting sites do not seem to be indicated in the text. We take into consideration two unspecified places plotted at about 37°50'N 68°45'E and roughly 39°45'N 68°45'E (Fig. 9).

## Systematic Review

Apart from the unfortunate mention in JAN's (1857) list of reptile and amphibian species in the Milan collection (see Taxonomy and Type Material: second smallprint), the first quotation in herpetological literature undoubtedly referring to *Platyceps rhodorachis* (JAN, 1863) was published in GÜNTHER's (1858) momentous ‘Catalogue’. There, two specimens from “Schiraz; Kurdistan” showing a reddish vertebral stripe along the trunk are listed as a colour variety (“var. C”) of *Zamenis ventrimaculatus* [sic] (GRAY, 1834). JAN's (1863) unduly short diagnosis of *Z. rhodorachis* relies upon several syntypes from “Persia, Shiraz”. Quite surprisingly, the species is not illustrated in the ‘Iconographie générale’.

Besides *Platyceps rhodorachis* and *P. ventromaculatus*, GÜNTHER's (1858) *Zamenis ventrimaculatus* [sic] is made up of two additional species, the northeast African *P. florulentus* (GEOFFROY SAINT-HILAIRE, 1827) and a then yet undescribed racer (“Var. B [...] or perhaps it is a species”), viz. *Zamenis gracilis* GÜNTHER, 1862 (see Affinities). Amazingly, no author prior to SCHMIDT (1930), although for a different taxon from Iraq, *P. karelini chesneii* (MARTIN, 1838), used the correct spelling of the specific name *ventromaculatus* GRAY, 1834. The type locality of *Z. rhodorachis* JAN *op. cit.*, for instance, the origin of GÜNTHER's (1858) specimens are considered vague (see Taxonomy and Type Material, Samples and Characters: third smallprint). In those times, collectors and natural history dealers, or curators and other museum staff, often did not pay great attention to field notes or precise localities. Apart from *rhodorachis*, further nominal racers and related taxa described from ‘Schiraz’ (see following paragraph, next smallprint, Taxonomy and Type Material: second smallprint) and other specimens with that origin presented herein may have been obtained quite far from this city because “Schiraz”, “Shiraz”, “Shiráz”, or “Shirâz” was usually applied to the whole of today's Fars Province (SCHÄTTI *et al.*, 2012: footnote 10).

*Zamenis ladacensis* ANDERSON, 1871, established upon a racer from “Ladak” with indistinct “broad brown dorsal bands”, was conferred species status by BOULENGER (1890) but shortly afterwards downgraded to a junior synonym of *Z. rhodorachis* auct. (BOULENGER, 1892: “I now

regard *Z. rhodorachis* [...] and *Z. ladacensis* as colour varieties of one and the same species”). The description of *Gonyosoma dorsale* ANDERSON, 1872 from “Schiraz” is somewhat inarticulate (see Taxonomy and Type Material). This taxon is identical with “*Z. ventrimaculatus*, var. C, Günther [1858]” (GÜNTHER, 1874), viz. *Platyceps rhodorachis* from the same type locality (see preceding smallprint) as unanimously agreed upon by former and contemporary herpetologists (e.g., STRAUCH, 1873; BOULENGER, 1892, 1893; DAS *et al.*, 1998). STRAUCH (1873: 137) considered *ventrimaculatus* [sic] sensu GÜNTHER (1858) to be made up of various valid species (“ich bin [...] der Ansicht, dass Dr. Günther in der Zusammenziehung der Arten zu weit gegangen ist und unter dem Namen *Zamenis ventrimaculatus* Gray [...] verschiedene Arten [...] zusammengeworfen hat”). BLANFORD (1876), however, relegated *Z. rhodorachis* JAN, four nominal taxa mentioned above (*chesneii*, *dorsale*, *florulentus* [“Schlegel, 1837”], *ladacensis*) as well as *Z. persicus* JAN, 1863 and *Coluber (Tyria) karelini* BRANDT, 1838 into the synonymy of *ventrimaculatus* [sic]. Apart from *P. rhodorachis* and probably *P. karelini* (nominotypical subspecies), William Thomas Blanford's sample of racers from southern Iran and “Balúchistán” presented in the zoological part of ‘Eastern Persia’ (see Taxonomy and Type Material: last smallprint) possibly embraces *P. mintonorum* (MERTENS, 1969) but definitely no genuine *P. ventromaculatus*. Based on material collected by the Afghan Delimitation Commission, BOULENGER (1889) regarded *karelini*, *rhodorachis*, and *ventromaculatus* to be valid species of *Zamenis* auct. (see Taxonomy and Type Material: first smallprint). He affirmed that “*Z. rhodorachis* [...] is perfectly separable from both *Z. ventrimaculatus* and *Z. karelinii*” [sic] (BOULENGER, 1892) and supported his assertion by scale data including ventral and subcaudal counts. Due to the presence of a postsubocular, BOULENGER (1893) classified a striped racer from Gulran in NW Afghanistan (Herat Province, not “Badghis”) previously determined as *rhodorachis* (BOULENGER, 1889) under *karelini*. Probably because of their low ventral and subcaudal counts, two *rhodorachis* from Kashmir and Khorasan-e Razavi (Central K.) were reidentified as “*ventrimaculatus*”.

After having “received the part of Jan's ‘Iconographie’ containing the figure of *Z. [amenis] persicus*” (JAN & SORDELLI, 1867: Pl. II.1, destroyed MSNM syntype, see Taxonomy and Type Material: second smallprint), ANDERSON (1872) considered “*L. [sic] ladacensis*” to be a junior synonym of the former (a nomen oblitum, SCHÄTTI *et al.*, 2010a), viz. *Platyceps karelini chesneii* (MARTIN). Later, and most likely inspired by BOULENGER (1892, 1893), ANDERSON (1895) came to the conclusion that *Z. ladacensis* was “unquestionally [sic] identical with Jan's” Cliff Racer. Apart from the latter, *Z. ventrimaculatus* [sic] sensu BLANFORD (1876) consists of at least one additional valid species, leading to enduring chaos. Either *P. karelini* (nominotypical subspecies) or *P. mintonorum* are present in the ‘Eastern Persia’ series, depending on the identity of specimens inaccessible for examination (see Southern Pakistani Racers), including possibly lost material. There can be no doubt, however, that authentic *ventromaculatus* had passed through William T. Blanford's hands as exemplified by BMNH 1880.11.10.201a–b from Gwadar or ZMB 9957 obtained near Karachi. BOETTGER (1880, 1888), among the first to assent with BLANFORD's (1876) potpourri con-

cept (see, e.g., MURRAY, 1884 [“the whole of South Western Asia to Egypt”]; TRISTRAM, 1884), indicated “*ventrimaculatus*” auct. from Egypt and the Near East (“Arabien” and “Palästina”) to India (see Affinities, SCHÄTTI *et al.*, 2012). Then again, SCLATER (1891b) assigned racer populations from “Egypt [...] to Ladak” including, for instance, ZSI 4827 and 7336–37 to *Z. ladacensis* [sic] (see chresonymy). The enormous systematical confusion resulted in, for example, reports of the northeast African *P. florulentus* (GEOFFROY SAINT-HILAIRE) from Baluchistan (Afghanistan, Pakistan), viz. “Zandra” (leg. Capt. F. B. Peile) and Quetta (A. H. McMahon) by MURRAY (1892) and WALL (1908a, 1923), respectively (see also Distinction: last smallprint). As evidenced by morphological features (e.g., 21 msr, “costals [...] keeled obtusely”, WALL, 1908a), at least the Quetta specimen belongs to a colubrid taxon other than *Platyceps* spp. Apart from mistakes as to the gender of some individuals (e.g., BMNH 1880.3.15.386a, 1891.9.14.17) and minor discrepancies partly due to a different counting system (comprising preventrals), ventral data for two *P. rhodorachis* listed in BOULENGER (1893) differs in a drastic way from that ascertained by us; BMNH 1892.11.28.7 (letter *t*) from Aydere has 223 instead of 244 ventrals, and 256 are found in a subadult female from Gilgit (β, BMNH 1880.3.15.386b, “yg. [...] V. 225”).

NIKOLSKIJ (1905) correctly classified a formerly unidentified *Platyceps rhodorachis* from Turkmenistan (ZISP 8623, VARENCZOV, 1894) but ranked several specimens of Jan’s Cliff Racer from eastern Iran (NIKOLSKIJ, 1900, 1916) and Central Asia under *Zamenis karelini*, *ventrimaculatus* [sic], or “*dahlii*”, viz. *P. najadum* (EICHWALD, 1831). NIKOLSKIJ’S (1905, 1916) *rhodorachis* [sic] included individuals of the striped and patterned (“var. *ladacensis* And.”) phenotypes. WALL (1911a) thought that *P. rhodorachis* and *P. ventromaculatus* had different conditions of the maxillary (“a very clear distinction can be shown in the dentition of the two species”, WALL, 1911b). This erroneous idea, viz. the lack of a diastema in *ventromaculatus*, is based on a skull (BMNH 1930.5.8.399) from “Campbellpore” in extreme NW Punjab (Attock City, 33°46’N 72°22’E), and the statement may be due to a mis-identification of the voucher specimen (SCHÄTTI & SCHMITZ, 2006; see External Data: second smallprint). WALL (1911b) inferred that “[t]his difference appears to me of sufficient importance to warrant generic [!] distinction between the two” but noted that there were “no constant differences in lepidosis, by which *rhodorachis* can be distinguished from *ventrimaculatus*.” A few years later, WALL (1914) admitted that the dentition of these taxa “agrees” and held “the view [...] that (1) *ventrimaculatus* (Gray), (2) *rhodorachis* (Jan.), (3) *ladacensis* (Anderson), (4) *dorsale* (Anderson), and (5) *chesnei* (Martin), are all varieties of a single species”, referring 84 racers (72 collected within the area under consideration) “from Almora in the East to Aden in the West” to a “few” and “many shielded variety” or “form” of *ventrimaculatus* [sic] (see footnote 6 and Distinction: last smallprint). The composite nature of WALL’S (1914) taxon makes it difficult, and often impossible, to correctly assign scale counts, information on coloration, dimensions, and dentition data as well as some locality records or ecological notes to a particular species of the *P. rhodorachis-ventromaculatus* complex (SCHÄTTI & SCHMITZ, 2006: footnote 1).

NIKOLSKIJ (1905) enumerated ZISP 8623 (coll. “Warenzow. 1893”) from Ashgabat (“Aschabad”). In fact, this and another striped individual (see Colour Pattern: sixth smallprint) are from the vicinity of Kurtusu (“20-j verste po Kuchanskomu shosse”) and Hawdan (VARENCZOV, 1894). Various racer specimens obtained by the Russian officer and explorer Petr Aleksandrovich Varenzov and published in his report on the Transcaspien fauna cannot be located today (ANANJEVA & ORLOV, 1977). WALL (1914) specified two collecting sites of the Chitral series (WALL, 1911b), viz. the capital and Drosh (see Ecology). Four records of *Zamenis ventrimaculatus* [sic] from central Khyber Pakhtunkhwa (Malakand, ca. 650 m above sea level), Himachal Pradesh (Kasauli, ca. 1,690 m, see next), and Uttarakhand (“West of Almora” and Mussoorie at ca. 1,600 m each) are hereafter referred to *Platyceps rhodorachis*. This, because they originate from beyond the confirmed range of *P. ventromaculatus* and have been collected at altitudes considered not to be attained by the latter (see footnote 6 and Sympatry incl. last smallprint). “Lamgarrah” (WALL, 1923) is Lamgara (or Lamgarha, 29°32’N 79°45’E, 1,850–1,880 m) situated roughly 12 km southeast of Almora (29°37’N 79°40’E); only the skull of this specimen could be located (see External Data: second smallprint). Although the case is unclear, we regard reports from “West of Almora” (arbitrarily placed at 29°37’N 79°30’E) and Lamgara as two distinct collecting sites (Fig. 11). WALL (1914: maps 1–2) mentioned at least three racers from NW India and “Punjab” to be housed in the Bombay Natural History Museum (“Bo. M.”). BNHM 537 from Kasauli (leg. Lt. Col. Simple July 1907), however, is missing (SCHÄTTI & SCHMITZ, 2006: footnote 3), and there is no “specimen of *Coluber* collected from Mussoorie” nor any *rhodorachis* or *ventromaculatus* from Indian Punjab in the Mumbai (Bombay) herpetological collection (Varad B. Giri in litt.). Furthermore, WALL (1914) mapped the “Punjab” entry under the “many-shielded variety”. This is in contradiction to the ‘Synopsis of specimens’, which explicitly puts on record the absence of this cluster from “Punjab” (l.c.: 38). Two racers from Sukkur (27°42’N 68°51’E) in Sindh (l.c.: 43, 204 ventrals, 121 subcaudals) and Karachi (201, 114) belong to *ventromaculatus*.

*Zamenis rhodorachis* [sic] var. *tessellata* WERNER, 1909 from Asia Minor (“Asie Mineure”, IRSNB 2027) is without further information as to its provenance (see last paragraph in this chapter and Affinities).

Having had at hand a fair number of specimens gathered from 1877 to 1905 by Friedrich Carl Andreas between Kazerun, Shiraz, and Takht-e Jamshid (Persepolis) in Fars, WERNER (1917) concluded that *Zamenis rhodorachis* [sic] and *Z. ventrimaculatus* [sic] auct. show very similar behaviour (“Ethologisch dürften beide kaum verschieden sein”) and might be conspecific (“vielleicht überhaupt nicht artlich verschiedene”). He declared, however, that *Z. rhodorachis* had more ventrals and subcaudals as well as a uniform instead of spotted belly. The assertion concerning the pattern of the venter is incorrect and this author later clarified that the number of ventrals of these species (sensu auct.) overlapped and only subcaudal counts allowed for a positive identification (WERNER, 1938).

WERNER’S (1917) series of eleven *Zamenis rhodorachis* [sic] was originally deposited in the Zoologisches Museum der Universität Göttingen. Today, no. 156 registered as from “Persien” is in Vienna (NMW 15167.2) and the remainder in Bonn (BÖHME & BISCHOFF, 1984). ZFMK 31666 is F. C. Andreas’s no. 165 (see Colour Pattern, Samples and Characters). WERNER’S (1917) remark regarding the coloration of ZFMK 31667–70, viz. a uniformly light brown dor-



sum (“oberseits eintönig hellbraun”), is misleading because these specimens including an unusually large male described in detail (ZFMK 31667 [no. 206], “1385 mm”) belong to the typical (striped) phenotype. ZFMK 31671 (no. 184) has a faint light vertebral stripe (“Spur einer hellen Rückenlinie”) and is incomplete. Five juveniles with an indistinctly bordered yellowish spinal line (“mit gelblicher, undeutlich begrenzter Spinallinie (*rhodorhachis*)”) encompass NMW 15167.2 and four racers of the ZFMK 31603–07 series. The latter are in bad condition (desiccated) and scale data was only ascertained for ZFMK 31603 (dorsal colour pattern unknown). The specific identity of three out of four very young (“sehr jung”) snakes (no. 145, 152–153 and 159) could not be verified due to their state of conservation, and it is unclear which of the ZFMK 31604–07 specimens did not form part of WERNER’s (1917) sample (see Material). Andreas’s field notes contain three “*Z. v.[entrimaculatus]* var. *D. persica*” from “Tangistân” near Ahram in Bushehr Province (ca. 28°53’N 51°05’E) and a cottage at “Tschâbâgh”, probably Châh Bâgh Qorbân (28°42’N 55°02’E, see Colour Pattern: fifth small-print). They were inaccessible to WERNER (1917).

Apart from two incidental quotations in early treatises on the snake fauna of British India (THEOBALD, 1868; NICHOLSON, 1874), CHERNOV (1934) was the first to allocate Jan’s Cliff Racer to *Coluber* LINNAEUS, 1758 and clarify that records of *Zamenis ventrimaculatus* [sic] from Turkmenistan in reality belong to *Platyceps rhodorachis*. TERENTJEV & CHERNOV (1936–1949) referred reports of “*ventrimaculatus*” from all republics of the former USSR (e.g., NIKOLSKII, 1905–1916; CZAREVSKII, 1918) to the patterned phenotype of *P. rhodorachis* (for further details see CHERNOV, 1959) for which they pegged subspecific recognition as *C. rhodorachis ladacensis* versus the nominotypical striped morph. Confusion with *P. najadum*, however, persisted (see chresonymy, Colour Pattern: fourth small-print).

CLARK & INGER (1942) found salient discrepancies in the dorsal scale row reduction pattern of Holarctic racers (*Coluber* auct.), prompting them to split this polyphyletic cluster into five genera (INGER & CLARK, 1943). The latter authors incorporated additional character sets (head scales, hemipenis features) and referred *C. florulentus* GEOFFROY SAINT-HILAIRE, *C. ravergeri* MÉNÉTRIÉS, *C. ventromaculatus* auct., *Tyria najadum* EICHWALD, *Zamenis rhodorachis* JAN, and *Z. rogersi* ANDERSON to *Platyceps* BLYTH. Their generic partition was criticised (e.g., CHERNOV, 1959; KRAMER & SCHNURRENBERGER, 1959; MINTON, 1966) and generally overlooked or rejected by Old World herpetologists active during the second half of the last century (see, e.g., LEVITON & ALDRICH, 1984: footnote 24).

FMNH 19501 and 26357 selected by Robert Frederick Inger and his fellow student to exemplify “the scale formula [dsr reduction sequence] of the type species, *ventromaculatus*” (INGER & CLARK, 1943) belong to *Platyceps karelini chesneii* (MARTIN, 1838). *Coluber* (*Tyria*) *karelini* BRANDT, 1838 was not dealt with in their studies. The implicit and, respectively, overt (*Zamenis rogersi* ANDERSON, 1893) mention of both western subspecies (Chesney’s and Rogers’s Racer), however, *noles volens* assigns Karelin’s Racer to *Platyceps* sensu INGER & CLARK (1943). This taxon is polyphyletic by inclusion of *Hemorrhais ravergeri* (MÉNÉTRIÉS, 1832). *Coluber dahlia* “Fitzinger”, viz. *P. najadum dahlia* (SCHINZ, 1835) from Dalmatia (Croatia) to southern Anatolia, was referred to *Zamenis* auct. Apart from this nominal genus (nec *Zamenis* WAGLER, 1830,

viz. ratsnakes, see Taxonomy and Type Material: first small-print) and *Platyceps* BLYTH, 1860, INGER & CLARK’s (1943) breakdown of southern Palaearctic and Afrotropical (*florulentus*) racers led to the revalidation of *Hemorrhais* BOIE, 1826 (monotypic) to accommodate *Coluber hippocrepis* LINNAEUS, 1758. Although deficient to some extent, and highly limited as to its systematic scope, their generic partition was a promising first step to a serious revision of *Coluber* auct., and it is regrettable that their effort did not come to fruition. *Virtus semper invidiae patet* (Othloh, Prov.: Virtue is always the target of envy).

SMITH (1943) addressed *Platyceps* spp. (as *Coluber* auct.) from British India and Iran, confirming that *P. rhodorachis* and *P. ventromaculatus* are specifically different (“The higher ventral count [...], the greater reduction of scale-rows on the posterior part of the body [of *rhodorachis*], and the slight differences in coloration, justify its retention as a distinct species”). Relying on morphological features including head and body measurements, PARKER (1949) recognised *C. rhodorachis subnigra* [sic] (BOETTGER, 1893) from Eritrea to Somalia and placed emphasis on “an apparent distributional gap” separating Near and Middle East populations of *C. rhodorachis* auct.

BOGDANOV (1953) postulated hybridization between *Platyceps karelini* and *P. rhodorachis* on the basis of ten aberrant specimens out of a total of 119 racers collected in the Murgab Valley, Turkmenistan. Strangely enough, he concluded that *rhodorachis* was a subspecies of Karelin’s Racer (*Coluber karelini rhodorachis* [sic] comb. nov.) consisting of two varieties (“variáciij”), “*rhodorachis i* [and] *ladocensis*” [sic] (see CHERNOV, 1959: footnote p. 145).

LEVITON (1959) noted that the distribution limits of *Platyceps karelini*, *P. rhodorachis*, and *P. ventromaculatus* auct. “overlap most extensively”, and “[t]hey exhibit the same ranges of morphological variation, the same color pattern variations, and are found in similar environmental situations”, concluding that “their recognition is based upon characters of rather nebulous taxonomic value, and their present partition is not entirely satisfactory.” In particular, this author referred seven racers (CAS 84630–36) from Helmand (Chah Anjir) in SW Afghanistan to Karelin’s Racer. Two years later, CHERNOV (in LEVITON & ANDERSON, 1961) redetermined three genuine *karelini* (nominotypical subspecies) of that series as *Coluber rhodorachis ladacensis* and retained under *C. karelini* four racers (CAS 84630–33) belonging to an as yet undescribed species, *P. mintonorum* (see MERTENS, 1969: 56; SCHÄTTI & STUTZ, 2005: footnote 1). KRAMER & SCHNURRENBERGER (1963) provided morphological data for the only known extant original specimen of *Zamenis rhodorachis* JAN (MSNG 30312, Fig. 2A), which they declared the lectotype (see Taxonomy and Type Material). MINTON (1962, 1966) and MERTENS (1969) demonstrated that *rhodorachis* auct. and *ventromaculatus* can be separated on the basis of their dorsal colour pattern and the sum of ventrals and subcaudals. Nevertheless, *C. rhodorachis* and *C. r. ladacensis* sensu MINTON (1966) and MERTENS (1969), respectively, are composites (see Southern Pakistani Racers).



MERTENS (1956) remained indecisive as to the subspecific status of *Zamenis ladacensis* ANDERSON (“Ob *ladacensis* als eine Unterart betrachtet werden kann, ist zur Zeit noch nicht sicher; fest steht, daß in einigen Gebieten *ladacensis* tatsächlich als eine geographische Rasse auftritt, in anderen aber offenbar neben der typischen Form vorkommt”) but later (MERTENS, 1969) adopted a clear stance and used this name for the patterned phenotype (“Es fehlt eine rote Vertebraallinie; deshalb ist es [“*rhodorachis*-Material”] zweifellos [!] zur *ladacensis*-Rasse zu stellen”). MERTENS (1969: 60) reported 205–244 ventrals (mean 216.1) and 121–142 subcaudals (132.9) for Pakistani *Coluber rhodorachis ladacensis* (SMF specimens, the sum of “328–387” [353.0, p. 61] includes cliff racers from areas extralimital to this study). SMF 50457–58 and 62927, however, possess as few as 199–204 ventrals, considerably lower subcaudal counts (108–111), and a sum of only 307 to ca. 314 (see Brahui Racer). Except for SMF 57306, 62928, and 62938 (Figs 24B–C) with 236–246 ventrals and 115–143 subcaudals (see Sindh Racer, Incertae Sedis), none of these cliff racers from mainland Pakistan (without Astola Island, see Geographic Variation: first smallprint) has more than 216 ventrals (♂♂ 199–216, ♀♀ 211–212).

Relating to the ‘Variegated Sand Racer’ or “*Coluber* sp.”, viz. *Platyceps mintonorum*, MINTON (1966) emphasised that “its relationships to other racers of the Middle East and North Africa will not be clear until monographic treatment of the group is undertaken.” CLARK *et al.* (1969) pointed out that “the group must be studied throughout its geographic range before specimens can be assigned with certainty to one of these taxa” of the *P. rhodorachis-ventromaculatus* complex. LEVITON *et al.* (1992) hit upon “unresolved problems relating to the recognition of subspecies of *C. rhodorachis*”. They considered populations from the Arabian Peninsula including a completely black individual (Pl. 15D: “melanistic phase”) from Taif, Saudi Arabia, to be “typical of the nominate subspecies”. Another illustrated specimen (MMTT 1073) from north of Bushehr with pronounced broad dark transverse blotches “exhibits the color pattern often referred to as characteristic of *C. r. ladacensis*, the subspecies usually associated with the Iranian Plateau, east to Afghanistan, and Pakistan, and north into southern Turkestan.” This, however, is also the distribution range of the striped (typical) phenotype of *P. rhodorachis* except southern Pakistan (Fig. 14). Moreover, and without any reference, LEVITON *et al.* (1992: caption to Pl. 15E) stated that “some authorities believe [that *ladacensis*] may represent a distinct species” (see Subspecies).

The diagnoses in LEVITON *et al.* (1992: 92, 213–214) reflect the degree of uncertainty regarding, for instance, the colour pattern variation in Jan’s Cliff Racer. “*Coluber rhodorachis*” has the “dorsum dark anteriorly” with “weakly developed dark dorsal and lateral blotches [...] separated by narrow whitish areas, usually one scale row wide” and “black anteriolateral markings on each ventral scute for most of body length”. “The variety [!] *C. rhodorachis ladacensis* [...] is pale gray with alternating rows of dark spots that fade out on the tail (see Pl. 15E). There are small light spots just in front of and behind the eyes.” These descriptions do not allow for a positive identification of typical (striped) specimens nor MMTT 1073 (see Colour Pattern). At any rate, the ‘Handbook to Middle East amphibians and reptiles’ cements incorrect ideas concerning the taxonomy and distribution of *ladacensis* auct. (“Turkestan” and Pakistan, thus excluding the type locality) as exemplified by DISI *et al.* (2001) and DISI (2002: *C. r. ladacensis* [sic]) who reported this

subspecies from Iran to Pakistan and Afghanistan, respectively. Iranian herpetologists noted that “*ladacensis* has been considered a color pattern variation of *rhodorachis* ever since J. Anderson (1895)” but “traditional classification [...] is adopted” (RASTEGAR-POUYANI *et al.*, 2008) and they “regard the two subspecies as two morphs of the same species” (FATHINIA *et al.*, 2010).

KHAN’s (1977–2006) contributions to the herpetology of Pakistan are as numerous as evasive and unpromising, at least with respect to *Platyceps* spp. (see, e.g., IN DEN BOSCH, 2003; TILLACK & KUCHARZEWSKI, 2004; DAVID & PAUWELS, 2005; DAS, 2006). Besides minor details and typographic errors in earlier papers (e.g., KHAN, 1977, 1982; KHAN & AHMED, 1987; KHAN & KHAN, 1996), there is an obvious lapsus as to the ventral scale count (“277”) of a Common Cliff Racer from NE Punjab (KHAN, 1986: Tab. 4) perpetuated in subsequent articles and books by Muhammad Sharif Khan. This catapulted the sum of ventrals and subcaudals of *P. r. rhodorachis* sensu KHAN & KHAN (2000) to dizzy 421 scales (see Geographic Variation: first smallprint).

Things got out of hand with KHAN’s (1997) ‘new approach to the problem’ of the *Platyceps rhodorachis-ventromaculatus* complex. Alluding to the disarray surrounding *rhodorachis* in the former USSR (see above), KHAN (1997) brought up “[f]amous Indian ophiologist Frank Wall (1923)”, rather than citing WALL’s (1914) much more detailed study, who “found no option but to unite *C. [oluber] ventromaculatus* with *C. rhodorachis* to settle this taxonomic tangle.” KHAN (1997: 57) believed that these species “sometimes indistinguishably intergrade into each other in appearance, scale counts and dorsal body pattern.” This idea may have its origin in an annotation by SMITH (1943: “Wall has united this species [*rhodorachis*] with *ventromaculatus*, and Form I [patterned phenotype of *rhodorachis*] certainly resembles it very closely”). Although *ventromaculatus* auct. is mapped as far west as Mesopotamia, KHAN (1997: 56–58) regarded “all reports of this snake from Iran and Iraq as pertaining to local races of *C. rhodorachis* with low ventral and subcaudal counts” or “color morphs” of the latter and was “inclined to believe that [...] *C. ventromaculatus* does not extend westward beyond the Indus.” Additionally, he thought that two *mintonorum* (CAS 84632, 101593) from Chah Anjir (LEVITON, 1959) and the vicinity of Nushki reproduced in GASPERETTI (1988: Fig. 29) belonged to *karelini*, and that Minton’s Racer “erected [...] on similar *C. rhodorachis* from the Baluchistan highland” (KHAN, 1997: 56) was “a color variation” of *rhodorachis* (e.g., KHAN, 2002: 206; see also KHAN, 2014). “*Coluber karelini mintonorum*” appears in KHAN’s (2002: 45) ‘Systematic checklist’ or KHAN (2004) and was “collected [...] from the Sulaiman Range [...] in a rocky area” (KHAN, 2006), but the nominotypical subspecies sensu KHAN is reported from the same area and habitat. *P. mintonorum*, an endemic of northern Baluchistan, and *karelini* do not occur in Punjab (Fig. 25, see Sympatry). The unacknowledged photograph of a “*Coluber karelini*” in KHAN (1993: Fig. 19, 1997: Fig. 3, 2006: Pl. 123) is manipulated (it shows the loops of two different snakes) and the map of

“*karelini karelini*” sensu KHAN (2006) most probably includes two (out of three) localities based on *mintonorum* (SCHÄTTI *et al.*, 2012: smallprint p. 460). Minton’s Racer runs under “*Coluber rhodorachis*” in photos published by KHAN (1993: Fig. 22, 2002: Fig. 64, mirror-inverted). KHAN (2004, 2006) indeed recognised *Platyceps* BLYTH to accommodate *rhodorachis* and *ventromaculatus* but left *karelini* in the New World genus *Coluber* LINNAEUS (see also KHAN, 2012, 2014).

Instead of reversing the trend, the ‘new approach [...]’ fostered the existing chaos, celebrating a bizarre systematic concept of the *Platyceps rhodorachis-ventromaculatus* complex, and the reader can only be lost for words as to the methodology or arguments, and the conclusions drawn. Unbelievably, the total number of ventrals and subcaudals for the various taxa dealt with are merely the additions of the respective overall extremes, and not the sum of discrete numerical values (see also, e.g., KHAN & KHAN, 2000: Tab. I; KHAN, 2002: Tab. 4). A surfeit of conflicting data including body scales (e.g., l.c.: 102 vs. Tab. 4) causes certain unease, and KHAN’s (1997 etc.) articles bristle with recurrent incoherent statements, deliberate suppression of facts, and circular reasoning.

*Coluber rhodorachis kashmirensis* KHAN & KHAN, 2000 is based on 24 specimens, most of them previously assigned to the nominotypical subspecies (KHAN & KHAN, 1996; KHAN, 1997). The type locality is at “1315 mm”. A record from Garhi Habibullah (KHAN, 1997) in Khyber Pakhtunkhwa is not referred to the purportedly new taxon (nor discussed in the text) despite its proximity to Muzaffarabad, the origin of three paratypes. No individual morphological data is provided for the type series reported from eleven localities. KHAN (2006) plotted only three stations, the northernmost near 36°N 76°E in the central Karakoram, and indicated an altitudinal range of between 1,500–2,000 m above sea level (l.c.: Tab. 10.1). Most collecting sites of *C. r. kashmirensis*, however, lie below 1,000 m and various (e.g., Bhimbar, Mirpur) are situated under 500 m. The holotype (MSK 188), and possibly the entire type series, is kept in the private collection of M. S. Khan, which violates Recommendation C of Art. 16.4 of the Code (ICZN, 1999) that “authors should deposit type specimens in an institution that maintains a research collection” and “making them accessible for study”. Moreover, *C. r. kashmirensis* KHAN & KHAN was established without the need to waste a single word on the status of *Zamenis ladacensis* ANDERSON (“Type locality: Ladakh, Baltistan, northeastern Pakistan”, KHAN, 2006: 207), after all a valid and most closely related taxon living in adjacent Gilgit-Baltistan. Citing authorities like MINTON (1966) and MERTENS (1969), KHAN (1997: 57) thought “*Zamnis* [sic] *ladacensis*” to be the striped (!) phenotype of *Platyceps rhodorachis* (“Despite proven conspecificity, a *rhodorachis* with a median [...] vertebral line has been regarded as *ladacensis*”). KHAN (2002: 45) listed the latter as a subspecies of *rhodorachis* but it lacks in the systematic section. Again, KHAN (2006) considered *ladacensis* to be “[a] typical *rhodorachis*

with a red middorsal line” that “appears to be simply a color variant, however, I recognize it as a subspecies until more material is available from its type locality [!].” Nevertheless, this author mapped perfectly separated ranges for *rhodorachis* (north to Punjab) and *ladacensis* (south to approx. 33°30'N latitude), although Sherman Anthony Minton, Jr. (“pers. comm., 1998”) had informed him about the presence of “the uniform gray form of *rhodorachis*, with orange or red vertebral stripe, as common in Quetta (Baluchistan)”. In reality, MINTON (1966: 122, Pl. 25.2) had reported this phenotype from the vicinity of Peshawar (Federally Administered Tribal Areas) and a “uniformly greenish gray” specimen without any trace of a spinal line from Ziarat District belonging to a new species (see Brahui Racer).

Many records of *Coluber rhodorachis* auct. in KHAN (1997: Appendix I) from Baluchistan, Punjab, and “Sind” do not appear on his map and the occurrence in “Nepal” remains unsubstantiated (see last paragraph under Distribution). According to KHAN (2002: 30), *C. rhodorachis* is absent from India. KHAN & KHAN (2000) characterised *C. r. rhodorachis* auct. as a “highland snake” from “sea level” in Makran and “inland low ranges” including Sindh Province; two lines farther ahead, it is noted that this racer “does not extend in plains of Punjab and Sindh, Pakistan.” The presence of *rhodorachis* in “Western Balochistan” (KHAN, 2002: 23) is not shown on the accompanying map, which possibly involves collecting sites of different racer species, and *r. rhodorachis* auct. is reported “from Potwar highland [Islamabad area] to the northern sub-Himalayan ranges and Balochistan highland.” *Platyceps r. rhodorachis* sensu KHAN (2006) is found “from sea level to 350–3000 m of elevation” (p. 206) or from 800 to ca. 2,300 m (Tab. 10.1) and *r. ladacensis* auct. is indicated between 1,000–1,600 m.

The senior author scrutinised further excerpts from KHAN (1997, 2002) and other publications dealing with *Platyceps* spp. (e.g., SCHÄTTI, 2005, 2006b; SCHÄTTI & SCHMITZ, 2006; SCHÄTTI *et al.*, 2012). “Khan’s (2006) recognition of three subspecies [of *P. rhodorachis* in Pakistan] needs extra studies as the range and choice of morphological characters are dubious and overlapping” (MASROOR, 2012). The descriptions of two new subspecies of Gray’s Racer (KHAN & KHAN, 2000) are either invalid (*indusai*) or junior objective synonyms (*bengalensis* and the nomen novum *khonorum* BARABANOV, 2002) of *P. ventromaculatus* (GRAY), and the captions of the accompanying illustrations (l.c.: Figs 1–2) are mixed up (SCHÄTTI & STUTZ, 2005: footnote 6). At long last, the ‘Amphibians and reptiles of Pakistan’ brings a small ray of light; although some data reported earlier for cliff racers (e.g., KHAN & AHMED, 1987) remains unconsidered, the range for the number of ventrals (206–220) and subcaudals (125–140) of *P. r. rhodorachis* sensu KHAN (2006) correspond roughly to what is actually observed in populations of this taxon from SE Baluchistan to SW Sindh or Punjab to Khyber Pakhtunkhwa (northern populations show lower minimum for subcaudals in males). In the present study, remarks and data penned by M. S. Khan are limited to entries in the chresonymies, body scale counts in some earlier papers (KHAN, 1977, 1986; KHAN & AHMED, 1987), and comments indispensable for the clarification of a specific issue or the understanding of a particular context (see External Data, Pholidosis: second smallprint, Geographic Variation: first smallprint, Subspecies, Sindh Racer).

TUNIJEV (2000) asserted that *Platyceps karelini* × *P. rhodorachis* crossbreeds reported from Turkmenistan belonged to Karelin's Racer ("Natural hybrids of *C. [oluber] rhodorachis* and *C. karelini*, described earlier by a number of the authors, appear to be color forms of *C. karelini*"), a rather tenuous argument (see next but one paragraph, Geographic Variation: fourth smallprint, Hybrids incl. first smallprint).

The senior author referred *Zamenis rhodorachis* JAN and further representatives of the *rhodorachis*-*ventromaculatus* complex to *Platyceps* BLYTH (SCHÄTTI *et al.*, 2001 *etc.*; see chresonymy). Apart from two taxa with as yet unresolved status, viz. *P. rhodorachis subniger* (BOETTGER) from Eritrea to the Horn of Africa (SCHÄTTI, 2006a) and the Arabian '*Platyceps* sp. *incertae sedis*' sensu SCHÄTTI & MCCARTHY (2004), the *rhodorachis* group is made up of at least three species, viz. the name-giving taxon, *P. afarensis* SCHÄTTI & INEICH from Djibouti and most probably limitrophe countries (only known from the type series) as well as *P. saharicus* SCHÄTTI & MCCARTHY from the western Sahara to Wadi Arabah and the southern Levant.

The step by step revision of the eastern species of the *Platyceps rhodorachis*-*ventromaculatus* complex started with *P. mintonorum*, a northern Baluch endemic. SCHÄTTI & STUTZ (2005) discussed three peculiar specimens (AMNH 161997 [SAM 679], SMF 62928 and 62938) and concluded that "their systematic status requires further studies" (see Sindh Racer, *Incertae Sedis*). SCHÄTTI & SCHMITZ (2006) urged for a re-examination of the holotype of *P. semifasciatus* BLYTH, 1860, the type species of the genus (by monotypy) universally understood to be a junior synonym of *ventromaculatus* auct. They also drew attention to the need for more investigation as to the geographic ranges of *ventromaculatus* (sensu stricto) and *rhodorachis* in northern India and questioned the occurrence of the former in mountainous areas. The southern distribution limit of Gray's Racer set forth by SCHÄTTI & SCHMITZ (2006) requires confirmation (see Distinction: last smallprint). SCHÄTTI (2006b) erroneously assigned a *karelini* (nominotypical subspecies) from Golestan to '*P. cf. ventromaculatus*' and was inclined to refer another racer from NE Iran (see *Incertae Sedis*) to that interim taxon. In reality, it is a subspecies of *karelini* (*k. chesneii*) as shown in a recent study of this species and hybrids with *rhodorachis* (SCHÄTTI *et al.*, 2012).

PERRY (2012) sighted "168 live and preserved" cliff racers "usually identified as *Coluber rhodorachis*", 105 of them recovered in Israel. Alongside material from Egypt (*Platyceps saharicus*), Somaliland (*P. r. subniger*), and the Arabian Peninsula (status unclear), samples from Afghanistan, "India", Iran, and Turkmenistan are most probably quite limited (specimens and collecting sites unspecified). This author assigned Afro-Arabian including Near East cliff racers to three species, *P. ladaensis* (ANDERSON), *P. subnigra* [sic] (BOETTGER) comb. nov., and *P. tessellata* [sic] (WERNER) comb. nov. (see Subspecies, Affinities).

## Descriptive Part (Jan's Cliff Racer)

### Common Cliff Racer

#### *Platyceps rhodorachis rhodorachis* (JAN, 1863)

- Etairejus rhodorachis* JAN, 1857: 46, "Persia" (nomen nudum, see Taxonomy and Type Material: second smallprint).
- Zamenis ventrimaculatus* [sic] (GRAY, 1834) "var. C". – GÜNTHER, 1858: 106 ("Schiraz; Kurdistan": BMNH R.R. 1963.992a–b, see Appendix A).
- Pl.[atyceps] semifasciatus* BLYTH, 1860: [113] 114, "Subathoo" [Subathu], 30°58'N 77°00'E (ZSI 7240 [SCLATER, 1891b], see Taxonomy and Type Material).
- Zamenis rhodorachis* JAN, 1863: 65, "Persia, Shiraz" (incl. MSNG 30312, see Taxonomy and Type Material, Fig. 2A).
- Platyceps semifasciatus*. – GÜNTHER, 1864: 237 (see Taxonomy and Type Material).
- Zamenis rhodorachis*. – JAN, 1865: 356 ("Persia": incl. MZUT R610, see Taxonomy and Type Material).
- C.[oluber] (Platyceps) semi-fasciatus* [sic]. – THEOBALD, 1868: 52 ("Subathoo", holotype of *P. semifasciatus* BLYTH).
- Compsosoma semifasciata* [sic]. – STOLICZKA, 1870a: 106 [abstract], 1870b: 107 [abstract], and 1870c: [141] 188, Pl. XI.2 ("lower hills about Subathoo, south of Simla" [mapped at 30°57'N 77°01'E, ZSI 7265, SCLATER, 1891b], see Pholidosis: first and second smallprints, ANDERSON, 1870b).
- Platyceps fasciatus* [sic]. – STOLICZKA, 1870c: 134 (in error for *P. semifasciatus* BLYTH).
- [*Compsosoma*] *semifasciatum*. – ANDERSON, 1870b: 84 ("Below Simla", purchased), and 1871b: 34 (same specimen as in STOLICZKA, 1870a–c).
- Gonyosoma dorsale* ANDERSON, 1872: 395, Fig. 9, "Shiraz, Persia" (ZSI 77676–77, see Taxonomy and Type Material).
- Zamenis ventrimaculatus* [sic]. – STOLICZKA, 1872: 130 ("Saltrange, and Mt. Sirban near Abottabad": incl. NMW 25452.5–6, see footnote 7).
- Zamenis rhodorachis* [sic]. – STRAUCH, 1873: 137 (species status, see Systematic Review).
- C.[oluber] semifasciatus*. – NICHOLSON, 1874: 82 ("Subathoo").
- Z.[amenis] ventrimaculatus* [sic] "var. C". – GÜNTHER, 1874: 73 (*Gonyosoma dorsale* ANDERSON syn., see GÜNTHER, 1858).
- Zamenis ventrimaculatus* [sic]. – BLANFORD, 1875: 208 (holotype of *P. semifasciatus* BLYTH, see Taxonomy and Type Material).
- C.[ompsosoma] semifasciatum*. – THEOBALD, 1876: 164, XXVII ("the North-Western Himalayas, Simla and Subathu").
- Z.[amenis] ventrimaculatus* [sic] [partim]. – BLANFORD, 1876: [12] 414 (Afghanistan: "Kila-i-Fath, Sístán" [Qala-i Fateh, Qal'eh-ye Fath], ?"Zamrán" [Kamran, 30°53'N 61°47'E, ?ZSI 4616 or 8603, see Southern Pakistani Racers]; Iran: Askan [26°49'N 63°08'E, ZSI 4618], "Húng, Balúchistán" [Hang-e Sofla, 26°25'N 62°08'E, ZSI 3494], Kalagan, ?"Karmán" [Kerman, incl. ZSI 4615], "South of Rigán, Narmashir" [incl. ZSI 8601]: incl. BMNH 1874.11.25.11–12, see Localities, Systematic Review, Hybrids incl. second smallprint, Appendix B, Fig. 25:



- BMNH 1873.1.7.10, 1874.11.25.10, SCLATER, 1891a–b; BOULENGER, 1893; SCHÄTTI & SCHMITZ, 2006: 761; SCHÄTTI *et al.*, 2012). – THEOBALD, 1876: 169, XXVIII (“India, probably Western”). – BLANFORD, 1881: 680 (“Shiráz”: BMNH 1879.8.15.26).
- Composoma semifasciatum*. – ATKINSON, 1884: 75 (see Distribution: last smallprint, Colour Pattern: third smallprint).
- Zamenis rhodorachis*. – BOULENGER, 1889: 102 (“Gulran encampment, Badghis” [Herat], see Systematic Review, Hybrids, Appendix B, Fig. 25: BMNH 1886.9.21.104).
- Zamenis ventrimaculatus* [sic]. – BOULENGER, 1889: 102 (Bezd: BMNH 1886.9.21.100).
- Zamenis dorsalis* [sic]. – WERNER, 1890: 237 (head and body scales, incl. data provided by “Dr. Oscar Boettger” [in litt.], see WERNER, 1893).
- Zamenis ladacensis* ANDERSON, 1871 [partim]. – BOULENGER, 1890: [324] 326 (see Taxonomy and Type Material: second smallprint).
- Zamenis ventrimaculatus* [sic] [partim]. – WERNER, 1890: 237 (see *Z. “dorsalis”* above, WERNER, 1893). – SCLATER, 1891a: 238 (incl. “Below Simla, Sabathu”, relies on BLYTH, 1860; STOLICZKA, 1870a–c). – SCLATER, 1891b: 27 (incl. “Subathu nr. Simla”, holotype of *P. semifasciatus* BLYTH).
- Gonyosoma dorsalis* [sic]. – SCLATER, 1891a: 238 (“type”, syn. *Zamenis ladacensis* auct.), and SCLATER, 1891b: 27 (see Taxonomy and Type Material).
- Zamenis ladaccensis* [sic] [partim]. – SCLATER, 1891a: 238, and SCLATER, 1891b: 27 (incl. “Bushire” [Bushehr, ZSI 8401–02, 13416–18, 13423–24], “Quetta” [ZSI 11695–96], “Shiraz” [ZSI 4827, 7336–37], see Systematic Review: second smallprint, Taxonomy and Type Material: last smallprint, Distribution: first smallprint, Southern Pakistani Racers: smallprint).
- “Genus? species?”. – ZARUDNYI, 1891: 291 (Ashkhabad [Ashgabat], “Gjarmou” [Germob (Germab), 38°01’N 57°44’E], “Merv (près des lacs de Gueuk-Tépé)” [Gurktepe Well, 37°30’N 61°05’E, sight record], vic. Tedzhen [“non loin de Jaman-Rinde”, ca. 37°23’N 60°30’E, sight record], syn. BOULENGER, 1892).
- Zamenis rhodorachis* [sic]. – BOULENGER, 1892: 632 (“Transcaspia” [Aydere]: BMNH 1892.11.28.6–7, see Systematic Review incl. second smallprint).
- Zamenis ventrimaculatus* [sic]. – MURRAY, 1892 [partim?]: 70 (Afghanistan: “Zandra” [Zanda, 31°57’N 65°51’E]; Pakistan: “Bibinane” [Bibi Nani, 29°42’N 67°23’E], Gulistan [30°36’N 66°35’E], Kirta [29°36’N 67°29’E]; see Southern Pakistani Racers, SCHÄTTI & SCHMITZ, 2006: 748, 761). – BOULENGER, 1893 [partim]: [381, 383] 400 (“Bezd, Afghanistan” [Khorasan-e Razavi, BOULENGER, 1889]; “Between Kashmere and Murree”: incl. BMNH 1873.7.3.12).
- Zamenis karelinii* [sic] (BRANDT, 1838) [partim]. – BOULENGER, 1893: 402 (“New Gulran”, see Systematic Review, Hybrids, BOULENGER, 1889).
- Zamenis rhodorachis* [sic] [partim]. – BOULENGER, 1893: [381, 383: Tab. I] 398 (Iran: incl. “Bushire, Persia”, “South of Regan” [BLANFORD, 1876]: incl. BMNH 1869.8.28.127 and –129; Turkmenistan: “Ai Dara” [Aydere, BOULENGER, 1892]; see Systematic Review).
- “*Zamenis* species?” [no. 8]. – VARENCZOV, 1894: 28 (ca. km 20 on Ashgabat–Quchan road [vic. Kurtusu, ca. 37°45’N 58°23’E] and “Gaudan” [Hawdan, 37°39’N 58°24’E], syn. NIKOLSKII, 1905 [ZISP 8623], see Systematic Review: third smallprint).
- Zamenis rhodorachis* [sic]. – ANDERSON, 1895 [partim]: 654 (data from BOULENGER, 1893). – WERNER, 1895: 17 (“Kuh-i-Sirdsch” [west of Sirch], ca. 30°13’N 57°27’E)<sup>1</sup>.
- Zamenis rhodorachis* [partim?]. – ALCOCK & FINN, 1897: 563 (between “Gazichah [Well] and Robot I” [Chagai Hills, ZSI 14197–211], ca. 29°20’N 64°15’E, see Southern Pakistani Racers).
- Zamenis ventrimaculatus* [sic]. – NIKOLSKII, 1897: 334 (“Mont. Kopet-Dag in Pers. orient. parte septentr.” [ZISP 8455–57], “Mont. Nachduin” [Nagduin, Turkmen-Iran border, 37°39’N 58°22’E, ZISP 8466], see CHERNOV, 1959).
- Zamenis rhodorachis* [sic] [partim]. – ANDERSON, 1898: 254 (incl. “Persia”, see 1895). – WERNER, 1898: 135 [Tab.] (incl. “Persien” to “N. Ind.”, see Affinities). – BOETTGER, 1898 (ssp.): 44 (“Askhabad”, see Hybrids, Appendix B, Fig. 25: SMF 18216, Fig. 22A).
- Zamenis Dahli* [sic] “Fitz.[inger] var.” [*Coluber Dahlii* (sic) SCHINZ, 1835, viz. *Platyceps najadum dahlii*]. – BOETTGER, 1899: 285 (“Ai-Dere” [Aydere, GNM 48f, coll. Eylandt 1893], syn. ANANJEVA & ORLOV, 1977).
- Zamenis rhodorachis*. – NIKOLSKII, 1899a: 176 (“Darwaz” [Darvaz, ZISP 9071], 38°28’N 70°47’E). – NIKOLSKII, 1899b: [48] 55 (data from BOULENGER, 1893; distribution relies on ZARUDNYI, 1891).
- Zamenis ventrimaculatus* [sic]. – NIKOLSKII, 1899b: [48] 56 (“moshet byt ve Zakaspijskoj oblasti” [possibly in the Transcaspian Region]).
- Zamenis dahlii* “Fitz.[inger]”. – NIKOLSKII, 1900: 403 (“Tscha-i-Dura in Kirmano orient.” [vic. Bazman], “Kaskin in Kirmano orient.” [Sistan-ve Baluchestan, see NIKOLSKII, 1916: Pl. 1.2], “Chun-i-Kaka in Sargado” [Khun Kaka, Sarhad], “Kerat in Chascht-Adano” [Karat]: ZISP 9285.1–2, 9286–88, syn. ANANJEVA & ORLOV, 1977).
- Zamenis rhodorachis* [sic]. – NIKOLSKII, 1900: 403 (“Ferimun in Chorosano orient.” [Fariman, ZISP 9293], 35°43’N 59°52’E).
- Zamenis ladacensis*. – McMAHON, 1901b: 10 (“Dir and Swat”).
- Zamenis ventrimaculatus* [sic]. – McMAHON, 1901a: 5 (“Chitral” [District], see *P. r. ladacensis*). – McMAHON, 1901b: 10 (“Dir and Swat”, ca. 34°30’N 71°45’E, syn. KHAN, 1997, see Colour Pattern: third smallprint).
- Zamenis rhodorachis*. – McMAHON, 1901b: 10 (“Dir and Swat”). – ANNANDALE, 1904: 209 (“Perso-Baluch frontier” [ZSI], see Southern Pakistani Racers).
- Zamenis dahlii* [partim]. – NIKOLSKII, 1905: 233 (same sample as in NIKOLSKII, 1900).
- Zamenis karelini* [partim]. – NIKOLSKII, 1905: 238 (“Samarkand” [ZISP 9556], ca. 39°39’N 66°58’E, syn. BOGDANOV, 1960).
- Zamenis rhodorachis* [sic] (incl. var. *ladacensis*). – NIKOLSKII, 1905: 235 (incl. “Persia” [ZISP 1708–10], “Feraman” [Fariman, incl. ZISP 9335], see Systematic Review).

<sup>1</sup>) Iranian *Platyceps r. rhodorachis* from the vicinity of Sirch and Jiroft (Sabzevaran) in Kerman reported by WERNER (1895) and WETTSTEIN (1951) are not deposited in the herpetological department of the Vienna Natural History Museum (NMW). These specimens and an unclassified “*Zamenis rhodorachis*” [sic] from “Biabun” (see footnote 7) in Hormozgan (WERNER, 1929a) could not be located in the collections we poured through.



- Zamenis ventrimaculatus* [sic]. — NIKOLSKII, 1905 [partim]: 236 (incl. “Bucharā” [Shurcha] and “Desert. Kisyl-Kum”: ZISP 9489, see TERENTJEV & CHERNOV, 1936; BOGDANOV, 1960; Hybrids, Appendix B: ZISP 7407). — NIKOLSKII, 1907 [partim?]: 293 (“Flum. Karun (Nasrie)” [ca. 31°20′N 48°45′E, ZISP 10317], “Montes Nasrie (Arabistan)” [ZISP 10287], see Distribution: first smallprint, Geographic Variation: sixth smallprint).
- Zamenis rhodorhachis* [sic]. — ?NIKOLSKII, 1907: 293 (“Nasrie et Awchaz [Ahvaz] (Arabistan)” [ZISP 10327], see last paragraph under Distinction). — WALL, 1908b (“variety *typica*” and *ladacensis*): 798, Tab. (Maidan “Mihaftan” [M.-e Naftun, incl. BNHM 559, 563, 629]).
- Zamenis rhodorhachis* [sic] (“variety”) *ladacensis*. — WALL, 1911a [partim?]: 1034 (Duki [30°09′N 68°34′E], Fort Sandeman [Zhob, 31°20′N 69°27′E], ?Hanna [Urak Valley, 30°15′N 67°08′E], Mach [29°52′N 67°20′E], Quetta, Sibi [29°33′N 67°53′E], ?“Spinkarez” [30°13′N 67°09′E], ?“Takatu” [Mt. T., ca. 30°22′N 67°05′E], see Southern Pakistani Racers).
- Zamenis rhodorhachis* [sic] [partim]. — WALL, 1911b (“variety *typica*” and *ladacensis*): 134, Tab. (“Chitral” [District]: incl. BMNH 1910.7.12.2, 1930.5.8.392–94 [skulls], see External Data: first smallprint, Systematic Review, Samples and Characters: first smallprint, Subspecies). — BARBOUR, 1914: 88 (“Arabia”: MCZ 902, see Taxonomy and Type Material, footnote 7).
- Zamenis ventrimaculatus* [sic]. — WALL, 1914 [partim]: [37, 41] 42, Fig. [dorsal, lateral, and ventral views of head], Tab. [“Synopsis of specimens”], maps 1–2 (India: “West of Almora”, Kasauli [30°54′N 76°58′E, BNHM 537, missing], Mussoorie [30°27′N 78°05′E, “Bo.M.”]; Pakistan: incl. Chitral [Town, 35°51′N 71°47′E], Drosh [35°34′N 71°48′E], Malakand [34°34′N 71°56′E]; see External Data, Systematic Review: third smallprint, footnote 6, Subspecies: second smallprint, Sindh Racer, Distinction: last smallprint). — CZAREVSKII, 1915: 54 [Tab.] (promontory of “Tissagorskago” Range in “Turkestan” [Hisor Mts, Tajikistan, MSPGU 497]; Turkmenistan: Firjuza, 37°55′N 58°05′E [MSPGU 653]). — NIKOLSKII, 1916 [partim]: [79] 97 (see NIKOLSKII, 1905, 1907; CHERNOV, 1934; TERENTJEV & CHERNOV, 1936; CHERNOV, 1959).
- Zamenis dahlii* [partim]. — NIKOLSKII, 1916: [78] 92, Tabl. [plate] 1.2 [ZISP 9286, “Kirman orient.”] (“Nusret-abad” [ZISP 9991], “Sargadin in Persia orient.” [Sarhad, ZISP 9992], syn. ANANJEVA & ORLOV, 1977, see Localities, NIKOLSKII, 1900).
- Zamenis rhodorhachis* [sic]. — NIKOLSKII, 1916: [79, *rhodorachis*] 95 (see NIKOLSKII, 1905, 1907). — WERNER, 1917: [192] 208 (“Shirāz” and Fars [“in dem Gebiete zwischen Kazerun-Schiraz-Persepolis”]: NMW 15167.2, ZFMK 31603–07, 31666–71, see Systematic Review: fourth smallprint, footnote 7).
- Z. [amenis] v. [entrimaculatus] (sic)* “var. *D. persica*”. — Andreas [field notes] in WERNER, 1917: 211 (“Tangistān” and “Tschâbâgh”, see Systematic Review: fourth smallprint, Colour Pattern: fifth smallprint, SCHÄTTI *et al.*, 2010a: 278).
- Zamenis rhodorhachis* [sic]. — LANTZ, 1918: 16 (“River Tajan” [Tedzhen, MMGU]).
- Zamenis ventrimaculatus* [sic]. — CZAREVSKII, 1918: 89 (“Iogit (Darvaz). Bukhara”: ZISP 12134.1–2)<sup>2)</sup>. — WALL, 1923 [partim]: 618 (“Lamgarrah, Almora District” [?BMNH 1930.5.8.395, skull], see External Data: second smallprint, Systematic Review: third smallprint, Distinction: last smallprint).
- Zamenis rhodorachis* “var.” *ladacensis*. — INGOLDBY & PROCTER, 1923: 128, map (Ladha, 32°34′N 69°50′E).
- Zamenis rhodorachis* (ssp.). — MORICZ, 1929: 33 (Iran: “Meshed” [Mashhad, 36°18′N 59°37′E], “Nishabur” [Neyshabur, 36°13′N 58°48′E]; Turkmenistan: incl. “Uch Adzhi” [Utsch-Adshi, 38°06′N 62°48′E]).
- Zamenis rhodorhachis* [sic]. — ?WERNER, 1929a: 242 (“Biabun”, see footnotes 1 and 7). — WERNER, 1929b [partim]: [64] 70 (data from BOULENGER, 1893).
- Zamenis ventrimaculatus* [sic]. — MORICZ, 1929: 33 (Serakhs [Iran], 36°32′N 61°10′E).
- Zamenis rodorachis* [sic] “var” *ladacensis*. — LAPTEV, 1934: 122 (“Nazar-Ekrem” Spring [Ekerem?, 39°37′N 54°22′E], see Localities: smallprint).
- Coluber rhodorhachis* [sic] comb. nov. — CHERNOV, 1934 (“forma *ladacensis*”): 273 (incl. Tashkepri [36°17′N 62°39′E], “Kara Kala” [Garrygala]: incl. ZISP 11789–90). — D’ABREU, 1934: 226 (“Sakessar [Sakesar, 32°16′N 72°45′E] on the Salt Range”). — TERENTJEV & CHERNOV, 1936 (ssp.): 62, Fig. 25 [lateral view of head] (key, distribution in USSR, see Systematic Review). — WERNER, 1936: 201 (“Persien”, checklist).
- Coluber najadum* (EICHWALD, 1831) [partim]. — TERENTJEV & CHERNOV, 1936: Tabl. [plate] IV.2 (from NIKOLSKII, 1916: Pl. 1.2).
- Coluber rhodorhachis* [sic] *ladacensis*. — DAL, 1936: 165 (Tajikistan: Artuch [MSGU 330 and 1618], 39°20′N 68°07′E; Uzbekistan: vic. Samarqand [MSGU 1619], Verkhovja [ca. 39°35′N 66°51′E, Upper Agalyk Valley, western Zeravshan Range, MSGU 793]; see TERENTJEV & CHERNOV, 1949; CHERNOV, 1959; BOGDANOV, 1960).
- Coluber rhodorhachis* [sic]. — WERNER, 1938: 268 (Bazman: NMW 15167.1, 34985). — GABRIEL, 1939: 118 (same sample).
- Coluber rhodorachis ladacensis*. — ANDRUSHKO *et al.*, 1939: 231 (“Kyzyl-Arvat”: ZISP 16385).
- Coluber rhodorhachis* [sic] *ladocensis* [sic]. — PESTINSKII, 1939: 137 (vic. Toshkent [Tashkent, ‘Ankhor’ irrigation canal, ca. 41°19′N 69°15′E]).
- Coluber rhodorhachis* [sic] (ssp.). — TERENTJEV & CHERNOV, 1940: 137 (key, distribution in USSR).
- Coluber rhodorachis*. — CLARK & INGER, 1942: 167 (dorsal scale reduction).
- Platyceps rhodorachis* comb. nov. — INGER & CLARK, 1943: 144 (see Systematic Review).
- Coluber rhodorhachis* [sic] [partim]. — SMITH, 1943: [7, 167] 168 (update of BOULENGER, 1890).
- Coluber ventromaculatus* [partim]. — SMITH, 1943: [167] 168 (“India [...] eastwards to Almora district in the United Provinces”, “Uzbekistan”).
- Coluber rhodorhachis* [sic] *ladacensis*. — CHERNOV, 1945: 66, Tab. A (vic. “Khanaka-dari” [Khonakoh River, close to the mouth],

<sup>2)</sup> ZISP 12134.1–2 from “Iogit” are generally considered to have been collected near Darvaz in western Kuhistoni Badakhshon, Tajikistan (e.g., CHERNOV, 1959; SAID-ALIEV, 1979). In reality, they were obtained around Darvaza in N Jizzax Province, Uzbekistan (Appendix A) as evidenced by the area (eastern and southern parts of Bukhara Emirate) visited by the collector V. Ja. Lazdin (CZAREVSKII, 1918).

- ca. 38°27'N 68°36'E). – GENTNER, 1945: 122 (“Morgunovskij” [Morgunow, 35°17'N 62°23'E], ZISP fide ATAJEV, 1985).
- Coluber r. rodorhachis* [sic]. – GENTNER, 1945: 122 (Akrabat, 35°28'N 61°43'E).
- Coluber* [r.] *rhodorhachis* [sic]. – PARKER, 1949 [partim]: [6] 30 [37], Figs 1–3, Tab. [body scales, relative length of frontal] (see Systematic Review).
- Coluber rhodorhachis* [sic]. – BOGDANOV, 1949: 36 (“Iolotan” [Yolöten]). – TERENTJEV & CHERNOV, 1949 (ssp.): [223] 241, map 29 (distribution limits: vic. “Stalinabad” [Dushanbe] and Repetek, 38°34'N 63°11'E).
- Coluber rhodorachis*. – SHOCKLEY, 1949: 122 (Ras Jiunri [Jiwani airfield], 25°04'N 61°48'E). – FORCART, 1950: 150 [155] (“zwischen Zahedan und Chahbar”: NMB 14383, see Appendix A).
- Coluber rhodorhachis* [sic]. – WETTSTEIN, 1951: 443 (“Sabzawaran” [Jiroft], 28°40'N 57°44'E, see footnote 1).
- Coluber karelini rhodorhachis* [sic] comb. nov. (var. *rhodorhachis* [sic]). – BOGDANOV, 1953: 55, 57 (Bayramali, Imambaba [36°43'N 62°27'E], Karabata [37°37'N 61°34'E], “Kaushut-bent” [Gowshutbent, Murgab Valley, 37°36'N 62°05'E], Sultanbent [37°11'N 62°28'E], Turkmenkala [37°26'N 62°20'E]: incl. IFUT and ZISP hybrids, see Systematic Review, Hybrids, Appendix B, Fig. 25: ZISP 17210, 17220, 17223).
- Coluber karelini rhodorhachis* [sic] (var. *ladocensis* [sic]). – BOGDANOV, 1953: 55 (incl. Kushka [Serhetabad, 35°17'N 62°20'E, ZISP fide ATAJEV, 1985], “Pakhta-bazar” [Takhtabazar, 36°01'N 62°46'E, ?IFUT], incl. ZISP 17224 [Bayramali] and 17225 [Yolöten]).
- Coluber rodorhachis* [sic]. – RUSTAMOV, 1954: 324 [Tab.] (“Kara-Kum”).
- Coluber rhodorhachis* [sic]. – GENTNER, 1954 (ssp.): 32 (incl. vic. Kagazly [ca. 35°48'N 62°16'E]). – KARTASHEV, 1955: 195 (foothills of Greater Balkan Mts, relies on SHUKUROV, 1951; see Taxa and Authors). – KOLESNIKOV, 1956: 165 (Danata [Kyu-rendag], 39°06'N 55°10'E). – KORELOV, 1956: 266 (“Nauvali-saj” [Pskem Valley] near Sedzhak [Sidzhak or Syzhak, Uzbekistan, ca. 41°43'N 70°03'E, DBQA, coll. Rodionov]). – PARASKIV, 1956: [152] 153, map 57 (same specimen as in KORELOV, 1956).
- Coluber karelini*. – KORELOV, 1956: 266 (“Chakyr-Tash”, Ugom Valley, ca. 41°45'N 69°58'E, syn. Bogdanov, 1960).
- Coluber rhodorachis*. – MERTENS, 1956: 95 (Birjand, “SW Iranshar, Bampur-Ufer”: SMF 51071, SMNS 3008, see Systematic Review: sixth smallprint, Pholidosis: second smallprint, Fig. 2B).
- P.[latyceps] subfasciatus* [sic]. – LOVERIDGE, 1957: 257 (syn. *Coluber ventromaculatus* GRAY [see Taxonomy and Type Material], in error for *P. semifasciatus* BLYTH).
- Coluber korelini* [sic]. – ZHELEZNIAKOV & KOLESNIKOV, 1958: 96 (“Shavazi-Kolon-Saja”, syn. fide VASHTKO *et al.*, 2003).
- Coluber rhodorachis*. – LEVITON, 1959: 462 (“Afghanistan”, checklist). – RUSTAMOV & PTUSHENKO, 1959: 104 (Orta-Kuyu Well, 40°42'N 57°30'E, see Appendix D, Fig. 14).
- Coluber rhodorhachis* [sic]. – CHERNOV, 1959 (ssp.): [142–143] 144–145 incl. footnotes (Kyrgyzstan: Uzun-Akmat [“Akhmat”] Valley; Tajikistan: incl. “Gissar” Valley [vic. Hisor, ca. 38°31'N 68°33'E], Kondara Gorge [ca. 38°50'N 68°50'E, affluent of Varzob, coll. Vinogradov], Nadzhi [38°38'N 68°28'E], Varzob Valley: incl. MMGU 1171, ZISP 15819). – VASILJEV *et al.*, 1960: 82 (“jushnoje pobereshje Kara-Bogaz-Gol” [southern shore of Garabogazkö], ca. 40°30'N 54°00'E). – BOGDANOV, 1960 (ssp.): [199] 218, Fig. 48 (incl. Karakamys [41°22'N 69°14'E], Pakhta [40°01'N 68°57'E], Iljansa [Kara Tepa, ca. 39°24'N 67°01'E], Shurcha [“Buchara”, NIKOLSKIJ, 1905]).
- Coluber rhodorhachis* [sic] *ladacensis*. – BOGDANOV, 1962: [168] 170 (incl. “Bjuk Abaj” Cheshme [Byuka-Bay Spring, Gezyadyk Mts, 35°52'N 61°19'E], western Greater Balkan Mts [“zapadnoj chasti”, ZISP, coll. Vinogradov & Adlerberg], Kalininskij [37°48'N 58°32'E], Karabil Mts [ca. 36°15'N 63°30'E (“nesomnenno, vstrechajetsja”: doubtlessly occurs)], “o.[strov or ostrovok] Kjusjukli” [ZISP, coll. Varenzov, see Distribution: second smallprint], “Kugitang” Mts [Köytendag, ca. 37°55'N 66°35'E, not recorded (“nesomnenno, vstrechajetsja”), between Mary and Bayramali [ca. 37°00'N 62°00'E], Talkhatanbaba [37°24'N 62°09'E], Zolotoj Kljuch [ca. 37°45'N 58°18'E]).
- Coluber r. rhodorhachis* [sic] [partim]. – BOGDANOV, 1962: [149] 168, Fig. 29 (incl. Hindukush [Gindukush, 37°19'N 62°21'E], “Zelenogo klina” [Zelenyi Klin (grove), ca. 35°25'N 62°25'E], see Hybrids incl. second smallprint).
- Coluber rhodorachis*. – MINTON, 1962: 17, Fig. 55 (key). – ANDERSON, 1963: 465 [477], Figs 2–3 [map, habitat], Tab. 12 (Masjed Soleyman, between “Masjid-i-Suleiman” and “Haft Kel” [p. 423], “Naftak” [Maidan-e Naftun], “Champ Kure” [Cham Kureh]: CAS 86371, 86409, 86420 [Fig. 5A], 86433, 86586 [see discussion of Ahvaz sample under Geographic Variation], 86624). – LEVITON & ANDERSON, 1963: 338 (15 km southwest of Kabul “on road to Kandahar”: CAS 92323).
- Coluber r. rhodorachis* [partim]. – KRAMER & SCHNURRENBERGER, 1963: 501 (lectotype designation, MSNG 30312 Taxonomy and Type Material).
- Coluber rhodorhachis* [sic]. – BOGDANOV, 1965a: 33 (incl. Akar Cheshme [35°48'N 61°28'E], between Firjuza and Chuli [ca. 37°57'N 58°02'E], Kaakhka [37°21'N 59°36'E], vic. “Karakala” [Garrygala; Tuzly Tepe fide ATAJEV, 1985, 38°25'N 56°20'E, ZISP]). – BOGDANOV, 1965b: 33 [254], Tabs [“Krasnopolosy poloz’] (ecology).
- Coluber rhodorachis* [partim]. – RAI, 1965: 41, carte [map] 8 (“Akinlou” [Akanlu], ?“Bandar Chapour” [30°26'N 49°06'E]: MNHN 1961.134, see first smallprints in Colour Pattern and Distribution, Figs 13–14). – MINTON, 1966: [47] 121 [123, 172], Pl. 25.1 [from MINTON, 1962: Fig. 55] (Churma Island, “Dadu District: Khadeji Falls” [Jamshoro, Sari Canyon], 3 mi. northeast of “Hab Chowki” [Hab Nadi Chauki], 5 mi. southwest of Jerruck [Jherruck], “Kach” [Dum Kach], Karachi area, “Pab Hills” [see Appendix A: AMNH 85456, UMMZ 121970], 5 mi. south of Peshawar: AMNH 82181, 84022, 84247, 85301, 85456, 85578–79, 85863, 86898, 87481, 88439, 88470, 89293, 161996, 161998, UMMZ 121970, see Systematic Review, Southern Pakistani Racers).
- Coluber rhodorhachis* [sic] *ladacensis*. – SHAMMAKOV, 1968: 13 (incl. “Cholsa” Spring [Chalsu, 39°19'N 55°01'E], Karagoz [Spring, 38°09'N 55°53'E], “Kara-Kez” [Karagöz, Kyurendag, 38°57'N 55°25'E], “Kemal” Spring [Kemally, 39°07'N 55°37'E], “Kujundzhik” Spring [Kundzhik?, 39°18'N 53°03'E], see Localities: smallprint).
- Coluber rhodorachis* (ssp.). – KRÁL, 1969: 63, Tab. 1 (“Bisut area, 5 to 10 kms N of Jalal-Abad” [ca. 34°32'N 70°27'E, MMB

- [“MM”] 28501–02], “Ag Chah (Mazar-i Sharif province)” [Aqchah, Jowzjan, 36°55′N 66°11′E, SNMB 55–57]].
- Coluber r. rhodorachis*. – HAAS & WERNER, 1969: 363, Fig. 1 [map], Pl. 19 (“Mahor Birinj”): MCZ 58872).
- Coluber rhodorachis ladacensis* [partim]. – MERTENS, 1969: [4, 59] 60 [93], Abb. 1 [map] and 5 [habitat on Astola] (Abbotabad, Astola Island, hills [“Berge”] near Baleji [Hawkes Bay], Haripur [Khyber Pakhtunkhwa], Jiwani, Karachi, Kharan, Mansehra: SMF 57304–05, 57307–08, 57327–28, 62926, 62930, 62941, see Systematic Review, Southern Pakistani Racers, Incertae Sedis: SMF 62938, Figs 24B–C).
- Coluber rhodorachis* [sic] [partim]. – ANDERSON & LEVITON, 1969: 52, Fig. 1 [map], Tab. 1 (Kandahar area, “Paghman vicinity”: CAS 115970–71, FMNH 161185, 171788 [“unnumbered”], see Incertae Sedis: FMNH 161075, Fig. 24A).
- “*Coluber* species” [cf. *rhodorachis* (sic)]. – CLARK *et al.*, 1969: 312, Fig. 1 [map] (“5–10 mi. ENE Nimla” [“about 10 mi. SW Balabagh”]: CAS 96250, see Colour Pattern).
- Coluber rhodorachis* [sic]. – KULLMANN, 1970: 19, Abb. 15, Tab. 4 [*rhodorachis*] (Pech Valley: ZFMK 8643–44).
- Coluber rhodorachis*. – LEVITON & ANDERSON, 1970: 173 [*rhodorachis* (sic)], 196 (“Afghanistan”, checklist). – CASIMIR, 1971: 246, Abb. “1” [5, “*Ptyas mucosus*”] (west of Jawand “am Ufer des Murghab”: SMF 67907).
- “*Coluber rhodorachis* [sic] (?)”. – ABDULALI, 1971: 463 (“Khodija [Khadeji] Falls”, see Ecology: last smallprint).
- Coluber rhodorachis* [sic]. – TUCK, 1971: 61, map 21 (45 km north of Ahvaz, see Hybrids, Appendix B, Fig. 25: USNM 153743, Fig. 23A). – SHAMMAKOV, 1971: Tabs 1–2 (Köpetdag Gershi). – TUCK, 1974: 108 (Hormoz Island [Hormuz, MMTT 516], 27°04′N 56°28′E).
- Coluber r. rhodorachis* [sic]. – WERNER, 1971 [partim]: 244 (“Iran”, see HAAS & WERNER, 1969).
- Coluber rhodorachis* [sic]. – TUCK, 1974: 108 (Hormoz Island [Hormuz, MMTT 516], 27°04′N 56°28′E).
- Coluber r. rhodorachis* [sic]. – CZELLARIUS, 1974: 83 (2 km north of Repetek, ca. 38°36′N 63°11′E), and CZELLARIUS, 1975: 43, Tab. 2 (vic. Repetek, see Hybrids, Fig. 25). – ATAJEV, 1975a [ssp.]: 79 [*C. r. ladecensis* (sic)], Tab. – ATAJEV, 1975b: 66 (“Bagir”, 37°58′N 58°13′E, see Ecology: last smallprint).
- Coluber rhodorachis*. – SHARMA & SHARMA, 1975: 646 (Bhaderwah [32°59′N 75°43′E], Srinagar [34°05′N 74°49′E], Udhampur [32°56′N 75°08′E]). – MURTHY & SHARMA, 1976: 536, Fig. 7 (“around Poonch”, ca. 33°46′N 74°06′E).
- Coluber rhodorachis* [sic] *ladacensis*. – SHUKUROV, 1976: 77 (vicinity of “Khodzhakaraul [Khodzhakaraul, 37°45′N 66°21′E] incl. “Ljalmkan” [Lejlimekan, unlocated, ca. 37°47′N 66°20′E, see SHAMMAKOV, 1981: map]).
- Coluber rhodorachis*. – KHAN, 1977: [147] 149 (vic. Rabwah [31°45′N 72°55′E] incl. “Babul Abwad” and “Darul Sadar Shamali”). – SCHLEICH, 1977 [partim?]: 129, map 2 (incl. vic. Sarpol-e Zahab [34°28′N 45°52′E, unspecified record], see Distribution: first smallprint).
- Coluber karalini* [sic]. – KHAN, 1977: [147] 148 (Darapathar “about two miles” west of Rabwah, see Pholidosis: second smallprint, KHAN, 1982).
- [*Coluber rhodorachis*] (“Krasnopolosyj poloz”). – RADZHABOV, 1977: 183 (“okr. Agitmy” [vic. Bash-Agitma], ca. 40°38′N 64°35′E, vic. Kokcha, ca. 40°38′N 64°50′E).
- Coluber rhodorachis* [sic]. – ANANJEVA & ORLOV, 1977: 14 (see BOETTGER, 1899; NIKOLSKII, 1900, 1916). – BANNIKOV *et al.*, 1977 (ssp.): [261] 268, Pl. 28.4, map 115 (review, incl. plotted sites in Tajikistan, Turkmenistan, and Uzbekistan, see Localities: smallprint, Distribution). – MURTHY & SHARMA, 1978: 233 (diet). – MAKEJEV, 1979: 134, Tab. (biomass, vic. Mary [“ot 28-go kilometra kanala”]).
- Coluber rhodorachis*. – MURTHY *et al.*, 1979: 236, Pl. III.4 (“Mag-nar, Poonch”, “Dal Lake” [ca. 34°07′N 74°52′E], “Poonch Fort”).
- Coluber rhodorachis* [sic] (“Boulenger”). – CHOPRA, 1979: 30 (“Corbett National Park”, ca. 29°37′N 78°55′E).
- Coluber rhodorachis* [sic] (*ladacensis*). – SAID-ALIEV, 1979: 108, Fig. 48 [map] (incl. “Dashti-Bet” [Dashtibedi Kalon, 38°36′N 69°06′E], “Khodzhaidug” [slopes of “Turkestan-skogo khrebta”], “Khumbob” Valley [Obikhumbod River, ca. 38°29′N 70°48′E], Kyrkkuduk [Sughd, 40°42′N 70°41′E], Matcha [Zeravshan Valley, 39°27′N 69°40′E], vic. Obikiik [ca. 38°10′N 68°40′E], vic. Parkhar [Farkhor, ca. 37°30′N 69°24′E], Romit [Reserve, ca. 38°50′N 69°20′E], vic. Saripul [39°19′N 69°16′E], Tujun Mazar [Pass, “Koktau”, ca. 38°00′N 68°30′E], and two plotted sites, see Localities: smallprint).
- Coluber ventromaculatus*. – CHOPRA, 1979: 30 (“Corbett National Park”, see Sympatry: last smallprint).
- Coluber rhodorachis* [sic] (“gibrida”). – BRUSHKO & MAZIN, 1981: 29, Figs 1–2 (“10–14” km northwest of Kazakhli Well, ca. 41°35′N 55°50′E, see Hybrids).
- Coluber rhodorachis* [sic] *ladacensis*. – NILSON & ANDRÉN, 1981: 140, Abb. 1 [map] (“Station Shah Abbas” [Kārvānsarā-ye Shah Abbāsī, 34°44′N 52°10′E, NHMG (“G.N.M.-Re.ex.”) 4424], “Mohammad-Reza-Shah-Wildpark” [game reserve, ca. 37°31′N 56°35′E, NHMG 4423]). – SHAMMAKOV, 1981: 247, Fig. 59 [map] (incl. Bakharden [38°26′N 57°26′E], Chuli Gorge [ca. 38°00′N 58°00′E], Edzher [ca. 39°13′N 55°33′E], Firjuza Gorge, Khejrabad [37°53′N 57°50′E], Khindivar [ca. 37°55′N 57°52′E], Kurkulab [38°02′N 57°40′E], Lesser Balkan Mts [“khrebet Malyj Balkhan”, unspecified, see SHAMMAKOV, 1968], Mergenulei [ca. 38°00′N 58°00′E], 45 km southwest of Nokhur [ca. 38°11′N 56°43′E], 22 km southeast of Tedzhen [ca. 37°14′N 60°40′E], Uzyn Akar Spring [ca. 39°30′N 54°20′E], ZISP fide ATAJEV, 1985).
- Coluber r. rhodorachis* [sic]. – SHAMMAKOV, 1981: 243, Fig. 59 [map] (incl. Aydere Gorge [ca. 38°25′N 56°45′E, coll. Makejev 1969], Alybeg [ca. 37°59′N 58°12′E], Annau [37°53′N 58°32′E], “Bekrova” [Bikrova, 37°56′N 58°17′E], Chuli, Ishmetpest [ca. 35°16′N 62°28′E], Karametnijaz [37°44′N 64°33′E], Kurtlinskoje ozjero [Lake, ca. 37°59′N 58°19′E, coll. Atajev 1975], Mejмили [ca. 37°59′N 58°14′E], ZISP fide ATAJEV, 1985).
- Coluber k. karelini* [partim]. – KHAN, 1982: [225] 226 (same specimen as in KHAN, 1977; see Pholidosis: second smallprint).
- Coluber rhodorachis* (*ladacensis*) [partim]. – KHAN, 1982: [225] 226 (“Sargodha Division”, ca. 32°05′N 72°40′E).
- Coluber rhodorachis* [sic] (ssp.). – RUSTAMOV & SHAMMAKOV, 1982: [219] 225, Tabs 2–5 (ecosystems, habitats, abundance) (incl. “Sarykamysh” Depression [ca. 41°45′N 57°30′E] and “Western Uzboi channel” [ca. 39°30′N 55°00′E, see Appendix D, Fig. 14], “Iranian-Afghan species”).
- Haemorrhais* [sic] *r. rhodorachis* [sic] comb. nov. – WELCH, 1982: 155, and WELCH, 1983a: 69 (see SCHÄTTI *et al.*, 2005).



