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Revealing two centuries of confusion: new insights on nomenclature and systematic position of *Argyrogena fasciolata* (Shaw, 1802) (auctt.), with description of a new species from India (Reptilia: Squamata: Colubridae)

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http://zoobank.org/8BBB5786-A54D-4C5F-842C-7801DB21044C

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Abstract

Coluber fasciolatus Shaw, 1802 (today *Argyrogena fasciolata* auctt.) is the name used for a widespread terrestrial colubrid snake species inhabiting subtropical and tropical dry deciduous/thorn forests of South Asia from Pakistan to India, with unconfirmed records of distribution in Nepal, Bangladesh and Myanmar and a single doubtful record from the northern tip of Sri Lanka.

During the past 200 years, *A. fasciolata* (common name Banded racer) has been placed in different genera, i.e. *Tyria* Fitzinger, 1826*, Zamenis* Wagler, 1830, *Coryphodon* Duméril, Bibron and Duméril, 1854, and *Coluber* Linnaeus, 1758 where it primarily remained until the mid 1960s and exceptionally until the year 2011. Three subsequently introduced names, viz. *Coluber hebe* Daudin, 1803, *Coluber curvirostris* Cantor, 1839, and *Argyrogena rostrata* Werner, 1924 were synonymized with *C. fasciolatus* shortly after its description.

Based on a combination of characters including body pattern, external morphology and osteological differences Wilson (1967) reviewed the taxon *fasciolatus* Shaw and considered it as generically distinguishable, removed it from the then heterogeneous and undefined collective genus *Coluber* and assigned it to the resurrected genus *Argyrogena* Werner, 1924.

Shaw's (1802) description of *C. fasciolatus* was based exclusively on the information of Russell's "Nooni Paragoodoo" published in 1796 in his "Account of Indian Serpents, collected on the coast of Coromandel; […]". Our analysis of the original data and the depicted type specimen in Russell (1796) revealed that the name *fasciolata* was initially established for a species distinct from that currently known as the "Banded racer", and that Russell's data have been used simultaneously but unwittingly, for more than 150 years, as original source for two valid species from two different genera.

Specimens of Banded racer found in the southeastern part of peninsular India are morphologically and genetically distinct from populations of the rest of the distribution area. These populations from central and southern Tamil Nadu state represent a different species, consequently described as a new species herein. Furthermore, examination of specimens of the Banded racer from different populations across its entire range, including the type specimen of the genus *Argyrogena* (*A. rostrata* Werner), reveals a similarity in morphology with the genus *Platyceps* Blyth, 1860. This was further supported by molecular data which demonstrates that the genus *Argyrogena* is nested within *Platyceps*.

Keywords

Distribution, *Lycodon fasciolatus* comb. nov., morphology, *Platyceps josephi* sp. nov., *Platyceps plinii* comb. nov., Serpentes, South Asia, systematics

Introduction

The Banded racer, presently named *Argyrogena fasciolata* (auctt.), is a colubrid snake species with an assumed wide but scattered distribution in the Indian subcontinent and has an unstable taxonomic history. This species was first mentioned by the Scottish surgeon and naturalist Patrick Russell (1796, p. 26 f., pl. 21) when he described and depicted a "*Coluber*", called "Nooni Paragoodoo" by the natives, in his monumental book about the "[…] Indian Serpents, collected on the Coast of Coromandel […]". Russell's enormous effect on the systematic herpetology of South and Southeast Asia is evidenced through numerous descriptions of Asian snakes by subsequent authors, including G. K. Shaw, F. P. Nodder, J. G. Schneider, P. A. Latreille, F. M. Daudin, M. Bechstein, B. Merrem, C. S. Rafinesque-Schmaltz, T. Bell, H. Boie, F. Boie, L. J. Fitzinger, and Ph. Schmidt who relied exclusively on Russell's text and images (see also Bauer 2015). Based on Russell's (1796) information, the English zoologist George Kearsley Shaw (1802) formally described *Coluber fasciolatus* and since then the specific epithet has been used in binomial combinations with different genera, first used by the following authors as: *Coluber* Shaw (1802), *Coryphodon* Günther (1858), *Tyria* Cope (1863), and *Zamenis* Günther (1864) (see list of synonyms and chresonyms). Werner (1924) described a new genus and species under the name *Argyrogena rostrata* but that taxon was synonymized with *C. fasciolatus* by Smith (1928). Wilson (1967) reviewed morphology and nomenclature of the *C. fasciolatus* and placed the taxon in the monotypic genus *Argyrogena* erected by Werner (1924), the combination predominantly used until today.

Our critical analysis of the original source (Russell 1796) and the subsequent interpretation of his descriptions raises serious doubts regarding the present allocation of the name *Argyrogena fasciolata* to what is commonly regarded as "Banded racer" today. Russell's description of the "Nooni Paragoodoo" and the species *fasciolatus* Shaw and *hebe* Daudin based thereon, show remarkable differences in regard of colour, pattern and pholidosis in comparison to our own and published data on the Banded racer. The present study clarifies the taxonomic status of *Coluber fasciolatus* sensu Shaw. We review nomenclature, taxonomic allocation, morphology, and distribution of the Banded racer and describe a related but distinct new species on the basis of morphological and genetic differences. Furthermore, we provide genetic data for other related colubrid snakes found in India including *Platyceps gracilis* (Günther, 1862), *P. ventromaculatus* (Gray, 1834), *P. bholanathi* (Sharma, 1976), *Lytorhynchus paradoxus* (Günther, 1875), *Wallaceophis gujaratensis* Mirza, Vyas, Patel, Maheta and Sanap, 2016 and *Wallophis brachyura* (Günther, 1866).

Materials and methods

Sampling

We generated DNA sequence data for eight specimens of *Argyrogena* (auctt.) collected from different parts of peninsular India (Appendix 1). Additionally, molecular data for some closely related species including *Platyceps gracilis*, *Platyceps bholanathi*, *Platyceps ventromaculatus* and the distantly related *Lytorhynchus paradoxus*, *Wallaceophis gujaratensis* and *Wallophis brachyura* from India were generated in this study (Appendix 1).

Molecular analysis

Genomic DNA was extracted from liver or tail tissue samples stored in absolute ethanol at –20°C. DNeasy (Qiagen) blood and tissue kits were used to extract DNA. We amplified partial sequences of two nuclear (nu) and three mitochondrial (mt) genes. Cytochrome b (*cytb*) and NADH dehydrogenase subunit 4 (*ND4*), 16S rRNA (*16S*) and the nu markers are oocyte maturation factor (*cmos*) and recombination activating gene 1 (*rag1*). PCR conditions followed previously reported protocols for the respective primer pairs (*cytb*, primers GluDG L: Palumbi 1996 and H16064: Burbrink et al. 2000; *ND4*, primers ND4 and Leu: Arévalo et al. 1994; *16S*, primers 16Sar-L and 16Sbr-H: Palumbi et al. 1991; *cmos*, primers S77 and S78: Lawson et al. 2005; *rag1*, primers R13 and R18: Groth and Barrowclough 1999). In total 37 individual se-

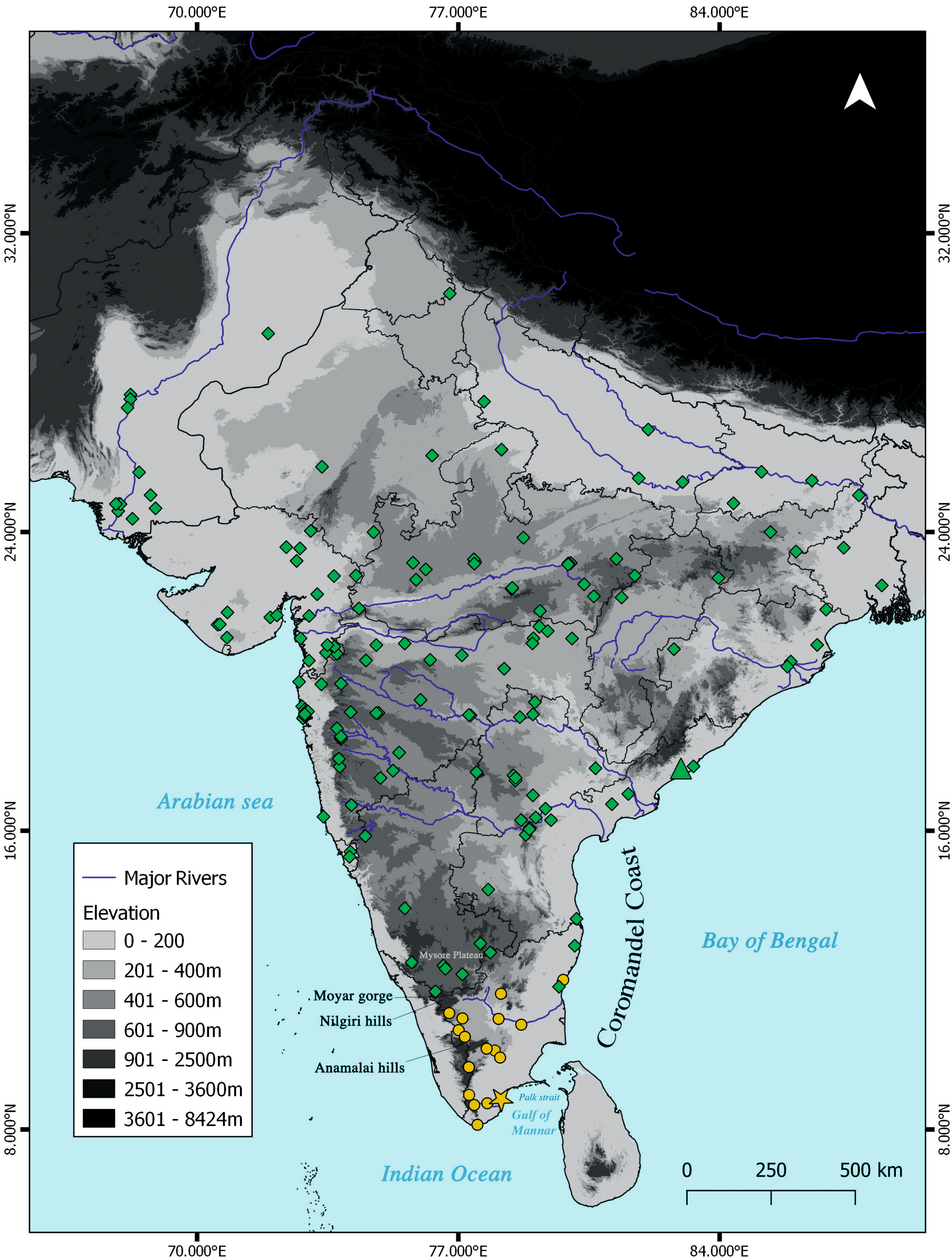

Figure 1. Map showing geomorphological features in parts of the Indian subcontinent and current locality records (see Appendix 9) for *Platyceps* spp. mentioned in this study. Green (triangle) denotes the type locality and green (diamonds) for records of *P. plinii* comb. nov. Yellow (star) denotes the type locality, and yellow (circles) for the records of *P. josephi* **sp. nov.** Historically relevant names and important physiographic features are labelled.

quences were generated in this study (Appendix 1). PCR amplifications were carried out in a S1000TM Thermal Cycler (Bio-Rad, USA). Amplified PCR products were run on a 2% agarose gel and viewed under an Essential V4 (UVITEC Cambridge, UK) gel documentation system. Sanger sequencing was carried out in both directions using the same primers as used for amplification. Lab work was carried out at Centre for Ecological Sciences, Bangalore and sequencing was done at Medauxin sequencing services (Bangalore, India). Sequence chromatograms were edited and assembled using SNAPGENE Viewer (http://www.snapgene.com/products/snapgene_viewer). Protein-coding genes (*cytb, ND4, cmos, rag1*) were checked for stop codons in unexpected regions by translating nucleotide alignments to amino acids in MEGA7 (Kumar et al. 2016).

Apart from the five genes for which we generated data, we also included an additional gene *12S* because sequences of this marker were available for 55% of the samples. Taxon sampling was based on the recent publications on global snake and old world racer phylogenies (Figueroa et al. 2016; Zaher et al. 2019; Rajabizadeh et al. 2020). Newly generated data were combined with data from GenBank for other old world racers and the outgroups (Appendix 1), and aligned using the ClustalW algorithm (Thompson et al. 1994) with default settings as implemented in MEGA7 (Kumar et al. 2016).

All phylogenetic analyses were carried out using the CIPRES Science Gateway portal v3.3 (Miller et al. 2010). PartitionFinder v2 (Lanfear et al. 2016) was used (default MrBayes settings) to find the best-fit partition scheme for the concatenated dataset and model of sequence evolution for each partition. The best-fit scheme comprised six partitions (Appendix 2). We estimated phylogenetic relationships using maximum likelihood (ML; Felsenstein 1981) and Bayesian inference (BI; Huelsenbeck et al. 2001) as implemented in RAxML 1.8 (Stamatakis 2014) and MrBayes 3.2 (Ronquist et al. 2012), respectively. ML analysis in RAxML 1.8 accepts only one model (GTR) of sequence evolution, and PartitionFinder suggested Gamma (G) correction for all the partitions (Stamatakis 2006), therefore, GTR + G model was used for this analysis. The ML + rapid bootstrap method was used to search for best trees, and branch support quantified via 1000 non-parametric bootstrap. The BI analysis used two runs with four Markov chains initiated from random trees and was run for 10,000,000 generations, sampling every 1000 generations. When the BI analysis was terminated, the standard deviation of split frequencies was less than 0.005, and the first 25% of trees were discarded as "burn-in". Convergence was confirmed for all parameters using Tracer v1.6 (Rambaut et al. 2014). Uncorrected pairwise genetic distances were calculated in MEGA 7 (Kumar et al. 2016) and resulting data were summarized for different genera in R 3.2.0 (R Core Development Team 2017) using package tidyverse (Wickham 2017).

Morphology

In addition to the type series and referred material (n=11) of the new species described below, comparative material examined directly includes the holotype of *Argyrogena rostrata* (type species of the genus *Argyrogena* Werner, 1924) and additional preserved museum specimens so far determined as *A. fasciolata* (n=50) and representative specimens from the genera *Lycodon, Hemorrhois*, *Platyceps* and *Spalerosophis* (n=33). Examined material is listed in Appendix 10. Voucher specimens were studied or mentioned from the following museums and institutional collections: BMNH (Natural History Museum, London, UK), BNHS (Bombay Natural History Society, Mumbai, India), CAS (California Academy of Sciences, San Francisco, USA), KUMNH (Kansas University Biodiversity Institute & Natural History Museum, Lawrence, USA), MCZ (Museum of Comparative Zoology, Cambridge, USA), MNHN (Muséum national d'Histoire naturelle, Paris, France), NCBS-AU/AQ (National Centre for Biological Sciences, Bengaluru, India), NMW (Naturhistorisches Museum Wien, Vienna, Austria), ZMA.RENA (former collection of Zoological Museum Amsterdam, now housed in RMNH – Naturalis Biodiversity Center, Leiden, The Netherlands), SMF (Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main, Germany), ZFMK (Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany), ZMB (Museum für Naturkunde, Berlin, Germany), ZSI-CZRC (Zoological Society of India, Central Zone Regional Centre, Jabalpur, India), and ZSI-K (Zoological Survey of India, Kolkata, India).

Total length, snout-vent length and tail length were measured with thread and a ruler to the nearest 1 mm. Other dimensions were recorded with dial callipers, to the nearest 0.1 mm. Identification of sex was performed by dissection (presence or absence of hemipenes, inspected through a subcaudal incision at the tail base).

The hemipenis of freshly euthanized specimens were everted by pressing the organ until it was everted to the maximum extent, after which the retractor muscle was cut at the level of the 10th subcaudal scale. From preserved specimens in which the hemipenis was not everted, it was removed through a longitudinal incision at 15th subcaudal and detached from the body by cutting the retractor muscle. The organ was separated by making an incision around its circumference at the cloacal region and was immersed in warm water (60°C) for about 5 minutes to soften the tissue. It was then slowly everted with a blunt-end forceps by gently pushing the organ from the distal to proximal end. Afterwards, the hemipenis was softened by again immersing it in warm water for intervals of 5–10 minutes. While everting, petroleum jelly was applied to the inner edge for smooth sliding of the inner ornamented layer. Care was also taken to avoid puncturing the hemipenial wall due to the rubbing of the spines. After eversion, the organ was inflated with petroleum jelly and tied at the base with a thread. Later it was immersed in 1% alizarin red solution in 70% ethanol and removed from the solution after one hour of staining. The calcified spicules were stained using this process and excess stain was removed by immersion of the hemipenis in 70% alcohol for approximately 30 minutes. Detailed photographs of the stained hemipenes were taken using Nikon D 5100 with a 100 mm macro lens (Nikon). Descriptions of hemipenial characters and terminology follow Dowling and Savage (1960), Savage (1997), Myers and Campbell (1981), Keogh (1999) and Zaher (1999).

Length and width of head scales were measured at the longest and widest points of the respective scale(s). Interocular width was measured on top of the head at the shortest distance between the eyes. The number of ventral scales was counted according to Dowling (1951a). Dorsal scale row reduction formulae were based on Dowling (1951b). The terminal scale was not included in the subcaudal count. Values for symmetric characters are provided in left/right order.

To evaluate character states of midbody vertebrae we created µCT-scans of postcranial skeletons for six "Banded racers", four *Platyceps rhodorachis* and one each for *P. florulentus*, *P. ventromaculatus* and the new species, respectively and also included literature data for these taxa provided by Wilson (1967), Schätti (1987) and Schätti et al. (2014) in our analysis. *Hemorrhois ravergieri* and *Spalerosophis diadema* have previously been µCT-scanned and vertebrae data of *Hemorrhois nummifer* were taken from Schätti (1987) for comparative analysis (see Appendix 7 and 8). Values for the ratio of the total length to the maximum width of the nasal bone are abbreviated as TLn/TWn. Values for the ratio of the total length of dorsal laminae of nasal to the length of the nasal shield is given as TLln/Lns.

To obtain counts of teeth by a non-invasive procedure, heads of *Platyceps* species and comparative material were subjected to micro-tomographic analyses with GE Inspections Technologies computer tomographs, e.g. a Phoenix nanotom X-ray|s, at the Museum für Naturkunde Berlin, Germany, and a Phoenix v|tome|x M at Chakan, Pune, India. For body scans we used a FF35 (YXLON International, Hamburg, Germany) at the Museum für Naturkunde Berlin, Germany. The scans were performed with 60–95 kV and 135–1000 µA, generating 1000 or 1440 projections with 750 or 1000 ms per scan. The different kV and µA-settings depended on the respective specimen size. Effective voxel size, i.e. resolution in three-dimensional space, ranged from 10–71.16 µm. The cone beam reconstruction was performed using the datos|x-reconstruction software (GE Sensing and Inspection Technologies GMBH phoenix|x-ray datos|x 2.1) and the data were visualized in VGStudio Max 3.0.

Abbreviations of morphological characters used in text and tables are as follows: Measures and ratios: SVL – snout-vent length; TaL – tail length; TL – total length (SVL+TaL); TaL/TL – ratio tail length/total length; HW – head width, measured at its widest lateral extension; HL – head length, measured from tip of snout to posterior edge of mandible; ED – eye diameter, measured horizontally; RW – rostral width; FL – frontal length; FW – frontal width; PrefL – prefrontal length; InL – internasal length; E-S – distance from anterior border of the eye to tip of snout; ParL – parietal length; ParW – parietal width; DSR – dorsal scale rows: numbers are given at one head length behind head, at midbody (taken at half of the total number of ventral scales), and at one head length before vent, respectively; PreVen – number of preventrals; Ven – number of ventrals; TS – total number of ventral and subcaudal scales including preventrals and terminal scale; PrO – number of preoculars; PoO – number of postoculars; T – number of temporal scales; SupL – number of supralabials; SubL – number of sublabials.

The opensource software QGIS (http://www.qgis.org) was used to prepare the map. Some of the metrics used in the IUCN Red-Listing criteria (IUCN, 2012) were used to calculate the area of occupancy (AOO) and the Extent of occurrence (EOO) of the new species using the GeoCat online tool (Bachman et al. 2011).

Results

Molecular phylogeny

Both BI and ML analysis recover a well supported monophyletic *Platyceps* (including *Argyrogena*) as sister to *Hemorrhois* + *Spalerosophis*, also with high support (ML bootstrap 100 & BI posterior probability 1; Fig. 2 and Appendix 4). A gene tree built only using nuclear *cmos* gene had several polytomies and poorly resolved nodes nevertheless *Argyrogena* is nested well within *Platyceps* (Appendix 5). We use this result as one line of evidence to transfer the genus *Argyrogena* into *Platyceps. Platyceps gracilis*, *P. ventromaculatus, P. bholanathi* are *P. rhodorachis* constitute a monophyletic group with weak support (Fig. 2 and Appendix 4). Among the samples of *Argyrogena* there are two distinct clades. One is restricted to Tamil Nadu state of India and another widespread across peninsular India and Southeast Pakistan (Fig. 1). We describe the clade from Tamil Nadu as a new species. Among samples of *Argyrogena fasciolata* (auctt.) collected from peninsular India, there is very little genetic variation (1% in *16S*; 0.0–1% in *ND4* uncorrected p-distance). The uncorrected p-distance between *Argyrogena fasciolata* (auctt.) and the new species is 4–5% in *cytb* & *ND4* and 3% in *16S* (Appendix 3). The uncorrected p-distance within *Platyceps* species used in this study is as follows: 8–15% in *cytb*, 1–17% *ND4* and 4% in *16S* (Appendix 3). The uncorrected p-distance between "*Argyrogena*" species and *Platyceps* species used in this study is as follows: 13–17% in *cytb* & *ND4* and 5–7% in *16S* (Appendix 3).

Systematics

Lycodon fasciolatus Shaw, 1802 comb. nov. – Russell's wolfsnake

Coluber. – Russell 1796, p. 26 f., pl. 21, "Nooni Paragoodoo", locality not given, collector unknown; Anonymous 1796, p. 1667, "Nuni Paragudu"; Duncan and Duncan 1798, p. 5, "Nooni Paragoodoo"; Gmelin 1798, p. 21 "Nuhni Paraguhduh"; Bechstein 1802, p. 83 f., pl. 9, fig. 3, "Nuhni Paragudih" or "Russelsche Hofnatter"; Wilkes 1810, p. 804 f., 811, "Nooni paragoodo"; Buhle et al. 1835, p. 93, "Hofnatter, oder Nuhnih-Paragudih"; Druitt 1860, p. 166, "Nooni Paragoodo".

Coluber Fasciolatus Shaw, 1802, p. 528, 413, "Fasciolated Snake", type locality "India", based on Russell's (1796, p. 26–27) account

Figure 2. ML phylogeny showing inferred phylogenetic relationships of Old World racers. Labelled in pink colour are the sequences generated in this study, coloured blue is a sample from this study+GenBank sequence. Numbers at internal branches are ML bootstrap values. Bootstrap values below 50 are not shown.

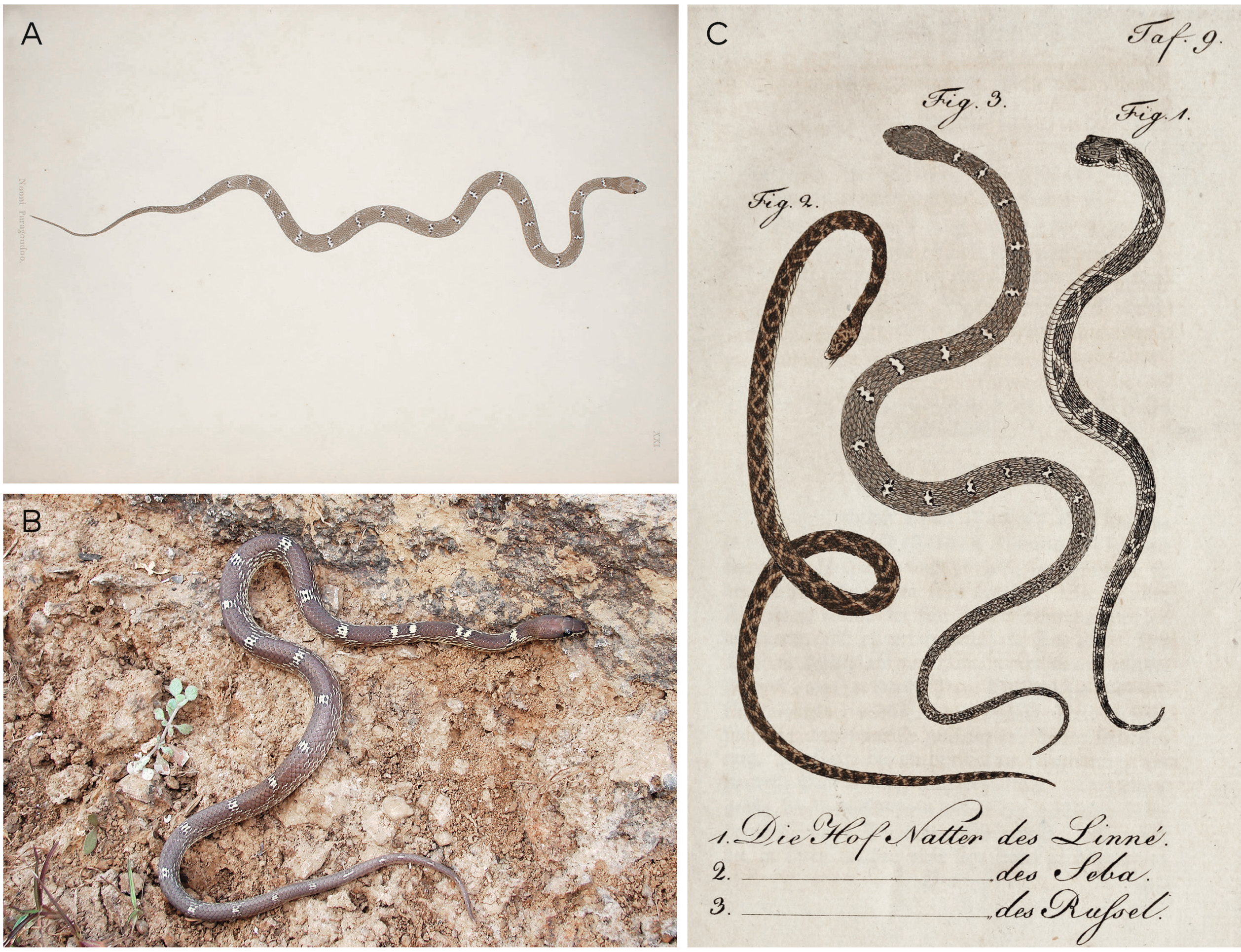

Figure 3. *Lycodon fasciolatus* comb. nov. **A.** Holotype of *Coluber fasciolatus* Shaw, 1802, as well as holotype of *Coluber hebe* Daudin, 1803, "Nooni Paragoodoo" reproduced from Russell (1796, pl. 21), **B.** uncollected live specimen from Rushikulya, Ganjam, Odisha state, India, and **C.** "Nuhni Paragudih oder Russelsche Hofnatter", rearranged sketch from Russell (1796, pl. 21) reproduced by Bechstein (1802, pl. 9, fig. 3).

of "Nooni Paragoodoo" and illustrated on plate 21, holotype lost according to Bauer (2015); Rees 1819, "Nooni Paragoodoo".