- Eremiophis rhodorhachis* [sic] comb. nov. irrita. – WELCH, 1983b: 108 (*Eremiophis* FITZINGER, 1843 is a nomen nudum, see SCHÄTTI & UTIGER, 2001).
- C.[oluber] rhodorhachis* [sic]. – CZELLARIUS *et al.*, 1983: 64, Tab. I [microhabitats] (“Erojlanduz” Depression [ca. 35°40′N 61°48′E], see CZELLARIUS, 1992).
- Coluber (Coluber) rhodorachis* [partim] comb. nov. – MAHENDRA, 1984: [286] 288 (subgenus).
- Coluber (Coluber) ventromaculatus* [partim] comb. nov. – MAHENDRA, 1984: [286] 288 (ibid.).
- Coluber rhodorachis*. – SCHÄTTI, 1984: 335 (“Petsh-Tal, Nuristan”: ZFMK 8643–44, see Ecology, KULLMANN, 1970). – SAHI & DUDA, 1985 [partim]: 89, 96 (from SHARMA & SHARMA, 1975). – DAREVSKIJ, 1985: 69 (see Subspecies).
- Coluber rhodorhachis* [sic] [partim]. – LATIFI, 1985: 159, Figs 41–42 [ssp., maps] (incl. *C. ventrimaculatus* [sic], see LATIFI, 1991).
- Coluber rhodorhachis* [sic] *ladacensis*. – ATAJEV, 1985: 253, Figs 70–71 [incl. map], Tab. 63 (incl. Akmejdin [ca. 37°57′N 58°12′E], Aksuv [ca. 37°55′N 57°48′E], Archman [38°35′N 57°07′E], 25 km south of Bakharden [ca. 38°16′N 57°26′E, ZISP], Ekerem [38°33′N 61°10′E], Karaburun [38°34′N 61°11′E], Karasuv Spring [ca. 38°00′N 66°38′E], Kazandzhik [Gazanjk, 39°15′N 55°31′E], “Khodzha-i-Fil” [Khodzhai Filata, ca. 37°54′N 66°28′E, ZISP], Khodzhaken Spring [ca. 38°15′N 55°40′E], Kouata [ca. 38°00′N 57°42′E, ZISP], Malaja Bakhcha [ca. 38°00′N 57°46′E], “Nisa” [Razvaliny Nessa (ruins), Gadymy Nusay, 37°58′N 58°12′E], vic. Svinczovyj Rudnik [Gurşunmagdan Kärhanasy, ca. 37°53′N 66°27′E, ZISP], “Zelenaja Dolina” [Valley, ca. 39°10′N 55°22′E]; Tajikistan [p. 257]: Uszczelje Chinor [Gorge], ca. 38°24′N 69°24′E).
- Coluber r. rhodorhachis* [sic]. – ATAJEV, 1985: 248, Fig. 69 [map], Tab. 62 (incl. Mt. Duşak [ca. 37°57′N 57°54′E], “23–30” km from Golovnoje along “[Karakumskij] kanal” [ca. 37°31′N 65°29′E]).
- Coluber ventromaculatus*. – SAHI & DUDA, 1985: 89, 96 (Doda [33°09′N 75°34′E], Srinagar, see Distribution: last smallprint).
- Coluber rhodorhachis* [sic]. – BOBORJEV *et al.*, 1985: [59] 61, map (Uzun-Akmat Valley, relies on CHERNOV, 1959). – SZCZERBAK *et al.*, 1986: 100, Fig. 8 (Babazo Gorge, 37°43′N 58°18′E).
- Argyrogena rhodorhachis* [sic] [partim] comb. nov. – MURTHY, 1986: 21 (“common in the mountainous region of Northwest India” incl. “Kashmir”, see footnote 13).
- Coluber rhodorachis*. – KHAN, 1986: 122, Tab. 4 (“Pir Peahai” [vic. Kalabagh], ca. 32°58′N 71°32′E, see Systematic Review, Geographic Variation: first smallprint). – KOLBINCZEV & BRUSHKO, 1986 (*C. r. ladacensis*): 178, Tab. (Berkara Gorge [ca. 42°55′N 70°40′E], “Ulken Kokbulak” [River, 20 km northwest of Vanovka (Turar Ryskulov), ca. 42°40′N 70°13′E], “Talasskogo Alatau” [unspecified, ca. 42°30′N 71°00′E], and “Severnomo Priaralje”, see Distribution).
- ?*Argyrogena ventromaculatus* [sic]. – LAMBA, 1987: 82 (sight records from Corbett National Park, see Sympatry: last smallprint, Appendix E).
- C.[oluber] ladacensis* comb. nov. – BORKIN & DAREVSKIJ, 1987: 139 (see Subspecies).
- Coluber rhodorachis*. – KHAN & AHMED, 1987: 368, Tab. IV (Khuzdar, 27°48′N 66°37′E, see Geographic Variation: first smallprint, KHAN, 1997). – KHAN, 1987 [partim?]: 108 [Tab.] (“Baluchistan”, checklist, “unconfirmed records are disregarded”). – SCHÄTTI, 1987 [partim]: 403 [412], Figs 1–3 [basisphenoid (MHNG 2443.36, *P. saharicus*), vertebra ratios, hemipenis (MHNG 1359.1, see Osteology and Anatomy, Geographic Variation: sixth smallprint)], Tab. 1 (pholidosis, osteology, relationships). – KHAN & BAIG, 1988: 159, Fig. 1 [map] (Dandot [32°39′N 72°58′E], “Goalpur” [Golpur, 32°35′N 72°56′E], Rohtas Fort [32°58′N 73°35′E]).
- Coluber rhodorhachis* [sic]. – RUSTAMOV *et al.*, 1988: 112 (“Bashbulak” [Başbulak, Köytendag], ca. 37°53′N 66°33′E).
- Coluder* [sic] *rhodorhachis* [sic]. – JADGAROV *et al.*, 1988: 53 (Achchi [Malguzar Mts, 39°57′N 68°14′E], “Andaginsaj” [Nuratau, ca. 40°25′N 67°00′E], Atakurgan [ca. 40°33′N 67°26′E], “Dzhaloir” [Dzhalaïr, 39°56′N 68°34′E], 10 km east of Jangikishlak [ca. 40°25′N 67°17′E], 6 km south of “Kadamzhaj” [Kasamsaj, Fergana Valley, Andijon, ca. 40°42′N 72°15′E], Karamazar [39°48′N 68°11′E], “Turkman” [Turkmen, 39°56′N 68°30′E]).
- “*Coluber species*”. – CLARK, 1990: 33 (with “a prominent red vertebral stripe” displayed by a snake charmer in “Kabul bazaar”).
- Coluber rhodorachis*. – CLARK, 1990: 33, Tab. (“30/40 Km.SW Jalalabad”: CAS 120492, 120718).
- Coluber rhodorhachis* [sic]. – CZELLARIUS, 1990: 43, Fig. 1 [“Kepe-linskaia szczel” (ravine), ca. 35°20′N 62°20′E], Tab. 3 (see Ecology).
- Coluber rhodorachis* (ssp.) [partim]. – LATIFI, 1991: [67] 103, Pl. 16 [Figs 41–42 incl. maps] (incl. Bushehr Province: Deheh Emam Hasan [ca. 29°51′N 50°16′E]; Esfahan: “Gholpaeghan” [Golpayegan, 33°27′N 50°17′E], Kashan [33°59′N 51°27′E], Khansar [33°13′N 50°19′E], “Khorghan” [“Central Province”, Qorghān, 33°26′N 50°04′E], “Mimeh” [Meymeh, 33°27′N 51°10′E]; Fars: Eqlid [30°55′N 52°42′E], “Naghshesh Rostam” [Naqsh-e Rostam, 29°59′N 52°52′E]; Hormozgan: “Keesh” [Kish Island], ca. 26°32′N 53°58′E; Khorasan-e Jonubi (South K.): “Ghaen” [Qa’en (Qayen), 33°44′N 59°11′E], Sarbisheh [32°36′N 59°49′E]; Khorasan-e Shomali (North K.): “Kalat Naderi” [Kalateh Nader, 37°04′N 56°45′E]; Khuzestan: Al-bajhi [31°31′N 48°38′E], Dezful [32°23′N 48°24′E], “Mas-jhedehe Solaiman” [Masjed Soleyman], Shush [32°12′N 48°15′E], Shushtar [32°03′N 48°51′E]; Kurdistan: Najafabad [34°56′N 46°55′E]; Markazi: Arak [34°05′N 49°41′E], Delijan [33°59′N 50°41′E], Khomeyn [33°39′N 50°05′E], Mahallat [33°55′N 50°27′E], Tafresh [34°42′N 50°01′E]; Qom [“Markazi”]: Qom [City, 34°39′N 50°53′E]; Semnan: “Ivanaky” [Eyvanekey, 35°21′N 52°04′E], Garmsar [35°20′N 52°13′E], Shahrud [Emamshahr, 36°27′N 54°59′E]; Sistan-ve Baluchestan: Zabol, 31°02′N 61°30′E; Tehran: “Tehran” [ca. 35°40′N 51°25′E], Varamin [35°20′N 51°39′E]; Yazd [“Khorasan”]: Tabas, 33°35′N 56°55′E; see Distribution incl. first smallprint). – LEVITON *et al.*, 1992: [89, Fig. D] 92, Pl. 15E [northwest of Bandar-e Ganaveh, ca. 29°38′N 50°27′E, MMTT 1073] (see Systematic Review, Subspecies).
- Coluber* [*r.*] *rhodorhachis* [sic] (“nominativnyj podvid”) [partim]. – CZELLARIUS, 1992: 108 (“kordona Gyzyldzhar” [G. checkpoint, 35°50′N 61°51′E], “vpadine Jerojulanduz” [Jerojlanduz Depression, see CZELLARIUS *et al.*, 1983], see Hybrids, Fig. 25).
- C.[oluber] rhodorhachis* [sic]. – JEREMCHENKO *et al.*, 1992: 162 (Kyrgyzstan [“Ferganskaja dolina”]: vic. Tash-Kumyr [ca. 41°21′N



- 72°13'E, IBKB R004012], vic. Mayлуу-Suu ["Majli-Saj", ca. 41°17'N 72°28'E, R004186]; Turkmenistan: Badkhyzskogo zapovednika [Badkhyz Reserve, IBKB R007113–15]; Uzbekistan: Nuratau khr.[ebet] ["Kyrgyzstan", ca. 40°20'N 67°15'E, IBKB R004190], between "Zaamin" [Zomin] and Kara [Samarqand District, ca. 39°54'N 68°05'E, R006097]). — SHAM-MAKOV *et al.*, 1993 (ssp.): 130, Tab. 1 [ecosystems and habitats]. — ATAJEV *et al.*, 1994: 336 (Köpetdag Gershi).
- Argyrogena rhodorhachis* [sic]. — HUSAIN & RAY, 1995: 160, Tab. (Nainital and Pauri Garhwal Districts ["Uttar Pradesh" (Uttarakhand), see References], arbitrarily placed at Bhowali [29°23'N 79°31'E] and Kandara [28°58'N 78°44'E], resp.).
- Argyrogena ventromaculatus* [sic] [partim]. — HUSAIN & RAY, 1995: 160, Tab. (Almora [WALL, 1914], Nainital, and "Pauri", see Sympatry: last smallprint, Appendix E).
- Coluber rhodorachis*. — AKRAM & QURESHI, 1995: 27 (Abbaspur [31°20'N 72°57'E], Faisalabad [31°25'N 73°05'E], "Guttee" [ca. 31°30'N 73°08'E], Ram Diwali [31°34'N 73°04'E], see Geographic Variation: first smallprint).
- Coluber ladacensis* [partim?]. — ATAJEV *et al.*, 1996: 37 (vic. Khivabad, ca. 37°11–12'N 59°33'E: may be based on, or include, CAS series from this area, see Appendix A).
- Coluber rhodorhachis* [sic]. — ATAJEV *et al.*, 1996: 37 ("Chacha" [River, Çäçe, ca. 36°46'N 60°33'E], vic. Khivabad ["Kelat" pistachio grove, "Syjatoj Khodzha" Spring], see Geographic Variation: fourth smallprint).
- Coluber rhodorachis*. — KHAN & KHAN, 1996: 176 [181], Tabs I–II ("Azad Jammu and Kashmir"). — AKRAM & QURESHI, 1997: 34 (Shahinabad [31°54'N 72°39'E], Shahpur [32°17'N 72°26'E], "Silianwali" [Sillanwali, 31°50'N 72°32'E], Wadhi [32°08'N 72°23'E]). — FRYNTA *et al.*, 1997: 12 (Qamishlu, 32°03'N 51°28'E). — KHAN, 1997 [partim]: [51] 56 [58], Figs 2B and 6 [map], Tabs 1–3 ("Azad Kashmir": Aram Bari [vic. Tattapani], Bagh [33°58'N 73°47'E], Bhimbar [32°59'N 74°05'E], "Dulaih" Jattan [Dullah J., 33°20'N 73°49'E], "Goi Madan" [ca. 33°30'N 74°00'E], Kotli [33°31'N 73°55'E], Mirpur [33°09'N 73°44'E], Muzaffarabad [34°22'N 73°28'E], Palandri [33°43'N 73°41'E]; Baluchistan: "Boostan" [Bostan, 30°26'N 67°01'E], Chaman [30°55'N 66°28'E], Kalat [29°01'N 66°35'E], Khuzdar [KHAN & AHMED, 1987] incl. "Arnachh", "Karna", "Naal", and "Waddh", Mastung [29°48'N 66°51'E], "Peshin" [Pishin, 30°35'N 67°00'E], "Punjpai" [Panjpai, 29°55'N 66°30'E], "Zob" [Zhob (Fort Sandeman), 31°20'N 69°27'E] incl. "Loi Banda" and "Muslim Bazar"; Khyber Pakhtunkhwa [incl. Federally Administered Tribal Areas]: Bannu [32°59'N 70°36'E, FATA], Dadar [33°16'N 70°31'E, FATA], "Ghari" Habibullah [Garhi H., 34°24'N 73°23'E], Kalam [35°32'N 72°35'E], Kohat [33°35'N 71°26'E, FATA], Mardan [34°12'N 72°03'E], Nowshera [34°00'N 71°59'E], "Peshawar" [Peshawar, 34°00'N 71°34'E, FATA], Swat [District, ca. 35°00'N 72°30'E], Tank [32°13'N 70°23'E, FATA], Wana [32°18'N 69°34'E, FATA]; Punjab: Attock [33°54'N 72°18'E], Chhattar [33°10'N 73°10'E], Choa Saidan Shah [32°43'N 72°59'E], Islamabad [33°42'N 73°10'E], "Khewara" [Khewra, 32°39'N 73°01'E], Pind Dadan Khan [32°35'N 73°03'E], "Rohats [Rohtas] Fort" [KHAN & BAIG, 1988]; ?Sindh: Band Murad Khan [25°06'N 67°00'E], "Chauki", Thatta [24°45'N 67°55'E]; see Systematic Review, Southern Pakistani Racers).
- Argyrogena ventromaculata*. — DAS *et al.*, 1998: 150 (holotype of *P. semifasciatus* BLYTH).
- Coluber rhodorhachis* [sic]. — TUNJIEV *et al.*, 1998: 78 [80] (incl. "gorge of Keltechinar River" [Chinar R., ca. 38°00'N 57°45'E]. — ANANJEVA *et al.*, 1998 (ssp.) [partim]: 443, Pl. 38 [photo no. 161], map (see Hybrids: last smallprint, ANANJEVA *et al.*, 2004).
- Argyrogena rhodorachis* [partim]. — SHARMA, 1999: 95, Fig. "33" [32] ("Mountainous regions of Northwestern India", see Affinities: last smallprint).
- A.[rgyrogena] ventromaculatus* [sic] [partim]. — SHARMA, 1999: 95 ("Western Himalayas").
- Coluber rhodorachis*. — KHAN, 1999: 276, 283, 285 ("Wide ranging" in Pakistan). — TUNJIEV, 2000: 56, Figs 1a–b, Tab. (incl. "szczel Turanga" [T. Ravine], ca. 35°50'N 61°26'E, see Hybrids, incl. IZTA specimens). — LATIFI, 2000: 269, Pls 41–42 [ssp., maps] (incl. Azarbayjan-e Sharqi [West A.], Golestan, Hamadan, Ilam, Kerman, Qazvin, and Zanjan Provinces [all unspecified], see Distribution incl. first smallprint).
- Coluber r. rhodorachis* [partim]. — KHAN & KHAN, 2000: 49, Fig. 2A ["*Coluber ventromaculatus bengalensis*"], Tab. I (see Systematic Review incl. last smallprint, SCHÄTTI & SCHMITZ, 2006: 752).
- Coluber rhodorachis kashmirensis* KHAN & KHAN, 2000: 49, Figs 2B–C ["*Coluber ventromaculatus bengalensis*"] and 3C [forebody], Tab. I, "Goi Madan, Kotli, Azad Kashmir 33°30'N and 74°00'E" (paratypes from "Aram Bar", Bagh, Bhimbar, "Dulaih Jattan", "Goi Madan", Kotli, Mirpur, Muzaffarabad, Palandri, "Punch" [District], see Systematic Review, Taxonomy and Type Material, Subspecies).
- Argyrogena rhodorhachis* ("Shaw") [sic] [partim?]. — SHRESTHA, 2001: 172 ("mountainous region of Dang" [ca. 28°07'N 82°19'E] "and Chitwan valley", see Distribution, Sympatry).
- [*Coluber* spp.]. — BOBROV & ALESZCZENKO, 2001: 233 [288, Tab. 1] ("*C. ladacensis*" and "*C. rhodorhachis*" [sic] of the "Saharo-Gobian Desert Subregion").
- Platyceps rhodorachis* [partim]. — SCHÄTTI *et al.*, 2001: 15, and SCHÄTTI & MCCARTHY, 2001: 81 [88] (revalidation of *Platyceps* BLYTH). — SCHÄTTI, 2001[a]: 140. — SCHÄTTI, 2001b: 491 ("*Platyceps* Blyth («*rhodorachis* Gruppe»)"). — SCHÄTTI & UTIGER, 2001: 935, Figs 8–9 (molecular evidence for validity of genus incl. *P. cf. rhodorachis* from Yemen).
- P.[latyceps] subfasciatus* [sic]. — SCHÄTTI & UTIGER, 2001: 935 (syn. *Coluber ventromaculatus* GRAY [see Taxonomy and Type Material], in error for *P. semifasciatus* BLYTH).
- A.[rgyrogena] rhodorachis* [partim]. — SHARMA, 2002: 51, "Fig. 33" ("Mountainous regions of Northwestern India", see Affinities: last smallprint).
- A.[rgyrogena] ventromaculatus* [sic] [partim]. — SHARMA, 2002: 51 ("Western Himalayas").
- Coluber rhodorachis*. — MULDER, 2002: 89, Tab. 1 ("approx. 4 km south-east of Durān (32°02'54"N, 49°11'30"E) [NMR 9994–00368]). — KHAN, 2002 (ssp.) [partim]: [23, 30, 45, 57] 102 [106], Figs 45e ["Pigmentation pattern of scales", from KHAN, 1997] and 66 ["*ladacensis*", "Turkmenia"], Tab. 4 ["*r. rhodorachis*"], map 7 (see Systematic Review).
- Coluber rhodorachis kashmirensis*. — KHAN, 2002: [23, 45] 103, Tab. 4, map 7 (Mangla [33°08'N 73°38'E], "Naderi" [unlocated], "Tata Pani" [Tattapani, 34°11'N 73°27'E]).

- Coluber rhodorachis* (ssp.). – SZCZERBAK, 2003: [163] 171, Pls 138–139, map 111 (see Subspecies: first smallprint).
- Coluber rhodorhachis* [sic]. – DOCZENKO, 2003: 20 (Tajikistan: khr.[ebet] “Gujun-Tau” [Tujuntau, ca. 37°25′N 67°45′E, ZIK 591.1774], Surkhob [khr. Karatau, 37°27′N 69°19′E, 593.1776]; Turkmenistan: incl. 15 km south of Bakharden [ca. 38°18′N 57°25′E, ZIK 1027.2597], Berzengi [37°53′N 58°23′E, 522.1657–58, 596.1779, 1137.2799], Duzlydepe [38°18′N 56°44′E, 862.2272], Dzhebel [Greater Balkan Mts, 39°38′N 54°14′E, 173.667], “Gaudan” [Hawdan, 1026.2594–96], “Malaja Bakhcha” [20 km south of Geok Tepe, ca. 38°00′N 57°58′E, 521.1656], Kalinina [Gyaur, 39°26′N 55°33′E, 174.668–70, 520.1655, 959.2427, 1126.2785, 1140.2803], Şarlawuk [38°13′N 55°38′E, 182.701–02]). – VASHETKO *et al.*, 2003: 31, map 3 (confluence of Akbulak and Terekli [Serkesaj] Rivers [41°27′N 70°13′E], “Arpapajasa-j” [ca. 41°26′N 69°50′E], Chirchiq Valley [ca. 41°28′N 69°35′E], vic. Kamchiq [ca. 41°09′N 70°28′E], Khandajlyk [Khondajlyk, 41°37′N 69°43′E], Kajnar [41°41′N 70°03′E], “Shavas-saj” [ca. 41°12′N 70°23′E], near origin of “Shavazi-Kolon-saj” [Shavazikolon River, ca. 41°12′N 70°15′E, see ZHELEZNIAKOV & KOLESNIKOV, 1958], IFUT specimens). – ANANJEVA *et al.*, 2004 (ssp.): 136, photo, map.
- Coluber karelinii* [sic] [partim]. – ANANJEVA *et al.*, 2004: 132, lower photo, map (see Hybrids: last smallprint).
- Coluber ladacensis* [partim]. – WHITAKER & CAPTAIN, 2004: [22, footnote 6] 136, Pl. [“Turkmenistan”: ZMB 56081], map (“Jammu & Kashmir”).
- Coluber ventromaculatus* [partim]. – WHITAKER & CAPTAIN, 2004: [21, footnote 6] 134, map (“Jammu & Kashmir”).
- Platyceps rhodorachis* ssp. (*kashmirensis*, *ladacensis*, *rhodorachis*) [partim]. – KHAN, 2004: 196 (“Pakistan”, checklist).
- Coluber r. rhodorachis* [partim]. – FIROUZ, 2005: [202] 204, photo (“4, 7, 10, 11, 13–15, 18, 25” [serially numbered Iranian provinces], relies on LATIFI, 1985, 2000).
- Platyceps rhodorachis* [“auct.”]. – SCHÄTTI & SCHMITZ, 2006: 757, footnotes 3–4 (vic. Pithoragarh, see Systematic Review, Sympatry: last smallprint, Fig. 5E).
- Platyceps rhodorachis* ssp. (*kashmirensis*, *ladacensis*). – KHAN, 2006: [4] 206–207, Tab. 10.1 [altitudinal distribution], Pl. 135, map.
- Platyceps r. rhodorachis* [partim]. – KHAN, 2006: [4, 17, 37 (Fig. 28Bi)] 206, Tab. 10.1, Pl. 134 [from MINTON, 1966: Pl. 25.1], map (see Systematic Review).
- Argyrogena rhodorhachis* [sic] [partim]. – SHARMA, 2007: [129] 130 (“Himalayas [...] to [...] Somaliland”, see Affinities: last smallprint).
- Coluber ladacensis*. – SHESTOPAL, 2008: 46 (10 km south of Khodzhalakala Valley, ca. 38°38′N 56°20′E).
- Platyceps rhodorachis*. – RAJABIZADEH *et al.*, 2008 (ssp.) [partim?]: [7, 10] 67, 2 photos, maps (incl. vic. Bandar Abbas [ca. 27°11′N 56°17′E], vic. Ilam [ca. 33°38′N 46°25′E], Kabir Kuh [Abdanan area], vic. Yazd [ca. 31°54′N 54°22′E], see Distribution: first smallprint, incl. RUZM and ZCSK specimens). – KOLBINCZEV, 2010: 110, map 12 (“canjon Boroldaj” [ca. 42°52′N 69°52′E], “canjon Koshkarata” [ca. 42°56′N 69°55′E], “v uszcz.[el]jakh” Tikasu” [Gorge, ca. 42°57′N 70°38′E], “Zapadnogo Tjan-Shanja”, see Distribution). – TORKI, 2010: 29 ff., Figs 7–8 and 11 [habitats] (incl. Badavar Mts, Hanjis Mts [33°45′N 47°37′E], “Mamolan” [Ma’mulān, 33°23′N 47°58′E], “Mianevar” [Abdanan area, 33°08′N 47°06′E], and “Sepidkoh” Mts [Sefid Kuh]: incl. FTHR 15305, 15307, see External Data).
- Platyceps r. rhodorachis*. – FATHINIA *et al.*, 2010: 15, Fig. 3d [incl. map], Tab. 1 (“Shirvan-Chardavol” [Shahrestan-e Shirvan-ve Chardaval, ca. 33°45′N 46°35′E] and “Abdanan area [ca. 33°00′N 47°25′E] in the Zagros Mountains” [incl. RUZM 30.16–17, Behzad Fathinia in litt.]).
- Platyceps r. ladacensis*. – FATHINIA *et al.*, 2010: 16, Fig. 3e [incl. map], Tab. 1 (“collected in Ilam, Abdanan and Mehran [County, ca. 33°20′N 46°30′E] regions” [incl. RUZM 30.18–21, B. Fathinia in litt.], see Systematic Review: seventh smallprint, Distribution: first smallprint).
- ?*Platyceps rhodorachis*. – KHAN & SIDDIQUI, 2011: 1382 [Tab. 4] (“Shamtahar Nala” [River, ca. 30°03′N 66°53′E], see Brahui Racer, Fig. 20).
- C.[oluber] ladacensis*. – GEOKBATYROVA, 2012: 70 (“Ajyderinskom [Aydere, ca.38°25′N 56°45′E] i Jolderinskom [Yuldi-Dere] uchastkakh zapovednika [sector reserves]”).
- C.[oluber] rhodorhachis* [sic]. – GEOKBATYROVA, 2012: 70 (“uszcz. Joldere” [Yuldi-Dere Gorge], ca. 38°17′N 56°45′E).
- [*Platyceps r. rhodorachis*] (*P. k. karelini* × *P. r. rhodorachis*). – SCHÄTTI *et al.*, 2012: 463, 482 [Appendices A–B], Figs 5–8 [incl. map], Tab. 4 (incl. 50 km east of Imambaba, see Hybrids, Incertae Sedis, Appendix B, Fig. 25: ZMB 38833, Figs 22C–D).
- Platyceps rhodorachis*. – MASROOR, 2012 [partim]: 129, Figs 83–84 [incl. map], Tab. I [habitats] (Margalla Hills National Park [ca. 33°45′N 73°03′E] and various map entries [incl. ca. 26°30′N 64°00′E, ca. 28°20′N 64°25′E (vic. Hurmagai), ca. 31°30′N 67°50′E, ca. 33°55′N 70°05′E (vic. Parachinar), ca. 33°45′N 70°30′E, ca. 34°45′N 71°30′E, ca. 36°00′N 71°45′E], see Colour Pattern: fourth smallprint, Distribution: last smallprint). – ZAREIAN *et al.*, 2012: Tab. 4 (Kuh-e Gorm area, ca. 28°40′N 53°20′E). – SINDACO *et al.*, 2013 [ssp.]: 130, Fig. 7.19 [map, *rhodorachis* complex], map 84, photos 148 and 151 [“ssp.”] (“Iran”, see Colour Pattern: sixth smallprint).
- Coluber rhodorachis*. – HUSSAIN *et al.*, 2013: 651, Tab. 2 (Sanghar Bathara, ca. 34°30′N 73°34′E, see Ecology).
- Platyceps rhodorachis*. – YOUSEFKHANI *et al.*, 2014 (“Jan, 1845”): 79, Fig. 3B, Tab. 1 (Khorasan-e Razavi [“SUHC” (= TMUS) 1005]). – WALLACH *et al.*, 2014: 555 (catalogue).
- Platyceps ventromaculatus*. – YOUSEFKHANI *et al.*, 2014: 79, Fig. 3C, Tab. 1 (Khorasan-e Razavi [“SUHC” (= TMUS) 1017], see Sympatry: last smallprint).

## Taxonomy and Type Material

GÜNTHER (1864) was “quite at a loss as to where the *Platyceps semifasciatus*, Blyth [...] should be placed; no mention is made either of the shields of the head or of the scales.” BOULENGER (1893) and more recent authors unanimously accepted BLANFORD’S (1875) opinion that the juvenile holotype of *P. semifasciatus* (ZSI 7240, unexamined) from Subathu in Himachal Pradesh “is a young specimen of *Zamenis ventrimaculatus*”, a compound including various species of the *P. rhodorachis*-

*ventromaculatus* complex. Genuine *P. ventromaculatus* (GRAY) are not represented in, for example, BLANFORD'S (1876) 'Eastern Persia' sample (see last smallprint in this section and Systematic Review incl. second smallprint), and "*ventrimaculatus*" sensu BLANFORD (1881) is entirely made up of *P. karelini chesneii* (MARTIN) and *P. rhodorachis* (SCHÄTTI, 2006b; SCHÄTTI *et al.*, 2012). Because of scarce morphological data in the original description of the type species of *Platyceps* BLYTH (by monotypy, see next but one paragraph), the composite nature of "*ventrimaculatus*" auct., BLANFORD'S (1876) dismissal and his abandoning of *semifasciatus* in later contributions (he did not even mention the name anymore) as well as ecological and biogeographical considerations, SCHÄTTI & SCHMITZ (2006) voiced reservations as to BLANFORD'S (1875) identification and doubted that *P. semifasciatus* BLYTH, 1860 was a junior synonym of *Coluber ventromaculatus* GRAY, 1834.

To clarify matters, GÜNTHER'S (1864) comment apropos *Platyceps semifasciatus* BLYTH appeared under *Coluber* auct. (viz. ratsnake taxa, nec *Coluber* LINNAEUS, 1758) and not *Zamenis* auct. (erroneously applied to racers, see Systematic Review incl. fifth smallprint). STOLICZKA'S (1870a–c) and THEOBALD'S (1876) allocation of *P. semifasciatus* to *Composoma* DUMÉRIL, 1853 is hard to comprehend. This view followed a suggestion by Thomas Caverhill Jerdon after his examination of the holotype of *P. semifasciatus* (STOLICZKA, 1870c). In the generic diagnosis, THEOBALD (1876) averred "keeled" dorsals and the "[a]nal usually entire" but indicated "smooth" scales and a "bifid" anal scute for "*C. semifasciatum*". His description of this taxon is merely a shorter version of STOLICZKA'S (1870c) text. Interestingly, WALL (1914) did not say a single word about *P. semifasciatus* BLYTH.

The number ("187") of "[s]cutae" (BLYTH, 1860) for the "not so perfect" (STOLICZKA, 1870c) holotype of *Platyceps semifasciatus* is far below the minimum values for ventrals ascertained for *P. rhodorachis* and Indian *ventromaculatus*, and the type locality at a much higher altitude (> 1,200 m above sea level) than any confirmed record of Gray's Racer (see Sympatry). Photographs of ZSI 7240 (see Material: smallprint) show a desiccated, totally fragmented, and seemingly incomplete juvenile. A positive identification is impossible due to its extremely poor condition and the few photos at hand, but there is no evidence against our persuasion that *P. semifasciatus* BLYTH is a senior subjective synonym of *Zamenis rhodorachis* JAN. Photographs of a *P. r. rhodorachis* from Simla (see Colour Pattern) support this point of view.

Apart from BLYTH'S (1860) description, mentions in the synonymy of *Zamenis ventrimaculatus* [sic] auct. (BOULENGER, 1890, 1893; SCLATER, 1891b) and elsewhere (e.g., SMITH, 1943: *Coluber ventromaculatus*; SUNDER-SINGH, 1960 [as "*Platyceps*" (sic) s.], RAI, 1965: *C. rhodorachis* auct.; SCHÄTTI & SCHMITZ, 2006; NARAYANAN & SATYANARAYAN, 2012 ["Blyth, 1861"]; WALLACH *et al.*, 2014) as well as citations in the context of the type species of *Platyceps* BLYTH (e.g., LOVERIDGE, 1957 ["*subfasciatus*"]; WILLIAMS & WALLACH, 1989; SCHÄTTI & UTIGER, 2001 ["*subfasciatus*"]) or the holotype of *Platyceps semifasciatus* (e.g., DAS *et al.*, 1998), the chresonyms enumer-

ated above (GÜNTHER, 1864; THEOBALD, 1868; STOLICZKA, 1870a–c [incl. "*fasciatus*"]; ANDERSON, 1870b, 1871b; NICHOLSON, 1874; BLANFORD, 1875; THEOBALD, 1876; ATKINSON, 1884) are the only quotations of *P. semifasciatus* or variant spelling thereof we are aware of. WERNER'S (1917) "*Zamenis ventrimaculatus* Gray var. *semifasciatus* Blyth?", viz. *P. najadum schmidtleri* (SCHÄTTI & MCCARTHY, 2001), was rendered moot by the author of this one-off combination himself. To the best of our knowledge, the specific name *semifasciatus* BLYTH, 1860 has not been used as valid after 1899 whereas *rhodorachis* has been applied to Jan's Cliff Racer in a plethora of works published by hundreds of authors as documented by the references cited in this study. For the sake of taxonomic stability, and in accordance with Art. 23.9.2 of the Code (ICZN, 1999), we herewith declare the junior subjective synonym *rhodorachis* JAN, 1863, as published in the binomen *Zamenis rhodorachis*, a nomen protectum with priority over *Platyceps semifasciatus* BLYTH, 1860 (nomen oblitum) for the purpose of the specific name. With this reversal of precedence, *Z. rhodorachis* JAN becomes the valid type species of *Platyceps* BLYTH.

The concise diagnosis of *Zamenis rhodorachis* JAN is based on at the very least two specimens. Besides its salient feature, viz. the reddish vertebral stripe insinuated by the specific name, the description indicates two scale characters (nine supralabials, 19 msr), the origin ("Persia, Schiraz"), and a remark regarding the place of custody, the Museo Civico di Storia Naturale in Milan ("M."). The scientific name derived from the Greek words *rhodon* (ρόδον) and *rhachis* (ράχης) means 'rose spine'. *Z. rhodorachis* JAN is not reproduced in the 'Iconographie générale'.

The very first mention of the species is found in JAN (1857) as *Etairejus rhodorachis*, a nomen nudum (this also applies to *Pseudoperiops persicus* JAN [*Zamenis persicus*]). Both generic names have apparently never been used again in biological literature. The pertinent literature (e.g., BLANFORD, 1876; BOULENGER, 1893; NIKOLSKII, 1916; TERENTJEV & CHERNOV, 1949; ANDERSON, 1963; HAAS & WERNER, 1969; ATAJEV, 1985; LEVITON *et al.*, 1992; RASTEGAR-POUYANI *et al.*, 2008; AMR & DISI, 2011; PERRY, 2012; SINDACO *et al.*, 2013) attributes the authorship and year of *Zamenis rhodorachis* JAN, 1863 to the more detailed account in the 'Note di un viaggio in Persia' (JAN in DE FILIPPI, 1865). In fact, the original description had never been correctly cited in herpetological literature until this century (SCHÄTTI, 2001; SCHÄTTI & UTIGER, 2001; see SCHÄTTI *et al.*, 2010a–b: 276 and 650, resp.). This is also the case with, for instance, *Periops parallelus schirasianus* JAN, 1863 (*Spalerosophis diadema schirasianus*) from "Schiraz, Persia" (see Systematic Review: first smallprint). It is worth mentioning that BOULENGER'S (1893) 'Catalogue' enumerates under *Zamenis* auct. various valid colubrid taxa described in the 'Elenco sistematico [...]' (JAN, 1863: 60, 63) as, for example, *Periops* [= *Hemorrhoids*] *algira* [sic], *P. neglectus* (syn. *Coluber* [= *Hemorrhoids*] *nummifer* REUSS, 1834), or *Coryphodon* [= *Coluber* (*Masticophis* auct.)] *oaxaca*. *Periops* WAGLER, 1830 is masculine (ICZN, 1999: Art. 30.1.4.3) as evidenced by the adjective '*neglectus*', and JAN (1863) treated *algirus* as a masculine noun of the 'a' declension, which is quite unusual for inhabitants of a country. Although speculative and only historically relevant, it cannot be ruled out that BOULENGER (1893) considered *Z. rhodorachis* JAN, 1863 to be a nomen nudum, as did ANDERSON & LEVITON (1969: 53) explicitly with respect to *P. p. schirasianus* JAN (SCHÄTTI *et*



*al.*, 2010a–b). The description of *rhodorachis* in the ‘Elenco sistematico [...]’, however, meets the requirements for availability as stipulated by the Code (ICZN, 1999: Arts 10.1, 11.1–5, 12.1). Furthermore, the specific name alludes to the eponymous attribute, viz. “a broad rose coloured band along the whole back” as noted two years later (JAN, 1865) using GÜNTHER’s (1858) wording. In the case of *Z. persicus* JAN, which is diagnosed in the same couplet as *rhodorachis* (a syntype of the former is from “Schiraz”, see above and Sympatry: second smallprint), BOULENGER (1893: 400) cited the engraving in “Jan” (JAN & SORDELLI, 1867 as the original reference (see below and Systematic Review incl. second smallprint). Further evidence that George Albert Boulenger, who generally respected the priority of names, had certain doubts as to the availability of JAN’s (1863 or 1865) *rhodorachis* at all, derives from the fact that he preferred, at one moment, *ladacensis* ANDERSON, 1871 as the valid name of the species. It is not explained what prompted BOULENGER (1890) to arrive at this decision. BOULENGER (1892, 1893) also introduced the inaccurate, albeit etymologically correct, spelling “*rhodorhachis*” (from *rháchis*, see above), a lapsus perpetuated by a plethora of authors (see chresonymy) up to the present (e.g., ANANJEVA *et al.*, 2004). Also, the type locality of *rhodorachis* is incorrectly reported as “Iran” (e.g., ANDERSON, 1963; ANANJEVA *et al.*, 2004), “Persia” (e.g., MINTON, 1966; LEVITON *et al.*, 1992), or the Arabian Peninsula (“Arabijskij p-ov” [полуостров], BANNIKOV *et al.*, 1977).

The type material of *Zamenis rhodorachis* JAN once housed in the Milan Museo Civico di Storia Naturale was destroyed during World War II (SCALI, 1995). KRAMER & SCHNURRENBERGER (1963) unearthed a female syntype (MSNG 30312, Fig. 2A) labelled as “[t]ipo; dono del Prof. Jan. 1864. Shiraz, Persia mer.[idionale] leg. Ratchy.” Although the specimen is improperly denoted as the holotype (“das Typusexemplar”) elsewhere in their text, these authors correctly contemplated the existence of several syntypes, evidently unaware of their whereabouts and fate (“In der Annahme, dass [...] ursprünglich weitere Belegstücke vorhanden waren (zur Zeit konnten wir nur noch dieses einzige Ex[emplar] ausfindig machen)”). They designated MSNG 30312 with a faint vertebral stripe (“schwach erkennbar”) as the lectotype and, quite unnecessarily, restricted the type locality to the vicinity of Shiraz (“Umgebung von Schiras, Zentralpersien”). BLANFORD (1876) had seen this specimen “brought from Shiráz” and “identified by Jan with his *Z. rhodorachis*” (see Colour Pattern: last smallprint). Surprisingly, CAPOCACCIA (1961) did not list the later lectotype, nor the species at all, in the catalogue of herpetological type material in her custody. The register specifies that MSNG 30312 (“Viag. Kotchy. dal Museo di Milano, 1864”) was donated by Giorgio (or Georg, Georges) Jan after the description of the species. Originally, it was acquired from Karl Georg Theodor Kotschy, an Austrian explorer and collector of natural history items.

There is no doubt that JAN’s (1863) type series of *Platyceps rhodorachis* was obtained during Th. Kotschy’s expedition to western Iran. Travelling via the Euphrates and, after a sojourn on Khark Island, shipping to Bushehr, he arrived at Shiraz in mid-February 1842. The collections resulting from his survey of the city’s outskirts were despatched to Basra in October. The following month, Kotschy headed for Tehran and spent time in the Alborz (Elburs) Mountains before returning to Vienna over Er-

zurum and Istanbul (EDMONDSON & LACK, 2006). Apart from MSNG 30312 and possibly existing paralectotypes, four additional *P. rhodorachis* with the same provenance are in the NMW (all show a vertebral stripe, see footnote 7).

From 1853 onwards, Giorgio Jan, who became interested in herpetology only towards the end of his life, was involved with the preparation of the monumental ‘Iconographie générale’ (JAN & SORDELLI, 1860–1881) in collaboration with the engraver and publisher Ferdinando Sordelli. Throughout this endeavour, he obtained snakes for identification and illustration from many institutions worldwide, for instance material stored in “Cambridge, Mass.” (MCZ) as exemplified by *Coluber constrictor* LINNAEUS, 1758 cited in the ‘Elenco sistematico [...]’ (JAN, 1863). BARBOUR (1914) thought a *Platyceps rhodorachis* with a red vertebral stripe from “Arabia” kept in the same collection (MCZ 902) “received from the Essex Institute in Salem, 1861 [...] collected by Captain Charles Millitt” (Millett) and “sent by Professor Agassiz to Jan [...] to be one of his types of this species.” The typical (striped) phenotype of *P. rhodorachis* is not found in Arabian populations usually referred to that species, and this fine specimen from Iran (see Pholidosis incl. third smallprint, footnote 7) is no paralectotype because it had not been examined by the time of the original description. This is also the case with MZUT R610 from southern Iran (“Persia merid.”, ELTER, 1981). Although the ‘Elenco sistematico [...]’ contains holdings of the “Torino” collection as, for example, *C.[oluber] [Masticophis auct.] mentovarius* (DUMÉRIL, BIBRON & DUMÉRIL, 1854), this striped Common Cliff Racer obtained by the Marquis Doria is in fact one of probably several specimens that gave rise to the entry in the ‘Note di un viaggio in Persia’ (JAN in DE FILIPPI, 1865).

Filippo De Filippi, then lecturing zoology and comparative anatomy at the University of Turin, held office as the scientific director of a board including Giacomo Doria and Michele Lessona associated with the mission of an Italian delegation to Persia to establish diplomatic relation. Taking the route over Tbilisi (Tiflis) and Tabriz, the party arrived in Tehran at the beginning of August 1862. The political staff led by Marcello Cerruti stayed in the capital while De Filippi, Lessona, and other members of the expedition returned to Europe via “Ghilan”, the Caspian Sea, and “Russia” (DE FILIPPI, 1863, 1865). Giacomo Doria travelled on to southern Iran gathering scientific items. Most probably, his collections were not available to JAN (1863) as explained elsewhere (SCHÄTTI *et al.*, 2010b).

BMNH R.R. 1963.992a–b from “Schiraz; Kurdistan” (registered as from “Shiraz” without indication of a donor) listed in GÜNTHER (1858) and BOULENGER (1893) were denoted as “syntypes” on the loan form. These authors, however, did not affirm that those specimens were “types” and it remains unclear why they subsequently appeared to have been regarded as such. By all means, there is no supporting evidence for paralectotype status in the register, in-house catalogues, or files of The Natural History Museum (Colin McCarthy in litt.).

The purportedly two original specimens of *Gonyosoma dorsale* ANDERSON, 1872 “could not be located

at present” (DAS *et al.*, 1998). Interestingly, 19<sup>th</sup> century zoologists affiliated with the Indian Museum (e.g., BLANFORD, 1876; SCLATER, 1891a) reported only “the type”, but SCLATER (1891b) enumerated two syntypes (ZSI 7676–77, “Persian Coll. (Mus. Coll.)”). ANDERSON (1872: Fig. 9) depicts a complete row of suboculars separating the eye from the supralabials. This character state, however, is not mentioned in the description, and other details of lateral head scales (“fourth labial [...] divided below the posterior half of the loreal”, nine on the temples incl. “[a] line of elongated temporals along the occipitals [parietals], and another similar line along the labials”) are not discernible in the drawing. This may indicate the existence of two syntypes of *G. dorsale* ANDERSON and, thus, would mean that the reproduced specimen is not the one described. At any rate, the conditions shown in ANDERSON (1872) have not been observed in examined cliff racers, the subcaudal count (“caudals 107”) is from an incomplete tail, and a single “apical groove” instead of paired pits is most probably by mistake.

We could not find an entry in ANDERSON (1872a, 1873) or earlier ‘Accessions to the [Indian] Museum’ (see References) available to us which would correspond to the type(s) of *Gonyosoma dorsale*. The original material is not identical with three “[*Zamenis persicus*, Jan]” from “Shiraz, Persia” obtained by “Captain O. St. John and Museum Collector” (ANDERSON, 1871a). The type specimen(s) of *G. dorsale*, however, was (were) gathered during the same campaign, viz. Major (later Sir) Oliver B. St. John’s first exploration of Persia “with the assistance of a native collector sent from the Indian Museum in Calcutta, in the years 1869–70/71” as specified in the introduction to BLANFORD (1876). The “*Zamenis ventrimaculatus*” series presented in the zoological part of ‘Eastern Persia’ was procured by the 1872 mission under the same commander and accompanied by William T. Blanford. ANDERSON’S (1871a) above mentioned classification of three “Shiraz” racers as “*persicus*, Jan” does not allow for a positive identification (*Platyceps karelini chesneii*?) as illustrated by his (ANDERSON, 1872) annotation to JAN & SORDELLI’S (1867) plate of *Z. persicus* (syntype); SCLATER (1891b) assigned the same sample (ZSI “7336–7, 4827”) to *Z. ladaccensis* [sic] (see Systematic Review: second smallprint).

The type series of *Coluber rhodorachis kashmirensis* KHAN & KHAN, 2000 is supposed to be in the private collection of Muhammad S. Khan (see Systematic Review, Subspecies).

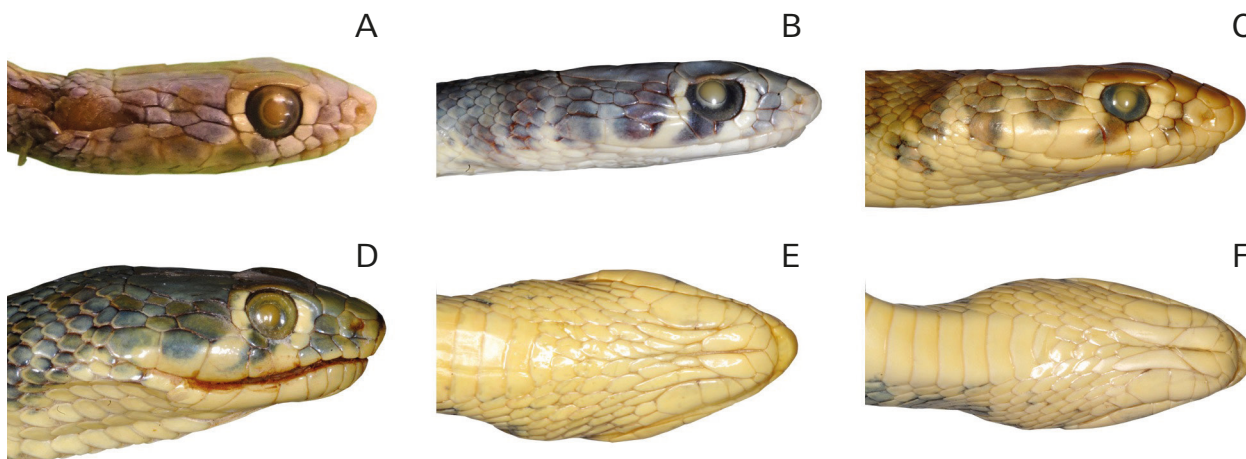
## Pholidosis

Head 2.04–2.63 times longer than broad (see Samples and Characters: Tab. 1). Rostral 1.30–2.49 times broader than high. Snout aberrantly hog-nosed in ZSM 223.1989.3. Internasals normally shorter than prefrontals (equal length in, e.g., BMNH 1874.11.15.11). The latter incompletely separated in USNM 52141 and left prefrontal divided in ZFMK 86744. Frontal in specimens with 400 mm or more snout-vent length 1.13–1.49 times longer than maximum width (1.57 in MNHN 1961.134, Fig. 13, as much as 1.55 in juveniles), 1.10–1.73 times longer than internasals and prefrontals (1.78 and as much as 2.15, respectively), 0.74–1.03 times length of pari-

etals (1.30 and as low as 0.72, resp.). These shields are fused in MMGU 13381 (except last portion) and a photographic record (see next smallprint). Posterior border of parietals usually more or less straight (distinctly convex in MHNG 2443.35 or SMF 67907) and only slightly indented (> -shaped) at the median suture or, sometimes, forming an obtuse angle (e.g., CAS 184431, MCZ 58872, MZUF 23939, 23942, NMW 25452.6, RUZM 30.7, ZMB 38725). Outer margin of parietals often constricted behind (Figs 2A, 2C and 3), posterior edge only about half the maximum width in some specimens (e.g., FMNH 171136, left in CAS 182941, MHNG 2718.18 or MMGU 13381, see above).

Distance from the nostril to the eye 0.80–1.17 times the internasal-prefrontal length (Tab. 1). Loreal usually longer than high (shorter in MMGU 12649) and larger (in particular longer) than anterior subocular (about same size in MMGU 1171), resting on third and, frequently, posterior portion of second supralabials (only on third in, e.g., ZFMK 92802 or on right side of MHNG 2718.18), and separated from subocular except in a few cases (e.g., AMNH 84022, in punctiform contact on right side of MTD 25336). A small scale between the lower border of the nasal and loreal on left of BMNH 1879.8.15.26 (minuscule) and NMW 15167.2. The latter with an elongated scale below the left loreal (apart from a bilateral presubocular). Preocular entire except on one side of MHNG 2443.35 and ZFMK 31669 (lower small) and normally in contact with frontal (separated in, e.g., MMGU 1171, 2729a [distinctly], 13006 or ZISP 14033, unilaterally in CAS 182939, 182941, 184431 or 185035); with an incomplete suture in USNM 52141 (right) and ZMB 38815 (Fig. 2C). Anterior subocular invariably present. A usually smaller presubocular occurs in CAS 182940, MCZ 902 (see next paragraph), MHNG 2443.28 (minuscule), 2646.13, 2718.19, NMW 15167.2 (see above and WERNER, 1917), 15168.4, ZFMK 31668–69, ZMB 38815 (comparatively large and placed mostly above fourth supralabial out of ten, Fig. 2C), ZSM 22.1954.2, 223.1989.2 (small on left), and -.5 as well as on right of NMP 74181, ZISP 11790 (minuscule) and SMNS 3008. The anterior subocular of the latter is larger than in all other verified cases and the distinct unilateral presubocular, basically the detached upper portion of the third supralabial, situated completely below the loreal (Fig. 2B).

The indication of divided (“2”) preoculars (e.g., WERNER, 1895) most probably includes the anterior subocular (see also Distinction: third smallprint). STOLICZKA’S (1870c) “two anteoculars” in ZSI 7265 (“the lower [...] being [...] a detached portion of the third upper labial”, actually the fourth) comprise the presubocular (l.c.: Pl. XI.2, see next smallprint). This scale is usually in contact with the lower posterior edge of the loreal. The configuration observed in SMNS 3008 is also found in a specimen from NE Baluchistan Province reported by WALL (1911a: “3rd supralabial [...] divided”), possibly on both sides. Field photographs of six unregistered *Platyceps r. rhodorachis* from unknown localities in Fars and Yazd Provinces taken by various students (gathered and provided by Mahdi Kazemi) reveal a left presubocular in one of them; another has the parietals coalesced along the whole length. A photographic record from Khorasan-e Razavi (Bazangan, Figs 3A and 4C) shows



**Fig. 2.** Head scales of *Platyceps r. rhodorachis*. MSNG 30312 (lectotype, A) showing standard scalation, SMNS 3008 (B: large subocular and presubocular, three anterior temporals), ZMB 38815 (C: preocular with faint suture, distinct presubocular, ten supralabials), ZSM 223.1989.4 (D: presence of a postsubocular), MTD 20400 (E: posterior inframaxillaries widely separated), and RUZM 30.13 (F). Not to scale. Courtesy of Giuliano Doria/MSNG (A).

a very broad contact of the preocular (with a faint suture) and the frontal, a tiny granule between the anterior subocular and the third and fourth supralabials, and this specimen is exceptional in its single postocular.

Predominantly nine supralabials, last three being larger; eight in MNHN 1961.134, ZSM 229.1988 and 223.1989.1, and on right side of MMGU 1171 and ZSM 223.1989.6; ten in FTHR 15305, 15310, ZMB 38815 (Fig. 2C) as well as on right of BMNH 1879.8.15.26 and MHNG 2646.13. Usually fifth and sixth supralabials in contact with eye; fourth and fifth in specimens with eight scales; sixth and seventh in FTHR 15305, 15310, MHNG 2646.13 (right), and ZMB 38815; only fifth supralabial bordering orbit in specimens with a postsubocular except CAS 147425, FMNH 171133, and ZSI 7265 (see next incl. smallprint); sixth in MCZ 902 which has the upper part of the fifth supralabial split off. A triangular scale occurs between the second and third or seventh and eighth supralabials in ZFMK 93702 (right, upper border) and NMW 34991.3 (left, lower margin, scale pointing upwards), respectively. Two postoculars except in a specimen from Khorasan-e Razavi (Fig. 3A); upper scale somewhat larger or both equal in size. Postsubocular absent except in CAS 147425 (small, fifth and sixth supralabials entering eye), FMNH 141610, 171133 (small, two supralabials entering eye), ZSM 223.1989.4 (Fig. 2D), on left side of FMNH 171788 (ANDERSON & LEVITON, 1969) and ZSM 223.1989.2 as well as in two literature records (see Taxonomy and Type Material regarding the condition in *Gonyosoma dorsale* ANDERSON).

A small postsubocular is found on the right side of ZSI 7265 (STOLICZKA, 1870c) from Himachal Pradesh (“the upper posterior edge of the sixth (or fifth) upper labial being detached from the rest”) but two supralabials (fifth and sixth) enter the eye. KHAN’S (1977) “*Coluber karalini*” [sic] from Darapathar (viz. Rabwah, ca. 31°45’N 72°53’E) with a single supralabial in contact with the orbit (“aberrant racer” from “arid Punjab”, KHAN, 1982) is *Platyceps*

*r. rhodorachis* as evidenced by the number of subcaudals (130) and its origin (SCHÄTTI *et al.*, 2012: 460 [smallprint], 469). MERTENS’S (1956) remark apropos the presence of a right postsubocular in SMNS 3008 (“6. [supralabial] vom Auge durch ein Suboculare getrennt”) is incorrect (Fig. 2B).

Two anterior temporals, lower larger (distinctly so in, e.g., AMNH 161998, BMNH 1936.10.12.6, CAS 182939, 182941, 184837, 185035, FMNH 171788, MHNG 2646.38, MMGU 2729b, and ZFMK 31603 or on right side of NMP 74181 and left of SMF 57308) and upper sometimes paired, viz. two scales in a row (e.g., CAS 184837, 185035, NMW 34990). Two or three secondary temporals (see Geographic Variation incl. Tabs 3–4). The lectotype (MSNG 30312, “2 + 1 + 3” according to KRAMER & SCHNURRENBERGER, 1963) shows 2 + 3 scales (Fig. 2A). SMNS 3008 has three anterior temporals on both sides (Fig. 2B, MERTENS, 1956) and the lower left is exceedingly long. Three or four scales along lateral border of parietals (only two on right side of MHNG 2718.13 by fusion of posterior scales), last usually enlarged and often exceeding size of upper first temporal (Figs 2A–D and 3, see Taxonomy and Type Material apropos *Gonyosoma dorsale* ANDERSON).

Mostly ten (nine to eleven) sublabials; anterior four to five (three) scales in contact with first inframaxillary, sixth (fifth or seventh) largest. Anterior chin shields normally shorter (sometimes much so) and wider than, or about equal to, posterior pair. The latter usually separated in front by two (one) rows of scales of variable shape and size (comparatively large in, e.g., BMNH 1879.8.15.26; granular and partly concealed in RUZM 30.13 or ZISP 13557) and three (two) to five rows behind (Figs 2E–F, see footnote 9). Gulars in four (three) to five oblique rows between the caudal edge of the posterior inframaxillaries and first ventral.

Ventrals in examined material 204–244 (♂♂ 204–244, ♀♀ 206–237, see Geographic Variation incl. first smallprint). Last plate divided in BMNH 1874.11.25.11



and 1951.1.1.26, incompletely developed in CAS 182942, FMNH 171788, MHNG 2718.17 (plus first three ventrals paired) and -19, and MMGU 13006, or anterior ventrals divided in MMGU 2729b (first) and 12649 (first to third plus second preventral). Half-scales not accounted for occur in MTD 25334 (inserted between third and fourth ventrals, eighth with tendency to division), MHNG 2718.15 (last), and ZFMK 41340 (between fourth and fifth). Usually one or two preventrals, absent in, for example, CAS 185035, NMB 14383 or SMF 62926 and 62930, three in ZMB 38815 (this number is also reported by NILSON & ANDRÉN, 1981). Anal scute divided except in MZUF 23942, which shows highly irregular ventrals. Subcaudals in 104–145 pairs (♂♂ 108–144, ♀♀ 104–145), second and third coalesced in MTD 25334, last three in FMNH 171133, penultimate in CAS 147426, and last in MHNG 2718.13 and -16. Total body scales 317–388 (♂♂ 318–388, ♀♀ 317–374, see Geographic Variation incl. Figs 16–18, Tabs 2–3, and first small-print).

Dorsal scales with two apical pits, usually arranged in 19–19–13 rows along the trunk. BMNH 1889.8.28.127 (11 preanal dsr) and ZFMK 41340 (see last paragraph under Geographic Variation) show 19–17–19 dsr between ventrals 100–120 and 98–110, respectively, including midbody. Two specimens from Fars (ZFMK 31667) and NE Afghanistan (ZFMK 8644) have 21 rows on parts of the anterior trunk; this number is present at midbody in RUZM 30.7 and virtually throughout the anterior portion and beyond in TMUS 1006 from Iran (see next small-print). Hindu Kush populations frequently display 19–19–15 dsr (see Geographic Variation incl. Tab. 3).

Twenty-eight examined specimens have an additional bilateral decrease to 11 dsr, usually between 87–97%ven at paraventral (ZISP 9287, see next), lateral (verified in 12 cases), paravertebral (BMNH 1874.11.25.11, SMF 62926, USNM 166773, ZISP 9285.1, ZSM 223.1989.4 and -.6), or median (BMNH 1919.7.18.12, MTD 25334 with 12 dsr between ventrals 200–208 levels (see Methods and Definitions, Samples and Characters: second smallprint, Geographic Variation incl. third smallprint). At least seven of them increase to 12 (AMNH 82181) or 13 dsr between 95–97%ven involving rows 3–5 (MMGU 12001, MZUF 23940, NMW 15168.2, SMF 57305) or with the participation of the vertebral row (UMMZ 121970, USNM 166773). MHNG 2718.17 attains 11 dsr at 88%ven and shows a vertebral split to 12 at 90% followed by three changes (11–12–11) between ventrals 200 to 207 involving rows 4+5. BMNH 1874.11.25.11, MMGU 12001 (12 dsr between ventrals 180–185), SMF 57305, and ZSM 223.1989.6 reduce to 11 dsr at 81–85%; even farther cranial positions are observed in SMF 62926 (77%) and ZISP 9287 (71%, reduction involves rows 1–2).

*Platycephalus r. rhodorachis* with more than two reductions (13 or 11 preanal dsr) except CAS 115970 show the anterior regular fusions (19–15 dsr) normally between 54–64%ven (51–66%), mostly at lateral or paravertebral levels (see Methods and Definitions, Geographic

Variation incl. second smallprint). The vertebral row participates in BMNH 1905.10.14.46 (17–15 dsr), CAS 86586, MCZ 58872, MHNG 2718.13 (all 19–17) as well as in BMNH 1919.7.18.12 and MTD 25334 (both 13–11) with four reductions. Mixed levels occur in twelve specimens with 19–19–13 dsr, viz. CAS 86420, 182940, and 184430–31, MHNG 2443.30, MTD 27935, MZLU 3225, MZUF 23942, ZISP 12134.2 (all 19–17–15), and MNHN 1961.134 (15–13) as well as in TMUS 1006 (21 msr, 17–15) and ZISP 9285.1 (19–19–11 dsr, 19–17). Irrespective of the number of bilateral decreases, the third regular fusion (15–13) is paravertebral, or includes a high level in mixed reductions, and usually situated between 63–79%ven (see Geographic Variation: third smallprint, Tab. 4). Farther caudal positions are found in MHNG 2443.28 (85%), MMGU 2729b (85%), MNHN 1961.134 (81%), and RUZM 30.7 (82%, 21 msr).

MINTON (1966) reported “20 or 21 rows on neck occasionally, more rarely reduction to 17” in the Karachi area, and TUNJEV (2000: Tab.) noted “18” scales around the neck in one out of nine unspecified specimens. We have never observed fewer than 19 dsr in front of ventral 98 (ZFMK 41340) including the nape prior to ventral 15 (see Methods and Definitions). RUZM 30.7 increases to 21 dsr between ventrals 57–67 and attains 19 just behind midbody (51%ven, paravertebral reduction). Except for a short segment near ventral 25 (21–19–21 dsr, paravertebral changes), TMUS 1006 shows 21 rows as far as 54%ven; there are 13 posterior dsr but the number is unstable (13–11–13 etc.) beyond ventral 200. ZFMK 8644 has 21 dsr on parts of the trunk in front of ventral 50 and irregular scaling passed ventral 95 (19–21–19 etc., 20 msr). WERNER’S (1917) report of 21 dsr for ZFMK 31667 (no. 206, “fällt [...] durch ungewöhnliche Größe [...] und 21 Schuppenreihen auf”) is not exactly at midbody (see Systematic Review: fourth smallprint); this specimen displays 20–21 dsr between ventrals 63–76 and 81–103 (changes involving high levels) but has 19 msr. MCZ 902 shows inconstant counts after ventral 100 and at midbody. CAS 115970 attains 15 dsr at only 71%ven (first reduction damaged, 13 at 79%). USNM 166773 is outstanding for a total of four out of five bilateral alterations at paravertebral and median (preanal increase) levels. Three Turkmen specimens from the Khivabad area (CAS 182943, 184430) and Chuli (CAS 185035) with 19–19–13 dsr exhibit only 12 along a short segment (six ventrals or less) of the posterior trunk with the participation of rows 4+5 (CAS 182943, also temporarily reduces to 14 dsr between ventrals 152–154) or at median level. A male from the Lesser Balkan Ridge (CAS 184837, see Geographic Variation: first smallprint) shows 12 rows between ventrals 202–226 by low right side changes. The portion immediately in front of the vent often manifests variation in the number of dsr with frequent multiple changes including more dorsals (15) than farther cranial. An increase from 11 to 13 dsr less than five scales prior to the anal scute and usually involving rows 2–4 occurs in, for example, AMNH 84022, MHNG 2718.17, MTD 19902 and 25334, SMF 62926, USNM 52141, ZMB 56081, ZSM 223.1989.2, -.4, or -.6, and these specimens entered the analysis with 19–19–11 dsr (see Methods and Definitions, Geographic Variation: third smallprint).

## Dimensions

The longest examined specimens are five males (NMW 15168.1, 15168.4, 25452.5, ZFMK 8643 and 31667) from SW Iran, NE Afghanistan, and N Pakistan with a total length of ca. 920 + 380 mm, 900 + 345 mm, 900 + 350 mm, 940 + 375 mm, and 1,025 + 360 mm (WER-



**Fig. 3.** Head scales and dorsal colour pattern of live *Platyceps r. rhodorachis*. Unregistered specimens from Bazangan (A, see Fig. 4C) and Fars or Yazd Provinces (B, see Pholidosis: first smallprint), MHNG 2443.31 (C), and FTHR 15303 (D) preying upon *Trachylepis aurata*. Courtesy of Uwe Prokoph (A), Mahdi Kazemi (B), and Farhang Torki (D).

NER, 1917), respectively. A male from Uttarakhand (vic. Pithoragarh) measures ca. 1,230 (920 + 310) mm. Four males (MHNG 2443.27, MNHN 1961.134, MTD 6126, RUZM 30.13) from Iran (Hamadan), southern Turkmenistan, and Tajikistan attaining 850–893 mm (tail 295–385 mm) exceed the snout-vent length of the largest females (except CAS 157119, see Kurdish Cliff Racer), viz. BMNH 1879.8.15.26 from Fars with ca. 840 mm (tail 330 mm), CAS 86420 (Fig. 5A) from Khuzestan with 808 mm (ANDERSON, 1963), and MCZ 902 (ca. 780 + 315 mm). The smallest specimen (NMB 14383) measures 190 + 86 mm. The tail versus body length ratio ranges from 0.32 to 0.48 (♂♂ 0.33–0.47, ♀♀ 0.32–0.48, see Geographic Variation: Tabs 3–4).

Larger snout-vent lengths (990 mm in ♂♂, 880 mm in ♀♀) for specimens from Turkmenistan than recorded by us are notified by BOGDANOV (1962). MINTON (1966) indicated over one metre total length in the Karachi area (1,043 mm and 1,009 mm, resp.) and almost 1,300 mm is attained in northern Pakistan (STOLICZKA, 1872). WALL (1911b) noted ca. 1,022 mm (3'–4¼") for a "Chitral" female (typical phenotype) and longer dimensions in two intergrades with *Platyceps rhodorachis ladacensis* (see Subspecies).

A specimen from the vicinity of Kurtusu (VARENCZOV, 1894) measures 889 mm ("1 arshin 4 vershka"). A tail of 448 mm in a female of the striped phenotype with 660 mm snout-vent length (BOGDANOV, 1965a) is

certainly incorrect, and two further indications by this author (173 mm in a ♂, 237 mm in a ♀, tail vs. body length ratio 0.31–0.32) may rely on specimens with an injured tail. *Platyceps r. rhodorachis* from the Boralday Mountains and Malyj Karatau (Lesser Qaratau Zhotasy) in Kazakhstan (KOLBINCZEV & BRUSHKO, 1986) match the proportions of populations from Uzbekistan and Kyrgyzstan (Tab. 4) except for a slightly lower quotient (0.30–0.31) in two females. AKRAM & QURESHI's (1997) data for the Sargodha area in Punjab (♂♂ 0.35–0.39, ♀ 0.32) may mostly be based on specimens with incomplete tails. WHITAKER & CAPTAIN's (2004) maximum total length ("1043mm") is after MINTON (1966). This author reported "290–300 mm" for supposed newborns in the Karachi area (see last paragraph under Ecology). Two Indian cliff racers including a juvenile from Subathu (STOLICZKA, 1870c) with ca. 216 mm snout-vent length have quotients of 0.34 (Pithoragarh ♂) and 0.35. Undoubtedly, STOLICZKA's (1872) individual measuring 1,295 mm in total ("51 inches, the tail being 12.5 inches") is a male; its tail vs. body length ratio (0.32) is much lower than observed in the examined material from this regional group (Tab. 4: group G) and not considered in the analysis. This is also the case with the very low value (0.35) resulting from WERNER's (1917) dimensions for the large Fars male (ZFMK 31667). MULDER (2002) noted a tail vs. body ratio of 0.47 in a male roadkill from Khuzestan.



## Colour Pattern

Head grey to brownish except some supralabials as well as in front of and behind the eye (creamy white to yellow, posterior labials sometimes with a touch of orange, Fig. 3A). Loreal region often slightly darker. A distinct oblique subocular streak (curved backwards) and usually two broad dark marks across the temples, the first in contact with the anterior lateral edge of the parietal and the other running to the corner of the mouth. Pileus normally without discernible pattern but sometimes with irregular semi-symmetrical darker marbling, in particular on the parietals and supraoculars.

Our material from SE Hormozgan (MHNG 2718.13–16, Fig. 4B) has uniform greyish heads without darker lateral markings as also observed in adjacent southern Sistan-ve Baluchestan (NMB 14383) and most specimens from inland Makran (ZSM series). NMW 15167.1 from Bazman (Sistan-ve B.) exhibits prominent subocular and temporal streaks. Only the former is present in a photographic record from Fars or Yazd (Fig. 3B) with virtually no head pattern. Intermittent dark marks on the pileus are found in certain individuals from Turkmenistan (e.g., CAS 184431 [prominent irregular markings], ZMB 51839) to Tajikistan (MMGU 12649 [Uzbekistan], ZISP 14032–33, 15819), the Kabul area and NE Afghanistan (e.g., ZFMK 8643–44, see below), Kashmir (PMNH 1431), Karachi (SMF 57328), Bazman (MMGU 12001), and from the southern parts of Kerman (MHNG 2646.38–39, Fig. 4A) and Fars (FMNH 171135) through Bushehr (FTHR 15306) and Khuzestan (BMNH 1951.1.1.26, CAS 86409) to the Zagros (e.g., MMGU 13382) and W Ilam (RUZM 30.7). A *Platyceps r. rhodorachis* from Uttarakhand (Fig. 5E) displays a lyre-shaped mark on the parietals and a noticeably mottled anterior pileus. STOLICZKA's (1870c incl. Pl. XI.2a) juvenile from Himachal Pradesh “with some dark markings on the occipitals” (viz. parietals) actually exhibits a horseshoe mark with the ends directed forwards. A very pronounced complex head pattern is found in another specimen from this area (Simla, see below). A juvenile from Kabul (ZFMK 8651, Fig. 5D) shows a distinct symmetrical head pattern and nuchal streak. This feature also occurs in an Ilam racer depicted by FATHINIA *et al.* (2010: Fig. 3e). The dorsal head views of an Iranian “*Coluber rhodorachis*” in RAI (1965: Pl. III.7–10) belong to *P. karelini chesneii* (SCHÄTTI, 2006b).

Chin, underside of neck, and belly usually ivory to bright yellow. Venter “with sometimes some pinkish suffusion” (WALL, 1911b), pale greenish (see fifth smallprint in this section), or “shading to buff posteriorly” (MINTON, 1966); outer portions (delimited by the ventral keels) often impinged on by the dorsal coloration (“with a slight dusky tinge”, STOLICZKA, 1870c incl. Pl. XI.2b) or with a touch of red in life (e.g., MHNG 2718.17, TMUS 1017). Lateral edges of numerous anterior ventrals normally with dark spots or short transverse streaks (see Samples and Characters). Underside of tail usually pearly white, sometimes yellow or slightly reddish.

*Platyceps r. rhodorachis* is polymorphic. The typical phenotype features a reddish vertebral stripe and specimens virtually devoid of any apparent marks down the dorsum occur; these morphs are discussed at the end of this section (see also Samples and Characters incl. Fig. 14, Geographic Variation, Affinities: first smallprint). The more common patterned or non-striped phenotype shows dark transverse blotches (bands or bars, see Methods and

Definitions: second smallprint) or spots on a mostly greyish, brownish, or olive trunk (see next smallprint). The markings gradually disappear behind midbody, are usually absent from the posterior third, and lack on the last quarter except in a few specimens from western Iran (see below). The hind trunk and tail are often uniform dun to doe-coloured; the upper side of the tail sometimes shows a reddish hue.

The dorsal markings vary from black to various shades of grey or brown including “chestnut, or pale russet” (MINTON, 1966). Their shape, size, and configuration along the forebody and beyond are variable. Typically spotted specimens exhibit paraventral, lateral, and mid-dorsal (or a median) rows of juxtaposed dots down each flank. The blotched phase may display lateral spots in between these cross-marks, or the latter extend across the whole dorsum. A transversely banded or barred pattern on the neck and/or anterior trunk, including chequered arrangement, may gradually become spotted (or rather so) behind. The dorsal colour pattern often comprises diffuse irregular pigmentation, in particular passed mid-body, made up of clusters of dark-edged scales. Moreover, the lateral borders of the dorsals are frequently of a different colour to the median segment as mentioned by ALCOCK & FINN (1897) and others (see Southern Pakistani Racers, KHAN, 1997: Fig. 2B).

The dorsal coloration varies from light grey or “dun” (WALL, 1914: Chitral), brownish tones, “olive-greenish” (WALL, 1911b), or greenish grey (“Grünlichgrau”, WERNER, 1917) to bright yellowish green (“leuchtend gelbgrüne Färbung”, CASIMIR, 1971: SMF 67907). In the “Karachi District”, *Platyceps r. rhodorachis* is “pale to medium gray, in some cases with a brownish or greenish cast” (MINTON, 1966). STOLICZKA (1872) noted “fine longitudinal dark stripes along the scales” and WALL (1914) described the anterior dorsals of Chitral specimens as “black on their basal margins and pale yellowish or whitish on their apical margins where overlapped. This produced a beautiful variegation chiefly visible when the snake inflated itself under excitement.” Space simply does not allow a more exhaustive description of the manifold nuances of dorsal markings. The following text provides a somewhat detailed overview of the variation of colour pattern from the Himalayas to the western Tien Shan, southern Turan, and Iran. Generally speaking, juveniles manifest more intense pigmentation.

A juvenile *Platyceps r. rhodorachis* from Subathu in Himachal Pradesh displays “numerous short, rather broad blackish transverse bands, interrupted on the sides and alternating with lateral spots” (STOLICZKA, 1870c incl. Pl. XI.2a). A filmed cliff racer from the same area (Simla, see Material: smallprint) with five broad collars (anteriormost with a short median protrusion directed cranially) followed by alternating mid-dorsal spots and oblique cross-bands strongly resembles the Subathu specimen. Two adults from Himachal Pradesh and Uttarakhand show bold blotches across the trunk (BNHM 539) or dark transverse blotches on the nape turning into spots posteriorly (Fig. 5E, see next smallprint).

Five specimens from Azad Jammu and Kashmir (BMNH 1873.7.3.12, PMNH 1431), central Khyber Pakhtunkhwa (incl. SMF 62941), and Punjab are transversely barred (e.g., NMW 25452.6) or basically spotted





**Fig. 4.** Dorsal colour pattern of live *Platyceps r. rhodorachis* from Iran and Turkmenistan. MHNG 2646.39 (A, Kerman Province), MHNG 2718.13 (B, Hormozgan), unregistered specimen (C, Khorasan-e Razavi, see Fig. 3A), and MHNG 2443.35 (D, vic. Ashgabat). Not to scale. Courtesy of Uwe Prokoph (C).

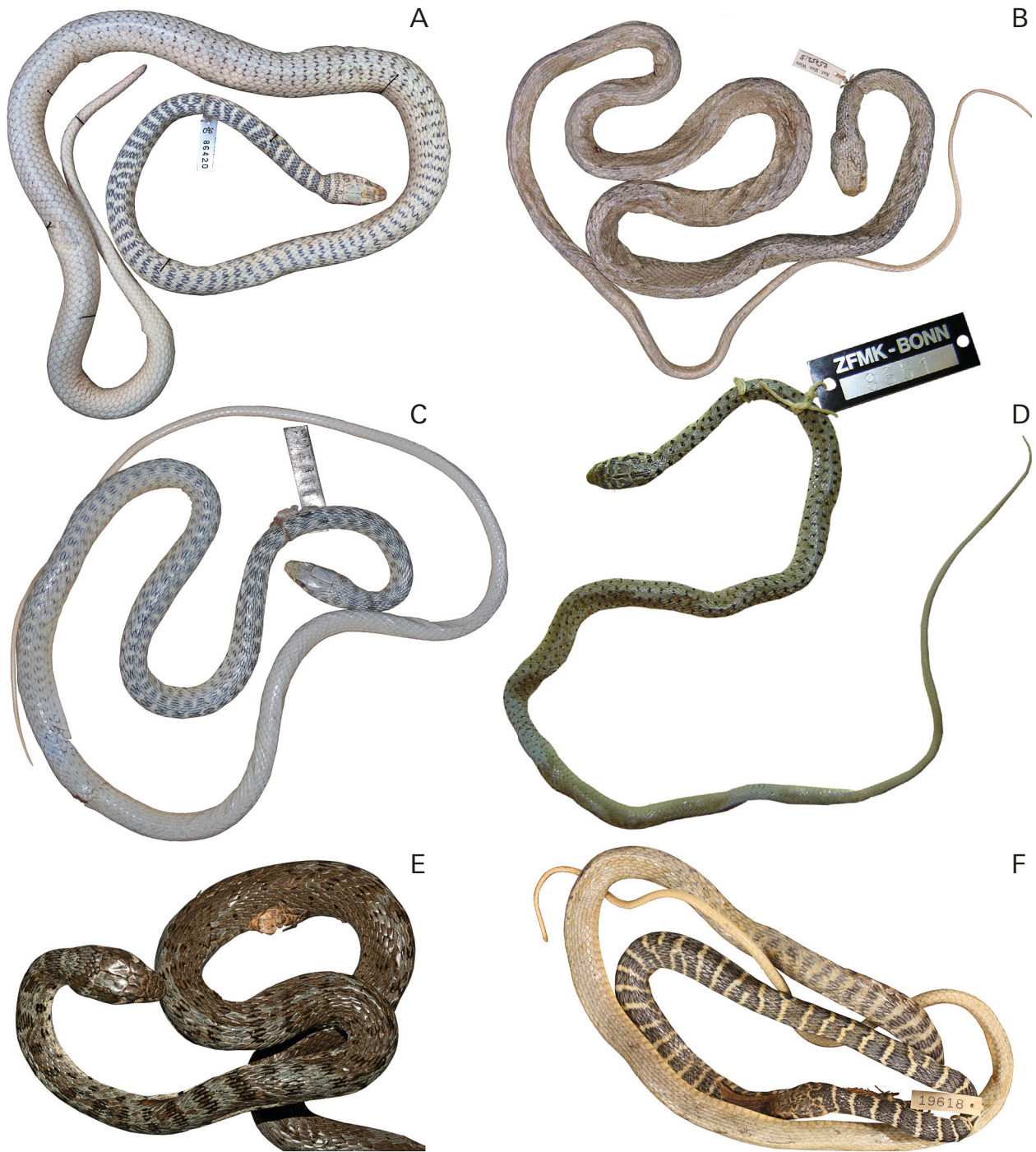
(e.g., SMF 57308, with a few collars). The spotted pattern is also encountered in immediately adjacent Afghanistan, viz. Konar (ZFMK 8643–44, KULLMANN, 1970: Abb. 15) and Nangarhar (see last paragraph in this section) as well as in Laghman (CAS 120492, 120718) or around Kabul (CAS 92323 [see next smallprint], 147425–26 [with 1–3 collars], MMGU 2729a–b, ZFMK 8559, 8651 [Fig. 5D], 8678, ZSM 22.1954.1–2). WALL (1911b) noted “quincunciate, small, blackish, round spots, most conspicuous anteriorly” in Chitral. The single examined specimen from this district (BMNH 1910.7.12.2) essentially matches this description; on the neck, it features pronounced short mid-dorsal or paravertebral transverse blotches (the latter partially extending down the flanks).

Sixteen specimens collected within a perimeter of 125 km from Karachi are chequered or spotted (often combined). AMNH 85863 has comparatively broad collars (dorsal marks become very faint near ventral 100) and a few nuchal bars are present in AMNH 161996 (single), SMF 57328, 62926, and UMMZ 121970. A cliff racer from Astola Island (SMF 57305) is essentially transversely barred, eight obtained in Makran (ZSM series) are chequered or spotted, and two from Chagai (PMNH 770, 771) predominantly chequered. This pattern is also observed in USNM 52141 (Fig. 5C) from “Quetta” but it becomes spotted towards midbody, similar as in AMNH

88470 (dorsal markings visible to ventral 150) from the Nari draining region of NE Baluchistan Province west of the main watershed (Brahui Range). Five specimens collected in contiguous Afghanistan (Kandahar area) may show a few narrow collars (e.g., CAS 115970, see following smallprint) and are basically chequered (incl. MZLU 3225) or conform to the spotted phase (FMNH 171788, MZLU 3226, 3036, see Geographic Variation: first smallprint). MZLU 3227 from Zabol Province exhibits transverse mid-dorsal marks.

Part of ATKINSON’s (1884) text apropos *Composoma semifasciatum* auct. (“colour above pale olive grey transversely dark barred and spotted [...] belly whitish with a slight dusky tinge”) is after STOLICZKA (1870c) and the description of the head pattern deficient (“a horse-shoe mark with the ends directed backwards [!] on the occipitals [parietals]; a pale, elongate, lateral ocellus on each occipital”, see first smallprint in this section). Three *Platyceps r. rhodorachis* from Indian Kashmir (vic. Poonch) have the “dorsum [...] covered by spots arranged in a chessboard pattern” (MURTHY & SHARMA, 1976: Fig. 7). Specimens from the vicinity of Rabwah (n=1) and Kalabagh (2) in Punjab (Pakistan) feature a “pattern of short cross bars which may break into dark spots” and a “slight indication of barred pattern in anterior one fourth part of the body”, respectively (KHAN, 1977, 1986). A photographic record from the vicinity of Rawalpindi provided by Rafaqat Masroor shows six longitudinal rows of spots. The distinction of two phases of the non-striped morph in “Dir and Swat” by McMAHON (1901b: “ventrimaculatus [auct.]. – Not so common as” *ladacensis*, treated as





**Fig. 5.** Dorsal colour pattern of *Platyceps r. rhodorachis* including Kurdish Cliff Racer (F). CAS 86420 (A, Khuzestan), NMW 34992 (B, Kabul, juv.), USNM 52141 (C, Quetta), ZFMK 8651 (D, Kabul, juv.), unregistered specimen (E, Uttarakhand), and FMNH 19618 (F, Arbil). Not to scale. Courtesy of Jens V. Vindum/CAS (A), Heinz Grillitsch/NMW (B), Ursula Bott/ZFMK (D), Ashok Captain & Emmanuel Theophilus (E), and Kathleen Kelly/FMNH (F).

distinct species) may rely on different dorsal colour types (spotted versus transversely barred). Four Afghan specimens from the vicinity of Jalalabad (Nangarhar) and Aqchah (Jowzjan) have “indistinct transversal stripes in their anterior part of body” (KRÁL, 1969). LEVITON & ANDERSON (1963) described the marking of CAS 92323 from Kabul Province as consisting of “small, irregular, dark patches”, noting that its pattern “[d]iffers from others [...] reported on from Afghanistan in lacking the distinct blotches on the dorsum” (we are not aware of any published records of such Afghan specimens prior to this statement). According to MINTON (1962, 1966: 47, 121), *P. r. rhodorachis* exhibits “small, dark spots” or “short cross bars or

alternating spots” but the illustrated Karachi racer belongs to the “[b]lotched phase” (MINTON, 1966: Pl. 25.1). Six specimens from SE Baluchistan (Khuzdar, incl. three juveniles) show “an indication of spotty pattern in the anterior part” (KHAN & AHMED, 1987). WALL’s (1911a) sample from NE Baluchistan Province (see Brahui Racer: first smallprint) displays “a regular series of spots [...] down the dorsum. These spots are usually rather large, and roundish or oval, but in some specimens these are replaced by narrow bars.” The discrepancy between our descriptions and some remarks in literature is due to terminology. Obviously, ‘spots’ as used by various authors are comprised of short transverse mid-dorsal bars as exem-

plified by two racers from Kandahar including CAS 115970, viz. “with small dark spots, arranged in alternating rows (checkerboard fashion, but the spots not in contact with one another)” (ANDERSON & LEVITON, 1969). The reported caudal extent of the marks (“fading out on the posterior third of tail”) is erroneous.

A *Platyceps r. rhodorachis* from the Morghab in NW Afghanistan (Badghis, SMF 67907) shows cross-bars (lateral view of head and neck in CASIMIR, 1971: Abb. 5, see chresonymy) and two specimens from Jowzjan Province may look very similar (KRÁL, 1969; see preceding smallprint). Examined cliff racers from Uzbekistan, Tajikistan, and Kyrgyzstan are transversely barred with a series of juxtaposed lateral or paraventral marks; MTD 11334 and ZISP 14032 have a few cross-bands on the nape. The barred and/or chequered dorsal colour types are also prevalent in SE Turkmenistan. MHNG 2443.31 (vic. Ashgabat, Fig. 3C) shows comparatively faint markings behind the neck, others display spots on the neck (e.g. BMNH 1892.11.28.6, MTD 20400, 25335), and CAS 184837 (Lesser Balkan Ridge) or specimens from the Kopetdag (e.g., CAS 185035, ZMB 51839), and in particular most of the Khivabad series (182940–43, 184430), are basically spotted throughout the patterned segment except for sporadic short transverse bars. This phase is also common in NE Iran (Fig. 4C; TMUS 1017 is distinctly barred at midbody) and south to Sistan-ve Baluchestan (e.g., CAS 141076, FMNH 141610, MMGU 12001 [chequered posteriorly], NMB 14383, NMW 15167.1, SMNS 3008, ZISP 9285–88) and SE Hormozgan (LATIFI, 1985: Fig. 42). The median segment completely lacks any dark pigmentation in a specimen from the latter province (MHNG 2718.13, Fig. 4B), resulting in a light grey mid-dorsal band. This peculiarity is also encountered elsewhere as exemplified by ZFMK 8643 from Konar in NE Afghanistan (KULLMANN, 1970: Abb. 15). The neck of MMGU 12211 and ZFMK 93702 from the ‘Dasht-e Lut’ area is virtually devoid of markings and the remaining pattern conforms to the ‘*persicus*’ morph (see next but one smallprint).

TERENTJEV & CHERNOV (1940, 1949) described the dorsal colour pattern of *Platyceps r. rhodorachis* from Central Asian republics of the former USSR as with narrow transverse blotches between which smaller marks are found (“v temnykh, uzkiikh [...] poperechnykh pjatnakh, meshdu kotorymi ny bokakh raspolosheny bolee melkie pjatna”). BANNIKOV *et al.* (1977: Pl. 28.4a), TUNJIEV (2000: Fig. 1b), SZCZERBAK (2003: Pl. 138), ANANJEVA *et al.* (2004), or WHITAKER & CAPTAIN (2004: unnumb. Pl., ZMB 56081) illustrate specimens, possibly all from Turkmenistan. A *P. r. rhodorachis* from “Ramit National Park” in Kofarnihon County (Mamnu’gohi Romit, Tajikistan) is presented in MASROOR (2012: Fig. 83). Two olive grey specimens from Artuch (Tajikistan) exhibit cross-bars on the anterior trunk; their width is variable in two individuals from the Zeravshan Range and the vicinity of Samarqand (DAL, 1936). Kazakh cliff racers are transversely barred (KOLBINCEV, 2010; see Subspecies: first smallprint). NIKOLSKIJ (1900) mentioned five longitudinal rows of dark spots in ZISP 9285–88 from E Iran. ZISP 9286 with two pseudo-collars and tiny scattered spots (ocellated on forebody) is reproduced in the ‘Fauna Rossij’ and elsewhere (NIKOLSKIJ, 1916: Pl. 1.2; TERENTJEV & CHERNOV, 1936: Pl. IV.2; SINDACO *et al.*, 2013), and it is not at all surprising that the whole series had been classified as “*Zamenis dahlii*” (NIKOLSKIJ, 1900, 1905, 1916) or “*Coluber najadum*”, respectively. In fact, this dor-

sal colour pattern is prevalent in Transcaucasian *P. n. najadum* (see Systematic Review: fifth smallprint, Sympatry: first smallprint, SINDACO *et al.*, 2013: photos 144–145).

BMNH 1869.8.28.129, 1919.7.18.12, FMNH 141639, 171135, FTHR 15306, and MHNG 2646.38–39 (Fig. 4A) from the southern parts of Kerman and Fars, Bush-e-hr, and Henjam Island manifest an essentially chequered pattern with transverse blotches behind the head except in the insular racer (dorsal nape segment without markings). A specimen from “Bushire” (BMNH 1869.8.28.129) exhibits distinct broad cross-bands on the neck and four series of small dark spots onto the last quarter (anterior portion) of the trunk.

The dorsal marks of *Platyceps r. rhodorachis* from southwestern Iran may extend far beyond midbody as exemplified by further specimens, for instance MCZ 58872 (HAAS & WERNER, 1969: Pl. 19), MMTT 1073 (LEVITON *et al.*, 1992: Pl. 15E) from the vicinity of “Ganaveh [...] Khuzistan Province” (actually in N Bushehr) with a strongly banded pattern on the anterior portion, slightly staggered along the spine after midbody, and alternating bars posteriorly (see Systematic Review: seventh smallprint), or ZFMK 31666 which has black bands (broader mid-dorsally) across the whole trunk (see next smallprint) and remnants of the pattern visible as far caudal as about ventral 180.

All examined non-striped cliff racers from Khuzestan (viz. BMNH 1951.1.1.26, CAS 86371, 86409, 86420, 86433, 86586 and 86624, FMNH 171133–34, MCZ 58872) show conspicuous cross-bands behind the head and are usually chequered at least over a certain distance of the trunk. CAS 86420 (Fig. 5A) features numerous strikingly narrow transverse bars near midbody. Distinct large paraventral dots are found beyond the nuchal bands (e.g., BMNH 1951.1.1.26, MCZ 58872). Prominent cross-bands on the nape, along the neck, and normally present farther caudal are observed in six specimens (incl. MMGU 13381) from Ilam (RUZM 30.7) and Lorestan (FTHR 15307, 15310) north to Kermanshah (MMGU 13006) and Hamadan (RUZM 30.13). Those from the vicinity of Nurabad (Lorestan) are similar to an individual from Ilam (FATHINIA *et al.*, 2010: Fig. 3e) with alternating transverse blotches behind the banded neck and a portion of the forebody. BNHM 565 from Azarbayjan-e Gharbi (East A.) has a dorsal colour pattern basically made up of cross-bars including a few collars and some broader dark mid-dorsal marks on the neck.

FIROUZ (2005) depicts the densely patterned dorsal colour type often met with in southwestern Iran. Some specimens from near Masjed Soleyman including CAS 86420 (Fig. 5A) are similar to Iraqi cliff racers regarding their broad neck markings (see next chapter, Subspecies). WERNER’s (1917) description of ZFMK 31666 (no. 165, Fars), viz. with narrow cross-bands on the anterior body (“schmale dorsale Querbinden auf der vorderen Körperhälfte [...] erheblich schmaler [...] als die Zwischenräume”), is inadequate apropos the width of these marks and purported larger interspaces (see above). “*Z.[amenis] v.[entrimaculatus]* var. *D. persica*” is the appellation used by F. C. Andreas in his field chronicle and literally cited by WERNER (1917). The sample includes three specimens from Bush-



ehr (“Tangistân”) and Fars (“Tschâbâgh”, see Systematic Review: fourth smallprint), and the description of the dorsal colour pattern (pileus and posterior trunk monochromatic) clearly identifies them as *Platyceps r. rhodorachis*. In one, the venter has a slight greenish hue (“blaßes, atlasglänzendes Meergrün”). The “var. *D. persica*” is characterised by dark-edged scales forming zigzag lines (“Zickzacklinien [...] gebildet durch die dunkleren, schwärzlichen Ränder der Schuppen”), or remnants thereof, across most of the trunk. The Bushehr specimen is described as having white transverse blotches (“quergestellte weiße Flecke”). Four photographed non-striped *P. r. rhodorachis* from Fars and Yazd Provinces (see Pholidosis: first smallprint), all with nuchal cross-bars, feature vague markings only slightly darker than the light greyish brown colour of the dorsum and they are virtually invisible in an individual prior to shedding. This physiological state and/or certain preservative agents (in particular formaldehyde) give such specimens a plain appearance.

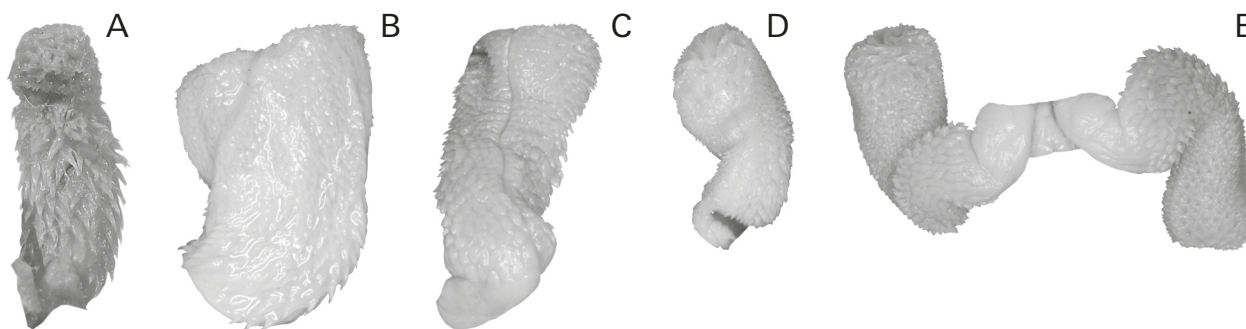
The typical phenotype displays a similar chart of dorsal colour palette as encountered in non-striped *Platyceps r. rhodorachis*, and there exist no differences between these morphs regarding head and venter markings. Living specimens seen by us are greyish or show various shades of brown. The vertebral stripe is orange to vermilion or crimson, starts at the posterior junction of the parietals and is sometimes interrupted immediately behind these shields (e.g., MHNG 2718.18, MTD 30814, or in an unregistered racer from Yazd, see Pholidosis: first smallprint). It is usually two or three dsr wide (one in, e.g., MHNG 2718.18 or on nape of some specimens, four towards midbody in TMUS 1005 and 1006 or the individual presented in Fig. 3B, see following smallprint) and may become faint or disappear posteriorly (extends onto tail in TMUS 1006). Normally, the dorsum exhibits no pattern but black-edged scales are observed in FMNH 161185 from Paghman (“the posterior margin of each dorsal scale of anterior third of body black”, ANDERSON & LEVITON, 1969), near Peshawar (AMNH 161998), MZUF 23939 (neck), 23941 (anterior trunk), and 23942 (reaching beyond midbody) from the Herat-Badghis border or in Khorasan-e Razavi (MMGU 13172). Small dark spots occur along the flanks of MTD 30814 (in particular at midbody) and USNM 166773 has partially light-edged lateral scales. ZFMK 86744 shows a few (3–4) short transverse marks on the sides of the nape and very fine dots down the anterior flanks. Some specimens (e.g., BMNH 1869.8.28.127, MCZ 902) manifest black splashes which are highly irregular in shape and size and randomly dispersed over the trunk; a dark patch also occurs on the neck of MTD 19178 and forebody of MZUF 23941.

Illustrations of striped *Platyceps r. rhodorachis* are found in, for example, BANNIKOV *et al.* (1977: Pl. 28.4), LATIFI (1991 [1985]: Pl. 16 [Fig. 41]), TUNJEV (2000: Fig. 1a), SZCZERBAK (2003: Pl. 139), RAJABIZADEH *et al.* (2008: photos p. 68), FATHINIA *et al.* (2010: Fig. 3d), PERRY (2012: Fig. 8, BMNH 1936.10.12.6), SINDACO *et al.* (2013: photo 148, same specimen as in Fig. 3B), or YOUSEFKHANI *et al.* (2014: Fig. 3A). ANDERSON (1872) reported a vertebral stripe “from the posterior extremity of the vertical [frontal] on to the base of the tail” in the type(s) of *Gonyosoma dorsale* AND. from Fars. WALL (1908b) noted a BNHM individual (“Var. *ladacensis*” no. 2) from near Masjed Soleyman with “a faint indication anteriorly of a pinkish vertebral stripe so that it seems probable intermediate forms will be met with to connect the two colour varieties.” We have not come

across this transitional pattern. The spinal line is “rose-coloured” (GÜNTHER, 1858; JAN, 1865), “bright pink” (ANDERSON, 1872), “pink or red” (BOULENGER, 1893), “bright vermilion” (McMAHON, 1901b), “very bright pink” (WALL, 1908b), “bright rosy pink” or “brownish-red” (WALL, 1911b), and “reddish” or “light orange to vermilion” (MINTON, 1966: 47, 122). WERNER’s (1917) purportedly yellowish stripe in five desiccated juveniles (see Systematic Review: fourth smallprint) may rely on partially faded pigmentation. Apart from “[o]live” (GÜNTHER, 1858; JAN, 1865), the dorsal coloration varies from graphite (“plomb foncé”, ZARUDNYI, 1891) or different shades of grey such as “pale brownish gray” (MINTON, 1966) to light brown (“hellbraun”, WERNER, 1917) and “[p]ale yellowish green” (ANDERSON, 1872). VARENCZOV (1894) mentioned small dark spots in two typical cliff racers from the Kopetdag including ZISP 8623. Most striped *P. r. rhodorachis* are “without dark ventral [...] markings” (MINTON, 1966) but conspicuous spots are found in, e.g., BMNH 1951.1.1.27 (except on underside of neck) and further specimens from the same area (Masjed Soleyman) in Khuzestan (WALL, 1908b); ventral dotting has also been noted in AMNH 161998 and MMGU 13172 from Peshawar and NE Iran.

STOLICZKA (1872) and WALL (1911b) described “adults [...] occasionally coloured uniform olive” and individuals with the “spots [...] absent” from northern Pakistan (probably central Khyber Pakhtunkhwa) and “Chitral”, respectively. Very vague spots are discernible on the neck of NMW 25452.5 from Mt. Sirban included in the former paper. CAS 115971 from Kabul Province is “more or less uniform tan, with no distinct pattern” (ANDERSON & LEVITON, 1969); in fact, the spots have almost completely disappeared and the specimen is virtually plain. A juvenile from Kabul (NMW 34992, Fig. 5B) with prominent dark streaks below the eye, on the anterior temple and the last supralabial is devoid of any dorsal markings except a few scattered black smudges (incl. tail). A rudimentary pattern is also observed in ZFMK 41340 (see last paragraph under Geographic Variation) but the venter shows pronounced dark lateral streaks on each plate from the neck to the posterior third of the trunk. The “uniform gray” CAS 96250 (CLARK *et al.*, 1969) from Nangarhar Province has a weak spotted pattern (Fig. 14).

BLANFORD (1876) stated that the striped phenotype “passes into another, to which some of the specimens collected by me belong, without the rose-coloured stripe down the back, but also without any indication of cross-bands. An individual of this variety brought from Shiráz exists in the Museo Civico di Genoa, and was identified by Jan with his *Z.[amenis] rhodorachis*.” This remark applies to the lectotype (MSNG 30312) with a faded vertebral stripe (see Taxonomy and Type Material), and it appears that BLANFORD (1876) was unaware of its taxonomic status. None of the ‘Eastern Persia’ specimens examined by us (see Systematic Review: second smallprint, chresonymy) conforms to this “variety” devoid of any dorsal colour pattern, viz. the plain phenotype (see fifth smallprint in this section). Reports of monochromatic *Platyceps r. rhodorachis* from Iran as a reddish grey specimen (“Oben einfarbig rötlichgrau”) mentioned by WERNER (1895) or ZFMK 31667–70 (see Systematic Review: fourth smallprint) refer to the typical phenotype (Appendix D, see External Data). The unicoloured AMNH 161999 shown in MINTON (1966: Pl. 25.2), though, belongs to a different taxon (see Brahui Racer).



**Fig. 6.** Hemipenes of *Platyceps r. rhodorachis* FMNH 171136 (A), MHNG 2718.13 (B, left, asulcate view, apex not fully everted), MTD 20400 (C), MTD 25334 (D, asulcate), and MHNG 2718.17 (E, asulcate). Right organ in A and C–D (sulcate view in A and C). Not to scale.

### Osteology and Anatomy

Maxillary normally with 14–16 (13–17) teeth (see Geographic Variation incl. Tabs 3–4). Anterior series subisodont, posterior two teeth separated by a usually wide diastema and enlarged, last offset laterad. Palatine with 9–10 teeth ( $n=26$ ) and once 8, pterygoid 15–21 ( $n=13$ ), dentary usually 16–18 ( $n=78$ ), sometimes 19 ( $n=11$ ), and unilaterally 20 ( $n=1$ ). Proportions for seventeen midbody vertebrae of MHNG 2443.28, -30, and -32 are 1.41–1.55 (centrum length against minimum width of neural arch), 0.55–0.64 (centrum length versus width across prezygapophyses), and 1.09–1.25 (neural crest length vs. minimum width of neural arch). Data for five vertebrae extracted from MHNG 2443.30 near ventral 50 is 1.50–1.63, 0.65–0.69, and 1.15–1.32, respectively.

MHNG 2718.18 unilaterally shows eight palatine teeth (nine on left side). Ten are found in AMNH 85578 (bilateral count), CAS 147427, MHNG 2443.28 (bilateral), -30 (ibid.) and -31, 2718.17 (bilateral), ZISP 41340, and ZMB 38725. Eight out of ten specimens (eleven counts) with 19 teeth on the dentary are from southern Iran (3) including ZFMK 93702 (20 teeth on one side), the Baluchistan Region (3) including MZLU 3226 (see Geographic Variation: first smallprint), or the Karachi area (2), and two are from the vicinity of Ashgabat (CAS 182939, MHNG 2443.32). Several numerical values for dentition of “*Zamenis rhodorachis*” and “*ventrimaculatus*” auct. reported by WALL (1911b, 1914) are incorrect or at least do not refer to *Platyceps rhodorachis* (see External Data, SCHÄTTI & SCHMITZ, 2006: footnote 1). In particular, “10 or 11” prediastemal teeth in three Chitral *P. r. rhodorachis* (1911b: no. 8 and 14–15) certainly do not include all sockets. There are “13 or 14 maxillary teeth before the gap” in skulls (1914: 43) of *r. rhodorachis* (no. 16) and an intergrade with *r. ladacensis* (no. 1, 22–23 on pterygoid) as well as in three additional specimens (no. 5–7) from “Chitral” (1911b). We have never observed the maximum numbers indicated for the palatine (“9 to 11”) and pterygoid (“15 to 24”) or the minimum for the dentary (mandibular, “15–20”, 1911b, 1914) in any species of the *rhodorachis-ventromaculatus* complex from the area covered by this study. Our data for vertebrae relies entirely on Turkmen specimens.

Hemipenis subcylindrical with simple *sulcus spermaticus*. Proximal portion densely covered with subequal spines (longer at base); apical area distinctly calyculate, trabecular ridges spinulate (Fig. 6). Apex reaches subcaudals 7–12 (4.9–9.8%subc), insertion of *Musculus retractor penis magnus* at subcaudals 25–32 (19.2–27.5%). The female anal gland extends to the third subcaudal (CAS 184431) and scales 4–7 (2.8–5.3%). MHNG 2443.28 (♀) has the anterior edge of the thyroid at ventral 45 (20%ven), posterior tip of heart at 52 (23%, trachea enters right lung at same level), liver situated between ventrals 61–108 (27–48%), anterior tip of pancreas at 141 (62%), and kidneys from 194–205 (right, 85–90%) and between 205–217 (left, 90–96%). MHNG 2443.27 and -34–35 (♂♂, ♀, Turkmenistan) have the posterior tip of the heart between ventrals 54–58 (24–26%).

The description of the hemipenis relies on everted organs of specimens from Iran and Turkmenistan. The proximal spines are larger in FMNH 171136 from N Hormozgan (Fig. 6A) and the partially everted left hemipenis of BMNH 1869.8.28.129 from Bushehr. Notes regarding their extent in two specimens from Karachi District and Kabul Province record “to sixth subcaudals” out of nine (SMF 57327) and “onto apex” (FMNH 161185), respectively. The observed variation needs to be addressed with more material in order to corroborate or refute these conditions. The hemipenis of a cliff racer from Ahvaz illustrated earlier (SCHÄTTI, 1987) is discussed further ahead (Geographic Variation: sixth smallprint).

### Distribution

*Platyceps r. rhodorachis* is found from the Kurdish Region and the eastern Caspian coast to Kyrgyzstan, and from the Shatt al-Arab area to at least the border area between Uttarakhanda (India) and westernmost Nepal (Figs 7–11 and 15).

The distribution in northwestern Iran is poorly documented. LATIFI (1985–2000) maps the species as far as the borders with Turkey, Armenia, and Azerbaijan including Nakhchivan (Nakhichevan) but no collecting site from farther north than 36°15'N latitude (Saqqez) is specified. Although not corroborated by hard evidence,

the presence of *Platyceps rhodorachis* in the Orumiyeh (Urmia) area, Azarbayjan-e Sharqi (West A.), seems to be beyond reasonable doubt in view of a report from contiguous Iraq (Fig. 7, see next chapter). *Platyceps r. rhodorachis* is confirmed for Meyaneh County in southeastern Azarbayjan-e Gharbi (East A., BNHM 565), reported from Zanjan (LATIFI, 2000), most certainly lives in S Ardabil, and presumably so in SW Gilan. The absence from the Caspian ecozone (Hyrcanian Forest and littoral belt), and possibly all along the northern escarpment of the Alborz east to Golestan, as indicated by LATIFI (1985–2000) is correct. Cliff racers are recorded from Turkmen territory (vic. Şarlawuk, see next but one smallprint) immediately across the Atrek River (Rud-e Atrak) and the Golestan-Khorasan-e Shomali border (NILSON & ANDRÉN, 1981). For the rest, *P. r. rhodorachis* occurs over most of Iran from near the Arvand Rud (Shatt al-Arab, Khuzestan Plain) to the eastern periphery except areas devoid of rocky terrain in the Dasht-e Kavir and Dasht-e Lut. While probably accurate, we are not aware of any published collecting site from the Gulf coast east of the Strait of Hormoz (Biyaban District: MHNG 2718.13–16) as shown in LATIFI (1985–2000: maps). The Common Cliff Racer is recorded from Henjam Island (BMNH 1919.7.18.12) and inhabits Kish (TUCK, 1974) or Hormoz (LATIFI, 1985) off Jazireh-ye Qeshm, by far the largest island in this strait (as yet unreported but certainly present).

KHALAF'S (1959) laconic remark regarding the occurrence "in Iraq" is probably based on SCHMIDT'S (1939) specimen from Arbil Governorate (see next chapter). With the exception of the Kurdish Region (see Geographic Terms), all populations of *Platyceps r. rhodorachis* west of the central Zagros main ridge are from Iranian territory. In particular, there are no mentions from the southeastern Iraq frontier Governorates of Al-Basrah, Maysan, and Wasit. MMGU 13006 and RUZM 30.7 from Kermanshah and NW Ilam, however, strongly suggest the presence in adjacent Diyala. Interestingly, the distribution limit in Ilam shown in FATHINIA *et al.* (2010: Figs 3d–e) does not include the limitrophe sector and, therefore, their vague indication from Mehran (frontier district) is plotted towards the interior near the Kuh-e Siah Ab (Mt., Fig. 7). Three unspecified map entries in Ilam (RAJABIZADEH *et al.*, 2008) and W Kermanshah (SCHLEICH, 1977) are supposed to be correctly assigned to *P. rhodorachis* (see Sympatry: second smallprint). Records of "*Zamenis ventrimaculatus*" from the vicinity of Ahvaz (NIKOLSKII, 1907) tentatively referred to *r. rhodorachis* (e.g., ZISP 10287, 10317, both unlocated at present, see Geographic Variation: sixth smallprint, last paragraph under Distinction) are in need of comparison with sympatric congeners, in particular *karelini chesneii* (see Fig. 25 and penultimate paragraph under Hybrids). Although the presence of *r. rhodorachis* around Bushehr City is uncontested, the same reservation apropos their veritable identity applies to certain specimens registered from this area (e.g., SCLATER, 1891b) or "Bandar Chahpour" (Bandar-e Emam Khomeyni, RAI, 1965) in seaside Khuzestan (see Appendix E, SCHÄTTI, 2006b). This is also the case with LATIFI'S (1985, 1991) reports from Bushehr, Esfahan, Fars, and Khuzestan because *k. chesneii* ("*Coluber ventrimaculatus*") and *r. rhodorachis* are lumped together. Surprisingly, LATIFI (2000) does not mention the latter from Bushehr Province (nor Semnan or Kish Island in Hormozgan). Probably isolated populations of the Common Cliff Racer inhabit rocky sites of the Dasht-e Kavir (NILSON & ANDRÉN, 1981) and Dasht-e Lut (e.g., ZFMK 93702).

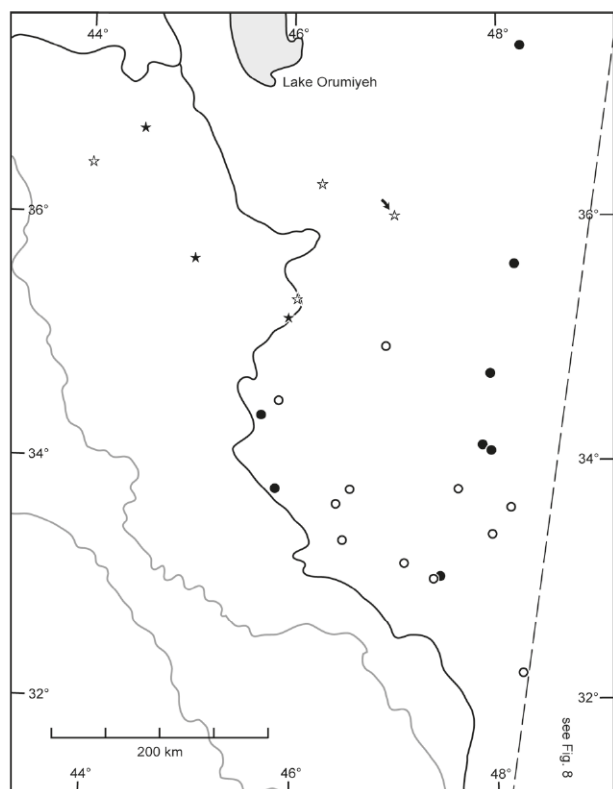
In Turkmenistan, *Platyceps r. rhodorachis* is distributed from the Caspian shores in Balkan Province to the bor-

der triangle with Afghanistan and Uzbekistan. Littoral areas inhabited are, for instance, the southern coast of Garabogaz Bay (VASILJEV *et al.*, 1960; DOCZENKO, 2003: ZIK 1176.2856) and there is a record from Kösýukli Islet. Inland, cliff racers are recorded from the Greater Balkan Mountains to the Kopetdag, along the Tedzhen River, in Badkhyz, the Kushka and Murgab Valleys, the uplands of the Karabil, and from the Köýtendag. In the northwestern corner, *P. r. rhodorachis* occurs around Orta-Kuyu Well (RUSTAMOV & PTUSHENKO, 1959), in the Sarygamys Depression (RUSTAMOV & SHAMMAKOV, 1982), and is reported from an unspecified collecting site in the southern Ustjurt (BANNIKOV *et al.*, 1977: map 115).

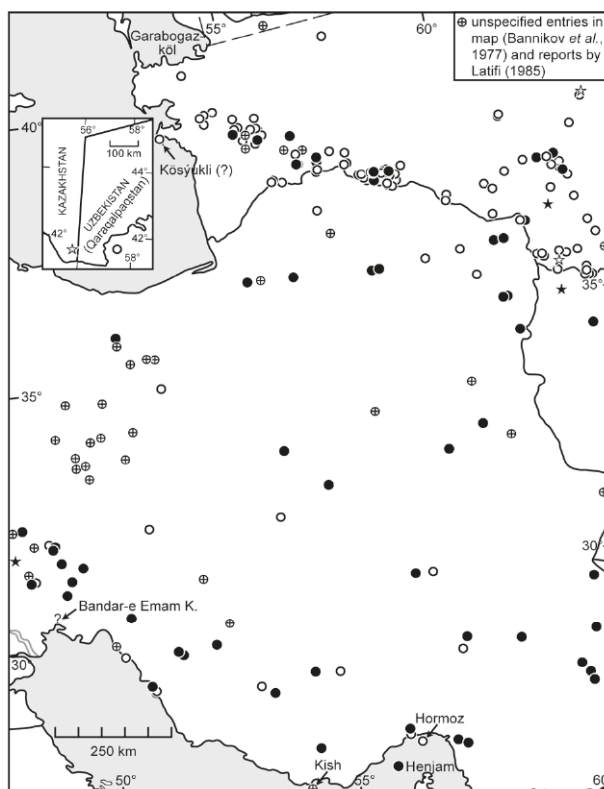
We have been unable to locate Kösýukli in the Caspian Sea ("V Kaspijskom more na o. Kjusjukli", BOGDANOV, 1962). Following SHAMMAKOV (1981: Fig. 59, pt. 1a, "ostrov [island] Kjosjukli"), we position this probable islet at the southwestern tip of the Çeleken Peninsula (ca. 39°22'N 53°11'E, there is no collecting site plotted in this area on the map in BANNIKOV *et al.*, 1977). In Turkmenistan, *Platyceps r. rhodorachis* is predominantly found in mountain areas or contiguous lowlands and lives in places along the fringes of the southern Karakum (see Ecology incl. third smallprint). The Common Cliff Racer is absent from the Atrek Valley below Şarlawuk (RUSTAMOV & SHAMMAKOV, 1982: Tab. 2) but not the Tedzhen and Murgab Valleys as notified by these authors. Various reptile species purportedly present near Lake Sarygamys such as *Mesalina guttulata* (LICHTENSTEIN, 1823), *Boiga "trigonatum"* [sic]<sup>3)</sup>, or *Macrovipera lebetina* (LINNAEUS, 1758) indicated by RUSTAMOV & SHAMMAKOV (1982: 219) are not tabulated, but *Eremias* ("*Mesalina*") *velox* (PALLAS, 1771), for instance, is. SHAMMAKOV *et al.* (1993) did not enumerate "*Coluber rhodorachis*" as a member of the "Sarykamysh Complex" herpetofauna. The Common Cliff Racer is probably absent from eastern Daşoguz and northern Lebap Provinces including the Amu Darja Valley below the Türkmenabad (Chardzhou, 39°04'N 63°35'E) sector. This is also the case with the northern Turan Plain between that river and the Syr Darja in Kazakhstan (Fig. 15). The reported presence of the 'Krasnopolosy poloz' (*P. rhodorachis*) in the northern Aral Region ("severnorn Priaralje", LOBACHEV *et al.*, 1973; KOLBINCEV & BRUSHKO, 1986) is based on material stated to be deposited in the MMGU and ZISP collections and published without detailed origins. It is from north of the Syr Darja, at least 500 km from the nearest verified occur-

3) The authorship of *Coluber trigonatus* is unanimously attributed to "Schneider" as originally mentioned in BECHSTEIN (1802: 256 ["156"], Taf. XL.1). In reality, the description relies on "Russel [sic] l. c. n. 15", viz. RUSSELL'S (1796) "Tar Tutta" (pp. 20–21, "No. XV. Coluber"; see, e.g., SCHÄTTI *et al.*, 2010b: 644). We suppose that Patrick Russell's account was communicated to Johann Matthäus Bechstein by Johann Gottlob Schneider, and if the latter were to have introduced the specific name *trigonatus* in a contribution of which we are unaware, this would not change the fact that the data originates from 'An account of Indian serpents'. According to the rules of the Code (ICZN, 1999: Arts 11 and 50.1), however, the author of *C. trigonatus* is BECHSTEIN, 1802. Opinion 1374 (ICZN, 1986) stipulates the gender of *Boiga* FITZINGER, 1826 to be feminine although at least some "early French ophiologists" used "Le Boiga" (see LACÉPÈDE, 1789), and not "La Boiga" as stated in STEJNEGER (1907: "The name is probably of barbaric origin"). MERREM'S (1790) later holotype of *Coluber irregularis* BECHSTEIN, 1802 (type species of *Boiga* FITZINGER) is ZMB 2583 (BAUER & GÜNTHER, 2013). MEIRTE (2013) presents a more detailed discussion of *C. irregularis* including its authorship.





**Fig. 7.** Collecting sites of *Platyceps r. rhodorachis* (circles) in Iran and Kurdish Cliff Racer (stars). Solid (empty) symbols denote examined material (literature data). The arrow points to an arbitrarily placed record (Qezel Bolaq, LATIFI, 1985). See text incl. *P. cf. r. rhodorachis* and Fig. 1 for further explanations and details.



**Fig. 8.** Collecting sites of *Platyceps r. rhodorachis* in Iran, NW Afghanistan, Turkmenistan, and extreme SW Kazakhstan and NW Uzbekistan (inset). Stars show six entries based on *P. karelini* ssp.  $\times$  *P. r. rhodorachis* (incl. inset). Solid (empty) symbols denote examined material (literature data). See text and Fig. 1 for further explanations and details.

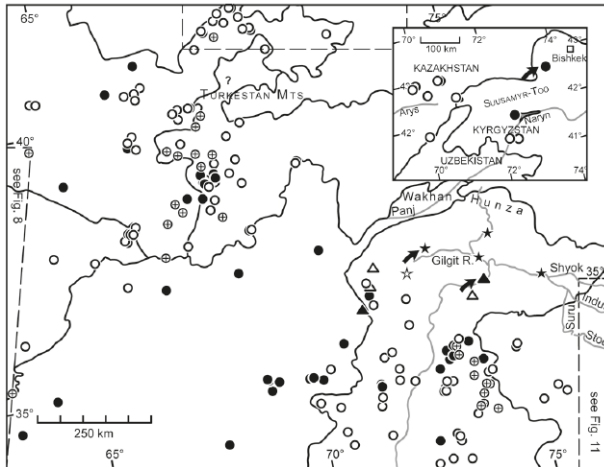
rence along the Arys (upper drainage system) and Boralday Rivers or in central Uzbekistan (Kyzylkum, Fig. 9), and we consider the indication from the northeast Aral area incorrect.

*Platyceps r. rhodorachis* lives in extreme SE Mangghystau Province, Kazakhstan (Ustjurt Plateau, BRUSHKO & MAZIN, 1981; see Hybrids). The remaining trustworthy collecting sites in this country (see preceding small-print) are located in the border area with Kyrgyzstan and Uzbekistan southwest of Taraz (Zhambyl Province) including Ontüstik (South) Qazaqstan Province, viz. the Berkara and Tikasu Gorges in the Lesser Qaratau Zhotsay (Malyj Karatau) and the Boralday Mountains (incl. Qoshqarata Canyon and Kokbulak River). This racer is not recorded from the eastern (Greater) Qaratau, the northwestern spur of the Tien Shan. It may occur in the southernmost Kazakh districts of Maqtaaral, Saryaghash, and Shardara, is reported from the western Talas Alatau (see next paragraph), and certainly inhabits the escarpment of the northwestern extension of the Kyrgyz Mountains roughly east of Taraz.

*Platyceps r. rhodorachis* seems to be absent from most of N Uzbekistan, probably except the Ustjurt in SW Qaraqalpaqstan (Qonirat District, see above regarding contiguous Turkmenistan). It is documented for the central Quljuqtov Tog'lari (Kuldzhuktau), the Buxoro

(Bukhara) area (BANNIKOV *et al.*, 1977: map 115), extreme SE Navoiy Province (MMGU 12649), Surxondaryo bordering Afghanistan and Tajikistan, Samarqand and Jizzax (see footnote 2) as well as Toshkent (Tashkent) Viloyati. An isolated record is from Andijon in the Fergana Valley (JADGAROV *et al.*, 1988). To the east, cliff racers follow the Naryn into Kyrgyzstan at least as far as the southwestern escarpment of the Suusamyr-Too, in particular along the Uzun-Akmat River (MMGU 1171, CHERNOV, 1959; BANNIKOV *et al.*, 1977; BOBORJEV *et al.*, 1985). *P. r. rhodorachis* is also found near Mayluu-Suu (Mayli-Say). BANNIKOV *et al.* (1977) indicate a collecting site in the Bishkek area (not plotted). MTD 13640 ("Umgebung von Frunse") is mapped roughly 50 km west-southwest of Bishkek (Appendix A). Based on this and unspecified indications from the Talas Alatau (KOLBINCZEV & BRUSHKO, 1986), viz. the western Tien Shan ("Zapadnogo Tjan-Shanja", KOLBINCZEV, 2010), possibly on Kazakh territory, there can be no doubt that *r. rhodorachis* lives in NW Kyrgyzstan (Talas Oblasti). Its presence beyond western Chuy and Lake Toktogul (Naryn) is subject to proof (Fig. 15).

Although confirmed for Jizzax and Toshkent, the Common Cliff Racer is not reported from in between Sirdaryo Province (Uzbekistan) nor farther downstream the Syr Darja in Kazakhstan (see preceding smallprint). The Fergana record by JEREMCHENKO *et al.* (1992) is from the Naryn in Kyrgyzstan. CHERNOV (1959) supposed

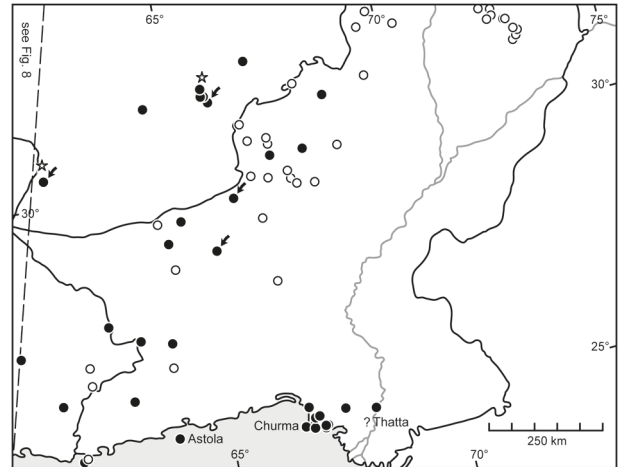


**Fig. 9.** Collecting sites of *Platyceps r. rhodorachis* (circles), *P. r. ladacensis* (stars), and intergrades (triangles) from southern Turan to NW India. Solid (empty) symbols denote examined material (literature data and photo from Rawalpindi area). Arrows point to the vague origin of MTD 13640 (inset), the “Chilas” intergrade, and a “Gilgit” *ladacensis*. Plus icons (⊕) refer to map entries (BANNIKOV *et al.*, 1977; SAID-ALIEV, 1979) and *Coluber r. kashmirensis* KHAN & KHAN. The question mark in N Tajikistan (Khujand) indicates the origin of the holotype of *Choristodon brachycephalus*. See text incl. Subspecies, Hybrids (last smallprint), and Fig. 1 for further explanations and details.

*Platyceps r. rhodorachis* in the Fergana Valley and the mountains along the Naryn and Syr Darja (“Fakt nakhozheniya etogo poloza v bassejne Naryna govorit o tom, chto on dolzhech byt kak v Ferganskoj doline, tak i v okryzhajuszczikh jejo gorakh”) but we are aware of only a single published collecting site from Uzbek territory (see above) and northernmost Tajikistan (SAID-ALIEV, 1979), respectively. Certainly, *P. r. rhodorachis* lives along the northern escarpment of the Turkestan Mountains in Tajikistan and SW Kyrgyzstan, viz. Batken Oblasti and Osh east to the Jalal-Abad region. The Common Cliff Racer is assumed to occur in the Kara-Darya (Qoradaryo) catchment area and follow the Gulcha and Tar into the Pamir-Alay Range.

Apart from the Fergana record (Sughd Province, see preceding smallprint and last one under Hybrids apropos ZISP 3581 from Khujand), Tajik populations of *Platyceps r. rhodorachis* are documented for the Zeravshan Valley as well as the affluents along the Kafirnigan, Panj, Surkhandarja, and Lower Vakhsh of the Amu Darja drainage system. The easternmost collecting sites are in the vicinity of Darvaz (NIKOLSKIJ, 1899a; see footnote 2) including the Obikhumbod Valley (SAID-ALIEV, 1979) at the border with Afghanistan. Cliff racers are not on record for the interior of Kuhistoni Badakhshon, viz. mountainous eastern Tajikistan (Pamir).

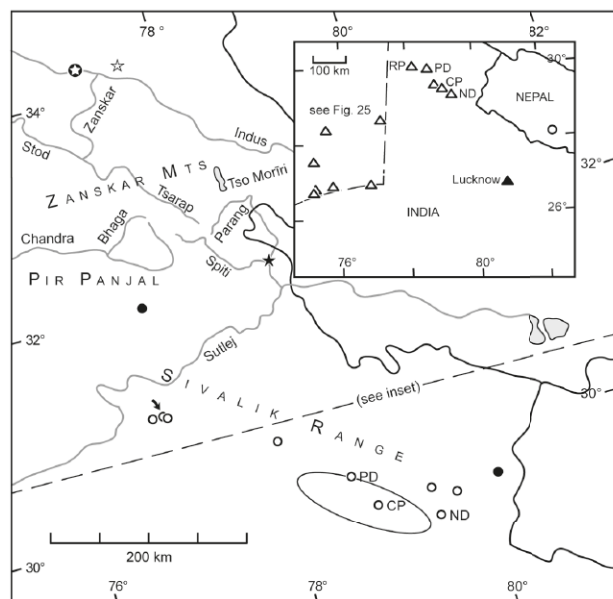
*Platyceps r. rhodorachis* possibly lives in suitable habitats up to over 3,000 m above sea level (e.g., Dashti Nawar) throughout large parts of Afghanistan. The presence in the extreme Southwest (Nimruz) relies on a hybrid with Karelina's Racer. Its likely occurrence in the Wakhan Valley (Badakhshan, Pamir, Figs 1 [inset] and 9) draining into the Panj awaits confirmation. The verified range in southern Pakistan is restricted to areas west of



**Fig. 10.** Collecting sites of *Platyceps r. rhodorachis* from the Baluchistan Region to Punjab. Stars indicate unassigned records of *Platyceps* spp. from Kamran (Nimruz) and Zanda (Kandahar). Solid (empty) symbols denote examined material (literature data). Arrows point to *P. cf. mintonorum* (vic. Kandahar, Kharan, Nushki) and a *P. k. karelini* × *P. r. rhodorachis* hybrid (Nimruz: Qala-i Fateh). See text incl. Southern Pakistani Racers and Figs 1 and 20 for further explanations, details, and additional questionable records.

the Indus in Baluchistan and SW Sindh. In particular, *P. r. rhodorachis* seems to be absent from Punjab south of the Ravi. It extends to southern Chitral and the eastern Indus Plain north of about 31°N latitude. Trustworthy records from adjacent India are limited to Jammu and Kashmir State. Farther east, the Common Cliff Racer inhabits Himachal Pradesh (Kasauli, Kulu, vic. Subathu) and Uttarakhand (e.g., vic. Almora, Mussoorie, see Sympatry: last smallprint). The Pithoragarh specimen (Fig. 5E) renders its presence in contiguous Nepal (Mahakali Zone) highly likely and SHRESTHA (2001) reports the taxon from farther east.

Astonishingly few collecting sites of cliff racers are documented for Afghanistan (none from central provinces, see Samples and Characters) and *Platyceps r. rhodorachis* may be absent from large areas of the southwestern deserts (see fourth smallprint in next section). KHAN's (1977) distribution range in Pakistan (“from Ladakh, and throughout except Thar Desert”) is based on MINTON (1966). According to the latter author, *P. rhodorachis* “probably occurs throughout West Pakistan [viz. today's Pakistan] exclusive of the Thar Desert [incl. Cholistan] and upper Indus basin”, or “from Ladak [...] south to western Sind”. Plotted records in MASROOR (2012) doubtlessly based on *rhodorachis* are incorporated into Figs 9–10. The report from the “Cholistan Desert” (BAIG *et al.*, 2008) is, at the very least partly, due to confusion with *P. ventromaculatus* (see Sindh Racer, Fig. 20). *P. r. rhodorachis* is absent from the Indian States of Gujarat and Rajasthan, probably most of Punjab (see Systematic Review: third smallprint), Haryana, and Uttar Pradesh. “*Coluber ventromaculatus*” from Doda at “736” m a.s.l. (SAHI & DUDA, 1985) in Indian Kashmir is from above 1,000 m on the Chenab River (provided the locality is correct) and, therefore, referred to the Common Cliff Racer (see Sympatry). Unspecified reports from the Corbett National Park (CHOPRA, 1979) or Nainital



**Fig. 11.** Collecting sites of *Platyceps r. rhodorachis* (circles), *P. r. ladacensis* (stars, encircled: photographed specimen, Figs 12B–C), and *P. ventromaculatus* (triangles) in NW India. Solid (empty) symbols denote examined material (literature data). The arrow points to the type locality of *P. semifasciatus* BLYTH (Subathu). The ellipse encompasses five reports of *P. ventromaculatus* (inset) from Corbett National Park (CP, 2), Nainital District (ND), Pauri Garhwal D. (PD), and Rajaji N. P. (RP). See text incl. Sympatry and Appendix E for details.

and Pauri Garhwal Districts (HUSAIN & RAY, 1995) in Uttarakhand are considered correct (see Sympatry: last smallprint). ATKINSON'S (1884) laconic remark ("common") pertaining to "*Compsosoma semifasciatum*" refers to 'The Himalayan districts of [...] India', an area covering Uttarakhand (viz. Garhwal and Kumaon), Nepal, and Tibet. Except for a short extract from THEOBALD (1876) regarding the dorsal marking (actually after STOLICZKA, 1870c; see Colour Pattern: third smallprint) and a hint to the 'Descriptive catalogue' ("Th. 164"), no further information is provided nor a single collecting site indicated. ATKINSON'S (1884) work and/or the occurrence in Ladakh (see next but one chapter) are the sources for the indication of "*Coluber rhodorachis*" in "Western Tibet" (SWAN, 1947: Tab. p. 79, see Geographic Terms: first smallprint). We are not aware of any confirmed record of *r. rhodorachis* from Nepal (e.g., SWAN & LEVITON, 1962; KRAMER, 1977; GRUBER in SCHLEICH & KÄSTLE, 2002; SHAH & TIWARI, 2004; KÄSTLE *et al.*, 2013). SHRESTHA'S (2001) indication from the Dang region at altitudes above 650 m in the Churia Hills at the foot of the Mahabharat Range is deemed possible but the presence in the low-lying humid Chitwan Valley centering around 27°30'N 84°20'E requires confirmation (see Sympatry incl. last smallprint).

## Ecology

*Platyceps r. rhodorachis* occupies a broad array of habitats from sea level to over 3,000 m except densely vegetated areas and pure sand or salt deserts. This racer "shows a preference for cliffs, canyons, and other rocky situations" (MINTON, 1966) such as riverbanks, hillsides or mountain flanks, is met with around constructions (e.g., irrigation systems, abandoned sites, collapsed structures), in

graveyards, or cultivations. It enters gardens and buildings (e.g., roofs, barns, attic floors, cellars) in search for food, shelter, or hibernation. *P. r. rhodorachis* is an excellent climber, swims in lakes, rivers, pools or ditches, and preys upon a large variety of vertebrate and other animals. This euryoecious snake hibernates in northern regions and at higher altitudes but is active throughout all seasons in Sindh and probably adjacent areas.

In view of the substantial number of observations and reports, authentic specific natural history notes are surprisingly scarce. Apart from general comments, published ecological data for individuals or particular samples from Afghanistan, India, or Central Asia except southern Turkmenistan including the Kopetdag area can be counted on the fingers of one hand for each country, and seems to be completely absent in the case of Kyrgyzstan. With respect to Iran, WERNER (1895) remarked that cliff racers are common in gardens and orchards in the outskirts of Kerman, and attains 2,300 m above sea level along a creek near Sirch. Apart from this and two recent articles containing notes regarding sympatry with *Platyceps najadum* in the Zagros area and Ilam, we are aware of only three explicit references from Fars and Khuzestan (WERNER, 1917; ANDERSON 1963; MULDER, 2002) citing food items and number of eggs (see below).

ANDERSON (1963: Fig. 3) shows ledges in the Zagros foreland, the characteristic habitat inhabited by *Platyceps r. rhodorachis*. Landscape types in Lorestan ranging from oak forest with intermittent grassland (Sefid Kuh, "1250–1950 m") to woodland remains in highly eroded terrain (Ma'mulān, "1000–1500 m") and mountain areas with low shrubs and thin herbage cover (Badavar Mountains, "1800–2100 m") are illustrated in TORKI (2010: Figs 7–8 and 11). At the latter location as well as in oak forests of the Hanjis Range between 1,300–1,700 m and near Abdanan ("Mianevar [...], 1531–1635 m"), *P. r. rhodorachis* is found alongside *P. najadum* ssp. (see Sympatry incl. first smallprint). In Ilam, Eichwald's Racer dwells "in habitats similar to those of" the Common Cliff Racer (FATHINIA *et al.*, 2010).

MHNG 2646.38–39 from southwestern Kerman have been collected in rocky terrain with acacia, *Tamarindus indica*, and *Ziziphus* trees close to a dry watercourse. One specimen escaped into the gravel along the ramp of a highway bridge. Another from west of Sabzevar in Khorasan-e Razavi roamed among low bushes on the undulated face of a rocky outcrop amidst pebble fields with scattered acacias and halophytes on sandy patches. Around Bezd (ca. 1,300 m a.s.l.) near Torbat-e Jam, *P. r. rhodorachis* frequents stone walls, orchards, herb or vegetable gardens, and the flanks of Qolleh-ye Sehpayeh (ca. 2,400 m) with a few trees (*Juniperus* zone). In Biyaban (Hormozgan) near sea level, specimens have been encountered on stony slopes and among boulders along the Rudkhaneh-ye Garu, in the wide riverbed with tamarisks and in nearby alluvial bean, cucumber, or melon plantations as well as in stony enclosures for domestic animals, date groves, or kitchen gardens. MHNG 2718.13 was discovered in the wooden ceiling of an outside clay bathroom and MHNG 2718.14 hid in a crack of the carpet-covered concrete floor inside a house.



ZARUDNYJ (1891) noted *Platyceps r. rhodorachis* amid clover or, probably, alfalfa (“trèfle”) fields at Ashgabat and close to an irrigation ditch of a garden in the Kopetdag (Germob). There, “[t]his species is found everywhere in mountain steppe, on slopes and in valleys, and in foothills” (ATAJEV *et al.*, 1994). In the central sector, it has been met with in twenty-one out of a total of 122 specific observations of snakes (SHAMMAKOV *et al.*, 2007). SHAMMAKOV (1981) indicated unspecified collecting sites up to “1800–2000 m” altitude in the Kopetdag. Near the western spur (Gyzylarbat, Balkan Province), ANDRUSHKO *et al.* (1939) monitored a specimen in a well for months (see last smallprint in this section). Along the eastern range, cliff racers live everywhere (“vstrechajetsja povsemestno”) up to 1,000 m, for instance in stone walls in woodland or pistachio groves, and in ravines, around Khivabad (ca. 650 m) or, farther southeast, inhabit loamy hillsides, rubble fields, and steep rocky formations within tamarisk copse along the Çaçe River at ca. 300 m (ATAJEV *et al.*, 1996).

RUSTAMOV & SHAMMAKOV (1982: Tab. 5) and ATAJEV *et al.* (1994) give an average density of 0.6 specimens per hectare “in Lowland Turkmenistan” and the Kopetdag, respectively. 41% (n=50) of the sight recordings made during eighty two field excursions of between two and four hours from March 2006 to November “2007” (?) by SHAMMAKOV *et al.* (2007) concern *Macrovipera lebetina*. The second most frequent snake is *Hemorrhois ravergieri* (19%).

*Platyceps r. rhodorachis* is considered “rare” in the “Kopetdag piedmont plain” (SHAMMAKOV, 1971: 55) and neither is it numerous in the Jerojlanduz Depression (“nemnogochislen”, CZELLARIUS, 1992). There, it is absent from pure desert (‘step’) habitat but indicated as common (“obychn”) in the clay steppe (“glinistaja pustynja”, CZELLARIUS *et al.*, 1983). CZELLARIUS (1990) investigated the ecological niches of reptiles including cliff racers in the Badkhyz pistachio biocoenosis. A specimen from the Gezgyadyk Mountains was encountered in dense cover of meadow grass and sagebrush (*Poa* and *Artemisia* sp.) with scattered *Pistacia vera* (BOGDANOV, 1962). ZARUDNYJ (1891) noticed various individuals in cushion plants (“dans une herbe touffue”), for example in the vicinity of Mary. *P. r. rhodorachis* is the most frequently seen snake species at a nearby site along irrigation canals studied by MAKEJEV (1979). BOGDANOV (1956) compiled quantitative observations around Yolöten (Iolotan, Murgab Valley) over seven years (1946–1952). From Takhtabazar to Bayramali, this racer mainly occurs on gravel and clay grounds in ravines and slopes or deserted places. *P. r. rhodorachis* hybridises with *P. k. karelini* in more arid habitats with a higher proportion of arenaceous soil but is absent from purely sandy sectors including dunes (BOGDANOV, 1953, 1962; see Hybrids). In the Köytendag close to the border with Uzbekistan (Surxondaryo), *r. rhodorachis* lives at 1,600–2,000 m in the juniper zone (ATAJEV, 1985; RUSTAMOV *et al.*, 1988).

According to BOGDANOV (1953), *Platyceps r. rhodorachis* vanishes (“ischezajet”) downstream of Bayramali, though a report from the

vicinity of Karaburun (ATAJEV, 1985) substantiates its presence in the Karakum along the Lower Murgab. As stated by RUSTAMOV & SHAMMAKOV (1982: Tab. 3), *P. r. rhodorachis* is lacking in salt marshes (“Solonchak desert areas”) and barren scree country but occurs in “[s]andy desert areas”. This refers to the Karakum, whose “large number of species [...] is also due to reptiles pervading here from the adjacent piedmonts of the Kopetdag and from the lower reaches of river valleys.” Without further comment, SHAMMAKOV *et al.* (1993) listed “*Coluber rhodorachis*” [sic] from sabulous and similar habitats (“Sandy, clay and on construction sites”) of the “Karakum” (and “Caspian”) herpetofauna. As a matter of fact, *r. rhodorachis* is absent from most of the interior and only few reports exist from this extensive desert (number of specimens unknown, Figs 8 and 14). Apart from the Murgab Valley (see above), these are Utsch-Adshi, the Repetek reserve, and three mentions from the northwestern corner including the Turkmen Ustjurt and the border area with Qaraqalpaqstan (see Distribution). The large Orta-Kuyu record (“krupnyj krasno-polosyj poloz”, RUSTAMOV & PTUSHENKO, 1959) was obtained during hot desert wind blowing from the northern sector (‘samum’). In early spring, BOGDANOV (1962) found cliff racers basking alongside *Spalerosophis diadema* and *Echis carinatus* in the vicinity of Bayramali.

Near Iljansa in Samarqand Viloyati (Uzbekistan), *Platyceps r. rhodorachis* frequents mountainsides with an ephemeral flora and protruding granite crags, and inhabits ravines or loess hillsides with scant cover of vegetation in the vicinity of Toshkent (BOGDANOV, 1960). Altitudes of roughly 1,750 m (Kamchiq, VASHETKO *et al.*, 2003) are recorded for northern Toshkent Province. In the Pskem Valley, KORELOV (1956) found cliff racers at “1300–1400 m” within the hazelnut belt on a flank with dense herbage and scattered trees. JADGAROV *et al.* (1988) saw 1–2 specimens per 10 km stretch of way in montane and steppe habitats of Jizzax Viloyati. KOLBINCZEV & BRUSHKO (1986) encountered *P. r. rhodorachis* at 1,100–1,200 m amidst eroded rocks and slate debris on gentle slopes or scree areas with sparse vegetation and in riverside woodland. In the Boralday Mountains and Lesser Qaratau Zhotasy of Ontüstik (South) Qazaqstan, cliff racers live between 600–1,200 m among boulders and in clearings of rubble fields with grassland (“savannoidnoj”) vegetation, at the edge of forests, and along creeks. It is absent from the foot and promontory of the “Malyj Karatau” (KOLBINCZEV, 2010).

In the Hisor Valley southwest of Dushanbe draining the Surkhandarja, *Platyceps r. rhodorachis* inhabits bluff formations near the mouth of the Khonakoh (ca. 700 m), is found in the upper shrub wood belt of the Tajik mountains (CHERNOV, 1945), and occurs at 2,300 m in the *Juniperus* zone of the southern Hisor Range (TERENTJEV & CHERNOV, 1949; CHERNOV, 1959). Similar altitudes (“2240” m, ANDERSON & LEVITON, 1969) are attained around Paghman in Afghanistan, and elevations above 3,000 m are on record for Ghazni (Dashti Nawar). ZFMK 8643–44 (♂♀) were encountered in a decayed stump of a cedar tree in the mixed forest belt of the Lower Pech Valley at ca. 2,000 m (KULLMANN, 1970; see below). CAS 96250 from Nangarhar Province “was found dead on the edge of a field not far from the river” in flat open country with “some small bare and rocky hills” (CLARK *et al.*, 1969: 287, 312).

MURRAY's (1892) remark regarding "*Zamenis ventrimaculatus*" auct. in "Beloochistan and southern Afghanistan" ("Appears to be very common") has to be taken with reservation; however, fifteen racers from the Chagai Hills (Pakistan) close to the border with Afghanistan (ALCOCK & FINN, 1897) may belong to *Platyceps r. rhodorachis* (see Systematic Review: second smallprint, Southern Pakistani Racers). Reports are lacking for the Khash Desert in N Nimruz and limitrophe Farah Provinces or the Dasht-e Margow south of Lashkar Gah on the Helmand.

"In Karachi", *Platyceps r. rhodorachis* "is often found in residential compounds bordering abandoned stone quarries" (MINTON, 1966). MERTENS's (1969: Abb. 5) photograph gives a glimpse of the kind of country inhabited on Astola Island. In northern Punjab, specimens have been reported "from under the rocks of the hills surrounding Rabwah City" (KHAN, 1977) and "green habitat along the fringe of rocky and barren area" to the west (see Pholidosis: second smallprint) or "[c]ultivated area with fodder, maize and vegetables and citrus gardens" in the vicinity of Sargodha (AKRAM & QURESHI, 1997). Records from the Salt Range (STOLICZKA, 1872; D'ABREU, 1934) probably originate from rocky places. An individual from Kashmir was encountered about one metre inside a deep cavity in an old dead *Pinus wallichiana* (HUSSAIN *et al.*, 2013). *P. r. rhodorachis* is "very common" in "Dir and Swat" (McMAHON, 1901b). "Several were killed inside our very congested little fort at Drosh, and another inside the mess in Chitral where it was seen in the roof" (WALL, 1914). Further citations and remarks referring to Pakistani habitats in the context of sympatry with *P. ventrimaculatus* are found in the corresponding chapter. PMNH 1431 is from close to 2,000 m above sea level in Kashmir and elevations above that height are attained in northern Baluchistan Province (Toba Kakar Mountains, PMNH 500).

MURTHY & SHARMA (1976) recorded three specimens "from residential places and rocky situations around Poonch" in Indian Kashmir, and another from the same area (vic. Poonch) is "from a maize field in Magnar" (MURTHY *et al.*, 1979; see last smallprint in this section). WHITAKER & CAPTAIN's (2004) altitudinal limit ("3000" m) is based on *Platyceps r. ladacensis* from "Jammu & Kashmir". The nominotypical subspecies lives above 1,000 m in Himachal Pradesh and Uttarakhand and at ca. 1,830 m or higher in the border region with Nepal (Pithoragarh).