Coluber fasciolatus. – Gmelin 1809, p. 590, 649, "Fasciolated Viper"; Gray 1831, Appendix, p. 92; Cantor 1847a, p. 73, 150; Cantor 1847b, p. 919, 1069; Cantor 1848, p. 274; Froriep and Schomburgk 1848, col. 282; Jerdon 1853, p. 529; Blyth 1855b, p. 740.

Coluber hebe Daudin, 1803 p. 385 ff., type locality "Coromandel", like *Coluber fasciolatus* Shaw based on Russell's (1796) account of the "Nooni Paragoodoo", see above; Cuvier and Duméril 1818, p. 190, "La Couleuvre Hébé", "Nouni-paragoudou"; Gray 1831, Appendix, p. 92; Hoeven 1856, p. 282.

[*Natrix*] *hebe*. – Merrem 1820, p. 95.

Lycodon Hebe. – Boie, H. 1826, p. 238 [partim]; Boie, H. in Boie, F. 1827, col. 551 [partim]; Schlegel 1827, col. 293 [partim]; Wagler 1830, p. 186; Schlegel 1837, pt. Générale, p. 78, 142, 231 [partim], pt. Descriptive, p. 106 [partim]; Filippi 1840, p. 183 [partim]; Fitzinger 1843, p. 27 [partim]; Burmeister 1850, p. 80; Beddome 1862, p. 22.

Lycodon aulicum. – Duméril, Bibron and Duméril 1854, p. 370 [Varieté B, partim, non *Lycodon aulicus* (Linneus, 1758)].

Coryphodon fasciolatus. – Günther 1858, p. 109 [partim]; Gray 1863, p. 83 [partim].

Lycodon anamallensis Günther, 1864, p. 318 f., type locality "Anamallai Mountains", holotype BMNH 1946.1.14.92, coll. B.[sic] R.H. Beddome; Ganesh and Vogel 2018, p. 29 ff. [see also further citations in their synonym list].

Lycodon osmanhilli Taylor, 1950, p. 562 ff, pl. 20, type locality "Colombo, Ceylon", holotype KUMNH 24141, coll. W.C. Osman-Hill.

Lycodon fasciolatus.– this work.

Coluber fasciolatus formally named by George Kearsley Shaw (1802) in the third volume of the "General Zoology" series is entirely based on Russell's (1796) description of a "*Coluber*" named "Nooni Paragoodoo" by native inhabitants of the "Coromandel Coast", encompassing the lowlands of the today's Tamil Nadu and Andhra Pradesh states on the southeastern coast region of peninsular India. Besides short remarks on pholidosis, colour, pattern, measurements and brief comments on experiments about possible toxic effects of its bite (Russell 1796, p. 26–27), the specimen is illustrated on plate 21 [reproduced here in Fig. 3 A]. A complete German translation of Russell's account was published by Johann Matthäus Bechstein (1802, p. 83–84) under "Nuhni Paragudih oder Russelsche Hofnatter", accompanied by a rearranged sketch on plate 9, figure 3, illustrating another position and different colouration [reproduced here in Fig.3 C]. Additional shortened German versions can be found in Anonymous (1796), Gmelin (1798), and Buhle et al. (1835), while further English versions were published by e.g. Gmelin (1809) and Wilkes (1810).

On the same basis and almost simultaneously as Shaw (1802), François Marie Daudin described *Coluber hebe* in 1803. Merrem (1820, p. 96, footnote a) was the first to recognise the synonymy of *fasciolatus* and *hebe* but he preferred to use Daudin's younger name as valid and combined it with the generic name *Natrix* Laurenti, 1768. This synonymy went unnoticed by subsequent authors and while *fasciolatus* remained in the genus *Coluber*, Daudin's *hebe* was relegated in the newly erected genus *Lycodon* by H. Boie (1826). A few years later Gray (1831), and subsequently Schlegel (1837) and Duméril, Bibron and Duméril (1854) recognized the conspecificity and continued to use *Lycodon* as the preferred genus. Like Merrem (l.c.), Schlegel (1837) also disregarded the priority of the name *fasciolatus* Shaw and considered specimens from Java to be identical to the taxon described from India by Shaw (l.c.) and Daudin (l. c.). It has to be noted that some subsequent authors erroneously credited the name *hebe* to Schlegel (e.g. Filippi 1840; Burmeister 1850; Günther 1861; Mason 1861; Gray 1863; Steindachner 1867; Müller 1878; Boulenger 1893; Wallach et al. 2014) or Boie (e.g. Fitzinger 1843; Hoeven 1856). The confusion was further increased by the synonymization of *hebe* Daudin with *Coluber aulicus* Linnaeus, 1758 and *Lycodon capucinus* Boie, H. in Boie, F., 1827 by Duméril, Bibron and Duméril (l.c.), two morphologically almost indistinguishable species with the same lepidosis and variable colour and pattern (see O'Shea et al. 2018).

In his "Catalogue of Colubrine snakes […] of the British Museum" Günther (1858, p. 203) listed a "Var. F." under the synonymy of *Lycodon aulicus* without voucher specimens. This refers to Russell's (1769, p. 34–35, pl. 29) account on a "*Coluber*" ("Patza Tutta") from "Casemcottah" which is undoubtedly a specimen of what is commonly regarded as a "Banded racer" today, but not a *Lycodon* (wolfsnake). With his comment "belongs perhaps to *Coryphodon fasciolatus"* [= *Coluber fasciolatus* Shaw] he justified the confusion of two valid colubrid taxa, which continues today. In 1864 (p. 316) Günther noted: "The synonymy [of *Lycodon aulicus*] in all preceding herpetological works is confused – *C. striatus, C. malignus, C. hebe, C. fasciolatus*, and probably *C. capucinus* belonging to other species". He ignored the previous generic allocation to *Lycodon*, excluded the aforementioned taxa from the synonymy of *L. aulicus*, relegated *fasciolatus* Shaw, and *hebe* Daudin together with the simultaneously synonymized *Coluber curvirostris* Cantor, 1839 to the genus *Zamenis* Wagler, 1830, and created a conglomerate of unrelated taxa of racers and wolfsnakes. From that point on, authorities used the name *fasciolatus* in combination with different genera as the scientific name for the Banded racer whereas *C. hebe* together with *C. curvirostris* were treated as junior synonyms (e.g. Theobald 1876; Boulenger 1890, 1893; Wall 1921; Smith 1943; Wallach et al. 2014; Bauer 2015; Uetz et al. 2019). At the same time, Russell's "Nooni Paragoodoo" and *C. hebe* were also recognized as synonyms of *Lycodon aulicus* or *L. capucinus* (e.g. Boulenger 1893; Wall 1921; Iskandar and Colijn 2002; Wallach et al. 2014; Uetz et al. 2019).

Smith (1943, p. 531–532) studied the sketches in Russell's (1796) 'Indian Serpents' and identified the specimens depicted on plate 21 "Nooni Paragoodoo" together with that on plate 29 "Patza Tutta" as *Coluber fasciolatus* and continued to confuse the two different taxa. Further misidentifications are done in the list of determinations made from the Thomas Hardwicke collection of water-colour sketches deposited in the Zoological Library of the Natural History Museum, London, where he determined that four snakes depicted in sketch 55 and 61–63 were examples of *Coluber fasciolatus* (Smith 1943, p. 529). In contrast, our re-examination of the illustrations revealed that sketch no. 55 depicts a wolfsnake, *Lycodon* sp., and no. 61 a Common ratsnake, *Ptyas mucosa* and only sketch 62 and 63 illustrates a Banded racer (see Fig. 8).

It is also to be noted that from the initial confusion caused by Günther (1864), the original scalation data of Shaw's *Coluber fasciolatus* (192 ventrals and 62 subcaudals) were no longer considered representative of the scalation variation in the Banded racer. Not a single subsequent author, even when citing the original source, has included the values of the "Nooni Paragoodoo" in their variation of *fasciolatus*; not even Wilson (1967) in his revision discusses the very low number of 62 subcaudals recorded for the type specimen.

Bauer et al. (2015) investigated two collections of dried snake skins housed in the Natural History Museum, London. The first collection arrived in 1837, the second in 1904 and are preliminarily attributed to Patrick Russell (see also Campbell 2015). The skins are attached to paper and in addition to their inventory numbers, for some specimens, handwritten notes are added which refer to Russell's books of 'Indian Serpents' (see Fig. 4). It is remarkable that all specimens from the 1904 collection labelled with the vernacular name "Nooni Paragoodoo" have been identified as *Lycodon aulicus* by Bauer et al. (2015). Our reexamination of the *Lycodon* specimens amongst Russell's dried skin collections (including BMNH 1837.9.26.50–52; BMNH 1904.7.27.34, 43, 48, 52, 55, 72, 89 and 93) revealed that none of these specimens qualifies as the holotype of *Coluber fasciolatus*, as the measured lengths of these skins (ranging from 37 to 55 cm) are well below the 2 feet [60.96 cm] length reported by Russell for his "Nooni Paragoodoo".

In this work, we clarify the identity of *C. fasciolatus,* by analysing Russell's (1796) original data and comparing it with specimens from various museums, data and photographs from the authors and literature concerning Indian snakes (e.g. Günther 1864; Boulenger 1890; Smith 1943; Whitaker and Captain 2004). We conclude that, in contrast to earlier determinations (Günther 1864; Boulenger 1890, 1893; Smith 1943, to name a few authorities only), Russell's "Nooni Paragoodoo" and therefore *Coluber fasciolatus* Shaw (incl. *C. hebe* Daudin) is not a racer but a wolfsnake of the genus *Lycodon*.

Wall (1914, p. 34) explained the meaning of the vernacular name "Nooni Paragoodoo" as: 'Nooni' = oil in

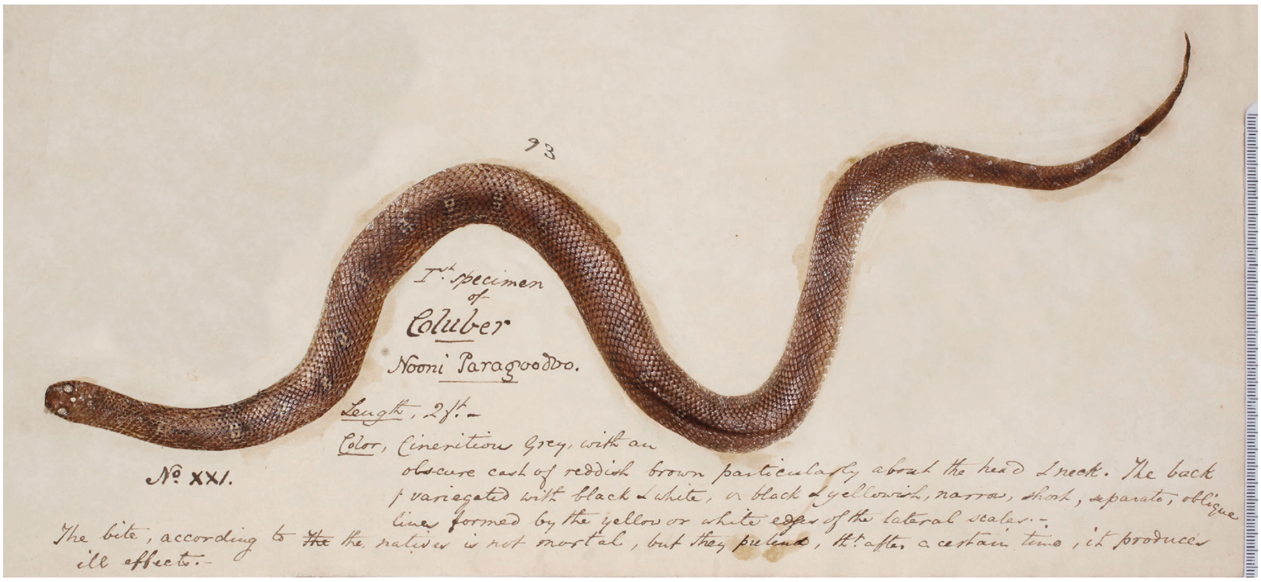

Figure 4. *Lycodon fasciolatus* comb. nov. Previously unpublished extract from a paper sheet with glued specimens from the 1904 collection of dried snake skins preliminarily attributed to Patrick Russell showing a specimen of the "Nooni Paragoodoo" kept in the herpetological collection of the Natural History Museum, London, U.K. (BMNH 1904.7.27.93).

Telugu language and 'Paragoodoo' stands for a runner or glistening, concerning the smooth and polished character of the scales in the snake. The extraordinary glossy character of dorsal scalation is well known for *Lycodon* species.

To determine the species affiliation we carefully compared Russell's description and the sketch on plate 21 with published data of *Lycodon* species from southern and eastern India (Table 1). In terms of the combination of pholidosis, colouration and pattern, Russell's specimens are generally comparable to a short banded morphotype of the Common Indian wolfsnake, *Lycodon aulicus*, a widespread species in the Indian subcontinent.

In a recent study on population systematics of the *L. aulicus* complex Ganesh and Vogel (2018) identified two different species-groups. Based on head dimensions, collar band pattern, hemipenal morphology, preocular-frontal and supraocular-prefrontal scale contact conditions, they reassessed the systematics of *Lycodon aulicus*, provided a redefined diagnosis for *aulicus* (sensu stricto) and revalidated *Lycodon anamallensis* Günther, 1864, a taxon so far regarded as conspecific with *L. aulicus*. Another result of Ganesh and Vogel's (l.c.) analysis is the synonymization of *Lycodon osmanhilli* Taylor, 1950 with *L. anamallensis*.

Our comparison of the original information of *fasciolatus* Shaw, with data from the two morphotypes identified by Ganesh and Vogel (l.c.), showed the closest match with *L. anamallensis* (see Table 1). Although ventral and subcaudal counts of female *fasciolatus* lie within the ranges of females from both *anamallensis* and *aulicus*, it is clearly distinguished from the latter by the combination of following diagnostic characters: (1) preoculars not in contact with frontal vs. in contact, (2) supraoculars in contact with prefrontals vs. not in contact, (3) collar absent vs. collar present and in contact with parietals, (4) upper labials yellow with dark brown center vs. upper labials whitish, (5) short whitish bands stippled with black, not extending into lateral edges of ventrals vs. elongated cream-white bands, extending onto lateral edges of ventrals.

Based on these consistencies of its morphological characters, colour and pattern, we consider *Coluber fasciolatus* Shaw, 1802 and *Coluber hebe* Daudin, 1803 as conspecific with *Lycodon anamallensis* Günther, 1864, including its synonym *Lycodon osmanhilli* Taylor, 1950.

With the reallocation of the taxon *fasciolatus* Shaw to the genus *Lycodon* we follow the lead of H. Boie (1826) and regard *Lycodon fasciolatus* (Shaw, 1802) as a valid combination with priority over its younger synonyms *L. hebe*, *L. anamallensis* and *L. osmanhilli*.

Description. According to Taylor (1950, as *osmanhilli*), Ganesh and Vogel (2018, as *anamallensis*) and our own observations, *Lycodon fasciolatus* can be diagnosed as follows: (1) dorsal scales smooth in 17 rows at fore- and midbody and 15 before vent, (2) one to three preventrals followed by 174–204 laterally angulate ventrals (max. 197 for Indian populations), (3) 59–74 paired subcaudals, (4) a divided anal scale, (5) nasals in contact with first supralabial, naris large (6) internasals much smaller than prefrontals, (7) frontal shorter than its distance to tip of snout, shorter than parietals, (8) loreal elongated, nearly twice as long as high, (9) one preocular, usually not in contact with frontal (10) two postoculars, (11) supraocular usually in contact with prefrontal, (12) 2+3+4 temporals, (13) nine supralabials, third to fifth in contact with eye, (14) 10–11 sublabials, first five in contact with anterior submaxillars, (15) a thin, small head, reddish brown coloured, slightly darker than body, (16) iris black, pupil scarcely visible, (17) dorsal colour brown or reddish brown, (18) collar absent, first band just behind neck, curved backwards, (19) whole body with short cream white or yellow, irregularly shaped bands or blotches strippled with black, scarcely extending to the flanks, not

Table 1. Comparison of available characters for the type specimen of *C. faciolatus* Shaw with other *Lycodon* species from South and East India. Species from India formerly allocated to the genera *Dryocalamus* and *Dinodon* are ignored. Data sourced from Russell (1796), Shaw (1802), Whitaker and Captain (2004), Mukherjee and Bhupathy (2007), Purkayastha (2013), Ganesh and Vogel (2018), Vogel and David (2019), Ganesh et al. (2020, in part), and Kalki et al. (2020). We did not include the character "Supraocular-prefrontal-contact" as used by Ganesh and Vogel (2018) for delimiting *Lycodon anamallensis* from *L. aulicus* because it is a consequence of the condition "Preocular-frontal-contact".

Taxon	Ventrals	Subcaudals	Preocular-frontal-contact	Collar / in contact with parietals	Colouration of upper labials	Dorsal body pattern
fasciolatus (holotype)	192	62	no	absent	yellow with dark brown center	short whitish bands stippled with black not extending onto ventral scale edges
anamallensis (Indian populations)	♂♂ 174–186 ♀♀ 186–197	♂♂ 63–64 ♀♀ 59–74	no	absent	creamy white or yellow with dark brown center	short yellowish or whitish bands stippled with black not extending onto ventral scale edges, or patternless
aulicus (s. str.)	♂♂ 180–206 ♀♀ 191–215	♂♂ 65–72 ♀♀ 57–73	yes	present / yes	whitish	creamy-white bands extending onto ventral scale edges
deccanensis	198–214	66–69	no	present / yes	light brown with irregular dark brown speckles	irregular dirty whitish bands with dark brown speckles extending onto ventral scale edges
fasciatus	197–220	69–94	scarcely	present / yes	dark greyish-white	dirty whitish-brown bands extending onto ventral scale edges
flavicollis	210–224	65–72	yes	present / usually	yellow	without or with very faint yellow bands not extending onto ventral scale edges
flavomaculatus	165–183	53–63	no	absent but a small spot present	white	yellow bands extending onto ventral scale edges
jara	167–188	52–74	no	absent	whitish-grey	overall speckled with small yellow spots
laoensis	163–187	60–76	yes	present /yes	whitish	yellow-white bands extending onto ventral scale edges
travancoricus	176–206	64–76	yes	present / scarcely	greyish, mottled with brown	yellow bands extending onto ventral scale edges
striatus	154–195	35–50	no	present / yes	whitish	whitish-brown or yellowish bands extending onto ventral scale edges
zawi	179–207	45–75	yes	absent	whitish-brown	short white bands not extending onto ventral scale edges

reaching the lateral edges of ventrals, (adults sometimes patternless), (20) body lateral with four to five thin longitudinal interrupted whitish lines (21) supralabials creme white or yellow, anterior ones with a distinct dark brown spot in its center, (22) short hemipenis reaching to eighth subcaudal, covered with numerous long flounces and spines, (23) total length up to 52 cm, (24) relative tail length 0.14–0.20.

Distribution. Russell (1796) does not provide specific information for the origin of his "Nooni Paragoodoo", Shaw (1802) only states "India" as the type locality for *C. fasciolatus* and Daudin (1803), referring to the title of Russell's publication, i.e. "Coromandel" as the origin of his *C. hebe*. As already noted by Bauer (2015, p. 35) the description of *C. fasciolatus* is based on a single specimen and the snake depicted on plate 21 in Russell (1796) is the holotype. This makes Wallach et al's (2014, p. 54) lectotype designation unnecessary and their type locality restriction "Vizagapatam, coast of Coromandel, India" [= Vishakhapatnam, Andhra Pradesh state, SE India, 17°41'N, 83°13'E, elevation 25 m] via lectotype selection" is unjustified because no such information was provided by Russell for the holotype. Even considering that Russell spent most of the time of his service for the East India Company in the Visakhapatnam district (Andhra Pradesh state of India), it is not clear whether he captured the individual specimen himself. Russell (1796) mentioned 11 persons by name who sent him material but does not name anybody in relation to the "Nooni Paragoodoo". Other specimens described by him without a named donor and therefore possibly captured by himself personally came from Lake Ankapilly, Bimblipatam, Boni, Masulupatam and Nerva in Andhra Pradesh, from Tanjore in Tamil Nadu, from Ganjam in Odisha and Hyderabad in Telangana. Strictly speaking, besides Vizagapatnam any of these places could be considered as the possible type locality of *L. fasciolatus*.

Lycodon fasciolatus seems to be widespread in southern peninsular India and recent records from the Coromandel region support the possible demarcation of the type locality in this area. According to Das and de Silva (2005, as *L. osmanhilli*), Ganesh and Chandramouli (2011, as *L. aulicus* morph 2), Ganesh and Vogel (2018, as *L. anamallensis*), and Madawala et al. (2019, as *oanamallensis* [sic] or *anamalensis* [sic]), *L. fasciolatus* is known from the Indian states of Kerala (Kannur, Mundakayam), Tamil Nadu (Anaimalai Hills, Chennai, Mannampandal), Andhra Pradesh (Nallamala Hills) and from Sri Lanka (Ampara, Andigama, Chilaw, Colombo, the Jaffna Peninsula, Kandy, Matara, Peradeniya, Tabbowa, Yala). In the present study, the species is found to be common along the Ganjam coast up to Chhatrapur and we also report the northernmost record from Ganjam, Odisha state of India (see Appendix 10). This species was found inhabiting *Pandanus odorifer* (Forsskål), Kuntze bushes, other scrub vegetation, agricultural fields and occasionally entering human habitation.

Some old records mention a specimen under the name *Coluber* or *Coryphodon fasciolatus* (Blyth 1855a, p. 291; Günther 1860, p. 163) collected by Major W.S. Sherwill at Darjeeling (West Bengal, India) but this refers to another taxon, probably also a *Lycodon* species.

Günther's (1861, p. 218) record of *C. fasciolatus* from the central hilly region of Nepal, based on a coloured sketch in the B. H. Hodgson's collection, shows a colubrid snake different from both wolfsnakes and racers and will be discussed below.

Recently, O'Shea et al. (2018) reviewed the complex taxonomic history and confusion surrounding *L. capucinus* and *L. aulicus* and finally considered *capucinus*, also based on molecular data published by Siler et al. (2013), as a valid species. They discussed the distribution of both species and presented a map showing the actual known range of *L. capucinus* with its westernmost mainland border running between northeastern India and Bangladesh. At the same time, O'Shea et al. (l.c., p. 71) stated that "[...] *L. hebe* (Daudin 1803), [is] now a synonym of *L. capucinus*; [...]" but neglected the fact that the origin of *hebe* Daudin, with its type locality on the Coromandel Coast of India, contradicts their presented distribution for *L. capucinus*.

Remarks. Blyth (1855b, p. 740, smallprint) described *Coluber vittacaudatus* (collector unknown, holotype not located) from the vicinity of Darjeeling (West Bengal state, India) and considered it as allied to *Coluber fasciolatus* Shaw. The taxon fell into oblivion until Das et al. (1998, p. 157) listed it again as a valid species based on a personal communication by Van Wallach. Whitaker and Captain (2004, footnote 6) were unsure where *C. vittacaudatus* should be placed and Schätti et al. (2014, p. 384, smallprint) regarded it as "possibly a senior synonym of the Oriental ratsnake *Orthriophis taeniurus yunnanensis* (Anderson, 1879), and of *O. taeniurus* (Cope, 1861) as well." The alleged relationship to *C. fasciolata* Shaw, as originally suggested by Blyth (1855b), prompted Wallach et al. (2014) and later Das and Das (2017) to place *vittacaudatus* into the previously monotypic genus *Argyrogena* Werner, unaware that *fasciolatus* Shaw is not a racer.

It is undisputed that Blyth (l.c.) considered the resemblance of *C. vittacaudatus* to *C. fasciolatus* in the sense of Shaw, so he clearly did not mean what is now commonly referred to as the Banded racer. Because of our clarification that *C. fasciolatus* is a wolfsnake, all previous assumptions concerning the identity of *Coluber vittacaudatus* Blyth are questionable.

Platyceps plinii (Merrem, 1820) comb. nov. – Banded racer

Coluber. – Russell 1796, p. 34–35, pl. 29 [reproduced here in Fig. 5 A], "Patza Tutta", from "Casemcottah" [=Kasimkota village Visakhapatnam district, Andhra Pradesh state, India; see Note 1], two specimens coll. Captain Gowdie and Lieutenant Whyte; Anonymous 1796, p. 1667, "Patza Tutta"; Gmelin 1798, p. 26, "Patza Tutta"; Bechstein 1802, p. 273 f., pl. 44, fig. 2, "Die halbbandierte Natter" or "Patza Tutta" [reproduced here in Fig. 5 B]; Gmelin 1809, p. 685 f. "Patza Tutta"; Wilkes 1810, p. 813 "Patza tutta"; Buhle et al. 1835, p. 97, "Die halbbandierte Natter, (Patza Tutta)".

Coluber pictus Daudin, 1803, p. 347–349, "La Coleuvre Peinte", type locality "Casem-Cottah, au Bengale", based on Russell's (1796, p. 34–35, pl. 29) account of "Patza Tutta", holotype not located; Cuvier and Duméril 1818, p. 190, "patza-tutta"; Boie 1827, col. 524; Schlegel 1837, pt. Descriptive, p. 172; Traill 1843, p. 148; Cantor 1847a, p. 67; Cantor 1847b, p. 913; Jerdon 1853, p. 529; Blyth 1854, p. 416; Blyth 1855a, p. 292 [nec *Coluber pictus* Gmelin, 1789, p. 1116; nec *Coluber pictus* Georgi, 1801, p. 1883; nec *Coluber pictus* Pallas, 1814, p. 54 [sic], 45; nec *Coluber pictus* Theobald, 1868a, p. 45; all primary homonyms].

[*Natrix*] *Plinii* Merrem, 1820, p. 101 f., "halbbandierte [Natter]", type locality "Bengalen", restricted here to "Casemcottah" (= Kasimkota village, Andhra Pradesh state, India; see Appendix Note 1), based on Russell's (1796, p. 34–35 pl. 29) account of "Patza Tutta", type material not located, lectotype by present designation: specimen depicted on plate 29 in Russell (1796); Anonymous 1822, col. 693.

Coluber plinii. – Boie 1827, col. 524; Schlegel 1837, pt. Descriptive, p. 172; Traill 1843, p. 148; Cantor 1847a, p. 67; Cantor 1847b, p. 913; Blyth 1855a, p. 292; Wallach et al. 2014, p. 219 [wrongly attributed as a synonym of *D. pictus* Gmelin].

Coluber curvirostris Cantor, 1839: 51, type locality "Bengal", holotype not located, an unpublished original sketch depicting the iconotype is kept in the Bodleian Library (Oxford, U.K.), [reproduced here in Fig. 7]; Cantor 1841, p. 82.

Coluber fasciolatus. – Mason 1861, p. 708; Smith 1928, p. 495; Smith 1943, p. 170, [partim], p. 529 [partim, Hardwicke sketches vol. II, plate 62, 63 only, the latter reproduced here in Fig. 8]; Constable 1949, p. 127; Taylor 1950, p. 546; Deranyiagala 1955, p. 25; Minton 1962, p. 17; Swan and Leviton 1962, p. 140; Anderson 1964, p. 163; Minton 1966, p. 123; Underwood 1967, p. 134; Mertens 1969, p. 54; Singh 1972, p. 190 [as *Coluber fasciolata* [sic]; Waltner 1973, p. 15; Sharma and Diksit 1976, p. 171; Khan 1977, p. 147; de Silva, P.H.D.H. 1980, p. 256 f; Mahendra 1984, p. 289; Shrestha and Shah 1985, p. 51; Amr and Disi 2011, p. 191.