*Platyceps r. rhodorachis* "has been collected during every month but most frequently during April and at the end of the monsoon" in the Karachi area (MINTON, 1966). Over a considerable part of its distribution range, however, the Common Cliff Racer normally hibernates from about mid-October to March. In the Murgab Valley, individuals rarely emerge from their dens as early as end of February, and the last foray has been observed on 13<sup>th</sup> September 1947 (BOGDANOV, 1962). This author and MORICZ (1929) noted excursions until October in Badkhyz and around Ashgabat, respectively. In the same areas, SHAMMAKOV (1981: 246) and ATAJEV (1975b, 1985) encountered various specimens including several juve-

niles between December and February (see following smallprints). AKRAM & QURESHI (1995) found *P. r. rhodorachis* in NE Punjab (Faisalabad District) from April to October. Three "Chitral" intergrades with *P. r. ladacensis* were obtained between 25<sup>th</sup> October and 29<sup>th</sup> November (see last smallprint in this section). Cliff racers are mostly diurnal, especially at higher altitudes, but also active after sunset (e.g., MHNG 2646.61). "[I]n cooler weather and at high altitudes it has been found abroad about midday" (MINTON, 1966). BOGDANOV (1962) registered specimens around sunset and at dusk from May to the end of summer. In the Kopetdag, "[s]nakes are active for seven to eight months" per year and ATAJEV *et al.* (1994) noted a "shift to crepuscular and nocturnal activity in summer."

SHAMMAKOV's (1981: 248) winter observation in the vicinity of Serhetabad ("Kushka", Badkhyz) is identical with ATAJEV's (1975b) record from a grove near Morgunow ("Zelenyj Klin"). Dens are located in, for example, embankments and mounds along old canals, clefts in loess acclivities, burrows and old nests of rodents, and in ruins (BOGDANOV, 1962). At Turkmenkala, an abandoned village, *Platyceps r. rhodorachis* hibernates in fissures between brick stones, together with *P. k. karelini*. The first specimens with stomach contents were encountered on 13<sup>th</sup> March and 28<sup>th</sup> February, respectively (BOGDANOV, 1953).

Food items consist mainly of lizards (agamids, geckos, lacertids, skinks) and smaller rodents or shrews. In the Murgab Valley, *Platyceps r. rhodorachis* mostly predate on so-called 'fast lacertids', viz. *Eremias* and *Mesalina* spp., for lack of alternative abundant food ("na dannom uchastke sluzhit jaszczurka bystraja; drugaja piszczavstrechajetsja redko", BOGDANOV, 1953). Further lizards extracted from Turkmen cliff racers are *Eumeces schneideri*, *Laudakia caucasia*, *Tenuidactylus caspius*, *Trachylepis aurata*, and *Trapelus sanguinolentus* (BOGDANOV, 1962; ATAJEV, 1985). KOLBINCEV & BRUSHKO (1986) found *Ablepharus deserti* and *Mediodactylus russowii* in individuals from Ontüstik (South) Qazaqstan. Tajik specimens collected in mid-May contained rodents (bezoars and parts of skeleton), and others collected in June various lizards (*Ablepharus pannonicus*, *Eremias nikolskii*, *Tenuidactylus fedtschenkoi*) or a nestling of *Passer domesticus* (SAID-ALIEV, 1979). ATAJEV (1985) reported eggs of this bird in a *P. r. rhodorachis* from the Firjuza Gorge (see smallprint). One from Badkhyz was discovered in the roof of a house where sparrows were nesting (GENTNER, 1945). KOLESNIKOV (1956) recorded bones and feathers of an undetermined avian species and ATAJEV *et al.* (1994) mentioned "small passerine birds" fed upon. Two cliff racers from "Tschâbâgh" (Fars) plundered nests of *Passer* sp. and swallows (WERNER, 1917). *P. r. rhodorachis* also ambushes bats as exemplified by ZFMK 8644 (SCHÄTTI, 1984). ANDERSON (1963) noted "unidentifiable snake remains in the stomach" of CAS 86586. Further incidents of ophiophagy involve *Spalerosophis* sp. and *Myriopholis macrorhyncha* as reported by MURTHY & SHARMA (1978) and MULDER (2002), respectively. Juveniles often prey upon insects (CHERNOV, 1959). The diet probably includes fish and amphibians.

A Balkan specimen apparently living in a well at the bottom of a ravine from May to August probably consumed *Tenuidactylus caspius* (ANDRUSHKO *et al.*, 1939). This gecko was also encountered in a juvenile from west of Ashgabat (Gadymy Nusaý) found on 30<sup>th</sup> December (ATAJEV, 1985: Tab. 63). Another juvenile from the same general area (Bagyr) encountered in February contained an unspecified lacertid (“bystraja jaszczurka”, ATAJEV, 1975b). BOGDANOV (1962) recorded predominantly ‘fast lizards’ (“preimuszczestvenno jaszczurki bystroj”, n=14) fed upon, viz. *Eremias* spp. (potentially *E. grammica*, *intermedia*, *lineolata*, *nigrocellata*, *persica*, *scripta*, or *velox*) and, at times, *Mesalina guttulata* or *M. watsoniana* (“pojedajutsja jaszczurka krapchataja”). A total of eight lacertids (“jaszczericz”) out of twenty-four stomachs (incl. five empty) is registered for Central Asia cliff racers examined by BOGDANOV (1965b: Tabs 8 and 12). No food items were found in four out of five specimens from the Lower Murgab (Yolöten) obtained in mid-June (BOGDANOV, 1949). Apart from rodents (5 instances) and lizards (9), eighteen Turkmen specimens contained three times remains of sparrows and a *Turdus merula* including nestlings, and once five bird eggs in a cliff racer of 650 mm total length (ATAJEV, 1985: Tabs 62–63). In Chitral, WALL (1911b) observed *Altiphylax stoliczkae* as prey and notified *Calotes versicolor* in two *Platyceps r. rhodorachis* – *ladacensis* intergrades collected late in the year (25<sup>th</sup> October and 21<sup>st</sup> November). ANDERSON & LEVITON (1969) and CLARK (1990) discovered “a mouse” and agamids in Afghan cliff racers. “Two *Teratoscincus* specimens extracted from the stomachs of *Coluber rhodorachis*” from “the sand desert near Kandahar” (CLARK, 1990: 28) refers to *P. mintonorum* (SCHÄTTI & STUTZ, 2005). ABDULALI’S (1971) record of *P. r. rhodorachis* predating on water frogs (“*Rana* [= *Euphylyctis*] *cyanophlyctis*”) is tainted with some doubt apropos the snake’s identity. MURTHY *et al.* (1979: Pl. III.4) illustrate the Poonch (Kashmir) case reported earlier (MURTHY & SHARMA, 1978) and noted that “[t]he largest specimen in the series was caught while preying upon an equally long Red-spotted Diadem snake (*Sphalerosophs* [sic] *arenarius*). Despite two or three strong blows delivered on the head of the Cliff Racer, it did not eject its prey.” The specific allocation of the victim remains in question. Conversely, *P. r. rhodorachis* consumed by a saw-scaled viper (*Echis carinatus*, observation in captivity) and *Psammodphis schokari* is described by SHOCKLEY (1949) and NILSON & ANDRÉN (1981), respectively.

Follicles attain 2.5 mm length in mid-May around Garrygala (“v Kara-Kala”, BOGDANOV, 1965a) in SE Balkan (Turkmenistan), 12–13 × 7–8 mm (Chuli, four follicles, end of May), 24 × 6 mm (Firjuza Gorge, six, June) or 10,5 × 3 mm (two, June) in the Kopetdag (ATAJEV, 1985), and dimensions of 4 × 2 mm are reported from 1,600–1,800 m altitude in the Köýtendag at the end of April (RUSTAMOV *et al.*, 1988). Seven eggs of a Kyurendag female (five in left ovary) obtained in mid-June measured 35 × 15 mm (KOLESNIKOV, 1956). Up to “39 mm. in diameter” are reported at the end of June near Masjed Soleyman, Khuzestan (CAS 86420, ANDERSON, 1963). ZISP 14033 from Tajikistan contains three eggs (24,5–28,4 × 6,2–6,5 mm), MZUF 23941 from NW Afghanistan seven, nine are present in ZSM 223.1989.1 from Makran (snout-vent length 552 mm), and four to six in ZISP 13557 (22,0–25,3 × 5,7–6,3 mm) and CAS 86420 (Fig. 5A, see below) from Iran. WALL (1911b) recorded three to nine eggs in Chitral. Identical figures are indicated by TERENTJEV & CHERNOV (1949) who noted their strongly elongated shape (up to 30 × 6.5 mm). In Turkmenistan, eggs (four to nine, 28–30 × 5–8 mm) are laid in June or July (ATAJEV, 1985: 251, 257).

In the Karachi area, newborns (“The smallest ones”) “have been collected in August and September” (MINTON,

1966). Our material (examined *Platyceps r. rhodorachis* and considered literature samples, see Appendices A and C) contains ca. 59% more males (137:86), which may indicate a roughly even ratio for the genders (♂♂ are more active and likely to be caught during the reproduction period), but males outnumber females more than five times according to KHAN’S (1997: Tab. 3) figures (“Distribution of sex” 73 ♂♂ versus 13 ♀♀). WALL (1911b) noted more females than males in “Chitral” (7, n=12, intergrades excluded) and five out of eight examined specimens of known gender from Makran are females. In Turkmenistan, the observed gender ratio is between 1,6 (striped phenotype) and 3,2 males per female (ATAJEV, 1985).

## Kurdish Cliff Racer

### *Platyceps* cf. *r. rhodorachis* (JAN, 1863)

- Coluber rhodorachis* [partim]. – SCHMIDT, 1939: 73 (Diyana: FMNH 19618, Fig. 5F).
- Coluber rhodorachis* [sic]. – REED & MARX, 1959 [partim]: [96–97] 106, Fig. 1 [map] (“Sulimaniyah Liwa [As-Sulaymaniyah Muhafazat or Governorate], Bazyan [Basiyan] Nahiya [District]”: FMNH 74615, see SCHÄTTI *et al.*, 2005).
- Coluber* [r.] *rhodorachis* [sic]. – KHALAF, 1959: [54] 75 (“Iraq”, see Distribution [*P. r. rhodorachis*]: first smallprint).
- Coluber r. ladacensis* [partim]. – LATIFI, 1985: 159, Fig. 42 [incl. map], and LATIFI, 1991: 103, Pl. 16 [Fig. 42] (“Ghezelbalagh” [Qezel Bolaq, see Localities], ca. 36°00’N 47°00’E, Saghez [Saqqez], 36°15’N 46°17’E).
- Coluber rhodorachis* [partim] (ssp.). – LEVITON *et al.*, 1992: 92 [references]. – LATIFI, 2000: 269, Pl. 42 [incl. map] (Kurdistan [Province, Iran], unspecified).
- Coluber r. rhodorachis* [partim]. – FIROUZ, 2005: 204 (“18” [“Kurdistan”], relies on LATIFI, 1985 and 2000).
- Platyceps rhodorachis ladacensis* (ANDERSON, 1871) comb. nov. – AFRASIAB & MOHAMAD, 2011: 21, Fig. 2 [“*Platyceps ladacensis*” comb. nov.] (“Daraymars Caves”, Jabal Hawraman area, see text incl. second smallprint).

Four specimens of Jan’s Cliff Racer from the northwestern limit of the species’ distribution (Kurdistan, Iraq) including IMNH 746 (AFRASIAB & MOHAMAD, 2011) show a particularly bold dorsal colour pattern or high ventral and probably subcaudal counts, and peculiarities in lateral head scales are found in two. Kurdish cliff racer populations merit more investigation as to their systematic status (see Subspecies).

FMNH 19618 (Fig. 5F) and 74615 display broad and mostly even dark transverse bands from the nape to mid-body (tapering in width posteriorly) with narrow light interspaces (probably yellowish in life). The dorsal colour pattern of IMNH 746 (“Dark dorsal strips separated by yellow area of one scale width disappearing gradually caudally”) is basically identical (AFRASIAB & MOHAMAD, 2011: Fig. 2). All four specimens show prominent mark-



ings on the pileus and a conspicuous median streak protruding from the first nuchal collar (narrower than following neck bands) to the posterior portion of the parietals is present except in CAS 157119. This individual, FMNH 19618, and IMNH 746 have 242–249 ventrals, the maximum possibly includes preventral(s); the latter specimen shows 144 subcaudals (sum 393). The Diyana racer exhibits a small triangular scale between the rostral and first left supralabial, and the upper portion of the third left labial is separated, forming a presubocular. FMNH 74615 has the upper part of the fifth left supralabial detached, viz. two anterior suboculars, and only the sixth in contact with the eye. CAS 157119 measures 980 mm snout-vent length (tip of tail missing). The anal gland of this female extends to the fifth subcaudal.

FMNH 74615 is “extensively damaged” (REED & MARX, 1959) and no body scale data except the number of msr (19), nor dentition features, could be verified. FMNH 19618 has 19-19-13 dsr and the reductions occur between ventrals 133–138 involving rows 3+4, 137–138 (7+8), and 176–181 (6+7), respectively. It bears 15 teeth on the maxillary. Head proportions for this specimen and CAS 157119 (rw/rh 1.99) are 2.19–2.23 (hl/hw), 1.27–1.40 (fl/fw), 1.30–1.33 (fl/inp), 0.84–0.89 (fl/pl), and 0.95–1.00 (dne/inp, see Tab. 1 for explication of abbreviations). IMNH 746 (19 msr) with a “body length” of “81 cm” (tail “30 cm”, AFRASIAB & MOHAMAD, 2011) almost attains the maximum size for examined female *Platyceps r. rhodorachis* (see Dimensions).

Confirmed records of this form, and *Platyceps rhodorachis* from Iraq in general, are limited to four females and a specimen of unknown gender (see next smallprint) from Arbil and As-Sulaymaniyah Governorates (Fig. 7). We suppose *P. cf. r. rhodorachis* to occur in Dahuk along the frontier with extreme SE Turkey (Hakkâri and Şırnak Provinces) and it “is to be expected in the Jarmo area” (vicinity of Kānī Sard, 35°33′N 44°57′E, ca. 740 m above sea level) at the border of NE Kirkuk with As-Sulaymaniyah (REED & MARX, 1959: 96). Due to their proximity, two reports of “*Coluber rhodorachis*” [sic] from altitudes over 1,400 to near 2,000 m (Qezel Bolaq) in adjacent Iran (LATIFI, 1985) are tentatively referred to the Kurdish Cliff Racer (see Subspecies). CAS 157119 and FMNH 19618 are from ca. 700 m a.s.l. FMNH 74615 was “captured May 9, 1955, following the rainy season [...] in deep grass on a steep slope in rocky hill-country (BRAIDWOOD, 1952, fig. 15)” at the entrance to “Palegawra Cave” (ca. 925 m, REED & MARX, 1959). IMNH 764 from the immediate border area with Iran was “collected [...] inside one of the Daraymars Caves” at the beginning of August (AFRASIAB & MOHAMAD, 2011).

The “Daraymar” or “Daray Mar” Caves, indicated at “20 km northeast of Khormal, in the lowest zone of Hawraman Mountain, altitude 900 m. a.s.l.” (AFRASIAB & MOHAMAD, 2011) would be on Iranian territory. The peak of Jabal Hawraman (35°13′N 46°09′E) is about 15 km southeast (!) of Khormal (35°18′N 46°02′E) and the unlocated caverns are mapped in the vicinity of Darah Marr (35°18′N 46°06′E, ca. 1,050 m), about 10 km east of Khormal and roughly 5 km from the frontier with Iran, viz. in SE As-Sulaymaniyah bordering extreme NW Kermanshah Province. A preserved specimen from “north of Arbil” (Saman R. Afrasiab in litt.) stored

in the “Arbil museum of natural history” (no. “3–22” either in the collection of the College of Science, University of Salahaddin or the Department of Biology, Hawler Medical University) and documented by a photograph shows a generally dark dorsum (incl. head and tail), which is probably due to preservation in formaldehyde. The origin is arbitrarily placed ca. 25 km north of Arbil (Hawler) in the vicinity of Zirraw (ca. 36°25′N 44°00′E, ca. 450 m).

AFRASIAB & MOHAMAD (2011) reported *Platyceps r. rhodorachis* from northern Iraq (“melanistic phase in the north of Iraq and reddish-brown in the north-west”) but declared at the same time that *P. rhodorachis* ssp. auct. “are confined to the mountain regions of the north-east of Iraq Kurdistan at altitudes lower than 1000 m a.s.l.” There is no other mention or evidence of melanotic *P. rhodorachis* sensu stricto (see Affinities: first smallprint) nor the species’ presence west of Kurdistan, and elevations clearly higher than 1,000 m are attained in contiguous Iran (see above). The allocation of IMNH 746 to *P. rhodorachis ladacensis* auct. is due to the prevailing confusion regarding trinomina in Jan’s Cliff Racer (see following chapter, Subspecies, Affinities: second smallprint).

## Ladakh Cliff Racer

### *Platyceps rhodorachis ladacensis* (ANDERSON, 1871)

*Zamenis ventrimaculatus* [sic] (GRAY, 1834). – STEINDACHNER, 1867: 65 (“aus dem Thale des Spiti-Flusses”: NMW 25452.10, see Distribution and Altitude, Subspecies).

“*Zamenis*” [sp.]. – ANDERSON, 1870a: 18 (“Kulu Ludak. Dr. Cayley” [ZSI 7323, presumed holotype], see Type Material, References).

*Zamenis Ladacensis* [sic] ANDERSON, 1871[b]: 16, “Ladak” (not mapped, see Type Material, Subspecies).

*Zamenis ladacensis* [partim]. – BOULENGER, 1890: [324] 326 incl. footnote (“The Western Himalayas (Ladák, Gilgit”): BMNH 1870.11.30.35, 1880.3.15.386a–b, see Systematic Review incl. second smallprint).

*Zamenis ladaccensis* [sic] [partim]. – SCLATER, 1891a: 231, 238, and SCLATER, 1891b: V, 28 (“Kula, Ladak” [“Type”], “Gilgit dist.[ri]ct” [not mapped, ZSI 8605, “Col. J. Biddulph”]: incl. ZSI 7274 [“Ladak”], see Type Material, Fig. 12A).

*Zamenis rhodorachis* [sic] JAN, 1863 [partim]. – BOULENGER, 1893: 398 (“N.W. India”). – ANDERSON, 1895: 654 incl. footnote 1 (*Z. ladacensis* ANDERSON syn.), and ANDERSON, 1898: 254 (data from BOULENGER, 1893).

?*Zamenis ventrimaculatus* [sic] [partim]. – MCMAHON, 1901a: 5 (“Chitral” [District, not mapped], see Subspecies: third smallprint).

*Zamenis rhodorachis* [sic] (“variety”) *ladacensis* [partim]. – WALL, 1911b: 134, Tab. (“Chitral” [intergrades], see Subspecies).

*Zamenis ventrimaculatus* [sic] [partim]. – WALL, 1914: 37 [footnote], Tab. [“Synopsis of specimens”], map 2 (incl. literature data [morphology, distribution], see footnote 6, Subspecies: second smallprint).

*Coluber rhodorhachis* [sic] [partim]. – SMITH, 1943: 169 (see Morphology: smallprint).

*Coluber rhodorachis ladacensis* [partim]. – KHAN, 1982: 226 (“mountain parts of Pakistan, like Ladakh in the western Himalayas”).

*Coluber rhodorachis* [partim]. – SAHI & DUDA, 1985: 89, 96 (Leh, 34°10'N 77°35'E).

*Argyrogena rhodorhachis* [sic] [partim] comb. nov. – MURTHY, 1986: 21 (incl. “Laddakh”, see Affinities: last smallprint and footnote 13).

*Coluber ravergeri* (MÉNÉTRIÉS, 1832) *ladacensis*. – DAS, 1997: 41, and DAS *et al.*, 1998: 152 (see Subspecies).

*Argyrogena rhodorachis* [partim]. – SHARMA, 1999: 95 (see *P. r. rhodorachis*).

?*Coluber rhodorachis kashmirensis* KHAN & KHAN, 2000 [partim]: 49 (see Subspecies).

*A. [rgyrogena] rhodorachis* [partim]. – SHARMA, 2002: 51 (see *P. r. rhodorachis*).

*Coluber ladacensis*. – DAS, 2003: Tab. 1 [p. 475] (see Subspecies: first smallprint). – WHITAKER & CAPTAIN, 2004 [partim]: 136, map (“Jammu & Kashmir” [Ladakh]).

*Argyrogena rhodorhachis* [sic] [partim]. – SHARMA, 2007: [129] 130 (“Ladak in the Western Himalayas”).

*Platycephalus rhodorachis*. – MASROOR, 2012 [partim]: 129, Fig. 84 [map] (Gulmit [Hunza River], ca. 36°00'N 72°45'E [W Ghizar], ca. 35°20'N 74°10'E [Chilas area, probable intergrade], ca. 36°15'N 72°00'E [probable intergrade]: incl. PMNH 1652, see Subspecies: third smallprint).

## Type Material

ANDERSON's (1871) description is based on morphological data ascertained from a single “Ladak” specimen. Besides SCLATER's (1891a–b) brief remark on its presence in the Indian Museum and a short comment (see next), respectively, or mentions of “the type” in two footnotes (BOULENGER, 1890; WALL, 1914), DAS *et al.* (1998) recently reconfirmed the existence of a “holotype”. ANDERSON (1895: footnote 1), however, had acknowledged “the Trustees of the Indian Museum for the opportunity of re-examining the types [!] of *Zamenis ladacensis*.”

SCLATER (1891b) considered ZSI 7323 presented by “Dr. Cayley” and catalogued as from “Kula, Ladakh” to be the “[t]ype of the species”. As a matter of fact, the label of another specimen, ZSI 7274 from “Ladak”, designates this individual as the “type” (Fig. 12A). It lacks any indication of a collector or donator (“No history”, SCLATER, 1891b) and, to conclude from a note on the ticket (“M.N.A 4.1.40”) in the same handwriting as the remaining text, was reregistered in 1940. The metal tag bears the accession number (“7274”) and the reverse side says “4.18.8.80”.

The manuscript with the description of *Zamenis ladacensis* ANDERSON was submitted at the end of October 1870. Thus, it can practically be ruled out that it dealt with specimens obtained by the first Yarkand Mission returning that fall (HENDERSON & HUME, 1873)<sup>4)</sup>. ZSI 7274 and the agamid *Laudakia himalayana* (STEINDACHNER, 1867) from Dras (ANDERSON, 1871) were possibly

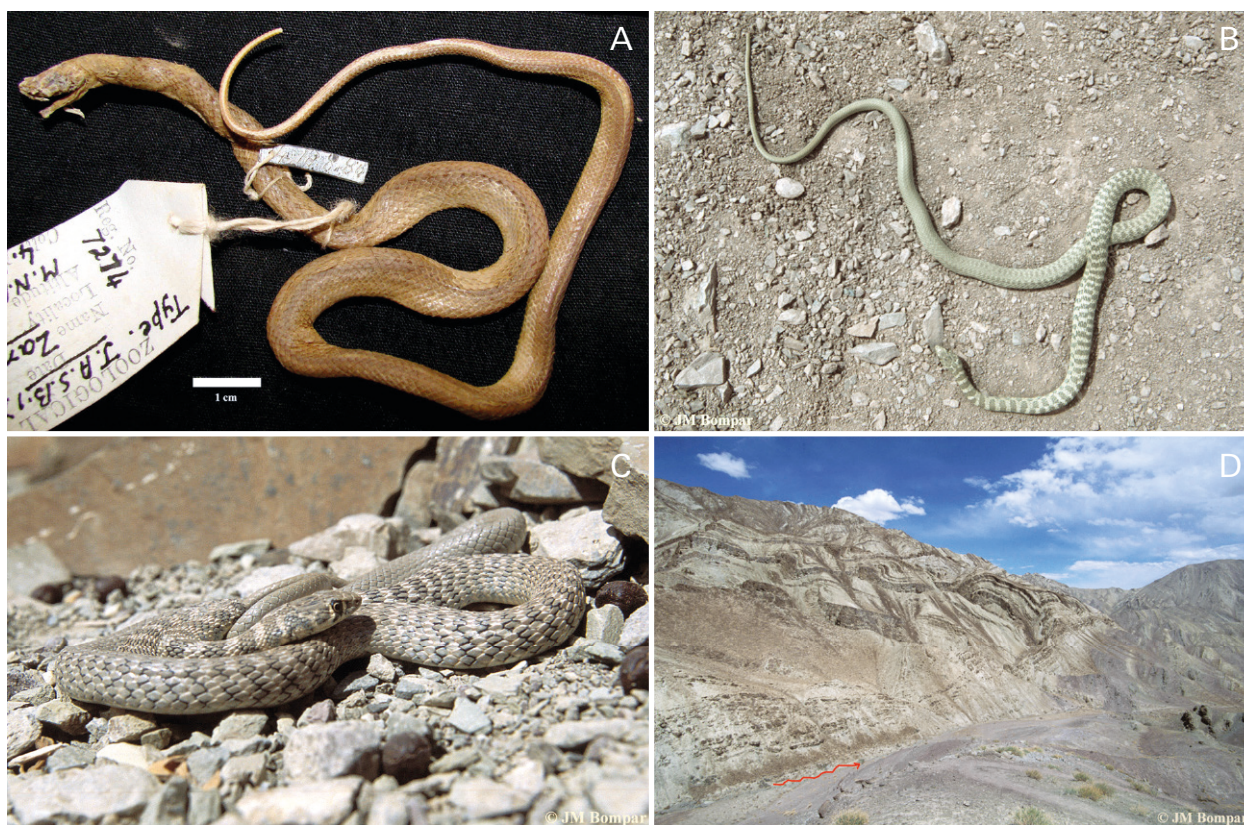
collected by Ferdinand Stoliczka, who visited this place in early September 1865 (BALL, 1886). ZSI 7323 might have been found on the way from Kulu to Ladakh. This is the “*Zamenis*” listed in the ‘Accessions to the Museum in May 1870’ (ANDERSON, 1870a) which cannot be located at present (Indraneil Das and Pratyush Mohapatra in litt., see Material: smallprint). There can be no doubt that ZSI 7274 was accessible to John Anderson at the time he was about to compose the description of *Z. ladacensis*, that ZSI 7323 had been incorporated into the herpetological collections of the Indian Museum when the manuscript was handed in to the editor, and that the printed text relies on a single individual.

Henry Cayley served as the British Resident at Leh between 1867 and 1871. Except during the summer months (June to August), he held office from Simla in Himachal Pradesh, the point of departure for travels to Ladakh with Kulu (Sultanpur) at ca. 1,600 m a.s.l. the veritable outpost. Indeed, Adolf, Hermann, and Robert von Schlagintweit in the mid-1850's or Ferdinand Stoliczka in 1864 (exploration of the Spiti area and over Rupshu along the Indus to Hanle) and 1865 (visiting Leh) reached the Ladakh Valley via Kulu across the Pir Panjal (taking the Rohtang La) and Zaskar Mountains, traversing the Parang and Bara Lacha (“Baralatse”, Paralatse) passes, respectively (see Subspecies: fourth smallprint, STOLICZKA, 1866b: Pl. I [map]). Besides the fervent Austrian scientist, ANDERSON (1871) mentioned various donators of reptiles integrated into the Indian Museum's collections between 1865 and 1870 (William Thomas Blanford, James Alexander Gammie, Henry Haversham Godwin-Austen, John Colpoys Haughton, Thomas Caverhill Jerdon, Samuel Edward Peal, and William Theobald) – but none of them seems to have had a particular connection with Ladakh, and enumerated a single collecting site from the same general area as *Zamenis ladacensis*, viz. “Dras in Ladakh” for the agamid “*Stellio himalayanus*” (see preceding paragraph).

The description of *Zamenis ladacensis* is without an indication of the gender or dimensions. The parietals (“Occipitals”) are “transversely truncated behind”, the preocular is entire, there are nine supralabials, two postoculars, 2+2 temporals, 237 ventrals (incl. pre-ventrals?), 102 subcaudals (“tail [...] probably mutilated”, BOULENGER, 1890), and 19 dorsal rows (“smooth scales with two apical pores”). Some lateral head scale conditions are hard to come to terms with, for instance the configuration of the subocular (“a small detached piece below [the “preocular”] separated from the 3rd and 4th upper labials”) and the arrangement of the supralabials

<sup>4)</sup> The herpetological items procured by the first Yarkand Mission were described by ANDERSON (1872). Both expeditions to western China in 1870 and 1873–74 started in Murree and traversed Kashmir on their way to, and from, Ladakh (HENDERSON & HUME, 1873; BLANFORD, 1878b; BALL, 1886). Incidentally, ANDERSON's (1872) comments on, for instance, the skink “*Eumeces ladacensis*” (see footnote 5) from “Ladak” or the new species (*Cyrtodactylus yarkandensis* [syn. *Altiphylax stoliczkai* (STEINDACHNER, 1867)], *Phrynocephalus forsythii*) from “Yarkand” (Shache, 38°25'N 77°14'E) are without a hint as to the provenance of the specimens, namely “a collector, who accompanied Dr. Henderson” but, “unfortunately, the localities had apparently, in some cases, not been correctly marked on the labels” (BLANFORD, 1878a: 1, 13).





**Fig. 12.** *Platyceps rhodorachis ladacensis*. Putative “type” of *Zamenis ladacensis* ANDERSON (A, ZSI 7274) and live specimen from Rinzong, Ladakh Valley (B–C) with habitat (D, red undulated line shows route of observation). Not to scale. Courtesy of Pratyush Mohapatra (A) and Jean-Michel Bompar.

in relation to the eye (“the 4th and 5th entering the orbit, the posterior upper extremity of the latter prolonged up behind the orbit. The upper half of the 6th distinct, but excluded from the orbit by the 5th”). These character states are odd among cliff racers and possibly erroneous, the more so as ANDERSON (1895) declared that “the types [...] are unquestionably [sic] identical with Jan’s *Z. rhodorachis*.” Moreover, tooth counts (“Nine teeth in each maxillary”) are far lower than the minimum found in any *Platyceps* spp., and *P. rhodorachis ladacensis* in particular.

ZSI 7274 (Fig. 12A) measures 279 mm snout-vent length, has 231 ventrals, an incomplete tail with ca. 85 paired subcaudals, and 19-19-17 dorsal scale rows along the trunk (data ascertained by Pratyush Mohapatra). The anterior portion of the head is severely disfigured, possibly macerated by dermestic beetles. The number of supralabials (eight?) remains in doubt and we cannot discern any subocular scale on the basis of the photographs at hand. There are two postoculars and three strikingly large temporals extending all along the outer border of the right parietal (no data for left side) and in contact with at least the penultimate (seventh?) supralabial. The dorsum is more or less uniform light brown (colour pattern probably faded).

Apart from the reported position of the anterior subocular, the condition of the temporals (few in number, first and second possibly single) inspires serious con-

cerns over the true identity of ZSI 7274, and data for this specimen is not included in the following section. By all means, ZSI 7274 does not match the description of *Zamenis ladacensis* ANDERSON, which remains mysterious and is reminiscent of incompatible information for another nominal racer taxon designated by this author, *Gonyosoma dorsale* (see Taxonomy and Type Material). Although the case regarding the original sample of *Z. ladacensis* pends future investigation, we refer to the described specimen (ZSI 7323) as the holotype.

### Morphology

Number and arrangement of head scales generally similar to *Platyceps r. rhodorachis* (see above for reputed configurations in holotype). Ten supralabials in BMNH 1880.3.15.386a (right side) and PMNH 1950 (data only for left side). A small slender third left postocular in PMNH 1652 (no data for right side). Upper left anterior temporal in the latter and PMNH 1950 paired. Rostral of NMW 25452.10 (♂) 1.69 times broader than high, head 2.05 times longer than broad; head ratio of BMNH 1870.11.30.35 (♀) 2.26. Frontal 1.39–1.47 times longer than maximum width, 1.29–1.34 times longer than internasals and prefrontals, 0.90–1.01 times length of parietals (♀, ♂). Posterior border of these shields “truncated” in holotype; strongly indented at posterior end of



interparietal suture in NMW 25452.10. Distance from the nostril to the eye 0.81–0.93 (♀, ♂) times the internasal-prefrontal length.

Five specimens from Gilgit-Baltistan and “N.W. India” have 244–256 ventrals (3 ♂♂ 244–249, 2 ♀♀ 245–256); there are 252 (incl. prefrontals?) in an unexamined male (SMITH, 1943) and as few as 237 in NMW 25452.10 (♂) from Himachal Pradesh and the missing holotype. Subcaudals 127–133 (127–129, 129–133) and total body scales 370–385 (370–376, 378–385; data relies on BMNH 1870.11.30.35, 1880.3.15.386a–b, and PMNH 1652).

BMNH 1870.11.30.35 has both prefrontals as well as three ventrals (first, 242<sup>th</sup>, and last) divided. BOULENGER’S (1893) data for this specimen (letter z) is not precise; it is an adult female (“Hgr.”) with 245 (“243”) ventrals and 133 (“135”) subcaudals. The origin (“N.W. India”) is vague and it may have been collected in N Pakistan. SMITH (1943) noted 252 ventrals “in a ♂ from Gilgit”; the specimen is neither BMNH 1880.3.15.386a (247) nor -386b (see Systematic Review: second smallprint) but possibly ZSI 8605 mentioned by SCLATER (1891b).

PMNH 1652 and 1950 have 19-19-13 dsr (no detailed data available, see Material: smallprint). The damaged Gilgit male has 19 msr and about 13 dsr prior to the vent but the reduction pattern is utterly aberrant and interspersed large scales are found throughout. BMNH 1870.11.30.35 (♀) has 21-21-15 dsr and reduces at ventrals 133 (131–135, 54%ven) and 153 (62%) with the participation of rows 9+10 and 3+4, respectively; the decrease to 15 dsr occurs at 170–171 (70%) by fusion of rows 6–8 (13 are attained at 242–243 or 99% involving rows 2–4, see Methods and Definitions). NMW 25452.10 with 19-(21)-19-15 dsr shows 19 rows after ventral 13, increases to 21 dsr at 51.5 (51–52), has a variable number of dorsals (19-21-19 etc.) between ventrals 70–100, and re-establishes 19 dsr at 106.5 involving rows 8–10; the regular reductions occur between 139–141 (59%ven) and 145–147 (62%) at lateral (rows 4+5) and paravertebral (7+8) levels.

NMW 25452.10 (♂) has a snout-vent length of ca. 940 mm. The largest female (BMNH 1870.11.30.35) measures ca. 650 + 240 mm (see Subspecies regarding intergrades). The tail versus body length ratio is 0.37–0.38 (BMNH 1870.11.30.35, 1880.3.15.386b [sub-adult], PMNH 1652).

Pale olive brown (ANDERSON, 1871) to light grey above. The dorsal colour pattern consists of distinct dark transverse bands on the nape and neck, usually followed by bilateral blotches arranged in zipper-fashion alternating with well-defined bars along the lower flanks (Figs 12B–C). These markings become narrower and indistinct towards midbody and the posterior trunk is unicoloured. The dorsal blotches of the holotype are “only a little darker than the general colour of the snake” (ANDERSON, 1871), which is probably due to the brownish (instead of greyish) complexion of the specimen. Venter of holotype “pale yellow, faintly marbled with brown on the under surface of the tail”, whitish or yellow in exam-

ined material, with dark lateral spots and outer edges of ventrals impinged on by dorsal marks.

Maxillary with 16 teeth (BMNH 1870.11.30.35, NMW 25452.10). Apex of hemipenis (NMW 25452.10) reaches tenth subcaudal, the female anal gland the fifth (BMNH 1870.11.30.35).

## Distribution and Altitude

*Platycephalus rhodorachis ladacensis* is documented for the southern escarpments of the eastern Hindu Kush and Karakoram, the Ladakh Valley, and on the basis of a single specimen from the Spiti Valley in montane Himachal Pradesh (Figs 9 and 11). This population may be isolated from those north of the Zaskar Ridge. We consider the presence in N Chitral to be a given (see Subspecies). Most certainly, the Ladakh Cliff Racer inhabits the Shyok Range, probably including Nubra Valley, and Ghanche (SE Baltistan) where it is presumed to live along the Suru River. Also, we are confident that future collecting will confirm *P. r. ladacensis* in valleys of central Zaskar. If not through the Indus Valley at over 4,000 m above sea level, which cannot be excluded a priori, this taxon may encroach upon Tibet along the Sutlej and/or Parang. Verified elevations are ca. 2,350–2,500 m a.s.l. in Gilgit-Baltistan (Gulmit, Skardu area), about 3,000 m (“circa 10.000 Fuss”, STEINDACHNER, 1867) in the Spiti Valley, and ca. 3,700 m near Rizong (34°16′N 77°07′E, Fig. 12D) in Ladakh. Chitral *r. rhodorachis* – *ladacensis* intergrades were found active astonishingly late in the year (see Ecology incl. last smallprint).

Records from “Gilgit” (BMNH, ZSI) are arbitrarily placed east of the district capital (35°56′N 74°30′E) at about 3,000 m a.s.l. and in the Upper Gilgit Valley (Ghizar District) east of Yasin (36°22′N 73°20′E) at ca. 2,250 m (Fig. 9). The bottom of the Zaskar Valley around Padam (Padum, 33°28′N 76°53′E), watered by the Stod and Tsarap forming the Zaskar River (Fig. 11), lies at altitudes below 3,600 m. The Stod and Suru Valleys are separated by less than 5 km in a horizontal line at slightly under 4,200 m (lowest passage) in the Pensi La area (pass, ca. 33°51′N 76°22′E). *Platycephalus rhodorachis ladacensis* may attain elevations close to 4,000 m along these and other watercourses of Zaskar. The confluence of the Spiti River with the Sutlej (ca. 2,800 m) is just a few kilometres (depending on the contested borderline) from the frontier between India and China (Tibet) situated at roughly 3,000 m along that stream (Fig. 11). This altitude is indicated for the Himachal Pradesh record. The collector of NMW 25452.10, however, mentioned only a viviparous skink (as “*T. Sikkimensis* Gray” [sic]) and “*Eumeces ladacensis*” [sic] from “Spiti” but no other reptiles nor racers in particular (STOLICZKA, 1866a: 868). A “*Coluber*” without any further indication and “eine *Vipera* (*Halys* [= *Gloydius*] *himalayanus* Gthr.)” from ‘Bisahir’ (“Umgebung von Chini” [Kalpa, Kinnaur District], 31°32′N 78°16′E, ca. 2,700 m) are the only snakes reported<sup>5</sup>. The pit viper

<sup>5</sup> Most probably, “*T.*” stands for *Tiliqua* auct. As far as we are aware, this binomen was only used by STOLICZKA (1866a). The viviparous *Plestiodon* [sic] *sikkimensis* GRAY, 1853 (a lapsus calami for *Plestiodon* DUMÉNIL, BIBRON & DUMÉNIL, 1839), viz. *Eutropis m. multifasciata* (KUHL, 1820), is a widely distributed Southeast Asian skink. This species, however, exhibits a completely different habitus from Himalayan skinks. *Mococa* ...

is from ca. 3,000 m a.s.l. (“auf einer Höhe von 10000 Fuss”) above Pangi (31°36'N 78°16'E) along the Sutlej. We follow STEINDACHNER (1867) and pinpoint the origin of NMW 25452.10 near the junction of the Parang and Spiti River slightly above 3,000 m (see Subspecies: fourth smallprint).

## Analytical Part

### Samples and Characters

*Platyceps rhodorachis* from northern peripheral regions (NW Iran, NW Turkmenistan and Qaraqalpaqstan east to Kyrgyzstan, mountainous northern Pakistan, India) or Punjab and southern Afghanistan, above all the Southwest or Upper Helmand proper and along the border with Pakistan, are scarcely represented in our material (Appendix A). Regarding morphological features, and apart from visibly imperfect tails, many individuals lack the filigree posteriormost portion. Out of 250 examined *P. rhodorachis* ssp. including those studied by collaborators (see Material) and considered literature samples, 173 (69.2%) appear to have the extreme tip of the tail intact, and few subcaudal counts from literature were incorporated into the analysis (Appendix C, see External Data). Moreover, some characters discussed in the following text, in the first place detailed dorsal scale data, are based on limited series. Midbody counts are available for virtually all specimens and those at the neck and posterior level have been ascertained for most undamaged individuals but exhaustive reduction sequences, a time-consuming task to accomplish, are quite limited for some areas. Head measurements from 148 cliff racers belonging to the nominotypical subspecies (incl. two from Kurdistan) are often incomplete and miscellaneous indications pertaining to dentition (except the number of maxillary and dentary teeth) or hemipenis features rely on rather reduced samples. Despite these restrictions, the results outlined hereafter allow for solid assertions regarding the variability of morphological traits within *P. r. rhodorachis* (see next section incl. sixth smallprint and last paragraph under Distinction regarding the Ahvaz population). Cliff racers from NE Iraq and *P. r. ladacensis* are dealt with farther ahead (Subspecies).

Not a single *Platyceps r. rhodorachis* from Kazakhstan or Nepal has been examined for this study, nor is literature data available, and only two records from Kyrgyzstan were made accessible to us (Appendix A, Fig. 15). Preserved material from Chitral and Kashmir east to Uttarakhand is lacking in most institutional collections, the type series of *Coluber rhodorachis kashmirensis* KHAN & KHAN, 2000 is inaccessible, and published scale counts for this taxon are unreliable (see Material, Systematic Review, Subspecies). Just one Chitral *P. r. rhodorachis* was studied and data largely relies on WALL's (1911b) specimens from the district capital, Drosh (WALL, 1914), and unspecified localities (n=13; no. 7, a ♂ with an incomplete tail, is BMNH 1910.7.12.2). Three more cliff racers from this big northwest border district are intergrades with *P. r. ladacensis* (see Subspecies). Regarding Azad Jammu and Kashmir, and apart from PMNH 1651 and 2477 (see Incertae Sedis), only two males (BMNH 1873.7.3.12, PMNH 1431) have been accessible for study. WALL (1914) tabulated summary body scale counts for Indian *r. rhodorachis* (see Subspecies: second smallprint) but individual data for morphological features in general is virtually non-existing<sup>6)</sup>. The number of ventrals and subcaudals for “*Coluber ladacensis*” in WHITAKER & CAPTAIN (2004: “201–230”, “93–148”) are from LATIFI's (1991) “*C. rhodorachis ladacensis*”, and quite a few conditions of various characters (e.g., dsr reduction pattern, maxillary tooth counts) in Indian populations remain unknown (see first smallprint in next section).

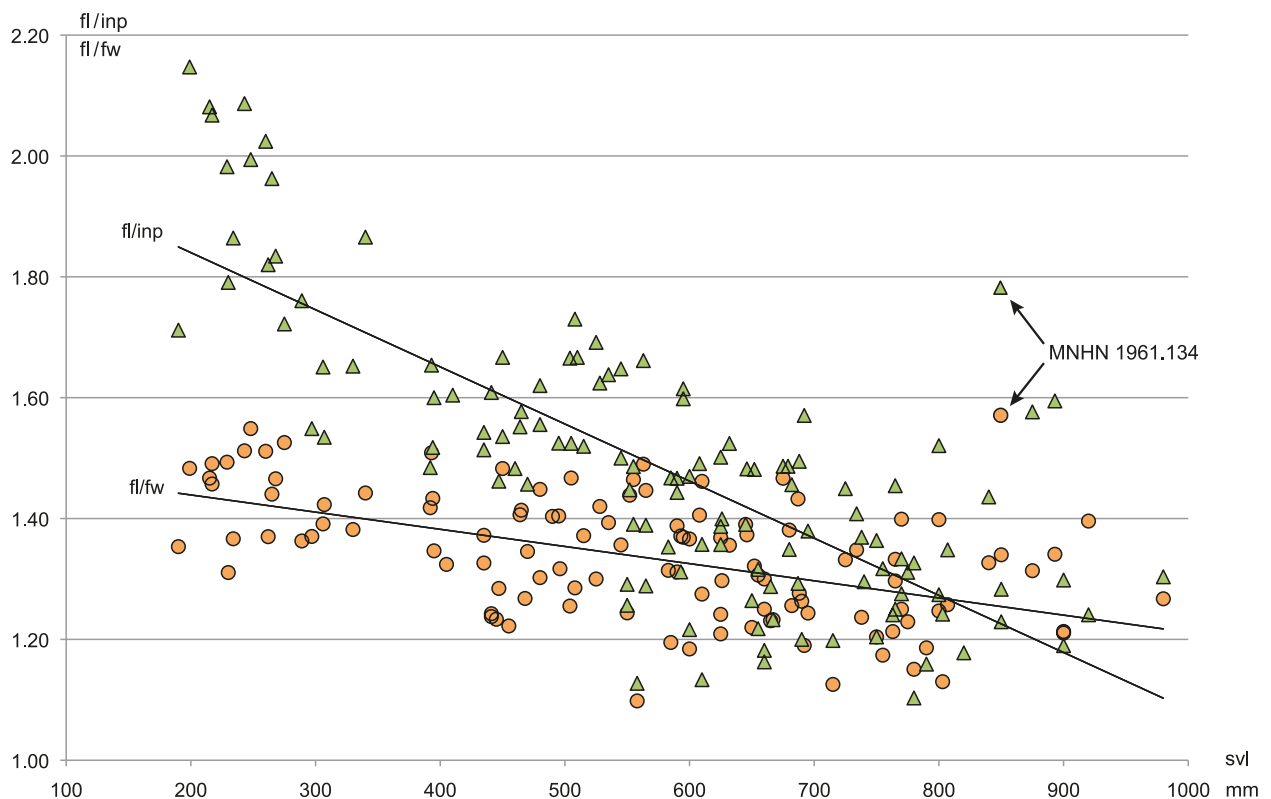
The variation of certain head and dorsal scales (e.g., number of supralabials and suboculars, longitudinal position of third reduction) is unrelated to origin, gender, age, or macroecological parameters as, for instance, altitude. Differences in the transverse level of first dsr fusions (presence or absence of lateral reductions, Tab. 4) vis-à-vis neighbouring groups observed in some areas of Iran with only a few specimens available (vicinities of Kerman and Ahvaz) or northern Pakistan (Peshawar to Kashmir) do not allow for any sound conclusion. Other features unveil rampant individual discrepancy (e.g., degree of separation of posterior inframaxillaries, Figs 2E–F, see footnote 9). The tail versus body length ratio is correlated with the number of ventrals and subcaudals.

<sup>5)</sup> ... [= *Asymblepharus*] *sikimensis* (!) BLYTH, 1853 (“Hab. Sikim, where procured by Capt. W. S. Sherwill”) does not occur in the Western Himalayas and is oviparous (JEREMCHENKO, 2002). We strongly suspect that the species in question is *Asymblepharus himalayanus* (GÜNTHER, 1864), which is viviparous and found in the area under consideration, and shows more similarities with *A. sikimensis* than *A. ladacensis* (GÜNTHER, 1864) from “Ladak (Tibet)” (type locality, leg. Messrs. von Schlagintweit). Based on several specimens from Spiti (“Thale des Spiti-Flusses”), STEINDACHNER (1867) described *Euprepes stoliczkai*, a junior synonym of *A. ladacensis* (BOULENGER, 1890; JEREMCHENKO, 2002). The unspecified colubrid is the ratsnake *Orthriophis hodgsonii* (GÜNTHER, 1860) NMW 26924.7 (“östlich von Chini”, see footnote 8).

<sup>6)</sup> WALL (1914: 38, 42) reported 190–222 ventrals and 82–125 subcaudals (see External Data: first smallprint) for the “few shielded variety” of “*Zamenis ventrimaculatus*”, including striped Chitral specimens, and 214–246 and 124–145, respectively, for the “many shielded variety” (incl. striped phenotype from “Persia” and *Platyceps rhodorachis ladacensis*); the sum of ventrals and subcaudals ranges from 281–391 (281–344 and 341–391, resp., see Sindh Racer: smallprint). The caption to map 1 in WALL (1914: “few-shielded variety”), however, gives the minimum for ventrals as 199 and the maximum for subcaudals as 122. The maxima for the Chitral group (222 ventrals, 122 subcaudals) rely on a female of the striped phenotype (“Variety *rhodorachis* (Jan.)”) listed in WALL (1911b: no. 14). To conclude from the published information (WALL, 1914: Tab. [“W. Himalayas” cluster], maps 1–2), BNHM 537 from Kasauli in Himachal Pradesh (locality 14) possesses at least 216 ventrals (possibly incl. preventrals; 126 or more subcaudals and a minimum of 347 total scales may not apply to this missing specimen in case of an incomplete tail); an unlocated racer from Mussoorie in Uttarakhand (locality 10) has a potential maximum of 221 ventrals, 122 (125?) or fewer subcaudals, and at best a sum of 335 (see Systematic Review: third smallprint, Subspecies: second smallprint, SCHÄTTI & SCHMITZ, 2006: footnotes 1 and 3).

**Tab. 1.** Head shield proportions in *Platyceps r. rhodorachis* except MNHN 1961.134 (see text, Fig. 13, Appendix A). Sample size in brackets. Specimens under 400 mm snout-vent length in parenthesis. Rostral width against height (rw/rh), head length versus width (hl/hw), frontal length vs. width (fl/fw), frontal vs. internasal-prefrontal length (fl/inp), frontal vs. parietal length (fl/pl), and nostril-eye distance vs. internasal-prefrontal length (dne/inp).

Region, gender	rw/rh	hl/hw	fl/fw	fl/inp	fl/pl	dne/inp
Turkmenistan, Uzbekistan, and Kyrgyzstan	♂♂ 1.30–1.77 [18] 1.31–1.74 [10] (1.62–1.70, 2)	2.19–2.56 [19] 2.17–2.49 [12] (2.30–2.54, 2)	1.10–1.39 [16] 1.18–1.43 [11] (1.36–1.44, 2)	1.13–1.62 [20] 1.20–1.69 [12] (1.76–1.96, 2)	0.75–1.01 [23] 0.79–0.95 [12] (0.85–0.97, 2)	0.89–1.09 [18] 0.83–1.07 [9] (0.97–0.99, 2)
Afghanistan and Tajikistan	♂♂ 1.48–1.87 [9] (1.62–2.00, 10)	2.11–2.44 [12] (2.04–2.60, 10)	1.22–1.49 [11] (1.31–1.55, 10)	1.35–1.73 [8] (1.65–2.15, 10)	0.80–0.97 [11] (0.72–0.93, 10)	0.82–1.03 [8] (0.94–1.17, 10)
	♀♀ 1.46–1.79 [4] (1.74–1.93, 3)	2.19–2.45 [4] (2.30–2.59, 3)	1.23–1.47 [5] (1.49–1.51, 3)	1.49–1.73 [4] (1.98–2.09, 3)	0.84–1.03 [5] (0.83–0.90, 3)	0.89–1.06 [4] (1.06–1.12, 3)
Pakistan	♂♂ 1.96–2.33 [8] (1.93–2.30, 2)	2.11–2.53 [10] (2.36–2.38, 2)	1.13–1.27 [7] (1.35–1.39, 2)	1.20–1.50 [10] (1.60–1.65, 2)	0.75–0.93 [11] (0.91–0.93, 2)	0.84–1.10 [10] (0.98–1.10, 2)
	♀♀ 1.79–2.49 [10] (2.03, 1)	2.27–2.47 [12] (2.43, 1)	1.19–1.48 [10] (1.53, 1)	1.16–1.67 [10] (1.72, 1)	0.74–1.01 [12] (0.98, 1)	0.86–1.01 [9] (0.92, 1)
Iran	♂♂ 1.50–2.33 [15] (1.98–2.27, 2)	2.05–2.56 [24] (2.41–2.49, 2)	1.15–1.47 [19] (1.35–1.42, 2)	1.10–1.67 [22] (1.48–1.71, 2)	0.75–1.01 [22] (0.73–0.93, 2)	0.80–1.09 [21] (0.82–1.03, 2)
	♀♀ 1.55–2.23 (10) (1.77–2.23, 5)	2.17–2.54 [14] (2.22–2.63, 6)	1.24–1.46 [13] (1.37–1.49, 5)	1.18–1.65 [14] (1.52–1.87, 4)	0.81–1.02 [13] (0.81–0.94, 6)	0.86–1.00 [14] (0.91–1.01, 5)

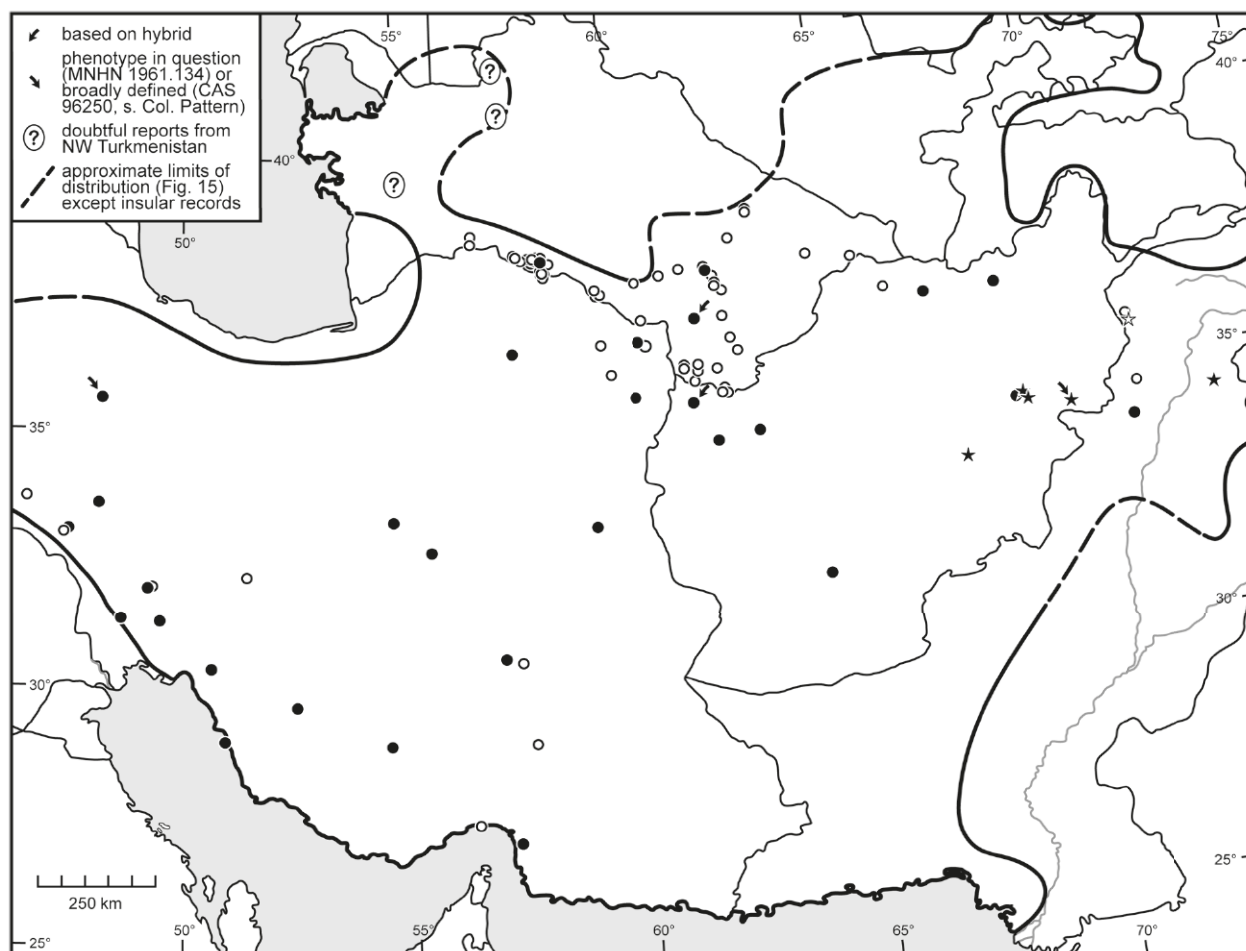


**Fig. 13.** Quotients of frontal length against maximum width (fl/fw, orange circles) and internasal-prefrontal length (fl/inp, green triangles) in relation to snout-vent length (svl) in *Platyceps r. rhodorachis* (see text and Appendix A).

As a rule, no regional differences exist in head shield proportions but Pakistani populations show a considerably higher mean for the rostral quotient (2.15,  $n=22$ ), and a single value lower than 1.93 (1.79) occurs in NMW

25452.6 (Tab. 1). Iranian cliff racers with 400 mm or more snout-vent length except FMNH 171134 (2.33), MHNG 2718.13 (2.31), and MMGU 12001 (2.23) do not exceed 2.17. MNHN 1961.134, a large male from Hamadan,





**Fig. 14.** Collecting sites of striped (circles) and plain (stars) *Platyceps r. rhodorachis*. Solid (empty) symbols denote examined material (literature data) and a field observation in Hormozgan. See text incl. third smallprint, Fig. 1, and Appendices (A, D) for further explanations and details.

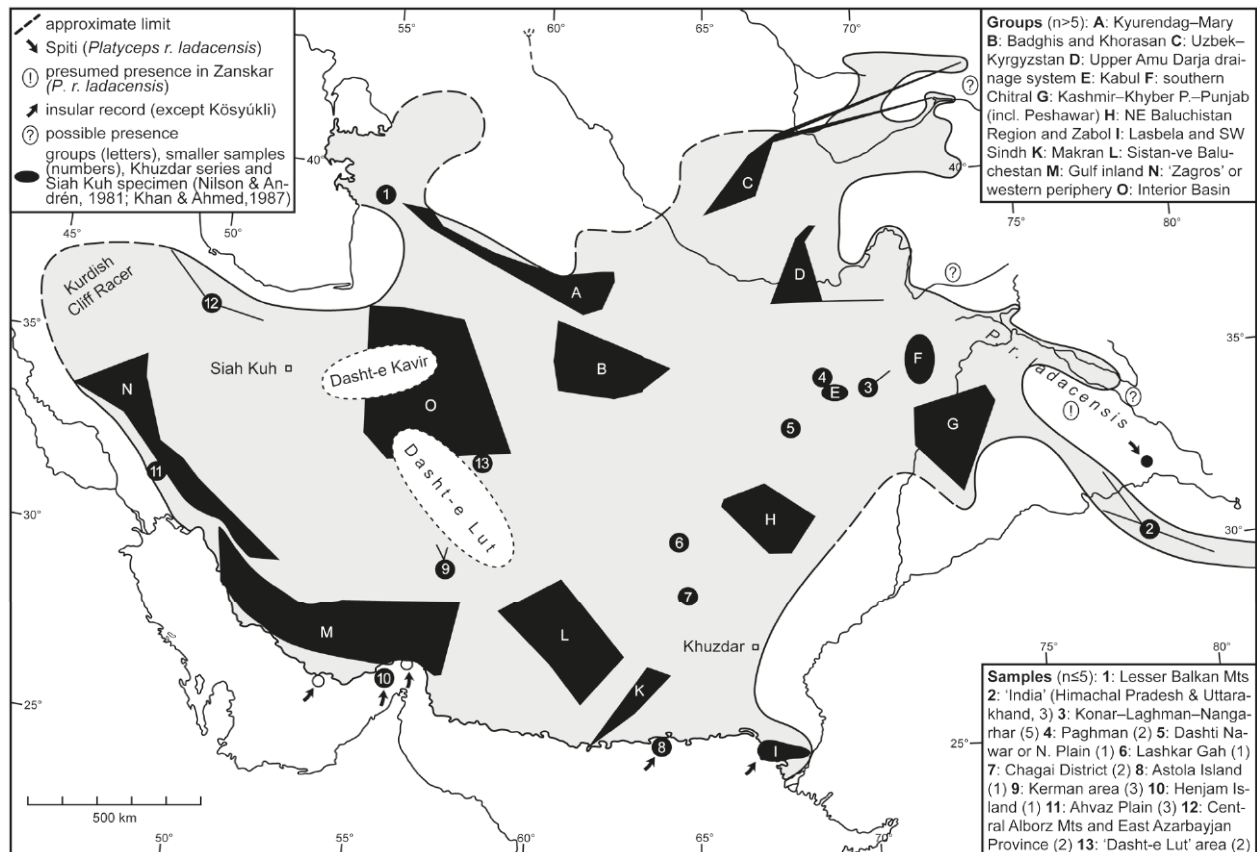
displays various deviating proportions (see Pholidosis). PARKER (1949: Fig. 3) found “juveniles having a much higher ratio than adults” regarding “the length of the frontal to the distance between the frontal and rostral shields.” As a matter of fact, our data for *Platyceps r. rhodorachis* with known snout-vent length (Fig. 13) corroborates an ontogenetic component for the fl/inp quotient (linear regression  $2.03-0.001$  svl,  $R^2$  0.61,  $n=124$ , without MNHN specimen). The proportion of the frontal itself (fl/fw) does virtually not differ with increasing body size ( $1.50-0.0003$  svl,  $R^2$  0.30,  $n=116$ ) but separates age classes in Pakistani specimens (Tab. 1). The purported “elongation of the head with increasing age” (PARKER, 1949) is subject to considerable variation and the hl/hw ratio plotted against the snout-vent length generates an almost horizontal regression line (slope  $-0.0002$ ,  $R^2$  0.10,  $n=136$ ).

Apart from the number of ventrals and total body scales around Kabul and in southern Chitral (groups E–F, Fig. 15), subcaudals from central Khyber Pakhtunkhwa to Punjab (G, ranges of ventrals and sum overlapping), or possibly subcaudals and the aggregate for the Upper Amu Darja drainage system (D, only one ♀), *Platyceps r. rhodorachis* hardly shows significant sexual dimorphism in body scales (Figs 16–18, Tabs 2–3). Few

(11) dsr on at least a portion of the posterior trunk (four reductions, see third smallprint under Pholidosis apropos an increase to 13 dsr immediately prior to vent) are quite uncommon in females (see next section incl. Tabs 3–4 and third smallprint). A gender-related difference is observed in maximum size (♂♂ larger, see Dimensions, Subspecies: Kurdish Cliff Racer).

Out of twenty-eight specimens with four reductions (11 posterior dsr), only three (MMGU 12001, USNM 52141, ZSM 223.1989.2) are females, all from the Baluchistan Region. NMP 34586 (Hormozgan, “19-19-11” dsr) is a juvenile without detailed sequence data available. The males are AMNH 82181, BMNH 1874.11.25.11, 1889.8.28.127 [17 msr], 1919.7.18.12, FMNH 141610, MHNG 2718.17, MTD 19902, 25334, MZUF 23940, NMB 14383, NMW 15168.2, PMNH 770, RUZM 30.13 [see Geographic Variation], SMF 57304–05, 57327, 62926, UMMZ 121970, USNM 166773, ZISP 9285.1, 9287, ZMB 56081, ZSM 223.1989.4, and -6. Regarding maximum length, *Platyceps r. rhodorachis* differs from *P. karelini* and *P. mintonorum* (genders attain similar dimensions) or *P. ventromaculatus* (♀♀ slightly larger).

The patterned phenotype is found over the entire geographic range of the species. Striped (typical) specimens are documented from Ilam south to the Strait of Hormoz, and east through Turkmenistan and a good part of Afghan-



**Fig. 15.** Confirmed distribution of *Platyceps rhodorachis* and geographic groupings based on morphology. See Geographic Variation incl. first smallprint, Distribution, Figs 1, 7–11 and 14, and Appendix C (literature data) for details.

istan to N Pakistan. Except for this blatant dimorphism, no differences exist in pholidosis and the striped pattern is uncorrelated to gender, age, or altitude. Plain specimens are apparently a local phenomenon at the eastern confines of the typical phenotype (Fig. 14, see last paragraph under Colour Pattern and next section incl. Tabs 3–4).

Mentions of the typical phenotype from “Arabia” (e.g., SMITH, 1943: “Form II”) are based on an incorrect origin (see footnote 7). The dorsal colour pattern of MNHN 1961.134 from Hamadan (dulled due to preservation in formaldehyde) remains in question (Fig. 14). Striped specimens are recorded from Ilam (FATHINIA *et al.*, 2010) at least as far southeast as Minab County in E Hormozgan (Biyaban District, pers. obs.). LATIFI (1985: Fig. 41) indicated this morph from Kurdistan Province, and it cannot be completely ruled out that one or both of GÜNTHER’S (1858) striped cliff racers (BMNH R.R. 1963.992a–b), actually the very first published record of the species ever, indeed hail from there. This phenotype is unknown in both Azarbaijan Provinces, Ardabil, or Gilan (northern distribution limit in Iran), may be absent from certain areas of Turkmenistan (see below and Ecology: third smallprint), and seem not to reach the Köytendag (or is rare there) in the extreme eastern corner (ATAJEV, 1975a: Tab.; SHUKUROV, 1976; RUSTAMOV & SHAMMAKOV, 1982: Tab. 2; SHAMMAKOV *et al.*, 2008: Tab.). Indeed, ATAJEV (1985) averred that the typical morph (“*Coluber r. rhodorachis*” [sic]), contrary to “*ladacensis*”, is basically found in lowland Turkmenistan (“boleev ravinnaja zmeja, shiroko naseljajuszcza nizmennye uchastki”) but later reported striped and patterned individuals (as belonging to distinct species) up to 1,000 m above sea level (ATAJEV *et al.*, 1996; see Ecology, Subspecies incl. first smallprint). The plain Chitral record (WALL, 1911b) is arbitrarily positioned at Muldeh (35°48’N 71°47’E) south of the district capital.

The distribution limits of the striped morph are far from clear, particularly in the northwestern regions of Iran (see preceding smallprint) and Turkmenistan with generally scant data and no material at hand. The frivolous interpretation of certain references and conflicting statements make it difficult to evaluate things properly in Balkan Province and W Daşoguz. The putative presence in the Kyurendag relies on incorrect information, reports from the western Uzboy channel and Sarygamyş area are problematical, and the occurrence of the typical phenotype in NW Turkmenistan pends confirmation.

BOGDANOV (1962) listed cliff racers from the Kyurendag (coll. Kolesnikov 1956) as “*Coluber rhodorachis rhodorachis*”, viz. the striped phenotype (see Subspecies, SHAMMAKOV, 1981: map 59; ATAJEV, 1985: map 69). KOLESNIKOV (1956), however, had given no evidence that any specimen from Danata (Kyurendag, n=6) showed a vertebral line and SHAMMAKOV (1968, 1981: 248) explicitly referred to more material from this area under the patterned morph (“*ladacensis*” auct.). According to ATAJEV (1975a: Tab. I, columns 5–6), striped specimens are lacking in the Greater and Lesser Balkan Mountains. Nonetheless, RUSTAMOV & SHAMMAKOV (1982) tabulated this morph as exclusive (!) for these ranges or the Sarygamyş Depression, and they enumerated both phenotypes from the “Western Uzboi channel” and “Caspian Sea coast”. SHAMMAKOV (1981) and ATAJEV (1985) reported only “*ladacensis*” from the Caspian zone. The indications from the Sarygamyş–Uzboy drainage system (formerly watered by the Aral Sea) are not supported by verifiable evidence (e.g., institution acronym, accession numbers) and the reputed absence of the non-striped morph is quite surprising. By all means, the “Ortakuyu” record (Orta-Kuyu Well,

southern Sarygamys Depression) mapped in SHAMMAKOV and ATAJEV (l.c.) is based on a single specimen collected by RUSTAMOV & PTUSHENKO (1959), published without a hint as to its phenotype, and we have reservations regarding certain data provided by RUSTAMOV & SHAMMAKOV (1982) due to various inconsistencies (see Distribution: second smallprint).

The lateral edges of most anterior ventrals usually display dark spots or short transverse streaks (e.g., TEREENTJEV & CHERNOV, 1949; MINTON, 1966). Specimens from India (n=3), Kashmir (BMNH 1873.7.3.12), or NE Afghanistan (ZFMK 8643–44) show dots “at least as far as the upper black markings extend” (STOLICZKA, 1870c; see also last paragraph under Colour Pattern regarding ZFMK 41340). SMF 57308 from Khyber Pakhtunkhwa has conspicuous spots almost to the anal scute. Dense ventral dotting on the forebody is also observed in many Iranian specimens (e.g., MULDER, 2002), for instance BMNH 1874.11.25.11 (except neck) and ZISP 9285–87 (virtually all ventrals) from northern Sistan-ve Baluchestan, FMNH 171136 (N Hormozgan), FMNH 141639 (central W Fars), BMNH 1951.1.1.26 (Khuzestan, spotted beyond midbody), or RUZM 30.13 (Hamadan), but uniform venters are found, for example, in Fars (e.g., ZFMK 31666, WERNER, 1917).

The random presence or absence of small but distinct dark grey or black dots along the outer margins of the ventrals has been noted by various authors as, for instance, STOLICZKA (1872: “with or without lateral dark spots on the ventrals”) or WALL (1911b: “usually a small round blackish spot at the side of each ventral especially marked in the anterior ones, but these may be absent”). Actually, an unspotted venter is rather the exception in *Platyceps r. rhodorachis*, and the occurrence of dotted ventrals at least on the forebody is certainly the paramount reason for confusion with *P. ventromaculatus* auct. WERNER (1917), and most probably many herpetologists before and after him, considered pronouncedly spotted lateral edges of the ventrals to be the par excellence diagnostic feature for *ventromaculatus* (hence its scientific name) versus a homogeneous belly (viz. “die einfarbig hellgelbe Bauchseite”) in *rhodorachis* auct.

## Geographic Variation

Generally speaking, *Platyceps r. rhodorachis* from western and central Iran to SW Sindh are characterised by many total body scales (mean > 346) but show considerable differences in the number of ventrals and subcaudals between various regions (Figs 15–18, Tabs 2–3: groups H–O). Their sum is particularly elevated in two males from Chagai (sample 7, see following smallprint), comparatively high (mean > 355) in adjacent NE Baluchistan (group H, max. 374, ♀) or a female from the ‘Dasht-e Lut’ (sample 13, 374), and the average is above 362 along the western periphery (N) of the distribution range except in the Ahvaz Plain (no. 11). Apart from that latter population (see below), few total scales (mean < 336) are typical of cliff racers from Uzbekistan to the Tien Shan (C), the southern Hindu Kush Region except samples 3–4, and also occur in three Indian specimens with pertinent data available. Few ventrals (≤ 226) are observed from the Kyzylkum and Kyrgyzstan southeast through the

Upper Amu Darja catchment area, Kabul Province to southern Chitral, Kashmir, and Punjab east into Uttarakhand (groups C–G and samples 2–4). Northern *P. r. rhodorachis* (A, C–D) except a Lesser Balkan specimen (no. 1) as well as those from NE Iran and adjacent Afghanistan (B), Kabul Province, and northern Pakistan including Chitral show a low mean number of subcaudals (≤ 125)<sup>7)</sup>.

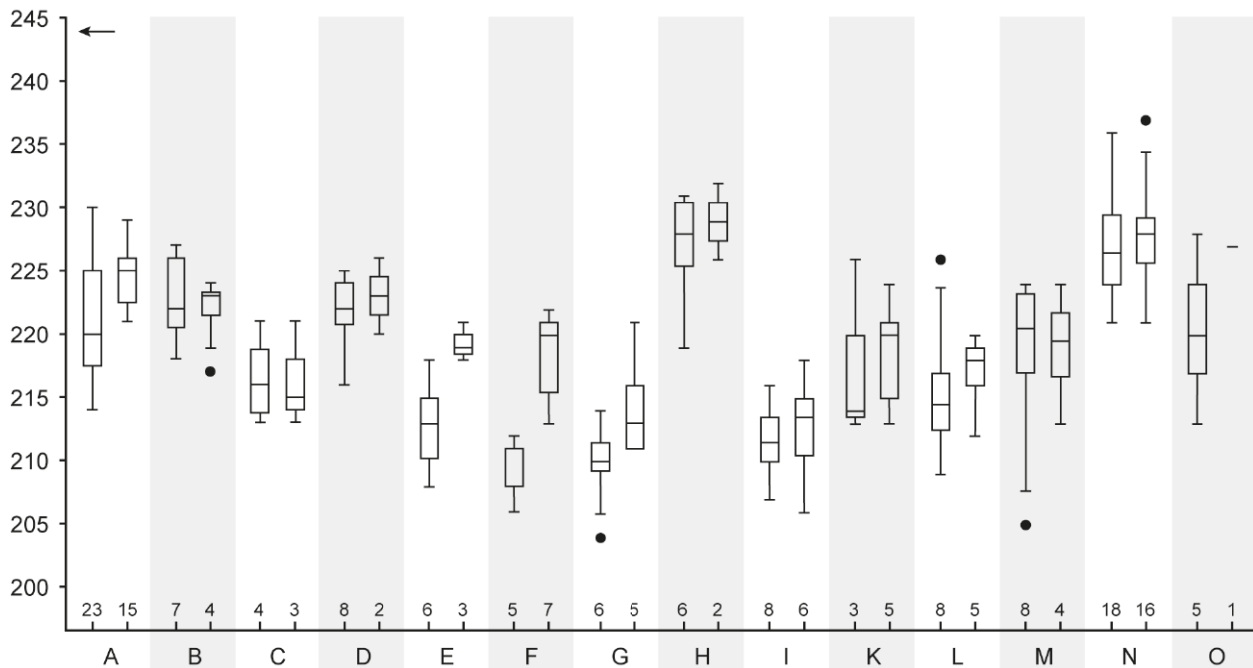
A lower or higher number of body scales for specimens of unknown gender compared to identified males and females (Tab. 2) is mostly due to counts from literature (see Appendix C), viz. the maximum for ventrals in group C based on MSGU 793 (DAL, 1936) and the maxima for ventrals and the sum in Makran (SHOCKLEY, 1949) and Khuzestan (WALL, 1908b), which relies on a BNHM specimen (no. 4). Data from Iran including Ilam (see next) may result in female overall maxima for ventrals higher than 237. Indications in LATIFI (1985, 1991: 201–235 ventrals, 93–148 subcaudals) are probably comprised of *Platyceps* spp. other than *P. rhodorachis* (see Distribution: first smallprint). LATIFI (2000) gives narrower ranges (214–235 and 106–136, resp.) and numerical values for body scale in RAJABIZADEH *et al.* (2008) rely on this publication. FATHINIA *et al.* (2010) noted 221–242 ventrals (incl. prefrontals?) for six specimens of unknown gender from Ilam; their minimum for subcaudals (“106”) is based on an incomplete tail (130–137 in rest). BOGDANOV (1962) recorded a maximum of 126 in Turkmenistan (see second smallprint under Systematic Review regarding ventrals in BMNH 1892.11.28.7). *P. r. rhodorachis* (IZTA series, TUNJEV, 2000: Tab.) with 219–233 ventrals (incl. prefrontals?) and 117–130 subcaudals are without any indication apropos their origin and gender or, except in the case of two striped specimens (*rhodorachis*), individual data. CAS 184837 (♂) from the foothills of the Lesser Balkan Ridge where this taxon lives alongside *P. k. karelini* (CAS 184834–36), has much more ventrals (231) and subcaudals (134) than the remaining examined Turkmen cliff racers, and exceeds by far the counts for MTD 25334–36 with 221 (♀♀) to 225 (♂) ventrals and 124 subcaudals (♀) collected roughly 55 km farther east in the Kyurendag (see last smallprint

<sup>7)</sup> MCZ 902 from “Arabia”, MZUT R610 (“Persia merid.”, leg. Doria), and NMW 15168.1–4 (“Persien”, coll. Th. Kotschy), all belonging to the typical phenotype, were probably collected in Fars (see Taxonomy and Type Material) and possibly Bush-eir or Khuzestan. Another striped specimen (ZFMK 31669) stated to come from “Shirāz” (F. C. Andreas no. 200, WERNER, 1917) has fewer ventrals (214) and subcaudals (117) than the examined material from Fars. It may have been obtained beyond the limits of the ‘Zagros’ group (Fig. 15) and is not included in the geographic analysis. NMW 25452.5–6 (leg. Stoliczka 1874, “Persien”) are from northern Pakistan (see Appendix A). Body scale counts of two racers, purportedly from inland of the Strait of Hormoz, do not concur with data for populations from the Gulf area (group M), and MHNG 2646.38–39 (vic. Jamal Bariz, 221–224 ventrals, 128 subcaudals, n=1) or 2718.13–16 from E Hormozgan (Biyaban District, 205–224, 131–140) in particular. The identity of the unlocated female “*Zamenis rhodorachis*” [sic] (WERNER, 1929a) from “Biabun” (“Südküste Persiens”, leg. Alfons Gabriel) with 237 ventrals (incl. prefrontals?) and 116 subcaudals remains unresolved. It cannot be excluded that the origin is confused as the collector travelled for one and a half years between the Near East (Damascus) and “Maskat” (Masqat) in Oman and between Bandar Abbas through Kerman and Semnan to Tehran. As few as 206 ventrals and 116 subcaudals are found in BMNH 1951.1.6.68 from “Jamal, Bariz” (Kuh-e Jabal-e Barez?). This juvenile and WERNER’s (1929a) specimen are not considered in the following analysis nor Fig. 8 or Tabs 2 and 4.