Coronella baliodeira. – Cantor 1847a, p. 67 [partim, "Patza Tutta"]; Cantor 1847b, p. 913 [partim, "Patza Tutta"], [non *Coronella baliodeira* Boie, 1827].

Coryphodon fasciolatus. – Günther 1858, p. 109 [partim]; Beddome 1862, p. 16 f. [partim]; Cope 1863, p. 338; Gray 1863, p. 83; Jan 1863, p. 64 [partim].

Tyria [*fasciolata*]. – Cope 1863, p. 338.

Zamenis fasciolatus. – Günther 1864, p. 254 f., [partim]. pl. 21, fig. F; Theobald 1868a, p. 47; Anonymous 1870, p. 46; Anderson 1871, p. 34; Stoliczka 1871a, p. 191; Stoliczka 1871b, p. 431; Nicholson 1874, p. 87, pl. 13, fig. 1; Theobald 1876, p. 170 f. [partim]; Anonymous 1877, p. 44; Ferguson 1877, p. 19; Blanford 1879, p. 114; Müller 1884, p. 285; Phipson 1886, p. 84; Haly 1886, p. 10; Boulenger 1890, p. 327 [partim]; Haly 1891, p. 3, 21; Sclater 1891, p. 28; Boulenger 1893, p. 404 [partim]; Bethencourt Ferreira 1897, p. 225; Cardew 1897, p. 593; Willey 1906, p. 233; Wall 1907, p. 115; Wall, 1908, p. 21, footnote; Abercromby 1910, p. 6; Abercomby 1913, p. 304; Wall 1913, p. 20, footnote; Cazaly 1914, p. 26 f.; Wall 1914, p. 34, pl. 22 [partim]; Wall 1921, p. 191 ff.; Prater 1924, p. 157, 169 f; Wall 1924, p. 618; Mullan 1927, p. 380; Amaral 1929, p. 11; Nicholls 1929, p. 116, 128; Werner 1929, p. 65, 71 [partim]; Gharpurey 1931, p.1084; Gharpurey 1932a, p. 465; Gharpurey 1932b, p. 906; Gharpurey 1932c, p. 273 f.; Lindberg 1932, p. 691 ff.; Gharpurey 1935a, p. 943; Gharpurey 1935b, p. 198; Bourret 1936, p. 175; Fraser 1936, p. 58 ff.; Lindberg 1939, p. 333; Themido 1941, p. 20.

A.[*rgyrogena*] *rostrata* Werner, 1924, p. 51, fig, 4a–c, type locality "Argentinien" [in error], holotype NMW 18160; Dunn 1928 p. 23 [*Argyrogena*]; Amaral 1929, p. 11.

Argyrogena fasciolata. – Wilson 1967, p. 261 [new comb.], [partim]; Kumar et al. 1976, p. 92; Kramer 1977, p. 735; Khan 1980, p. 135, 144; Tiedemann and Häupl 1980, p. 50; Khan 1982, p. 4; Murthy and Acharjyo 1987, p. 140; Welch 1988, p. 36; Williams and Wallach 1989, p. 12; de Silva 1990, p. 77 f.; Schleich 1993, p. 146; de Silva 1994, p. 15; Shah 1995, p. 38; Anders et al. 1997, p. 53; Das and Andrews 1997, p. 4; Shah 1997, p. 27; Das 1998, p. 44; Das and Ota 1998, p. 184; Shah 1998b, p. 27; Shrestha 1998, p. 39; Gayen 1999, p. 15; Smith and David 1999, p. 46; Daniels 2000, p. 8; Vyas 2000a, p. 20 [as *Argyrogena stolatum*]; Shrestha 2001, p. 171; Gruber 2002, p. 820 ff.; Khan 2002, p. 79 ff.; Das 2003, p. 474; Shrestha 2003, p. 634; Khan 2004, p. 196; Shah and Tiwari 2004, 154; Whitaker and Captain 2004, p. 138; Somaweera 2006, p. 50: Khan 2006, p. 192 ff.; map and p. 275; Srinivasulu et al. 2006, p. 113; Whitaker 2006, p. 31 ff.; Hutton and David 2008, p. 314; Khaire 2008, p.68; Rameshwaran 2008, p. 22, back cover [partim]; Satish 2008, p. 88; Srinivasulu and Das 2008, p. 119; Dutta et al. 2009, p. 108; Aengals 2009, p. 193; de Silva and Jinasena 2009, p. 6; Kabir et al. 2009, p. 118 f.; Prakash and Raziuddin 2009, p. 12; Ingle 2011, p. 83; Joshi 2011; p.1 f.; Sharma and Warman 2011, p. 62; Thakur 2011, p. 3; Vijayaraghavan and Ganesh 2011, p. 40 [partim]; Amol et al. 2012, p. 364; Bhandarkar et al. 2012, p. 45; Chikane and Bhosale 2012, p. 7 image 5D, p. 14 table; Das 2012, p. 73; Khan et al. 2012, p. 166; Kumbhar et al. 2012, p. 364; Walmiki et al. 2012a, p. 96; Walmiki et al. 2012b, p. 9; Kästle et al. 2013 p. 197; Khaire 2010, p. 36; Pande et al. 2013, p. 29 f.; Vyas 2013, p. 38; Fellows 2014, p. 2; Hasan et al. 2014, p. 183; Ingle et al. 2014, p. 136; Joshi et al. 2014, p. 168; Khaire 2014, p. 44; Khedkar et al. 2014, p. 8; Porob et al. 2014, p. 179, image; Pradhan et al. 2014, p. 244; Schätti et al. 2014, p. 384, smallprint; Seetharamaraju 2014, p. 95 ff.; Wallach et al. 2014, p. 54; Ahmed et al. 2015, p. 56; Bauer 2015, p. 35, 37; Bauer et al. 2015, p. 76; Charjan and Joshi 2015, p. 2; Deshmukh et al. 2015, p. 38 f.; Joshi et al. 2015, p. 24; Koushik, 2015, p. 91; Manhas et al. 2015a, p. 1870; Palot 2015, p. 8016; Patel et al. 2015, p. 122, fig. 3; Pradhan and Talmale 2015, p. 117; Sayeswara et al. 2015, p. 498; Bansode et al. 2016, p. 105 f.; Dileepkumar et al. 2016, p. 53 f.; Khan 2016, p. 23; Pasar and Paul 2016, p. 343; Tambre and Chavan 2016, p. 108 f.; Das and Das 2017, p, 165; de Silva and Ukuwela 2017, p. 171; Gayen et al. 2017, p. 19; Joshi et al. 2017, p. 584; Kanaujia et al. 2017, p. 121; Paliwal and Bhandarkar 2017, p. 3440; Sheikh 2017, p. 56; Aengals et al. 2018, p. 22; Bansode and More 2018, p. 377; Ganesh et al. 2018, p. 42; Jadhav et al. 2018, p. 1858, 1860; Khan et al. 2018, p. 1731; Manhas et al. 2018, p. 109; Pasar 2018, p. 5; Patil 2018, p. 6; Das and Pramanick 2019, p. 94; Das et al. 2019, p. 311 ff.; Gemel et al. 2019, p. 171; Ingle et al. 2019, p. 81; Madawala et al. 2019, p. 251; Mohalik et al. 2019, p. 150; Patel and Vyas 2019, p. 771; Patel et al. 2019a, p. 23; Patel et al. 2019b, p. 148 f.; Sagadevan et al. 2019, p. 13567 [partim], Rajabizadeh et al. 2020, p. 6.

Argyrogena fasciolatus [sic]. – Whitaker 1978, p. 31. [partim]; Koul and Murphy 1979, p. 48; Kutty et al. 1981, p. 167; Sharma 1982, p. 123 [partim]; Whitaker 1982, p. 31. [partim]; Murthy 1985, p. 64; Vyas 1987, p. 228; Green 1988, p. 144; Khan 1988, p. 13 [as *Argyrogene* [sic] *fasciolatus*]; Daniel 1989, p. 78; Dutta and Acharjyo 1990, p. 41; Murthy 1990, p. 27 f.; Ahmed and Dasgupta 1992, p.42; Murthy 1992, p.173; Negi 1992, p. 129; Khan 1993, p. 89, fig. 8; Das 1994, p. 31; Sanyal and Sur 1995, p. 60; Das 1996, p. 54; Khaire 1996, p. 69; Das 1997, p. 40; de Silva 1998a: 64; de Silva 1998b, p. 7; Shah 1998a, p. 29; Captain and Thakur 1999, p. 147 ff.; Khan 1999, p. 286; Sharma 1999a, p. 42; Sharma 1999b, p. 95; Sharma 1999c, p. 112; Vyas 1999, p. 5; Islam et al. 2000, p. 77; Sharma 2000, p. 277; Vyas 2000b, p. 388; Daniels 2001a, p. 7; Daniels 2001b, p. 16; de Silva 2001, p. 59; Ingle 2001a, p. 14; Ingle 2001b, p. 23; Vyas 2001a, 204; Vyas 2001b, p. 23; Vyas 2001c, p. 18; Daniel 2002, p. 94 f.; Das 2002, p. 20; Ingle 2002, p. 9; Khan 2002, p. 79 f.; Lobo 2002, p. 6; Sharma 2002a, p. 51; Sharma 2002b, p. 63; Bhuvaneswari 2003, p. 169; Ingle 2003, p. 4; Palot and Radhakrishnan 2003, p. 4; Shah et al. 2003, p.13; Sharma 2003, p. 82 f.; Dasgupta and Raha 2004, p. 167; Khan, M.A.R. 2004, p. 18; Pradhan 2004, p. 111; Somaweera 2004: 37; Vyas 2004, p. 1514; Chandra and Gajbe 2005, p. 83; Das and de Silva 2005, p. 24; Gajbe and Gupta 2005, p. 10; Rao et al. 2005, p. 1739; Sharma 2007, p. 132 f.; Vyas 2007, p. 13; Chandra et al. 2008, p. 52, 54, 71; Ingle 2008, p. 15; Pradhan 2008, p. 327; Anonymous 2010, p. 56; Bahuguna 2010, p. 501; Singh and Ngullie 2010, p. 56; Thakur 2010, p. 15; Patankar 2011, p. 9; Sawant 2011, appendix 2, p. 2; Vyas 2011, p. 11; Chauhan and Shingadia 2012, p. 64; Dasgupta et al. 2012, p. 217; Upadhye et al. 2012, p. 16; Aengals and Pradhan 2013, p. 454; Reddy et al. 2013, p. 519; Raut et al. 2014, p. 374, 376; Manhas et al. 2015b, p. 1550 [as *Argyrogene* [sic] *fasciolatus*]; Anonymous 2017, Annex 5, p. 5; Vibhute 2018, p. 79; Anonymous n. d., p. 13.

Platyceps plinii. – this work.

The preceding list of synonyms and chresonyms contains quotations which to our best knowledge refer to the snake species so far known as Banded racer (*Argyrogena fasciolata* auctt.) in the sense of Günther (1864). Because of our clarification that *Coluber fasciolatus* Shaw represents a wolfsnake of the genus *Lycodon* (see above), it is necessary to assign an adequate scientific name to the Banded racer. In this context, two well-known names are available from the list of synonyms, i.e. *Coluber curvirostris* Cantor, 1839, and *Argyrogena rostrata* Werner, 1924. The first name was synonymized with *C. fasciolatus* by Günther (1864) and the latter by Smith (1928).

Coluber curvirostris was based on a single specimen from "Bengal" described by Theodore Cantor (1839) in his "Specilegium Serpentium Indicorum". A coloured sketch of the holotype is deposited in the Bodleian Library (Oxford, U.K.) and reproduced here for the first time (Fig. 7).

Franz Werner (1924) described *Argyrogena rostrata* (genus et species nova) based on a specimen stored in the Natural History Museum, Vienna, which was originally listed as having come from "Argentinien" and for a few years it was considered a valid neotropical taxon (Dunn 1928; Amaral 1929). Malcolm A. Smith, who visited the herpetological collection of the Natural History Museum, Vienna in 1927, examined several of Werner's type specimens, including the holotype *A. rostrata*, recognized its true identity, synonymized it with *fasciolatus* and relegated *Argyrogena* to the synonymy of *Coluber.* This classification was largely maintained until Wilson (1967) dedicated a study to the Banded racer and in this context revalidated Werner's name *Argyrogena*. Subsequently, the combination *Argyrogena fasciolata* (Shaw, 1802) was established and has been used for the Banded racer until today (see list of synonyms and chresonyms and e.g. Williams and Wallach 1989; Smith and David 1999; Whitaker and Captain 2004; Khan 2006; Somaweera 2006; Wallach et al. 2014; Koushik, 2015; Das and Das 2017; Uetz et al. 2019, to name a few general publications). In a short overview of the taxonomy of *Coluber,* Amr and Disi (2011, p. 191) erroneously stated that Wilson (1967) reallocated the taxon *fasciolatus* to the genus *Platyceps*.

We also tracked down two older and previously overlooked or wrongly assigned names that clearly refer to what is currently understood to be the Banded racer, viz. *Coluber pictus* Daudin, 1803 and *Natrix plinii* Merrem, 1820. Again both names are entirely based on the same description in Russell (1796, p. 34–35, pl. 29: "*Coluber*" named "Patza Tutta" by natives).

Boie (1827) considered *plinii* and *pictus* as synonymous and a *Coluber* close to *helena* (= *Coelognathus helena* (Daudin, 1803)). Cantor (1847a, b) on the other hand regarded Daudin's *pictus* and Merrem's *plinii* to be identical to *Coronella baliodeira* Boie, 1827, an assessment that Blyth (1854, p. 416, 1855a, p. 292) contradicts by addressing both taxa as true *Coluber* based on a juvenile specimen procured in South India by Jerdon (1853, p. 529; ZSI K 7333), which was later listed by Theobald (1868a, p. 47) under *Zamenis fasciolatus.*

From the mid of the 19th century onwards both names fell into oblivion as potential synonyms of the Banded racer. This was probably also due to Schlegel (1837, pt. Descriptive p. 172) who regarded both *pictus* Daudin and *plinii* Merrem as possibly identical with *Coluber triscalis* Linnaeus, 1758 and *Coluber corallinus* Linnaeus, 1758. The latter two are currently regarded as synonyms of the Caribbean colubrid snake *Liophis* (now *Erythrolamprus*) *triscalis* (see Dundee 1994).

Coluber pictus Daudin, 1803 however, is threatened for reasons of homonymy by an older name, *Coluber pictus* Gmelin, 1789, the accepted original combination for the Painted bronzeback (now *Dendrelaphis pictus,* see ICZN 1958). Therefore, *Coluber pictus* Daudin, 1803 represents a younger primary homonym of *Coluber pictus* Gmelin, 1789 and is unavailable (ICZN 1999, Art. 57.2; see also above the list of synonyms and chresonyms for further homonymous names).

Merrem (1820) used Russell's (1796) account of the "Patza Tutta" and formally named it *Natrix Plinii.* His diagnosis was very short and besides some general features concerning habitus and characteristics of dorsal scales, he mentioned only the number of ventral (202) and subcaudal (91) scales. Additional information can be found in Russell's (1796, p. 34–35, pl. 29) original text and plate. He described the "Patza Tutta" with the following characters: 1) head small, very little broader than neck, ovate, depressed, 2) two internasals, 3) two prefrontals, larger than internasals but similar in form, 4) two supraoculars, purse-shaped, 5) frontal bell-shaped, 6) parietals semi heart-shaped, truncate, 7) mouth wide jaws unequal, lower considerably shorter, 8) teeth small sharp, reflex, two palatal rows, and one marginal [maxillar], in the upper jaw, 9) eyes distant, lateral, large, orbicular, 10) body round, covered with very small smooth, ovate scales, outer row orbicular, 11) length one foot eleven inches [58.4 cm], tail five inches [12.7 cm], very tapered and sharply pointed, 12) dorsal colour brown, forebody with narrow crossbands, composed of short, black and white lines, behind these, a few obscure reddish-brown bands interspaced by white colour of interstitial skin; bands fading at posterior part of body, 13) outermost dorsal scale row yellow, 14) ventral with pale-yellowish cast. The description resembles the specimen depicted on plate 29 and in comparison with our own and published data (see below) it corresponds to male specimens of the Banded racer.

To our best knowledge, *Natrix plinii* Merrem, 1820 is the oldest available name for the snake species which is commonly now regarded as Banded racer. Merrem (l.c.) simplified the type locality to "Bengal", but according to Russell (1796, p. 35) two specimens of the "Patza Tutta" were sent to him from "Casemcottah" by Captain Gowdie in 1788 and by Lieutenant Whyte without year specification (see Appendix Note 1).

Type material. We could not locate the two type specimens of *Natrix plinii* Merrem, 1820 among Russell's dry and wet preserved material stored in the collections of the Natural History Museum, London, U.K. A wet preserved topotypic male (BMNH 37a) donated by P. Russell according to Günther (1858, p. 110) from "East Indies", restricted to "Vizagapatam District" by Boulenger (1893, p. 405), does not correspond with the original data for the "Patza Tutta" published by Russell (1796 p. 34–35, pl. 29). Because of its lower ventral scale count (199 vs. 202), an incomplete tail (with 51 vs. 91 subcaudals) and a shorter snout-vent length (43.2 vs. 58.5 cm [1 ft 11 inch]), specimen BMNH 37a can be excluded as one of the syntypes. Also among the dried skin collections attributed to Russell (including BMNH 1837.9.26.48–49 and BMNH 1904.7.27.81) no specimen corresponds to his original data of the "Patza Tutta".

The same applies to the type specimen of *Coluber curvirostris* Cantor, 1839 from "Bengal" which is not yet located. Although some of Cantor's original specimens

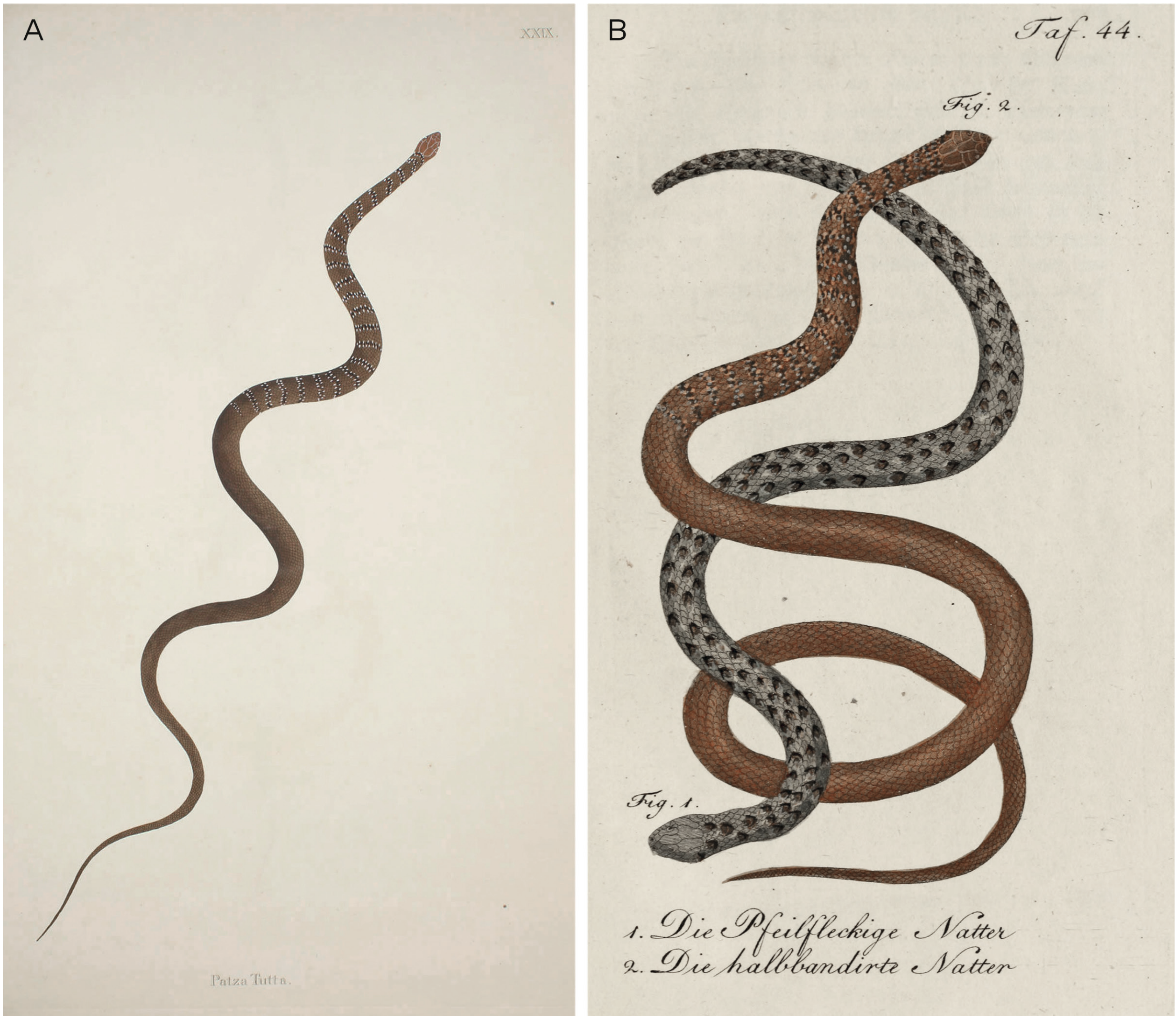

Figure 5. *Platyceps plinii* comb. nov. **A.** Lectotype of *Natrix plinii* Merrem, 1820, "Patza Tutta" from "Casemcottah" reproduced from Russell (1796, pl. 29), and **B.** "Die halbbandierte Natte Bechstein (1802, pl. 44, fig. 2).

are known to be stored in the Natural History Museum, London (Adler 2007, 2016), we were unable to identify the holotype of *C. curvirostris* among the preserved specimens in the collection. A possible candidate donated by the Zoological Society of London to the British Museum (Nat. Hist.) (BMNH 1851.9.13.260 from "India"), can be excluded as the holotype because it does not correspond to Cantor's original data and plate, in respect of the number of ventrals (226 vs. 220) and subcaudals (88 vs. 85). A transcript of Cantor's unpublished original manuscript for *C. curvirostris,* with an expanded description, is presented here in the Appendix (Note 2).

Description. Based on our own data and summarized information from literature (Russell 1796; Smith 1943; Wilson 1967; Whitaker and Captain 2004), *Platyceps plinii* is characterized as follows: (1) dorsal scales smooth in 23–25 (exceptionally 21 or 22) rows at forebody, 23 (exceptionally 21 or 25) at midbody and 17 (exceptionally 16 or 15) before the vent, (2) one to three preventrals followed by 190–234 ventrals, (3) 73–101 paired subcaudals, (4) a divided cloacal plate, (5) nasals divided, in contact with first and second supralabial, naris medium sized (6) internasals smaller than prefrontals, (7) frontal shorter than its distance to tip of snout, as long as or little shorter than parietals, (8) loreal usually slightly longer than high, rarely as long as high or higher than long, exceptionally fused with prefrontal, (9) usually two (80% of examined specimens) exceptionally three preoculars, one larger upper preocular usually in contact with frontal and one (exceptionally two) very small lower presuboculars wedged between third and fourth supralabial, (10) two (exceptionally three) postoculars, (11) supraocular not in contact with prefrontal, (12) temporals variable, in anterior two (rarely three or one) and secondary three (rarely two) rows, (13) eight (exceptionally seven, nine or ten) supralabials, fourth and fifth (rarely fifth and sixth or sixth and seventh) in contact with the eye, (14) usually ten, sometimes nine or eleven sublabials, first four to five in contact with anterior submaxillars, (15) head wide and moderately pointed, barely distinct from neck, body round, olive brown to reddish brown coloured, patternless in adults or with light vermicular pattern in juveniles, (16) iris dark grey or blackish, pupil black with light brown corona, (17)

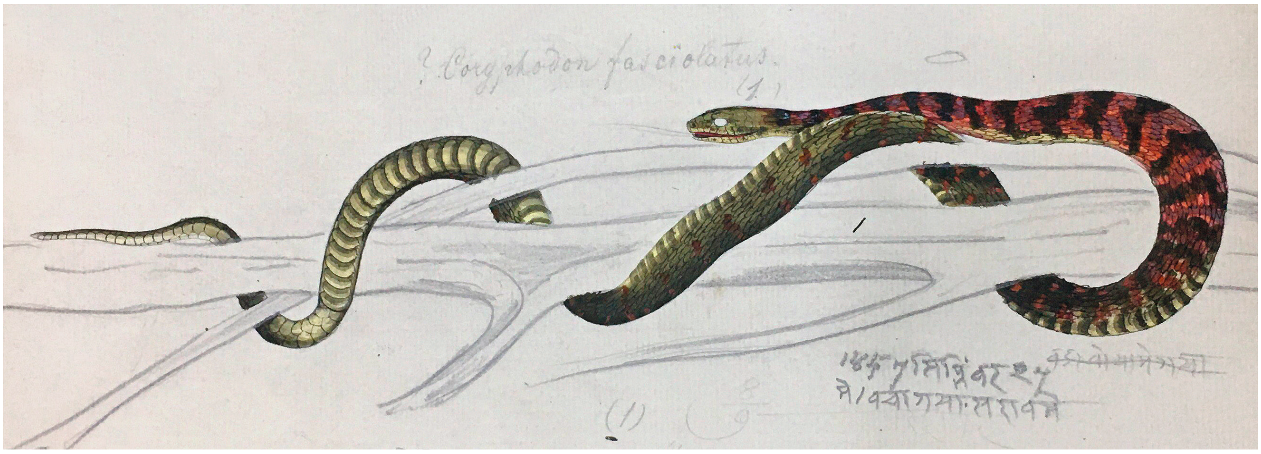

Figure 6. Extract from a previously unpublished original water-colour painting from Brian H. Hodgson's collection of drawings kept in the Zoological Library of the Natural History Museum, London, U.K. The depicted specimen from the „Central hilly region "of Nepal, determined by Günther (1861) as "? *Coryphodon fasciolatus*" (= *Platyceps plinii* comb. nov.), is the original and sole source for the distribution of the Banded Racer in Nepal. In fact, the specimen shown is an adult *Rhabdophis himalayanus* (Günther, 1864) (see chapter "Unconfirmed or erroneous distribution"). The inscription in Devanagari script on the lower right side of the sheet states that this specimen was preserved in alcohol on 27 September 1857. Reproduced with permission from the Natural History Museum, London, U.K.

dorsal colour greyish or reddish brown, (18) collar absent, (19) whole body patternless or with indistinct small light bands on forebody in adults; in juveniles with distinct black and white strippled bands reaching lateral edges of ventrals, extending to near vent, (20) supralabials creme brown, patternless, or with small light spots in juveniles (21) throat, ventral body and tail yellowish cream without pattern, (22) hemipenis simple; proximal fourth smooth; distal three fourths covered with small spines gradually decreasing in size distally; distal area with irregular shaped calyces, denser towards the apex (23) total length up to 148 cm, (24) relative tail length 0.19–0.31.

Variation. Pholidosis: Head 2.17–2.14 times longer than broad (males 1.17–2.14, females 1.22–2.05), canthus rostralis moderate developed. Rostral nearly twice as broad as high, clearly visible from above. Internasals usually shorter than prefrontals, sometimes equal in length in, e.g. BNHS 646 and BNHS 319, or slightly longer in, e.g. BMNH 62.8.14.29, MCZ R-28645, NMW 25465:3 and SMF 50409. Frontal 1.01–1.46 times longer than maximum width (males 1.01–1.46, females 1.02–1.32), 1.05–1.63 times longer than internasals and prefrontals (males 1.05–1.63, females 1.16–1.42), in Pakistani population from southern Sind equal in length in, e.g. SMF 50410 or slightly shorter incl. SMF 50406–407, SMF 50409, SMF 50446, SMF 62922 and in a specimen from 'Bombay' BNHS 646. Posterior border of parietals usually more or less straight or slightly indented (< shaped) at the median suture or, sometimes, forming an obtuse angle in, e.g. MNHN RA-0.6230. Posterior edge of parietals less than half of the maximum width. Loreal usually longer than high, equal in BNHS 3193, shorter in, e.g. BNHS 2857, BNHS 3107, ZMB 8053 (on right side) and SMF 50407 (on right side) or fused with prefrontal in SMF 62921 (on right side) and SMF 50446 (on both sides). Preocular single or with an additional small pre-subocular below it or rarely with two small pre-suboculars in SMF 62922. Preocular in contact with frontal or rarely separated in, e.g. MNHN RA-0.6230.

Predominantly eight supralabials, last two or three being larger (longer), fifth highest; nine in BMNH 1921.6.15.14–15, SMF 57311 (on left side), BNHS 3175 (on both sides), or seven in MCZ R-28645 (on right side). Usually fourth and fifth supralabials in contact with eye, fifth and sixth sometimes in specimens with nine supralabials, e.g. SMF 57311. Two postoculars except in a specimen from "India" without exact locality (BMNH 62.8.14.29) with three postoculars on left side; upper scale somewhat wider, lower usually higher. Normally two anterior temporals, sometimes three including BMNH 62.8.14.29 and NMW 18160 (on left side) and SMF 57311 (on right side), exceptionally one in NMW 25465:3 (on both sides). Secondary temporals variable, mostly three, sometimes two e.g. SMF 57312, SMF 50407 and SMF 50446 (on both sides), BNHS 642, SMF 62921, SMF 50406, and SMF 50410 (on left side) and BNHS 3107, SMF 50409 and SMF 62922 (on right side), or exceptionally four in e.g. ZMA RENA 12554 (left side). Mostly ten sublabials, sometimes eleven, including BMNH 1921.6.15.14 and SMF 57311 (on both sides), SMF 50407 and BMNH 37A (on left side), BNHS 646, BNHS 3175, SMF 50406 and SMF 50410 (on right side), or rarely nine, e.g. SMF 62922 (both sides); the anterior four to five scales in contact with first inframaxillary, the sixth or rarely seventh largest. Anterior inframaxillars normally longer and wider than, or about equal to, posterior pair, except in BMNH 62.8.14.29, BNHS 657, BNHS 3093, BNHS 3107, MNHN RA-0.6230, SMF 50407, SMF 62921–62922 and ZMB 8053. The posterior pair of inframaxillars usually separated by two or three rows of gular scales of variable shape and size. Gulars in three to four oblique rows between the apical edge of the posterior inframaxillars and first ventral. Ventrals in examined

Figure 7. *Platyceps plinii* comb. nov. Previously unpublished original painting (no. 7) of the holotype of *Coluber curvirostris* Cantor, 1839 from Cantor's original manuscript entitled "Indian Serpents–Innocuous–Collected, figured & described (1831–1837)", kept in the Bodleian Library, Oxford, U.K. (see Appendix, Note 2). Reproduced with permission from the Bodleian Library, Oxford, U.K.

material 190–231 (males 190–220, females 215–231), last plate divided in SMF 50407. Usually two, sometimes one or three preventrals. Cloacal plate divided, right part overlapping left. Subcaudals in 73–101 pairs (males 81–101, females 73–89). Total body scales, including preventrals and terminal scale 273–321 (males 273–315, females 296–321). Dorsal scales, usually arranged in 23–25/23/17 rows along the trunk. Three specimens from Maharashtra (BMNH 3093, BMNH 642 and BMNH 646) show 27 anterior DSR; one specimen each from "Calcutta" (NMW 25463: 3), "India" (BMNH 37 A), and "Bangalore" (BMNH 1920.7.7.5) shows 21, 22 and 24 anterior DSR respectively. One specimen from Sind (SMF 50409) with 25 and one from "India" (BMNH 37 A) with only 21 midbody DSR and two specimens from Bangalore (BMNH 1921.615.14, BMNH 1920.7.7.5) with 16 DSR at posterior part of body. In contrast to Constable (1949) we counted 23 midbody DSR instead of 21 for MCZ R-28645 from "Bangalore". Dorsal scale with paired apical pits. Supracaudal scales usually with two apical pits, up to three pits on the first three scales followed the supracaudal reduction.

Dorsal scale reduction formula summarized from 31 examined specimens (see Appendix 10; divergent data from literature [Wilson 1967] in square brackets). Only main reductions are given.

2+3, 3+4, or 10+11 (6–11) 2+3, 3+4, 7+8, 8+9, 9+10, or 10+11 (65–131) [79–133]
25 -------------------------------- **23** --
3+4, or 10+11 (5–9) 2+3, 3+4, 7+8, 8+9, 9+10, or 10+11 (63–131) [82–129]

2+3, 3+4, 4+5, 8+9, 9+10, or 10+11 (68–145) [105–137]
21 ---
1+2, 2+3, 3+4, 4+5, 7+8, 8+9, or 9+10 (68–142) [107–138]

4+5, 6+7, 7+8, 8+9, or 9+10 (111–192) [157–174] 7+8 (188–194)
19 --- **17** ---------------------------- **15**.
3+4, 4+5, 7+8, 8+9, or 9+10 (112–191) [156–178] 7+8, or 8+9 (190–195)

Six examined specimens (BMNH 1851.9.13.260, BMNH 1920.7.7.5, BMNH 1921.6.15.14, BMNH 1940.3.4.45, NMW 18160, and SMF 50409, all females) show an additional lateral or bilateral increase to 18 or 19 dorsal

Figure 8. *Platyceps plinii* comb. nov. Previously unpublished original colour-painting from the Thomas Hardwicke collection of sketches (Volume II, sketch 63) kept in the Zoological Library of the Natural History Museum, London, U.K. (see also Smith 1943, p. 529). Reproduced with permission from the Natural History Museum, London, U.K.

scale rows involving rows one to three between 89 and 99% of ventrals.

Hemipenis (based on ZSI-CZRC-V-6416, Pune, left organ, Fig. 11). The hemipenis reaches up to 13th subcaudals and is 36.9 mm in length and 8.2 mm maximum width at midbody and apex. It is divided into three distinct areas; the proximal area (nearly 30% of the total hemipenial length) is smooth without any ornamentation, middle zone (about 25% of the total hemipenial length) is with evenly scattered spinules and the apical calyculated portion (45% of the total hemipenial length). No enlarged spines are present, but the size of spinules at the proximal end are slightly larger than the ones at the distal end. The calyculated area can be further divided almost equally into proximal half with large calyces and distal half with smaller and denser calyces. The sulcus spermaticus is single, bounded with thick walls, runs straight across its length and opens into a delta (3 mm wide at apex, 1.9 mm in length), which is nude. The delta is subapical in position and the apex is calyculated, edged with fewer papillae. At the sulcate side, the calyces are larger proximally and gradually smaller and denser towards the distal end. The distal calyces are scalloped and edged with papillae. Along the asulcate side the spinous area starts more distally than the sulcate and lateral side. After the spinous zone, there are 2–3 rows of large calyces followed by densely packed calyces towards the apex. The proximal large calyces (9–10 in number) are of uneven size (mostly rounded or pentagonal) and among them the distal ones are scalloped. The large scalloped calyces are of 2.2–2.7 mm in length and 1.9–2.5 mm in width.

Wilson (1967) mentioned that the hemipenis is clavate, but in a fully inflated organ it starts widening from the middle and from the asulcate side there is a slight constriction between the midbody and apex. The ornamentation in ZSI-CZRC-6416 from Pune and ZSI-CZRC-6284 matches with that of LSUMZ 9425 as provided by Wilson (1967). However, the only available drawing of the organ as provided by the author is of the sulcate side, but apparently, differentiations in calyces are seen at the asulcate side.

Dentition (based on ZMB 8053, male, Bengalen). 15/15 maxillary teeth, the anterior 13/13 precranterian teeth are increasing in size posteriorly and are followed by a small diastema and 2/2 enlarged roundish cranterian teeth without groove. All maxillary teeth are slightly curved posteriorly, without significant interspaces. Medial to the precranterian teeth are single replacement tooth at different growth stages. One to two replacement teeth per cranterian tooth are found posteromedially to each tooth, showing different growth stages. 11/11 palatine teeth, decreasing in size posteriorly. All are curved posteriorly shortly above the base. Lateral to the palatine teeth there is a single replacement tooth at different growth stages. No significant interspace exists between the different palatine teeth. Posteromedial process of palatine large, expanding two pterygoid teeth. 13/12 ptery-

Figure 9. *Platyceps plinii* comb. nov. in life from various parts of India. Adults: **A.** ZSI-CZRC-6384 (male, SVL: 491) from Baripada, Odisha state, **B.** Uncollected specimen from Pune, Maharashtra state, **C.** ZSI-CZRC-V-6416 (male, SVL: 815) from Pune, Maharashtra state, and **D.** Uncollected female from Amaravati, Maharashtra state. Hatchlings/juveniles: **E.** ZSI-CZRC-V-6329 (subadult male, SVL: 355) from Choudwar, Odisha state, **F.** Uncollected specimen from Pune, Maharashtra state, **G.** Uncollected specimen from Amboli, Maharashtra state, and **H.** Uncollected specimen from Yavatmal, Maharashtra state. SVL in mm.

goid teeth, decreasing in size posteriorly. All are curved posteriorly shortly above the base. Lateral to the pterygoid teeth there is a single replacement tooth at different growth stages. No significant interspace exists between the different palatine teeth. The posterior 57% of the pterygoid are without teeth. 17/17 mandibular teeth, increas-

Figure 10. *Platyceps plinii* comb nov. Variation of neck pattern in specimens from various parts of India. Adults: **A.** NCBS-AQ492 (female, SVL: 820) from Bangalore, Karnataka state **B.** BMNH 62.8.14.29 (female, SVL: 854 mm) from Bengal, **C.** ZSI-CZRC-7111 (female, SVL: 965) Kabeerdham, Chhattisgarh state and **D.** BNHS 2857 (female, SVL: 746) Pune, Maharashtra state, **E.** ZSI-CZRC 6331 (male, SVL: 713) from Bhandara, Maharashtra state. Hatchlings/juveniles: **F.** BNHS 657 (male, SVL: 331) from Satna, Madhya Pradesh state, **G.** BNHS 639 (sex unknown, SVL: 212) from Saugor, Madhya Pradesh state, **H.** BNHS 637 (sex unknown, SVL: 222) from Ambala, Punjab state, **I.** BMNH 37A (male, SVL: 432) from Visakhapatnam, Andhra Pradesh state, and **J.** ZSI-CZRC 6330 (male, SVL: 350) from Cuttack, Odisha state. Scale bar 10 mm; SVL in mm.

ing in size up to tooth 5/5 and from there decreasing in size posteriorly. All are slightly curved posteriorly. Medial to the mandibular teeth there are 1–2 replacement teeth at different growth stages.

Variation in dentition. Wall (1914) based on one skull from his collection described 13 subequal maxillary teeth which are followed by a diastema which is as large as one tooth and followed by two little larger posterior teeth. He described 11 palatine, 15 to 16 pterygoid teeth all decreasing in length posteriorly and 18 mandibular teeth which increasing in length up to the fifth tooth and from there decrease in length posteriorly. Smith (1943, p. 159, fig. 48 D) depicted an upper jaw with 13 precranterian teeth which are increasing very slightly in size posteriorly and are followed by a distinct diastema and a pair of enlarged cranterian teeth. Wilson (1967, p. 271) mentioned like Smith (1943, p. 170), 12 –14 maxillary teeth followed by a distinct diastema but in contrast to the latter, Wilson (l. c.) identified the following two cranterian teeth as unenlarged and counted 9–11 palatine teeth, 14–17 pterygoid teeth, and 14–18 mandibular teeth. The dentition of four Indian specimens (BMNH 37a, see Fig. 12; MCZ R-28645; NMW 25465:3 and ZMB 4786a) is characterized by 12–14 maxillary teeth followed by a diastema (except MCZ R-28645, without diastema) and

Figure 11. Hemipenis of *Platyceps plinii* comb. nov. (ZSI-CZRC-V-6416, left organ) from Pune, Maharashtra state, India: **A.** lateral, **B.** asulcal, and **C.** sulcal view. Scale bar 10 mm.

two enlarged cranterian teeth, 9–11 palatine teeth with a posteriomedial process of palatine expanding two or three pterygoid teeth, 13–17 pterygoid teeth with 48–52% of the posterior pterygoid without teeth, and 16–19 mandibular teeth, increasing in size up to tooth 4–6 and from there decreasing in size posteriorly.

Four specimens from Pakistan (SMF 50410, SMF 57312 and SMF 62921–22) show 12–14 maxillary teeth followed by a diastema (except SMF 50410, without diastema) and two enlarged cranterian teeth, 9–11 palatine teeth with a posteriomedial process of palatine expanding two pterygoid teeth, 14–17 pterygoid teeth with 48–58% of the posterior pterygoid without teeth, and 17–20 mandibular teeth, increasing in size up to tooth 4–7 and from there decreasing in size posteriorly.

Dimensions and proportions. The body is robust, moderately stout, roundish in cross-section at midbody. Head moderately pointed, barely distinct from neck. Eye large, 16–24% of head length. Male specimens grow slightly larger than females; the longest examined specimens are from Sind, Pakistan including a male (SMF 50446) with 1482 mm and a female (SMF 50409) with 1361 mm total length. The longest Indian specimen was reported by Gharpurey (1931) from Ahmednagar, Maharashtra with 1422 mm total length. The smallest male (NMW 25465: 3) with 336 mm and the smallest female (SMF 57311) with 553 mm total length came from "Calcutta" and Sind respectively. The tail versus body length ratio ranges from 0.21 to 0.31 (males 0.21–0.31, females 0.23–0.28). For ten specimens from Telangana state, India measured by Seetharamaraju (2014, p. 95 ff.) the tail versus body length ratio ranges from 0.19 to 0.23 (males 0.19, females 0.19–0.23).

Colour and pattern (Fig. 9 A–K and Fig. 10 A–J)**.** Dorsal colour and pattern show a significant ontogenetic change. In juvenile and subadult specimens the dorsal ground colour is olive-brown to light brown, the head dorsally slightly darker with narrow elongated irregular shaped whitish markings. Along the body up to 70 narrow whitish/black or dark brown stippled crossbars, usually two scales wide and in contact with lateral edges of ventrals. The first band is separated from the posterior border of parietals, the interspace between bands is three to four dorsal scales wide. The intensity of bands decreases posteriorly and the contours become blurred near to the vent. Dorsocaudally the bands are dissolved in an irregular fine pattern of light and dark points. Temporals, preoculars and supralabials can show small whitish spots. From about 600 mm total length the colour and pattern of young specimens begin to fade and disappear gradually. Adult specimens are dorsally dark brown to dark reddish-brown without any markings on head, body or tail. The ventral side of head, body and tail in all age classes is patternless yellowish cream.

Distribution. *Platyceps plinii* is commonly believed to occur from Pakistan in the West to Bangladesh in the East with a North to South distribution from Nepal to Sri Lanka (see e.g. Smith 1943; Mahendra 1984; Welch 1988; Daniel 2002; Gruber 2002; Whitaker and Captain 2004; Sharma 2007; Wallach et al. 2014; Das et al. 2019; Uetz et al. 2019). We analyzed pertinent literature and locality information from museum specimens to present a list of localities corrected and updated for each country (see below and Appendix 9 Gazetteer).

According to our current knowledge, *Platyceps plinii* is only known with certainty from India and Pakistan. In India it is recorded from the states of Andhra Pradesh (Kasimkota [Casemcottah, type locality], Eluru, Nallamala Hills, Pulicat Lake, Rajahmundry, Rollapenta, Sundipentha/Sikharam, Thummalapalle mine and Visakhapatnam), Bihar (Munger, Patna, Tinpahar and Rajmahal), Chhattisgarh (Pharsabhar), Goa (Bondla Wildlife Sanctuary and Panaji), Gujarat (Baroda, Bharuch, Bhavnagar, Dahod, Dangs, Gandhinagar, Girnar Hill, Gir Forest, Kala Gadba, nr. Mahal, Mehsana, Panchmahal, Sabarkantha, Samot, Surat, Valsad, Vansda National Park and Vijapur), Haryana (Ambala), Jharkhand (Hazaribag District), Karnataka (Balekola, Chincholi Forest, Belgaum, Coimbatore, Coorg, Hosar, Mysuru and Shivamogga), Kerala (Muthanga in Wayanad Wildlife Sanctuary), Madhya Pradesh (Bhopal district, Barkatullah University Campus, Dewas, Dumna Nature Park, Gwalior, Indore, Jabalpur, Kanha National Park, Katra Hills, Mandla, Pachmarhi Biosphere Reserve, Sagar, Satpura Tiger Reserve, Shahdol, Sita Hill and Ujjain), Maharashtra (Akola district, Ahmednagar, Ale nr. Narayangon, Atpadi, Aurangabad, Bassein Fort, Bohali, Borivali (Gorai) mangroves, Buldhana district, Chink Hill, Dahanu Forest Division, Deolali, Devagad, Ghorawadi nr. Talegaon, Jalgaon, Jawhar, Juvem, Kaas Plateau, Khanda-

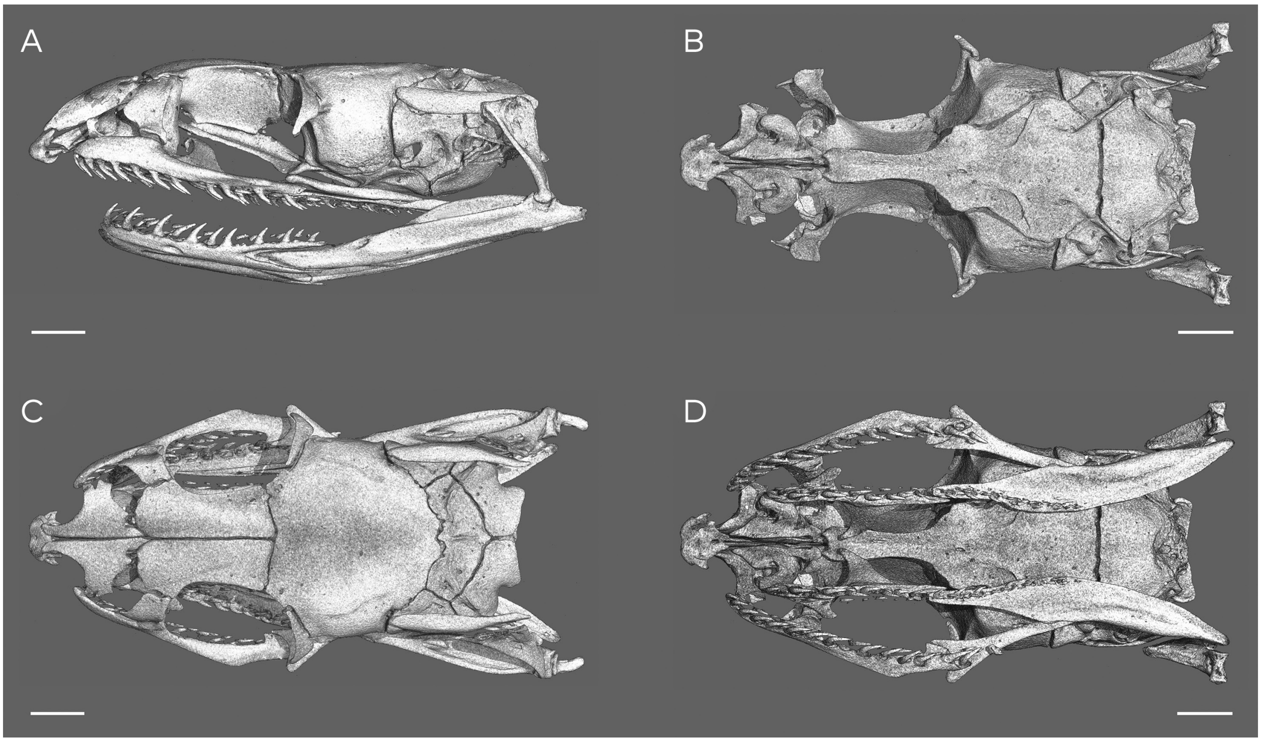

Figure 12. Skull of *Platyceps plinii* comb. nov. (BMNH 37a) from Visakhapatnam, Andhra Pradesh state, India: A. lateral, B. ventral (tooth bearing and connecting bones virtually extracted), C. dorsal and D. ventral view (lower jaw virtually extracted). Scale bar 1.5 mm.

la, Kolhapur district, Konkan region, Kurduvadi, Malegaon, Marol, Mokhada, Mumbai, Nagar, Nagpur, Nanded, Navegaon National Park, Navi, Panchgani, Parel, Parvati-Pachgaon Hills, Powai, Pune, Ranidoh region, Thana, Vidarbha region, Vidyanagari, Visapur and Yavatmal), Odisha (Gandhamardan Hills, Nandankanan, Choudwar, Similipal Biosphere Reserve, Baripada and Bhadrak), Puducherry, Rajasthan (near Hemavas Dam, Pratapgarh district and Ramri), Tamil Nadu (Chennai and Hosur Hills), Telangana (Farahabad, Hyderabad region, Ippalapally, Jannaram, Kerimeri, Khanapur, Kinnerasani, Old Bowenpally, Rushulacheruvu, Tarnaka and Vijayapuri), Uttar Pradesh (Mathura region, Faizabad, Prayagraj and Varanasi), West Bengal (Dum Dum, Durgapur, Kolkata and Panchet Hill). The westernmost published record of the Banded racer comes from the Girnat Hill or Girnagar in the Junagadh district of Gujarat, approximately 70°31’ East (Patel et al. 2019a). According to Anonymous (1870), Anderson (1871), Stoliczka (1871b), Sclater (1891), Smith (1943) and Ahmed and Dasgupta (1992) the actual westernmost distributional border for *P. plinii* lies in West Bengal state of India, near Kolkata approximately 88°25’ East (incl. ZSI-K 7332, don. Joseph Fayrer 1870, ZSI-K 7334 don. John F. Galiffe, and the specimen from Dum Dum illustrated on sketch 63 of the Hardwicke collection in the Natural History Museum, London; see Fig. 8).

In Pakistan confirmed records are known from the Indus plain in Sindh province (nr. Badin, Hala, Jati, Lakarna, Makli Hills, Mohenjo-daro, Pir Patho, Raj Malk, Sonda, and Tatta) and some authors mentioned southern and central Punjab without specific locality (e.g. Khan 1980, 1982, 2002, 2006). We found only one record with more precise information for Punjab from the Lal Suhanra National Park in Bahawalpur published by Khan et al. (2018, p. 1731).

Unconfirmed or erroneous distribution records. Sporadically the Banded racer is mentioned for the Himalayan region in northwestern and northeastern India. Mahajan and Agrawal (1976) and Agrawal (1979) published records (as *Coluber fasciolatus*) from Saproon village and the Gambhar bridge from an elevation of 1513 m and 1485 m a.s.l. respectively. Both localities are situated in the Solan district of Himachal Pradesh state of India. From Uttarakhand state the Banded racer was listed by Sharma (2004) from Sokharak, Mandal Rest House and Mandal-Chopta road in Kedarnath Wildlife Sanctuary located between 1500 and 3300 m a.s.l. in the Chamoli and Rudraprayag districts, and by Bahuguna (2010) for the Corbett Tiger Reserve (now Jim Corbett National Park). Since these reports, no further specimens from the Himalayan range of Himachal Pradesh and Uttarakhand have become known and because of the fact that these localities are considerably above the average altitudinal distribution of this species (see below), we suspect that these records are based on incorrect determinations (Abhijit Das, pers. comm. 2020) and consider the records to be very doubtful. The Banded racer is also listed from the Eastern Himalayas by e.g. Jha and Thapa (2002), Chettri and Bhupathy (2007) and Chettri et al. (2011). Whereas the first authors consider it “rare”, Chettri and Bhupathy (l.c.) regarded it surprisingly as “common” in Sikkim. Since none of the above-mentioned authors provided a single voucher specimen or a specified locality in that

East Himalayan state, and no preserved material is known from any collection, so we consider its distribution in Sikkim to be unproven.

Based on water-colour sketch no. 61 from the Hardwicke collection, Smith (1943, p. 529) mentioned "Cawnpore" [Kanpur, Uttar Pradesh state of India] for *Coluber fasciolatus*. Although the Banded Racer is known to occur in this state (see above), the snake depicted on this drawing is in fact, a Common ratsnake, *Ptyas mucosa*.

Wallach et al. (2014) added the Pakistani province of Balochistan to the distribution range, but the literature cited provided no such indications and we could not identify a single credible record for this state.

When it comes to the distribution of the Banded racer in Sri Lanka, there is a consistent reference to Haly (1886, 1891), who allegedly provided the first evidence. But, as already noted by Somaweera (2006), Ferguson (1877) was the first who listed this species for "Ceylon". Ferguson (l.c.) stated that the specimen "[…] was sent to the Museum [Colombo] lately by Mr. Deputy Queen's Advocate Thwaites, and supposed to have been found by Mr. Twynam, the Government Agent of the Northern Province, about Aripo" (see Appendix Note 3). Since Haly (1886) the Banded racer is consistently listed as part of the Sri Lankan snake fauna (e.g. Wall 1921; Deranyiagala 1955; P. de Silva 1980; de Silva 1990, 2001; Das and de Silva 2005; Somaweera 2006; de Silva and Jinasena 2009; Wallach et al. 2014; de Silva and Ukuwela 2017) although no additional specimen has been collected, no preserved voucher specimens are known from any collection, and recent fieldwork on Jaffna Peninsula revealed no further material (Abyerami and Sivashanthini 2008; Madawala et al. 2019). We follow Taylor (1950) and regard this species as doubtful for Sri Lanka.

In several publications, especially in overview works and faunal lists, the Banded racer is mentioned for Bangladesh. This is probably because in older publications (e.g. Cantor 1839; Günther 1864; Theobald 1876; Boulenger 1890) "Bengal" is listed as a known distribution, a region currently divided between Bangladesh and the West Bengal state of India. After the separation of the central and eastern regions of Bengal from India in 1947 and the foundation of the state of Bangladesh in 1971, the majority of (Indian) authors changed the original information "Bengal" to "West Bengal"(India), but others still maintained the distribution for Bangladesh (e.g. Welch 1988; Daniel 1989, 2002; Das 2002; Whitaker and Captain 2004; Wallach et al. 2014; Uetz et al. 2019), although Wall (1914) already clarified that the species is not found further east than Calcutta in West Bengal state of India. Authors who refer exclusively to the herpetofauna of Bangaladesh (e.g. Islam et al. 2000; Khan 1988, 2004; Kabir et al. 2009) do not present more detailed localities and while Hasan et al. (2014) listed the Banded racer as expected to occur in the Northeast and Southeast of the country, he did not provide any supporting evidence. We could not find any historical or current evidence that this snake species occurs in Bangladesh.