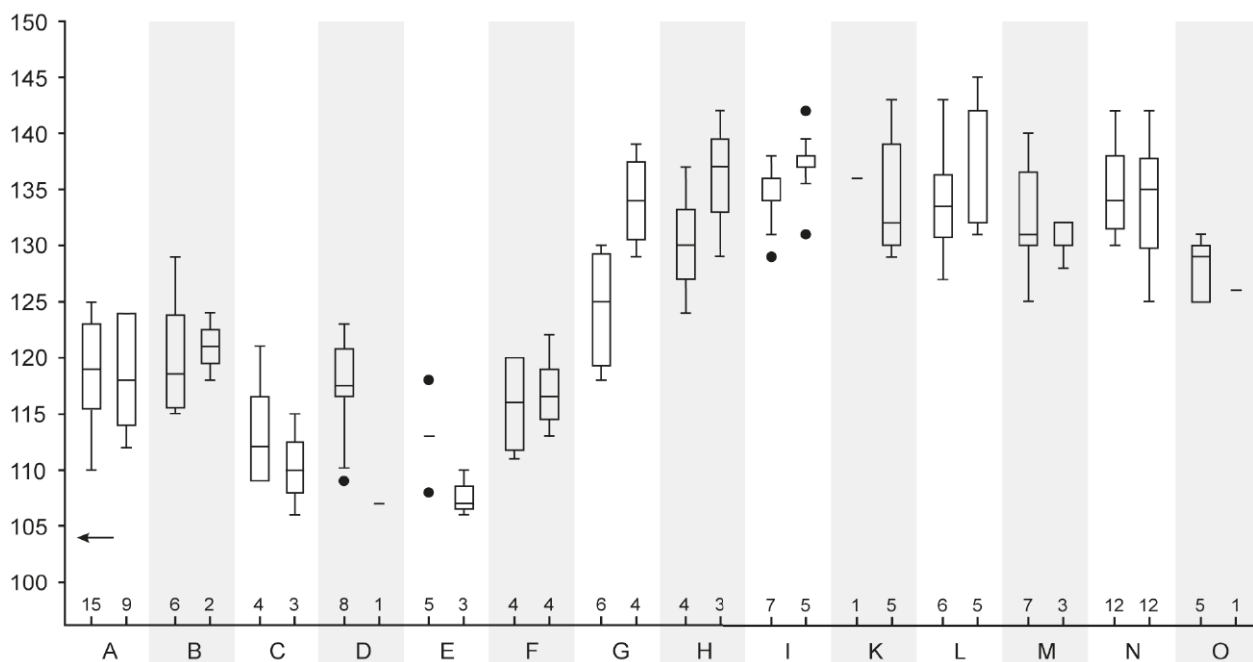


**Tab. 2.** Number of ventrals, subcaudals, and sum thereof in *Platycephalus r. rhodorachis*. Range, sample size (in parenthesis), mean, and standard deviation ( $\sigma^2$ ,  $\sigma$ ). Boldface numbers denote counts in specimens of unknown gender beyond minimum or maximum for males and females. See External Data, Methods and Definitions, Samples and Characters, this section incl. footnote 7, first smallprint (additional small samples), Figs 16–18 (visualised data for  $\sigma^2$  and  $\sigma$  of groups A–O), and Appendices (A, C) for details.

Region (see Fig. 15)	ventrals $\sigma^2$		subcaudals $\sigma^2$		sum $\sigma^2$	
	$\sigma^2$	$\sigma$	$\sigma^2$	$\sigma$	$\sigma^2$	$\sigma$
Balkan – Mary (A and sample no. 1)	214–230 (23) 221.0 ± 4.4	219–227 (4) 224.5 ± 2.5	221–229 (15) 224.5 ± 2.5	110–125 (15) 118.7 ± 5.0	112–124 (9) 118.7 ± 5.1	337–353 (9) 343.6 ± 5.4
Badghis and Khorasan (B)	218–227 (7) 222.9 ± 3.5	-	217–224 (4) 221.8 ± 3.2	115–129 (6) 120.2 ± 5.7	118–124 (2) 121.0 ± 4.2	335–348 (2) 341.5 ± 9.2
Uzbekistan to Kyrgyzstan (C)	213–221 (4) 216.5 ± 3.7	220–225 (4)	213–221 (3) 216.3 ± 4.2	109–121 (4) 113.5 ± 5.7	106–115 (3) 110.3 ± 4.5	319–336 (3) 326.7 ± 8.6
Upper Amu Darja drainage system (D)	216–225 (8) 221.8 ± 2.9	-	220–226 (2) 223.0 ± 4.2	109–123 (8) 117.8 ± 4.6	107 (1)	327 (1)
Hindu Kush (E–F, 3–4, MMGU 2729b)	206–223 (15)	213–218 (3)	213–223 (13)	108–135 (11)	112 (1) see Tab. 3 for details	325–354 (8)
Kashmir – Khyber Pakhtunkhwa – Punjab (G)	204–214 (6) 209.8 ± 3.4	218 (1)	211–221 (5) 214.4 ± 4.2	118–130 (6) 124.3 ± 5.5	129–139 (4) 134.0 ± 4.8	340–353 (4) 346.8 ± 5.9
NE Baluchistan Region and Zabol (H)	219–231 (6) 227.0 ± 4.6	-	226–232 (2) 229.0 ± 4.2	124–137 (4) 130.3 ± 5.6	129–142 (3) 136.0 ± 6.6	355–374 (2) 364.5 ± 13.4
Lasbela and SW Sindh (I)	207–216 (8) 211.8 ± 2.9	206–211 (3)	206–218 (6) 212.7 ± 4.3	129–138 (7) 134.4 ± 2.9	127 (1)	338 (1)
Makran (K)	213–226 (3) 217.7 ± 7.2	218–229 (2)	213–224 (5) 218.6 ± 4.5	136 (1)	129–143 (5) 134.6 ± 6.1	342–364 (5) 353.2 ± 9.8
Sistan-ve Baluchestan (L)	209–226 (8) 215.3 ± 5.2	215 (1)	212–220 (5) 217.0 ± 3.2	127–143 (6) 134.0 ± 5.6	135 (1)	344–361 (5) 353.4 ± 7.4
Gulf inland (M)	205–224 (8) 218.6 ± 6.5	207–217 (5)	213–224 (4) 219.0 ± 4.7	125–140 (7) >132.7	128–134 (2) 130.7 ± 2.3	345–350 (3) 348.0 ± 2.6
‘Zagros’ or western periphery (N)	221–236 (18) 227.3 ± 4.2	220–241 (15)	221–237 (16) 227.6 ± 3.8	130–142 (12) 134.7 ± 4.1	130–139 (9)	349–373 (12) 362.1 ± 7.7
Alhvaz Plain (sample 11, see Tab. 4; remark)	208 (1)	-	213–219 (2) 216.0 ± 4.2	115 (1)	104 (2)	317–323 (2) 320.0 ± 4.2
Interior Basin (O)	213–228 (5) 220.4 ± 5.9	225 (1)	227 (1)	125–131 (5) 128.0 ± 2.8	126 (1)	353 (1)



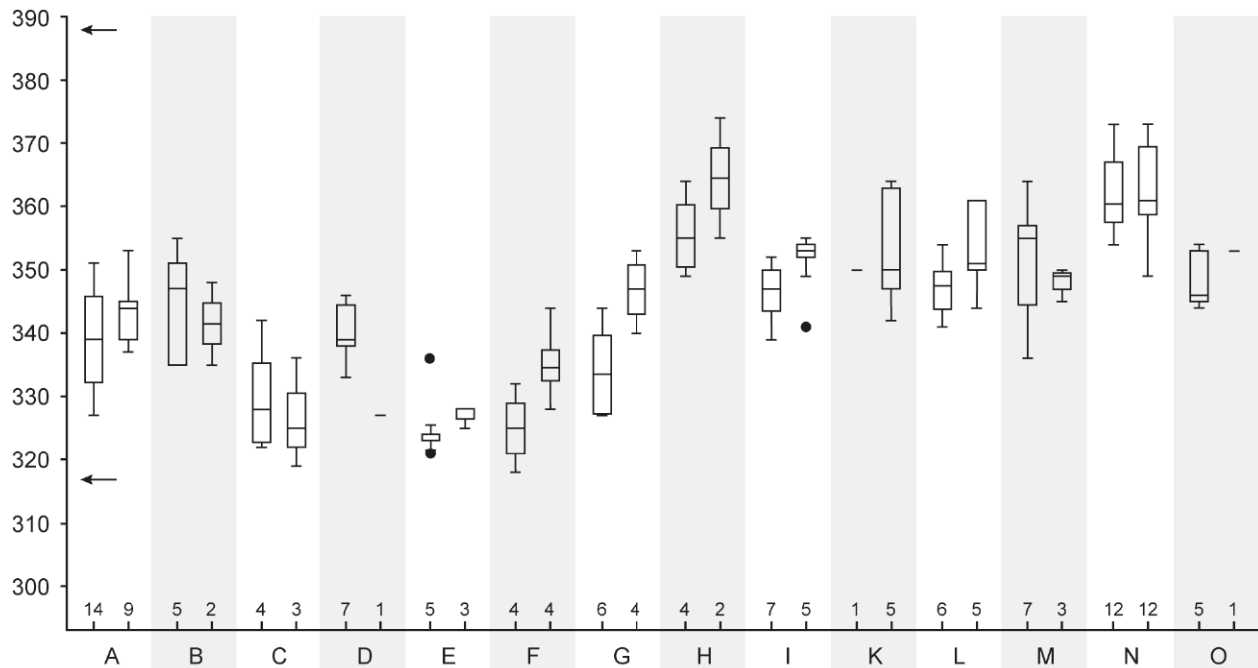
**Fig. 16.** Number of ventrals in geographic groups of *Platyceps r. rhodorachis* (♂♂, ♀♀). Arrow shows maximum (244, ♂) in small Chagai sample (no. 7). See Fig. 15, Methods and Definitions (second smallprint), External Data, this section incl. footnote 7, first smallprint (additional samples), Tabs 2–3 (incl. specimens of unknown gender and further examined material), and Appendices (A, C) for details.



**Fig. 17.** Number of subcaudals in *Platyceps r. rhodorachis*. Arrow shows minimum (104, ♀♀) in small Ahvaz sample (no. 11). See caption to Fig. 16 for details. Compare Tabs 2–3 regarding a slightly higher number of subcaudals for two males of groups F and M, and this section incl. sixth smallprint or last paragraph under Distinction apropos the Ahvaz population.

under Pholidosis regarding the number of dsr on the posterior trunk). Based on circumstantial collecting information, MZLU 3225–26 from “Hadda” with 226–231 ventrals (♀, juv. ♂), 19–19–13 dsr, and 15–16 maxillary teeth are considered to come from Kandahar Province, and not the Hadda Buddhist Monastery in Nangarhar (see Appendix A and last smallprint in this section). CAS 115970 from Kandahar has fewer (132) than “135” subcaudals (LEVITON & ANDERSON, 1969), the ventral count (“220”) is slightly higher than our (1+218), and the gender (“♀”) as well as the tail length (“196”

mm) of a young “unregistered” specimen (FMNH 171788) tabulated by these authors are erroneous. The gender is also incorrect in the case of a striped juvenile female from Peshawar (MINTON, 1966: “male”, SAM 686, viz. AMNH 161998) and its number of subcaudals (“147” instead of 137) is due to a counting error or lapsus calami. The exceedingly high maximum for ventrals (“277”) in Pakistan reported by KHAN (1986, 1997, 2002) and KHAN & KHAN (2000) is wrong (see Systematic Review), and we also have doubts regarding the subcaudal count (“144”) for this male from Mian-



**Fig. 18.** Sum of ventrals and subcaudals in *Platyceps r. rhodorachis*. Arrows show absolute extremes attained in Ahvaz (317, ♀) and Chagai (388, ♂). See captions to Figs 16–17 for details including slightly more scales in two males.

wali District. The range of 205–218 ventrals (♂♂ 205–216, ♀♀ 206–218) and 125–136 subcaudals (129–136, 125–135) for the vicinity of Rabwah (KHAN, 1977) is based on an unknown number of specimens. We admit AKRAM & QURESHI's (1995) ventral data for five males (213–218) from Punjab (Faisalabad District) but consider "214–240 ( $22.6 \pm 6.13$ )" ventrals for three females to be incorrect (probably 214–224, mean 220.6). Except for the maximum in males, the subcaudal counts (♂♂ "100–125", ♀♀ "100–114") are certainly based on injured tails. Four specimens of unknown gender from Khuzdar at about 1,200 m in SE Baluchistan with 212–214 ventrals and 141–145 subcaudals (potential range of aggregate 353–359, KHAN & AHMED, 1987) originate from an area not covered by our material. They are intermediate with respect to the number of ventrals in neighbouring populations (Karachi area, Makran) and show high subcaudal and total scale counts. PMNH 770 and 771 (♂♂) from Chagai District feature many ventrals (243–244, maximum) and subcaudals (144 in PMNH 771), by far the highest sum thereof (388) for the taxon, 13 or 11 preanal dsr, and three secondary temporals. The single cliff racer from Helmand Province (CAS 147427) is a striped juvenile male with 213 ventrals, 133 subcaudals, and 19-19-13 dsr (anterior reductions relatively far caudal at 63–65%ven, see next smallprint). SMF 57305 (♂) from Astola Island (MERTENS, 1969: "♀") has 227 ventrals and 137 subcaudals (see next but one smallprint). Our body scale data for Indian *r. rhodorachis* (211–212 ventrals, 113–119 subcaudals, sum 325–330, 13 dsr prior to vent in one verified case) relies on two males from Himachal Pradesh (BNHM 539) and Uttarakhand (see Material: smallprint) as well as the juvenile from Subathu described by STOLICZKA (1870c). A missing specimen from Kasauli in Himachal Pradesh has at least 216 ventrals (see Systematic Review: third smallprint, Samples and Characters: first smallprint and footnote 6).

Cliff racers from the vicinity of Kabul except Paghman (group E) show few ventrals and subcaudals (see end of this section incl. last smallprint). CAS 96250, 120492, 120718, and ZFMK 8643–44 from ca. 650–1,000 m above sea level in Konar, Laghman, and Nangarhar have distinctly higher counts (Tab. 3, see preceding smallprint

regarding "Hadda"). The Kabul series displays 19-19-15 dsr ( $n=7$ , preanal count unknown for ZFMK 8559, 8651, and 8678). The transverse reduction levels are variable (low-high or high-low) in both genders; NMW 34992 involves the vertebral row (17-15 dsr). The fusions lie between 57–64%ven (19-17 dsr, maximum in ZSM 22.1954.2) and 60–75% (17-15, *ibid.*) compared to 66% or less for the second step in *Platyceps r. rhodorachis* with at least three reductions. ZFMK 8644 from Konar has 21 dsr on parts of the anterior trunk and around mid-body (see Pholidosis: last smallprint).

MMGU 2729a with 215 ventrals (tail incomplete) shows 15-14-15 dsr (two alterations) at mixed transverse levels between ventrals 195–201. MMGU 2729b has more subcaudals (118, tail vs. body ratio 0.37) and total body scales (336) than ten specimens from the Kabul area, and 19-19-13 dsr; the last reduction occurs far caudal (85%ven). This juvenile male may have been collected beyond the perimeter of the series included in Tab. 3. The maximum for the longitudinal position of the second decrease in all examined *Platyceps r. rhodorachis* with 19-19-13 or 19-19-11 dsr (66%ven) relies on BMNH 1910.7.12.2 from southern Chitral (♂, 19-17 at 63%). BMNH 1873.7.3.12 and NMW 25452.5–6 from Kashmir, central Khyber Pakhtunkhwa, and Punjab have the second fusion at 58–63%ven. Apart from one specimen with 19-19-14 dsr, WALL (1911b) reported five incidences of 19-19-15 dsr in Chitral (♂♂♀♀,  $n=13$ ); the anterior reductions involve rows 7+8 (or 8+9) and 3+4 (rarely 2+3). "These two steps occur quite close together, and may be reversed or mixed. When the rows still further reduce to 13 [...], the 7th row [...] is absorbed." Regarding the longitudinal position of the second fusion in general, 65% are found in CAS 147427, ZFMK 8644, and ZFMK 86744 from Balkh, Helmand, and Konar Provinces (Afghanistan), and it is situated comparatively caudal along the southern periphery from the Arabian Sea to the Gulf, viz. at 62%ven (mean,  $n=14$ ) in group I and 61% in K–M ( $n \geq 8$ ).

The lack of a fourth dsr reduction as in the Hindu Kush Region is also observed in *Platyceps r. rhodorachis*



**Tab. 3.** Number of ventrals, subcaudals, and sum thereof (range, mean, standard deviation), secondary temporals, longitudinal position of third regular reduction (in %ven), proportions, striped (percentage) and plain phenotype, and number of maxillary teeth in *Platyceps r. rhodorachis* from the Hindu Kush Region incl. intergrades with *P. r. ladacensis*. See Methods and Definitions, Colour Pattern (last paragraph), this section incl. second and last smallprints, Fig. 14, Tab. 4, and Appendices (A, C–D) for details.

Area	Paghman (Kabul Province)	vicinity of Kabul	Konar, Laghman, and Nangarhar	southern Chitral	<i>P. r. rhodorachis</i> - <i>ladacensis</i> (Chitral)
sample size	2 ♂♂	12 (5 ♂♂, 3 ♀♀ plus 2)	5 (2 ♂♂, 3 ♀♀)	14 (5 ♂♂, 7 ♀♀ plus 1)	5 (3 ♂♂, 2 ♀♀)
	♂♂	>215 and 223	208–215	ca. 206–212	230–240
		211.8 ± 3.1	223.0 ± 0.0	ca. 209.0 ± 2.4	235.0 ± 5.0
ventrals	unknown	215–218 (juv., subad.)	-	213 (Wall, 1911b; no. 9)	-
	♀♀	218–221	222–223	213–222	ca. 238 and 239
		219.33 ± 1.5	222.7 ± 0.6	218.3 ± 3.6	
	♂♂	119 (CAS 115971)	108–113 (n=4)	111–120 (n=3) and >120	>126 (n=1)
		111.8 ± 2.5	131.5 ± 4.9	>115.8	
subcaudals	unknown	112 (n=1)	-	-	-
	♀♀	106–110	132 (n=1)	113–122 (n=4)	136 (n=1)
		107.7 ± 2.1		117.0 ± 3.9	
	♂♂	342 (n=1)	321–324 (n=4)	318–332 (n=3) and >328	>356
			322.8 ± 1.3	>324.0	
sum	unknown	330 (n=1)	-	-	-
	♀♀	325–328	354 (n=1)	328–344 (n=4)	375
		327.0 ± 1.7		335.3 ± 6.6	
temporals in 2 <sup>nd</sup> row	3 (n=1)	3 (n=6) plus once 2/3	2–3 (see text)	2 (BMNH 1910.7.12.2)	3 (n=1)
3 <sup>rd</sup> reduction (15–13 dsr)	♂♂ ♀♀	- (19–19–15 dsr)	66–69 70–79	76 (BMNH 1910.7.12.2)	no data
tail/body ratio	♂♂ ♀♀	0.33 (n=1) 0.33–0.34 (n=2)	0.37–40 0.42 (n=1)	no data	no data
phenotype	striped plain	FMNH 161185 CAS 115971	0% CAS 96250 (see text)	23% present (Wall, 1911b)	not on record not on record
maxillary teeth (incl. mean)		14 (CAS 115971)	15–16 15.1 (n=4)	15–16 15.5 (n=4)	15.5 (n=1, mean)
remarks		FMNH 161185 incomplete excl. MMGU 2729b (see second smallprint)	21 dsr on parts of trunk in ZFMK 8644	13–15 preanal dsr most data from Wall (1911b)	includes three specimens from Wall (1911b)

from Uzbekistan (possibly except Surxondaryo) to Kyrgyzstan and India or certain areas of Iran with little material available. Apparently, the occurrence of this optional fusion is sporadic in western Iran and uncommon from Turkmenistan and NE Iran into NW Afghanistan. On the other hand, 29–55% of the examined specimens from southern Baluchistan and SW Sindh have 11 dsr prior to the vent (Tab. 4: groups I–L, mostly ♂♂, see Samples and Characters incl. second smallprint).

Besides NE Baluchistan, Chagai (PMNH 770, sample 7), Astola and Henjam islands (8, 10), and much of mainland Iran including Khorasan-e Razavi (MHNG 2718.17), few posterior dsr (11, viz. four reductions) are also found in two northwest Afghan males (MZUF 23940, USNM 166773) or MTD 19902, MTD 25334, and ZMB 56081 from Turkmenistan. WALL (1911a) noted 11 dsr towards the vent in one out of at the very least eight specimens from NE Baluchistan Province (see External Data, Brahui Racer: first smallprint). The purportedly more frequent occurrence (40%) of 12 or 11 preanal dsr “within or near the Karachi District” (MINTON, 1966: reduction of “scale rows [...] to 13 just anterior to vent in nine specimens and to 11 or 12 in six”) is due to methodology (see also Pholidosis: last smallprint). For example, AMNH 84022 (215 ventrals) examined by Sherman Anthony Minton, Jr. has 19-19-13 according to our counting system although it features 13-11-13 dsr between ventrals 212–213 (99%ven). Nine AMNH *Platycephalus r. rhodorachis* and UMMZ 121970 (MINTON, 1966; no data for three juveniles, viz. AMNH 85301, 85579, and 89293) as well as four additional specimens from Karachi to Hawkes Bay (SMF 57327–28, 62926, 62930) manifest ten times 19-19-13 dsr, twice 19-19-11 (SMF 57327, 62926), and once 19-19-11/12 (AMNH 82181) or 19-19-11/13 (UMMZ 121970). The longitudinal position of the preanal count (“11” dsr fide KHAN & AHMED, 1987) in four Khuzdar specimens is not specified. SMF 57305 from Astola Island with the third dsr reduction at 62%ven accounts for the most cranial position observed in *P. r. rhodorachis*, the fourth is situated at 85%ven, irregular scaling (11-12-11 etc.) occurs between ventrals 193–203, and there are 13 dsr prior to the vent.

More than roughly half or more of the populations from the Central Zagros Range to NW Afghanistan belong to the typical phenotype which may be slightly more numerous than the patterned morph in certain regions. While striped specimens live in Turkmenistan, is frequent over most of Iran and are found through Afghanistan (possibly except most of the Baluchistan area) into Pakistan (Fig. 14, Tabs 3–4), this morph is absent from NW Iran (LATIFI, 1985–2000; see Samples and Characters: third smallprint), Uzbekistan (possibly occurs in S Surxondaryo), Kazakhstan, Kyrgyzstan, Tajikistan, SW Pakistan, or India and not on record for Sistan-ve Baluchestan (may be present in peripheral areas) and Kashmir.

According to TUNIJEV (2000), about 25% (“primerno chetvertuyu chast”) of field observations in the Kopetdag and Badkhyz, and Turkmenistan in general (fide ATAJEV, 1985), involve striped specimens (“*rhodorachis*-morfa”, see Hybrids: fourth smallprint). According to the latter author, the patterned morph outnumbers the striped one by three to one (20 versus 59 or 62, i.e.: 250, 256); quoting BOGDANOV (1962) and SHAMMAKOV (1981), it is stated that the ratios are 86 to 14 in the Murgab Valley and 24 to 12 in the southern Karakum, respectively. SHAMMAKOV *et al.* (2007: Tab.) list seven striped specimens (“*C.[oluber] rhodorachis*” [sic]) out of 21 cliff racers from the central Kopetdag. We have not observed the typical phenotype in the CAS series from Khivabad (Appendix A) along the border with Iran but the striped morph is noted for this

area by ATAJEV *et al.* (1996). Besides reports by CZELLARIUS (1974, 1975) from the vicinity of Repetek, all of BOGDANOV’s (1962) MMGU (coll. Shibarov) and ZISP (“ZIN”, Szczeglov) *Platycephalus r. rhodorachis* from this reserve area or Jerojlanduz specimens (Badkhyz, CZELLARIUS, 1992) are striped (see Hybrids: first smallprint).

The combination of phenotype (viz. absence of striped morph), number of preanal dsr (fourth reduction in  $\geq 29\%$ ), and dentition (mean for maxillary teeth  $\geq 15.1$ ), or the transverse level of the first regular dsr reduction (only few fusions at lateral positions, see second smallprint in this section regarding longitudinal level of second bilateral decrease of dsr) allow for the characterisation of cliff racer populations from the southern Baluchistan Region and contiguous SW Sindh (groups I–L, the optional reduction also occurs in 11% of group H which has 15.1 maxillary teeth and lacks the typical phenotype). High tooth counts (mean  $\geq 15.0$ ) are encountered from Laghman to southern Chitral (combined mean 15.3,  $n=8$ ), from central Khyber Pakhtunkhwa to the Arabian Sea littoral and east through Sistan-ve Baluchestan south of the Bampur River, and along the Gulf inland and western periphery (Tabs 3–4). Lower averages ( $\leq 14.6$ ) are observed in northern areas including adjacent Iran and Afghanistan as far as Kabul (groups A–E plus sample 4, group O).

The single Lesser Balkan specimen (CAS 184837, sample 1) has 15 maxillary teeth. The minimum number (13) relies on two specimens from SE Balkan (Turkmenistan, ZISP 11789) and the Nuratau Range (Uzbekistan, MMGU 12649). Fourteen teeth occur in groups A (11 counts), B (5 plus once 14/15), C (2), D (4), Kabul Province (6 incl. CAS 115971 and MMGU 2729b), H and I (1 in each), L (see next), O (4, see below), or on the fringes of the Dasht-e Lut (MMGU 12211) as well as in the Central Alborz and an island specimen (samples 10 and 12–13, see below). The maximum (17) is from Kashmir (BMNH 1873.7.3.12) and southern Baluchistan (NMB 14383, ZSM 223.1989.5). CAS 141076, NMW 34985, and SMNS 3008 from Sistan-ve Baluchestan south of 28°N latitude (Bazman area) have 16 maxillary teeth; 14 are found in ZISP 9285.1 and 9286–87 from north of the Bampur River (Kaskin, 27°30'N) to Sarhad (ZISP 9285.2 with 14/15).

The Gulf group (M) displays both phenotypes and 15–16 maxillary teeth; 11 dsr prior to the vent occur twice (BMNH 1869.8.28.127, NMP 34586, see Sample Size and Characters: second smallprint), without taking account of NMP 34585, not examined by us, and reported as with “12” preanal dsr (no reduction sequences available, see Appendix A). A Biyaban male (MHNG 2718.13, Fig. 4B) features exceedingly few ventrals (205,  $\geq 214$  in remaining ♂♂). The Henjam Island racer (♂, BMNH 1919.7.18.12) with 221 ventrals and 124 subcaudals has 11 preanal dsr (last reduction at 90%ven involving vertebral row, anterior fusions between 56–64%) and 14 maxillary teeth. Three specimens from the Kerman highland including BMNH 1936.10.12.6 (♂, PERRY, 2012: Fig. 8) are striped and possess 15 maxillary teeth. This small sample (Fig. 15: no. 9) exhibits higher scale counts than observed in geographically adjacent populations (L–M, Tab. 2), viz. 223–230 ventrals in the male (228), BMNH

**Tab. 4.** Secondary temporals (mean), dorsal scales, proportions (♂♂, ♀♀), phenotype (incl. sample size), and dentition (range, mean, sample size) in *Platyceps r. rhodorachis*. Dorsal scale row (dsr) data comprised of transverse level of first regular reduction (lat.[erall], parav.[erterall]), longitudinal position of third decrease (range in %ven for ♂♂ [upper line] and ♀♀, outliers in parenthesis), and presence of fourth fusion. See caption to Tab. 2 and Appendices (A, D) regarding the phenotype.

Region (see Fig. 15)	temporals in 2 <sup>nd</sup> row	dorsal reductions			tail/body ratio	striped phenotype	maxillary teeth	remarks
	19-17 dsr	15-13 dsr	13-11 dsr					
Balkan – Mary (A and sample no. 1)	2.63 (n=35) lat. or parav.	67-76 (79) 65-79 (85)	8% (n=37, 3 ♂♂)	0.33-40 0.33-40	13-15 14.6 (36)	16% (43)		incl. CAS 184837 (not considered in Tab. 2) only one striped male (n=26)
Badghis and Khorasan (B)	2.50 (n=13) lat. or parav.	65-71 70-76	23% (n=13, 3 ♂♂)	0.38-39 0.39-40	14-15 14.5 (13)	67% (13)		
Uzbekistan to Kyrgyzstan (C)	2.43 (n=7) (lat. or) parav.	71-78 71-72	none (n=9)	0.33-37 0.35-38	13-16 14.4 (5)	0% (11)		MTD 21473 and NMP 35463 from Uzbekistan (Surxondaryo) belong to group D
Upper Amu Darja drainage system (D)	2.50 (n=11) lat. or parav.	68-78 70-74 (n=2)	none (n=9)	0.33-38 0.34-37	14-15 14.6 (9)	18% (11)		striped phenotype only in Afghanistan
Hindu Kush (E-F, 3-4, MMGU 2729b)	2.71 (n=14) lat. or parav.	66-79 (85*) see Tab. 3	none (n=27)	0.33-42	14-16	12.9% (31) see Tab. 3		*MMGU 2729b plain phenotype on record
Kashmir – Khyber Pakhtunkhwa – Punjab (G)	2.83 (n=9) parav. (n=4)	69 (n=2) 65-77	none (n=8)	0.39-43 0.43 (n=1)	15-17 15.5 (5)	17% (12)		plain phenotype on record
NE Baluchistan Region and Zabol (H)	2.56 (n=9) lat. or parav.	68-79 66-77 (n=2)	11% (n=9, ♀)	0.40 (n=2) 0.41-45	14-16 15.1 (9)	0% (10)		
Lashela and SW Sindh (I)	2.92 (n=12) (lat. or) parav.	63-70 63-71	29% (n=14, 4 ♂♂)	0.42-47 0.47-48	14-16 15.2 (9)	0% (17)		
Makran (K)	2.56 (n=9) (lat. or) parav.	65-67 (n=2) 65-77	44% (n=9, 3 ♂♂, ♀)	- 0.42-45	15-17 15.8 (8)	0% (10)		fourth reduction in all examined males (3)
Sistan-ve Baluchestan (L)	2.96 (n=13) (lat. or) parav.	64-68 66-69	55% (n=11, 5 ♂♂, ♀)	0.41-46 0.43-45	14-17 15.1 (11)	0% (14)		fourth fusion in 71% of ♂♂ with data (7)
Gulf inland (M)	2.67 (n=15) lat. or parav.	67-72 64-69	15% (n=13*, ♂, juv.)	0.40-44 0.40-44	15-16 15.4 (8)	29% (17)		incl. 'Boyerahmad' and low-lying S Fars *preanal dsr excluding NMP 34585 (see text)
'Zagros' or western periphery (N)	2.89 (n=44) lat. or parav.	65-77 (81*) 67-73 (82*)	6% (n=32, 2 ♂♂)	0.38-45 0.39-44	15-16 15.4 (19)	49% (47) [50%, n=48]		incl. Ilam and Kermanshah, no data for Kabir Kuh (FTHR 15303) phenotype excl. MNHN 1962.134 (see Fig. 14); *RUZM 30.7 (21 msr)
Ahvaz Plain (sample 11, see remark)	2.67 (n=3) parav. (n=3)	75 (n=1) 75-76 (n=2)	none (n=3)	0.40 0.32-36	15-16 15.3 (3)	100% (3)		see Geographic Variation and Distinction regarding systematic allocation
Interior Basin (O)	2.29 (n=7) (lat. or) parav.	66-76 69 (n=1)	none (n=6*)	0.38-42 0.39 (n=1)	14-15 14.2 (5)	57% (7)		21 msr (incl. forebody) in TMUS 1006 *preanal dsr excluding NMP 34585 (see text)



1936.10.12.7 (juv.), and WERNER's (1895) record of unknown gender (230). The indication of "124" subcaudals for the latter may rely on an incomplete tail (potential sum  $\geq 347$ , see footnote 1). There are 19-19-13 dsr (first reduction in ♂ at paravertebral level, last at 63%ven) and three secondary temporals.

*Platycephalus r. rhodorachis* from the Kabir Kuh and Zagros areas (group N) have a high percentage of striped specimens, 15–16 maxillary teeth (no data for FTHR 15303, see Fig. 3D, Appendix A), and only two (NMW 15168.2, RUZM 30.13) with 11 preanal dsr (most cranial anterior reductions at 51–55% detected in the latter, which has 13-15-13 etc. dsr between ventrals 155–165 involving lateral to median changes). The mean number for secondary temporals is quite elevated (2.89, two scales bilaterally in only two out of 43 specimens, three show 2/3, see next but one smallprint). The dorsal coloration of these western populations is basically grey and the spotted form seemingly absent. MNHN 1961.134 from Hamadan is noteworthy for various deviating head shield proportions and a low number of supralabials (see Pholidosis, Fig. 13).

The Ahvaz sample (Fig. 15: no. 9) is characterised by few ventrals and subcaudals. Their sum is more than twenty-five scales lower than the minimum for the 'Zagros' group (Tab. 2). Without either an obvious topographic impediment present or a radical change in ecological conditions, the number of total body scales drastically shoots up from 323 in MHNG 1359.1–2 to 373 in MCZ 58872 (♂, HAAS & WERNER, 1969; SCHÄTTI & MCCARTHY, 2004: 701) and CAS 86586 (♀, the maximum outlier in ventrals [237, Fig. 16], see External Data: first smallprint) from ca. 200–630 m a.s.l. and less than 150 km to the north and roughly east, respectively, of Ahvaz. High ventral counts (238, 241, incl. preventrals?) and the maximum for the aggregate (376) in the 'Zagros' group are reported for two cliff racers collected near Masjed Soleyman (central Khuzestan, ca. 250–300 m, WALL, 1908b). Comparatively few subcaudals (123–125) are found in two females and a specimen of unknown gender from the Shiraz area (BMNH 1879.8.15.26, ZFMK 31666) and Ramhormoz (BMNH 1905.10.14.46, ca. 180 m, Khuzestan) at less than 40 km from Cham Kureh (CAS 86586) or 120 km from Ahvaz. The two BMNH specimens attain a total body scale count of 349 (minimum, BMNH 1905.10.14.46) and 351.

Apart from low ventral counts and the minimum for subcaudals within *Platycephalus rhodorachis*, our three examined specimens (♂, ♀♀) from the Ahvaz Plain, all belonging to the typical phenotype, have the first dsr fusion at purely paravertebral levels (Tab. 4). NIKOLSKII's (1907) report of striped and patterned cliff racers from this area lacks pertinent data (see Distribution: first smallprint, last paragraph under Distinction). A drawing of a hemipenis, purportedly the right organ of MHNG 1359.1 (SCHÄTTI, 1987: Fig. 3F; 1988a: Fig. 7), shows definitely longer and stronger spines as well as striking differences in shape (slender) or ornamentation (densely spinose throughout) and the course (straight) of the *sulcus spermaticus* compared to *P. r. rhodorachis* (Fig. 6). Although the external morphology of MHNG 1359.1–3 manifests certain discrepancy vis-à-vis the Common Cliff Racer, hemipenis features

would clearly argue for different genera involved. The left organ of MHNG 1359.1 (not fully everted), however, does not present these peculiar features, and we suppose a mix-up of prepared samples (see penultimate and last paragraph under Hybrids and Distinction, resp., regarding the systematic allocation of racers from the lowland around Ahvaz).

*Platycephalus r. rhodorachis* from east of the Markazi Range (group O) show the lowest average number of maxillary teeth, revealing similarities with populations from eastern Khorasan-e Razavi to Central Asia, and secondary temporals as well (mean 2.29, only one case with three scales bilaterally). There is a high percentage of striped animals (57%, maximum in adjacent group B) and they are intermediate between northeast and west Iranian cliff racers (groups B and N) regarding subcaudals in males, and possibly also in females. NMP 74181, not examined by us, is stated to possess "12" preanal dsr (not considered in Tab. 4, no reduction sequences available, see Appendix A). MMGU 12211 and ZFMK 93702 from the 'Dasht-e Lut' bear 14–15 teeth on the maxillary (18–20 on dentary, see second paragraph under Dentition), have two secondary temporals, and 234 (233) ventrals and 126 (141) in the male (female). MMGU 12211 (♀) from roughly 70 km southwest of Birjand shows twenty total body scales more than SMF 51071 (♂, 354) collected near this town. A specimen of unknown gender from the Siah Kuh area in westernmost Semnan (Dasht-e Kavir) with 233 ventrals (incl. preventrals?) resembles the Interior Basin group (O) in the number of subcaudals (130, NILSON & ANDRÉN, 1981). MHNG 1553.59 from the Central Alborz (♀) shows few ventrals (219) and maxillary teeth (14). The single studied individual from Azarbaijan-e Gharbi (East A., BNHM 565, ♂, lacking extreme tip of tail) has 213 ventrals and slightly more than 135 subcaudals.

NHMG 4424 (NILSON & ANDRÉN, 1981) and BNHM 565 are without data for the number of secondary temporals. MHNG 1553.59 has three scales. Mean numbers below 2.50 are found from the desert basin in Iran (group O and sample 13) northeastward into Kyrgyzstan (bilaterally two scales in MMGU 1171 and MTD 13640). Counts higher than 2.90 occur in groups I and L (Tab. 4, see next smallprint regarding the situation in the Hindu Kush Region).

Besides morphological clines or shared conditions, and traits in common with *Platycephalus r. rhodorachis* from immediately contiguous and more distant regions, populations from the southern escarpments of the Hindu Kush to the outskirts of Peshawar and central Khyber Pakhtunkhwa disclose amazing small-scale variation. This is surprising because one may expect cliff racers from the highlands along the Kabul and Konar (Kunar) Rivers, and on to the Indus, to form a common gene pool. With the exception of the vicinity of Paghman (ca. 2,300 m a.s.l.), a distinct cline in the number of subcaudals is observed in the Kabul-Konar drainage system (probably including lowermost Chitral River), viz. an increase from the Peshawar area (below 400 m) to the highlands around Kabul (above ca. 1,800 m) and southern Chitral (> 1,000 m, see Subspecies: third smallprint). There, few total body

scales and a high percentage of specimens with only two reductions (19–19–15 dsr) occur (see second smallprint in this section). Populations from Kabul and Chitral (groups E–F) are unique among examined *P. r. rhodorachis* and considered literature samples (WALL, 1911b) in having a clear disparity in the number of ventrals between genders (Fig. 16, Tab. 3). The studied material reveals 14–15 maxillary teeth in Kabul Province versus 15–16 in southern Chitral or Konar, Laghman, and Nangarhar, and the situation south of the Hindu Kush main watershed is complex regarding the dorsal colour pattern (Tab. 3). The typical phenotype is apparently uncommon in the latter three provinces (not represented in our sample nor two specimens reported by KRÁL, 1969). Cliff racers from “Dir and Swat” (McMAHON, 1901b), probably in contact with the Konar Valley population for instance along the Baraul Khwar or across the Binshai Kandao (pass, ca. 2,450 m), encompass patterned and striped individuals (the Swat attains the Kabul River northeast of Peshawar). A plain morph is documented from Ghazni Province to Chitral and central Khyber Pakhtunkhwa (Mt. Sirban, Fig. 14).

Actually, high subcaudal counts ( $\geq 128$ ) are found from Laghman to Peshawar and northern Azad Jammu and Kashmir (PMNH 1431, see Incertae Sedis: fourth smallprint) incl. Mt. Sirban and Haripur, and means of at least 130 are characteristic of populations from Punjab to the Arabian Sea littoral and through southern Iran to the western periphery (groups H–N). The verified maxima for subcaudals and total body scales in the Kashmir–Khyber–Punjab group (G, except the Mianwali record by KHAN, 1986) rely on two females from Peshawar, viz. AMNH 161998 with 137 (see first smallprint in this section) and 353, respectively, as well as AMNH 88439 (131, 344), compared to a sum of 327–340 (♂♂) and 340 (♀) in the remaining examined specimens from this region (see next chapter incl. last smallprint for more scale data). Two males from Paghman (CAS 115971, FMNH 161185) at about 25 km northwest of Kabul differ in a higher number of ventrals and fewer preanal dsr (Tab. 3) compared to the capital area series including a female (CAS 92323) collected 15 km southwest of Kabul. Our very limited data set, however, does not allow one to speculate whether the Paghman population (Fig. 15: sample 4) is that distinct from group E. Similarly, differences in the number of secondary temporals between our material from along the Chitral–Konar river system (none with three scales bilaterally, verified in four out of five specimens of sample 3) versus the Kabul–Paghman area (absence of two scales on both sides, one has 2/3) and northern Pakistan (just one with two on both sides, another with 2/3) are hard to evaluate due to possible sampling errors (see first smallprint in this section regarding supposed origin of two MZLU specimens with three temporals in second row).

ZFMK 41340 from the Nawar Plain (Dashti N., Ghazni) above 3,000 m a.s.l. in E Afghanistan is remarkable for aberrant dorsal scaling between 45–50%ven (chaotic on right side with interspersed enlarged scales) and its vestigial dorsal marking consisting of a few faint mid-dorsal blotches alternating with lateral spots on the neck and finely black-edged scales forming an indistinct transverse zigzag pattern across midbody producing a virtually plain appearance (see last paragraph under Colour Pattern). Besides the phenotype, this adult male resembles cliff racers from Kabul Province (Tab. 3) in, for instance,

the number of ventrals (218), subcaudals (113/114), or maxillary teeth (15).

## Subspecies

In particular Sovjet herpetologists (e.g., TEREŇTJEV & CHERNOV, 1936–1949; CHERNOV, 1959; BOGDANOV, 1960, 1962; ATAJEV, 1975a–b, 1985; SHAMMAKOV *et al.*, 1993; see next smallprint) reserved the nominotypical assignation to striped specimens and used “*Coluber rhodorachis* [sic] *ladacensis*” exclusively to denominate the patterned phenotype of *Platyceps r. rhodorachis* sensu stricto. Gradually, this practice became pervasive. MERTENS (1969), to cite a respected authority, assigned his Pakistani sample to *C. r. ladacensis* because of the lack of striped individuals in the material at hand. LEVITON *et al.* (1992) applied this trinomen to populations of Jan’s Cliff Racer from Iran to “Turkestan” and Pakistan. They referred to those from the Arabian Peninsula as “typical of the nominate subspecies”, without a mention of the striped (typical) phenotype or a comment on the type locality of *Zamenis ladacensis* ANDERSON, 1871. These and other blurred taxonomic concepts haunt the more recent literature and have been adopted almost universally over the decades (see Systematic Review incl. sixth and seventh smallprints, chresonymy of *P. r. rhodorachis*, Affinities).

In an abstract, DAREVSKIJ (1985) addressed the issue of co-existence between *Platyceps rhodorachis* ssp. in southern Central Asia (“Na juze Srednej Azij”) and the overt deficiency of the hitherto prevailing usage regarding subspecific classification. In a checklist, BORKIN & DAREVSKIJ (1987) treated “*Coluber ladacensis*” (‘Pustynnyj poloz’, viz. ‘Steppe racer’) as specifically distinct from “*C. rhodorachis*” [sic], the ‘Krasnopolosyj poloz’ or ‘Red-striped racer’. No explanation is given but, obviously, taxonomic upranking for the patterned phenotype was conferred to prevent largely sympatric, and actually syntopic, subspecies. The “[c]urrent status” assigned to *Zamenis ladacensis* ANDERSON, 1871 by DAS *et al.* (1998), viz. a subspecies of *Hemorrhois ravergieri* (MÉNÉTRIÉS, 1832), is unreproducible (see also DAS, 1997: ‘Eastern mountain racer’).

*Zamenis ladacensis* sensu SCLATER (1891a–b) or McMAHON (1901b) relies on the ephemeral naming in the ‘Fauna of British India’ (BOULENGER, 1890; see Taxonomy and Type Material: second smallprint). SZCZERBAK (1994: 316, pt. 16) noted “two known forms of *Coluber rhodorachis*. [...] Shammakov (1988) suggested that these are two different species [...]. However, numerous records of hybrid [!] individuals between these two forms in Turkmenistan contradict their proposed specific status.” Similarly, SZCZERBAK (2003) declared that “in the south of Turkmenistan both forms are found together and Shammakov (1989) expressed an opinion about their specific independence, and this point of view had been uncritically perceived by some researchers (e.g., Borkin *et al.* 1990). At the same time, the individuals with scale [!] and color characters of both forms are numerous in Turkmenistan, which makes the aforementioned viewpoint doubtful.” Jan’s Cliff Racer is not dealt with in BORKIN *et al.* (1990), and we have been unable to uncover

the two cited articles (“1988” and “1989”) by Sakhat Muradovich Shammakov. “*Coluber ladacensis*” is found in, for example, ATAJEV *et al.* (1996), BOBROV & ALESZCZENKO (2001), SHAMMAKOV *et al.* (2007, 2008), SHAMMAKOV (2008), or SHESTOPAL (2008). SHAMMAKOV (2009) downgraded *ladacensis* auct. to a subspecies of “*C. rhodorachis*” [sic] but it is again listed as specifically different in more recent publications (GEOKBATYROVA, 2012; SHAMMAKOV *et al.*, 2012). KOLBINCEV (2010) adverted to the unfortunate appellation ‘Steppe racer’ and referred to the dorsal colour pattern of the non-striped phenotype as the “poperechno-polosataja forma”, which alludes to *Platyceps karelini*, the ‘Poperechnopolosatjy poloz’ (viz. the ‘Transversely striped racer’). According to DAS (2003: Tab. 1), the “[c]urrent name” of *Z. ladacensis* ANDERSON is “*Coluber ladacensis*”, with ATAJEV *et al.* (1994) as the source for that stance; these authors, however, do not mention the taxon. WHITAKER & CAPTAIN (2004) applied this binomen to cliff racers from “Jammu & Kashmir” including Ladakh as well as from “Pakistan to Turkmenistan”, and they erroneously credited SCHÄTTI & UTIGER (2001) as the reference for the validity of “*Coluber ladacensis*”. BAIG & RAFIQUE (2005) recovered a specimen referred to this taxon in NW Azad Jammu and Kashmir (see Incertae Sedis). PERRY (2012: Fig. 6) recognised two species of Near East cliff racers, the “northern form probably most accurately designated *Platyceps ladacensis*” (see Affinities).

Genuine *Platyceps rhodorachis ladacensis* (ANDERSON, 1871) are only documented from the eastern Hindu Kush to northern Himachal Pradesh at altitudes over 2,000 m above sea level. High ventral and maxillary tooth counts, a transversely banded dorsal colour pattern (at least on neck), and large size are characteristic traits. The striped phenotype is not on record.

The number of ventrals (237) for the missing holotype of *Zamenis ladacensis* ANDERSON (ZSI 7323) and NMW 25452.10 from the Spiti Valley is lower than in six examined *Platyceps rhodorachis ladacensis* from Gilgit-Baltistan and “N.W. India” (see Ladakh Cliff Racer, Appendix A). This may suggest fewer ventrals in populations from Ladakh to Himachal Pradesh. The Spiti deme (see below incl. penultimate smallprint) conforms to typical *P. r. ladacensis* in external morphological features including a partially elevated number of dsr (21) on the anterior trunk or at midbody and 15 rows prior to the vent.

Pakistani *Platyceps rhodorachis ladacensis* and cliff racers from southern Chitral to Kashmir strikingly differ in ventral counts, viz. 244 or more versus fewer than 223 (Fig. 16, Tabs 2–3). Three *P. r. rhodorachis* from Himachal Pradesh and Uttarakhand (Fig. 5E) resemble *r. ladacensis* in their neck markings (cross-bands) but show a clearly lower number of ventrals and subcaudals (see Geographic Variation: first smallprint). In particular, BNHM 539 (♂) from Kulu has 211 ventrals (115 subcaudals) compared with 237 in a *r. ladacensis* (NMW 25452.10, ♂, tail incomplete) collected roughly 125 km farther east-northeast (see footnote 6 regarding the Kasaulli and Mussoorie specimens).

WALL (1914: 38) reported both the “few” and “many shielded variety” of “*Zamenis ventromaculatus* [...] from Almora to Gilgit [“W. Himalayas”], and Chitral” with 190–222 and 216–246 ventrals, 101–125 (probably 101–122) and 126–145 subcaudals, and a sum of 293–344 and 347–391, respectively (see footnote 6). The “many shielded” cluster includes data for the missing holotype

of *Platyceps rhodorachis ladacensis*, three additional specimens (BMNH 1870.11.30.35, 1880.3.15.386a–b) from “N.W. India” and “Gilgit” (ANDERSON, 1871; BOULENGER, 1890, 1893; see Systematic Review: second smallprint, Type Material), *P. r. rhodorachis*, and Chitral intergrades with *r. ladacensis*. Moreover, the maximum counts for ventrals, subcaudals, and their sum correspond exactly to BOULENGER’S (1893) data for a female paratype of a new species (BMNH 1891.9.14.16, see Sindh Racer: smallprint).

BNHM 621 (♂) from Chilas, NMW 18213.1 (♀) from S Nuristan (Afghanistan) as well as three Chitral cliff racers (WALL, 1911b: Tab., no. 1 and 3–4, ♀♂♂) have 230–240 ventrals (♂♂ 230–240, ♀♀ ca. 238–239) and are intergrades of *Platyceps rhodorachis ladacensis* and the nominotypical subspecies (Fig. 9, Tab. 3). Male tails are injured (> 126 subcaudals in no. 4); a female (no. 1) presents 136 subcaudals and a sum of 375. Two Chitral specimens (♂♀) measure 1,225 and 1,117 mm total length and the Nuristan female is of similar size. The dorsal colour pattern of the latter is reminiscent of typical *P. r. ladacensis* but the few nuchal bands are disrupted at the spine and the dorsal markings disposed in four (two mid-dorsal) rows of irregular spots, which are replaced posteriorly by clusters of two or three scales unilaterally bordered with a narrow dark line. The Chilas intergrade displays a transversely banded pattern. The outer edges of the ventrals bear conspicuous fine black mottling (BNHM 621) or are distinctly dotted (NMW 18213.1). The dorsals are arranged in 19–19–13 rows (n=4). The Chitral female (no. 1, BMNH skull) has 15/16 maxillary teeth and 22/23 on the pterygoid (see Osteology and Anatomy).

McMAHON’S (1901a) Chitral sample is without morphological information and may include *Platyceps rhodorachis ladacensis* and/or intergrades. This is probably the case with the northernmost Chitral record and one from the vicinity of Chilas mapped in MASROOR (2012). The single entry in Fig. 9 for three *P. r. rhodorachis – ladacensis* reported by WALL (1911b) is arbitrarily positioned north of Chitral Town near Shali (35°56’N 71°48’E, ca. 1,600 m). Little and imprecise collecting data makes it difficult to establish the zone of intergradation. We expect it to pass through the Chilas-Kashmir border sector (see below). The probably vague origin of BNHM 621 (Appendix A) is placed north of the Indus near Gor in the Chilas-As-tore border area at ca. 2,400 m. In the case of the Chitral Valley, we speculate that the subspecies meet each other above 1,500 m in the outskirts of the district capital. Populations from the Kunar (Konar) Valley (viz. downstream of the confluence of the Chitral River with the Urtsun Gol at 35°29’N 71°45’E) are assigned to the nominotypical subspecies. The Afghan *r. rhodorachis – ladacensis* (NMW 18213.1) was probably collected around 2,000 m in Kamdesh District (Appendix A, see KASY, 1965). This heavily damaged female has distinctly more ventrals (ca. 238) than *r. rhodorachis* from Afghanistan and, implicitly, settles the occurrence of *r. ladacensis* in adjacent northern Chitral beyond doubt. The Pachkyun, an affluent of the Urtsun Gol, is separated from southern Nuristan valleys of the Modu drainage system (watering into the Konar) by altitudes below 2,700 m. The identity (nominotypical subspecies versus intergrades) of cliff racers in the Modu Valley proper remains unresolved.

Gene flow between *Platyceps rhodorachis ladacensis* from, for instance, N Chitral and Gilgit (Ghizar District) is ensured across passages at elevations comparable with verified altitudes attained in the Ladakh Valley (ca. 3,700 m,



e.g., Shandur La [pass], 36°04'N 72°31'E). The distribution pattern outlined for Baltistan and Zaskar (Lahaul) relies on an estimated vertical limit close to 4,000 m a.s.l. (see Distribution and Altitude). The Spiti population (Figs 11 and 15), however, is separated from *P. r. ladacensis* north of the Zaskar Ridge by higher altitudes.

The only route to reach the Tsarap drainage north of the Great Himalaya Range below 5,000 m from the Spiti Valley is over the Kunzum La (Kanzam Pass, 4,550 m) to Lichu (Lächu, 32°23'N 77°37'E) and along the Chandra or Bhaga to the headwaters of these rivers in the Bara Lacha La (32°44'N 77°26'E, 4,890 m) area. Collecting sites of local snake species close to this altitude are reported for *Orthriophis hodgsonii* (GÜNTHER, 1860) at "Tsomoriri, Ladak" (BOULENGER, 1894) in Rupshu (Zaskar, 4,600 m) and *Gloydus himalayanus* (GÜNTHER, 1864) from "4877m (4920–16,000ft)" according to WHITAKER & CAPTAIN (2004)<sup>8)</sup>. Starting from Spiti, the Tso Moriri (Tsamorari, Lake) is accessible along the Parang (Pare River) through Chinese territory (Tibet) at elevations below 5,000 m. The Salsal La, separating this watercourse from the Hanle catchment area to the east, is above 5,200 m. Other passes (e.g., Kyanse or Lenak La) lie at even higher altitudes.

The lack of precise records from the Chitral-Gilgit sector and almost the entire Upper Indus Valley, the absence of morphological data for the Shyok Range, Ladakh and Zaskar, or scant information pertaining to *Platyiceps rhodorachis* ssp. from Kashmir east to Himachal Pradesh (ca. 400 km, without evidence of morphologically intermediate populations) demonstrate the inadequate exploration of the region between the Upper Chandra and the Karakoram. Considerable work lays ahead to achieve a clearer picture of the situation regarding cliff racers in mountainous northern India and Pakistan. Along the Sutlej and/or Parang, and maybe the Indus as well, the presence of *P. rhodorachis* in limitrophe districts of China (Tibet) is likely or not excluded, respectively.

Most notably, morphological data from supposed zones of intergradation between *Platyiceps r. rhodorachis* and *P. r. ladacensis* is needed, and the occurrence of the latter in Himachal Pradesh requires a satisfying explanation. Even higher altitudes inhabited than indicated above, or temporarily accessible, would be one. We remind the reader, however, that the collector of the Spiti cliff racer (NMW 25452.10) did not mention this specimen (STOLICZKA, 1866a), and its origin (fide STEINDACHNER, 1867) is tainted with certain doubts. Fer-

dinand Stoliczka's exploration of Spiti and Zaskar in 1864–1865 included the eastern portion between Rupshu and Hanle (Indus), more western regions of Lahaul, and the Ladakh Valley (see Type Material: smallprint, Distribution and Altitude: smallprint, STOLICZKA, 1866b).

To clarify matters, pondering the scarce information does not permit to rule out with sufficient certainty that *Zamenis ladacensis* ANDERSON is a valid species, and purported intergrades with *Platyiceps rhodorachis* are in reality hybrids. But the substantial difference in, for example, ventral counts between *P. r. rhodorachis* from southern Chitral and the geographically closest populations of authentic *r. ladacensis* with morphological data available ("Gilgit" [Ghizar], see Distribution and Altitude: smallprint) is no good argument in favour of species status in view of the enormous geographic variation observed in *P. rhodorachis* as understood in this study, and given the extreme topography of the area under consideration.

*Coluber rhodorachis kashmirensis* KHAN & KHAN, 2000 was described on the basis of twenty-four specimens from "Azad Kashmir" collected between 32°59'–34°22'N and 73°28'–74°04'E (Fig. 9) at roughly 300 m a.s.l. around Bhimbar to about 1,375 m near Palandri. The 'Diagnosis' indicates 210–239 ventrals and 119–135 subcaudals (genders confounded), dimensions (snout-vent length 385–660 mm, tail 190–228 mm), and some irrelevant details of head scales including the condition of the inframaxillaries ("posterior genials are separated by a patch of 5–8 granular intergenial scales, which sometime are arranged in a double row (Fig. 1B)" (in reality Figs 2B–C), an unstable trait (Figs 2E–F, see Pholidosis and next paragraph). No individual morphological data is provided and KHAN & KHAN's (1996) maximum length for Azad Jammu and Kashmir (915 mm) not confirmed. In the 'Comparison', KHAN & KHAN (2000) noted "19 midbody scale rows always reduced to 13 at vent" and differences in dorsal colour pattern compared to *C. r. rhodorachis* auct. ("Head dark, except pre- and postocular bars which are distinctly white" and "anterior half of body black with no indication of spotty pattern" in *kashmirensis*).

The type locality ("Goi Madan [...] 33°30'N and 74°00'E, elevation 1315 mm"!) is in the vicinity of Panāg (ca. 950 m a.s.l.) in Kotli District. According to the description, *Coluber rhodorachis kashmirensis* KHAN & KHAN would clearly differ from the nominotypical subspecies auct. with purportedly more subcaudals ("139–144", data from KHAN, 1986; see Geographic Variation: first smallprint). The 'Comparison', however, does not say a word about this. A single male from Dalbandin in Chagai (PMNH 771: 144) and four females from "Quetta" (USNM 52141: 142), Karachi (SMF 57328: 142), and inland Makran (ZSM 223.1989.2 and -5: 139–143) are the only Pakistani *Platyiceps r. rhodorachis* studied by us with 139 or more subcaudals. BMNH 1873.7.3.12 (118) and SMF 62941 (118) from Kashmir and central Khyber Pakhtunkhwa (♂♂) as well as at least five Chitral specimens (2 ♂♂, 3 ♀♀, WALL, 1911b) have 111–118 subcaudals (see next, Geographic Variation: last smallprint, Incertae Sedis: fourth smallprint). Data in KHAN (1977, 1986) and AKRAM & QURESHI (1995) for Punjab (Faisalabad, Jhang, and Mianwali Districts) probably adds up to 205–224 ventrals (♂♂ 205–218, ♀♀ 206–224) and 125–139 subcaudals (ca. 125–136, 125–139, see Geographic Variation: first smallprint).

<sup>8)</sup> The highest record for *Gloydus himalayanus* is from "Dharmasala at foot of glacier, 16,000 ft." (Dharmasala, 32°15'N 76°19'E, ca. 2,100 m, Himachal Pradesh) as reported by SCLATER (1891b: ZSI 12875) but such elevations are not attained in this area (Sivalik Range). The purported maximum altitude ("5000 m") for *Orthriophis hodgsonii* is based on the lectotype (BMNH 1946.1.6.15, leg. Messrs. von Schlagintweit, "15,200 feet" fide GÜNTHER, 1860) established by KRAMER (1977) but the origin is tainted with doubts (e.g., SCHULZ, 1996; HELFENBERGER in SCHLEICH & KÄSTLE, 2002; WHITAKER & CAPTAIN, 2004). The highest confirmed collecting site for this ratsnake is based on BMNH 1953.1.1.67 "from near Tarakot, 10,500 ft." (ca. 3,200 m) in Nepal's Dolpa District (Karnali Zone, SMITH & BATTERSBY, 1953).

A Mianwali female has a total scale count of 350, and 348 (218 ventrals, 130 subcaudals) are reported for a specimen of unknown gender from the vicinity of Rabwah in Jhang (see Pholidosis: second smallprint, Appendix C).

Five male *Platyceps r. rhodorachis* from Azad Jammu and Kashmir and higher than 1,000 m a.s.l. in central Khyber Pakhtunkhwa (BMNH 1873.7.3.12, NMW 25452.5, PMNH 1431, SMF 57307 and 62941) have 204–212 ventrals and 118–130 subcaudals (see preceding smallprint), and a female (SMF 57308) from near the confluence of the Kabul River with the Indus (Haripur, ca. 500 m) shows 211 and 129, respectively. All manifest 13 dsr prior to the anal scute, and the number of “dorsals at vent” (KHAN & KHAN, 2000: Tab. I), purportedly “11–13” in *Coluber r. rhodorachis* auct., neither distinguishes *C. r. kashmirensis* KHAN & KHAN from *P. r. rhodorachis*. The reputed difference in the posterior chin shields, viz. separation of the inframaxillaries by “granular” (versus “elongated”) “inter genials” (l.c.), is a variable feature in various *Platyceps* spp., and the Common Cliff Racer in particular. The dorsal colour pattern of two “*kashmirensis*” shown in KHAN & KHAN (2000: Fig. 3C, only head and neck) and KHAN (2006: Pl. 135, probably a paratype) does not correspond to the description of this taxon and refutes the reported “black” (instead of “variegated”) head coloration (l.c.). PMNH 1431 has spotted dorsal markings on the forebody. Three “brownish” specimens from Poonch display “spots arranged in a chessboard pattern” (MURTHY & SHARMA, 1976: Fig. 7); the head marks of a mutilated *r. rhodorachis* from Kashmir shown in MURTHY *et al.* (1979: Pl. III.4) are hardly discernible.

With the exception of the putatively much higher maximum for ventrals, *Coluber rhodorachis kashmirensis* KHAN & KHAN cannot be distinguished from adjacent populations of *Platyceps r. rhodorachis*. We doubt counts of as high as “239” in cliff racers from Muzaffarabad to Bhimbar Districts (origin of the type series of *kashmirensis*) without evidence other than the numerical values in KHAN & KHAN (2000). And if such elevated ventral counts occurred in Azad Jammu and Kashmir, they would probably stem from specimens obtained along the northern periphery bordering Astore and Chilas Districts and require comparison with *P. r. ladacensis* (see third smallprint in this chapter). PMNH 1431 from NW Kashmir has 210 ventrals.

Cliff racers from Kurdistan (Iraq) are peculiar for their dorsal colour pattern consisting of bold transverse bands on the forebody (Fig. 5F) and a prominent cranial protrusion of the first (narrower) collar in three out of four specimens with data available, all of them females. Noteworthy are high body scale counts (> 240 ventrals; 144 subcaudals and a sum of 393 in IMNH 746, see following paragraph) or unilateral extra scales in the supralabial-subocular segment of FMNH 19618 (including one between the rostral and first upper labial) and 74615, excluding the fifth supralabial from contact with the eye in the latter (see Kurdish Cliff Racer). CAS 157119 with a snout-vent length of 980 mm is the second largest examined individual, and by far the largest female.

For the time being, a comparison with *Platyceps r. rhodorachis* from contiguous Iran is impossible due to the complete lack of morphological data and generally scarce records from the northwestern corner of this country (Fig. 7). Total body scale counts, for instance, are only known for one Kurdish Cliff Racer from literature (IMNH 746, AFRASIAB & MOHAMAD, 2011), actually the maximum number for the species. The distribution boundary of the typical phenotype as indicated in LATIFI (1985–2000) suggests that most cliff racer populations from that region do not include the striped morph (see Samples and Characters: third smallprint). Much lower ventral (213–224) and total body scale (> 348–354) counts than in Iraq are found in two male *P. r. rhodorachis* from extreme southeastern Azarbayjan-e Gharbi (East A., BNHM 565) and the Hamadan-Kurdestan border (MNHN 1961.134). *P. rhodorachis* from W Iran and adjacent Iraq resemble each other in, for example, a comparatively high number of maxillary teeth (15–16). CAS 86420 (Fig. 5A) and further specimens from Khuzestan (CAS 86371, 86586) or Ilam and Hamadan (RUZM 30.7, 30.13) display a neck pattern composed of broad cross-bands as present in Kurdistan (Iraq).

The morphological conditions observed in *Platyceps* cf. *r. rhodorachis* from NE Iraq (e.g., high ventral and total body scale counts, presence of supplementary lateral head scales in two out of four specimens with pertinent data, maximum size), and probably contiguous Iran, possibly as far as the Orumiyeh (Urmia) area in southern Azarbayjan-e Sharqi (West A.), make these populations a target for further studies. Whereas males usually outnumber females in the Common Cliff Racer (see last paragraph under Ecology), all four *P. cf. r. rhodorachis* of known gender are females. The debatable male holotype of *Zamenis rhodorachis* [sic] var. *tessellata* WERNER, 1909 from “Asie Mineure” matches scale and dentition data (number of maxillary teeth,  $n=1$ ) of four female cliff racers from Kurdistan (see Affinities incl. second smallprint).

## Southern Pakistani Racers

*Platyceps r. rhodorachis* sensu stricto is confirmed for the border triangle of Pakistan with Sistan-ve Baluchestan (Iran) and Afghanistan (Nimruz, see Distribution), across Makran and SE Baluchistan Province, probably all along the littoral of the Arabian Sea eastward beyond the Karachi area to the Indus, and north of the Makran and Brahui Ranges from Chagai to NE Baluchistan (Figs 8, 10 and 15).

Fifteen “*Zamenis rhodorachis*” from the Chagai Hills (ZSI 14197–211 fide Indraneil Das in litt.) bordering Helmand (Afghanistan) reported by ALCOCK & FINN (1897) are referred to this species. The allocation is based on their dorsal colour pattern (“Scales fine brown, with green edging”), prevailing terrain (a description of the “mountains west of Chagai” is given in MCMAHON, 1897), and because “*Karelinii*” [sic] is listed as a distinct

taxon. It cannot be excluded, however, that the material includes racers different from *Platyceps rhodorachis*. Two “*Z. ventrimaculatus*” from Kamran in Nimruz (BLANFORD, 1876; probably ZSI 4616 or 8603) remain unassigned because no morphological data is available (see next smallprint). These specimens may belong to *P. k. karelini* (BRANDT) and/or *P. mintonorum* (MERTENS). A report of “*ventrimaculatus*” from Zanda north of Kandahar (MURRAY, 1892) is hesitantly referred to *P. r. rhodorachis* (Fig. 10). Two “*rhodorachis*” collected along the “Perso-Baluch frontier” (ANNANDALE, 1904) were determined by Arthur Henry McMahon. He classified ten racers procured by the Seistan Arbitration Commission under *karelini* as annotated in ANNANDALE (1906) but confusion with *mintonorum* cannot be ruled out in either case. Generally, identifications of *Platyceps* spp. from Baluchistan are unreliable (see Systematic Review, introduction to Comparative Part) and morphological data for *rhodorachis* auct. in outstanding contributions to the herpetology of Pakistan (MINTON, 1966; MERTENS, 1969) is comprised of various taxa including two so far undescribed species.

Populations of *Platyceps r. rhodorachis* from SE Baluchistan (Lasbela) to Thatta District in Sindh are characterised by few ventrals and comparatively high subcaudal counts (Figs 16–17, Tab. 2). Four examined specimens from the southern Indus Plain drastically differ in the number of ventrals and belong to a new species (Sindh Racer). Compared to areas south of the Brahui Range, cliff racers from NE Baluchistan show more ventrals. Five males collected at altitudes of probably close to 1,800 m or higher above sea level in Nushki, Quetta, and Ziarat Districts, however, are distinct from *P. r. rhodorachis*.

One of the “Zamrán” racers (BLANFORD, 1876: 415–416), apparently with two supralabials bordering the eye, is definitely no *Platyceps k. karelini* (see SCHÄTTI *et al.*, 2012: smallprint pp. 461–462). The origin Kamran (“Zamrán in Balúchistán”), mapped at 30°53'N 61°47'E (ADAMEC, 1973), is along the route of the ‘Makran and Sistan Mission 1871–72’ under Major Euan Smith (GOLDSMID *et al.*, 1876: map). However, the sample may have been collected in the vicinity of Turbat (Makran, Pakistan) explored by Major Beresford Lovett in 1871, viz. along the Zamran Kaur (River, ca. 26°10'N 63°30'E). Ventral and subcaudal (n=1) counts of the Quetta Museum series (WALL, 1911a) agree with our data for *P. r. rhodorachis* (see following section incl. first smallprint). With reservation, and except for a few specimens obtained in Quetta District, racers from northern Bolan, Harnai, Loralai, Mastung, Pishin, Quetta, Qila [Killa] Abdullah, Sibi, and Zhob Districts reported by SCLATER (1891a–b), MURRAY (1892), WALL (1911a), and KHAN (1997) are referred to this taxon (Fig. 10). Apart from Bibi Nani, Kirta, and Sibi at about 135–500 m a.s.l., these collecting sites are situated between roughly 1,000 m (Mach) and 1,700 m (Mastung).

#### *Platyceps noeli* sp. nov. – Brahui Racer

?*Zamenis rhodorachis* [sic] (“variety”) *ladacensis* [partim]. – WALL, 1911a: 1034 (Hanna [30°15'N 67°08'E], “Spinkarez (Hanna)”, “Takatu” [Mt. T., ca. 30°22'N 67°05'E], see Morphology and Distribution, Fig. 20).

*Coluber rhodorachis* [partim]. – MINTON, 1966: [47] 121 [122, 172], map 2 [station 11], Pl. 25.2 (“5 miles northwest” and “7

miles southwest of Ziarat”: AMNH 88468 and 161999 [SAM 711], Fig. 19C).

*Coluber rhodorachis ladacensis* [partim]. – MERTENS, 1969: [4] 60, Abb. 1 [map] (“Nushki”, “Spinkares”, Urak: SMF 50457–58 and 62927, Figs 19A–B and D).

?*Platyceps rhodorachis*. – KHAN & SIDDIQUI, 2011: 1382 [Tab. 4] (Hazarganji Chiltan National Park, see Morphology and Distribution).

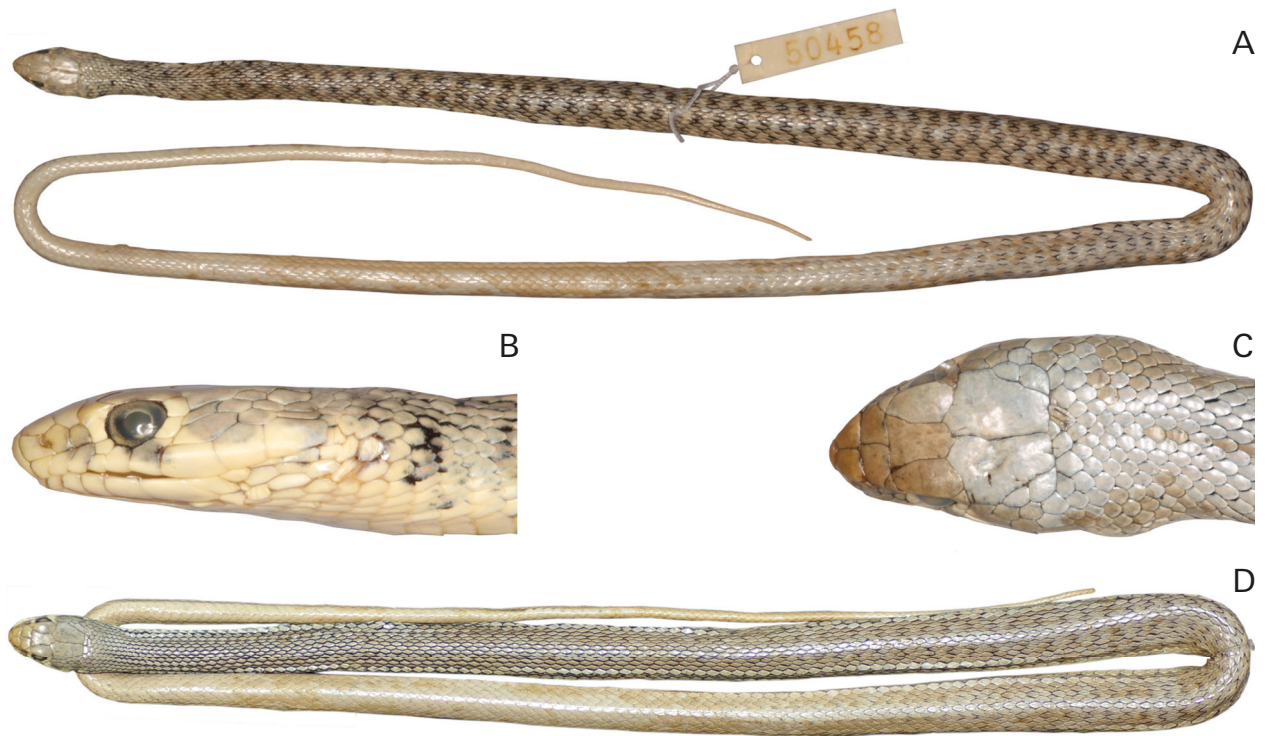
**Material** (n=5). Holotype: SMF 50458, Spin Karez (Spinkares, Spinkarez), Quetta District, Baluchistan, 30°13'N 67°09'E, ca. 2,000 m above sea level, ♂, coll. M. G. Konieczny (Figs 19A–B). Paratypes: AMNH 88468, 5 mi. northwest of ‘Ziarat’ (Ziarat Kharwari Baba), Ziarat District (formerly Sibi), ca. 30°24'N 67°42'E (near mouth of Bano River), ca. 2,400 m, ♂, Minton, Hassan & Maulana, May 1962; AMNH 161999 (SAM 711), 7 mi. southwest of Ziarat Kharwari Baba (Mt. Kholi area), ca. 30°16'N 67°40'E, around 2,000 m, ♂, same collectors and date, Fig. 19C; SMF 50457, Urak, Quetta, 30°16'N 67°10'E, ca. 2,000 m, subad. ♂, M. G. Konieczny; SMF 62927, “Nushki”, ♂, M. G. Konieczny (Fig. 19D, see Morphology and Distribution).

**Derivatio nominis.** The species is named after Dan Noël-Stevens for pivotal technical assistance, his thoughtful comments, and support in less than optimal circumstances.

**Diagnosis.** Ventrals 199–204 (all ♂♂), subcaudals 108–112 (maximum from complete tail?), sum thereof 307–314 (possibly slightly more). Dorsals in 19-19-13 or 19-19-11 rows. Rostral shield 1.44–1.78 times broader than high. Dorsum with two or four longitudinal rows of spots (posterior trunk without pattern) or devoid of markings throughout (plain). From geographically close or sympatric congeners, *Platyceps noeli* differs in, for instance, the absence of a postsubocular (vis-à-vis *P. k. karelini*) or lower ventral and subcaudals counts (*P. mintonorum*, *P. r. rhodorachis*, see Morphology and Distribution, Distinction).

**Holotype** (SMF 50458, ♂, Figs 19A–B). Snout-vent length 438 mm, tail 173 mm (tail versus body length ratio 0.39); head 12.20 mm. Rostral 1.44 times broader than high, not protruding, rounded in dorsal view and wedged in between internasals. The latter slightly smaller and distinctly shorter along median suture than prefrontals (length 0.80 and 1.25 mm, resp.). Distance from posterior tip of rostral to anterior edge of frontal 2.20 mm. The latter bell-shaped, length 4.00 mm, maximum width 3.10 mm. Interocular width 5.05 mm. Parietals 4.60 mm long, lateral margins lined with four temporals (last largest); six scales of variable shape and size along hind borders which form a slightly obtuse angle towards interparietal suture. Nasal divided, resting on first and second supralabials. Nostril-eye distance 2.35 mm. Loreal about as long as high, situated above third supralabial. Preocular entire, in contact with frontal. Subocular pentagonal (upper border straight), above fourth and anterior portion of fifth supralabials, and somewhat smaller than loreal (not in contact). Nine supralabials, fifth and sixth entering eye, sixth (higher than long) to ninth largest. Two postoculars of about equal size (upper slightly larger on right side),





**Fig. 19.** *Platyceps noeli* sp. nov. SMF 50458 (holotype, A–B), AMNH 161999 (paratype, C), and SMF 62927 (paratype, D). Courtesy of Linda Acker/SMF (D).

lower bordering anterior temporals and sixth supralabial. Temporals 2+2, lower first scale by far the largest. Ten sublabials (sixth largest), three in contact with anterior inframaxillaries. The latter wider and shorter than posterior pair, which is distinctly separated by ca. three (cranial) to four scales. Four oblique rows of gulars running between the posterior inframaxillaries and first ventral. One preventral and 204 ventrals; anal scute divided; 109 paired subcaudals (terminal spine intact, see Morphology and Distribution), with an annulus of granules between the vent and first subcaudals. Dorsal scales smooth with paired apical pits, disposed in 19-19-13 rows; reductions at ventrals 115–116 (57%ven) involving rows 7+8, 123 (60%, rows 3+4), and 140–141 (69%, 6+7).

Head brownish grey. Pileus without any apparent markings. Snout light brownish laterally. Anterior supralabials and circumoculars yellowish except for an indistinct darker area below the loreal and a short blackish subocular streak running to anterior half of the seventh supralabial. Temples encroached upon by hue of occiput extending onto upper part of eighth as well as posterior portion of last supralabials. Nape with two vague dark marks behind temples followed by four rows of juxtaposed lateral and mid-dorsal spots becoming larger towards midbody and fading on posterior third of trunk (uniformly light brown onto tail). Underside of head and body yellowish. Outer edges of ventrals with a fine black transverse line as far caudal as dorsal colour pattern extends. Tail base with a slightly orange hue.

Fifteen maxillary teeth, the last two enlarged and separated by a diastema; 16 teeth on dentary.

**Paratypes.** Total length 459 + 183 mm (SMF 62927, tail vs. body ratio 0.40) and 288 + 110 mm (SMF 50457, 0.38), 680 mm snout-vent length (AMNH 161999, tail > 195 mm). Rostral 1.51 (SMF 62927) to 1.78 (SMF 50457) times broader than high. Internasals much shorter (66%) than prefrontals in SMF 62927, which has the frontal distinctly separated from the preocular and the last temporal scale along lateral edge of the parietals clearly largest. Posterior border of these shields more or less straight (with a notch on left side of AMNH 161999), lined with three to five scales in this specimen (hind margin only about half the maximum width, anterior interparietal suture with a distinct bend, Fig. 19C) as well as in SMF 50457 and 62927 (no data for AMNH 88468). Loreal of SMF 50457 longer than high, anteriorly resting on upper posterior edge of second right supralabial; loreal of AMNH 161999 situated above extended posterior portion of second supralabial and presubocular (this scale is absent in remaining paratypes). Subocular (slender, elongated, and on fourth and anterior part of fifth supralabials in SMF 50457) noticeably separated from loreal. Eight supralabials on left side of AMNH 161999 by fusion of third and fourth (this and fifth scale entering eye). Upper postocular distinctly larger than lower in this specimen. Three postoculars on right side of SMF 62927 (lowest is detached upper posterior portion of sixth supralabial). Four sublabials in contact with anterior inframaxillaries; AMNH 88468 with nine right sublabials. Ventrals 199–203, subcaudals 108–112 (maximum in AMNH 88468, see Morphology and Distribution), sum 307–314 (maximum in SMF 62927 with 203 ventrals). Dorsal

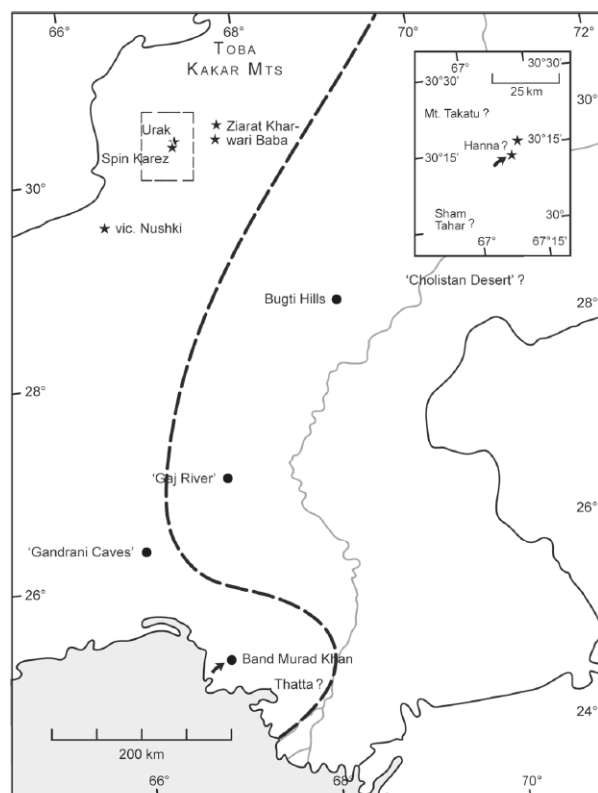
scale reductions in AMNH 88468 (partly damaged on right) and SMF 50457 (both with 19-19-13 dsr) between ventrals 113–114 (57%ven, rows 8+9), 115–119 (58–60%, rows 2–4 and 4+5, resp.), and 131–139 (66–69%, 6+7). Fusions to 13 dsr in AMNH 161999 at ventrals 112 (55%, 8+9), 116 (57%, 3+4), and 133 (66%, involving vertebral row); 13-12-13 dsr between ventrals 194–197 with the participation of rows 2–4 (right side). SMF 62927 with 19-19-11 dsr reduces to 13 at ventrals 116–118 (58%) involving rows 7+8 (right) and 8+9, 119–120 (59%, rows 3+4), and 143 (70%, 6+7); 12 are attained at ventral 179 (right, 88%, 3+4), followed by a fusion and addition on opposite flanks (ventrals 186–188, rows 4+5) cancelling each other out, and a unilateral (left) reduction to 11 dsr occurs at ventral 191 (94%, 2+3); 13 dsr are re-established immediately in front of the anal scute (ventrals 197–200, 98%ven, see Methods and Definitions).

AMNH 88468 “showed the typical spotted pattern” of *Platyceps r. rhodorachis* auct. and AMNH 161999 “was uniformly greenish gray in life” (MINTON, 1966: Pl. 25.2, “Unicolored phase”). SMF 50457 is olive along the paraventral portion between the nape and anterior trunk, the rest (from the parietals onto tail) reddish brown, and without pattern throughout. SMF 62927 has no apparent markings on the neck and forebody, two mid-dorsal rows of indistinct spots towards midbody, and the posterior trunk uniformly light brown onto tail (Fig. 19D).

Maxillary teeth 14–15, 15–16 on dentary. Apex of in situ hemipenis (SMF 62927) reaches tenth subcaudal (9%subc), insertion of *Musculus retractor penis magnus* at subcaudal 34 (31%subc). Both hemipenes of AMNH 161999 are partially everted; the proximal (visible) portion of the right organ is covered with subequal spines (largest on asulcate side) except for the smooth lips of the simple *sulcus spermaticus*.

**Morphology and Distribution.** MINTON (1966) emphasised “low ventral counts of 199 and 202” in AMNH 88468 and 161999 (“S.A.M. No. 711”). The latter “has an anomalous head shield between the loreal and third upper labial”, viz. a bilateral presubocular. The type series of *Platyceps noeli* is entirely made up of males. Although the tails are seemingly intact in all three SMF specimens (terminal spine present), the tip is surprisingly blunt. This is also the case with AMNH 88468, which shows a short terminal spine (regenerated?, only a few subcaudals missing if so). The tail of AMNH 161999 is incomplete.

Species rank for *Platyceps noeli* relies on clear morphological differences compared to *P. r. rhodorachis*, the sympatric *k. karelini*, and the probably parapatric *mintonorum*. From the latter two taxa, the Brahui Racer can easily be distinguished by the condition of the supralabials versus the eye (inconstant in *mintonorum*), lower body scale counts (at least the number of subcaudals in the case of *k. karelini*), and dorsal colour pattern (see Incertae Sedis: second smallprint, Distinction). Ventrals and



**Fig. 20.** Collecting sites of *Platyceps noeli* sp. nov. (stars) and *P. rhodorachis* sp. nov. (circles). Solid (empty) symbols denote examined material (literature data). Question marks refer to potential records of these species. Arrows point to possibly syntopic *P. r. rhodorachis* (WALL, 1911a; KHAN, 1997). The broken line indicates the approximate eastern distribution limit of this taxon. See text and Figs 1 and 15 for further explanations and details.

subcaudals also allow for an unproblematic distinction vis-à-vis *r. rhodorachis* (♂♂) from northern Baluchistan (Pakistan) and contiguous Afghanistan as evidenced by the above diagnosis and data for the Common Cliff Racer (Figs 16–18, Tab. 2), and the Brahui Racer differs from Pakistani *r. rhodorachis* in rostral shield proportions (Tab. 1).

Two *Platyceps r. rhodorachis* from “Kach” (AMNH 88470, ♂, see next smallprint) and “Quetta” (USNM 52141, ♀, Fig. 5C) have 225–232 ventrals and 124–142 subcaudals. WALL’s (1911a) “*Zamenis rhodorachis* [...] from Quetta, Fort Sandeman [Zhob], Hanna, Duki, Mach, Takatu, Spinkarez (Hanna), and Sibi” show 218–230 ventrals and 131 subcaudals “in the only specimen where the tail is complete”. The number of individuals (“several”) and their gender is not specified and it is unclear whether scale counts were ascertained for all of them; for the moment, it cannot be ruled out that the minimum for ventrals (218) may come from one or several female *P. noeli*. Ventral and subcaudal counts of the new species concur with male *P. ventromaculatus*. The latter, however, is a lowland species from east of the Sulaiman Range (Indus Valley) and the Arabian Sea littoral that clearly differs from *noeli* in dorsal colour pattern (Fig. 25, see Comparative Part). By all means, similar data for ventrals and subcaudals found in the Brahui and Gray’s Racer certainly does not support KHAN’s (1997 etc.) assumption that *rhodorachis* and *ventromaculatus* “sometimes indistinguishably intergrade into each other” (see Systematic Review).

*Platycephalus noeli* is only recorded from the vicinity of Nushki east to Ziarat District in NE Baluchistan Province (Fig. 20). SMF 62927 is supposed to originate from the mountains east of Nushki (e.g., Mt. Shuri, 29°29'N 66°14'E) attaining over 1,800 m above sea level. The collecting site is arbitrarily placed at 29°30'N 66°15'E (ca. 1,800 m) roughly 25 km east-southeast of Nushki in the immediate border area with SW Mastung. *P. noeli* inhabits altitudes up to about 2,400 m around Ziarat Kharwari Baba and may occur farther south in the Brahui Range or, possibly, the Toba Kakar Mountains to the north.

*Platycephalus rhodorachis* auct. from Hanna (ca. 1,920 m), Spin Karez (type locality of *P. noeli*), and the Mount Takatu area with altitudes over 3,000 m in Quetta District (border with Pishin) reported by WALL (1911a), or KHAN & SIDDIQUI'S (2011) "Shamtahar Nala" record (Sham Tahar River, ca. 30°03'N 66°53'E, above 2,000 m), might comprise *noeli* (see preceding smallprint). For the time being, there is no convincing evidence that these species co-exist in the same habitat. The "Kach" record of *r. rhodorachis* (AMNH 88470) is possibly from lower elevations.

According to MINTON (1966: map 2, station 11), "Kach in the Baluchistan highlands" of "Sibi" District (p. 172) is close to "Kowas" (Kawas, 30°28'N 67°35'E) and "Ziarat" (Ziarat Kharwari Baba, 30°21'N 67°45'E) near 2,500 m. The place name 'Kach' abounds in this region (e.g., Kamal Kach, 30°16'N 67°32'E, ca. 1,350 m, Upper Dirgi Manda River or Kuz Kach, 30°26'N 67°19'E, ca. 1,900 m, a town in western Ziarat District). The collecting site of AMNH 88470 is arbitrarily mapped at Dum Kach (30°13'N 67°47'E, ca. 1,350 m) along a main transport route (Quetta Road) in Harnai (formerly Sibi), about 20 km roughly south of Ziarat Kharwari Baba.

MERTENS'S (1969: 59) remark regarding sympatry of *Platycephalus noeli* (SMF 62927, as *rhodorachis*) and *P. mintonorum* in the Nushki area has to be taken with a pinch of salt (see above). The latter species has not been indicated from higher than 1,350 m (Iran, see Sympatry). *P. noeli* may be syntopic with *k. karelini* and/or *r. rhodorachis*. Although a hybrid nature of the specimens assigned to the Brahui Racer cannot be excluded a priori, their dorsal colour pattern including the plain morph displayed by AMNH 161999 is completely distinct from Karelin's Racer, and a postsubocular as usually encountered in this taxon or crossbreeds between *k. karelini* and *r. rhodorachis* (see next chapter) is absent in *noeli*. Then again, a badly damaged male racer (AMNH 96220) showing the characteristic dorsal marking and postsubocular of *k. karelini* is worth mentioning. It was collected "in a cultivated section of Urak Valley at an elevation of approximately 6500 feet" roughly "2 miles east of Hanna" (MINTON, 1966) and about 5 km north of the type locality of *noeli*. AMNH 96220 manifests irregularities in lateral head scales (loreal fused with nasal on both sides, eight/ten supralabials), viz. peculiar conditions frequently observed in hybrid racers.

# *Platycephalus sindhensis* sp. nov. – Sindh Racer

*Zamenis rhodorhachis* [sic] [partim]. – BOULENGER, 1893: [381] 398, Tab. I ("Western Rhugti Hills, N. of Shahpoor": BMNH 1891.9.14.16–17, Figs 21C–D). – ANDERSON, 1895: 654 ("Bugti hills"), and ANDERSON, 1898: 254 ("Bagti Hills", same sample as in BOULENGER, 1893).

*Zamenis ventrimaculatus* [sic] [partim]. – WALL, 1914: Tab. ['Synopsis of specimens'] (see smallprint).

*Coluber rhodorachis* [partim, incl. "*Coluber* sp. Variegated Sand Racer"]. – MINTON, 1966: [47] 121 [123, 172], map 2 [station 27] ("Kud River near the Las Bela-Kalat [Khuzdar] border": AMNH 161997 [SAM 679]).

*Coluber rhodorachis ladacensis* [partim]. – MERTENS, 1969: [4] 60, Abb. 1 [map] (Band Murad Khan, "Gaj River, Kirthar Range": SMF 57306 and 62928, Figs 21A–B).

?*Coluber rhodorachis*. – PRAKASH, 1974: 380, Tab. I ("Indian Desert"). – KHAN, 1997 [partim]: [51] 56 [58], Figs 4 and 6 [map] (Band Murad Khan, "Chauki", Thatta).

[*Platycephalus* sp. *incertae sedis* (partim)]. – SCHÄTTI & STUTZ, 2005: 418, Fig. 1 [map] (AMNH 161997 [SAM 679], SMF 62928).

?*Platycephalus r. rhodorachis* [partim]. – BAIG *et al.*, 2008: 204, Tabs 1 [preferred habitat] and 2 ["*Coluber r. rhodorachis*"] ("Cholisthan Desert").

**Material** (n=5). Holotype: SMF 57306, "Gaj River", Kirthar Range, Sindh, arbitrarily placed in the vicinity of Chhota Kund, Dadu District (see MERTENS, 1969: 87), ca. 26°53'N 67°14'E, ca. 180 m above sea level, subad. ♂, coll. M. G. Konieczny (Figs 21A–B). Paratypes: AMNH 161997 (SAM 679), "Gandrani Caves" (Kud River), Lasbela, Baluchistan, ca. 26°17'N 66°13'E, ca. 100 m, ♀, Minton, Minton & Anderson, March 1962; BMNH 1891.9.14.16, north of Shahpur (Bugti Hills), Dera Bugti-Nasirabad border area, Baluchistan, ca. 28°45'N 68°25'E, ca. 100 m, ♀, pres. ["P."] W. T. Blanford (Figs 21C–D); BMNH 1891.9.14.17, same data, ♂; SMF 62928, Band Murad Khan (on Hab River), Karachi, Sindh, 25°06'N 67°00'E, ca. 30 m, subad. ♀, M. G. Konieczny.

**Diagnosis.** Ventrals 230–247 (♂♂ 230–246, ♀♀ 234–247), subcaudals 133–148 (133–143, ≥ 134–148), sum thereof 363–395 (363–389, ≥ 368–395). Dorsals in 19-19-13 rows (three or four reductions). Dorsum transversely blotched or with six longitudinal rows of alternating spots, posterior trunk devoid of pattern. *Platycephalus sindhensis* differs from sympatric congeners (*P. r. rhodorachis*, *P. ventromaculatus*) in, for instance, far higher ventral and subcaudals counts (see Comparison and Distribution, Distinction).

**Holotype** (SMF 57306, ♂, possibly subadult, Figs 21A–B). Snout-vent length 375 mm, tail 153 mm (tail versus body length ratio 0.41); head 10.85 mm. Rostral 2.05 times broader than high, not protruding, rounded in dorsal view, and wedged in between internasals. The latter smaller and distinctly shorter along median suture than prefrontals (length 0.85 and 1.25 mm, resp.). Distance from posterior tip of rostral to anterior edge of frontal 2.15 mm. The latter bell-shaped, length 3.70 mm, maxi-



mum width 2.70 mm. Interocular width 4.70 mm. Parietals 3.90 mm long, lateral margins lined with four temporals (last largest); five scales along hind borders (plus two with partial contact to parietals in each corner) which form a slightly obtuse angle towards interparietal suture. Nasal divided, resting on first and anterior half of second supralabials (including a small extra scale on right side, see next). Nostril-eye distance 2.15 mm. Loreal somewhat longer than high, situated above posterior part of second and anterior half of third supralabials. Preocular entire, in contact with frontal. Subocular pentagonal (upper border straight), above fourth and anterior portion of fifth supralabials, and smaller than loreal (distinctly separated). Nine supralabials and a tiny triangular scale pointing downwards between upper margins of first and second right labials; fifth and sixth entering eye; sixth (higher than long) to ninth largest. Two postoculars, upper slightly larger, lower bordering anterior temporals and sixth supralabial. Temporals 2+3, lower first scale considerably larger than upper, those of second row, in particular uppermost, smaller. Ten sublabials (sixth largest), four in contact with anterior inframaxillaries. The latter wider and slightly shorter than posterior pair, which is distinctly separated by two (cranial) to three scales. Four oblique rows of gulars running between the posterior inframaxillaries and first ventral. One preventral and 246 ventrals including a half-scale between penultimate and last plate; anal scute divided; 143 paired subcaudals (terminal spine intact). Dorsal scales smooth with paired apical pits, disposed in 19-19-(11-)13 rows; reductions from 19 to 15 dsr at identical position (above ventral 140, 57%ven) involving rows 3-5 (3+4/4+5) and 7+8; 13 dsr at ventrals 153-154 (62%, rows 6+7), 11 at 200-201 (82%, 4+5); the fourth row splits up to 13 dsr five ventrals prior to the anal scute (98%).

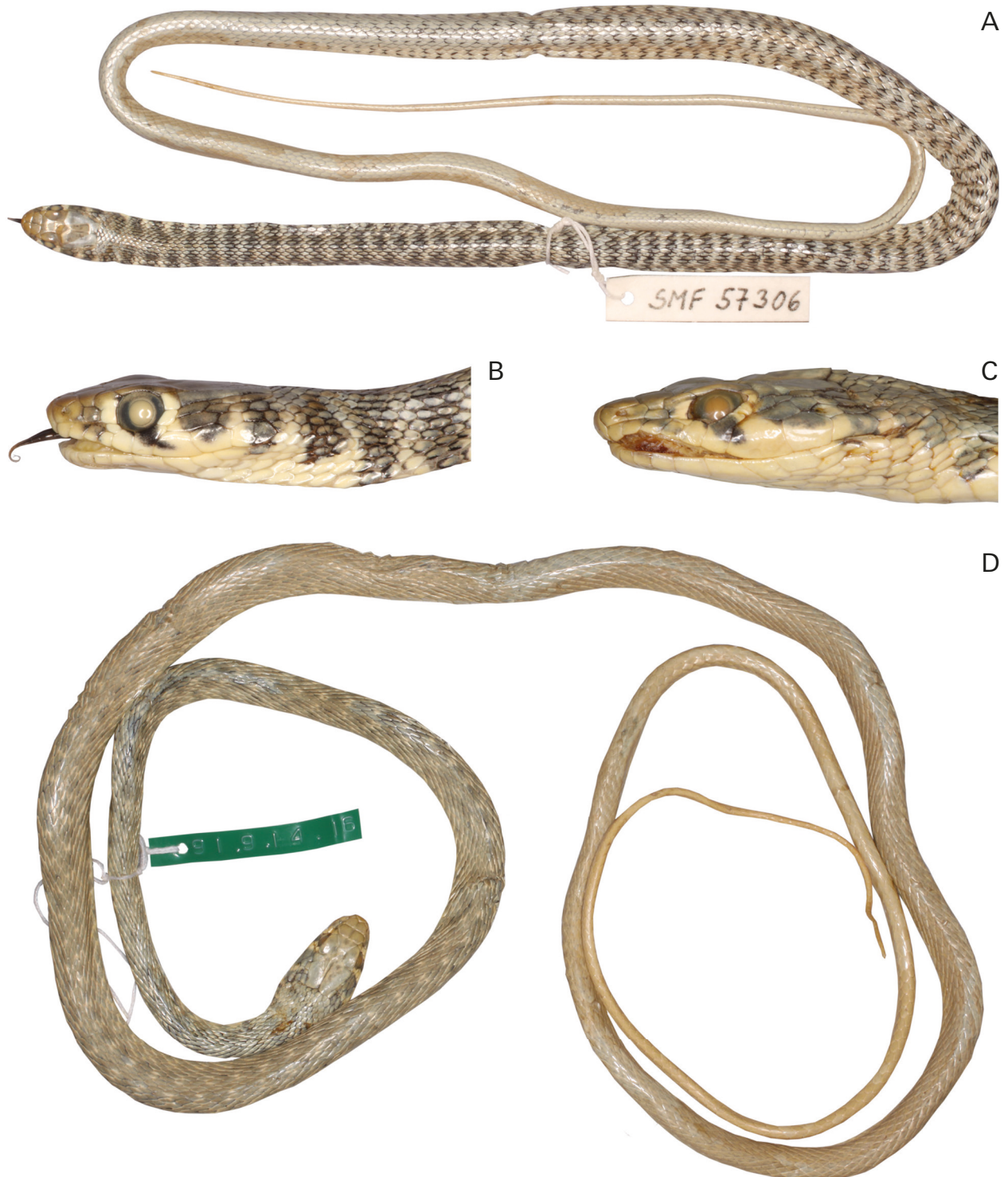
Head brownish grey. Pileus without any apparent colour pattern apart from a cloudy transverse bar on supraoculars and some indistinct marbling on parietals. Anterior supralabials and circumoculars yellowish except for darker pigmentation and some black flecks below the loreal as well as a black subocular streak pointing backwards and ending on seventh supralabial. Two darker areas across temples including upper part of eighth and posterior portion of last supralabials. Nape and neck with cross-bands (anterior four incomplete mid-dorsally) reaching ventrals, tending to be interrupted along spine towards midbody and turning into six longitudinal rows of juxtaposed short transverse markings behind gradually fading on posterior fourth of trunk (uniformly greyish olive onto tail). Underside of head, body, and tail yellowish. Lateral edges of ventrals with a small black spot or short line along their common border and slightly impinged on by lower row of dorsal marks as far caudal as dorsal colour pattern extends.

Fifteen maxillary teeth, the last two enlarged and separated by a diastema; 16 teeth on dentary.

**Paratypes.** Total length 786 + 333 mm (BMNH 1891.9.14.16, tail vs. body ratio 0.42), 695 + at least 290 mm

(AMNH 161997,  $\geq 0.42$ ), 558 + 236 mm (BMNH 1891.9.14.17, 0.42), and 365 mm snout-vent length (SMF 62928). Rostral 1.80-2.20 times broader than high. Head scales as in holotype except for nine regular supralabials in all (absence of extra scale), unequal size of prefrontals in BMNH 1891.9.14.17 (suture bent posteriorly), last upper temporal clearly largest in this specimen and SMF 62928, AMNH 161997 with three scales along outer margin of parietals (upper secondary temporal slender and elongated) and posterior inframaxillaries touching each other in front, peculiarities in BMNH 1891.9.14.16, viz. frontal against internasal-prefrontal length 1.36 instead of 1.60-1.75 (BMNH 1891.9.14.17, SMF 57306 and 62928; remaining cephalic proportions generally similar), nasal on first and most of second supralabials, seventh visibly largest, two temporals in second row on left side, five scales along lateral edge of left parietal (Fig. 21C), posterior border of parietals curved and indented at midline, as well as various character states shared with BMNH 1891.9.14.17, viz. loreal clearly longer than high (also in AMNH 161997), two anterior temporals in a row (lower right and upper left in -.16, upper right in -.17), and posterior inframaxillaries (separated by four rows of scales behind) distinctly longer than first pair. Ventrals 230-247 (last incompletely developed in BMNH 1891.9.14.17), subcaudals 133-148 (♂♀, tip of tail missing in SMF 62928 with 124 subcaudals, possibly so in AMNH 161997 with 134), sum 363-395 (♂♀). Anterior reductions of dorsals in BMNH 1891.9.14.16-17 (19-19-13 dsr) between ventrals 144-147 (59-60%ven) involving rows 7+8 (19-17 dsr) and 3+4 (17-15) and 138-144 (60-62%ven, rows 6-8 and 4+5), respectively; third fusion in former specimen at ventrals 180-183 (73%, rows 5+6 and 6+7; ca. ventral 158 in -.17: damaged, ca. 69%). AMNH 161997 with 19-19-(11-)13 dsr reduces at ventrals 133 (57%, rows 7-9), 137 (59%, 3-5), 154 (66%, 6+7), and shows 11 dsr from 217-222 (93-95%ven) with changes involving the vertebral row. A virtually identical sequence of dorsal scales occurs in SMF 62928 with reductions at ventrals 138 (58%), 139-141 (59%, rows 4+5), 152-153 (64%), and 11 dsr between 206-213 (87-89%ven) with participation of the fifth row.

SMF 62928 (possibly subadult) is generally similar to the holotype regarding head, dorsum, and venter colour pattern but the markings are mostly separated along the spine. AMNH 161997 essentially features cross-bars becoming reduced in width to the mid-dorsal segment and flanked with dots (anteriorly) or transverse blotches towards midbody. It exhibits a distinct black spot on the anterior outer margin of each ventral as far as the dorsal marks extend (slightly passed midbody). The BMNH paratypes show a much less pronounced pattern, basically made up of six rows of alternating paraventral, lateral, and paravertebral dots on the forebody (Fig. 21D); the mid-dorsal elements are partially confluent in the female. The underside of both is yellow with lateral spots on most anterior plates and as far as ventral 120 in the male.



**Fig. 21.** *Platyceps sindhensis* sp. nov. SMF 57306 (holotype, A–B) and BMNH 1891.9.14.16 (paratype, C–D).

Maxillary teeth 15–16, 16 (SMF 62928) to 18 on dentary. Apex of in situ hemipenis (BMNH 1891.9.14.17) reaches tenth subcaudal (8%subc), insertion of *Musculus retractor penis magnus* at subcaudal 27 (20%subc).

**Comparison and Distribution.** MINTON (1966) discussed AMNH 161997 (“S.A.M. No. 679”) with “circumocular scales as in *rhodorachis*” under the ‘Variegated Sand Racer’ (“*Coluber* sp.”), viz. *Platyceps mintonorum*

(MERTENS), indicated “237” (234) ventrals, “135” (134, complete?) subcaudals, and described the dorsal colour pattern as “more suggestive of this form [*mintonorum*] than of coastal *rhodorachis*”.

*Platyceps sindhensis* is similar to *P. noeli* and *P. r. rhodorachis* in head scale conditions or, for example, the number of maxillary and dentary teeth. Apart from rostral shield proportions, the Brahui and Sindh Racer drastically differ in ventral and subcaudal counts. *P. sindhen-*

*sis* also has many more ventrals than *r. rhodorachis* from the vicinity of Khuzdar in SE Baluchistan to the northern fringes of the Indus Delta as evidenced by the above diagnosis and data for the Common Cliff Racer (Fig. 16, Tab. 2, see Geographic Variation: first smallprint). This is confirmed by, for instance, fifteen *r. rhodorachis* “collected within or near the Karachi District” with “207–214 (mean 209.7)” ventrals in males and “206–217 (211.6)” in females (MINTON, 1966). The means for subcaudals of that series (“132.7” and “131.3”, resp.) and our somewhat higher counts for *r. rhodorachis* from the Kirthar Range to the lowermost Indus imply fewer scales than in *sindhensis*, resulting in clearly more total body scales for the latter (see Figs 17–18, Tab. 2: group I). The new species is utterly different from the sympatric *ventromaculatus* (see Distinction) and morphologically most similar to the allopatric *rhodorachis ladacensis*. The Ladakh and Sindh Racer, living in rather distinct habitats and their ranges separated by the northern Indus Plain, can be distinguished by the neck pattern (transverse bands in the former always present, usually no collars in the latter), sometimes higher (21) dsr on the anterior trunk or at midbody, and 15 (versus 13) dsr prior to the vent in *r. ladacensis* (11 on a portion of the posterior trunk in three out of five *sindhensis*) or another variable character, viz. the proportion of the frontal compared to the internasal-prefrontal length (1.29–1.34 in two *ladacensis* with pertinent data available vs. 1.36–1.75 in the type material of *sindhensis*).

The maxima for ventrals and subcaudals in “*Zamenis rhodorachis*” [sic] sensu BOULENGER (1893: 246 and 145, resp., letter x) are based on *Platyceps sindhensis* BMNH 1891.9.14.16. This specimen and the male paratype (BMNH 1891.9.14.17, BOULENGER, 1893: “♀”) from the “Western Rhugti Hills, N. of Shahpoor” were received from William T. Blandford but their original provenance is unknown. ANDERSON (1895, 1898) reported both from the “Būgti hills, on the right bank of the Indus, to the north of Jacobabad” (28°17'N 68°26'E) or the “Bagti Hills”, respectively. The route of the ‘Survey Operations during the Afghan Campaign of 1878–79’ (WATERHOUSE & WALKER, 1879: map) passed precisely through that area. Based on this, BMNH 1891.9.14.16–17 are presumed to have been collected by that taskforce and come from near Shahpur (28°43'N 68°25'E) in the Indus Plain of northeastern Baluchistan Province. The inclusion of these two racers in the “W. Himalayas” cluster (WALL, 1914; see Subspecies: second smallprint) can be explained by the fact that BOULENGER (1893: letters x–y) registered them next to *rhodorachis* auct. from “Gilgit” and “N.W. India”, and that the place name ‘Shahpoor’ (Shahpur) abounds in the northern regions of India and Pakistan. The “Sind: Chauki (1)” record of “*rhodorachis*” in KHAN (1997) is unclear as to its geographic position (name of various localities, not mapped) and specific identity. PRAKASH (1974) noted “*rhodorachis*” as well as “*ventrimaculatus*” from “The Sandy Habitat” in the “Indian Desert” (basically situated in Rajasthan) and only the latter taxon is annotated among the “common snakes which occur on rocks”. This raises considerable doubts regarding the identification of these racers (see Ecology, Sympatry), which may include *P. sindhensis*.

The type series of *Platyceps sindhensis* is from elevations near sea level to about 200 m in western Sindh and limitrophe Baluchistan, viz. Dera Bugti and Lasbela Districts (Fig. 20). Reports of the Common Cliff Racer from Sindh (KHAN, 1997) including Band Murad Khan (origin

of SMF paratype) may belong to *P. sindhensis*. This is possibly the case with an unspecified long-bodied “*Coluber rhodorachis*” showing a spotted and chequered dorsal pattern on the anterior trunk (l.c.: Fig. 4), presumably from one of the three cited localities (see chresonymy and preceding smallprint).

*Platyceps sindhensis* and *P. r. rhodorachis* are confirmed for the hinterland of Karachi and sympatry between these species is suggested from the Kirthar Range through Jamshoro District (*r. rhodorachis* AMNH 85863) to Thatta (AMNH 82181). The only specified voucher specimen (PMNH 1315) among four “*r. rhodorachis*” from flat, hard, saline areas (‘dhars’) in the “Cholisthan Desert” (BAIG *et al.*, 2008) is a *ventromaculatus* but it cannot be ruled out that the sample includes *sindhensis*. The collecting site is arbitrarily placed about 50 km roughly east of Rahimyar Khan in SE Punjab (Mithra Well, 28°22'N 70°48'E, ca. 85 m, Fig. 20). The Sindh Racer may occur in adjacent Rajasthan, India (see preceding smallprint).

## Hybrids

BOGDANOV (1953) described ten *Platyceps k. karelini* × *P. r. rhodorachis* collected between Bayramali, Imambaba, and Karabata in the southern Turkmen Murgab Valley (Mary Province, incl. ZISP 17210, 17220, 17223). All manifest a red or rose vertebral stripe as in typical *P. r. rhodorachis* and a postsubocular (only one supralabial entering eye), the par excellence diagnostic attribute of *P. k. karelini* (see Distinction). BOGDANOV (1962) reported additional specimens resulting in at least nineteen identified hybrid racers from that area. Czellarus (1974–1975, 1992) encountered crossbreeds in the Karakum roughly 150 km northeast of Bayramali and in the Jerojlanduz Depression (Badkhyz).

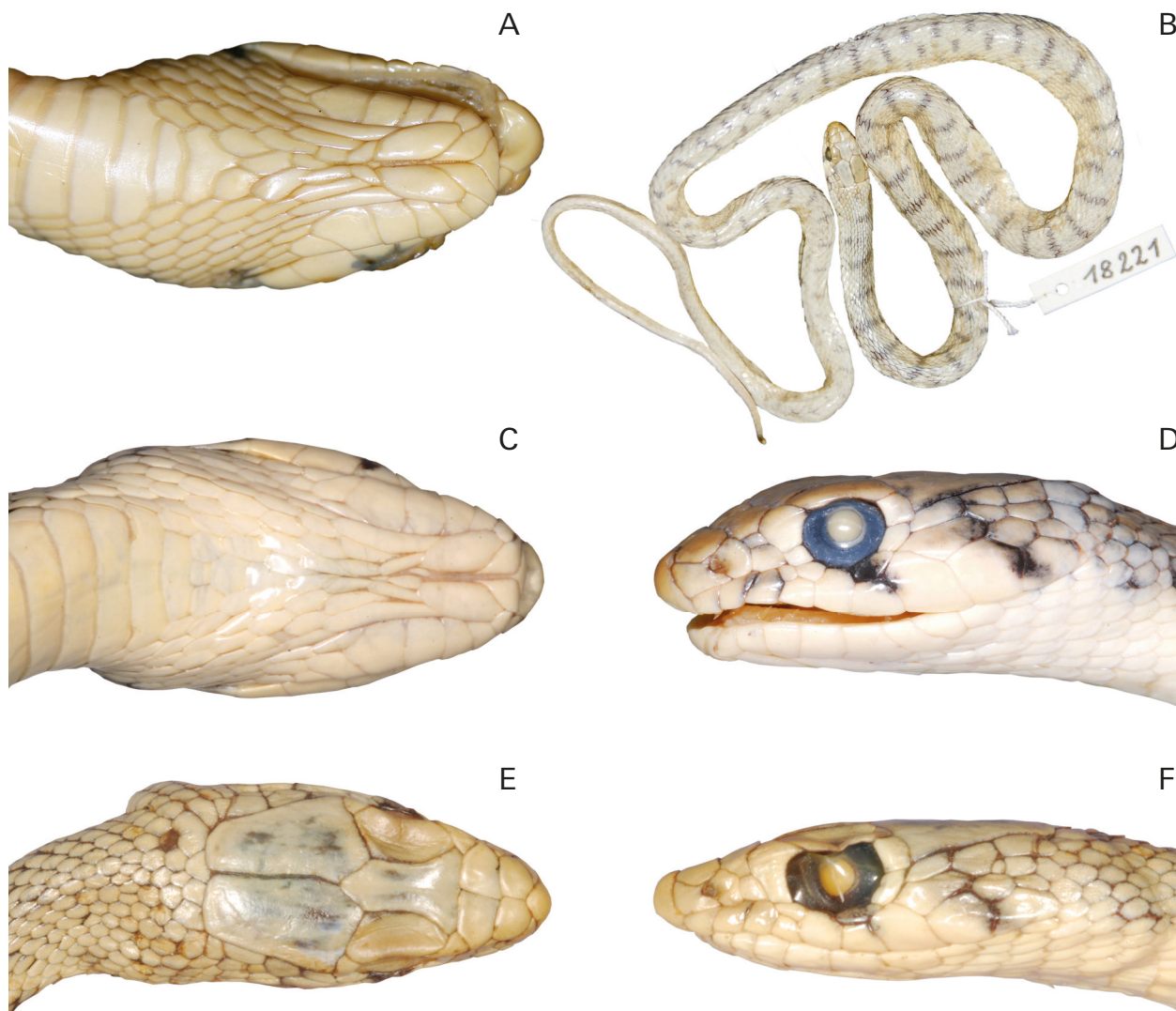
TUNJIEV (2000: 57, Fig. 2b) assigned a racer from the vicinity of Ashgabat with a broad red vertebral stripe but the habitus and pholidosis of *Platyceps k. karelini* (“*po gabitus i folidozis, identichnyj C.[oluber] karelini*”) to a comparatively rare colour form (“*otnositelno redko [...] czvetovyykh form*” or “*morf*”) of this taxon. He averred that the Murgab and “Erojlan-Duze” hybrids (BOGDANOV, 1962; CZELLARIUS, 1992) belonged to Karelin’s Racer (see Systematic Review). Striped specimens are absent, however, from a large part of the range of *P. k. karelini*, common in areas beyond the distribution limits of this racer, and in fact restricted to regions inhabited by *P. r. rhodorachis* (Figs 14–15 and 25). TUNJIEV (2000) dodges a straightforward explanation, denies the existence of hybrids between *k. karelini* and *r. rhodorachis*, and much less takes into consideration non-striped crossbreeds. As one parent species exhibits two completely distinct dorsal colour patterns, it seems reasonable to assume that both phenotypes also occur in hybrids.

All Jerojlanduz racers (CZELLARIUS, 1992) are classified under the nominotypical subspecies auct. of *Platyceps rhodorachis* and some display scale characters of *P. k. karelini* (“*osobi [...] nominativno-*



**Tab. 5.** Summary of particular head scale conditions, number of body scales, and dorsal colour pattern in examined *Platyceps k. karelini* × *P. r. rhodorachis* hybrids. References: 1 (BLANFORD, 1876), 2 (BOULENGER, 1889), 3 (BOULENGER, 1893), 4 (BOETTGER, 1898), 5 (BOGDANOV, 1953), and 6 (SCHATTI *et al.*, 2012). See text and Appendix B for further explanations.

Specimen, gender origin	peculiar head scale features proportions	ventrals + subcaudals dorsal colour pattern	references remarks
BMNH 1873.1.7.10, ♂ Afghanistan: Nimruz	loreal (shape), suboculars (complete row, eye separated from supralabials), sublabials high frontal against internasal-prefrontal ratio (1.85)	216 + 107 (sum 323) transversely blotched	1 ("Zamenis ventrimaculatus") 3 ("Z. karelini") 6 (incl. Fig. 8, Tab. 4, hybrid)
BMNH 1874.1.1.25.10, ♂ Iran: Kerman	none observed (closer examination may reveal features) exceedingly high frontal against internasal-prefrontal ratio (1.99)	203 + 102 (305) >55 transverse blotches (see text)	1 ("Zamenis ventrimaculatus") 3 ("Z. karelini") 6 (incl. Tab. 4, supposed hybrid)
BMNH 1886.9.21.104, ♂ Afghanistan: Herat	internasals and right supralabials (extra scales), right upper temporal (shape and extent)	206 + 110 (316) striped	2, 3 (see text incl. Systematic Review) 6 (incl. Fig. 7A, Tab. 4, hybrid)
SMF 18216, ♂ Turkmenistan: Ashgabat	inframaxillaries (Fig. 22A)	209 + 94 (303) striped	4 ("Zamenis rhodorachis")
SMF 18221, ♀ Turkmenistan: "Murgab-Fluß"	supralabials (10, extra scale on right), sublabials (11), inframaxillaries	206 + 95 (301) transversely blotched (Fig. 22B)	-
ZISP 17210 ♂ Turkmenistan: Bayramali	?	? + 112 striped	5 ("Coluber karelini rhodorachis") specimen badly damaged (in two parts) and desiccated
ZISP 17220, ♂ Turkmenistan: Bayramali	none observed (closer examination may reveal features)	202 + 100 (302) striped	5 ("Coluber karelini rhodorachis") hemipenis retractor muscle longer than in <i>Platyceps r. rhodorachis</i>
ZISP 17223, ♀ Turkmenistan: Bayramali	right supralabials (8)	211 + 93 (304) striped	5 ("Coluber karelini rhodorachis")
ZMB 38833, ♀ Turkmenistan: 50 km east of Imambaba	prefrontals (pseudo-loreals), preocular (one divided, other with distinct suture), left supralabials (extra scale), sublabials (11), inframaxillaries (Figs 22C–D)	212 + 110 (322) striped (with scattered tiny dots along dorsum)	6 (incl. Fig. 6A, Tab. 4, hybrid)



**Fig. 22.** Hybrid racers. *Platyceps k. karelini* × *P. r. rhodorachis* SMF 18216 (A), SMF 18221 (B), and ZMB 38833 (C–D) from Turkmenistan. *Platyceps k. karelini* × *P. mintonorum* BMNH 1886.9.21.101 (E–F) from Afghanistan (Nimruz). Courtesy of Linda Acker/SMF (A–B).

go podvida krasnopolosogo poloza i s folidozom poperechnopolosatogo”), viz. they are striped and possess a postsubocular. These are most probably hybrids, although the text says only that this is not excluded (“nje isključeno”). The number of examined specimens is not indicated but the assertion relies on numerous observations as to conclude from information in CZELLARIUS *et al.* (1983) commented upon elsewhere (Ecology). Two Murgab hybrids show transverse markings down the body, and one has a longer head with dark lateral streaks evocative of Karelin’s Racer (BOGDANOV, 1953). A Repetek female with similar head pattern features a pale orange vertebral stripe, vague paravertebral cross-bars on the forebody, and small dark lateral spots all along the trunk (CZELLARIUS, 1974). The wording to describe the mid-dorsal marks in relation to the vertebral line (“okajmlennaja v perednej chasti tela uzкими, nejasno vyrashennymi temnymi poloskami”, viz. margined on both sides with indistinct narrow dark stripes) is ambiguous because it may imply that they run parallel to the red spinal line, and not transversely to the body axis as is most probably the case. TUNJIEV’S (2000) assumption is based on a single unspecified specimen of unknown gender and without indication of scale counts; only a photograph showing the dorsal view of that putatively striped *k. karelini* is provided and the reader deprived of relevant data. It is not stated whether this racer possesses, for instance, a postsubocular as must be concluded from its identification. Moreover, TUNJIEV (2000) negates to mention BOGDANOV’S (1953) elaborate study of Lower

Murgab *k. karelini* × *r. rhodorachis*. Instead, he demands a re-evaluation of the distribution range of *r. rhodorachis* in Turkmenistan (see fourth smallprint in this chapter and Geographic Variation: first smallprint). This point of view has been adopted by ANANJEVA *et al.* (2004) as briefly outlined in the last smallprint of this chapter.

All reports pertaining to striped *Platyceps k. karelini* (e.g., SMITH, 1943; MERTENS, 1969: 59; CLARK, 1990) prior to TUNJIEV (2000) rely on BOULENGER’S (1893: letter *h*, “♀”) reclassification of BMNH 1886.9.21.104 from NW Afghanistan (see Systematic Review), a “very fine specimen” with a postsubocular and “splendidly marked with a bright red broad line down its back” (BOULENGER, 1889) or “uniform pale greyish above, with a bright orange vertebral stripe” (BOULENGER, 1893); the belly is completely devoid of any dotting. This as well as eight additional racers from the vicinity of Ashgabat to the Lower Murgab, Herat, SW Afghanistan (Nimruz), and Kerman, however, are hybrids between *P. k. karelini* and *r. rhodorachis* (Tab. 5, Appendix B). All possess a postsubocular scale (fifth supralabial or none [one case] entering eye) and six show

a red spinal line. ZMB 38833 (striped) displays a few minuscule scattered dots over the dorsum (SCHÄTTI *et al.*, 2012: Fig. 6A). BMNH 1873.1.7.10 with about 45 cross-bands features a colour pattern reminiscent of Karelin's Racer (l.c.: Fig. 8). BMNH 1874.11.25.10 resembles this taxon in the configuration of the anterior dorsal markings but has more than 55 transverse blotches compared with 41–50 in *k. karelini* from central and eastern Iran, and this despite the complete absence of pattern on the last portion of the body as is characteristic of *r. rhodorachis*. Close to 70 cross-bars reduced in width to the mid-dorsal segment on the posterior trunk and fading away in front of the tail base are found in SMF 18221 (Fig. 22B).

BMNH 1873.1.7.10 shows a loreal that is higher than long, a tiny left presubocular, a row of three subocular scales completely separating the eye from the supralabials (SCHÄTTI *et al.*, 2012: Fig. 8), and it is noteworthy for the number and arrangement of the sublabials (ten, but only three in contact with anterior inframaxillaries on right side, eleven on left). BMNH 1886.9.21.104 has the posterior lateral edge of the right internasal split off, a detached triangular lower anterior portion of the seventh right supralabial, and a comparatively slim upper right anterior temporal extending as far caudal as the lower scale (l.c.: Fig. 7A).

The posterior inframaxillaries are particularly slender, elongated, and distinctly separated along their whole length in SMF 18216 (Fig. 22A) and 18221; furthermore, the latter has ten supralabials by division of the sixth, a small extra scale at the upper border between the first and second right supralabials, and eleven sublabials. Only eight upper labials are present on the right side of ZISP 17223 but a tiny triangular scale is wedged in between the lower margin of the fifth and sixth. ZMB 38833 has the lower edge of the prefrontals detached (forming pseudo-loreals), a divided preocular (distinct suture on right side) and a presubocular on the left, a slender cuneiform scale between the upper portion of the second and third left supralabials, eleven sublabials, and the posterior inframaxillaries widely separated all along their length by four (rostral, the smallest protruding between the posterior tips of the anterior chin shields) to five (caudal) rows of scales (Figs 22C–D, see footnote 9).

The examined sample shows 202–216 ventrals (♂♂ 202–216, ♀♀ 206–212), 93–112 subcaudals (94–112, 93–110), and a sum of 301–323 (302–323, 301–322, Tab. 5). The last ventral of BMNH 1874.11.25.10 and ZISP 17223 is incompletely developed. The dorsal scales are arranged in 19–19–13 rows along the trunk, with anterior reductions (19–15 dsr) between 57–65%ven (♂♂ 57–63%, ♀♀ 59–65%) and the third between 70–77%ven (70–77%, 71–74%) except in SMF 18221 (♀, 85%), which has the first fusion at lateral level (paravertebral in remaining specimens apart from BMNH 1874.11.25.10). The latter is notable for its anterior reductions, viz. first completing on the right side (low-high) to 17 dsr at ventral 119 followed by the same sequence on the opposite flank (ventral 124). The third decrease in BMNH 1886.9.21.104 and SMF 18216 in-

volves the vertebral row. The largest specimens measure 1,200 (910 + 290) mm (♂, ZISP 17220) and 1,055 (800 + 255) mm (♀, ZISP 17223) with a tail versus body length ratio of 0.32 in both. The maxillary bears 14–15 teeth (n=8, wide diastema), the dentary 17–19 (2), and eight teeth occur on the palatine of BMNH 1873.1.7.10. The hemipenis of ZISP 17220 reaches the twelfth subcaudal (apex, in situ) and the *Musculus retractor penis magnus* inserts at subcaudal 34 (34%subc).

Hybrid racers from the vicinity of Ashgabat, the Karakum east of Imambaba, and the Lower Murgab (Turkmenistan), Herat, and Kerman show clearly fewer ventrals and subcaudals (except the maximum of 112 in ZISP 17210), and a significantly lower number of total scales than *Platyceps r. rhodorachis* from these areas (Tabs 2 and 5). The Nimruz crossbreed differs from a Helmand male cliff racer (CAS 147427) in distinctly fewer subcaudals (107 versus 133) and the aggregate (323 vs. 346). Striped as well as patterned hybrids differ from *P. k. karelini* in their dorsal markings (see, e.g., illustrations in SCHÄTTI *et al.*, 2012). The major retractor muscle of the hemipenis of ZISP 17220 is longer (34%subc) than in *rhodorachis* and within the range observed in *karelini* (see Distinction: second smallprint).

Both male Afghan crossbreeds (BMNH 1873.1.7.10, 1886.9.21.104) have more ventrals and subcaudals, respectively, than *Platyceps k. karelini* from Afghanistan and Iran, and higher total scale counts as well (Tab. 5, SCHÄTTI *et al.*, 2012: Tab. 3). The former specimen is remarkable for a much higher number of ventrals than male *P. k. karelini* from the whole distribution range; no comparative data from SW Afghanistan and Kerman is available for this taxon (SCHÄTTI *et al.*, 2012: smallprint p. 466; see Sympatry incl. second smallprint, Appendix E). The four Lower Murgab *k. karelini* × *r. rhodorachis* (SMF 18221, ZISP 17210, 17220, 17223) have fewer ventrals (♂♂), subcaudals (♀♀), and a lower sum thereof (♂♂, ♀♀) than *k. karelini* from SE Turkmenistan. BOGDANOV (1962) noted a similar number of ventrals (203–213) and 107–111 subcaudals for hybrids (13 ♂♂, 6 ♀♀, genders confounded) from the same area. Due to its very low ventral (209) and low subcaudal (113) counts, we assume that an unspecified striped Turkmen “*Cobuber r. rhodorachis*” [sic] mentioned by BOGDANOV (1962: 168) is a hybrid racer (Appendix C). It may possess a unilateral postsubocular.

Apart from the presence of a postsubocular, few ventrals and subcaudals, or the described details of dorsal colour pattern, our series of *Platyceps k. karelini* × *P. r. rhodorachis* manifests frequent irregularities in lateral head scales (above all the supralabial-subocular segment) and the inframaxillary region as observed in six out of eight specimens for which data is available in this respect (Tab. 5)<sup>9</sup>. BOGDANOV's (1962: Fig. 30) drawing shows a tiny presubocular and this author notified a unilateral

<sup>9</sup> At least six of nine examined hybrid racers (all three BMNH and both SMF specimens, ZMB 38833) have widely separated posterior inframaxillaries (Figs 22 A+C, no data ascertained for three ZISP hybrids). However, this character state resulting in slender posterior chin shields occur in certain Turkmen (and other) *Platyceps r. rhodorachis*, e.g., CAS 182939 and 182941 or MTD 20400 (Fig. 2E) from the Kopetdag area.



complete row of subocular scales separating the eye from the supralabials in certain hybrids. BMNH 1874.11.25.10 and ZISP 17220 (striped phenotype) present none of these peculiar configurations (although closer examination may reveal irregular scaling in both) but they are clearly discernible as hybrids due to their head and body scale conditions as well as dorsal colour pattern (see above).

BMNH 1873.1.7.10 and ZMB 38833 show more elongated frontals (fl/fw 1.56–1.63) than cliff racers (Tab. 1). The frontal against internasal-prefrontal length of the former (1.85) and BMNH 1874.11.25.10 (1.99) exceeds by far the proportions found in *Platyceps r. rhodorachis*. BMNH 1886.9.21.104 and ZMB 38833 have considerably higher ratios (1.62–1.63) than ten adult cliff racers (6 ♂♂, 4 ♀♀) from the Ashgabat area and Murgab Valley (1.18–1.49). The relative longitudinal position of the anterior dorsal scale reductions in Turkmen hybrids (0.59–0.65%ven) is situated farther caudal than in *P. r. rhodorachis* (0.54–0.62,  $n=36$ ) from this country (*k. karelini* 0.53–0.65,  $n=19$ ). In spite of a lower total number of subcaudals, the hemipenis retractor muscle of ZISP 17220 (see above) is longer than in *r. rhodorachis* and agrees with *k. karelini* (see Distinction: second smallprint). Sporadic miscellaneous data suggests that hemipenis data (see above) or further morphological features such as aberrant scale reduction sequences may help to track down hybrids (see end of this chapter incl. last smallprint). Large adult size seems to be another attribute of crossbreeds; ZISP 17220 measures 910 mm snout-vent length, surpassing the longest examined Turkmen cliff racer, and ZISP 17223 with 800 mm almost attains the maximum for females in general studied by us.

BOGDANOV (1962) described the snout in *Platyceps k. karelini* × *P. r. rhodorachis* as slightly pointed (“slabo priostren”, see third smallprint in next chapter). The noticeably projecting snout of BMNH 1886.9.21.104 (SCHÄTTI *et al.*, 2012: Fig. 7A) is due to a crushed mandible. The rostral is protruding to some degree in, for instance, SMF 18216 (Fig. 22A) and wedged in between the internasals in, for example, BMNH 1873.1.7.10, 1886.9.21.104, SMF 18221, or ZMB 38833, resulting in an internasal against prefrontal ratio of 0.47–0.63. This, however, does not allow for a distinction from certain *r. rhodorachis*. Three out of ten Murgab hybrids (BOGDANOV, 1953) have a snout-vent length of 940–990 mm and exceed the maximum for *r. rhodorachis* (920 mm) as established by TERENTJEV & CHERNOV (1949) for Central Asia. BOGDANOV (1962) reported larger maximum size for *rhodorachis* (see Dimensions) but only 970 mm (13 ♂♂) and 850 mm (6 ♀♀) in *karelini* × *rhodorachis*.

The veritable nature of hybrid racers can only be assessed upon closer examination and, first of all, cognizance of the topic and by being acquainted with their defining traits, viz. accepting their existence and understanding the inherent morphological character states. Without this, at least non-striped *Platyceps k. karelini* × *P. r. rhodorachis* would most probably be assigned to Karelín’s Racer due to the presence of a postsubocular. In the case of pure sight records, the verification of head scale conditions is normally just wishful thinking, and neither hybrid phenotype may be properly identified. The expert eye can dis-

cern most non-striped crossbreeds due to their deviating dorsal colour pattern (see below). We are fully conscious that this study does not produce a flawless proof for the reality of hybrid racers (viz. reproduction in captivity or genetic analysis of microsatellites or other nuclear markers) but the provided morphological evidence strongly corroborates their existence.

Interbreeding of *Platyceps k. karelini* and *P. r. rhodorachis* in zones of contact and viable offspring appear to be quite common in areas where the parent taxa are actually syntopic. Amazingly, CZELLARIUS (1975) reported three crossbreeds from the vicinity of Repetek but not a single genuine *r. rhodorachis*. According to the figures presented by BOGDANOV (1953), approximately 8% of the examined Lower Murgab racers are hybrids. There, the parent species dwell alongside over large distances in the Bayramali-Imambaba-Karabata area (incl. Gowshutbent, Yolöten, Sultanbent, and Turkmenkala), seem to have virtually identical activity cycles, and hibernate in the same dens (BOGDANOV, 1953, 1962). Hybrids are found in plains and gorges, along cliffs and irrigation ditches (‘aryks’), or around collapsed buildings. In the Yolöten-Karabata sector, they inhabit definitely more arid places than typical of *r. rhodorachis*, particularly sandy terrain close to cultivated land (BOGDANOV, 1962). Habitats appropriate for co-existence occur through a good part of the range shared by *k. karelini* and *r. rhodorachis* (Fig. 25). In the eastern Kopetdag, the latter prefers stony areas including ravines whereas *karelini* lives on gentle vegetated slopes (TUNJIEV, 2000; see last smallprint in this chapter and Sympatry: second smallprint). Around Bezd in Khorasan-e Razavi, for instance, these species are basically separated by altitude and soil type (*rhodorachis* prefers rocky mountain slopes, *karelini* low-lying prevailing soft ground habitats) but they meet in transitional zones at lower elevations with stones and scattered shrubs.

All literature hybrids so far discussed are from southern Turkmenistan and show a vertebral line. That dominance is probably deceptive because non-striped *Platyceps k. karelini* × *P. r. rhodorachis* may simply have been overlooked. TUNJIEV (2000) considers typical *r. rhodorachis* to be homozygotic regarding the supposedly recessive ‘striped’ allele. In some areas, however, the frequency of this phenotype in Jan’s Cliff Racer is notably higher (as much as two thirds of examined specimens in group B) than what would be expected (25% of the population) for a monogenic feature (Tab. 4, see Geographic Variation incl. fourth smallprint). The much more (or less) numerous manifestation of the striped morph in certain regions, however, does not seem to obey Mendelian rules for traits controlled by a single locus, and may be of polygenic inheritance.

BRUSHKO & MAZIN (1981: Figs 1–2) regarded an unspecified DBQA racer of unknown gender collected northwest of the Kazakhli Well in the Ustjurt of extreme SW Kazakhstan as a hybrid. Contrary to other reports of *Platyceps k. karelini* × *P. r. rhodorachis*, this specimen lacks a vertebral stripe as well as the left postsubocular (two supralabials entering eye unilaterally, see second smallprint in this chapter). The upper anterior portion of the left preocular is fragmented into four scales and there seem to be two more granules in front of the loreal (not



**Fig. 23.** *Platyceps karelini* ssp. × *P. r. rhodorachis* USNM 153743 (A, lateral and dorsal midbody views) and ZFMK 86743 (B, supposed hybrid). *Platyceps* cf. *k. karelini* ZFMK 86746 (C) and *P. cf. mintonorum* CAS-SU 13251 (D). Not to scale.

made out clearly on our copy). The snout is noticeably pointed in dorsal view and, purportedly, head proportions except the length of the frontal in relation to the parietal fit those of *k. karelini*. The dorsal colour pattern (indistinct longitudinal rows of small spots on the neck gradually turning into clusters of unilaterally dark-edged scales, second half of body without markings) is completely different from *k. karelini* and rather resembles that of certain *r. rhodorachis* ('*persicus*' morph). The tail versus body ratio (0.45, 541 + 245 mm, resp.) exceeds by far the quotient observed in *r. rhodorachis* from Turkmenistan to the Tien Shan and Hindu Kush (Tabs 3–4)

and *k. karelini* in general (SCHÄTTI *et al.*, 2012). The specimen is characterised by conflicting conditions approximating it to *karelini* or *rhodorachis*. Ventral, subcaudal, or dorsal scale counts are not indicated and comparative material for the Ustjurt and contiguous areas has not been available for either parent taxon, nor does literature data exist. This renders a sound appraisal of the true identity difficult but BRUSHKO & MAZIN's (1981) opinion cannot be refuted. On the contrary, the fragmentation of lateral head scales and dorsal markings definitely support their standpoint, which is further corroborated by the steppe habitat ("v pustynnuju zonu") atypical of *rhodorachis*.

The holotype of *Choristodon brachycephalus* SEVERCZOV, 1873 (ZISP 3581) from Khujand (“Khodzhen” or “Chodshent”, former Leninabad) in N Tajikistan (Lower Fergana Valley, Sughd Province, Fig. 25) manifests the lowest reported total body scale count (285) for Karelín’s Racer and blatant anomalies of the head, viz. a shorter right side with an elliptic eye and the rostral wedged in between the internasals to the point of almost completely separating them (STRAUCH, 1873). This specimen is either a teratological *Platyceps k. karelini* or its aberrant conditions reflect the disturbed genetic equilibrium of hybrids. ZISP 3581 is also noteworthy for the presence of a granular presubocular (l.c.), a scale which is uncommon in northern *P. k. karelini* (see Distinction: second smallprint) and *P. r. rhodorachis* in general. Records of *Platyceps* spp. without any indication of relevant scale data from western Afghanistan, eastern Iran, Tajikistan, Turkmenistan, and Uzbekistan may partly rely on, or be comprised of, *k. karelini* × *r. rhodorachis*. This is probably the case with a striped “*Coluber karelinii*” [sic] depicted in ANANJEVA *et al.* (2004: lower photograph) from “South-Western Turkmenistan, in Kara-kum piedmont desert on the border with Kopet-Dag mountain ridge” (Nikolaj L. Orlov in litt.). Its odd dorsal colour pattern (vague lateral marks near midbody) inevitably reminds one of the marking of certain Turkmen hybrids (see first smallprint in this chapter). This is the same racer as shown under “*rhodorachis*” in ANANJEVA *et al.* (1998: Pl. 38, photo 161), and the change of mind apropos its specific allocation implies that the specimen, possibly a ZISP holding, has a postsubocular (we have received no reply to various requests asking for more details). ANANJEVA *et al.* (2004) noted two colour varieties (“czvetovye variacii”) of “*karelinii*” including a longitudinally striped morph and declared that this form, sometimes referred to as hybrids (“inogda opisivalas kak gibrity mezhdu *C. karelinii* i *C. rhodorachis*”), occurred in areas where both parent species are met with (“tak kak v etom regione vstrechajutsja oba vida”, see second paragraph in this chapter). SCHÄTTI *et al.* (2012) ferreted out additional potential crossbreeds, for instance NMW 25446.2 (Murgab Valley, registered as *karelini*) with coalesced frontal and parietal shields. Further candidates are two MNHN racers from Kandahar Province with highly irregular scale reduction patterns (l.c.: Tab. 2) or, possibly, specimens studied since such as CAS 179543 (♂, catalogued as *karelini*) from the vicinity of Repetek with an elevated number of supralabials (10, right side), extremely high subcaudal and total body scale counts (123 and 337) compared to Karelín’s Racer, and ca. 70 distinct transverse dorsal elements (see Distinction incl. second smallprint).

We suspect two examined racers with particularly low total body scale counts from Uzbekistan (ZISP 7407) and N Afghanistan (ZFMK 86743, Fig. 23B) to be hybrids. Both lack a postsubocular and the dorsal colour pattern on the posterior trunk as characteristic of *Platyceps r. rhodorachis*. The former, a juvenile from an unspecified place in the Kyzylkum (NIKOLSKIJ, 1905) with widely separated posterior inframaxillaries (see footnote 9), has 208 ventrals, 111 subcaudals, a spotted dorsum, instead of transversely banded as is usually the case with cliff racers from Uzbekistan, and the loreal is smaller than the anterior subocular (larger in *r. rhodorachis*). Dorsal spots are also present in ZFMK 86743 (♂) from Mazar-i Sharif (loreal and subocular of equal size), which strikingly differs from ZFMK 86744 (juv. ♂ *rhodorachis*) with the same origin in very few ventrals (202 versus 221) and subcaudals (106 vs. 123, 117 in another ♂ *rhodorachis* from Qonduz, see Appendix A incl. remark) as typically observed in crossbreeds. The pileus of ZFMK 86743 exhibits distinct symmetrical marks followed by a short cuneiform nuchal streak. This specimen and ZISP 7407 reduce to 13 dsr at only 89–91%ven, farther caudal than

any examined *P. r. rhodorachis*, but both have 15 preanal scales (re-established by recurrent fusions and additions in ZISP 7407).

USNM 153743 from north of Ahvaz in Khuzestan is outstanding for various aspects of scaling, dorsal markings, or head proportions and brings into play *Platyceps karelini chesneii* (see Comparative Part). This juvenile (snout-vent length 272 mm) with 216 ventrals has more than 112 subcaudals (third to fifth coalesced, tail incomplete), which results in a higher total scale count (> 328) compared to three cliff racers from the vicinity of Ahvaz (Tab. 2, see Geographic Variation: sixth smallprint, last paragraph under Distinction). The dorsal colour pattern consists of a peculiar brown mid-dorsal segment (much darker than flanks) all down the trunk with transverse blotches confined to this area (Fig. 23A), and the presence of a short nuchal streak is remarkable (see Distinction incl. fourth smallprint). In this respect, USNM 153743 is different vis-à-vis examined cliff racer from Khuzestan and the species in general (see Colour Pattern). Furthermore, the fl/inp ratio (1.48) is lower than in juvenile *P. r. rhodorachis* (Fig. 13). These attributes, and in the first place the dorsal pattern, imply hybridisation between Chesney’s and Jan’s Cliff Racer.

Based on the presence of a postsubocular, BOULENGER (1889, 1893) identified BMNH 1886.9.21.101 from the banks of the Helmand in Nimruz as “*Zamenis karelinii*” [sic]. This racer has the rostral wedged in noticeably between the internasals (their median suture measures only about half the prefrontal length), distinctly enlarged scales along the posterior border of the parietals (Figs 22E–F), 203 ventrals, 105 subcaudals, 19–19–13 dsr (reductions at ventrals 123, 125.5, and 160), 15 maxillary teeth, and 18 on the dentary. The dorsal colour pattern consists of more than 70 bars, and a series of juxtaposed lateral markings, compared with 50 or fewer blotches in *Platyceps k. karelini* from Afghanistan and adjacent Iran. BMNH 1886.9.21.101 is considered a hybrid between the latter and *P. mintonorum* (Fig. 25, Appendix B, SCHÄTTI *et al.*, 2012: Fig. 6B, Tab. 4).

## Incertae Sedis

MERTENS (1969: 59) discussed SMF 62938, a large female “*Coluber rhodorachis ladacensis*” (ca. 1,140 mm total length) from Kharan (Baluchistan Province) in connection with *Platyceps mintonorum*. The specimen lacks a postsubocular (“die bezeichnende Subocular-Pholidose”) and is surprisingly similar (“Erstaunlich ähnlich”) to a syntopic female paratype of *P. mintonorum* (SMF 62933) in its dorsal colour pattern (Fig. 24B). FMNH 161075, a female “*rhodorachis*” [sic] from the vicinity of Kandahar (Fig. 24A) shows “spots [...] confluent to form narrow crossbars, one scale row wide, with a row of vertical dark bars down each flank, alternating in position with those of the back” fading away “on the posterior third of body and the tail” (ANDERSON & LEVITON, 1969) reminiscent of *P. r. rhodorachis*.



**Tab. 6.** Summary of morphological traits in provisionally assigned racers from northern Baluchistan (Kandahar, Kharan, Nushki: *Platyceps cf. mintonorum*), N Afghanistan (Balkh: *P. cf. k. karelini*), and NE Kashmir (*Platyceps* sp.). References: 1 (ANDERSON & LEVITON, 1969), 2 (MERTENS, 1969), 3 (CLARK, 1990), 4 (SCHATTI & STUTZ, 2005), and 5 (SCHATTI *et al.*, 2012). See text for further explanations.

Specimen, gender origin and allocation	postsubocular peculiar head scale features	ventrals + subcaudals	scale rows along trunk	dorsal colour pattern	references remarks
CAS 120540, ♂ Afghanistan: Balkh <i>Platyceps cf. k. karelini</i>	present preocular, right supralabials (10), right anterior temporal (single)	207 + 105 (sum 312)	19-19-13	bold short black blotches along trunk	3 (incl. Tab., " <i>Coluber karelini</i> " from "Tashkurgan") 5 (Fig. 7B, Tab. 4, potential hybrid)
CAS-SU 13251, ♂ "Baluchistan Desert" <i>P. cf. mintonorum</i>	present supralabials (7), left sublabials, postocular (single), parietals	233 + ≥115 (≥348)	19-19-13	mid-dorsal spots on forebody, transverse blotches (Fig. 23D)	formerly ZSI 14599 (no further collecting data)
FMNH 161075, ♀ Afghanistan: Kandahar <i>P. cf. mintonorum</i>	absent left supralabials (10), left posterior inframaxillary	223 + 117 (340)	19-19-13	alternating spots or transverse mid-dorsal bands (Fig. 24A)	1 (incl. Tab. 1, " <i>Coluber rhodorhachis</i> ")
PMNH 1651, ♂ Pakistan: Kashmir <i>Platyceps</i> sp.	absent supralabials (8)	204 + ?	19-19-14	cross-bars on anterior trunk (Fig. 24E)	details of head scales in PMNH specimens known only for one side except condition of postsubocular (see text incl. penultimate smallprint in this chapter), and ventral counts may be comprised of prefrontal(s)
PMNH 2427, ♂ Pakistan: vic. Nushki <i>P. cf. mintonorum</i>	present none observed	234 + 117 (351)	19-19-13	transverse blotches extending far caudal	
PMNH 2428, ♀ Pakistan: vic. Nushki <i>P. cf. mintonorum</i>	absent none observed	236 + 123 (359)	19-19-13	transverse blotches extending far caudal	
PMNH 2477, ♂ Pakistan: Kashmir <i>Platyceps</i> sp.	absent loreal (absent), supralabials (8)	208 + ?	19-19-15	cross-bars beyond midbody	
SMP 62938, ♀ Pakistan: Kharan <i>P. cf. mintonorum</i>	absent left loreal fused with nasal, right posterior inframaxillary	236 + 115 (351)	19-19-13	alternating mid-dorsal spots throughout (Fig. 24B)	2 (" <i>Coluber rhodorhachis ladacensis</i> ") 4 (unassigned, see text) snout strikingly blunt (Fig. 24C)
ZFMK 86746, ♀ (juv.) Afghanistan: Balkh <i>P. cf. k. karelini</i>	present right anterior temporal (single)	208 + 100 (308)	19-19-13	similar to typical <i>Platyceps</i> <i>karelini</i> (Fig. 25C)	head elongated (extremely long frontal)

Both racers tormented us for years apropos their veritable identity. They have a much lower number of subcaudals (115–117) than observed in *Platyceps r. rhodorachis* from NE Baluchistan (Fig. 17, Tab. 2) or Chagai (see Geographic Variation: first smallprint). Furthermore, FMNH 161075 unilaterally shows ten supralabials, eleven sublabials, and a fragmented posterior inframaxillary (largest scale hardly longer than anterior chin shields). SMF 62938 has the loreal and nasal fused on the left side and the right posterior inframaxillary is shorter than the anterior pair. Contrary to many *P. mintonorum*, the rostral is not slightly projecting (“nicht vorspringendes Rostrale”, MERTENS, 1969: 59; see next but one smallprint), does not protrude at all between the internasals, and the snout is extremely blunt in dorsal view (Fig. 24C). These Kandahar and Kharan specimens do not belong to *P. rhodorachis* sensu stricto. This probably also applies to PMNH 2427–28 (♂♀) from the vicinity of Nushki which display a dorsal colour pattern recalling the one found in cliff racer but, again, have fewer subcaudals (117–123) than Baluch *r. rhodorachis* from north of the Makran Range. Contrary to what is encountered in the latter taxon, the dorsal markings of PMNH 2427–28, basically made up of transverse dorsal blotches, almost extend to the tail base. The male possesses a bilateral postsubocular, viz. only a single (fifth) supralabial enters the eye (Tab. 6).

SMF 62938 exhibits the customary number and arrangement of the upper and lower labials. This specimen and FMNH 161075 have 19–19–13 dsr along the trunk, with anterior reductions at paravertebral (19–17 dsr) and lateral levels between 58–66% ven (FMNH, ventrals 129–147.5) and 59–60% (SMF, 139–142); the third fusion is paravertebral at 78% (173) and 71% (168.5), respectively.