From Nepal, the Banded racer was first mentioned by Günther (1861) in a list of "[…] Cold-Blooded Vertebrata […]" collected in that country. Günther's source was a water-colour painting of a specimen from the "Central hilly region" (reproduced here in Fig. 6) probably made by Raj Man Sinh Chitrakar, a Nepalese draftsman employed by Brian H. Hodgson (McClelland and Griffith 1844; Cocker and Inskipp 1988). The locality most probably refers to the complex of hills and valleys surrounding the Kathmandu valley where the majority of specimens in the Hodgson Nepalese collection originated. Our examination of Hodgson's original drawing, in the Zoological Library of Natural History Museum, London, revealed that the specimen depicted is not a Banded racer but a natricid snake, *Rhabdophis himalayanus* (Günther, 1864), a species reported from that region by e.g. Gruber in Schleich et al. (2002). Shrestha (2001) stated that the Banded racer has been reported from the Royal Chitwan National Park, and "[…] lives in dense Sal forest as well as grassland of Chitwan valley in Nepal […]". We regard this statement as based on a misidentification because no voucher is known. Similar to the aforementioned record for Sri Lanka, the occurrence of the Banded racer in Nepal relies solely on an old and unreviewed original source, so the presence of this species in Nepal could not be confirmed. Although Kramer (1977) already considered the distribution in Nepal as questionable, and no further material has been collected (Karan B. Shah in litt. 2019), most subsequent authors continue to list the Banded racer in the Nepalese herpetofauna (e.g. Swan and Leviton 1962; Welch 1988; Schleich 1993; Shrestha 1998, 2001, 2003; Gruber 2002; Shah and Tiwari 2004; Wallach et al. 2014; Uetz et al. 2019).

Based on records of the Banded racer in Bengal, Schleich and Kästle (2000) and Lenz (2012) suspected its possible occurrence in the Himalayan Kingdom of Bhutan which was adopted as questionable by Uetz et al. (2019). As explained above for the Himalayan regions of India and Nepal such a presumption lacks any basis and we refer to the list of verified records above (see also Appendix 9 Gazetteer).

Cantor (1847a, b) mentioned a specimen from the Province Wellesley (Seberang Perai, Penang state, West Malaysia) which corresponds with Russell's "Nooni Paragoodoo", and determined it as *Coluber fasciolatus*. Based on dentitional characters, which he regarded as similar to Russell's (1796) description, he concluded that *C. fasciolatus* "[…] cannot be placed in the genus *Lycodon*, to which it has been referred by M.M. H. Boie, –Wagler and Schlegel". Wall (1908, p. 21 footnote, 1913, p. 20 footnote, 1921, p. 195 footnote, 1924, p. 619) and Wilson (1967, p. 266) already doubted the authenticity of Cantor's record. Our re-examination of this juvenile specimen (BMNH 60.3.19.1121) confirmed its identity as *P. plinii*, thus the locality given by Cantor must be considered as an error.

Mason (1861) listed "*Coluber fasciolatus*" for "Burmah" and Theobald (1868b) and Nicholson (1874) mentioned, "*Zamenis fasciolatus* Shaw" from "Mergui" [Mergui or Myeik Archipelago, Myanmar]. The latter quoted "Blyth" but gives no specific reference, that

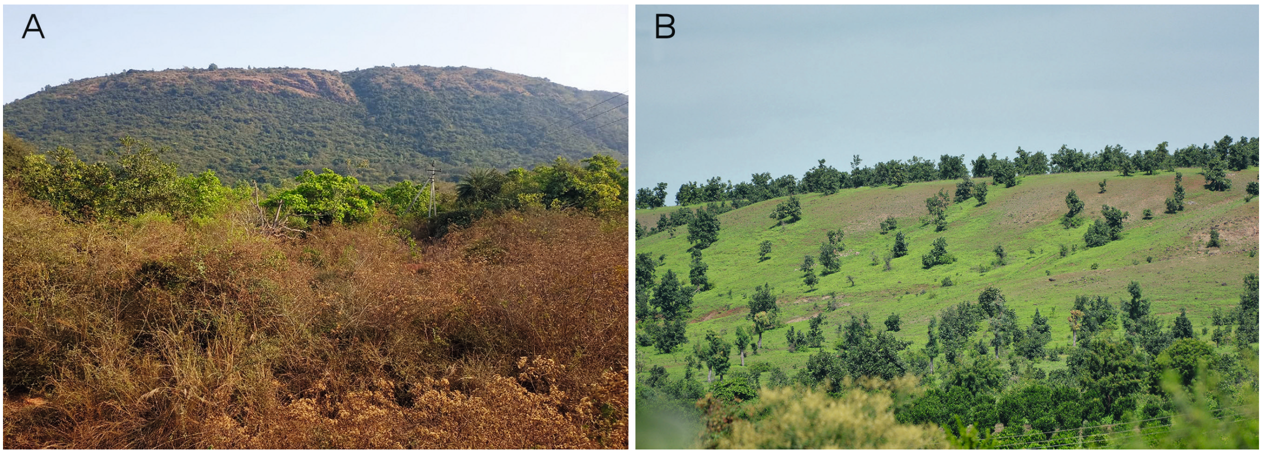

Figure 13. Habitats of *Platyceps plinii* comb. nov. in India: **A.** near type locality Kasimkota village, Andhra Pradesh state, and **B.** from Pune, Maharashtra state.

makes a reassessment impossible. Theobald (1880) added "Tenasserim, &c." to the distribution of the Banded racer, without reference to specific specimens or exact localities. As indicated above, the easternmost records are from West Bengal and we, therefore, consider the records for Myanmar to be based on misidentification.

Habitat and natural history. *Platyceps plinii* is widespread over the Indian Subcontinent (see above, Map 1 and Appendix 9 Gazetteer). It is reported as regionally common in e.g. Maharashtra and Karnataka (Murthy and Acharjyo 1987; Daniel 1989, 2002; Deshmukh et al. 2015; Ingle et al. 2014) and abundant in parts of Goa (Murthy and Acharjyo 1987). It inhabits plains, plateaus and mid hills covered with mixed and dry deciduous forest, scrub forest as well as semi-arid and rocky areas (for habitat examples see Fig. 13 A and B).

The vertical distribution ranges from sea level to over 1000 m altitudes, with about 85% of all finds below 600 m a.s.l. A few unusually high sites are known from the states of Madhya Pradesh (Pachmarhi Biosphere Reserve, 1053 m a.s.l.) and Maharashtra (Kaas Plateau, 1191 m a.s.l., and Panchgani, 1258 m a.s.l.) (see Appendix 9 Gazetteer).

It is a mainly terrestrial species but also observed to be a good climber (Ingle 2008) and found in open places, tall grass, dense bushes, under roots of old trees, in spiles of stones and bricks, and rodent holes. The Banded racer is also reported from urban and cultivated areas where it was found in houses, village environs, agricultural open fields, gardens, parks and farms (Stoliczka 1871a; Wall 1914; Lindberg 1932; Khaire 1996, 2014; Ingle 2002; Whitaker and Captain 2004; Rao et al. 2005; Srinivasulu et al. 2006; Chandra et al. 2008; Chikane and Bhosale 2012; Seetharamaraju 2014; Charjan and Joshi 2015; Sayeswara et al. 2015; Dileepkumar et al. 2016; Ingle et al. 2019). In some places, e.g. Bhadrak, Odisha, 30-40 individuals were found hibernating together in the cob walls in human habitations (Mohalik pers. comm.).

It is a diurnal species that is only exceptionally observed active during the night and known for its defensive and pugnacious behaviour. If threatened or captured it erects itself, flattens the forebody and furiously attacks when further provoked which one can confuse with a cobra (Wall 1907, 1914, 1921; Whitaker and Captain 2004). Its antipredator mechanism was summarized by Green (1988) as follows: (1) dorsoventral body compression, (2) dorsoventral neck compression, (3) lifting of head and neck, (4) S-coil striking posture, (5) lunging and striking, and (6) bite. One female caught while crossing a road immediately defecated and started attempting to bite. In other instances, individuals were observed climbing electric cables and visiting switch boxes, possibly looking for hiding geckos (*Hemidactylus* spp.).

The Banded racer is an active hunter that usually kills its prey by constriction or body pressure. Its prey consists of small mammals like rats, mice, shrews and bats, but also frogs, lizards, birds, worms, and for juveniles insects are part of the food spectrum (Wall 1914; Daniel 1989, 2002; Sharma 1999a; Das and de Silva 2005; Satish 2008; Whitaker and Captain 2004).

Mating of the Banded racer was observed between late winter and mid-monsoon (Dileepkumar et al. 2016). The reproduction is oviparous with clutch sizes between 2 and 23 eggs and egg sizes between 26.8–34.7 mm length and 16.5–22.4 mm width, laid between January and September (Vyas 1987; Khaire 1996, 2008, 2010, 2014; Das 2002; Das and de Silva 2005; Satish 2008; Ingle et al. 2014; Tambre and Chavan 2016; Parsar 2018; Patel et al. 2019b). Hatchlings have been observed in May (D'Abreu in Wall 1914) and July (Wall 1914; Daniel 1989, 2002).

Manhas (2015a) observed the Banded racer as roadkill during monsoon in Bhopal district of Madhya Pradesh state and Mohalik et al. (2019) reported the predation of this species by a leucistic Krait, *Bungarus caeruleus*, from the Patharakali area of the Bhadrak district in Odisha state of India.

For Pakistani specimens, Minton (1966) and Wilson (1967) observed semifossorial behaviour and Khan (2002, 2006) reported that reproduction in Banded racer occurs twice a year, during the months April to May and August to September, with clutch sizes from 23 to 30 eggs.

Platyceps josephi sp. nov. – Joseph's racer

Figs. 14 –20

http://zoobank.org/BCDF7898-79FE-41E6-806F-4935EF-67C3DD

"The Racer". – Whitaker and Whitaker 1986, p. 56 [lower image].

Zamenis fasciolatus. – Anonymous 1879, p. 35, Sclater 1891, p. 28 [partim]; Wall 1914, p. 34, pl. 22 [partim].

Coryphodon fasciolatus. – Beddome 1862, p. 16 f. [partim].

Argyrogena fasciolatus [sic]. – Whitaker 1978, p. 31. [partim, image p. 32]; Sharma 1982, p. 123 [partim]; Whitaker 1982, p. 31. [partim, image p. 32].

Argyrogena fasciolata. – Wilson 1967, p. 260 ff. [partim]; Whitaker and Captain 2004, p. 138 [partim]; Hutton and David 2008, p. 314; Rameshwaran, 2008: 22, front cover [partim]; Ganesh and Asokan 2010, p. 57; Vijayaraghavan and Ganesh 2011, p. 40 [partim, fig. 18]; Bhupathy and Satishkumar 2013, p. 4960; Chaitanya et al. 2018, p. 24; Sagadevan et al. 2019, p. 13567 [partim, image 1a,c].

Coluber fasciolatus. – Hutton 1949, p. 456; Rajendran 1986, part 1, p. 5, part 3, p.86–88, part 4, p. 1–4.

Platyceps josephi **sp. nov.** – this work.

Diagnosis. A medium sized (maximum total length 951 mm) snake with countersunk lower jaw; dark brownish dorsum; head with irregular white spots, two slanting roughly "∏" shaped white markings with black edges on either side, starting on the back of the head (behind parietals) extending into the body, almost the length of head; 13–18 prominent white bands in the anterior region of the dorsum in both juveniles and adults; 34–48 total bands on the body in both juveniles and adults; 23:21(exceptionally 23):16–18 smooth dorsal scale rows; 189–218 ventrals (males: 192–197; females: 189–216); 76–88 subcaudals (males: 83–88; females: 76–88); cloacal plate divided; tail without bands and underside creamish. Its dentition is characterized by 12–16 maxillary teeth, the last two enlarged and separated by a diastema, 9–11 palatine teeth, 14–15 pterygoid teeth and 15–16 mandibular teeth.

Platyceps josephi **sp. nov**. shows most similarities with its sister taxon *P. plinii* in regard to pholidosis and colour pattern but can be distinguished from the latter by its lower number of midbody dorsal scale rows (21 vs. 23), its lower mean value of ventral scales (202 vs. 214), its lower mean value of subcaudal scales (82 vs. 87) and its lower mean of the sum of ventral and subcaudal scales (285 vs. 304), the presence of the clearly demarcated two slanting roughly "∏" shaped white markings on the back of head vs. absence of such markings and distinct white bands on the dorsum in both juveniles and adults vs. ontogenetic change, i.e. bands present in juveniles only, but usually absent or faded in adults. Additionally, *Platyceps josephi* **sp. nov.** differs from *P. plinii* in variation of mitochondrial DNA sequences. With pairwise uncorrected p-distances varying 4–5% in *cytb* & *ND4* and 3% in *16S*. It is also clear from our thorough verification of distribution that these two species only have a minor range overlap in northeastern Tamil Nadu (Fig. 1 Map).

Holotype. NCBS AU-732, adult female, from Tuticorin, Tamil Nadu state, India (8.75442° N, 78.18482° E, 5 m a.s.l) collected by Naveen Joseph on 26th February 2017 (Figs 14–16 A and 20).

Paratypes. BNHS 3516 and NCBS AU-733, adult females, from Vagaikulam, Tuticorin, Tamil Nadu state, India (8.71634° N, 78.00203° E, 28 m a.s.l.), collected by Naveen Joseph on 28th July 2017 and 3rd November 2017, respectively. ZSI-CZRC-6639, adult male, from Karur, Tamil Nadu state, India (10.97382° N, 78.08949° E, 114 m a.s.l.) collected by Melvin Selvan on 2nd August 2018 and NMW 25465:2, juvenile male, from Salem, Tamil Nadu state, India (11.74178° N, 77.93888° E, 314 m a.s.l.), collected by Ferdinand Stoliczka and donated to the NMW collection on 11th January 1879.

Referred specimens. ZSI-CZRC-6521, adult female, from Tuticorin, Tamil Nadu state, India (8.73448° N, 77.97889° E, 33 m a.s.l.) collected by Naveen Joseph on 12th June 2017; ZSI-CZRC-6522, adult female, from Vilathikulam, Tamil Nadu state, India (9.125623° N, 78.176763° E, 20 m a.s.l.), collected by Ahmed Jerith and Naveen Joseph on 2nd February 2018; ZSI-CZRC-7358, sex unknown, from Anaikatti, Coimbatore district, Tamil Nadu state, India (11.11221° N, 76.75795° E, 581 m a.s.l.), collected by Jins VJ on 23rd October 2017; ZSI-K 12374, hatchling, from South India, presented by Edward Gerrard to the ZSI collection; ZSI-K 4379, hatchling, from Anamalai hills, collected by Richard Henry Beddome, and NMW 25465:1, juvenile female, from Salem, Tamil Nadu, India (11.74178° N, 77.93888° E, 314 a.s.l.) collected by Ferdinand Stoliczka. Because of the partly bad state of preservation or imprecise locality information we have excluded these specimens as potential type material.

Etymology. The specific epithet is a patronym of late Mr Naveen Joseph. Naveen was a naturalist from Tuticorin, well known for his research on reptiles, particularly snakes in that region. He was a friend of VD, SN, and GM and helped them collect specimens of the new species. *Suggested English name*: Joseph's racer. *Vernacular name*: In various parts of Tamil Nadu state this snake is called by the name "Odugali Pambu" "ஓடுகாலிப்பாம்பு". It is a portmanteau word in Tamil language "Odugali" is often used to address someone "who doesn't stay at home and elopes" and "Pambu" is the word for "snake".

Description of the holotype. Morphometric and meristic data are provided in Table 2. Female. Specimen in good condition with three incisions into coelom at 80th, 106th and 123rd ventral respectively.

Body subcylindrical, dorsoventrally flattened. Head ovate, barely wider than the anterior end of body. Total lenghth 934 mm; snout-vent length 758 mm; tail length 176 mm; ratio tail length/total length 0.19; head length 24.0 mm; rostral large, 2.2 times broader than high, not protruding, rounded in dorsal view, and wedged in between internasals; the latter smaller (1.5 mm) and distinctly shorter along median suture than prefrontals (2.5 mm); mid-line suture between internasals and pre-frontals in straight line; distance from posterior tip of rostal to anterior edge of frontal 4.2 mm, the latter bell-shaped, 6.4 mm long with a maximum width of 4.7 mm; interocular width 7.0 mm; parietals 6.3 mm long, outer lateral and posterior margins of parietals surrounded by 13

Table 2. Meristic and morphometric (in mm) data for examined specimens of *P. josephi* **sp. nov.** Symmetrical head characters are given in left/right order.

Inventory no.	**NCBS AU-732 holotype**	**ZSI-CZRC-6639 paratype**	**BNHS-3516 paratype**	**NCBS AU-733 paratype**	**NMW 25465:2 paratype**	**NMW 25465:1**	**ZSI-CZRC-6522**	**ZSI-CZRC-6521**	**ZSI-CZRC-7358**
Sex	female	male	female	female	male	female	female	female	unknown
SVL	757.6	574.3	592.0	608.5	440.0	255.0	574.5	722.2	NA
TaL	175.5	167.1	162.2	89.9	142.0	60.0	170.5	228.9	NA
TL	933.1	741.5	754.2	698.4	582.0	315.0	745.0	951.1	NA
HW	12.4	11.9	10.8	13.5	11.6	7.9	13.4	NA	NA
HL	24.1	20.0	21.6	22.7	14.5	10.7	23.0	NA	NA
ED	4.1	3.4	3.9	3.8	3.3	2.7	3.7	NA	NA
RW	4.8	4.8	4.2	4.6	3.8	2.4	4.1	NA	NA
FL	6.4	6.1	5.6	5.3	5.2	4.3	5.9	NA	NA
FW	4.7	3.8	4.3	3.7	3.7	3.0	4.2	NA	NA
PrefL	2.0	2.3	2.2	2.2	2.2	1.6	2.0	NA	NA
InL	1.2	1.6	1.6	1.5	2.1	1.5	1.9	NA	NA
E-S	8.2	7.6	7.2	7.7	6.3	4.6	7.3	NA	NA
ParL	6.3	5.7	6.0	6.0	5.7	4.5	5.8	NA	NA
ParW	4.5	4.2	4.2	4.1	3.9	3.0	4.6	NA	NA
DSR	23/21/18	24/23/17	23/21/17	23/21/17	21/21/17	23/23/17	NA	23/21/16	NA
PreVen	3	1	2	0	2	1	3	2	NA
Ven	203	192	195	208	197	216	204	189	218
Subc	76	82	77	84	88	79	damaged	88	NA
TS	283	276	275	293	288	297	NA	280	NA
PrO	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
PoO	2/2	2/2	2/2	2/2	2/3	2/2	2/2	2/2	2/2
T	2+2/2+3	2+3+4/2+2+4	2+3/2+3	2+3/2+3	2+2+3/2+3+4	2+3+4/2+2+4	2+3+4/2+2+4	2+3/damaged	2+3/2+3
SupL	8/8	8/8	8/8	8/8	8/8	8/8	8/8	8/8	8/8
SubL	9/9	10/10	10/10	10/10	11/11	10/10	10/10	damaged	10/10

scales between the upper postoculars; nasal completely divided, in contact with first and anterior half of second supralabial; nostril large in anterior shield; distance between posterior margin of nostril and anterior border eye 4.2 mm; loreal slightly longer (1.5 mm) than high (1.4 mm), in contact with posterior part of second and anterior half of third supralabial; preocular single, reaching top of head, touching frontal; presubocular squarish, smaller than preocular and loreal, in contact with third and fourth supralabial; 8/8 supralabials, fourth and fifth entering the eye, fifth highest; 2/2 postoculars, upper slightly broader, lower higher, lower postocular in contact with fifth supralabial; temporals in 2+3/2+3 rows, lower anterior slightly larger than upper; 9/9 sublabials, sixth largest, first five in contact with anterior inframaxillaries on both sides; anterior pair of inframaxillars broader and slightly longer (6.1 mm) than posterior pair (5.6 mm), which is distinctly separated by five inserted gulars; five gulars in a row between posterior edge of anterior inframaxillars and preventral; three preventrals and 203 ventrals; anal scute divided, right overlapping left; 76 paired subcaudals; terminal spine blunt; dorsal scales smooth, arranged in 23/21/17; apical pits present, but not consistently on all the dorsal scales, single or paired on dorsal part from the neck to near sacral region, single or triple pits present on dorsocaudal scales.

Dorsal scale reduction formula:

-3(6) +10(64) -10(67) +10(82) 10+11(87) 3+4(133) 8+9(151) –
23-------**21**-----------**23**---------**21**-----------**23**--------------**21**------------**19**------------**17**----------**18**(203).
-4(8) +11(65) -11(69) +11(84) -11(88) 3+4 (133) 8+9(150) +2(202)

Dentition (see Fig. 20). 14/16 maxillary teeth, the anterior 12/14 precranterian teeth are increasing in size posteriorly (from 0.9 to 1.6 mm length) and are followed by a diastema which is as long as the socket of the last precranterian tooth, and 2/2 slightly enlarged roundish cranterian teeth (~1.9 mm long) without groove. All maxillary teeth are slightly curved posteriorly, without significant interspaces. Medial to the precranterian teeth are single replacement tooth at different growth stages. One to 2 replacement teeth per cranterian tooth are found posteromedially to each tooth, showing different growth stages.

9/9 palatine teeth, decreasing in size posteriorly. All are curved posteriorly shortly above the base. Lateral to the palatine teeth there are single replacement tooth at different growth stages. No significant interspace exists be-

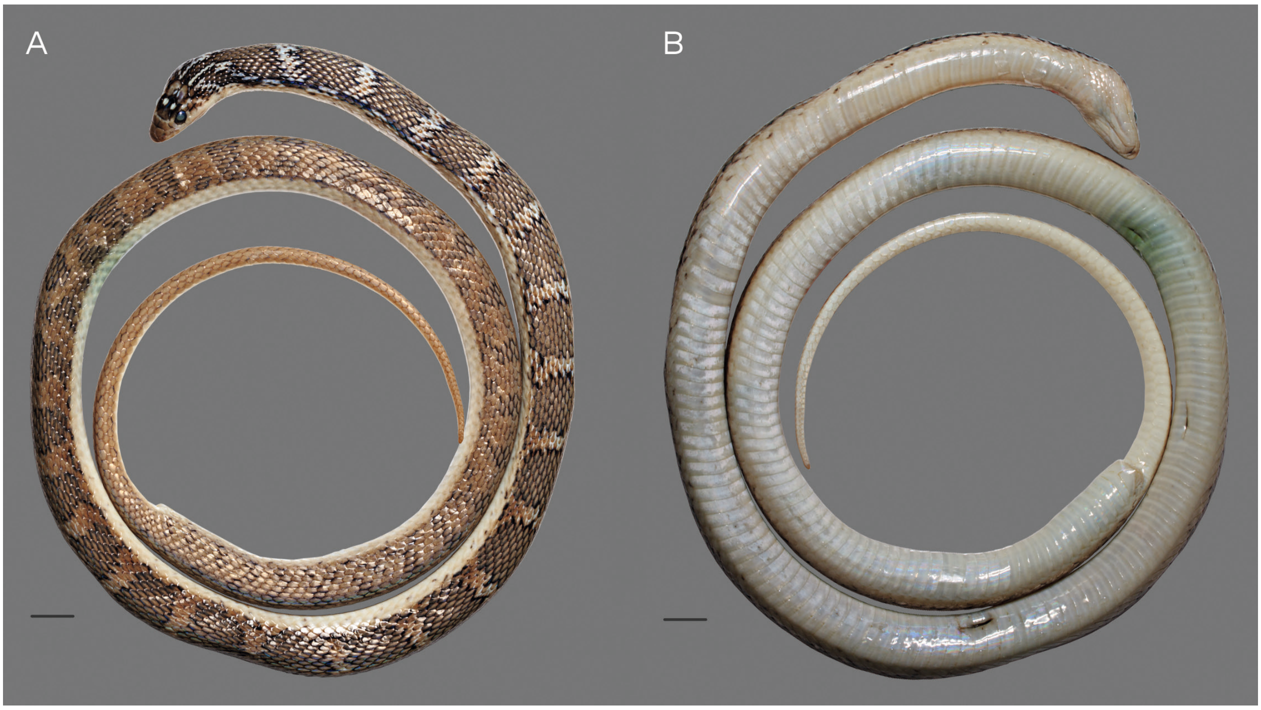

Figure 14. Holotype of *Platyceps josephi* **sp. nov.** (NCBS-AU 732) in preservation, from Tuticorin, Tamil Nadu state, India: **A.** dorsal and **B.** ventral view. Scale bar 10 mm.

tween the different palatine teeth. Posteromedial process of palatine large, expanding two pterygoid teeth.

14/14 pterygoid teeth, decreasing in size posteriorly. All are curved posteriorly shortly above the base. Lateral to the pterygoid teeth there are single replacement tooth at different growth stages. No significant interspace exists between the different palatine teeth. The posterior 56% of the pterygoid are without teeth.

15/15 mandibular teeth, increasing in size up to tooth 6/6 and from there decreasing in size posteriorly. All are slightly curved posteriorly. Medial to the mandibular teeth there are 1–2 replacement teeth at different growth stages.

Hemipenis (based on ZSI-CZRC-6639, paratype, Karur, right organ, Fig. 19). The hemipenis reaches up to 12th subcaudals and is 24.3 mm in length with a maximum width of 5.8 mm at 1/3rd of the proximal end. It is divided into three distinct areas; the proximal area (nearly 1/4th of the total hemipenial length) is smooth without any ornamentation, middle zone (about 28% of the total hemipenial length) is with spinulae and the apical calyculated portion (48% of the total hemipenial length). The spicules at the midbody of the hemipenis gradually reduce in size from proximal to the distal end. The calyculated area can be further divided almost equally into proximal half with large calyces and distal half with smaller and denser calyces. The sulcus spermaticus is single and runs straight across its length and opens into a wide and elongate naked area (3.3 mm) extending laterally from the proximal to distal end extending to the apex. The opening of the sulcus forms a triangular area and ends apically. The sulcus is bounded with thick walls. The calyces are larger proximally and gradually smaller and denser towards the distal end. The calyces distally are edged with papillae. Along the asulcate side, the spinous area starts more distally than the sulcate and lateral side. The proximal calyces are wider and elongated, with eight to nine well defined calyces extending towards the lateral side and the distal part of these calyces are scalloped. The calyces towards the distal part are with more of papiliated edges and are similar in micro-ornamentation with the sulcate side.

Variation among the paratypes. See Table 2 for variations in merestic and morphometric features. Paratypes generally in moderate to good condition; NCBS-AU733, BNHS 3516 and ZSI-CZRC-6639 with single incision and NMW 24565: 2 without incision into the coelom. ZSI-CZRC-6639, male, both hemipenis removed for further examination. Tail/body ratio 0.22 in BNHS 3516, 0.13 in NCBS-AU733 and 0.23 in ZSI-CZRC-6639. Mid-line suture between internasals and pre-frontals not in a straight line in NCBS-AU733, BNHS 3516, NMW 24565: 2 and ZSI-CZRC-6639. Nostrils in BNHS 3516 situated above the center between both nasals. Loreals longer than high in NMW 24565: 2 and ZSI-CZRC-6639 and subequal in BNHS 3516. Temporals 2+3 (left), 2+2 (right) rows in ZSI-CZRC-6639; 2+3 (left), 2+2 (right) in NMW 24565: 2 respectively; 2+3 rows in the left side of BNHS 3516 and middle temporal in the second row (right) the largest than the other two and 2+3 on the left side of the NCBS-AU733 and the lower anterior temporal being the largest in all the paratypes on both sides. Posterior margin of the parietals surrounded by nine scales in BNHS 3516, fourteen scales in NCBS-AU733 and twelve scales in ZSI-CZRC-6639. Ten sublabials on both sides in BNHS 3516, NCBS-AU733, NMW 24565: 2 and ZSI-CZRC-6639 with only the first four in contact with the an-

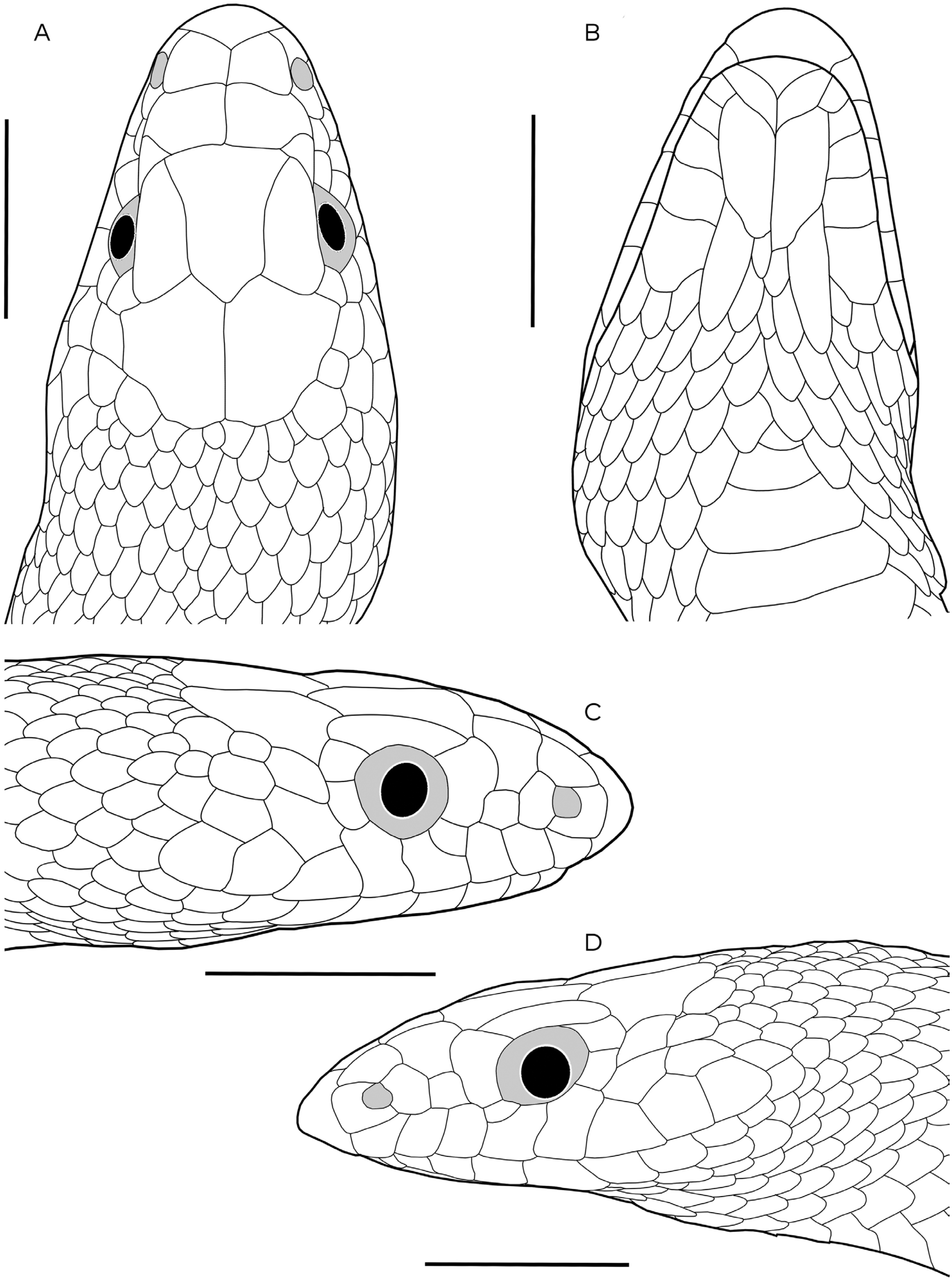

Figure 15. Line drawings showing head scalation and dimensions of the holotype of *Platyceps josephi* **sp. nov.** (NCBS-AU732) from Tuticorin, Tamil Nadu state, India: **A.** dorsal, **B.** ventral, **C.** lateral right and **D.** lateral left view. Scale bar 10 mm.

terior inframaxillars in ZSI-CZRC-6639. One preventral in ZSI-CZRC-6639 and two pre-ventrals in NMW 24565: 2 and BNHS 3516 and preventrals absent in NCBS-AU733. Terminal scute sharp and intact in both BNHS 3516 and ZSI-CZRC-6639. Apical pits in BNHS 3516 and NCBS-AU733 are mostly single or double in the dorsal and double (single in few scales) above sacral but from the anterior part of the body, it is consistently double in all the scales from the position of the 10th ventral (single before that) until the tip of the tail for ZSI-CZRC-6639.

Figure 16. *Platyceps josephi* **sp. nov.** in life from various parts of Tamil Nadu state, India: **A.** Holotype NCBS-AU732 (female, SVL: 757) from Tuticorin, **B.** Paratype NCBS-AU733 (female, SVL: 608) from Tuticorin, **C.** Paratype BNHS 3516 (female, SVL: 592) from Tuticorin, **D.** uncollected (juvenile) from Tuticorin, **E.** Paratype ZSI-CZRC-6639 (male, SVL: 574) from Karur, **F.** Uncollected (male) from Vathalagundu, **G.** uncollected (juvenile) from Tuticorin and **H.** uncollected (female, SVL: 655) from Pollachi. SVL in mm.

NCBS-AU733 differs from the holotype in having a slightly darker frontal and suprocular scales, presence of irregular white spots in the temporal scales, and a small white line along the midline between the two prefrontals. The first band on the body is separated from the "∏" shaped markings by 2 scales on both the sides along the

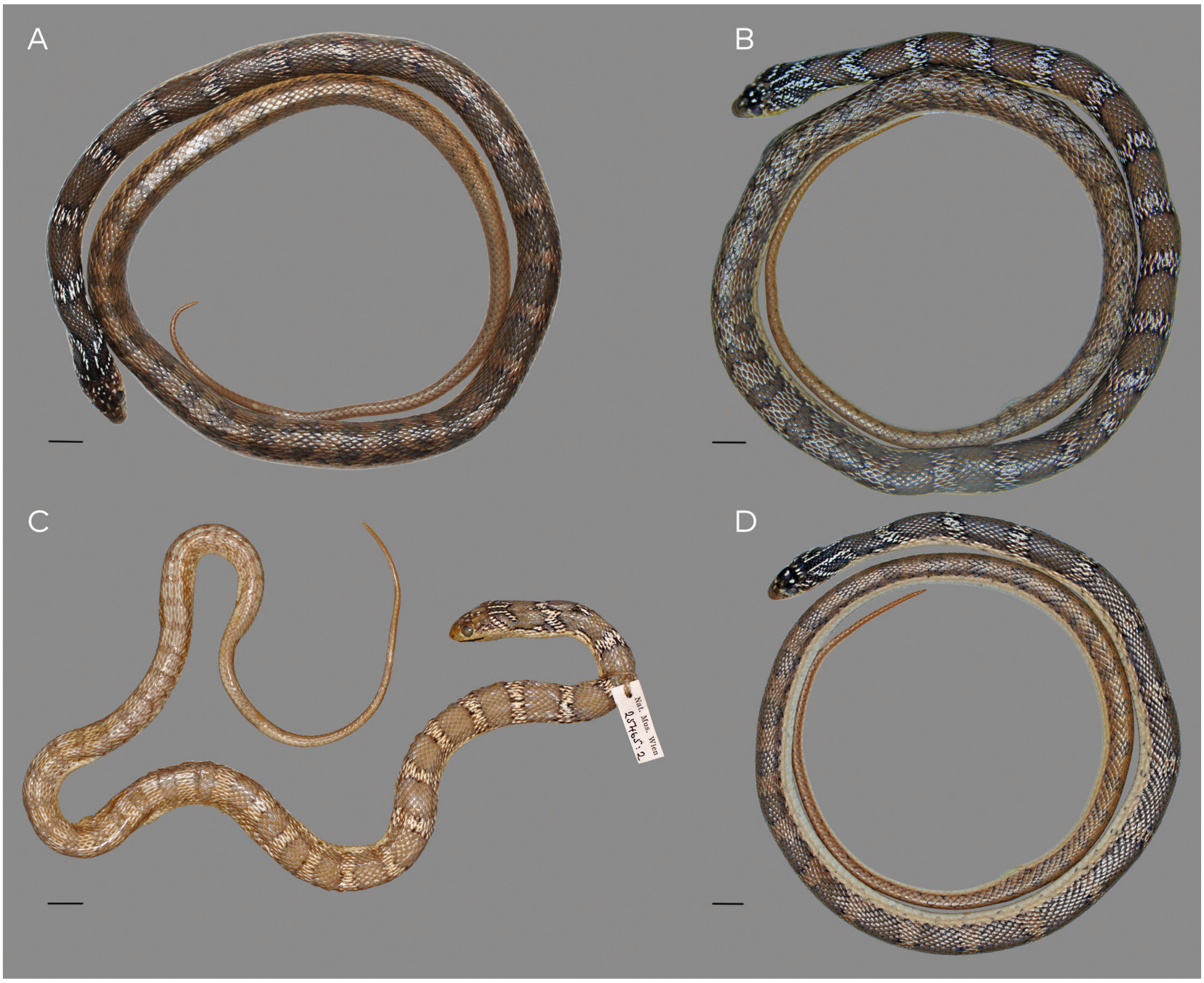

Figure 17. *Platyceps josephi* **sp. nov.**, dorsal view of preserved paratypes from Tamil Nadu state, India: **A.** ZSI-CZRC-6639 (male, SVL: 574), from Karur, **B.** NCBS-AU733 (female, SVL: 608) from Tuticorin, **C.** NMW 25465:2 (male, SVL: 440) from Salem, and **D.** BNHS 3516 (female, SVL: 592) from Tuticorin. Scale bar 10 mm.

lateral side. 46–48 bands on the dorsum from neck to vent, anterior 18 bands are prominent with white and black edges which fades and become wider towards the vent.

BNHS 3516 differs from the holotype by having dorsum darker, two prominent and two less prominent white spots parallel to each other in each parietal. The slanting "∏" mark behind the head, two corners starts from the first row of scales behind parietal but shifts to the next row of dorsal after 4 (right) and 5 (left) scales, the other two diagonal corners ends on the first dorsal scales near 4th ventral. There are 16 subequal horizontal bands on 2–3 dorsal scales, first band on the body separated from the "∏" shaped markings by three scale on right and two scales on left and all the other bands laterally connected with a mix of broken pale and black markings. There are 34 bands on the dorsum from neck to vent, anterior 16 prominent which becomes less prominent but wider towards the vent. ZSI-CZRC-6639 is overall similar to the holotype in the dorsum colours but with irregular white spots on the dorsal side of the head, a faint white spot at the junction of preocular, supraocular, prefrontal and frontal on both the sides; a faint white stripe in the anterior end of the frontal, the white spot in the suture between frontal and suproculars on both the sides, faint; 8–10 irregular spots together on both parietals. The slanting "∏" marking in the back of the head starts from the second row after the parietals on both the sides and continues towards the body but irregular. The first band on the body is separated from the "∏" shaped markings by 2 scales on both the sides along the lateral side. There are 42–44 bands on the dorsum from neck to vent, 14 prominent (white with black edges on each scale) which becomes less prominent but wider towards the vent. NMW 24565: 2 differs from holotype in having much lighter dorsum, by the presence of a white spot on the preocular-anterior frontal on both sides, two white spots along the midline suture on both parietals, one pair adjoining to frontal edge and other in the middle. The slanting "∏" shaped markings are much shorter extending only up to 7 rows of dorsal scales. About 39 visible bands on the dorsum of which anterior 13 are distinctly visible (see Figs 16–18).

Variation in dentition. The male paratype from "Salem" (NMW 25465: 2) show 12/12 maxillary teeth followed by a distinct diastema which is 50% longer as the socket of the last precranterian tooth and two enlarged cranterian

Figure 18. *Platyceps josephi* **sp. nov.** Variation of neck pattern in specimens from various parts of Tamil Nadu state, India. Adults: **A.** Paratype, ZSI-CZRC-6639 (male, SVL: 756) from Karur, **B.** Paratype, BNHS 3516 (female, SVL: 592) from Tuticorin, **C.** Paratype, NCBS-AU733 (female, SVL: 608) from Tuticorin. Hatchlings/juveniles: **D.** Paratype, NMW 25465:2 (male, SVL: 440) from Salem, **E.** ZSI 4379 (sex unknown, SVL: 204) from Anamalai hills, and **F.** ZSI-K 12374 (sex unknown, SVL: 242) from South India without specified locality. Scale bar 10 mm; SVL in mm.

teeth, 11/11 palatine teeth with a posteriomedial process of palatine expanding three pterygoid teeth, 15/14 pterygoid teeth with 41% of the posterior pterygoid without teeth, and 15–16 mandibular teeth, increasing in size up to tooth 7/7 and from there decreasing in size posteriorly.

Pholidosis. Head 1.25–1.99 times longer than broad (male 1.25–1.67, females 1.35–1.99). Rostral twice as broad as high and visible from above. Internasals (in midline suture) usually smaller than prefrontals. Frontals 1.32–1.59 times longer than the maximum width (male 1.40–1.59, females 1.32–1.42). Posterior border of parietals uneven in shape at the median suture forming an acute angle in ZSI-CZRC-6639 and NCBS-AU733 or both parietals uneven forming a slightly acute angle in BNHS 3516 or more or less straight with an obtuse angle in NMW 25465:2 and NCBS-AU-732. Posterior edge of parietals less than half the maximum width. Loreals usually longer than high or higher than long in NCBS-AU732 (on both sides). Preoculars single with a small pre-subocular present below it. Preocular usually in contact with frontal or rarely separated in, e.g., NCBS-AU733. Predominantly eight supralabials, usually last three being larger (in length), fifth highest. Fourth and fifth supralabials in contact with eye. Postoculars often two with the upper scale slightly wider than the lower scale that is usually higher or somewhat subequal in e.g., ZSI-CZRC-6639 and NCBS-AU732 in left side or lower scale smaller in ZSI-CZRC-6639 on the right side but in one specimen NMW 25565:2 with three postoculars on the right side. Usually two anterior temporals (on both sides). Secondary temporals variable, normally three but sometimes two in, e.g., NMW 25465: 2 and ZSI-CZRC-6639 (on right side) and BNHS 3516, NMW 25465: 2 and NCBS-AU732 (on left side). Mostly ten sublabials, sometimes nine in, e.g., NCBS-AU732 or eleven in NMW 25465: 2 (on both sides); the anterior four, rarely five in contact with first inframaxillary, sixth, rarely seventh largest in NMW 25465: 2. Anterior inframaxillaries normally longer than wider than the posterior ones except in BNHS 3516 and ZSI-CZRC-6522. The posterior pair of inframaxillaries usually separated by two or three rows of gular scales of variable shape and size. Gulars in four to five oblique rows between the apical edge of the posterior inframaxillaries and first ventral. Ventrals in examined material 189–218 (males 192–197, females 189–218). Usually, one or two preventrals, rarely without preventrals as in NCBS-AU733. Anal scute divided right part overlapping left part. Subcaudals in

Figure 19. Hemipenis of *Platyceps josephi* **sp. nov.** (ZSI-CZRC-6639, paratype, right organ) from Karur, Tamil Nadu state, India: **A.** lateral, **B.** asulcal, and **C.** sulcal view. Scale bar 10 mm.

76–88 in pairs (males 82–88, females 76–88). Total body scales, including preventrals and terminal scale 275–297 (males 276–288, females 275–297).

Dorsal scale rows (DSR), usually arranged in 23–24/21, rarely 23/17 or sometimes 18 rows along the trunk. One male specimen from Karur shows anterior 24 DSR; Midbody DSR predominantly 21 except in one specimen ZSI-CZRC-6639 with 23 DSR and two specimens NCBS-AU732 and NCBS-AU733 shows 18 DSR and one specimen ZSI-CZRC-6521 shows 16 DSR in posterior part of the body.

Dorsal scales with single or paired apical pits. Supracaudal scales usually with one to three pits on the first three to five scales followed the supracaudal reduction. In male (ZSI-CZRC-6639), consistently two pits from the midbody to the last supracaudal scale.

Dorsal scale reduction formula summarized from five examined specimens (see Appendix 10). Only main reductions are given.

4+5(6) 3+4(6–13) 2+3 or 3+4(116–133) 7+8 or 8+9 (144–151)
24 -------- **23** --------------------- **21**-------------------------- **19** --------------------------- **17.**
– 2+3 or 3+4(6–13) 3+4 (115–133) 7+8 or 8+9 (142–151)

Two examined specimens (NCBS-AU732, holotype, and NCBS-AU733) and one specimen (ZSI-CZRC-6521) show an additional lateral increase to 18 and reduction to 16 dorsal scales involving rows 1–3 between 95 and 99% of ventral scales respectively.

Dimensions and proportions. The body robust, moderately stout, roundish in cross section at midbody. Head moderately pointed, barely distinct from neck or sometimes slightly distinct. Eye large with black round pupil, 16–25% of head length. The longest examined specimens are from Karur (ZSI-CZRC-6639), a male specimen with 740 mm and a female from Tuticorin (ZSI-CZRC-6521)

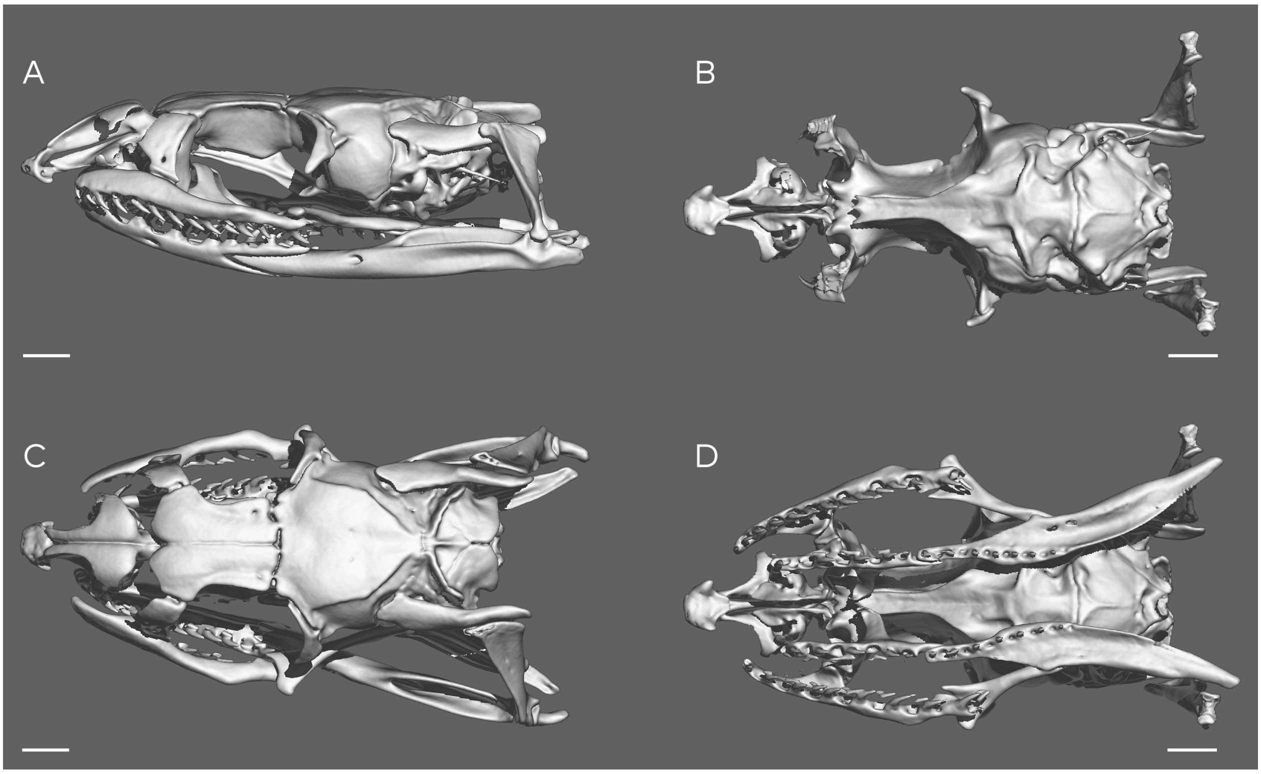

Figure 20. Skull of the holotype of *Platyceps josephi* **sp. nov.** (NCBS-AU732) from Tuticorin, Tamil Nadu state, India: A. lateral, B. ventral (tooth bearing and connecting bones virtually extracted), C. dorsal and D. ventral view (lower jaw virtually extracted). Scale bar 2.0 mm.

with 951 mm total length. The smallest specimens are from Salem including a male (NMW 25465: 2) with 582 mm and female (NMW 25465:1) with 315 mm total length. The tail/body length ratio ranges from 0.15 to 0.32 (males 0.29–0.32, females 0.15–0.32).

Distribution. *Platyceps josephi* **sp. nov.** is so far only known from Tamil Nadu state, India (see Fig. 1 Map). It is reported from the Anaimallai Hills and different localities within the districts of Coimbatore (Anaikatti, Coimbatore, Pollachi), Dindigul (Batlagundu), Kanyakumari (Maruthuvazhmalai), Karur (Karur), Madurai (Madurai, Vadipatti), Salem (Salem), Theni (Meghamalai Hills), Thoothukudi (Tuticorin), Tirunelveli (Coutrallam, Manimutharu, Tirunelveli) and Villupuram (Auroville) (see Appendix 9 Gazetteer and Appendix 10).

Habitat and natural history. *Platyceps josephi* **sp. nov.** mostly inhabits open habitats with sandy or rocky patches in grasslands and scrublands in both inland and coastal areas of Tamil Nadu from elevations between 10 and 580 m a.s.l. (see Fig. 21 and Appendix 9). Most of the areas where they occur receive less than 500 mm annual rainfall except locations near the rain shadowed areas close to the Western Ghats receives higher rainfall (Anaikatti and Megamalai) (http://www.tnsccc.in/rainfall.php). Sagadevan et al. (2019) report a sighting from the dry evergreen forest in Auroville, Villupuram district, but it is pertinent to mention here that this region was originally a scrub jungle and the current dry evergreen forest is an anthropogenic habitat created a few years ago (Blanchflower 2005). *Platyceps josephi* **sp. nov.** is usually observed under thorny bushes, rock boulders, paddy fields, heaps of dry coconut fronds and seen crossing roads (Rajendran 1986; NJ and MS personal observation). The holotype (NCBS-AU732) and the paratype (BNHS 3156) were both collected from human habitations. ZSI-CZRC-6639 was found under heaps of coconut fronds within a plantation surrounded by dry grasslands. NCBS-AU733 was collected from under a woodpile near a farmhouse surrounded by grassland. Two other referred specimens (ZSI-CZRC 6521 and 6522) from Tuticorin and one specimen (ZSI-CZRC-7358) from Anaikatti, Coimbatore were collected as roadkilled. It appears to be an uncommon snake in all known locations. However, in the past at least in Megamalai hills, it was recorded to be "fairly common" in the dry deciduous forests (Hutton 1949). The late Naveen Joseph and his team, who maintain a record for snake rescues in and around Tuticorin, had seen only 16 individuals in the 18 years between 2002 and February 2021.

Platyceps josephi **sp. nov.** is a diurnal snake, terrestrial and swift in locomotion. However, there is a report of arboreal behaviour under artificial conditions (Rajendran 1986), but this is not known in the wild. It is an aggressive snake, flattening its head as a mock hood display mimicking a cobra, when agitated and biting freely, but it becomes docile after a few days in captivity (Rajendran, 1986; Hutton, 1949). Similar behaviour was observed during this study for specimens from Tuticorin, Tamil Nadu (NCBS-AU732, NCBS-AU733 and BNHS 3516).

The diet of the *P. josephi* **sp. nov.** chiefly consists of geckos, lizards and small rodents. It is observed to kill

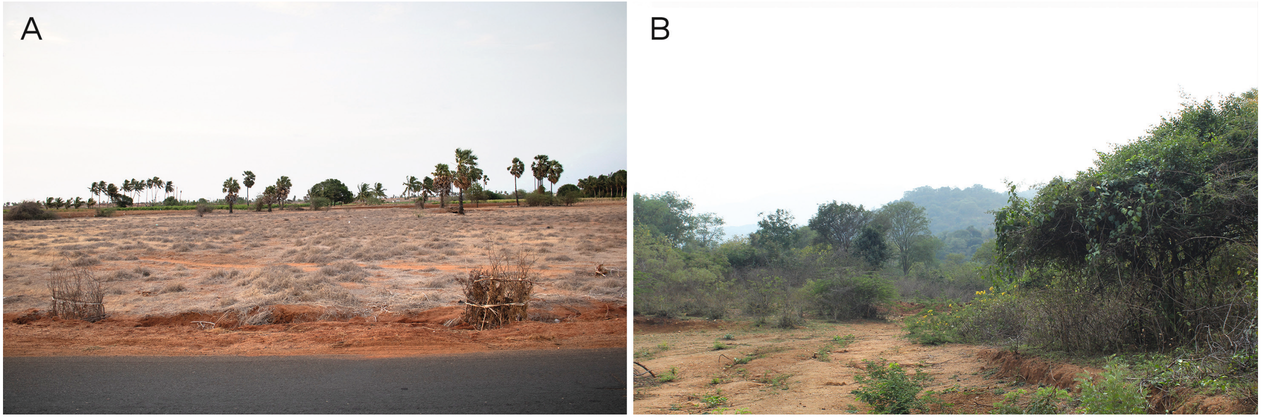

Figure 21. Habitats of *Platyceps josephi* **sp. nov.** in Tamil Nadu state, India: **A.** close to the coast at the type locality Tuticorin, and **B.** inland habitat near Anaikatti, Coimbatore.

the prey by constricting and/or crushing the prey against ground or tree trunk. In all captive observations, it swallows the prey from the head first. It is an oviparous snake with few records of clutch sizes, 7–12 eggs (Hutton 1949; Rajendran 1986; Rameshwaran 2008), during the month of March and June and were 40 mm in length (Rameshwaran 2008). Females are reported to lay their eggs in bunds (raised areas surrounding the paddy fields) of paddy fields (Rajendran 1986).

Platyceps josephi **sp. nov.** is reported only from one protected area (Megamalai) in its known range. The species faces a number of threats across its distributional range, including habitat destruction, because the grasslands in southern Tamil Nadu are being actively converted into plantations, farmlands and urbanisation. Although there are records from such converted plantations and human settlements,the species' ability to adapt and its reproductive success is not known. Rocky habitats in Madurai region are also highly affected by the mining activities and road traffic is another important threat to *P. josephi* **sp. nov.** Three out of the seven specimens collected in this study were roadkilled and six other uncollected roadkilled specimens were observed from various parts of Tamil Nadu between 2017 and 2020. The Area Of Occupancy (AOO) of *P. josephi* **sp. nov.** is 72.000 km^2 and Extent Of Occupancy (EOO) is 70,698 km^2. Even though this is a relatively large area of distribution for a species, our field surveys and records suggest that this species has patchy distribution within its range. Also, much of the habitat in these regions where *P. josephi* **sp. nov.** is reported are under severe threats like conversion of grasslands to farmlands, widescale monoculture plantations (*Eucalyptus* sp.) and urbanization. Given this information, we suggest that *P. josephi* **sp. nov.** should be considered a species in the Vulnerable category according to the IUCN criteria.