The lateral head scale aberration found in SMF 62938 (coalesced loreal and nasal) or an elevated number of supralabials (FMNH 161075) and erratic posterior inframaxillaries are highly reminiscent of what is observed in *Platyceps k. karelini* × *P. r. rhodorachis* (see preceding chapter). A postsubocular as characteristic of cross-breeds, however, is absent in three of these four racers (incl. PMNH 2427–28). Their origin from along the confirmed distribution limit of *mintonorum*, and within the range of *r. rhodorachis*, is particularly striking (Figs 10, 15 and 25). This favours the view that they may be hybrids between these species as speculated by SCHÄTTI & STUTZ (2005: “cannot be ruled out”) in the case of SMF 62938. Although morphology and distribution corroborate that hypothesis, we opt for a conservative approach and assign FMNH 161075, PMNH 2427–28, and SMF 62938 to a taxon most similar to Minton’s Racer in various aspects, *P. cf. mintonorum*. This diffident stance is taken because our data ultimately does not offer conclusive proof as to their intrinsic nature, and the importance we attach to keeping distinct data sets for possibly different taxa. All information (numerical values, colour pattern, etc.) regarding Minton’s Racer presented hereafter implicitly refers to *P. mintonorum* (MERTENS) sensu stricto.

The shape of the snout in *Platyceps mintonorum* is inconstant (MERTENS, 1969) and there is considerable variation with respect to certain head scales (see Distinction: second and third smallprints). In particular, a postsubocular is sometimes absent on both sides (CAS 84630, FMNH 140277, SMF 62933) or two unilateral scales may be present (SMF 62935, 62939, and 62948), and the number of supralabials entering the eye (0–2) is unstable. Data based on SCHÄTTI & STUTZ (2005) and two additional females (one from an unspecified locality) encompasses 221–240 ventrals (♂♂ 225–231, ♀♀ 221–240), 110–127 subcaudals (110–122, 113–127), and a sum of 336–360 (336–350, 337–360). The four racers discussed above generally agree with *P. mintonorum* in scale characters, but not with regard to the dorsal colour pattern observed in FMNH 161075 and PMNH 2427–28. PMNH 2427 (♂) has slightly more ventrals (234) and total scales (351) than male *mintonorum*; FMNH 161075 (♀) shows fewer ventrals (223) than two *mintonorum* (♂♀, 226–234) from the Kandahar area.

CAS-SU 13251 from the “Baluchistan Desert” has 233 ventrals, 115 subcaudals (complete?), a postsubocular, and shows the general dorsal aspects of *Platyceps mintonorum* (Fig. 23D, Tab. 6). This singular male specimen, however, manifests various aberrant conditions of head scaling including multiple bilaterally fused supralabials (seven, fourth entering eye), coalesced sublabials (left, fifth and sixth), entire postoculars, or a transverse notch running across the anterior portion of both parietals, and its allocation pends further studies.

SCHÄTTI *et al.* (2012) considered CAS 120540 from the vicinity of Khulm in N Afghanistan (Balkh Province, 36°42′N 67°36′E) to be a potential hybrid between *Platyceps k. karelini* and *P. r. rhodorachis*. This male racer with a postsubocular, 207 ventrals, and 105 subcaudals is remarkable for having divided preoculars and multiple unilateral deviating head scale features, viz. ten supralabials, eleven sublabials, and, most peculiar, a single anterior temporal (l.c.: Fig. 7B). It displays about 78 prominent black transverse mid-dorsal blotches all along the trunk, the maxillary bears 14 teeth (wide diastema), the dentary 18, the hemipenis reaches the twelfth subcaudal (11%subc), and the *Musculus retractor penis magnus* inserts at subcaudal 32 (30%subc).

The rostral of CAS 120540 protrudes noticeably beyond the lower jaw (SCHÄTTI *et al.*, 2012: Fig. 7B and p. 467 [smallprint]) but the snout shape in both dorsal and lateral views does not allow for a distinction of *Platyceps karelini* from *P. rhodorachis*. Moreover, the rostral is wedged in conspicuously between the internasals (median suture compared to prefrontal length 0.47). Again, this configuration is subject to substantial variation in *karelini* and *rhodorachis*, resulting in variable proportions of the internasal against prefrontal length. It is, however, noteworthy to state that a projecting snout and/or a deeply wedged in rostral are observed in various examined hybrid racers (see preceding chapter: third smallprint).

The Khulm racer clearly differs from two male *Platyceps r. rhodorachis* from Balkh and adjacent Qonduz Province in fewer ventrals (221, n=1) and subcaudals (117–123, ZFMK 84787, 86744). Reservations regarding the hybrid nature of CAS 120540 emerge from the lack of comparative data for impeccable *P. k. karelini* from central N Afghanistan (see next). Furthermore, the occurrence of divided preoculars and a similar number



**Fig. 24.** *Platyiceps* cf. *mintonorum* FMNH 161075 (A) and SMF 62938 (B–C). *Platyiceps* spp. (unidentified racers) FMNH 109996 (D), and PMNH 1651 (E). Courtesy of Alan Resetar/FMNH (A, D) and Rafaqat Masroor/PMNH (E).

of dorsal blotches (68–88) are documented for genuine *k. karelini* from adjacent Tajikistan. The condition of the anterior temporal (one scale), however, has not been encountered among 88 examined specimens of this taxon from virtually the whole range, nor is it on record for *r. rhodorachis*.

Surprisingly, a single right anterior temporal is present in a recently studied racer from Mazar-i Sharif (Balkh, 36°43'N 67°07'E), roughly 50 km west of the origin of CAS 120540. This juvenile female (ZFMK 86746, Fig. 23C) resembles the latter in body scales (208 ventrals, 100 subcaudals) or the number of dorsal marks (ca. 72) and is peculiar for its exceedingly elongated head behind the nose opening (nostril-eye distance and frontal length against internasal-prefrontal length 1.16 and 2.60, resp.) or extremely broad contact between the preocular (entire) and the frontal. Compared with typical *Platyiceps k. karelini*, both north Afghan specimens do indeed look strange. In the absence of more material, we simply do

not know where to place these eye-catching and systematically suspicious racers. In order not to unduly strain the good faith and acceptance of the target audience, they are classified as *P. cf. k. karelini* until further clarification. In the following text, all data pertaining to Karelin's Racer applies to the nominotypical subspecies sensu SCHÄTTI *et al.* (2012).

Apart from CAS 120540, CAS-SU 13251, FMNH 161075, PMNH 2427–28, SMF 62938, and ZFMK 86746, three out of roughly one thousand specimens belonging to *Platyiceps* spp. examined by us over the years (or, on rare occasions, simply informed about) pend proper identification, namely one from Khorasan-e Razavi and two from NW Azad Jammu and Kashmir (Fig. 25). In the case of the latter racers, only selective data communicated to the senior author is available.

These Pakistani males (PMNH 1651 and 2477) from Chogali (34°26'N 73°45'E, Muzaffarabad District) and Parli Doarian (P. Doāriān, 34°44'N 74°00'E, Neelum)



between about 1,630 to over 2,000 m above sea level (see next smallprint), respectively, show an anterior subocular, 2+2 (PMNH 1651) or 2+3 temporals (lower first much larger than upper in both, with an additional small scale between the upper anterior temporal, upper postocular, and parietal in the former), eight supralabials (fourth and fifth entering eye), and nine (PMNH 1651) or ten sublabials. PMNH 2477 lacks the loreal. There are 204–208 ventrals, the tails are injured (> 101 paired subcaudals in PMNH 1651), and the dorsal scales arranged in 19-19-14 (PMNH 1651) or 19-19-15 rows along the body. The head displays a dark bar across the temples and another from the posterior lateral edge of the parietals to the angle of the mouth, and irregular marks on the posterior pileus. Both specimens have a pronouncedly barred dorsal colour pattern on the anterior trunk (PMNH 1651, Fig. 24E) or beyond midbody.

The ventral counts are within the range observed in five male *Platyceps r. rhodorachis* from Azad Jammu and Kashmir (n=2, incl. PMNH 1431 from Chogali) and adjacent Khyber Pakhtunkhwa (204–212) or another five from southern Chitral (Tab. 3) where an elevated number of dsr prior to the vent (15) is common (see Geographic Variation). The dorsal marking of PMNH 1651 and 2477, however, differs from these and geographically more distant cliff racer populations, and these specimens have fewer supralabials than *P. r. rhodorachis* (eight versus nine). Both highland racers undoubtedly belong to one and the same taxon. For the moment, we refrain from a formal description of a probably new species because some scale data was not verified by ourselves, the lack of information regarding various characters, little comparative material from northern Kashmir, and in view of astonishing regional variation of morphological features including dorsal colour pattern within *r. rhodorachis*. The taxon from Kashmir remains undesignated among the *P. rhodorachis* complex.

This brief description of PMNH 1651 and 2477 is based on data ascertained by Rafaqat Masroor and two photographs of each specimen showing their general aspect and left head view. Some character states (e.g., the absence of a loreal, number of temporals) rely on these photos; certain right side head scale conditions or the dsr reduction pattern (in particular detailed data for the preanal segment) are unknown and the number of ventrals possibly comprises preentrals. The dorsal marking of Kashmir *Platyceps r. rhodorachis* is different from what is found in PMNH 1651 (Fig. 24E) and 2477 (see Subspecies). A cliff racer from Chogali (PMNH 1431), the origin of PMNH 1651, agrees with *P. r. rhodorachis* in colour pattern and scale data (e.g., nine supralabials, 130 subcaudals, 19-19-13 dsr). Photographs of an additional specimen from Neelum (not preserved) confirm the transversely blotched dorsal pattern of this undescribed taxon. BAIG & RAFIQUE (2005) reported PMNH 1651 (as “*Coluber ladacensis*” no. “1650”, a *Gloydus himalayanus*, R. Masroor in litt.) from an “elevation of 2385 m” in Machiara National Park characterised by “temperate forest with thick conifer trees and shrubs, representing extremely mesic habitat.” The number of preoculars (“2”) includes the anterior subocular.

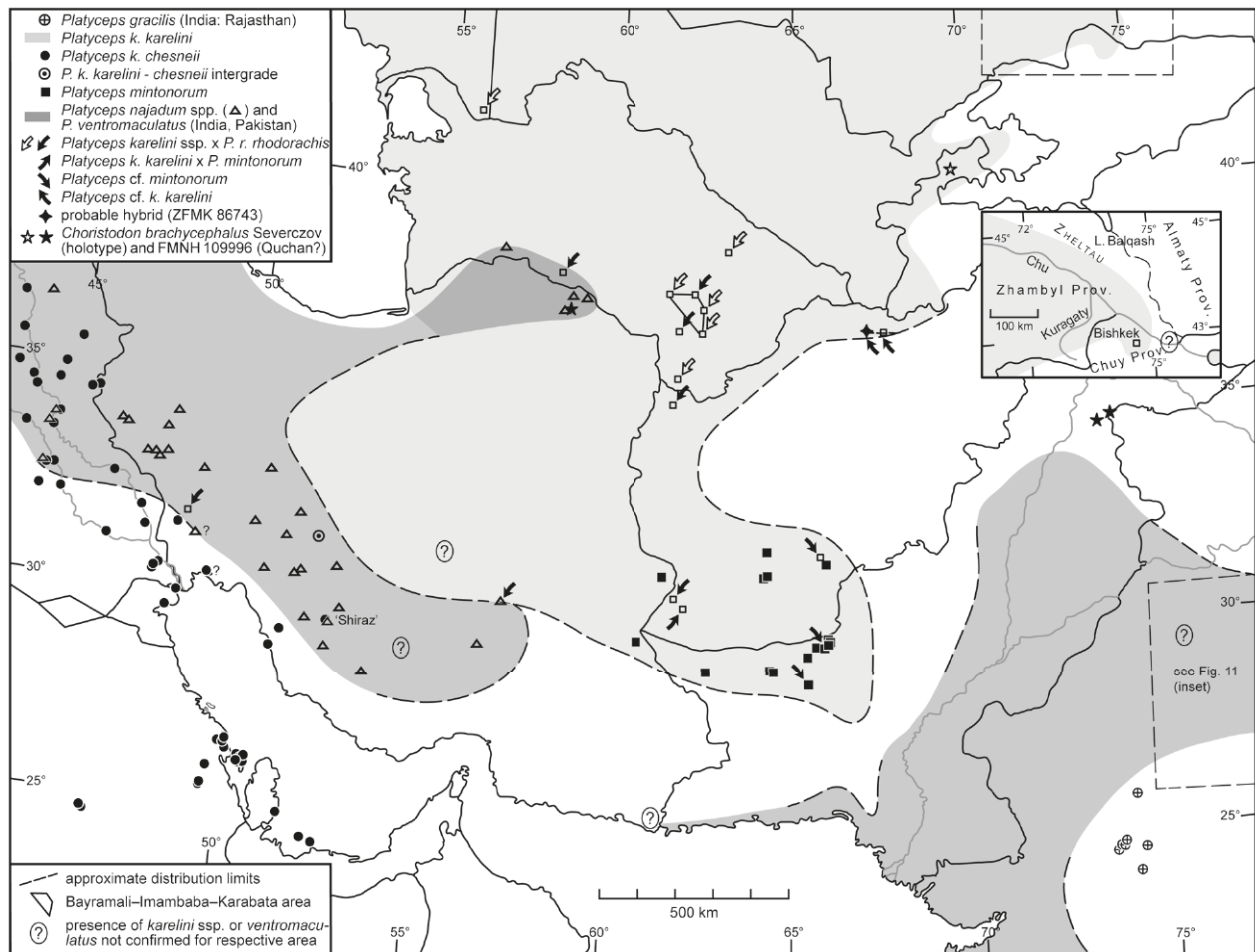
FMNH 109996, a large male racer (ca. 1,100 mm total length, tail versus body ratio ca. 0.36) reputedly from Quchan in NW Khorasan-e Razavi (37°06'N 58°31'E, leg. N. Ghaffary) conforms to *Platyceps r. rhodorachis*

from the Interior Basin (Figs 16–18, Tabs 2 and 4) in the number of ventrals (216) or dorsal scales (19-19-13 rows) but shows slightly fewer subcaudals (114/115), has a much lower sum of body scales, differs from geographically closer populations of cliff racers in more maxillary teeth (16), and the dorsal colour pattern including a conspicuous nuchal streak (Fig. 24D) is atypical of *P. r. rhodorachis* (see Distinction incl. fourth smallprint). For the time being, we do not know where to classify this individual due to its indicated origin but it definitely resembles *P. karelini chesneii*.

As stated in a letter by N. Ghaffary (Faculty of Medicine, University of Tehran) to Robert F. Inger dated 20<sup>th</sup> March 1960, FMNH 109996 (field no. 69) is from “Goochan (N.E. Iran)”. It was among a shipment of ten snakes (109991–110000 series) sent to the ‘Field Museum’ around that time. Except for the specimen in question, they had been obtained between Kerman, Bushehr, and Khvoy in Azarbaijan-e Sharqi (West A.). Quchan or Ghoochan is the name of various localities in Iran including a village in Chahar Mahall-ve Bakhtiari Province (32°39'N 50°50'E, ca. 1,925 m a.s.l.) roughly 70 km west of Esfahan. The head and body markings of FMNH 109996 are strongly reminiscent of *Platyceps karelini chesneii*, which occurs in that area (Fig. 25). Also, the ventral and subcaudal counts of the Quchan racer are very similar to those of three male *P. k. chesneii* (NMW 25466.1, SMF 61869–70: 214–217 ventrals, 109–116 subcaudals) from unspecified places in Iran as explained earlier (SCHÄTTI, 2006b: 685; SCHÄTTI *et al.*, 2012: 470). The anterior dsr reductions lay at ventrals 126 (left, rows 4+5), 128 (20-18 dsr, involving median rows), and 130 (right, 3+4); 13 dsr are attained between ventrals 155–158 at paravertebral level (6+7).

## Comparative Part

Natural history exploration in general has often been tied to geopolitical events but the proper identification of specific objects from these samplings, and amphibians or reptiles in particular, often remains a matter of controversy due to the absence of relevant published data for these collections or certain series and specimens, or lack of accessibility for study (see, e.g., Material: first smallprint, Southern Pakistani Racers). Besides tremendous confusion in early milestone works (e.g., GÜNTHER, 1858; BLANFORD, 1876) dealt with in a previous part of this study (Systematic Review), BOULENGER’S (1889, 1893) mix-up of *Platyceps rhodorachis* sensu stricto and *P. ventromaculatus* or his change of mind apropos the identity of BMNH 1886.9.21.104, in fact a hybrid racer, left an unfavourable aftermath for studies to come. In particular, it fostered the erroneous ideas that *P. ventromaculatus* was found in, for example, “Afghanistan” (Bezdz, Khorasan-e Razavi) or that striped specimens occurred among *P. k. karelini*. This, however, alongside problems with the distinction of these taxa, *P. mintonorum* sensu stricto, and *P. rhodorachis* (CHERNOV in LEVITON & ANDERSON, 1961) were minor issues compared to the mainly unsubstantiated views held by WALL (1914) and revitalised by KHAN (1997 etc.). They lumped together valid species on a larger scale and defined arbitrary “varieties”



**Fig. 25.** Distribution of congeneric species within the range of *Platyceps rhodorachis*, northernmost records of *P. gracilis*, and collecting sites of hybrids and provisionally assigned or unidentified racers. See text incl. last smallprint, Fig. 1, and Appendices (B, E) for further explanations and details.

or described new taxa, respectively, which resulted in serious repercussions upon the taxonomy and systematics of this already difficult racer compound (see Systematic Review, footnote 6, Subspecies, Southern Pakistani Racers, Distinction: last smallprint).

Up to the present day, the *Platyceps rhodorachis*-*ventromaculatus* complex continues to be an elaborate group mined with taxonomical pitfalls and riddled with preconceived judgements stemming from an era when a phenotypic species concept was the yardstick of systematic research. As far as the geographic scope of this study is concerned, viz. from the Tigris to Turan, the western Tien Shan and the Pamir, and western Nepal, and apart from actual or possible confusion with *Zamenis gracilis* GÜNTHER, 1862 in western India (see Distinction: last smallprint, Affinities), reports of *P. rhodorachis* and *ventromaculatus* auct. (mostly as *Zamenis* ["*ventrimaculatus*"] or *Coluber* auct.) consist of various valid species including *karelini*, *mintonorum*, *noeli*, *najadum* (BOETTGER, 1899; NIKOLSKII, 1900, 1905, 1916; TERENTJEV & CHERNOV, 1936), or *sindhensis* as well as hybrids between *karelini* and *rhodorachis*, a taxon from the systematical haze around *mintonorum*, and unidentified racers. This conjunction nurtured the ever-present disarray and led to enduring chaos.

## Sympatry

Nine taxa belonging to six congeneric species share part of their distribution ranges with *Platyceps r. rhodorachis* sensu stricto (Figs 15, 20 and 25), viz. *P. karelini chesneii* and *P. najadum* ssp. (2) in western and southwestern Iran, *P. n. atayevi* in the Saivan Valley (Kopetdag), *P. k. karelini* from Iran to the Lake Balqash area and Baluchistan, two endemics of the latter region (*P. mintonorum*, *P. noeli*), *P. sindhensis* from the southern Indus Plain as well as *P. ventromaculatus* in parts of Pakistan. No other racer co-exists with *P. r. ladacensis*.

*Platyceps najadum* is distributed from the northern Adria coast to the Greater Caucasus and the Kopetdag Region, south through Lebanon and Mesopotamia into western and northern Iran, and along the southern Zagros to Kerman Province. The nominotypical subspecies attains altitudes nearing 3,000 m above sea level in Dagestan and Azerbajdzhan. The Zagros endemic *P. n. schmidtleri* is recorded from clearly over 2,000 m (Appendix E). With the exception of the northern border sector from Azarbayjan-e Sharqi (West A.) to Gilan, Iranian populations of *najadum* are situated within the geographic range of *r. rhodorachis* (see Ecology: first smallprint).

Both species also occur in contiguous Iraq (see Kurdish Cliff Racer). *P. najadum* ssp. are sympatric with *karelini chesneii* in low-lying zones of Kurdistan (Iraq, see next but one smallprint) and Mesopotamia (except the south) into western Iran, and with *k. karelini* in NE Iran and adjacent Turkmenistan.

*Platyceps n. najadum* (EICHWALD, 1831), *P. n. atayevi* (TUNJIEV & SHAMMAKOV, 1993), and *P. n. schmidtleri* (SCHÄTTI & MCCARTHY, 2001) are found within the area under consideration<sup>10)</sup>. *P. n. al-bitemporalis* DAREVSKIJ & ORLOV, 1994 from the Hyrcanian Forest ecozone of SE Azerbajdzhan and probably nearby Iran (Ardabil, Gilan) is extralimital to this study. Populations of *P. najadum* from south of 34°N latitude east of the Karkheh (Zagros Range) are referred to Schmidtler's Racer. According to FATHINIA *et al.* (2010), specimens from Ilam belong to Eichwald's Racer (viz. nominotypical subspecies). Reports of *najadum* from Ahvaz near sea level and the vicinity of Kerman (LATIFI, 1985) are in need of confirmation. The distribution limit in southern Iraq is poorly documented and the farthest record in SCHÄTTI *et al.* (2005: Abb. 7, Al-Hindiya) is mapped one degree latitude too far south.<sup>9)</sup>

*Platyceps karelini chesneii* from SE Anatolia to SW Iran (up to near 2,200 m in N Fars) may encroach farther east along the southern Zagros and the foothills inland of the Gulf littoral. It is sympatric with *P. r. rhodorachis* all over its Iranian range. On the Central Plateau, *k. chesneii* is replaced by the nominotypical subspecies. The latter extends to Baluchistan (up to 2,000 m in the Urak Valley, Pakistan) and is confirmed for the western and southern limitrophe provinces of Afghanistan and along the northern border regions into SW Tajikistan (Kafirnigan drainage system, see Incertae Sedis). *P. k. karelini* occurs virtually throughout Uzbekistan, except at higher altitudes or in the eastern Fergana Valley, and also lives in contiguous Sughd (Tajikistan). The corroborated northern distribution limit runs from the Chu (Chuy) Valley in Kyrgyzstan across southern Kazakhstan to the northeastern Caspian littoral.

AFRASIAB & MOHAMAD (2011) are probably correct that "the distribution of *P. ventromaculatus* (Gray, 1834) [viz. *Platyceps karelini*

*chesneii*] does not reach the mountain regions of Kurdistan." Peripheral collecting sites in NE Iraq are Mosul (ca. 230 m, NMW 25452.1–2) and the Chemchamal area (FMNH 74633–37) at ca. 700 m altitude (Fig. 25, Appendix E). Surprisingly, FATHINIA *et al.* (2010) did not report Chesney's Racer from Ilam, despite its presence in the Kermanshah-As-Sulaymaniyah frontier sector to the north and Shaykh Saad (BOULENGER, 1920) roughly 50 km from the Ilam border (see also Distribution: first smallprint). A *P. k. karelini* – *chesneii* intergrade from "Schiraz" (NMW 25446.7) is not mapped because the destroyed MSNM syntype of *Zamenis persicus* JAN with identical vague origin was a typical *k. chesneii* (see first smallprints in Systematic Review and Distinction, Fig. 25, SCHÄTTI *et al.*, 2012: footnote 10). SCHÄTTI's (2006b) allegation of this racer from Golestan and NW Khorasan-e Razavi is incorrect (see Systematic Review, Incertae Sedis). According to ATAJEV *et al.* (1994), *k. karelini* is "very rare" in the southern foothills of the central and eastern Kopetdag (see remarks under Hybrids incl. last smallprint), and no collecting sites are indicated for contiguous Khorasan-e Shomali. TEREJTJEV & CHERNOV (1949: 243, map 29) noted Karelin's Racer from near Qaydaq Bay (northeast Caspian Sea) at about 45°30'N latitude in Kazakhstan. BANNIKOV *et al.* (1977: map 114) plotted a collecting site east of Aralsk (46°48'N 61°40'E) and draw the distribution limit near 47°N latitude north of the former shores of the Aral Sea. *P. k. karelini* is recorded from the western Betpaqkala grassland (45°48'N 67°20'E, DUISSEBAJEVA *et al.*, 2010) and found eastward to probably less than 100 km from the southern tip of Lake Balqash (Mt. Dzhambul, Zheltau), at about 74°E longitude in SE Zhambyl (PARASKIV, 1956; BRUSHKO, 1983), and along the Chu (Shu) drainage system including the Kuragaty into adjacent Kyrgyzstan (Chuy Province, Fig. 25: inset, Appendix E). There as well as in Kazakhstan, *k. karelini* possibly extends farther east. The range in Afghanistan is poorly documented and may comprise more inland areas (e.g., Ghor and Sar-e Pol Provinces) than shown on our map (Fig. 25). Actually, confirmation for Nimruz relies upon crossbreeds with *mintonorum* (BMNH 1886.9.21.101) and *r. rhodorachis* (BMNH 1873.1.7.10). In Pakistan, KHAN (1997, 2006) reported Karelin's Racer as far east as the vicinity of Zhob (ca. 31°20'N 69°27'E) and the Sulaiman Range (see Systematic Review, SCHÄTTI *et al.*, 2012: 460).

*Platyceps k. karelini* is sympatric with four congenics including *P. mintonorum* and *noeli* in Baluchistan (see below) and *r. rhodorachis* within its southern distribution range. In NE Iran (Golestan, NW Khorasan-e Razavi, Semnan), *k. karelini* is recorded from the same general area as *n. najadum*. Farther to the west and south (*najadum schmidtleri*), these species may largely be parapatric. Karelin's Racer prefers flat or undulating open country such as stony plains covered with low bushes or sandy terrain including dunes with patches of gravel and only scattered vegetation (see Hybrids). At all events, the distribution of *karelini* ssp. and *n. schmidtleri* along the western periphery of the Central Plateau and in the southern Zagros (*k. chesneii*, see Fig. 25) is unclear and specific investigation is necessary to establish their boundaries, possible zones of contact, and ecological segregation. Surprisingly, there seems not to be any explicit published record of Karelin's Racer from W Yazd to Sistan-ve Baluchestan except the Kerman hybrid (BMNH 1874.11.25.10, Appendix E).

Mentions of *Zamenis "karelinii"* [sic] from "Seistan" (ANNANDALE, 1906) and *Z. "ventrimaculatus"* [sic] from Nimruz may refer to, or at least include, *Platyceps mintonorum* (see Southern Pakistani Racers, Fig. 10). The latter appears to be restricted to northern Baluchistan but records are lacking for the Dasht-e Margow north of the

<sup>10)</sup> *Coluber atayevi* TUNJIEV & SHAMMAKOV is characterised by a high percentage of paired upper anterior temporals, peculiarities in the inframaxillary region, and lower ventral and subcaudals counts than in adjacent populations of the nominotypical subspecies, viz. Eichwald's Racer (SCHÄTTI, 2004; SCHÄTTI *et al.*, 2005). Atajev's Racer is only confirmed for the vicinity of the type locality on the Saivan-Nokhur Plateau. RUSTAMOV & SOPYEV's (1994) reports of this "rare endemic snake of Central Kopetdag" (as "*Coluber atayevi* [sic] N. sp. (in litt.)") from "the Sulyukli spring on Mount Dushak, Firyuza Valley, Kuchan highway, and to the south of Ashkhabad" rely upon mentions in literature. Most of these specimens are lost (ANANJEVA & ORLOV, 1977) and SCHÄTTI *et al.* (2005) assigned all to *Platyceps n. najadum*. SHAMMAKOV *et al.* (2008: Tab.) indicated "*C.[oluber] atayewi*" [sic] for the Kopetdag ("Kupetdag") and Syunt-Hasardag ("Sünt-Hasardag") Nature Reserve centering around Mt. Syunt (38°31'N 56°24'E) northeast of Garrygala in SE Balkan Province (see also, e.g., GEOKBATYROVA, 2012). RASTEGAR-POUYANI *et al.* (2008) enumerated *P. n. atayevi* in their checklist ("occurs in the Kopet Dag, Turkmenistan and probably adjoining Iran").



Helmand River in Nimruz (based on hybrid, Fig. 25). In Afghanistan, this psammophile racer has been collected from about 680 m in Chagai (Nok Kundi) to around 1,000 m southeast of Kandahar (Appendix E). According to LATIFI (1985–2000), it occurs between roughly 480–1,350 m in NE Sistan-ve Baluchestan (see MINTON, 1966: 123). *P. mintonorum* and *k. karelini* are recorded from Chah Anjir and the vicinity of Kandahar. Close to this town, near Dalbandin (PMNH 771) as well as probably in the Chagai Hills and elsewhere in Pakistan, Minton's Racer co-exists with *r. rhodorachis* (Figs 15 and 25). The reported sympatry between these species in the Nushki area (MERTENS, 1969) relies on *noeli* (see Southern Pakistani Racers, Incertae Sedis). The ecological parameters segregating *k. karelini*, *mintonorum*, and *r. rhodorachis* in their respective contact zones are poorly understood.

*Platyceps noeli* from the northeast Baluch highlands (Pakistan) and *P. r. rhodorachis* may be segregated by altitude but records of *rhodorachis* auct. from Hanna and Spin Karez (WALL, 1911a; Fig. 20: inset), if not entirely based upon the Brahui Racer (♀♀), argue for the presence of three *Platyceps* spp. in the Urak Valley including *k. karelini* (see Morphology and Distribution).

*Platyceps sindhensis* and *P. r. rhodorachis* are found in the same general area from Lasbela to SW Sindh (Fig. 20, see Comparison and Distribution). The "Cholisthan" record of *rhodorachis* (BAIG *et al.*, 2008) likely belongs to *ventromaculatus* or includes *sindhensis*. These lowland species are supposed to be sympatric throughout most of the latter's distribution range (Sindh and limitrophe Baluchistan, probably SE Punjab). Both species have been collected, for instance, along the Gaj River (Appendix E).

*Platyceps ventromaculatus* is documented from the Iran-Pakistan border (Gwadar) across the Baluch coast to the Indus, north to central Khyber Pakhtunkhwa (approx. 34°N latitude) and the Islamabad area, possibly encroaches upon southern Azad Jammu and Kashmir, and ranges all over Punjab and Sindh into Gujarat, Rajasthan, certainly farther north, and east to Uttar Pradesh and adjacent Nepal (fide SHRESTHA, 2001) at altitudes lower than about 600 m a.s.l. (see next paragraph and Appendix E). *P. ventromaculatus* and *r. rhodorachis* live alongside each other in a narrow strip from the Makran littoral to the Indus. They seem to have mutually excluding ranges in the remaining Lower Indus Valley except beyond approximately 31°N latitude in Punjab (see Distribution). MINTON (1966) recorded "[r]esting individuals" of Gray's Racer "under stones and in euphorbia mounds" and noted that "[n]ear Karachi, both *rhodorachis* and *ventromaculatus* [sic] are common and sympatric although somewhat segregated ecologically" (l.c.: 123). The latter inhabits "sparse grassland or clay or sandy desert with scrubby vegetation." In Jhelum District, *r. rhodorachis* is "common in the hilly tracts of the area [with bushes and grass], while *C.[oluber] ventromaculatus* is very rare" (KHAN & BAIG, 1988: 159–160). The few remarks regarding the latter species in India (e.g., KOUL & MURPHY, 1979; WHITAKER & CAPTAIN, 2004) rely on MINTON's (1966) observations (see next smallprint).

Despite the almost complete absence of precise collecting sites for *Platyceps ventromaculatus* from low-lying northwestern India, we regard this species and *P. r. rhodorachis* to be largely parapatric (Figs 11, 15 and 25). The presumed distribution limit of *ventromaculatus* from the Jammu region to Himachal Pradesh, inferred from its Pakistani range and ecological parameters (in the first place altitude), is expected to follow the western Sivalik Range, cross the Sutlej at roughly 31°30'N latitude in the Bhakra Dam area (Himachal Pradesh), and run through southern Uttarakhand into northern Uttar Pradesh. The reported presence of both species in Nepal's Chitwan area is subject to proof (see Distribution: last smallprint).

The mention of *Platyceps "ventimaculatus"* [sic] in "Greater Khorassan" [sic] ("Rare") by DARVISH & RASTEGAR-POUYANI (2012: Tab. 1) is due to confusion. Also, the photographed "*ventromaculatus*" from Khorasan-e Razavi in YOUSEFKHANI *et al.* (2014: Fig. 3C) is a non-striped *P. rhodorachis*. KHAN (1982) reported the species "up to an elevation of 185 meters" in Pakistan. His comments pertaining to the favoured habitats of "*rhodorachis ladacensis*" ("preference for cliffs and rocky [sic] areas", see first paragraph under Ecology) and "*ventromaculatus*" [sic] ("inhabits spare grassland, clay or sandy desert with scrubby vegetation") are plagiarised. Gray's Racer may penetrate as far west as the foothills of the Sulaiman Range and, to the north, reach the periphery of the Indus Plain in Bhimbar (Bhimber) and Mirpur Districts (Azad Jammu and Kashmir) as implied by a record from Jhelum (ca. 32°56'N 73°44'E, see above). RAIS *et al.* (2012) indicate only *P. ventromaculatus* for N Punjab (Chakwal, Islamabad, Rawalpindi). We doubt the co-existence of *rhodorachis* (noted, e.g., in "subtropical pine forest") and *ventromaculatus* (incl. "cultivated land") in "higher altitude degraded forest and ridges" and "subtropical semi-evergreen forest" of the Islamabad area (Margalla Hills, MASROOR, 2012: Figs 5–9, Tab. 1). The lack of distribution data from northwestern India is evocative of the situation outlined for cliff racers in mountainous northern Pakistan and India (see Subspecies). The occurrence of *ventromaculatus* in Indian Punjab is confirmed (AMNH 2859, SCHÄTTI & SCHMITZ, 2006) but not a single specified and reliable collecting site has been reported from this state, Haryana, or low-lying southern Kashmir (Jammu region) and Himachal Pradesh (Fig. 25, see last smallprint under Distribution regarding SAHI & DUDA, 1985). The putative presence around Simla (Subathu, SCLATER, 1891a–b) relies on BLANFORD's (1875) erroneous identification of the juvenile holotype of *P. semifasciatus* BLYTH (see Taxonomy and Type Material). WALL's (1914) "*Zamenis ventrimaculatus*" from the "Western Himalayas" is comprised of *r. rhodorachis* from above 1,500 m in Himachal Pradesh and Uttarakhand and *r. ladacensis* (see Systematic Review: third smallprint, Subspecies: second smallprint). WHITAKER & CAPTAIN (2004) correctly doubted the occurrence of *ventromaculatus* near Almora ("need to be confirmed as this species is not a highland form"). Apart from these montane populations, which most probably belong to *r. rhodorachis*, SCHÄTTI & SCHMITZ (2006: Fig. 3) were reluctant to take into consideration various mentions of "*ventromaculatus*" including sight reports from southern Uttarakhand due to the lack of morphological data and altitude. Waltner's (1974) indication up to about 1,850 m ("6,000 feet") in the "W. Himalayas" is based on SWAN (1947) and the compilation in SWAN & LEVITON (1962: Tab. 1), viz. unreliable literature records (see Distribution: last smallprint). CHOPRA (1979) and HUSAIN & RAY (1995) listed Gray's and Jan's Cliff Racer from unspecified localities in Corbett National Park attaining over 1,000 m and, respectively, the "[p]lains to 1800m" in Nainital and Pauri Garhwal Districts; at least the highland popula-

tions are *r. rhodorachis* (Fig. 11, see chresonymy for details). However, the presence of *ventromaculatus* around Bijrani or Khinanauli (Corbett N. P.) and, for instance, in the “Rajaji National Park” (ca. 30°05'N 78°10'E, 300–1,350 m) is deemed likely (LAMBA, 1987; HUSAIN & TILAK, 1995; Appendix E), and the situation in southern Uttarakhand merits special attention. NARAYANAN & SATYANARAYAN (2012) corroborated Gray's Racer for the Delhi area. SHRESTHA (2001) mentions “*ventramaculatus*” [sic] from “dense Sal forest as well as grassland of Chitwan valley in Nepal and India (central, hilly region of U.P. and Maharastra [sic]).” However, this species is not part of the Nepalese herpetofauna according to KÄSTLE *et al.* (2013). SHARMA (2000) indicated *ventromaculatus* south to Val-sad (20°38'N 72°56'E) and The Dangs in SE Gujarat (see VYAS, 2001). Literature records from western peninsular India mapped by SCHÄTTI & SCHMITZ (2006) are in need of confirmation (see last smallprint in following chapter).

## Distinction

Although *Platyceps rhodorachis* sensu stricto displays remarkable regional differences in head shield proportions, body scales, dorsal colour pattern, or dentition (see descriptive sections, Geographic Variation, Figs 2–5 and 16–18, Tabs 1–4), it can be distinguished by external morphological characters from the partly sympatric *P. karelini*, *P. mintonorum*, *P. najadum*, *P. sindhensis*, and *P. ventromaculatus* or the possibly co-existing *P. noeli*. The striped phenotype of *P. r. rhodorachis* is unique within *Platyceps* spp. dealt with herein and the identification of typical specimens is trivial.

*Platyceps najadum*, a species confused earlier with *P. rhodorachis* in the western spur of the Kopetdag and eastern Iran, is distinct from all congeneric taxa except *P. collaris* (MÜLLER, 1878) in having single instead of paired apical pits<sup>11)</sup>. *P. najadum* ssp. from Mesopotamia through Iran to Turkmenistan mostly have eight supralabials (SCHÄTTI *et al.*, 2005) and the dorsal colour pattern consists only of a few transverse nuchal bands (often just a single collar) and/or bars along the flanks of the neck. These features distinguish *P. najadum* from sympatric congeners including *P. karelini chesneii*. Also, Eichwald's Racer differs vis-à-vis *P. cf. r. rhodorachis* (Kurdish Cliff Racer) in the number of body scales, viz. fewer than 240 ventrals and 140 subcaudals (SCHÄTTI *et al.*, 2005: Abb. 1–2). Compared to all taxa treated in this chapter, *P. n. schmidtleri* can be recognised by fewer (17, sometimes 15) dsr on the anterior trunk and at midbody.

The following selection of illustrations facilitates identification of the racer taxa discussed herein except those treated in preceding parts (*Platyceps noeli*, *P. sindhensis*, *P. rhodorachis* ssp., Figs 2–5, 12, 19 and 21, see chresonymies for further photographs; we are not aware of any images of *P. r. ladacensis* sensu stricto other than those presented in Figs 12B–C). The reader is referred to the cor-

responding chapters regarding hybrids (*P. k. karelini* × *P. mintonorum*, *P. karelini* ssp. × *P. r. rhodorachis*, Figs 22 and 23A–B), provisionally assigned or unidentified racers (Figs 23C–D and 24), and Indian congeners (*bholanathi*, *gracilis*) covered at the end of this study. *P. k. karelini*: STRAUCH, 1873: Taf. III; NILSON & ANDRÉN, 1981: Abb. 9; KHAN, 2002: Figs 41–43; SCHÄTTI *et al.*, 2012: Figs 1–2, 9A, 10A; SINDACO *et al.*, 2013: photos 134–136. *P. k. chesneii*: JAN & SORDELLI, 1867: Pl. II.1 (destroyed syntype of *Zamenis persicus* JAN); LEVITON *et al.*, 1992: Pl. 15F; KHAN, 1993: Fig. 19 (“*Coluber karelini*”, also in KHAN, 1997: Fig. 3, and 2006: Pl. 123); SCHÄTTI, 2006b: Pl. 1; EGAN, 2007: photos [p. 71]; AFRASIAB & MOHAMAD, 2011: Fig. 2 (left photo); AMR & DISI, 2011: Fig. 72; SCHÄTTI *et al.*, 2012: Figs 9B–C, 10B–C. *P. mintonorum*: MINTON, 1966: Pl. 24.2; MERTENS, 1969: Abb. 17 (holotype); KHAN, 1993: Fig. 22 (“*Coluber rhodorachis*”, also in KHAN, 2002: Fig. 64, mirror-inverted); SCHÄTTI & STUTZ, 2005: Pl. 1. *P. n. najadum*: CORKILL, 1932: Pl. V; RAJ, 1965: Pl. III.1–3; LATIFI, 1985 (1991): Pl. 14 (Fig. 36); SCHÄTTI *et al.*, 2005: Taf. 1 (upper photo); FATHINIA *et al.*, 2010: Fig. 3c. *P. n. schmidtleri*: SCHÄTTI & MCCARTHY, 2001: Figs 1–3; SCHÄTTI *et al.*, 2005: Taf. 1 (lower photo). *P. ventromaculatus*: WALL, 1914: Pl. XXII.3–4; MINTON, 1966: Pl. 24.1; LEVITON *et al.*, 1992: Pl. 15H; KHAN, 2002: Fig. 67; WHITAKER & CAPTAIN, 2004: unnumb. Pl. (p. 135); KHAN, 2006: Pls 136A–B; SCHÄTTI & SCHMITZ, 2006: Fig. 1; AGARWAL, 2010: photo [p. 46]; MASROOR, 2012: Figs 85A–B; NARAYANAN & SATYANARAYAN, 2012: Figs 2–5.

*Platyceps karelini chesneii* can be easily identified by the presence of a nuchal streak and transverse blotches throughout the trunk. Except in the Ahvaz area, it also differs from *P. cf. r. rhodorachis* (NE Iraq) and cliff racer populations from west of the Zagros main ridge to Bush-eher and southern Fars in fewer ventrals ( $\leq 217$  versus  $\geq 222$ ) and subcaudals ( $\leq 116$  vs.  $\geq 125$ ); the sum thereof in *k. chesneii* from northern Iraq and Iran is 280–333 (SCHÄTTI, 2006b: Tab. 1; SCHÄTTI *et al.*, 2012) compared to at least 343 in *r. rhodorachis* BMNH 1869.8.28.127 (see Figs 16–18, Tab. 2). All three examined cliff racers from the Ahvaz Plain have a vertebral stripe but show only slightly more total body scales, viz. 317–323 versus fewer than 320 in *k. chesneii* with verified origins from Kermanshah to Bushehr and Fars (see Geographic Variation incl. sixth smallprint, penultimate paragraph under Hybrids, Incertae Sedis: last smallprint).

*Platyceps k. karelini* features a postsubocular, viz. a single (normally fifth) supralabial enters the eye, a condition separating it from all racer taxa discussed in this study except *P. mintonorum*. Apart from prominent dark slanted subocular and temporal streaks (pileus usually without markings), the colour pattern made up of dark cross-bands down the whole trunk and onto the tail base distinguishes Karelín's Racer from any sympatric *Platyceps* spp. including *noeli* (e.g., “Die breiten schwarzen Querbinden, namentlich in der vorderen Rumpfhälfte machen diese Art sehr auffällig”, WERNER, 1936). *P. k. karelini* from Iran to Pakistan, Afghanistan, and southern Tajikistan show consistently lower body scale counts (192–218 or fewer ventrals, 85–117 or fewer subcaudals, sum 286–331 or fewer) than sympatric populations of *r. rhodorachis* (Figs 16–18, Tab. 2, SCHÄTTI *et al.*, 2012: Tab. 3).

Data for new material from the Karakum in SE Turkmenistan with an elevated number of body scales (see last smallprint under Hybrids regarding CAS 179543) highlights the need for an in depth study of northeastern populations of Karelín's Racer. BOGDANOV'S (1962) “229” ventrals for *Platyceps k. karelini* is possibly in er-

<sup>11)</sup> The only exception pertaining to the number of apical pits within *Platyceps najadum* is the holotype of *P. n. schmidtleri* (FMNH 170927) from Yasuj in ‘Boyerahmad’ (see Taxonomy and Type Material regarding reputed condition in type[s] of *Gonyosoma dorsale* ANDERSON). As far as detectable, they are paired on the anterior trunk and single towards midbody and behind (SCHÄTTI & MCCARTHY, 2001).

ror (220?) and as much as 119 subcaudals reported by the same author (1960, 1962) may originate from eastern Turkmenistan. The absence of a postsubocular is not uncommon in *P. mintonorum* (see Incertae Sedis: second smallprint) and the occasional presence of this scale is documented for *r. rhodorachis* from Khuzestan (FMNH 171133), the Baluchistan Region, Pakistani Punjab (KHAN, 1977), Kabul (CAS 147425), and Himachal Pradesh (see Pholidosis incl. second smallprint). Out of 36 southern *k. karelini* with pertinent data available (incl. AMNH 161990, CAS 228726, MZLU 3224), 43% possess a presubocular (see next smallprint regarding *mintonorum*) and median reductions are frequently observed in this area (incl. additional AMNH and CAS specimens, SCHÄTTI *et al.*, 2012: Tabs 1–2). The occurrence of a presubocular is uncommon in northern populations of Karelin's Racer (l.c.: 454). The major retractor muscle of the hemipenis in *karelini* ssp. inserts more distal (subcaudals 29–39, 28–38%subc) than in *rhodorachis*.

Although originally described as a subspecies of *Platyceps karelini*, *P. mintonorum* (as 'Variegated Sand Racer' or "*Coluber* sp.") and Karelin's Racer "are quite different in pattern and in ventral and subcaudal counts" (MINTON, 1966). Sympatric *k. karelini* (BMNH 1882.3.20.2, CAS 84634–36, MNHN 8722 and 1999.8160 [hybrids with *r. rhodorachis*?], SMF 64629, SMNS 2381) have 196–212 ventrals and 92–105 subcaudals compared to clearly more in *mintonorum* (Incertae Sedis: second smallprint). The number of these scales also separates the latter from the parapatric *noeli* and the allopatric *ventromaculatus*.

MINTON (1966) considered the 'Variegated Sand Racer' to be distinct from *Platyceps karelini*, *P. rhodorachis*, and *P. ventromaculatus* "in the regular presence of a third preocular, high ventral count, and body pattern." His remark apropos the number of anterior scales in contact with the eye is due to terminology (SCHÄTTI & STUTZ, 2005 incl. footnote 3; SCHÄTTI *et al.*, 2012: smallprint p. 447). *P. mintonorum* is a morphologically plastic species (see preceding smallprint and Incertae Sedis: second smallprint). It often shows divided preoculars (57%, mean 1.57) whereas this scale is entire in *k. karelini* from Iran to Pakistan and northern populations except in a few specimens (l.c.: 467, Fig. 4D), *noeli*, and almost all examined *r. rhodorachis* or *ventromaculatus* (rarely divided). Furthermore, a presubocular is usually absent in *mintonorum*. MERTENS (1969: 59) regarded this species and Gray's Racer as very similar due to their general habitus ("*ventromaculatus* [...] erinnert [...] in der äußeren Erscheinung ebenfalls sehr an *mintonorum*"). They differ in, for example, dorsal colour pattern and body scales, viz. the higher number of ventrals, subcaudals in females (113–127), and sum thereof for *mintonorum* (Incertae Sedis: second smallprint). *P. ventromaculatus* has 193–218 ventrals (♂♂ 193–209, ♀♀ 199–218), 97–125 subcaudals (106–125 [usually ≤ 121], 97–114), and a sum of 297–331 (304–331, 297–327). A postsubocular occurs in about 10%. Data is based on SCHÄTTI & SCHMITZ (2006), additional Pakistani material studied since (BMNH 1879.8.15.27 [SCHÄTTI *et al.*, 2012: footnote 9], ZMB 9957, ZSM 222.1989) and counts for PMNH 116, 498, 966, 970, 1315, 1523, 1919, 1925, 2038, 2143, and 2385 provided by Rafiqat Masroor.

MERTENS (1969) correctly drew attention to the stronger degeneration of the dorsal markings in *Platyceps r. rhodorachis* compared with *P. mintonorum* ("In der Färbung und Zeichnung neigt *rhodorachis* entschieden mehr zu einer Rückbildung der Zeichnungselemente"). Although it is true that these taxa can usually be distinguished by their dorsal colour pattern, there is no fundamental difference as exemplified by USNM 52141 (Fig. 5C) and some *mintonorum*; neither do the shape of the snout nor

the condition of the postsubocular allow for a positive identification (see Colour Pattern, first and second smallprints in this chapter). Body scale data, however, reliably separates the taxa. Two male *r. rhodorachis* from Chagai (PMNH 770, 771) have far higher counts than encountered in any *mintonorum* (Geographic Variation: first smallprint, Incertae Sedis: second smallprint). CAS 115970 and FMNH 171788 (♂♂) from Kandahar show 132–137 subcaudals (219–227 ventrals, sum 351–364) compared to two *mintonorum* from the same area (CAS 120716–17, ♂♀) with 110–125 (226–234 and 336–358, resp.), and *r. rhodorachis* CAS 147427 (♂) from Helmand or a possibly parapatric "Quetta" female (USNM 52141, Fig. 5C) have more scales (133–142) than *mintonorum* from Helmand Province through Chagai into Kharan and Nushki Districts (♂♂ 114–122, ♀♀ 113–127). These species overlap only slightly in rostral shield proportions, viz. 1.25–1.66 wider than high in *mintonorum* versus 1.62–2.00 in three *r. rhodorachis* (CAS 115970, 147427, FMNH 171788) from the area of sympatry.

*Platyceps sindhensis* differs from the partly sympatric *P. ventromaculatus* in far more body scales (see Sindh Racer and preceding smallprint) as well as colour pattern including the neck (devoid of markings posteriorly, absence of nuchal streak). The former species tends to have fewer dorsals prior to the vent, viz. 11 dsr along a portion of the posterior trunk (three out of five cases) versus 13 or sometimes 15 dsr in *ventromaculatus*. The distinction of *sindhensis* from *r. rhodorachis* is detailed elsewhere (Comparison and Distribution, see Identification Key below).

MINTON (1962: 17) emphasised that *Platyceps ventromaculatus* differs from *P. rhodorachis* in the presence of a "short vertebral dark stripe" on the neck and "dark cross bars or rhombs" instead of "small, dark spots" down the dorsum. MERTENS (1969) confirmed these distinctive features and noted a much fainter, or absent, head pattern and less pronounced transverse dorsal blotches in Jan's Cliff Racer ("eine wenig deutliche oder fehlende Kopfzeichnung, niemals einen länglichen Nuchalfleck und weit kleinere und sich wenig von der Grundfarbe abhebende Querflecken auf dem Rücken"). Indeed, the patterned phenotype of *r. rhodorachis* and *ventromaculatus* are easily separable by the absence versus presence of a nuchal streak (e.g., LEVITON *et al.*, 1992: 89, Figs C–D), shape and configuration of the dorsal markings, and their fading on the posterior trunk in *r. rhodorachis* (last quarter or so devoid of pattern in sympatric populations and SE Iran).

The occurrence of a nuchal streak is definitely rare in *Platyceps rhodorachis*. Apart from a presumed hybrid with Chesney's Racer and a photographic record from the border area with Iraq, this feature has only been observed in three specimens from the latter country (out of a total of four females with data available, see Kurdish Cliff Racer) and a juvenile from Kabul (see Colour Pattern: first smallprint). With the exception of AMNH 2859 (see next smallprint), all examined *P. ventromaculatus* as well as illustrated animals in literature (see first smallprint in this chapter) show a nuchal streak. To clarify that issue once again, *rhodorachis* and



*ventromaculatus* cannot be distinguished by the eponymous presence of a dotted venter in the latter species (see Colour Pattern, Samples and Characters incl. last smallprint).

MERTENS (1969) stressed a disparity in the number of total body scales between *Platyceps r. rhodorachis* and *P. ventromaculatus* (“309–326” in the latter, see Systematic Review: sixth smallprint). As a matter of fact, *r. rhodorachis* from the area of sympatry, viz. the Makran coast to Thatta District and from northern Punjab to low-lying central Khyber Pakhtunkhwa (Indus Valley), have more subcaudals (127–142,  $\geq 125$  in literature) and total scales (338–370) than *ventromaculatus* in general (see third smallprint in this chapter). Limited data for Indian *r. rhodorachis* also argues for discrepancy in these characters and ventral scales as well. Moreover, the relative longitudinal position of the third dorsal reduction (15–13 dsr) separates sympatric Pakistani male *r. rhodorachis* (63–70%ven, Tab. 4) and *ventromaculatus* (74–86%), and female data overlaps only slightly (63–71% in group I and 77% in SMF 57308 from Khyber Pakhtunkhwa versus  $\geq 75\%$ , resp.).

Subcaudal and total body scale counts for Pakistani *Platyceps rhodorachis* are based on SMF 57304 from the Makran littoral, thirteen specimens of group I (Figs 17–18, Tab. 2), SMF 57308 (Haripur), and literature records from Makran (SHOCKLEY, 1949) and Punjab (see Subspecies incl. last smallprint). Our data for Indian *P. ventromaculatus* except a much higher subcaudal count (124) for a Punjab male (AMNH 2859: 197 ventrals, features a collar) is from BMNH 1891.9.11.20, 1946.1.11.42 (syntype, GRAY, 1834: Pl. 80.1), 1947.3.2.38, and NMW 25452.4 with 197–207 ventrals (♂♂ 197–202, ♀♀ 205–207), 99–108 subcaudals (108, 99–100), and a sum of 304–310 (310, 304–307). BISWAS & SANYAL (1977) reported 201–207 ventrals and 95–109 subcaudals for four specimens from Rajasthan; 203–207 and 112–115, respectively, are found in a couple from Delhi (NARAYANAN & SATYANARAYAN, 2012). Indian *ventromaculatus* show fewer body scales, and in particular much lower total counts, than four *r. rhodorachis* from Himachal Pradesh and Uttarakhand including WALL’s (1914) Kasauli racer (see Geographic Variation: first smallprint). SMITH (1943: 7, 169) mentioned “the greater reduction of scale-rows on the posterior part of the body” in *r. rhodorachis* compared to *ventromaculatus* (the reduction pattern “may help in the differentiation of two closely allied species, as in *Coluber ventromaculatus* and *C. rhodorachis*” [sic]). Also, MINTON (1962) separated the species by the number of “scale rows just anterior to vent” (11–13 in *rhodorachis*, 13–15 in *ventromaculatus*, see Geographic Variation: third smallprint). Indeed, *r. rhodorachis* from southern Pakistan, for instance, tend to have lower dsr counts prior to the anal scute (viz. more reductions) than *ventromaculatus*.

The following dichotomous key provides diagnostic characters for all nine *Platyceps* spp. living from Mesopotamia to the Lake Balqash area and southern India, thus including *P. bholanathi* (SHARMA, 1976) and *P. gracilis* (GÜNTHER, 1862), which is possibly parapatric with *P. ventromaculatus*. The latter is monotypic and *P. najadum atayevi* from the central Kopetdag is lumped with the nominotypical subspecies (see Systematic Review: last smallprint, Sympatry: first smallprint incl. footnote 10, The Genus *Platyceps*). Information regarding additional distinctive traits, unusual or rare character states, conditions in intergrades, and the situation with the Ah-

vaz population (Khuzestan) for the present referred to *P. r. rhodorachis*, hybrids (Turkmenistan to northern Baluchistan and Kerman, probably also in Uzbekistan, contiguous N Afghanistan, and Tajikistan), or provisionally assigned north Afghan (*P. cf. k. karelini*) and Baluch racers (*P. cf. mintonorum*) as well as an undesigned taxon from northern Azad Jammu and Kashmir is found in the corresponding chapters (descriptive sections, Geographic Variation: sixth smallprint, Subspecies, Southern Pakistani Racers, Hybrids, Incertae Sedis) and the preceding text. Crossbreeds between *P. r. rhodorachis* and *k. karelini* usually have a postsubocular, frequently show head scale configurations unusual for either parent species (including irregularities or utterly aberrant morphological conditions), and display deviating dorsal markings. The single known *P. k. karelini* × *mintonorum* hybrid (juv. ♂, SCHÄTTI *et al.*, 2012: Fig. 6B) agrees with Karelin’s Racer in body scale counts but strikingly differs in its much higher number of transverse dorsal bars.

In western India, *Platyceps ventromaculatus* is confirmed south to Gujarat (see Sympatry: last smallprint). SCHÄTTI & SCHMITZ (2006: 756, Fig. 3) indicated Gray’s Racer “as far south as Pune (Poona, 18°32’N 73°52’E)”. This report as well as records from “Bombay” (Mumbai, ca. 19°00’N 72°50’E), Deolali (19°57’N 73°50’E), and Khandesh (District, ca. 21°00’N 75°30’E) in Maharashtra State rely on MURRAY (1884) and WALL (1914, 1923). They are possibly based on confusion with *P. gracilis* which is recorded from southern Rajasthan (Fig. 25, see next chapter) and S Gujarat (VYAS *et al.*, 2011; WALMIKI *et al.*, 2012). Vice versa, old mentions (e.g., THEOBALD, 1868; MURRAY, 1884) of the Indian Ornate Racer from Pakistan (Sindh), which go back to a remark in GÜNTHER (1862: “Kurrachee”, syntypes), are either incorrect or rely on *ventromaculatus* (e.g., MINTON, 1966; MERTENS, 1969).

## Identification Key

- 1a. Specimen from west of 60°E longitude and east to Lower Murgab in Turkmenistan: ..... **2**
- 1b. Specimen from east of 60°E longitude including Sistan-ve Baluchestan: ..... **7**
- 2a. With a reddish vertebral stripe: ..... ***r. rhodorachis*** (partim)
- 2b. Vertebral stripe absent: ..... **3**
- 3a. Apical pits single (see footnote 11), eight (nine) supralabials, dorsal scales at midbody in 17–19 (15) rows: ..... **4**
- 3b. Apical pits paired, nine supralabials (rarely eight or ten), dorsal scales at midbody in 19 rows: ..... **5**
- 4a. Dorsal scales at midbody in 19 rows (Mesopotamia to Kopetdag Region incl. Central Khorasan, see remark above): ..... ***n. najadum***
- 4b. Dorsal scales at midbody in 17 (15) rows (Zagros Range): ..... ***najadum schmidtleri***
- 5a. Postsubocular present (a single supralabial entering eye): ..... ***k. karelini*** (partim)
- 5b. Postsubocular absent (two supralabials entering eye): ..... **6**
- 6a. Dorsal colour pattern along entire trunk, nuchal streak present: ..... ***karelini chesneii***

- 6b. Last quarter of trunk devoid of dorsal colour pattern (usually more, sometimes only last fifth in SW Iran), nuchal streak normally absent (rarely present but apparently common in Iraqi populations): .....  
..... *r. rhodorachis*  
(partim, incl. Kurdish Cliff Racer)
- 7a. Dorsal scales at midbody in 21 rows, large brownish dark-edged roundish, oval or saddle-shaped dorsal markings extending down both flanks (western peninsular India): ..... *gracilis*
- 7b. Dorsal scales at midbody in 19 rows, dorsal colour pattern very similar to, or different from, the one described: ..... 8
- 8a. Large brownish dark-edged oval or saddle-shaped dorsal markings extending down both flanks (nape element may be elongated and confined to mid-dorsal segment, SE India): ..... *bholanathi*
- 8b. Dorsal colour pattern not as described (from western Nepal [unconfirmed] and northern India westward): ..... 9
- 9a. With a reddish vertebral stripe: ..... *r. rhodorachis* (partim)
- 9b. Vertebral stripe absent: ..... 10
- 10a. Postsubocular present (a single supralabial entering eye), with distinct dark cross-bands along dorsum onto tail base: ..... *k. karelini* (partim)
- 10b. Postsubocular absent (two supralabials entering eye) or present (often so in *mintonorum*), dorsal colour pattern not as described except in certain juveniles of *ventromaculatus*: ..... 11
- 11a. Fewer than 220 ventrals and 332 ventrals plus subcaudals: ..... 12
- 11b. More than 219 ventrals and 331 ventrals plus subcaudals: ..... 14
- 12a. Nuchal streak present (very rarely absent), dorsal colour pattern along entire trunk: .....  
..... *ventromaculatus*
- 12b. Nuchal streak absent (very rarely present), last quarter of trunk devoid of pattern or unicoloured throughout: ..... 13
- 13a. 199–204 ventrals, 108 to ca. 112 subcaudals, sum 307 to ca. 314 (only ♂♂ known, probably close to and above 1,800 m a.s.l. east of Nushki, Urak Valley area, and Ziarat Mountains in NE Baluchistan, Pakistan): ..... *noeli*
- 13b. More than 203 ventrals and 105 subcaudals, sum at least 318 (minima from Hindukush to N Khyber Pakhtunkhwa): ..... *r. rhodorachis* (partim)
- 14a. 110–127 subcaudals, postsubocular present or absent (0–2 supralabials entering eye), preocular often divided (northern Baluchistan Region): .....  
..... *mintonorum*
- 14b. 106–148 subcaudals (132–144 in *r. rhodorachis* from area of confirmed sympatry with *mintonorum*), postsubocular usually absent (two supralabials entering eye), preocular entire (very rarely divided): ..... 15
- 15a. 230–247 ventrals, 133–148 subcaudals, sum 363–395 (documented for Sindh and contiguous

- Baluchistan Province, probably also SE Punjab and possibly W Rajasthan): ..... *sindhensis*
- 15b. 220–256 ventrals (fewer than 220 in area of potential sympatry with *sindhensis*, couplet 11), 106–145 subcaudals, sum usually lower than 364 (maximum in Makran 364, as much as 374 in NE Baluchistan and 388 in Chagai): ..... 16
- 16a. Usually fewer than 233 ventrals (as much as 244 in Chagai), 19 dorsal scale rows on anterior trunk or at midbody and 11–13 prior to vent:  
..... *r. rhodorachis* (partim)
- 16b. 237–256 ventrals, 19–21 dorsal scale rows on anterior trunk or at midbody and 13–15 prior to vent (eastern Hindu Kush, Karakoram, Ladakh, Spiti Valley in NE Himachal Pradesh, and probably Zaskar): ..... *rhodorachis ladacensis*

## Affinities

PARKER'S (1949) comment regarding "an apparent distributional gap through most of Iraq, Syria, and N. Palestine" separating *Platyceps r. rhodorachis* sensu stricto and *P. rhodorachis* auct. from west and south of a line running from northern Israel and the Wadi Arabah area across central Saudi Arabia to Oman holds up to these days<sup>12)</sup>. All reports of cliff racers from Syria (e.g., TERENTJEV & CHERNOV, 1949; BOGDANOV, 1962; ANDERSON, 1963; KRAMER & SCHNURRENBERGER, 1963; MINTON, 1966; ANANJEVA *et al.*, 2004; KHAN, 2006; AMR & DISI, 2011) are ultimately based on *Platyceps* taxa other than *rhodorachis* as understood in this study, and are probably entirely made up of *P. karelini chesneii* and *P. k. rogersi* from "Süd-Syrien" and "Syrien" (WERNER, 1898, 1907). These vague indications may refer to today's Jordan, Palestine, or Israel. At any rate, BOETTGER (1880, 1888) did not specify Syria as part of the range of "*Zamenis ventrimaculatus*" auct., WERNER'S (1898) mention of "*rhodorhachis*" [sic] from "Mesopot.[amia]" is due to confusion with Chesney's Racer, and KHAN'S (1997) opinion that western populations of "*Coluber ventromaculatus*" were *P. rhodorachis* is inadmissible.

Cliff racer populations (*Platyceps rhodorachis* auct.) from northern Africa and Nubia to the southern Jordan

<sup>12)</sup> The distribution of *Platyceps rhodorachis* as defined in this study is similar to the geographic range of *Spalerosophis diadema* (SCHLEGEL, 1837) from east of the Shatt al-Arab, viz. the nominotypical subspecies and *S. d. schirasanus* (JAN, 1863). A clear-cut hiatus in the number of subcaudals separates them from *S. d. cliffordii* sensu MARX (1959) found in Arabia and westward to Mauritania. SCHÄTTI & UTIGER (2001) found a substantial molecular distance of ca. 7% pairwise sequence divergence between *S. diadema* from Pakistan and Yemen, and the status of *Coluber cliffordii* SCHLEGEL, 1837 requires an in depth analysis (see SCHÄTTI *et al.*, 2010b). Irano-Turanian Diadem Snake populations may have ecological needs comparable to Jan's Cliff Racer but *S. diadema*, which is absent at higher altitudes, has a larger distribution in the Karakum and eastern Turan Plain (SINDACO *et al.*, 2013: map).

Rift region, the southern Levant (see following paragraph and next two smallprints), and probably NW Saudi Arabia (e.g., BOULENGER, 1893; BOETTGER, 1898; KRAMER & SCHNURRENBERGER, 1963; GASPERETTI, 1988; LEVITON *et al.*, 1992) belong to a distinct allopatric species, *P. saharicus* SCHÄTTI & MCCARTHY, 2004 (see, e.g., SINDACO *et al.*, 2013: photos 146–147). Leaving apart five ominous specimens from the vicinity of Cairo (“Umgebung von Kairo”, STEINDACHNER, 1900) and unclear reports of racer taxa from Sinai possibly corresponding to *P. rhodorachis* auct., ‘*Platyceps* sp. *incertae sedis*’ sensu SCHÄTTI & MCCARTHY (2004) and the Sahara Racer are sympatric in the Negev, SW Jordan or, probably, adjacent Saudi Arabia and clearly differ in ventral and subcaudal counts. As of now, we refer to these hitherto unassigned Arabian and possibly NE Egypt cliff racers as *P. cf. rhodorachis*. Their controversial status and specific allocation will be addressed in a separate study. Further investigation is also necessary to re-evaluate populations from coastal N Eritrea including the Dahlak archipelago to Somalia (Mudug Region, disputed with Puntland) generally similar to *P. cf. rhodorachis* (SCHÄTTI, 2006a) and currently classified as *P. rhodorachis subniger* (BOETTGER, 1893).

Based on “[t]wo primary characteristics [...] to reliably separate the [...] forms: Colour pattern, best compared at the neck region (Fig. 6) and number of ventral scales”, PERRY (2012) regards cliff racers from northern Israel and as far south as about 30°30'N latitude in Wadi Arabah and East Bank Palestine as specifically distinct from *Platyceps saharicus*. Purported differences in the neck markings are at best slight, ventral scale ranges largely overlap (l.c.: Fig. 11), and the allocation of non-striped *Coluber rhodorachis* auct. from the eastern Mediterranean coast (Haifa area incl. Mt. Carmel) east to “India” to *P. ladacensis* (“should be elevated to species level”) requires thorough reconsideration (see SINDACO *et al.*, 2013). The holotype of “*Zamenis rhodorachis* var. *tessellata*”, described by WERNER (1909) from an almost certainly incorrect locality [...] has both the appearance and a ventral scale count (244) typical of” *P. saharicus* from southern Israel (223–264 ventrals), viz. “the [...] form best referred to *P. tessellata*” [sic] comb. nov. (l.c.: 97, Fig. 6).

PERRY’s (2012: Fig. 11) analysis of ventral scales in cliff racers “from the entire distribution range” shuffles populations (“North” and “South” Israel) with colour pattern types (“Red stripe”, “Melanistic”, and “Black”) and does little to unveil the tremendous geographic variation observed in this feature, let alone untangle the chaos regarding *Platyceps rhodorachis* auct. or understand the intricacy of this racer complex, in particular within the area covered by the present study. Nor does this author provide useful data for the identification of the taxa involved. Apart from *P. subnigra* [sic] (BOETTGER) comb. nov., a purportedly valid species with “a limited and poorly-studied range, primarily in what is now Somalia and Somaliland and in parts of what is now Ethiopia and Eritrea”, the ‘ecologists [...] approach’ recognises *P. ladacensis*, *P. rhodorachis*, and *P. tessellata* [sic] (the specific name must be masculine; *tessellata* as used in the original description is in accordance with the feminine gender of the Latin noun *varietas*). *P. ladacensis* sensu PERRY (l.c.) “is the phenotype seen in India, and [...] Pakistan [...]”. It is also the form that Schätti and McCarthy (2004) assigned to

‘*Platyceps* sp. *incertae sedis*’ [...]’. This taxon is very broadly distributed, ranging from Israel in the west to India in the northeast to Yemen in the south”. *P. rhodorachis* sensu PERRY (l.c.) is “a slender desert snake with a prominent red vertebral stripe and no cross-bands. This taxon has a limited distribution in Iran and some of the former Russian republics in Asia”. Reproducing LATIFI’s (1991) drawing of a patterned Iranian *P. r. rhodorachis* sensu stricto, PERRY (2012: Fig. 7) quite surprisingly refers to it as “the desert form, which should be called *Platyceps tessellata*”. Actually, the latter is indicated from “Israel and the Palestinian Authority in the north to Saudi Arabia in the south and from Algeria in the west to Oman in the east” and “most likely” Eritrea and Ethiopia, but not from Iran. “The status of the many melanistic ‘*Coluber rhodorachis*’ found throughout the range (Figs. 9–10), mentioned by various authors and illustrated by Leviton *et al.* (1992, plate 15 D), is much less clear” and some uniformly dark “[a]nimals [...] are similarly hard to place.” It is further stated that “they are not easily distinguished from *ladacensis*, with which they broadly share both range and scale counts. This is possibly a melanistic form of *ladacensis*, although melanistic animals do not occur everywhere where the latter form is found.” PERRY’s (2012: Fig. 9) remark apropos “[t]he melanistic form found throughout much of Arabia” is a by far more appropriate way to handle the facts, though the photographed Omani specimen (BMNH ‘1977’ series) belongs to a uniformly greyish morph common in the eastern portion of the Arabian Peninsula (“the correct name for these animals remains unclear”). Melanism (melanotic or entirely black individuals) in cliff racers is not documented from outside this peninsula and the Red Sea area (see Kurdish Cliff Racer incl. second smallprint regarding a recent report from northern Iraq). At least, PERRY (2012) honestly admits that “ecologists simply need an accurate label to hang on the animals [...], and do not really care that much what the label is” (!), and “will let taxonomists do the legwork.” One can only speculate as to how many ‘species’ Gad Perry would have ‘labelled’ on the basis of morphological variation (or just the criteria ventrals and dorsal pattern) for *P. rhodorachis* sensu stricto from Iran to Central Asia and the Himalayas as presented in this study. And some may wonder whether “[t]his somewhat schizophrenic paper”, written to “sort things out” and “making sense of the profusion”, ever underwent a serious peer review process. Apart from the fact that no individual data is provided (e.g., ventral counts for “North Israel” specimens) or minor blunders (Aden, for instance, is not a country, nor is “Midian” in “currently Jordan”), the text contains some thought-provoking declarations which do not spare crucial points. The argumentation for species rank of *ladacensis* (its “history [...] is especially instructive of the dangers of excessive deference to scientific authorities”!) and “*tessellata*” sensu PERRY (2012: “Given the lack of overlap or intergradation in Israel”) is unintelligible; either ‘overlap’ is meant in terms of space – in its absence, ‘intergradation’ is simply a matter of impossibility, and things do not agree well with the distribution map (sympatry), or refers to the variation of morphological features (the number of ventrals in this case), which would be in contradiction with the presented graphics. With regard to reputed differences in their dorsal markings (“the two groups were consistently different [...] in appearance”) as exemplified by the “patterns on the heads and necks” of two specimens from the southern Dead Sea area representing these taxa, viz. an “individual from En Gedi (31°27'N 35°23'E), HUI 8820” and Sedom (31°04'N 35°24'E, HUI 3413, l.c.: Fig. 6), we are powerless to make out any significant dissimilarity between them.

AFRASIAB & MOHAMAD (2011) introduced the binomen *Platyceps ladacensis* (by inadvertence) and trinomial assignation in combination with *P. rhodorachis*, both used for cliff racers from Kurdistan. Ironically, PERRY’s (2012) proposed specific name to replace *P. saharicus* (*tessellatus*) applies to cliff racers with distinct transverse blotches (“Note [...] the dark cross-bands” or “the banded pattern”) as shown by, for instance, hatchlings or an unspecified adult racer (PERRY, 2012: Figs 1–2). “The type specimen of *Platyceps tessellata*” [sic] (l.c.: Fig. 13), viz. the male holotype of *Zamenis rhodo-*



*rhachis* [sic] var. *tessellata* WERNER (IRSNB 2027), has 243 ventrals, 141/142 subcaudals (140 fide WERNER, 1909), symmetrical dark arabesque frontoparietal markings, the dorsals on the anterior trunk black at the base, becoming light grey (“lichtgrau”) on the second half, and three rows of dark transverse bars gradually disappearing on the unicoloured posterior part of the body (l.c.). The upper portion of the third supralabial is extended and in broad contact with the anterior subocular. The lower first temporal is twice as large as the upper. There are 19-19-12 dsr with reductions at ventral 142 involving rows 2+3 and suppressing row 7 (19-15 dsr), ventrals 159–160 (rows 6+7), and a paravertebral fusion to 12 dsr near ventral 210. The maxillary bears 16 teeth. The revalidation of WERNER’s taxon with vague origin (“Asie Mineure”) and unknown collector (“inconnu”) is a lamentable action – a straightforward discussion of its potential implications would probably have been a more adequate approach “in the forest of taxonomy” where “great care” is mandatory (PERRY, 2012). Referring to WERNER’s (1909) description and indications from “Kleinasien” (VENZMER, 1922) or “Asia Minor” (BIRD, 1936) based on the holotype of *Z. r. tessellatus* WERNER, BODENHEIMER (1944) reasoned that “[i]t seems [...] preferable to omit this snake from the list of Turkish Reptilia, until confirmation of its occurrence is received.” FMNH 19618 from Diyana (Arbil, Iraq, Fig. 5F) was collected only about 50 km in a beeline from the border with Turkey. Although IRSNB 2027 differs vis-à-vis cliff racers from Kurdistan in dorsal colour pattern (a nota bene capricious feature in *r. rhodorachis*), scale conditions or, for instance, maxillary dentition are very similar, and the distribution of *P. rhodorachis* in northern Iraq pends further exploration (see Kurdish Cliff Racer).

WERNER (1917: 208) thought that racers of the Southwest Asian *Platyceps rhodorachis-ventromaculatus* complex (“die vorderasiatischen *Zamenis* der *rhodorachis*-Gruppe”) belonged to an as yet undifferentiated radiation group and that the various taxa were quite variable in morphological characters, which he regarded as of little importance anyway (“einen noch undifferenzierten Formenkreis bilden, in dem die einzelnen Arten in den ohnehin nicht sehr wesentlichen Merkmalen noch ziemlich stark schwanken”, see Systematic Review). Since those times, the number of eastern species assigned to this systematic complex comprising *karelini* has doubled (plus *mintonorum*, *noeli*, and *sindhensis*) and their morphological distinction is no longer a matter of mere personal preference. MINTON (1966) deemed *ventromaculatus* to be “[t]he nearest relative to *karelini*”, stating that they “differ only in the regular presence of a third postocular [viz. a postsubocular] in *karelini*, in head markings, and in the stronger blotched pattern of *karelini*.” Irrespective of the description of *mintonorum* as a subspecies of the latter due to the putatively complementary distribution (“ein Vikariant von *karelini*”) and the purportedly customary occurrence of a postsubocular, MERTENS (1969) acquiesced with MINTON’s (1966) assessment regarding immediate relationship between Gray’s and Karelín’s Racer (“*ventromaculatus* [...], den ich mit *karelini* für sehr nahe verwandt halte”). MINTON (1966) correctly observed that *karelini* (nominotypical subspecies) and *mintonorum* (as “*Coluber* sp.”) “are quite different in pattern and in ventral and subcaudal counts” and thought that the “nearest relative” of *mintonorum* “appears to be *rhodorachis*.” Body scales and dorsal marking show remarkable intraspecific variability as demonstrated in this study,

though, and are unsuitable for establishing phylogenetic relationships among these species.