Although local envenoming by congeners is reported for *P. rhodorachis* and *P. najadum* (Minton 1990; Kuch and Mebs 2002; Weinstein et al. 2011), bites from *P. josephi* **sp. nov.** seem to be harmless and without any local symptoms. Rajendran (1986) reported two bite cases, one being himself got bitten while trying to catch an individual in a paddy field and another for an adult male got bitten while harvesting the paddy. No local symptoms were observed after a bite from a later preserved specimen (BNHS 3516, paratype) to one of the authors (NJ) upon handling.

Juvenile *Platyceps josephi* **sp. nov.** can easily be confused with juveniles of *Platyceps plinii* but may be differentiated by the two slanting roughly "∏" shaped markings on the back of the head. *Platyceps josephi* **sp. nov.** is found in sympatry with the Common cobra (*Naja naja*) and the Common ratsnake, *Ptyas mucosa*, and can potentially also be confused with these two species.

Differences between *Platyceps josephi* sp. nov. and South Asian congeners. *Platyceps josephi* **sp. nov.** is distinguished clearly from *P. bholanathi, P. mintonorum, P. noeli, P. rhodorachis, P. sindhensis* and *P. ventromaculatus* by its higher number of midbody dorsal scale rows (21 vs. 19) and from *P. gracilis* by its lower mean value of ventral scales (202 vs. 214), its lower value of subcaudal scales without overlapping (88 maximum vs. 118 minimum), its different neck pattern (whitish ∏-shaped marking vs. a yellowish-cream and black edged V-shaped marking), and by differing dorsal body pattern (irregular whitish transverse bars stippled with black vs. dorsal yellowish-cream and black-edged transverse bars). *Platyceps josephi* **sp. nov.** shows similarities with *P. plinii* with regard to pholidosis and colour pattern but can be distinguished from the latter by its lower number of midbody dorsal scale rows (21 vs. 23), its lower mean value of ventral scales (202 vs. 214), its lower mean value of subcaudal scales (82 vs. 87), and its lower mean of the sum of ventral and subcaudal scales (285 vs. 304).

Comparision of Osteology. The first detailed description of osteological features of *Platyceps plinii* were based on a male and a female specimen (Fraser 1936). Later, Wilson (1967) studied 15 preserved specimens of the Banded racer, including two disarticulated skeletons, and compared it among other species formerly allocated to the genus *Coluber* with material of racer-like genera including Asian species currently placed in *Platyceps* (e.g. *elegantissimus*, *florulentus*, *gracilis*, *karelini*, *najadum*, *rhodorachis*, *rogersi*, *thomasi*, *variabilis* and *ventromaculatus*) as well as *Dolichophis jugularis*, *Hemorrhois ravergieri* and with *Orientocoluber spinalis*. He described several osteological characters which he used to delimit *C. fasciolatus* from other species of *Coluber* (sensu lato) and, because of differences from other racer-like genera he resurrected the genus *Argyrogena* Werner for the Banded racer.

In his comparison, Wilson (1967) stated that the premaxilla of *Argyrogena* is short and stout and its lateral processes are posteriorly orientated, whereas *Coluber* (sensu lato) has a longer premaxilla with more nearly transverse processes. In *Argyrogena* the nasals are stout, overlap the ascending process of premaxilla to some extent and posteriorly cover the nasal capsule more than in *Coluber* (sensu lato), there is nearly no overlap between nasals and premaxilla. He further states that the pterygoid of *Argyrogena* show a medial flange on the bone with the result that the teeth are situated near the center of the pterygoid rather than along its medial edge as in the other species of *Coluber* (sensu lato), which have no medial flange. Additionally, he writes that the tooth rows on the pterygoid bones converge posteriorly, whereas in *Coluber* (sensu lato) the rows diverge and furthermore that the pterygoid processes at the basioccipital are lacking in *Argyrogena*, but well developed in *Coluber* (sensu lato). Beside skull morphology, he also studied the postcranial skeleton and included characters of midbody and caudal vertebrae in his investigation. He stated that in *Argyrogena* at the midvertebrae the accessory process is shorter and more dorsolaterally orientated and the ventral aspect of the centrum is stouter and that the transverse processes of the caudal vertebrae are broad based and show a prominent notch between the posterior edge of each process and the centrum.

Some of the osteological characters used by Wilson (1967) were later specified and their phylogenetic significance assessed by Schätti (1987). The latter did not include *Argyrogena* in his analysis but indicated extensive sexual, ontogenetic, geographical or uncorrelated intraspecific variation in old world racers. Schätti (1987) refused to use dentition to separate distinct groups as “The total number of teeth, their absolute length, the presence of a diastema, as well as the enlargement of the teeth posterior to the diastema is subject to considerable variation.“ For this reason, he considered osteological characters as diagnostic to delimit Palearctic from Nearctic groups, but only the shape and size ratios of the vertebrae show distinct characters to separate *Platyceps* from other Palearctic genera because craniological features may show remarkable intraspecific variation.

Schätti (1987) took into account (1) length of centrum/least width of neural arch (LC/WN), (2) length of centrum/width across prezygapophyses between outer edges of articular facets (LC/WP), (3) length of neural spine/least width of neural arch (LN/WN), but emphasizes that especially the ratio (1) is useful for delimitation, because it varies only within narrow limits (see Appendix 6 for the description of the measuring distances).

Recently, Das et al. (2019) provided a detailed skull description based on six specimens of the Banded racer and distinguished it from *Platyceps* mainly by its longer and elongated nasal horizontal lamina. The latter authors also mentioned a backward curved transverse process in contrast to a laterally directed narrow transverse process in *Platyceps*, but did not name the belonging bone. We assume they were describing the premaxillary transverse processes. Finally, they separated *Argyrogena* from *Platyceps* by the existence of a mesial transverse process at the pterygoid vs. no mesial transverse process.

In contrast to the former studies on *Argyrogena* mentioned above, material examined by us lead to different results (see also Appendix 7 and 8). In all examined *Platyceps* species lateral processes of the premaxilla are always curved posteriorly, but with variable length. This can result in short lateral processes as described by Wilson (1967) and Das et al. (2019) and can be found in *P. plinii* comb. nov., *P. josephi* **sp. nov.**, and *P. rhodorachis*, but also in longer lateral processes as present in *P. florulentus, P. rhodorachis, P. ventromaculatus* and also in *P. plinii* comb. nov. Furthermore, we found that short lateral processes lead to a more pointed snout, thus a projected rostrum, a condition also commonly used as a key character to separate *Argyrogena* from *Platyceps* (see e.g. Wilson 1967; Rajabizadeh et al. 2020). However, a projected rostrum of variable expression and a countersunk lower jaw is also reported for different *Platyceps* species by Schätti et al. (2014; see also comments below).

We found differences within the distal ends of the lateral processes of the premaxilla, which either are tapering into a single tip in *P. plinii* comb. nov., *P. josephi* **sp. nov.**, and *P. rhodorachis*, expanded and divided into two tips in *P. florulentus* or expanded into a stout end in *P. rhodorachis* as well as in *P. ventromaculatus*. Because of this considerable intraspecific variation, we regard the form of the lateral processes of the premaxilla as an inappropriate character to delimit *Argyrogena* from *Platyceps*.

Das et al. (2019, p. 313) stated that the premaxilla in *Argyrogena* has no nasal process but in contrast to that, a short (ascending) process is shown in the sketch (Fig. 1 B, lateral view). In all examined specimens we found an ascending process of the premaxilla, which varies in length and can be clasp by the anterior process of the nasals. If the ascending process of the premaxilla is longer than the lateral processes, we define them as ‘long’, e.g. in *P. rhodorachis* and *P. ventromaculatus* otherwise as ‘short’ as in found in *P. plinii* comb. nov., *P. josephi* **sp. nov.** and *P. florulentus*.

Wilson (1967) noted that the anterior processes of nasals overlapping the ascending process of premaxilla in *Argyrogena* vs. less overlap of nasals and ascending process of premaxilla in *Coluber* (sensu lato). We found this overlap in all examined species, whereby the nasals can be in contact with the ascending process of premaxilla in *P. plinii* comb. nov., *P. josephi* **sp. nov.**, *P. florulentus* and *P. ventromaculatus* or just have a loose connection as in *P. rhodorachis*. Since this is a variable character and its presence in the Banded racer and *Platyceps* spp., makes this an inappropriate character for distinguishing genera.

Furthermore, Wilson (1967) described the nasals of *Argyrogena* as stout, as was verified by our analysis. The

Banded racer, *P. plinii* comb. nov., has the most compact nasal bone of all *Platyceps* examined (TLn/TWn range 0.93-1.04), distinguished by the following values, viz. *P. josephi* **sp. nov.** (TLn/TWn range 1.16–1.18), *P. florulentus* (TLn/TWn 1.24), *P. rhodorachis* (TLn/TWn range 1.27–1.39), and *P. ventromaculatus* (TLn/TWn 1.28).

Wilson (l. c.) mentioned that in *Argyrogena* the nasal shield posteriorly expands dorsolaterally to cover the nasal capsule more completely as in the other *Coluber* (sensu lato). Our measurements show that the nasal shield of the Banded racer tends to be shorter (TLln/Lns range 40%–50%) than in other examined *Platyceps* spp. (TLln/Lns range 56%–77%) and therefore covers only a smaller part of the nasal capsule. Our comparison of the nasal shields revealed that it covers in *P. plinii* comb. nov. the posterior part of the nasal capsule completely, whereas in the other examined *Platyceps* spp. (excluding *josephi*) only the middle part of the nasal capsule is enclosed. This resulted in a larger gap between the nasal shield and the frontal. *Platyceps josephi* **sp. nov.** shows an intermediate state regarding this character as the nasal shield do enclose the posterior part of the nasal capsule but shows a larger gap than observed in *P. plinii* comb. nov. This character seems to be highly influenced by the lifestyle of the species and varies considerably interspecifically (Schätti 1987).

Wilson (1967) and Das et al. (2019) identified the presence of a medial flange at the pterygoid bone (with teeth) are situated near the centre of the pterygoid rather than along its medial edge vs. no such medial flange as a main character to separate *Argyrogena* from *Coluber* (sensu lato) and *Platyceps* spp. This condition was not mentioned by Fraser (1936) and in Banded racer skulls studied by us, this medial flange is present in 60% of the examined specimens only (see Fig. 12 D, medial flange absent). It is always present in *P. josephi* **sp. nov.**, (see Fig. 20 D) but lacking in *P. florulentus*, *P. rhodorachis* and *P. ventromaculatus*.

Another character listed by Wilson (l. c.) as typical for *Argyrogena* deals with the pterygoid teeth row, which converges posteriorly in the Banded racer but diverges in *Coluber* (sensu lato). We cannot follow this observation as in all examined specimens the teeth row follows the medial edge of the pterygoid bone and therefore always converge posteriorly.

Wilson (l. c.) also described the pterygoid processes at the basioccipital which he mentioned as clearly visible in e.g. *Platyceps karelini*, *P. ventromaculatus*, *Dolichophis jugularis* and *Hierophis viridiflavus* but lacking in *Argyrogena*. In *Platyceps* spp. examined by us, we found a high variability of this character, ranging from a basioccipital without structures, with three or five small tips or sometimes with a high crest. Our comparison of different development stages of *D. jugularis*, *H. gemonensis* and *H. viridiflavus* show that in juveniles such structures are lacking while in adults, high crests and tips appear and the expression of this character is very likely age-dependent.

Differences in midbody vertebrae morphology of racer species is highlighted as a character of phylogenetic significance (Schätti 1987) and is compared here with the next related taxa. Vertebrae have been described and compared for *Argyrogena* and *Coluber* (sensu lato, including *Platyceps*) by Wilson (1967), for old world racers in general by Schätti (1987) and for *Platyceps* by Schätti et al. (2014).

Wilson (1967) stated that in *Argyrogena* the accessory processes at the mid-vertebrae are shorter and more dorsolaterally orientated as in *Coluber* (sensu lato). Based on Auffenberg's (1963) definition, Schätti (1987) defined the same character as ratio of the length of centrum to the width across prezygapophyses between outer edges of articular facets (LC/WP) (see Appendix 6–8). Our analysis of this character revealed, that intraspecific variation can be very low as in *P. ventromaculatus* (LC/WP range 0.76–0.86), but also more variable, e.g. in *P. rhodorachis* (LC/WP range 0.55–0.88). The total range of ratio LC/WP for *Platyceps* spp. examined ranges from 0.55–0.88 and included, with a wide overlap, the Banded racer, *Platyceps plinii* comb. nov. with a LC/WP ratio range from 0.73–0.95 (see Appendix 7 and 8). Furthermore, this character state cannot be used to delimit the Banded racer and other *Platyceps* spp. from next related genera because of overlapping values as determined for *Hemorrhois nummifer* (LC/WP range 0.63–0.71), *H. ravergieri* (LC/WP range 0.66–0.86) and *Spalerosophis diadema* (LC/WP 0.62).

According to Wilson (1967) the ventral aspect of the centrum of middorsal vertebrae in *Argyrogena* is stouter than in *Coluber* (sensu lato). Schätti (1987) used this character as quotient of the length of centrum and the least width of neural arch (LC/WN), based on Auffenberg's (1963) definition. Our analysis of this character shows that for the Banded racer the values vary from 1.21–1.59 with lower extremes below the range of other *Platyceps* species with an LC/WN range from 1.32–1.70. But also this character does not allow reliable distinction between *Platyceps* spp. (LC/WN range 1.21–1.70) and *Hemorrhois* (*nummifer* 1.22–1.39; *ravergieri* 1.20–1.61). Although *Spalerosophis diadema* is distinguished here by the lowest value (LC/WN 1.08) it is based on a single examined specimen only and the variation for this character is not sufficiently studied for this species (see Appendix 6–8). As further character Schätti (1987) defines the ratio of length of neural spine to least width of neural arch (LN/WN) as highly variable throughout the vertebral column in Holarctic racers. The analysis of this trait with respect to the position of the Banded racer to *Platyceps* and other related genera revealed that the Banded racer tend to lower values (LN/WN range 0.81–1.01) but overlap to some degree the other examined *Platyceps* spp. (LN/WN range 0.95–1.27). Similarly, to the conditions shown for the Banded racer the values for *H. nummifer* (LN/WN range 0.84–1.07), *H. ravergieri* (LN/WN range 0.80–1.16) and *S. diadema* (LN/WN 0.80) lie near to the lower variation range of all examined *Platyceps* (LN/WN range total 0.81–1.27) (see Appendix 6–8).

Wilson (1967) used also the structure of caudal vertebrae to delimit *Argyrogena* from *Coluber* (sensu lato) and described the transverse processes of it as broad-based proximally with a prominent notch between posterior edge of each process and the centrum. In contrast to that, he described for *Platyceps karelini*, *P. najadum* and *P. rhodorachis* the processes as rather broad-based proximally, but not as much as in *Argyrogena* and without a posterior notch. In contrast to Wilson (l. c.) we found in five examined specimens of the Banded racer and four other *Platyceps* spp., including *P. josephi* **sp. nov.**, the transverse processes of the caudal vertebrae as broad based but with striking differences between the sexes. In all males the transverse processes are directed laterally, the base occupies ~ 75% of the centrum and show a posterior notch, the latter characterized by considerable variability in expression even within a single individual. Contrary to males, the processes in females are directed anterio-laterally with a much shorter base which occupies not more than 60% of the centrum and show a posterior notch with the same degree of variability as in males. For specimens studied by us, we conclude that this character is sex dependent and qualifies no differentiation between *Argyrogena* and *Platyceps*.

In summary, it is evident that *Argyrogena* shares most osteological characters with *Platyceps*. Previous use of skeletal traits to underpin the distinctness of the genus *Argyrogena* is shown invalid, with the exception of the form of the nasal shield as the only distinguishing character to the previous known *Platyceps* spp. But with respect to the latter character, *Platyceps josephi* **sp. nov.** show an intermediate state and linked the Banded racer with *Platyceps*. We therefore consider *Argyrogena* Werner, 1924 a junior subjective synonym of *Platyceps* Blyth, 1860 and relegate the Banded racer (auctt.) to the genus *Platyceps* in the new combination *Platyceps plinii* (Merrem, 1820) (see the also conclusions in previous chapters).

Identification key to South Asian *Platyceps* (modified from Schätti et al. 2014)

1a. Midbody dorsal scales arranged in 23 rows .... ***plinii***
1b. Midbody dorsal scales arranged in 21, exceptionally 23 rows **2**
1c. Midbody dorsal scales arranged in 19 rows **3**
2a. Large brownish dark-edged roundish, oval or saddle-shaped dorsal markings extending down both flanks, 118– 27 subcaudals .... ***gracilis***
2b. Two clearly demarcated slanting rougly "∏" shaped white markings on the back of head, 76–88 subcaudals........ .... ***josephi* sp. nov.**
3a. Large brownish dark-edged oval or saddle-shaped dorsal markings extending down both flanks (nape element may be elongated and confined to middorsal segment, SE India) .... ***bholanathi***
3b. Dorsal colour pattern not as described (from western Nepal [unconfirmed] and northern India westward) **4**
4a. With a reddish vertebral stripe .... ***r. rhodorachis* (partim)**
4b. Vertebral stripe absent, postsubocular absent (two supralabials entering eye) or present (oftenso in *mintonorum*), dorsal colour pattern not as described except in certain juveniles of *ventromaculatus* **5**
5a. Fewer than 220 ventrals and 332 ventrals plus subcaudals **6**
5b. More than 219 ventrals and 331 ventrals plus subcaudals **8**
6a. Nuchal streak present (very rarely absent), dorsal colour pattern along entire trunk .... ***ventromaculatus***
6b. Nuchal streak absent (very rarely present), last quarter of trunk devoid of pattern or unicoloured throughout **7**
7a. 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 Balochistan, Pakistan) .... ***noeli***
7b. More than 203 ventrals and 105 subcaudals, sum at least 318 (minima from Hindukush to N Khyber Pakhtunkhwa) .... ***r. rhodorachis* (partim)**
8a. 110–127 subcaudals, postsubocular present or absent (0 – 2 supralabials entering eye), preocular often divided (northern Balochistan Region) .... ***mintonorum***
8b. 106–148 subcaudals (132–144 in *r. rhodorachis* from area of confirmed sympatry wit *mintonorum*), postsubocular usually absent (two supralabials entering eye), preocular entire (very rarely divided) **9**
9a. 230–247 ventrals, 133–148 subcaudals, sum 363–395 (documented for Sindh and contiguous Balochistan Province, probably also SE Punjab and possibly W Rajasthan) .... ***sindhensis***
9b. 220–256 ventrals (fewer than 220 in area of potential sympatry with sindhensis), 106–145 subcaudals, sum usually lower than 364 (maximum in Makran 364, as much as 374 in NE Balochistan and 388 in Chagai) **10**
10a. 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)**
10b. 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 Zanskar)..................................... .... ***rhodorachis ladacensis***

Discussion

The maximum likelihood (ML) and Bayesian (BI) phylogeny presented in this study were similar but not same, there were some unresolved nodes in the BI phylogeny. Furthermore, the phylogenetic relationships are different from that presented by Rajabizadeh et al. (2020) (e.g. position of *Persiophis* and *Muhtarophis*). This is probably due to the addition of new lineages and/or missing gene sequences or both. Das et al. (2019) reported a three gene Bayesian phylogeny for old world racers including one *Platyceps plinii* sample from India. In this phylogeny, *Platyceps plinii* (as *A. fasciolata*) was recovered as sister to other *Platyceps* species with moderate support. Our multilocus phylogeny shows them to be monophyletic with the highest support. Within species genetic differences is also very low for *Platyceps plinii* and *Platyceps josephi* **sp. nov.** across the sampled range. We were not able to acquire samples of *Platyceps plinii* from Pakistan, this population appears to be disconnected from the rest of the subcontinent and warrants further investigation. The taxonomic confusions between two common and widespread species identified and resolved in this study has not been recognized for over 150 years. This highlights the importance of thorough literature review and verification of historic specimens and original sources before describing new species. In particular areas where there were extensive collections in the past and preserved materials are available from various collections worldwide (e.g. Indian subcontinent).

Platyceps josephi **sp. nov.** is so far recorded only from Tamil Nadu state and all except two records (Salem and Auroville, Villupuram district) are south of the Cauvery River. The Nilgiri Mountains, the Moyar gorge and Cauvery River have been proposed to be a biogeographic barrier for fan-throated lizards (Deepak and Karanth 2018) and similar observations were also made in ground dwelling *Hemidactylus* geckos (*H. scabriceps*, Srikanthan et al. 2018). The northwestern distribution limit of *Platyceps josephi* **sp. nov.** lie south of Nilgiri Hills and *Platyceps plinii* is found north of Nilgiris in the Mysore plateau but their ranges appear to overlap in the northeastern part of Tamil Nadu (see, Fig. 1). Conversely, the southernmost distribution of *Platyceps plinii* and *P. bholanathi* extends only till the northeastern and northcentral part of Tamil Nadu and north of Cauvery River (Melvinselvan et al. 2018; this study). This further highlights the importance of the lesser known biogeographic barriers in peninsular India which were overlooked in the past.

In their study on Western Palearctic colubrid snakes, Rajabizadeh et al. (2020) provided a comparative morphological table with eight characters for colubrine genera of India, Central and Western Asia and North Africa. All these characters were identical for *Wallaceophis* and *Wallophis* and for *Argyrogena* and *Platyceps* as well. However, for the latter pair, the rostral scale character was incorrectly mentioned as “normal” for *Argyrogena*. Furthermore, within the currently recognized species of the genus *Platyceps*, some species show a projected rostrum as noted by Schätti et al. (2014) which is particularly distinct for examined *P. r. rhodorachis* (including SMF 67907 and ZFMK 92802), *P.* cf. *k. karelini* (including CAS 120540), *P.* cf. *mintonorum* (including CAS-SU 13251) and hybrid racer e.g. *P. k. karelini* x *P. mintonorum* (including BMNH 1886.9.21.101). The validity of the genus *Wallaceophis* needs further scrutiny through additional morphological examination.

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Appendices

Note 1

Francis Gowdie (date of birth unknown –12. Sept. 1813), served in the Third (1789–92) and Fourth (1798–99) Anglo-Mysore War and from 1805 to 1813 as Major General in the service of the East Indian Company Army at Madras (Chennai, Tamil Nadu state of India) (Dodwell and Miles 1838). Lieutenant James Whyte (sometimes White, life dates unknown) joined as an assistant surgeon the Madras Medical Service in 1765, served in the Second Anglo-Mysore War (1780–84) at Anagrudi near Tanjoe (Thanjavur, Tamil Nadu), was then sent as surgeon to the Vellore General Hospital and is listed for 1786 as surgeon at Tanjore hospital (Crawford 1916, Chakrabarti 2006). He is mentioned together with Patrick Russell as head surgeon for the Madras Medical Service at Trichonopoly (Tiruchirappalli, Tamil Nadu) for the year 1788 (Crawford 1914).

Earlier attempts by Bauer (2015) to locate "Casemcottah" failed and our intensive reseach on historical maps for the Indian Subcontinent revealed only a single similar spelled location on the southern western coast. On a map dated 1792, printed 1793 in London by William Faden, a place "Caser cotta" (probably today Kasergode town, Kerala state, 12.51000°N, 74.98527°E) is situated about 32 km south of Mangalore (Mangaluru, Karnataka) and directely south of Chianderghery (Chandragiri Fort, Kerala) respectively. It is documented by Russell that some material reached him from locations outside of his personal collecting area in the Visakhapatnam region. Bauer (2015) listed 27 different localities in India for Russell's material including some from the western part of the subcontinent like e.g. Maharashtra. Therefore, it is possible that the region was visited by the two donors of the "Nooni Paragoodoo" during their military service, especially also because the area was already under British East India Company sovereignty after the Treaty of Mangalore in 1784.

But "Caser cotta" lies on the northern part of the Malabar Coast and therefore opposite of the Coast of Coromandel where Russell spend most of the time during his medical service for the East Indian Company. Furthermore, Russell (1803, p. 49) mentioned that he himself collected a fish referred to as "Kora Motta" (= *Channa gachua* (Hamilton, 1822) fide Fricke et al. 2020) in the lake at "Casem Cottah". In at least two gazetteers of geographical place names (Marshall 1832, p. 226, right column, and Wright 1834, p. 188) a locality "Cossimcotta" is mentioned situated southeast of Ankapilly in division Cicacole, Hindoostan. Marshall (l.c.) wrote "Cossimcotta, a town of Hindoostan, in the circar of Circacole, on a river that flows into the Bay of Bengal, 77 m[iles] S.W. of Circacole, Long. 83.7. E., lat. 17.42.N." We regard "Cossimcottah" as identical with Russell's "Casemcottah", located in the former division Northern Circars of British India's Madras Presidency, today Kasimkota village, on the Sarada river, Visakhapatnam district, Andhra Pradesh state of India (17.67362°N, 82.9634°E, 26 m a.s.l.).

Note 2

The description of *Coluber curvirostris* published 1839 in Theodore E. Cantor's "Spicilegium Serpentium Indicorum" is a very short bilingual (Latin/English) section of nine lines of text only. Cantor's unpublished original manuscript entitled "Indian Serpents–Innocuous–Collected, figured & described (1831–1837)" is in the possession of the Bodleian Library, Oxford, U.K. This manuscript was the basis for Cantor's (1839) publication which unfortunately was published without plates and with much reduced descriptions only.

We here provide the transcript of the detailed description of *C. curvirostris* extracted from Cantor's manuscript. The description is accompanied by the coloured plate no. 7 [reproduced here as Fig. 7].

The title page contains following additional text: "A catalogue of the species will appear in the Proceedings of the Zool. Soc. London. April 29. 1839", and the following information about the content of the manuscript: "35 Drawings {28 Figures of Serpents. New Species., 7. Anatomical details of Do.", and " The descriptions occupy 240 pages".