WERNER (1917) is most probably correct with respect to the comparatively young age of the *Platyceps rhodorachis-ventromaculatus* complex as evidenced by hybridization in areas of contact. In spite of general agreement that the taxa making up this racer group belong to the same evolutionary lineage (e.g., INGER & CLARK, 1943; MINTON, 1966; MERTENS, 1969; SCHÄTTI & UTIGER, 2001; NAGY *et al.*, 2004), the detailed relationships between them are unclear. So far, nucleotide sequences could not elucidate the issue either (see next part).

The *Platyceps rhodorachis-ventromaculatus* cluster comprises *Zamenis gracilis* GÜNTHER, 1862 and *Coluber bholanathi* SHARMA, 1976 as correctly reclassified by WALLACH *et al.* (2014). Except for the higher number of scale rows at midbody (21 instead of 19) and its dorsal colour pattern (e.g., GÜNTHER, 1864: Pl. XXI.H; WHITAKER & CAPTAIN, 2004: unnumb. Pls [pp. 143–145]; VYAS *et al.*, 2011: Figs 2–3; WALMIKI *et al.*, 2012: Fig. 1), *P. gracilis* from W Maharashtra north through W Madhya Pradesh into the central Aravalli Range in Rajasthan (SHARMA & NAGAR, 2007; SHARMA *et al.*, 2012; Fig. 25) is generally similar to *ventromaculatus* in external morphology or maxillary dentition. Actually, *gracilis* was classified as a variety of “*Zamenis ventrimaculatus*” by GÜNTHER (1858) and confounded with this potpourri taxon for a while (see Systematic Review, Distinction: last smallprint).

A photograph of “*Argyrogena bholanathi*” in SHARMA (2003: Pl. 10B, unspecified specimen of type series) shows a snake highly reminiscent of *Platyceps gracilis* in its overall dorsal aspects. This is also the case with head scales and colour pattern in general (GUPTHA *et al.*, 2012: Fig. 2; GANESH *et al.*, 2013: Fig. 1, incl. “dorsal profile of holotype”; SEETHARAMARAJU & SRINIVASULU, 2013: Pls 3–4; SHARMA *et al.*, 2013: Fig. 1, SMART *et al.*, 2014: images 2–5). However, SCHÄTTI & UTIGER’s (2001) statement that *Coluber bholanathi* SHARMA “is probably a junior synonym” of *P. gracilis* requires reconsideration. These taxa appear to be very closely related but differ in msr (19 in *bholanathi*, 21 in *gracilis*), the shape of the rostral shield (much broader than high in *bholanathi*, GANESH *et al.*, 2013; SEETHARAMARAJU & SRINIVASULU, 2013: Pl. 4D), and possibly other scale characters. Their documented ranges are separated by more than 350 km between the Satara region south to Matheran (18°59’N 73°16’E, Raigad District, VYAS *et al.*, 2011) in W Maharashtra (WALMIKI *et al.*, 2012) and Bellary District of E Karnataka (SHARMA *et al.*, 2013) or over 400 km from SW Madhya Pradesh (WALL, 1923: Asirgarh) to the closest known collecting site of *bholanathi* west of Hyderabad in Andhra Pradesh reported by SEETHARAMARAJU & SRINIVASULU (2013: Fig. 1), who present photographs of everted hemipenes (l.c.: Pl. 4E–F). The Indian Ornate Racer (*gracilis*) is in need of a detailed study and the allopatric Nagarjun Sagar Racer (*bholanathi*, DAS, 1997) from the southern range of the Eastern Ghats in Andhra Pradesh to the Gingee Hills (Villupuram District) in NE

Tamil Nadu (SMART *et al.*, 2014) is ranked as a full species for now.

WHITAKER & CAPTAIN (2004: footnote 6) declared it to be “unclear where *Coluber gracilis* [...]; *Coluber bholanathi* [...] and *Coluber vittacaudatus* BLYTH, 1854 should be placed.” The latter, listed as a valid species by DAS *et al.* (1998: 157, status fide V. Wallach, “pers. comm.”), DAS (2003: Tab. 1), GUPTHA *et al.* (2012), SEETHARAMARAJU & SRINIVASULU (2013), and SHARMA *et al.* (2013) or as “*C. vettacaudatus*” in WALMIKI *et al.* (2012), is possibly a senior synonym of the Oriental ratsnake *Orthriophis taeniurus yunnanensis* (ANDERSON, 1879), and of *O. taeniurus* (COPE, 1861) as well. WALACH *et al.* (2014) classified *C. vittacaudatus* under *Argyrogena* WERNER, 1924, as originally suggested (“Affined to *C. fasciolatus*”, see next) by BLYTH (1854). In particular Indian herpetologists (e.g., LAMBA, 1987; HUSAIN & RAY, 1995; HUSAIN & TILAK, 1995; DAS *et al.*, 1998 [*A. ventromaculata*]; B. D. SHARMA, 1999, 2002; R. C. SHARMA, 2000–2007) followed WHITAKER (1978) and MURTHY (1986) who referred *Platyiceps gracilis*, *ventromaculatus*, and *rhodorachis*, respectively, to *Argyrogena*<sup>13</sup>. The gender of this genus is feminine and it includes a single species, *A. fasciolata* (WILSON, 1967; VYAS *et al.*, 2011). *Argyrogena rostrata* WERNER, 1924 (type species) from “Argentinien” is a junior synonym of *Coluber fasciolatus* SHAW, 1802 (SMITH, 1928). Apart from *gracilis*, *rhodorachis*, and *ventromaculatus*, Ramesh Chandra SHARMA (2003) assigned *bholanathi* as well as *P. karelini* and *Hemorrhois ravergeri* to *Argyrogena*. Furthermore, he quoted “Werner [...]: 51” as the original reference for the binomina “*Argyrogene* [sic] *karelini*”, “*A. ravergeri*”, and “*A. rhodorachis*” [sic] (SHARMA, 2007). On that page, WERNER (1924) had described the monotypic genus *Argyrogena* (see above). A namesake, Budh Dev SHARMA (2002: 51), mentions neither *karelini* nor *ravergeri* on that page. In the case of *rhodorachis*, he refers to “Fig. 33” which does not exist; Fig. 32 (“*Argyrogena rhodorachis* [...] from Jammu”), a poor photograph published in a very similar paper (SHARMA, 1999: 95, again as “Fig. 33”), possibly shows a water snake taxon (*Xenochrophis* sp.). GANESH *et al.* (2013: Fig. 1) and SMART *et al.* (2014: image 5) depict the holotype of *P. bholanathi* (ZSI 21337).<sup>12</sup>

## The Genus *Platyiceps* BLYTH, 1860

INGER & CLARK (1943) revalidated *Platyiceps* BLYTH for six northeast Afrotropical, southeast Mediterranean, and Saharo-Turano-Sindian racer taxa (see Systematic Review). Currently, this genus is comprised of twenty-three valid species, viz. those nine assessed (or at least discussed to some depth) in the preceding text (*bholanathi*, *gracilis*, *karelini* ssp., *najadum* ssp., *mintonorum*, *noeli*, *sindhensis*, *rhodorachis* ssp., *ventromaculatus*), two Saharo-Arabian and southern Red Sea (African) representatives of the *P. rhodorachis* group (*afarensis* and

*saharicus*), *P. collaris* of the southeast Mediterranean Region as well as the Afro-Arabian *P. florulentus* complex (eleven species). These figures do not take into account four nominal species and a subspecies, viz. *Coluber manseri* LEVITON, 1987, *C. scorteccii* LANZA, 1963, *C. thomasi* PARKER, 1931, *C. zebrinus* BROADLEY & SCHÄTTI, 1999, and *Zamenis ladacensis* var. *subnigra* BOETTGER, 1893 as explained in the preceding section (*P. rhodorachis subniger*) and below (incl. next smallprint).

*Platyiceps collaris* and *P. najadum* form an evolutionary lineage characterised by a synapomorphy, viz. single instead of paired apical pits (see footnote 11). We regard *Coluber atayevi* TUNJEV & SHAMMAKOV, 1993, only recorded from a small highland area in the Kopetdag, to be a highly local subspecies of *najadum* (see footnote 10). NAGY *et al.* (2004) found that “[t]he sequence divergence between *P. atayevi* and *P. najadum* [from Armenia] is in fact quite low indicating a relatively recent speciation event.”

The *Platyiceps florulentus* species group sensu SCHÄTTI & UTIGER (2001) included the northeast African *P. florulentus* (GEOFFROY SAINT-HILAIRE, 1827), *P. elegantissimus* (GÜNTHER, 1879) from Jordan along the Hejaz to the Asir and central Saudi Arabia (see next but one smallprint), *P. b. brevis* and *P. b. smithi* (BOULENGER, 1895a–b) from S Ethiopia and the Horn of Africa to N Tanzania, *P. largeni* (SCHÄTTI, 2001) of the Dahlak archipelago (Eritrea), the northwest Afrotropical *P. perreti* (SCHÄTTI, 1988) comb. nov., and *P. taylori* (PARKER, 1949) from the central Eritrean littoral to NW Puntland (SCHÄTTI, 1988, 2007). SCHÄTTI & CHARVET (2003) added *P. messanai* (SCHÄTTI & LANZA, 1989) and *P. somalicus* (BOULENGER, 1896) from the Nogal Valley (Puntland) and the Audo Mountains (Bale, Ethiopia), respectively. We herewith refer the southern Jordan Rift endemic *P. sinai* (SCHMIDT & MARX, 1956), *P. insulanus* (MERTENS, 1965) of the Farasan Archipelago (Red Sea, Saudi Arabia), and the southwest Arabian (southern Tihama to Dhofar) *P. variabilis* (BOULENGER, 1905) to the *florulentus* complex.

With species status conferred upon *Platyiceps perreti* from Cameroon and Nigeria, the name bearing taxon of the *P. florulentus* group is considered monotypic. SCHÄTTI & UTIGER (2001) found high (ca. 7%) pairwise sequence divergence within the Flowered Racer (*florulentus*), prompting two short remarks apropos an as yet “undescribed species from Ethiopia” (SCHÄTTI & CHARVET, 2003: 108; SCHÄTTI & INEICH, 2004: 688). This judgement relies on the genetic distance between specimens from the Mediterranean coast in Egypt (Burg al-Arab, MHNG 2414.91, GenBank no. AY39130 and AY39168 for mitochondrially encoded 12S rRNA and COI, resp.) and Illubabor in Ethiopia (Bedele, ca. 8°15'N 35°45'E, MHNG 2574.82, AY39161 and 39199). These distant demes are in contact through geographically intermediate populations along the Nile and its affluents (unpubl. data), and we reconfirm Ethiopian highland racers as belonging to *florulentus*. *Coluber* (sensu lato) *largeni* may be an insular subspecies of *P. taylori*. *P. messanai* and *P. somalicus* are only documented on the basis of their respective holotype. The type specimen (SMF 60027) and a slough are on record in the case of the Farasan Racer (*P. insulanus*, see Masetti, 2014). *Coluber manseri* LEVITON and *C. thomasi* PARKER (see SCHÄTTI & UTIGER, 2001) are considered to be conspecific with *P. variabilis* (subspecies, in prep.).

<sup>13</sup> We have been unable to locate earlier editions (1981, 1984) of ‘The snake book of India’ as indicated in the blurb and preface to MURTHY (1986), and to verify the very first usage of *Argyrogena rhodorachis* or variant spellings (nobody contacted could confirm an earlier version); an ‘Errata’ entry mentions the generic name as “*Argyrogenov*”. By all means, Jan’s Cliff Racer is not listed in MURTHY (1985). Indian authors also sometimes referred the Diadem Snake to this genus (“*Argyrogena diadema* (Schlegel)”, e.g., AHMED & DASGUPTA, 1991).



The closer phylogenetic relationships of the Somali endemic *Coluber scorteccii* remain enigmatic. This species from Puntland and Somalia (Galgadud) differs vis-à-vis the *Platyceps florulentus* complex in, for example, the presence of a complete series of suboculars (viz. one or no supralabial entering eye, also occurs in *P. insulanus*), an elevated number of dorsals at midbody (27–29 versus 17–23, 25 in *perreti*), and reductions involving mostly paravertebral rows. Scortecci's Racer lingers unassigned under the purely operational 'Coluber sensu lato' (SCHÄTTI & UTIGER, 2001; SCHÄTTI & CHARVET, 2003). This also applies to *Coluber zebrinus* from Namibia, a geographically isolated taxon that diverged from a common stock living prior to the Afrotropical and southern Palaearctic radiation of racers (e.g., NAGY *et al.*, 2004: Figs 2–3; SCHÄTTI & INEICH, 2004; SCHÄTTI & MONSCH, 2004; PYRON *et al.*, 2011–2013). *Coluber* (sensu lato) *zebrinus* is related to *Bamanophis dorri* (LATASTE, 1888), a monotypic western Sahel genus (NAGY *et al.*, 2004; SCHÄTTI & TRAPE, 2008).

Molecular studies (e.g., SCHÄTTI & UTIGER, 2001; NAGY *et al.*, 2004; SCHÄTTI, 2004; SCHÄTTI *et al.*, 2005) based on a total of fourteen taxa belonging to at least eight valid species corroborate the monophyly of *Platyceps* BLYTH, viz. the existence of a common ancestor giving rise to the extant *P. florulentus* (represented by DNA fragments of *florulentus*, *elegantissimus*, and *v. variabilis*), *P. najadum* (*collaris*, *n. najadum*, *n. atayevi*, *n. dahlii*, *n. schmidtleri*), and *P. rhodorachis-ventromaculatus* (*k. karelini*, *k. chesneii*, *k. rogersi*, *rhodorachis*, cf. *rhodorachis*, *ventromaculatus*) species groups. These phylogenies, however, generate partly controversial results and the authors of this investigation are not alone in yearning for a comprehensive approach of the intra-generic structure of the genus, above all a well-defined branching pattern of the species dealt with in the present study.

NAGY *et al.* (2004) sequenced five *Platyceps* spp., viz. *florulentus*, *k. karelini*, *k. rogersi*, *najadum* (incl. *atayevi*), *rhodorachis*, and *collaris* as "*P. rubriceps*" (VENZMER, 1919). *P. rhodorachis* is "[b]asally linked" to the remaining species in a BI/ML phylogeny; the MP "tree differs only in having *P. rubriceps* [*collaris*] and *P. florulentus* also as sister taxa." Surprisingly, molecular analyses cluster *ventromaculatus* with the western Arabian *elegantissimus* (SCHÄTTI & UTIGER, 2001: Fig. 8; SCHÄTTI, 2004: Fig. 3; SCHÄTTI *et al.*, 2005: Abb. 8). Zoogeographical considerations and limited molecular data for seven congeneric species prompted the senior author to assign the Most Beautiful (or, better, 'Handsome') Racer to the *florulentus* group.

Morphology and genetics clearly indicate a common origin for the genera *Hemorrhois* BOIE, 1826, *Platyceps* BLYTH, 1860, and *Spalerosophis* JAN, 1865, the sister group of the essentially Palaearctic *Eirenis-Hierophis* clade including *Coluber* (sensu lato) *andreas* (WERNER, 1917) and *Dolichophis* spp. within the Old World racer radiation (SCHÄTTI & UTIGER, 2001; NAGY *et al.*, 2004; SCHÄTTI & MONSCH, 2004; UTIGER & SCHÄTTI, 2004; UTIGER *et al.*, 2005; PYRON *et al.*, 2011–2013)<sup>14</sup>. Phylogenies inferred from the combined data set of two nucleotide sequenc-

es (12S rDNA and COI) are inconclusive regarding the position of *S. diadema* (SCHÄTTI & UTIGER, 2001: Figs 8–9; see footnote 12). Irrespective of the model of DNA evolution, maximum likelihood (ML) analyses place the Diadem Snake as the sister taxon of *Platyceps* (*collaris*, *elegantissimus*, *florulentus*, *karelini rogersi*, *najadum*, cf. *rhodorachis*, and *ventromaculatus*); neighbour joining and maximum parsimony (MP) analyses group *S. diadema* with *Hemorrhois* (*H. algirus*, *hippocrepis*, *nummifer*, *ravergieri*); all these dichotomies are supported by low bootstrap values (< 50%). Based on different including nuclear markers (c-mos), NAGY *et al.* (2004: 230, Tab. 3) confirm the monophyly of "*Hemorrhois*–(*Spalerosophis*–*Platyceps*)" but note that "[a]ll analyses of our data [...] show the genus *Spalerosophis* as represented in our study by a single specimen of *S. diadema*, linked directly with strong statistical support as sister taxon to the genus *Platyceps*. So placed, *Spalerosophis* becomes the basal member of a *Platyceps/Spalerosophis* clade" (see also PYRON *et al.*, 2011–2013). This relationship, however, is not corroborated by morphological evidence and we consider *Hemorrhois* and *Spalerosophis* to be the sister group of *Platyceps* (SCHÄTTI, 1986a–b; SCHÄTTI & MCCARTHY, 1987; SCHÄTTI *et al.*, 2009).

A weighted MP analysis resulted in (*Spalerosophis diadema*–*Platyceps*)–*Hemorrhois* (UTIGER *et al.*, 2005: Fig. 3; *algirus*, *hippocrepis*, *karelini rogersi*, *ravergieri*, cf. *rhodorachis*, bootstrap values of combined sequences 70%) or (*S. diadema*–*Hemorrhois*)–*Platyceps* (UTIGER & SCHÄTTI, 2004: Fig. 4; *collaris*, *hippocrepis*, *najadum*, *ravergieri*, *ventromaculatus*, 91%). Using the same method and ingroup taxa as in the latter study plus *S. microlepis* JAN, 1865 (type species), *Spalerosophis* clusters with *Hemorrhois* against *Platyceps* (SCHÄTTI & MONSCH, 2004: Fig. 1). An ML inferred phylogeny based on two DNA sequences from three taxa (*diadema*, *hippocrepis*, *k. karelini*) produced the same general topology (LAWSON *et al.*, 2005). The fragmentation of lateral head scales and other character states (e.g., heterogeneous paraventral scale rows) encountered in *Spalerosophis* spp. (this genus also manifests various degrees of breakup of the shields on the pileus) and the monotypic insular endemic *Hemorrhois socotrae* (GÜNTHER, 1881) are deemed to be plesiomorphic (e.g., SCHÄTTI & INEICH, 2004), and the polarity of certain conditions as, for instance, similar scale row reduction patterns or anatomical and osteological features observed in *Hemorrhois hippocrepis*, *Spalerosophis* spp. (SCHÄTTI, 1986a, 1987), or other Afro-Palaearctic racers requires careful re-evaluation in the light of new evidence.

Hopefully, the present contribution can help to clarify systematic and other aspects within the *Platyceps rhodorachis-ventromaculatus* species group. The detailed relationships among the various taxa involved remain unresolved and the phenomenon and mechanism of hybridization (in particular backcrosses) are still poorly understood. These issues as well as the elaboration of all extant evolutionary lineages within *Platyceps* BLYTH and its ties with the closely related *Hemorrhois* and *Spalerosophis*

<sup>14</sup> *Dolichophis* GISTEL, 1868 had been lumped in with *Hierophis* FITZINGER in BONAPARTE, 1834 prior to NAGY *et al.* (2004: 231). *Eirenis* JAN, 1863b is subdivided into various subgenera (see MAHLOW *et al.*, 2013) and is comprised of a northeast Afrotropical species, *E. (sensu lato) africanus* (BOULENGER, 1914).



pend further investigation. Some problems including the status of Arabian cliff racers, the Ahvaz population, an undescribed taxon from Kashmir, or provisionally assigned Afghan and Baluch racers persist or are in dispute. Definitely, the systematics and phylogeny of *Platyceps* spp. and related genera, as well as the complex radiation of Old World racers sensu UTIGER *et al.* (2005) continue to be a laborious (and virtually inexhaustible) but intriguing and, in any case, rewarding stomping ground for future students interested in these topics.

## Acknowledgements

While working on racers and allied colubrids, and in particular the *Platyceps rhodorachis-ventromaculatus* species group, assistance has been received from many sides, and space simply does not allow mentioning all those who contributed in innumerable ways to this undertaking.

Long ago, the late Eugen Kramer ignited the senior author's interest for snake systematics, the study of original texts, and whetted appetite for the unduly burdened '*Coluber* auct.'. Vincent Ziswiler and Volker Mahnert made it possible to fully engage in this endeavor. None of us imagined where the journey would lead.

Tackling the many essential themes necessary for a comprehensive approach towards a better understanding of the admittedly intricate *rhodorachis-ventromaculatus* complex was challenging and the authors have always felt obligated not to deprive the herpetological community of an ample review and update of the veritable brainteaser, the *Platyceps rhodorachis* species group proper. This venture became a long-term project paved with manifold obstacles, unforeseen complications, and drawbacks. Over the past six years or so, Mark-Oliver Rödel endorsed and bolstered the revision of eastern cliff racers and *P. karelini* in many respects, and his generous attitude enabled us to elucidate upon the subject in the present scope and form.

Notker Helfenberger indulges in our all fascination and passion for reptiles and books, and is a man of many skills. He co-operated as a research fellow in the assessment and elaboration of the Holarctic racer and ratsnake clans, brought together those behind this study, established contact with people contributing valuable detail information, and provided literature. Andrea Stutz shared the beauty, adventure, and hardship of field trips, assisted in the meticulous compilation of data, and aided in countless ways between the Middle East, Europe, and the Pacific Coast. She tolerated (and sometimes participated in) racer-related grumpiness and sacrificed, at times, the usual couple activities for less diverting pastimes. The artwork including line drawings and distribution maps are by her.

The bulk of personal observation poured into this study was gathered in Iran. The 'G. und A. Claraz-Schenkung' partially supported fieldwork in 2003. Companions were Paul Monsch and driver, interpreter, cook, and chess player Nader Rezaye. They joined in cold nights, dry throats, tired legs (and, once, cold feet) in gorgeous (and, rarely, less so) outback locations. Unforgettable were the countless casual but impressive and lasting encounters in downtown streets, bazaars, suburb teahouses, hostels, or guest-houses, along the roads, and in remote sites throughout the country.

A heartfelt 'mersi' to all of them, in the very first place to Ashgar Afzal Abadi in Sabzevar, Ali Jafari, Ibrahim Sadeqi, and their families in Ban Anbari as well as to Ali 'The Scout' from Bezd and Razul's household in Mehkuyeh for their hospitality, the memory of unique associations, extraordinary moments, and the privilege of certain insight into a much esteemed culture.

Michael L. Golubev, Nikolaj L. Orlov, and the late Nikolaj N. Szczerbak collected and sent live racers from areas not visited. Ashok Captain, Mahdi Kazemi, Rafaqat Masroor, Jifri Moravec, and Farhang Torki ascertained morphological data of racers in their possession or collections and attached photographs. Curators and other staff who approved loans, made us welcome at their institutions, placed at our disposal museum facilities, shot photographs, authorised dissections, the preparation of skulls (or particular bones) and/or vertebrae, or taking tissue samples, checked register numbers, localities and data for numerous animals in their collections, re-examined unusual or unclear scale conditions in particular specimens, or maintained correspondence are Linda Acker, Pere Alberch, Natalja B. Ananjeva, E. Nicolas Arnold, Markus Auer, Wolfgang Böhme, Ursula Bott, Patrick Campbell, Lilia Capocaccia, Ronald I. Crombie, the late Ilja Darevskij, Giuliano Doria, Robert C. Drewes, Orsetta Elter, Raffael Ernst, Linda S. Ford, Michael Franzen, Frank Glaw, Jean-Pierre Gosse, Heinz Grillitsch, Ulrich Gruber, Rainer Günther, Tracy Heath, W. Ronald Heyer, Barry Hughes, Ivan Ineich, Jeremy Jacobs, Kathleen M. Kelly, David A. Kizirian, Konrad Klemmer, Gunther Köhler, Axel Kwet, Georges Lenglet, Alan E. Leviton, Lars Lundqvist, Colin McCarthy, Konstantin D. Milto, Roman A. Nazarov, Ronald A. Nussbaum, Fritz-Jürgen Obst, Nikolaj L. Orlov, Valentina F. Orlova, Marta Poggesi, Eskandar and Nasrullah Rastegar-Pouyani, Kevin de Quiroz, Alan Resetar, Dennis Rödder, Jose P. Rosado, Andreas Schlüter, Greg Schneider, Franz Tiedemann, Jens V. Vindum, Harold C. Voris, Robert V. Wilson, Raffael Winkler, Urs Wüest, and Richard G. Zweifel. Varad B. Giri made available information on holdings in the Bombay Natural History Museum and scanned images of three specimens from Himachal Pradesh, Chilas, and Hamadan. Indraneil Das and Pratyush Mohapatra took pictures of supposed and genuine type specimens kept in the Zoological Survey of India; also, Pratyush verified scale features in a putative "type" and Indraneil informed about the accession numbers of some historically relevant ZSI racers.

We are indebted to former and active staff personnel of the scientific branches and technical departments of the Zoologisches Museum and the Zentralbibliothek der Universität Zürich, the Muséum d'Histoire naturelle de Genève, and the Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, above all Pierre and Ursula Brauchli, Monika Brunner, Corinne Charvet, Fabienne Favarger, Thomas Germann, Hans-Peter Höhener, Christelle Mougins, Nagwa Othman, Hans-Ulrich Raake, Martina Ribberger, Susanne de Roche, Andreas Schmidt, Jolanda Schuhmacher, and Phillippe Wagneur who tracked down obscure reference quotations from literature (and most often managed to obtain copies) or place names in former Persia and adjacent areas, catalogued samples, made drawings, typed early drafts or photographed specimens, bones, organs, etc. Kristin Mahlow computed and visualised dentigerous data for two specimens. For years, Sonia Fisch-Muller and Jean Mariaux borrowed material and foraged for literature, or helped with infrastructure and many more favours including moral support.

Kraig Adler, Natalja B. Ananjeva, Steven C. Anderson, Aaron M. Bauer, Mirko Barts, Aliye Changizi, Igor Doronin, Clare Inhelder Cowen, Jevgeni Jakhontov, Sergjus Kuzmin, Clemens Mueller, Arash Rezaye, Nurgul Weiss, and Thomas Ziegler provided literature and linguistic advice. Ljudmila Gumen, Rainer Günther, Julia Jagodzinski, the late Bert Langerwerf, and Ksenja Manuylova translated complete book chapters and shorter papers from Russian or verified crucial wording. Natalja B. Ananjeva, Eleonora and Karina Kolchina as well as Daniel A. Melnikov and Jekaterina N. Melnikova deserve special thanks for their efforts with elusive papers and hard to find localities. Juri Khomustenkov unearthed coordinates for further places in Turkmenistan. Abhijit Das, Ramesh Chinnasamy, and Uwe Prokoph sent pictures. Jean-Michel Bompar altruistically made available photographs of a live Ladakh Cliff Racer accompanied by notes. Philipp Wagner called our attention to six Afghan racers deposited in the Lund collection. Saman R. Afrasiab, Daniel Frynta, Kirill Makarov, and Khosro Rajabizadeh helped with miscellaneous morphological data, images, and field information including specification regarding a few collecting sites in Iran, Iraq, and Badkhyz (Turkmenistan). Tomas Mazuch and Annamaria Nistri shared news about Somali racers. Peter Beerli read passages of the hybrid and generic (*Platyceps*) chapters. Roland Blassnig, Hans-Peter Dänzer, Heidi Laubscher, Moisés Ortega Pina, Luis Enrique Santiago, the late Hugo Schuhmacher, David Spieth, and Eduardo ('Ed') Wade gave technical advice, actively helped make drawings of specimens and prepared samples, or provided equipment.

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## Appendices

**Appendix A.** Examined *Platyceps rhodorachis* ssp. including twenty racers studied by Ashok Captain (AC), Mahdi Kazemi (MK), Rafaqat Masroor (RM), Jiří Moravec (JM), and Farhang Torki (FT, see Material). A plus sign (+) indicates presence of a vertebral stripe (typical phenotype). Specimens followed by an asterisk were used for the calculation of cephalic proportions. Paired symbols (++, \*\*) stand for all individuals of the respective series. A question mark represents unknown gender. A dagger (†) denotes MHNG 2443.32 (disarticulated skeleton) and two extremely damaged unsexed specimens, viz. ZFMK 8645 (only maxillary and palatine dentition ascertained) and ZISP 13556 (no data). Additional *P. r. rhodorachis* incl. a specimen from Kurdistan (Iraq) not considered in the analyses of ventrals and/or subcaudals (Figs 16–18, Tab. 2) are BMNH 1886.9.21.100 (in two parts), BMNH 1951.1.6.68 (see footnote 7), FMNH 74615 (severely damaged, see Kurdish Cliff Racer: first smallprint) and 161185 (head and anterior neck missing), FTHR 15303 (no data, see Material), MZUF 23942 (ventrals highly irregular, tail injured), MZLU 3036 (body incomplete, tail registered under no. 3035), ZFMK 31604–07 (see Material), 31669 (see footnote 7), 31671 (only head and portion of anterior trunk), and 84787 (body incomplete) as well as ZISP 11790 (ventrals partly damaged). The designation of localities relies on loan forms, collection registers, file entries, museum catalogues, literature, or is adapted to national language in the case of various Turkmen places, and the naming of some sites may slightly differ from published references cited in the chresonymies. *P. rhodorachis ladacensis*. INDIA: NMW 25452.10\* (Spiti Valley, ca. 32°04'N 78°35'E [junction of Parang and Spiti River, Sumdo area], ♂, F. Stoliczka, see Subspecies). PAKISTAN: BMNH 1880.3.15.386a (“Gilgit”, 35°56'N 74°30'E [Gilgit Town], ♂, Capt. J. Biddulph), 1880.3.15.386b (“Gilgit”, 36°22'N 73°20'E [Yasin Valley, Ghizar],

subad. ♀, same collector, see Distribution and Altitude: smallprint); PMNH 1652 (Gulmit, Hunza River, 36°23'N 74°52'E, ♂, data RM), 1950 (Diamer-Bhasha Dam, ca. 35°20'N 75°50'E [Skardu area], ♂, data RM). ORIGIN UNCERTAIN: BMNH 1870.11.30.35\* (“N.W. India”, ♀). *P. r. rhodorachis – ladacensis* intergrades (see Subspecies: third smallprint). AFGHANISTAN: NMW 18213.1 (25 km north of “Barikut” [Bhirkot, Bar Kowt], ca. 35°31'N 71°32'E [S Nuristan], ♀, leg. Kasy & Vartian 1963). PAKISTAN: BNHM 621 (“Chilas, Jammu and Kashmir”, ca. 32°N 74°30'E [Gor], ♂, Capt. B. J. Dawkes, data from photographs). *P. r. rhodorachis* (incl. Kurdish Cliff Racer). AFGHANISTAN: BMNH 1968.1303 (Such, 36°48'N 70°50'E, ♂); CAS 92323 (15 km southwest of Kabul, ca. 34°25'N 69°05'E, ♀), 96250 (“5–10 mi. ENE Nimla”, ca. 34°20'N 70°12'E, ♀), 115970\* (east of Kandahar, 31°36'N 65°47'E fide ANDERSON & LEVITON, 1969, juv. ♂, formerly FMNH 161074), 115971 (vic. Paghman, 34°35'N 68°57'E, ♂, formerly FMNH 161186), 120492 (40 km west of Jalalabad, ca. 34°26'N 69°55'E [Laghman Prov.], juv. ♂), 120718 (30 km west of Jalalabad, ca. 34°26'N 70°03'E, ♀), 147425–26\*\* (Kabul [Kartesh, Sharinau], ca. 34°32'N 69°10'E, juv. ♀♂), 147427 (Lashkar Gah, 31°36'N 64°22'E, juv. ♂); FMNH +161185 (Paghman, ♂, see remark above), 171788\* (Kandahar, 31°37'N 65°43'E, juv. ♂); MMGU 2729a–b\*\* (“Kabul”, subad. ♂, juv. ♂, see Geographic Variation: second smallprint); ++MZUF 23939–42\*\* (Masjed-i Chobi, 34°34'N 63°05'E, 3 ♂♂, ♀, see remark above); MZLU [958] 3225–26\*\* (“Hadda”, approx. 31°45'N 65°45'E [Khawājah Mulk area], juv. ♂, ♀, see Geographic Variation: first smallprint), [958] 3227\* (Qalat, 32°06'N 66°54'E, ♂), [960] 3036\* (Kandahar, juv. ♀, see remark above); NMW 34992 (Kabul, juv., Fig. 5B); SMF 67907\* (10 km west of Jawand [“Kala-i Chamber”], ca. 35°04'N 64°01'E, ♀); +USNM 166773\* (Herat, 34°21'N 62°12'E, subad.

♂); ZFMK 8559 (Kabul, ♂), 8643–44\*\* (“Petsh” [Valley], ca. 34°57′N 70°52′E [Pech Dareh], ♂♀), †8645 (Kandahar, ?), 8651 (Fig. 5D) and 8678\* (Kabul, juv. ♂, subad.), 41340\* (Dashti Nawar [Plain], ca. 33°32′N 67°47′E, ♂), +84787\* (Qonduz [Kunduz], 36°43′N 68°51′E, ♂, see remark above), +86744\* (Mazar-i Sharif, 36°43′N 67°07′E, juv. ♂), +92802\* (Herat City [University Campus], ♂); ZSM 22.1954.1–2\*\* (Kabul [Gulbaba], juv. ♀, juv. ♂). INDIA (Himachal Pradesh, Uttarakhand): BNHM 539 (Kulu [Kullu, Sultanpur], 31°58′N 77°06′E, ♂, M. B. Balton, data from photographs); unregistered specimen (vic. Pithoragarh, ca. 29°35′N 80°13′E, ♂, data AC, Fig. 5E). IRAN: BMNH +1869.8.28.127\* and –.129 (“Bushire” [Bushehr City], 28°58′N 50°50′E, ♂♂), 1874.11.25.11\* (“south of Regan” [Rigan], ca. 28°39′N 59°01′E, ♂), 1874.11.25.12 (Kalagan, 27°31′N 62°45′E, juv.), +1879.8.15.26\* (“Shiraz”, ca. 29°36′N 52°32′E [Shiraz City], ♀, purch. Watkins & Doncaster), 1886.9.21.100 (Bezd, 35°13′N 60°26′E, ♂, see remark above), +1905.10.14.46 (Ramhormoz, 31°17′N 49°36′E, ♀), 1919.7.18.12\* (Henjam Island, 26°39′N 55°53′E, ♂), ++1936.10.12.6–7 (“Kerman”, ca. 30°17′N 57°05′E [Kerman City], ♂, juv.), 1951.1.1.26\* and +.27 (Masjed Soleyman, 31°56′N 49°18′E, ♂♀), 1951.1.6.68 (“Jamal, Bariz”, juv., see footnote 7), R.R. ++1963.992a\*–b (“Shiraz” [“Schiraz; Kurdistan”, GÜNTHER, 1858], ♂♀, reregistered, see Taxonomy and Type Material, Samples and Characters: third smallprint); BNHM 565 (Mendejin [Mendajin], 37°22′N 48°14′E, ♂, data from photographs); CAS 86371 (“between Masjid-i Suleiman and Haft Kel” [Haftgel], ca. 31°41′N 49°25′E, ♂), 86409 and 86420 (Masjed Soleyman, ♂♀, incl. Fig. 5A), 86433 (“Naftak” [Maidan-e Naftun], 31°59′N 49°19′E, ♀), 86586 (Cham Kureh, 31°32′N 49°52′E, ♀), 86624 (Masjed Soleyman, ♀), 141076 (Huvar [Sarbaz River], 26°09′N 61°27′E, ♀); FMNH 141610 (Iranshahr, 27°12′N 60°42′E, juv. ♂), 141639\* (5 km north of Pol-e Abgineh, ca. 29°33′N 51°46′E, subad. ♀), 171133–34\*\* (Mosharageh, 31°01′N 49°26′E, juv., ♂), 171135\* (Jahrom, 28°30′N 53°34′E, ♂), 171136\* (“6 mi. NW Bastak”, ca. 27°16′N 54°20′E, ♂); FTHR +15303 (Kabir Kuh, ca. 33°02′N 47°28′E, ?, see remark above, Fig. 3D), +15305 (“Sepidkoh” Mts [Sefir Kuh], 33°36′N 48°09′E, ?, data FT), 15306 (Bushehr, ♂, data FT), 15307 (Badavar Mts, 34°07′N 47°53′E, ♂, data FT), 15310 (Nurabad, 34°04′N 47°58′E, ?, data FT); MCZ +902\* (“Arabia”, ♀, Capt. C. Millett, see Taxonomy and Type Material, footnote 7), 58872\* (“Mohar Biringi” [Mahoor Berenji], 32°23′N 48°39′E, ♂); MHNG ++1359.1–3\*\* (Ahvaz, 31°19′N 48°41′E, ♂♀♀, see Geographic Variation: sixth smallprint, last paragraph under Distinction), 1553.59 (“Mt. Elbours” [Alborz Mts], ca. 35°50′N 51°22′E [Pangah, Tehran Prov.], ♀), +2646.13 (ca. 12 km west of Sabzevar, ca. 36°13′N 57°32′E, ♂), 2646.38–39 (south of Jamal Bariz [27 km ahead Jiroft on road to Kerman], ca. 28°50′N 57°54′E, ♀♀, incl. Fig. 4A), +2646.61 (southwest of Do Gonbadan, ca. 30°20′N 50°46′E, ♂ roadkill), 2718.13–16 (Ban Anbari, Biyaban District [Shahrestan-e Mīnāb], 26°50′N 57°15′E, ♂♂, subad. ♀♀, incl. Fig. 4B), 2718.17 and +2718.18 (west of Bezd, 35°13′N 60°21′E, ♂♀), 2718.19 (vic. Sabzevar, ca. 36°13′N 57°41′E, juv. ♀, leg. A. Afzal Abadi); MKQ [“*rhodorachis*” series] no. 1 (♂) and 2–3 (vic. Shiraz, gender and colour pattern unknown in case of no. 2–3, data MK); MMGU 12001\* (Bazman, 27°52′N 60°11′E, ♀), 12211\* (“Obi Garm (Dasht-e Lut)”, ca. 32°36′N 58°18′E [Kuh-e Ab-e Garm area], subad. ♀), 13006\* (ca. 50 km southeast of Qasr-e Shirin [Gilan River], 34°22′N 45°43′E, ♀), +13172\* (Bazangan, 36°18′N

60°26′E, ♀), 13381\* (“southwest slope of Zagros Ridge”, ♀); MNHN (+?)1961.134\* (“Akinlou” [Akanlu, Akenlu], 35°37′N 48°11′E, ♂, “Dr. Golvan”, see Samples and Characters: third smallprint); +MSNG 30312 (“Shiraz”, ♀, lectotype, Fig. 2A); +MZUT R610 [formerly no. 4020] (“Persia merid.”, ♀, “Miss. Doria”, see footnote 7); NMB 14383\* (“zwischen Zahedan [29°30′N 60°52′E] und Chahbar” [Chah Bahar, 25°18′N 60°38′E], not mapped, juv. ♂); NMP [“6V” series] 34585 (Isin, 27°19′N 56°17′E, subad., data JM), 34586 (Senderk, 26°50′N 57°25′E, juv., data JM), +72838 (Robat Sharaf Caravansary, 36°16′N 60°39′E, ♂, data JM), 74181 (east of Mayamey, 36°24′N 55°41′E, ?, data JM); NMW 15167.1 (“Belutschistan” [Bazman], subad. ♂, A. Gabriel), +15167.2 (“Persien” [Fars], juv., F. C. Andreas, see Systematic Review: fourth smallprint), ++15168.1–4\*\* (“Persien”, ♂♂, coll. Th. Kotschy, see footnote 7), 18213.2 (“Zaidan” [Zahedan], 29°30′N 60°52′E, ♀), 34985 (Bazman, ♂), +34990 and +34991.1 (“Shiraz”, juv., subad.), ++34991.2–3 (Darab, 28°45′N 54°33′E, juveniles); RUZM [“CP” series] 30.7\* (10 km west of Kanjavan, 33°45′N 45°51′E, ♀), 30.13\* (vic. Tazeh Kand [Hamadan], 34°43′N 47°57′E, ♂, Fig. 2F); SMF +51071\* (Birjand, 32°52′N 59°13′E, ♂); SMNS 3008\* (southwest of Iranshahr on Bampur River, 27°10′N 60°38′E, subad. ♂, Fig. 2B); TMUS +1005 (Godar-e Polamkhani [Pass], 33°07′N 54°45′E, ♂), +1006 (50 km east of Saqand [Saghand], ca. 32°30′N 55°35′E, juv. ♂), 1017\* (vic. Mojen, 36°28′N 54°37′E, ♂); ZFMK (+?)31603\* [juv.], 31666 [?, desiccated], +31667\* [♂, “Shirâz” fide WERNER, 1917], +31668\* [♂], +31669\* [?, see footnote 7], and ++31670–71\*\* [♂, ?, see remark above] (series from “Fars: Umgebung von Schiras” [ZFMK register], F. C. Andreas, see Systematic Review incl. fourth smallprint), 93702\* (“Wüste Lut” [Desert], not mapped, ♂); ZISP 9285.1\*–2 (“Tscha-i-Dura in Kirmano orient.” [“Cha-i Du-Ra” btw. Kaskin and Bazman], ca. 27°41′N 60°17′E, ♂♀, N. A. Zarudnyj 1898), 9286\* (Kaskin, 27°30′N 60°22′E, ♀, Zarudnyj 1898), 9287 (“Chun-i-Kaka in Sargado” [“Khun-i Kaka”, Sarhad], ca. 28°30′N 60°40′E [two localities named Khun Kaka btw. 28°30′–31°N 60°39′–41′E], ♂, Zarudnyj 1898), 9288 (“S. Kerat, Khasht-Adan” [Karat], 34°34′N 60°34′E, ♂, Zarudnyj 1898), 13556(†)–57\* (central Iran [“srednaja Persia”], ?, ♀). IRAQ (*P. cf. r. rhodorachis*): CAS 157119\* (Halabjah, 35°10′N 45°59′E, ♀); FMNH 19618\* (“Diana [Diwana], near Rewandes” [Rawandoz], 36°40′N 44°33′E, ♀, Fig. 5F), 74615 (“Sulimaniyah Liwa, entrance to Palegawra Cave”, ca. 35°38′N 45°02′E, ♀, see remark above). KYRGYZSTAN: MMGU 1171\* (Uzun-Akmat Valley, ca. 41°50′N 72°30′E, juv. ♀); MTD 13640\* (vic. Bishkek [“Umgebung von Frunse”], arbitrarily placed at 42°40′N 73°45′E south of Karabalta, ♀). PAKISTAN: AMNH 82181\* (5 mi. southwest of Jer-ruck [Jherruck], ca. 25°00′N 68°11′E [Sonda Forest area], ♂), 84022\* (Churma Island, 24°54′N 66°36′E, ♀), 84247\* (Karachi [near Hill Park], 24°52′N 67°04′E, ♂), 85301 (Karachi [Pechs colony], 24°51′N 67°03′E, juv.), 85456 (2 mi. east of Naka Kharai [Kharari], ca. 25°15′N 66°44′E [“Pab Hills”, MINTON, 1966], ♀), 85578\*–79 (Karachi, 24°52′N 67°03′E, ♂, juv.), 85863\* (canyon of Sari River, 23 mi. northeast of Malir [“Dadu Dist.: Khadeji Falls” fide MINTON, 1966], ca. 25°07′N 67°32′E [Jamshoro District], ♂), 86898 and 87481\* (Karachi, ♀♀), +88439 (5 mi. south of Peshawar, ca. 33°56′N 71°34′E, juv. ♀), 88470\* (Dum Kach, 30°13′N 67°47′E, ♂, see *P. noeli*: second smallprint), 89293 (Karachi, juv.), 161996\* [SAM 620] (3 mi. northeast of Hab Nadi Chauki, 25°07′N 66°55′E, ♀), +161998\* [SAM 686] (5 mi. south

of Peshawar, ♀); BMNH 1873.7.3.12 (“between Kashmere and Murree”, ca. 34°00′N 74°00′E, ♂), 1910.7.12.2 (“Chitral”, arbitrarily placed at 35°45′N 71°45′E south of Chitral Town, ♂, F. Wall); NMW 25452.5\* (“Persien”: Mt. Sirban, ca. 34°12′N 73°24′E, ♂, coll. W. Waagen, don. F. Stoliczka, see footnote 7), 25452.6\* (“Persien”: Salt Range, ca. 32°40′N 72°35′E near Nurpur, ♀, *ibid.*); PMNH 500 (“Tanishpa”, Toba Kakar Mts, ca. 31°10′N 68°28′E [vic. Awan Salawat], ♂, data RM), 770 (Chagai [Town], 29°17′N 64°42′E, ♂, data RM), 771 (Dalbandin, 28°54′N 64°25′E, ♂, data RM), 1431 (Chogali, 34°26′N 73°45′E, ♂, data RM); SMF 57304 (Jiwani, 25°03′N 61°44′E, ♂), 57305\* (Astola Island, 25°07′N 63°52′E, ♂), 57307 (Abbottabad [Abbattabad], 34°09′N 73°13′E, ♂), 57308\* (Haripur, Hazara, 34°00′N 72°56′E, ♀), 57327\* (vic. Baleji [Buleji], Hawkes Bay, ca. 24°51′N 66°48′E, ♂), 57328\*, 62926\* and 62930\* (Karachi, ♀, subad. ♂♂), 62941 (Mansehra, 34°20′N 73°12′E, ♂); UMMZ 121970\* (“Hills W Hab Chowki” [Hab Nadi Chauki], ca. 25°02′N 66°50′E [“Pab Hills” fide MINTON, 1966], ♂); USNM 52141\* (“Baluchistan, Quetta”, 30°12′N 67°01′E [Quetta Town], ♀, Fig. 5C); ZSM 220.1989\* (“Kedsch, Mekran” [Turbat], 26°00′N 63°03′E, ♀, E. Zugmayer), 221.1989\* (“Tank-i Grawag”, ca. 27°10′N 63°25′E [Grawag], ? [tail completely missing], Zugmayer), 223.1989.1–6\*\* (Panjgur, 26°58′N 64°06′E, 2 ♂♂, 4 ♀♀, Zugmayer, incl. Fig. 2D). TAJIK-ISTAN: MTD 6126\* (vic. Dushanbe, ca. 38°34′N 68°46′E, ♂), 11334\* (“Gissar” [Hisor] Valley, ca. 38°30′N 68°30′E, ♂); ZISP 14032\* (5–6 km northwest of Surkhakchashma, ca. 38°40′N 68°27′E, ♀, ‘Gissar’ Parasitological Exped. 1934, S. A. Chernov & A. Gvozdev), 14033\* (southern Hisor Mts, not mapped, ♀, *ibid.*), 15819\* (Varzob Valley, ca. 38°40′N 68°46′E, ♂, Tajik-Pamir

Exped. 1932); ZSM 313.1976\* (“Gissar Tal, ca. 90 km SW Dushanbe”, ca. 38°15′N 68°20′E, ♂). TURKMENISTAN: BMNH 1892.11.28.6–7 (Aydere, 38°24′N 56°45′E, ♀♀, C. Eylandt); CAS 182939–43\*\* (2 km N Khivabad, 37°12′N 59°33′E, ♂♂, ♀), 184430–31\*\* (within 2 km NE and NW of Khivabad, ca. 37°11′N 59°33′E, ♂♀), 184837\* (“Elev. 50 m [...] Chalsu Valley, base of the Maly (Little) Balkan”, 39°14′N 54°58′E, ♂, fide ‘Collection Database’), CAS 185035\* (“Lower Chuli”, 38°01′N 58°02′E, ♂); MHNG 2443.25–27\*\* (Mary, 37°36′N 61°50′E, ♂♂), 2443.28\* (♀), 2443.29\*–31 (♂♂, incl. Fig. 3C), †2443.32 (♂), 2443.33\* (♂) and ++2443.34–35\*\* (♂♀, incl. Fig. 4D) from the Ashgabat area (centering around 37°57′N 58°23′E); MTD +15621\* and +19178\* (Ashgabat, ♀♀), 19901–02\*\* (Mary, ♀♂), 20400\* (viz. Chuli, 37°59′N 58°01′E, ♂, Fig. 2E), 25334–36\*\* (“Kjuren dag”, ca. 39°04′N 55°30′E, ♂♀♀), 27935\* (vic. Ashgabat, ♂), +30814\* (“Koped Dag”, ♀); ZISP ++11789–90 (Garrygala, 38°26′N 56°18′E, ♂♂, see remark above), 16385 (Gyzylarbat, 38°59′N 56°17′E, ♂), 17224 (Bayramali, 37°37′N 62°10′E, ♀, O. P. Bogdanov), 17225 (Yolöten, 37°18′N 62°22′E, ♂, *ibid.*); ZMB 38725\* (Firjuza Gorge, 37°51′N 58°00′E, ♂), 38815\* (“Seraks” [Saraks], 36°31′N 61°13′E, ♀, Fig. 2C), 51839\* and 56081\* (Saivan Valley, ca. 38°30′N 56°47′E, ♀♀). UZBEKISTAN: MMGU 12649\* (vic. Gadaykhana, 40°33′N 66°32′E, juv. ♀); MTD 21473\* (“Hissar-Gebirge am Fluß Tupalango” [Topalangdaryo, Hisor Mts], ca. 38°19′N 68°00′E, ♂); NMP [‘6V’ series] 35463 (“Surkhandaryia” [Surxondaryo], not mapped, ♂, data JM); ZISP 9489\* (“Buchara” [Shurcha], 39°01′N 65°05′E, ♂), 12134.1–2 (vic. Darvaza [“Iog-it”], ca. 40°58′N 67°22′E, ♂♂, see footnote 2); ZSM 229.1988\* (Mt. Kemkutan, 39°27′N 66°49′E, ♂).

**Appendix B.** Examined hybrid racers (Tab. 5). Explanation of symbols in Appendix A. Presumed *Platyceps k. chesneii* × *P. r. rhodorachis*. IRAN (Khuzestan): USNM 153743\* (45 km north of Ahvaz [along highway], ca. 31°50′N 48°25′E [Nahr-e Shavur], juv. ♂, Fig. 23A). *P. k. karelini* × *P. mintonorum*. AFGHANISTAN (Nimruz): BMNH 1886.9.21.101\* (“Helmand” [River], ca. 30°17′N 62°03′E [near Chahar Burjak, SCHÄTTI *et al.*, 2012], ca. 500 m above sea level, juv. ♂, Afgh. Delim. Comm. [J. Aitchison], Figs 22E–F). *P. k. karelini* × *P. r. rhodorachis*. AFGHANISTAN (Herat, Nimruz): BMNH 1873.1.7.10\* (“Kila-i-Fath, Sistán” [Qala-i Fateh, Qal’eh-ye Fath], 30°34′N 61°50′E, ca. 500 m, juv. ♂, “Gen. [Frederic J.] Goldsmid, East India Office”, “captured by Maj. Euan Smith” fide BLANFORD, 1876), +1886.9.21.104\* (“New Gulran” [Gulran], 35°06′N 61°41′E,

ca. 770 m, ♂, Afgh. Delim. Comm.). IRAN: BMNH 1874.11.25.10\* (“Karmán, S.E. Persia”, ca. 30°17′N 57°05′E [Kerman City], ca. 1,760 m, ♂, W. T. Blanford). TURKMENISTAN (Ashgabat area, Mary): SMF +18216 [formerly no. 7398a] (Ashgabat, 37°57′N 58°23′E, 220 m, ♂, C. Eylandt, Fig. 22A), 18221 (“Murgab-Fluß”, ♀, H. Leder, Fig. 22B); ZISP +17210 [heavily damaged ♂, in two desiccated parts], +17220, and +17223 [♂♀] (Bayramali, 37°37′N 62°10′E, 240 m, O. P. Bogdanov, see Methods and Definitions: second smallprint); +ZMB 38833\* (“Kara-kum”, 50 km east of Imambaba, ca. 36°43′N 61°50′E, ca. 350 m, ♀, Dubrovskij 1961, Figs 22C–D). Probable *P. k. karelini* × *P. r. rhodorachis*. AFGHANISTAN (Balkh): ZFMK 86743\* (Mazar-i Sharif, 36°43′N 67°07′E, ♂, Fig. 23B). UZBEKISTAN: 7407\* (“Kyzylkum”, not mapped, juv. ♂).

**Appendix C.** Literature records of *Platyceps rhodorachis* and a supposed hybrid racer annotated with ventral (ven) and subcaudal (subc) counts (striped or plain phenotype indicated when applicable; see External Data incl. first smallprint; compare chresonymies for precise collecting sites). *P. k. karelini* × *P. r. rhodorachis* (probably Murgab Valley): BOGDANOV, 1962 (ven, subc, striped “*r. rhodorachis*” [sic], see Hybrids: second smallprint). *P. r. ladacensis* (“Gilgit” and “Ladak”): ANDERSON, 1871 (ven, ZSI 7323, holotype, see Type Material); SMITH, 1943 (ven, “♂”, see Morphology:

smallprint). *P. r. rhodorachis* – *ladacensis* intergrades (“Chitral”): WALL, 1911b (ven [3], subc [1], ♂♂♀). *P. r. rhodorachis*. INDIA (Himachal Pradesh): STOLICZKA, 1870c (ven, subc, ZSI 7265, juv.). IRAN (Kerman, Khuzestan, Semnan, “Shiraz”, see footnote 1): ANDERSON, 1872 (ven, striped ZSI “type” of *Gonyosoma dorsale* AND., see Taxonomy and Type Material); WERNER, 1895 (ven, striped, see footnote 1); WALL, 1908b (ven [4], subc [2], striped [1], BNHM holdings); WETTSTEIN, 1951 (ven, striped); NILSON & ANDRÉN, 1981 (ven, subc, NHMG 4424); MULDER, 2002 (ven, subc, NMR



9994–00368, ♂). IRAQ (*P. cf. r. rhodorachis*, As-Sulaymaniyah): AFRASIAB & MOHAMAD, 2011 (ven, subc, IMNH 746, ♀). PAKISTAN (southern Chitral, Karachi area, Makran coast, Peshawar, N Punjab, and probably Mt. Sirban in Khyber Pakhtunkhwa): STOLICZKA, 1872 (ven, subc, plain phenotype, ♂, see External Data, last paragraph under Colour Pattern); WALL, 1911b (ven [12, without no. 7, viz. BMNH 1910.7.12.2], subc [7], striped [3], “Chitral” series [mostly unspecified localities], incl. 4 ♂♂, 7 ♀♀, see Appendix

D); SHOCKLEY, 1949 (ven, subc); KHAN, 1977 (ven, subc, as “*karelini*”, see Pholidosis: second smallprint); KHAN, 1986 (ven, subc, ♀). TAJIKISTAN (Artuch): DAL, 1936 (ven [2], MSGU 330 and 1618, see chresonymy). TURKMENISTAN (Tedzhen Valley and two unspecified localities): LANTZ, 1918 (ven and subc [2], MMGU); TUNJEV, 2000 (ven and subc [2], striped, IZTA, see Geographic Variation: first smallprint). UZBEKISTAN (vic. Samarqand, Agalyk Valley): DAL, 1936 (ven, MSGU 793 and 1619).

**Appendix D.** Literature records of striped *Platyceps r. rhodorachis*. Only the first mentions of localities not documented by examined material (Appendix A) are listed. Question marks denote three putatively typical Turkmen specimens (Fig. 14, see Samples and Characters: fourth smallprint). AFGHANISTAN (Jowzjan): KRÁL, 1969 (Aqchah). IRAN (Ilam, Esfahan, Hormozgan, Kerman, Khorasan-e Razavi, Khuzestan): WERNER, 1895 (vic. Sirch, see footnote 1); NIKOLSKIJ, 1900 (Fariman); WALL, 1908b (Maidan-e Naftun); MORICZ, 1929 (Mashhad); WETTSTEIN, 1951 (Jiroft [Sabzevaran], see footnote 1); FRYNTA *et al.*, 1997 (Qamishlu, phenotype in litt.); RAJABIZADEH *et al.*, 2008 (Bandar Abbas); FATHINIA *et al.*, 2010 (Abdanan area and “Shirvan-Chardavol” County). PAKISTAN (Khyber Pakhtunkhwa): MCMAHON, 1901b (“Dir and Swat”, arbitrarily placed at 34°30'N 71°45'E); WALL, 1911b (“Chitral” [Town]). TURKMENISTAN (Ahal, Balkan, Daşoguz, Lebap, Mary): ZARUDNYJ, 1891 (Germob, Gurktepe Well [sight record], near “Jaman-Rinde” [vic. Tedzhen]); VARENCZOV, 1894 (Kurtusu, Hawdan); NIKOLSKIJ,

1897 (Mt. Nagduin, see CHERNOV, 1959); MORICZ, 1929 (Utsch-Adshi); CHERNOV, 1934 (Tashkepri); GENTNER, 1945 (Akrobat); BOGDANOV, 1953 [1962] (Bayramali, Gowshutbent, Imambaba, Yolöten, Karabata, Sultanbent, Takhtabazar, Turkmenkala); GENTNER, 1954 (Kagazly, Morgunow); RUSTAMOV & PTUSHENKO, 1959 (?Orta-Kuyu Well in W Daşoguz); BOGDANOV, 1962 (Hindukush, Repetek, Zeleyni Klin); BOGDANOV, 1965a (Akar Cheshme, Kaakhka); CZELLARIUS, 1974 (vic. Repetek in Lebap); ATAJEV, 1975b (Bagyr); SHAMMAKOV, 1981 (Aydere Gorge [Balkan, Ahal border], Alybeg, Annau, Bikrova, Chuli, Firjuza, Ishmetpest, Karametnijaz, Kurtlinskoje ozero [Lake], Mejмили); RUSTAMOV & SHAMMAKOV, 1982 (?“Sarykamys Depression” [W Daşoguz], ?“Western Uzboi channel” [Balkan]); ATAJEV, 1985 (Mt. Duşak, vic. Golovnoje, Gadymy Nusaý); CZELLARIUS, 1992 (Gyzylzhaz checkpoint, Solonchak Jerojlanduz); ATAJEV *et al.*, 1996 (Çaçe Valley, vic. Khivabad); TUNJEV *et al.*, 1998 (Chinar Gorge); TUNJEV, 2000 (Turanga Ravine); GEOKBATYROVA, 2012 (Yuldi-Dere Gorge).

**Appendix E.** Distribution records of *Platyceps* spp. (Fig. 25). An asterisk denotes literature reports, photographic evidence, or personal communication. *P. karelini chesneii* (SCHÄTTI, 2006b). BAHRAIN (near sea level): Al-Awali, ca. 26°05'N 50°33'E; Al-Budayyi (Budaiya), 26°13'N 50°27'E; Al-Hamalah, 26°09'N 50°28'E; Al-Jasrah, 26°10'N 50°27'E; Az-Zallaq (Zallaqah), 26°03'N 50°29'E; \*Umm an-Nasan (“Hasan”) Island, 26°09'N 50°24'E. IRAN (Bush-eir, Fars, Kermanshah, Khuzestan): ?\*Bandar-e Emam Khomeyni (Bandar-e Shahpur, “Bandar Chapour”, RAI, 1965), 30°26'N 49°06'E, nr.s.l. (see Figs 8 and 25); \*Borazjan (Borazjün), 29°16'N 51°12'E, ca. 70 m (WERNER, 1917); Bushehr, 28°58'N 50°50'E, nr.s.l.; vic. Khosravi, ca. 34°24'N 45°29'E, ca. 275 m; “Schiraz” (syntype of *Zamenis persicus* JAN), ca. 29°36'N 52°32'E, ca. 1,530 m (Shiraz City, see Sympatry: second smallprint); Susangerd, 31°34'N 48°11'E, nr.s.l. IRAQ: \*Ad-Dawr (Daur), 34°27'N 43°48'E; \*Ad-Diwaniyah, 31°59'N 44°56'E, 25 m; Al-Amarah, 31°50'N 47°08'E, nr.s.l.; \*Al-Basrah (Basra), 30°32'N 47°47'E, nr.s.l.; \*Al-Hillah, 32°29'N 44°26'E, 40 m; \*Ash-Shaibah, 30°24'N 47°38'E, 20 m; Ash-Sharqat (Kalat Sherghat), 35°29'N 43°14'E, 150 m; \*Az-Zubayr, 30°24'N 47°42'E, nr.s.l.; Baghdad, 33°20'N 44°24'E, 40 m; vic. Bayji, ca. 34°45'N 43°14'E, 130 m (Abu Kadur area); \*Baqubah, 33°45'N 44°39'E, 40 m; \*Esra’s tomb” (btw. Al-Amarah and Al-Qurnah), ca. 31°25'N 47°18'E, nr.s.l.; \*Fallujah, 33°21'N 43°47'E, 40 m; Faw Peninsula, ca. 29°58'N 48°28'E (Al-Faw), nr.s.l.; Jabal Hamrin, ca. 34°30'N 44°30'E, ca. 100 m; Khanaqin, 34°21'N 45°23'E, 180 m; Kish, 32°32'N 44°42'E, 30 m; Mo-

sul, 36°20'N 43°07'E, 230 m; “Mound of Jarmo” (Chemchamal area), ca. 35°33'N 44°55'E, ca. 700 m; \*Najaf, 32°00'N 44°20'E, 50 m; Nasiriyah, 31°03'N 46°16'E, nr.s.l.; Samarra, 34°12'N 43°53'E, 70 m; \*Shaykh Sa’d (Saad), 32°34'N 46°16'E, nr.s.l.; \*Tozkurmato (Tuz Khurmatli), 34°53'N 44°38'E, 230 m. KUWAIT: \*Sabiya Peninsula”, ca. 29°36'N 48°07'E (As-Sabiyah area), nr.s.l. \*QATAR (GARDNER, 2013): unspecified (arbitrarily placed at 25°00'N 51°40'E). SAUDI ARABIA (all records except those in the Riyadh area [ca. 600 m, AL-SADOON, 1989] from near sea level): \*Abqaiq, 25°56'N 49°41'E; \*Al-Awjam (Ajam al-Qatif), 26°34'N 49°57'E; \*Al-Hasa (Qatif area), 26°31'N 50°01'E; Al-Hufuf (Hofuf), 25°22'N 49°34'E; Al-Jubayl, 25°24'N 49°39'E; \*Ad-Diriyah [“Al-Diriyah”], 24°45'N 46°34'E; Dhahran, 26°18'N 50°08'E; Jazirat Tarut (T. Island), 26°34'N 50°03'E; \*Riyadh [“Al-Riyadh”], ca. 24°41'N 46°42'E. UNITED ARAB EMIRATES: \*Jazirat Dalma (D. Island), 24°31'N 52°19'E, nr.s.l. (GARDNER, 2013); Sir Bani Yas (Island), ca. 24°20'N 52°36'E, nr.s.l. *P. k. karelini* – *chesneii* intergrades (SCHÄTTI *et al.*, 2012). IRAN (Fars): Izad Khvast (Yezd-e Khast), 31°31'N 52°07'E, ca. 2,200 m; “Schiraz” (NMW 25446.7, origin probably imprecise, see Sympatry: second smallprint). *P. k. karelini* (only peripheral records). AFGHANISTAN (SCHÄTTI *et al.*, 2012): \*Aqchah (Ag Chah), ca. 36°55'N 66°11'E, ca. 280 m; Chah Anjir, 31°41'N 64°19'E, ca. 800 m; Chahar Dahaneh, 31°38'N 65°39'E, ca. 1,000 m; \*Chinkilok” (Herat area), 34°31'N 61°52'E, ca. 1,050 m; 45 km west of Herat, ca. 34°25'N 61°45'E, 880 m (Clark, 1990); Kandahar, 31°37'N 65°43'E, ca. 1,000 m; “Kilki”

(Ziarat-e Fateh Mohammad area), ca. 34°00'N 61°25'E, ca. 975 m. IRAN (SCHÄTTI *et al.*, 2012): Kerman, ca. 30°17'N 57°05'E (relies on BMNH 1874.11.25.10, see Appendix B); \*Zahedan, 29°30'N 60°52'E, ca. 1,350 m. KAZAKHSTAN (PARASKIV, 1956; BANNIKOV *et al.*, 1977 [map]; BRUSHKO, 1983): \*Aspara, 43°03'N 73°34'E, 615 m; \*btw. Furmanovka (Moyynqum, 44°17'N 72°57'E, 335 m) and Dzhambul Gorj (Mt. Dzhambul, 44°47'N 73°06'E); \*northern Moyynqum Desert [site plotted at ca. 44°15'N 71°45'E]; \*Novotroitskoje (Novotroitskoye), 43°41'N 73°45'E, 450 m. KYRGYZSTAN (BOBORJEV *et al.*, 1985; JEREMCHENKO *et al.*, 1992; examined material): Bishkek area ("Frunse"), ca. 42°52'N 74°35'E, ca. 770 m (MHNG 2442.96–97, MTD 10450); \*Kara-Archa Gorge, ca. 42°45'N 71°46'E, ca. 1,000 m. PAKISTAN (SCHÄTTI *et al.*, 2012): East of Hanna (Urak Valley), ca. 30°15'N 67°10'E, ca. 2,000 m; \*Chaman, 30°55'N 66°28'E, ca. 1,335 m; Kalat, 29°01'N 66°35'E, 2,020 m; Khuzdar, 27°48'N 66°37'E, 1,215 m; Pishin 30°35'N 67°00'E, 1,535 m; \*Wali Khan, 29°53'N 66°51'E, 1,650 m. *P. mintonorum* (SCHÄTTI & STUTZ, 2005). AFGHANISTAN (Helmand, Kandahar): Chah Anjir, 31°41'N 64°19'E, 800 m; 10 km north of Kuchnay Darweshan ("Darweshan", Darvishan), ca. 31°04'N 64°11'E, ca. 700 m; 10–20 km northeast of "Darweshan", ca. 31°06'N 64°15'E (west of Garmsir), ca. 750 m; "40 km SE Kandahar", ca. 31°19'N 65°58'E (Takhtah Pul area), ca. 1,050 m. IRAN (Sistan-ve Baluchestan, LATIFI, 1985): vic. \*Zabol, ca. 31°02'N 61°30'E, ca. 480 m; vic. \*Zahedan, ca. 29°30'N 60°52'E, ca. 1,350 m. PAKISTAN (Baluchistan: Chagai, Kharan, and Nushki Districts): 2 mi. northwest of Ahmadwal, ca. 29°27'N 65°55'E, ca. 900 m; Dalbandin, 28°54'N 64°25'E, ca. 850 m; Kharan, 28°35'N 65°25'E, ca. 700 m; Nok Kundi, 28°50'N 62°45'E, ca. 680 m; "near Nushki", ca. 29°33'N 66°01'E, ca. 1,000 m; "2 miles east of Nushki", ca. 29°31'N 66°01'E, ca. 1,000 m; "6 Meilen nördlich Nushki", ca. 29°37'N 66°00'E, ca. 950 m; "zwischen Nushki und Dalbandin", ca. 29°10'N 65°25'E, ca. 800 m (vic. Bilao); \*Surdehgar, 28°55'N 64°28'E, ca. 850 m; \*Zangi Nawar (Z. N. Kili, type locality), 29°26'N 65°47'E, ca. 900 m (MERTENS, 1969). *P. najadum* (SCHÄTTI *et al.*, 2005; FATHINIA *et al.*, 2010; TOKI, 2010; Khosro Rajabizadeh [KR] and Eskandar Rastegar Pouyani [ERP] in litt.). *P. n. atayevi*. TURKMENISTAN (type locality): vic. Saivan, ca. 38°30'N 56°47'E, ca. 1,250 m. *P. n. najadum*. IRAN (Ilam [nominotypical subspecies fide FATHINIA *et al.*, 2010] and easternmost records, viz. Khorasan-e Razavi): \*Abdanan, 33°00'N 47°25'E, 890 m; \*Darreh Gaz [Khorasan], 37°27'N 59°06'E, 475 m; \*Darreh Shahr, 33°08'N 47°23'E, 665 m; \*Eyvan-e Gharb, 33°50'N 46°19'E, 1,185 m; \*Karzan ("Karezan", area), ca. 33°45'N 46°32'E, ca. 1,250–1,500 m; \*Kuh-e Qamar Ali [Khorasan, SCHÄTTI *et al.*, 2012: footnote 8], 37°27'4"N 58°38'04"E, above 2,000 m (ERP, TMUS specimen); \*Mianavar (Abdanan), 33°08'N 47°06'E, ca. 1,600 m; \*Quchan [Khorasan], 37°06'N 58°31'E, 1,315 m. IRAQ (Al-Karbala, Arbil, Baghdad, Diyala): Baghdad, 33°20'N 44°24'E, 40 m; \*Baqubah, 33°45'N 44°39'E, 40 m; \*Al-Hindiya, 32°33'N 44°13'E, nr.s.l.; Kird Mamik (Girdmamik), 36°26'N 43°50'E, 325 m. *P. n. cf.*

*schmidtleri*. IRAN ("Boyerahmad", Chahar Mahall-ve Bakhtiari, Esfahan, Fars, Kerman, Khuzestan, Lorestan, incl. new examined material): ?\*, 31°19'N 48°41'E, 20 m (see Sympatry: first smallprint, Fig. 25); \*Badavar Mts, 34°07'N 47°53'E, 1,800–2,100 m (FTHR 15304); \*vic. Baft, ca. 29°14'N 56°36'E, ca. 2,270 m; \*Dasht-e Arzhan, 29°40'N 51°59'E, 2,025 m (photograph Daniel Frynta); east of Deh 'Ali, 31°31'N 51°10'E, ca. 1,850 m (MHNG 2646.65); \*Dehdez, 31°43'N 50°17'E, 1,535 m; \*Eqolid (Aghlid), 30°53'N 52°41'E, 2,240 m; vic. Gonahran (Gonharan), ca. 33°02'N 50°39'E, ca. 2,500 m; \*Hanjis Mts, 33°45'N 47°37'E, 1,300–1,700 m; \*Jahrom area, 28°30'N 53°34'E, 1,050 m (KR); \*Kerman, ca. 30°17'N 57°05'E, ca. 1,760 m; \*Malekoh (Mt., 5 km northwest of Pol-e Dokhtar), ca. 33°10'N 47°40'E, 1,100–1,800 m; Mehkuyeh area, ca. 29°00'N 52°29'E, ca. 1,700 m; Qamishlu (Qomishlu), 32°03'N 51°28'E, 2,140 m; vic. Shiraz, ca. 29°36'N 52°32'E, ca. 1,530 m; \*Takht-e Jamshid (Persepolis), 29°56'N 52°53'E, ca. 1,625 m; \*Tal Gerd-e Charam, 30°45'N 50°45'E, 790 m (KR); \*Tang-e Sat (N Andimeshk District), 32°52'N 48°44'E, 600–1,100 m; \*Yasuj, 30°40'N 51°35'E, ca. 1,800 m; 5 mi. northeast of Yasuj, 30°43'N 51°38'E, ca. 2,350 m (type locality). *P. ventromaculatus* (SCHÄTTI & SCHMITZ, 2006). INDIA (incl. LAMBA, 1987; HUSAIN & RAY, 1995; HUSAIN & TILAK, 1995; NARAYANAN & SATYANARAYAN, 2012; see Sympatry: last smallprint): \*Anand Parbat (Delhi Metropolitan area), 28°39'N 77°10'E, 220 m; \*Bijrani, 29°26'N 79°04'E, ca. 460 m (Corbett National Park, Fig. 11); \*Churu [District], ca. 28°18'N 74°58'E; \*Deesa, 24°15'N 72°10'E, 120 m; \*Delhi, 28°40'N 77°13'E, 220 m; \*Jaipur, 26°55'N 75°49'E, 440 m; Jodhpur, 26°17'N 73°02'E, 235 m; \*Khinanauli, ca. 29°34'N 78°54'E, ca. 420 m (Corbett N. P., Fig. 11); Lucknow, 26°51'N 80°55'E, 125 m; \*Nainital (District), arbitrarily placed at Kaladhungi, 29°17'N 79°21'E, ca. 400 m (Fig. 11); \*Naraina, 26°47'N 75°12'E, 370 m; \*Nokh, 27°34'N 72°16'E, 175 m; \*Paota, 26°58'N 76°56'E, 235 m; \*Pauri Garhwal (District), arbitrarily placed at Bilkhet, 29°58'N 78°41'E, ca. 580 m (Fig. 11); \*Phulera road, ca. 26°52'N 75°14'E, ca. 400 m; \*Pilani ("vicinity of Shivaganga"), 28°22'N 75°36'E, 295 m; \*Pugal, 28°30'N 72°48'E, 155 m; \*Rajaji National Park, ca. 30°05'N 78°10'E, ca. 420 m (Fig. 11); \*Sikar, 27°37'N 75°09'E, 430 m. PAKISTAN (incl. MASROOR, 2012; SCHÄTTI *et al.*, 2012: Fig. 5; PMNH material; only peripheral records): Bahadur Khel, 33°11'N 70°57'E, ca. 575 m (PMNH 1919); Bannu, 32°59'N 70°36'E, 380 m (PMNH 1925); \*Dera Ghazi Khan, 30°03'N 70°38'E, 130 m; \*Dera Ismail Khan, 31°50'N 70°54'E, 180 m; "Gaj River", ca. 26°52'N 67°20'E, ca. 125 m; Gwadar, 25°07'N 62°20'E, nr.s.l.; Islamabad, 33°42'N 73°10'E, ca. 500 m (PMNH 498); \*Jhelum, 32°56'N 73°44'E, 235 m; \*Karak, 33°07'N 71°06'E, ca. 580 m; \*Kaur Bridge (affluent of Gumal River), ca. 32°08'N 70°16'E, ca. 270 m; \*Larkana, 27°33'N 68°13'E, 55 m; Moenjo Daro (Mohenjodaro), 27°20'N 68°08'E, 50 m; Rumra, 25°23'N 63°44'E, nr.s.l.; \*Sialkot, 32°31'N 74°33'E, 250 m; unspecified report (KHAN, 2002: map entry): ca. 26°00'N 66°30'E (SE Baluchistan).