The description of *C. curvirostris* occupies the manuscript pages 37 to 44 as follows:

"*Coluber curvirostris*/ Fig: 7./ *C. supra partim late/ olivaceo-viridis punctis/ & lineis obliquis al-/ bis nigrisquae, - par-/ tim aeneus; abdomine subfusco/ Scuta abdominalia* …… 220./ *Scutella subcaudalia* 85./ *Habitat*: Bengal./

Above partly bright/ olive green with white/ and**|<38>|**black dots & oblique/ lines, - partly bron-/ ce-coloured; light/ yellow underneath./ Vernacular name:/ Tukkr-Bora./ The head a little broader,/ than the neck, subo-/ vate & strongly ar-/ ched, so that the/ profil of the rostrum/ is very oblique; the/ upper jaw extends/ about a line & a/ half beyond the low-/ er; **|<39>|** The nostrils moderate/ between two scuta./ The eyes, surrounded/ by two prae- & one post/ orbital scutum, large/ dark brilliant with a/ narrow reddish golden iris &/ a small round black/ pupil. The gape wide,/ straight with 8/8 labial/ scuta & with numerous little/ sharp teeth of equal size in the/ palaté & jaws. The/ tongue jet-black bi-/ furcate./ The shape of the body/ is elegant cylindrical;/ the tail more slender/ than **|<40>|** the trunk, gradually/ tapering into a small sharp point./ The scales of the body/ are oval-rhomboidal,/ very slightly imbricate,/ those of the tail shorter/ approaching a square/ form. The length of/ the abdominal scuta/ is about two lines;/ their breadth six lines./ The scutum of the/anus bipartite._/ The general colour/ is a shining bright/ olive green; on the an-/ terior part of the back,/ where the **|<41>|** sky-blue skin is visib-/ ble between the scales,/ a number of white & black dots, transversal-/ ly arranged, some of/ them forming rings./ About six inches from/ the head these dots change/ into white & bluish/ black oblique lines/ with points/ towards the head, ceasing/ on the posterior,/ third part of the body/ where the general color/ changes to a light/ brown **|<42>|** with a green metal-/ lic lustre./ The lips, the throat/ & the abdominal/ surface are of a light/ yellow./

Dimensions/

	ft. in lin
Breadth of the head	0. 0. 5/
Length of the head*	0. 1. 0/
Length of the trunk	2. 4. 6/
Length of the tail	0. 7. 0/

Total length …… 3 ft. 0 in. 6 lin/ Circumference of the neck. 1 inch 3 lines./ Greatest circumf. of the trunk: 2 inches./

*The upper surface of the/ head being strongly arched,/ the measurement is taken on/ the lower surface from the projecting muzzle to the anterior margin/ of the third scutum abdominal **|<43>|** This not very common/ species is found in jungle although/ it may occasionally/ enter houses in/ search of mice & small/ lizards. It will sponta-/ neously starve for a/ considerable length of/ time: a female specimen/ in my possession lived/ upwards of eight months/ without food, during/ which period the skin/ was changed three times/ Having been shut up/ in a cage for more,/ than**|<44>|** five months, the cold/ weather inclusively, she/ brought forth in the commencement of May 1836 an egg/ of a cylindrical form, /1 ½ inch long, & half/ and inch in diameter/ of a light reddish/ yellow color. It was/ left in the cage for/ about a forthnight,/ until putrefaction required/ it removed. On opening/ the soft external mem-/ brane, it was found/ contain nothing but yolk./ Only when about changing/ the skin she became irritable /& attempted to bite as repre/ sented in the sketch./ This serpent is seldom/ found beyond three feet/ or so in length."

Note 3

The alleged collector Sir William Crofton Twynam (1827–1922) also known as "Raja of the North" was born in Galle. He entered the Ceylon Civil Service in 1845 and held from 1869 until his retirement in 1896 the post as Government Agent on Jaffna (Martyn 1923). Aripo, a coastal village at the Gulf of Mannar is known for its historic Dutch Fortress (also known as Allirani Fort, today Arippu, Jaffna District, Northern Province, Sri Lanka, 8.79259°N, 79.92965°E).

Appendix 1

GenBank sequences number and locations for the samples used in this study. "_" no data or information not available. Sequences generated in this study marked in bold.

Species	Locations	Voucher number	cytb	ND4	CMOS	16S	12S	RAG1	Genseq
Bamanophis dorri	Niokolo-Koba NP, Senegal	HLMD RA2906	AY188040	AY487042	AY188001	AY188081	—	—	nomencla-ture
Bamanophis dorri	Niokolo-Koba NP, Senegal	HLMD RA2906	AY188040	AY487042	AY188001	AY188081	—	—	
Dolichophis andreanus	Iran	ICSTZM.7H.1154	MN531565	MN531564	—	—	AY647225	—	
Dolichophis caspius	Greece, Serifos	NHMW KCC1	AY376739	AY487039	AY376797	AY376768	AY039126	—	
Dolichophis jugularis	Turkey, Antalya Province	MVZ 230242	AY486917	AY487046	AY486941	AY376769	AY039152	—	
Dolichophis schmidti	Turkmenistan	CAS 182953	AY486923	AY487054	AY486947	AY376772	AY039159	—	
Eirenis aurolineatus	Turkey	CS4655/J170	AY376749	AY487070	AY376807	AY376778	—	—	
Eirenis barani	Anavarza, Turkey & Osmaniye, Turkey	CS97 Eb1/J252	AY376764	—	AY376804	AY376793	—	—	
Eirenis collaris	Aras, Armenia	ZISP 27859	AY376766	—	AY376824	AY376795	—	—	
Eirenis coronelloides	Jordan	CS98 cr/J209	AY376758	—	AY376816	AY376787	—	—	
Eirenis decemlineata	Syria	CS94 de2/J226	AY376760	—	AY376818	AY376789	—	—	
Eirenis eiselti	Kahramanmaras, Turkey	CS4653/J166	AY376747	AY487069	AY376805	AY376776	—	—	
Eirenis hakkariensis	Turkey	NMPGV 34464	AY376761		AY376819	AY376790	—	—	
Eirenis levantinus	Antakya, Turkey & Osmaniye, Turkey	J168, CS4651/J171	AY376765	AY487071	AY376806	AY376794	—	—	
Eirenis lineomaculata	Turkey	CS93li/J249	AY376762	—	AY376820	AY376791	—	—	
Eirenis medus	Hamadan, Iran	MNHG 2627.004	AY376767	—	AY376825	AY376796	AY647226	—	
Eirenis modestus	Sivas, Turkey & W. Turkey	CS4664/J173	AY376751	AY487072	AY376809	AY376780	AY039143	—	
Eirenis persicus	Ufra, Halfeti, Turkey	CS00pe/J200	AY376757	—	AY376815	AY376786	AY647227	—	
Eirenis punctatolinea-tus	Turkey	J175	AY376755	AY487073	AY376810	AY376784	—	—	
Eirenis rothi	Turkey	CS97 ro1/J225	AY376759	—	AY376817	AY376788	—	—	
Eirenis thospitis	Van, Turkey	CS 01th/J194	AY376754	—	AY376812	AY376783	—	—	
Grayia ornata	Ogooue, Gaboon	—	—	—	AY611957	AY611866	AF158434	—	
Hemerophis socotrae	Socotra, Yemen	HLMD RA2973	AY188042	AY487055	AY188003	AY188083	AY039132	—	
Hemorrhois algirus	Morocco	HLMD RA-1187	AY486911	AY487037	AY486935	AY611849	AY039149	—	
Hemorrhois hippocrepis	Cadiz Province, Spain & Morroco	MNCN 11988	AY486916	AY487045	AY486940	AY643350	AY039139	KY762199	
Hemorrhois nummifer	Kotajsk Region, Armenia	ZISP 27709	AY376742	AY487049	AY376800	AY376771	AY039163	—	
Hemorrhois ravergieri	Kotajsk Region, Armenia	ZISP 27733	AY486920	AY487050	AY486944	—	AY039153	—	
Hierophis cypriensis	Cyprus	Hcyp43	JX315475	—	—	—	AY541502	—	
Hierophis gemonensis	Narina, Croatia	—	AY376741	AY487044	AY376799	AY376770	AY039145	—	
Hierophis viridiflavus	Spain	MVZ 178418	AY486925	AY487057	AY486949	LN552128	AY541507	KY762200	
Lytorhynchus diadema	Djébil NP, Tunisia	HLMD RA2333	AY188025	—	AY187986	AY188064	AY647229	—	
Lytorhynchus gaddi	Khuzestan Prov-ince, Iran	MVZ234500	KX909327	—	—	—	KX909262	—	
Lytorhynchus maynardi	Pakistan	MVZ248462	KX909344	—	KX909367	KX909317	KX909285	—	
Lytorhynchus parado-xus	Sam, Rajasthan, India	—	—	**MZ020427**	—	**MW991416**	—	—	genseq4-ND4, 16S
Macroprotodon abuba-keri	Morocco	E2208.8	AY643378	—	—	AY643336	AY643297	—	
Macroprotodon brevis	Portugal	BMB990094	KY762176	—	KY762079	KY762061	KY762034	KY762201	
Macroprotodon brevis brevis	Te-touan, Tleta Tarhremt, Mo-rocco	MVZ 186239	DQ907242	DQ902333	—	—	—	—	
Macroprotodon cucul-latus	Bou Hedma, Tunisia	HLMD RA2974	AY188026	—	AY187987	AY188065	AY643288	—	
Macroprotodon cucul-latus	Spain	MVZ 186073	DQ902150	AY487064	AF471145	—	—	—	
Macroprotodon mauri-tanicus	Mallorca, Baleanc I., Spain	E2208.6	AY643384	—	—	AY643342	AY643301	—	
Mopanveldophis zebrinus	Namibia	CAS 214764	AY188043	AY487058	AY188004	AY188084	—	—	
Muhtarophis barani	Turkey	ZMH-RU2014/60-5	KX909323	—	KX909374	KX909292	KX909253	—	

Species	Locations	Voucher number	cytb	ND4	CMOS	16S	12S	RAG1	Genseq
Orientocoluber spinalis	Yunnan, China	MVZ 211019	AY486924	AY487056	AY376802	AY376773	AY541508	—	
Persiophis fahimii	Iran	RAP-2019	MN531567	MN531566	MT163748	—	MN536809	—	
Platyceps atayevi	Turkmenistan	CAS 185188	AY486912	AY487038	AY486936	—	AY647231	—	
Platyceps bholanathi	Hyderabad, India	—	—	**MZ020435**	—	—	—	—	genseq4-ND4
Platyceps collaris	Jordan	HLMD J14	AY486922	AY487053	AY486946	—	AY039133	_	
Platyceps plinii	Bangalore, India	NCBS AQ-492	**MZ020421**	**MZ020428**	**MZ020440**	**MW991417**	—	—	genseq4-cytb, ND4, CMOS, 16S
Platyceps plinii	Baripada, India	ZSI-CZRC-V-6384	—	**MZ020432**	—	—	MK329299	—	genseq4-ND4, 12S
Platyceps plinii	Choudwar, India	ZSI-CZRC-V-6329	—	**MZ020429**	**MZ020441**	**MW991418**	—	—	genseq4-ND4, CMOS, 16S
Platyceps plinii	Yavatmal, India	ZSI-CZRC-V-6413	—	**MZ020430**	—	—	—	—	genseq4-ND4
Platyceps plinii	Pune, India	ZSI-CZRC-V-6416	—	**MZ020431**	—	—	—	—	geneseq4-ND4
Platyceps florulentus	Egypt	—	AY486915	AY487043	AY486939	—	AY039161	—	
Platyceps gracilis	Gujarat, India	—	**MZ020424**	**MZ020436**	**MZ020443**	—	—	—	genseq4-CTYB, ND4, CMOS
Platyceps josephi **sp. nov.**	Anaikatti, India	ZSI-CZRC-7358	—	**MZ020433**	—	**MW991419**	—	—	genseq3-ND4, 16S
Platyceps josephi **sp. nov.**	Tuticorin, India	NCBS-AU732	**MZ020422**	**MZ020434**	**MZ020442**	—	—	—	genseq1-cytb, ND4, CMOS
Platyceps josephi **sp. nov.**	Karur, India	ZSI-CZRC-6639	**MZ020423**	—	—	**MW991420**	—	**MZ020447**	genseq2-cytb, 16S, RAG1
Platyceps karelini	Krasnovodsk, Turkmenistan & Uzbekistan	CAS 184636	AY486918	AY487047	AY486942	AY611820	AY647232	—	
Platyceps rhodorachis	Ahal Prov., Turkmenistan & Ambouli, Djibouti	CAS 185035	AY486921	AY487051	AY486945	—	—	—	
Platyceps rogersi	Sinai, Egypt	NMW KCR2	AY188041	AY487052	AY188002	AY188082	MF767306	—	
Platyceps saharicus	Hurkania, Israel	SMN-H<ISR>:17853	MF767406	—	—	—	MF767311	—	
Platyceps ventromaculatus	Sam, Rajasthan, India	—	—	**MZ020437**	**MZ020444**	—	—	—	genseq4-ND4, CMOS
Rhynchocalamus arabicus	Oman	CN4780	KT878854	—	KT878851	KT878847	KT878842	—	
Rhynchocalamus dayanae	Israel	TAU.R17093	KX909332	—	KX909361	KX909313	KX909283	—	
Rhynchocalamus ilamensis	Ilam, Abdanan, Iran	—	KY777450	—	KY777447	—	—	—	
Rhynchocalamus melanocephalus	Israel	TAU.R16340	KX909342	—	KX909350	KX909306	KX909264	—	
Rhynchocalamus satunini	Iran	CAS228723	KT878855	—	KT878850	KT878846	KT878843	—	
Rhynchocalamus satunini	Turkey	ZMHRU2015/0	KX909328	—	KX909362	KX909297	KX909263	—	
Scaphiophis albopunctatus	Tanzania	CMRK284	DQ486345	DQ486321	DQ486169	—	—	—	
Sibynophis subpunctatus	Sri Lanka	RAP0491	KC347471	KC347516	KC347411	KC347373	KC347335	—	
Spalerosophis diadema	Egypt	—	AF471049	—	AF471155	—	KC347335	—	
Spalerosophis diadema	Jordan & Hail, Saudi Arabia	HLMD J62	AY486926	AY487059	AY486950	HQ658450	AY039148	—	
Wallaceophis gujaratensis	Gujarat, India	NCBS HA-105	—	KR819923	KR819917	KR819921	KR819920	—	
Wallaceophis gujaratensis	Gujarat, India	—	**MZ020425**	**MZ020438**	**MZ020445**	**MW991421**	—	**MZ020448**	genseq4-cytb, ND4, CMOS, 16S, RAG1
Wallophis brachyura	Unknown	—	KX782330	KX782331	KX768756	—	—	—	
Wallophis brachyura	Maharashtra, India	—	**MZ020426**	**MZ020439**	**MZ020446**	**MW991422**	—	**MZ020449**	genseq4-cytb, ND4, CMOS, 16S, RAG2

Appendix 2

Partitions and models of sequence evolution used in the Maximum Likelihood (ML) and Bayesian Inference (BI) phylogenetic analyses. In the second column, 1st, 2nd and 3rd refer to codon position.

Partitions	Sites	ML	BI
P1	*12S*, *cytb* 1st, *ND4* 1st	GTR+G	GTR+I+G
P2	*ND4* 2nd , *cytb* 2nd	GTR+G	HKY+I+G
P3	*cytb* 3rd ,*ND4* 3rd	GTR+G	GTR+I+G
P4	*cmos* 1st, *cmos* 2nd, *rag1*1st, *rag1* 2nd	GTR+G	HKY+G
P5	*cmos* 3rd, *rag1* 3rd	GTR+G	HKY+G
P6	*16S*	GTR+G	GTR+I+G

Appendix 3

Pairwise uncorrected genetic distance matrices showing within and between generic distances for the three mitochondrial genes. Within genus pairwise distances, *Argyrogena – Platyceps* and *Wallaceophis – Wallophis* genetic distances are marked in bold.

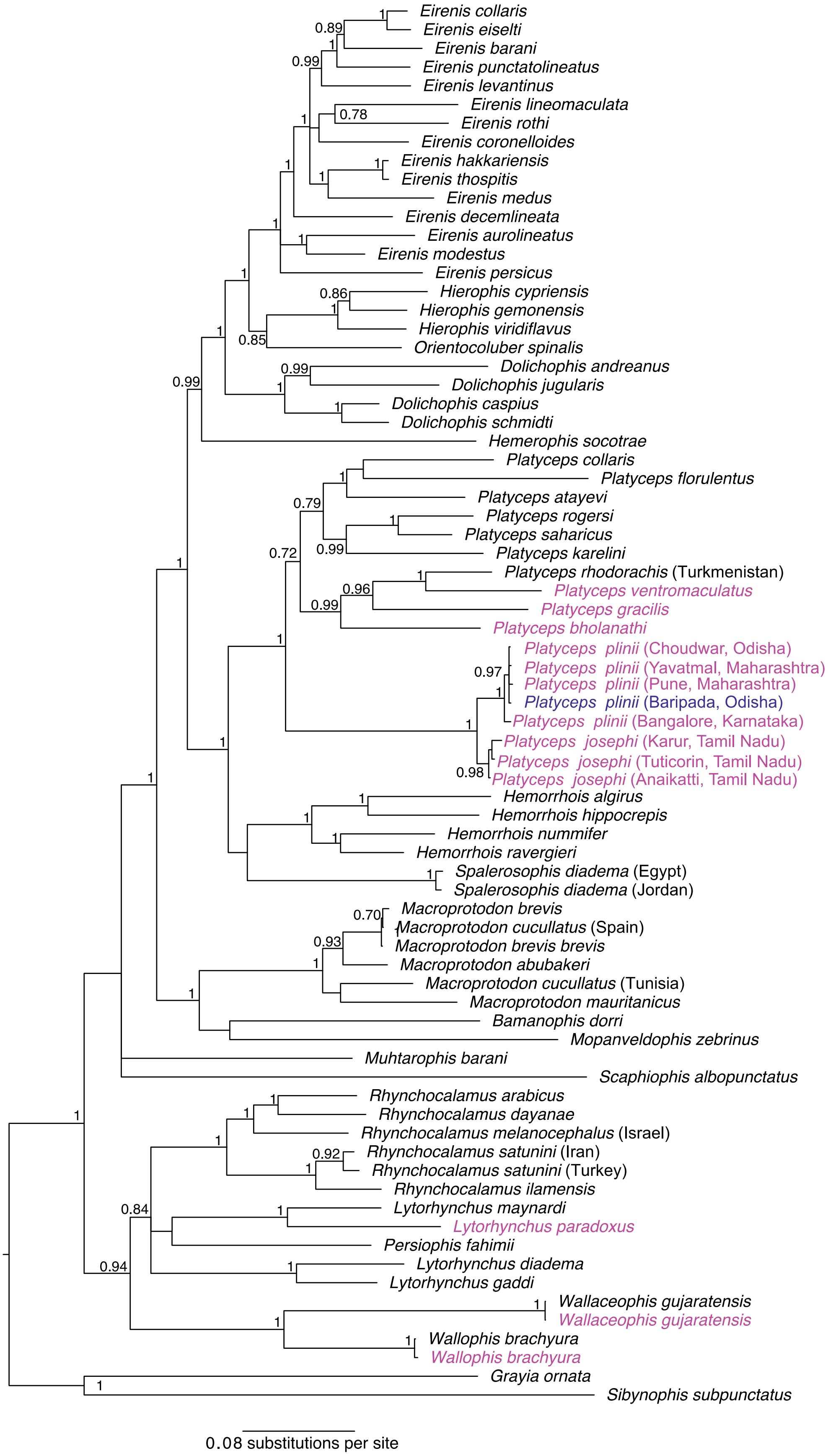
cytb																	
Genus	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
Argyrogena	**0.04–0.05**																
Bamanophis	0.18–0.19																
Dolichophis	0.14–0.18	0.16–0.18	**0.07–0.13**														
Eirenis	0.15–0.18	0.16–0.17	0.12–0.16	**0.04–0.15**													
Hemerophis	0.18	0.17	0.14–0.17	0.14–0.17													
Hemorrhois	0.14–0.17	0.15–0.17	0.12–0.17	0.13–0.17	0.16–0.18	**0.10–0.13**											
Hierophis	0.15–0.17	0.17–0.18	0.12–0.15	0.10–0.15	0.15–0.16	0.13–0.15	**0.09–0.10**										
Lytorhynchus	0.16–0.19	0.16–0.18	0.15–0.17	0.15–0.18	0.17	0.15–0.17	0.15–0.16	**0.11–0.17**									
Macroprotodon	0.17–0.19	0.12–0.15	0.13–0.18	0.14–0.19	0.15–0.17	0.15–0.19	0.15–0.18	0.14–0.18	**0.01–0.14**								
Mopanveldophis	0.19–0.21	0.20	0.18–0.19	0.17–0.20	0.19	0.18–0.19	0.19–0.20	0.18–0.20	0.15–0.18								
Muhtarophis	0.17–0.19	0.18	0.15–0.19	0.16–0.19	0.19	0.17–0.18	0.17–0.18	0.17–0.20	0.17–0.21	0.21							
Orientocoluber	0.17	0.16	0.13–0.16	0.12–0.15	0.15	0.14–0.16	0.12–0.13	0.16–0.18	0.15–0.17	0.18	0.18						
Persiophis	0.16–0.17	0.16	0.14–0.16	0.14–0.16	0.16	0.15–0.16	0.14–0.17	0.14–0.16	0.15–0.17	0.18	0.17	0.15					
Platyceps	**0.13–0.17**	0.17–0.18	0.13–0.18	0.13–0.18	0.16–0.17	0.13–0.16	0.14–0.17	0.15–0.19	0.14–0.20	0.18–0.20	0.17–0.19	0.15–0.16	0.15–0.17	**0.08–0.15**			
Rhynchocalamus	0.17–0.19	0.16–0.18	0.15–0.18	0.15–0.19	0.16–0.17	0.15–0.18	0.15–0.18	0.15–0.17	0.14–0.19	0.20–0.21	0.18–0.20	0.16–0.17	0.14–0.16	0.15–0.20	**0.03–0.13**		
Scaphiophis	0.19–0.21	0.19	0.17–0.20	0.18–0.20	0.20	0.18–0.20	0.19–0.20	0.18–0.19	0.18–0.20	0.20	0.20	0.20	0.18	0.19–0.22	0.19–0.20		
Spalerosophis	0.15–0.17	0.16	0.15–0.16	0.13–0.16	0.16–0.17	0.14–0.15	0.14–0.16	0.16–0.18	0.14–0.18	0.18	0.18	0.16	0.15–0.16	0.14–0.16	0.17–0.19	0.19	
Wallaceophis	0.18–0.20	0.19	0.16–0.20	0.18–0.21	0.19–0.20	0.17–0.19	0.18–0.19	0.17–0.19	0.19–0.20	0.21–0.22	0.20–0.22	0.18–0.19	0.17	0.17–0.19	0.16–0.18	0.19–0.21	0.19
Wallophis	0.15–0.19	0.16–0.17	0.14–0.16	0.14–0.18	0.18–0.19	0.15–0.18	0.13–0.16	0.15–0.16	0.16–0.18	0.18–0.20	0.18–0.19	0.15–0.17	0.16	0.14–0.18	0.15–0.18	0.18–0.19	0.16

ND4																	
Genus	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	
Argyrogena	**0.05**																
Bamanophis	0.14–0.15																
Dolichophis	0.16–0.18	0.13–0.15	**0.05–0.13**														

cytb																	
Genus	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
Eirenis	0.14–0.19	0.14–0.15	0.12–0.16	**0.07–0.11**													
Hemerophis	0.16–0.17	0.14	0.14–0.16	0.16													
Hemorrhois	0.14–0.18	0.14–0.16	0.13–0.17	0.14–0.17	0.16–0.17	**0.1–0.14**											
Hierophis	0.16–0.17	0.13–0.15	0.12–0.15	0.12–0.15	0.16–0.17	0.13–0.16	**0.09**										
Lytorhynchus	0.20	0.18	0.17–0.19	0.17–0.19	0.18	0.17–0.19	0.17–0.18										
Macroprotodon	0.15–0.16	0.13	0.13–0.15	0.13–0.15	0.15	0.12–0.15	0.13–0.14	0.16									
Mopanveldophis	0.18–0.19	0.16	0.16–0.17	0.16–0.18	0.18	0.17–0.18	0.15–0.16	0.17	0.15								
Orientocoluber	0.14–0.16	0.14	0.14–0.15	0.11–0.13	0.16	0.14–0.16	0.13–0.14	0.17	0.12	0.17							
Persiophis	0.15–0.17	0.16	0.15–0.16	0.16–0.19	0.19	0.16–0.18	0.15–0.17	0.15	0.14	0.18	0.16						
Platyceps	**0.13–0.17**	0.15–0.16	0.14–0.18	0.14–0.18	0.16–0.18	0.13–0.18	0.14–0.18	0.18–0.2	0.13–0.17	0.17–0.19	0.15–0.17	0.17–0.21	**0.1–0.17**				
Scaphiophis	0.20–0.21	0.18	0.18–0.19	0.20–0.21	0.18	0.18–0.20	0.18	0.20	0.18–0.19	0.19	0.19	0.20	0.19–0.22				
Spalerosophis	0.15	0.14	0.14–0.17	0.13–0.15	0.15	0.09–0.14	0.13–0.14	0.15	0.11	0.16	0.13	0.16	0.13–0.16	0.16			
Wallaceophis	0.2–0.21	0.19	0.18–0.20	0.17–0.20	0.19	0.18–0.20	0.19	0.18–0.19	0.18	0.2–0.21	0.19	0.18	0.19–0.2	0.21	0.19		
Wallophis	0.16–0.18	0.17	0.16–0.19	0.16–0.19	0.17–0.18	0.15–0.19	0.17–0.18	0.16–0.17	0.16	0.19–0.21	0.17	0.14–0.16	0.16–0.2	0.19–0.2	0.15–0.16	**0.15–0.17**	
16S																	
Genus	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	
Argyrogena	**0.03**																
Bamanophis	0.08–0.1																
Dolichophis	0.08–0.1	0.06–0.07	**0.02–0.04**														
Eirenis	0.06–0.11	0.06–0.08	0.03–0.06	**0–0.06**													
Hemerophis	0.09–0.11	0.08	0.06–0.07	0.07–0.08													
Hemorrhois	0.07–0.11	0.07–0.08	0.04–0.06	0.05–0.09	0.06–0.07	**0.04–0.05**											
Hierophis	0.07–0.08	0.06–0.07	0.04–0.05	0.04–0.06	0.06	0.06–0.08	**0.02**										
Lytorhynchus	0.08–0.11	0.07–0.1	0.06–0.08	0.05–0.08	0.07–0.09	0.06–0.09	0.06–0.08	**0.04–0.07**									
Macroprotodon	0.07–0.11	0.05–0.07	0.03–0.06	0.04–0.07	0.04–0.08	0.05–0.07	0.04–0.07	0.04–0.09	**0.01–0.04**								
Mopanveldophis	0.08–0.1	0.05	0.06–0.07	0.05–0.07	0.08	0.07	0.06	0.07–0.09	0.05–0.07								
Muhtarophis	0.07–0.08	0.07	0.05	0.05–0.07	0.08	0.06–0.07	0.05–0.06	0.05–0.07	0.05–0.07	0.07							
Orientocoluber	0.06–0.07	0.06	0.04–0.05	0.03–0.06	0.06	0.05–0.06	0.04	0.05–0.07	0.04–0.06	0.06	0.05						
Platyceps	**0.05–0.07**	0.07–0.08	0.06–0.07	0.05–0.08	0.07–0.08	0.05–0.07	0.06–0.07	0.06–0.08	0.06–0.08	0.07–0.08	0.05–0.06	0.05–0.06	**0.04**				
Rhynchocalamus	0.07–0.1	0.08	0.06–0.08	0.06–0.08	0.08–0.09	0.06–0.09	0.06–0.08	0.04–0.07	0.05–0.08	0.07–0.08	0.05–0.06	0.06–0.07	0.06–0.08	**0–0.05**			
Spalerosophis	0.09–0.1	0.09	0.08	0.07–0.1	0.08	0.07–0.08	0.08	0.08–0.1	0.06–0.08	0.1	0.08	0.07	0.07–0.08	0.08–0.09			
Wallaceophis	0.1–0.11	0.09	0.07–0.09	0.07–0.09	0.08	0.08	0.08	0.08–0.09	0.06–0.08	0.08	0.07–0.08	0.08	0.08	0.07–0.09	0.08–0.09		
Wallophis	0.09–0.11	0.07	0.08–0.09	0.07–0.09	0.09	0.07–0.09	0.08	0.07–0.08	0.06–0.09	0.08	0.08	0.08	0.08–0.09	0.06–0.08	0.09	**0.05**	

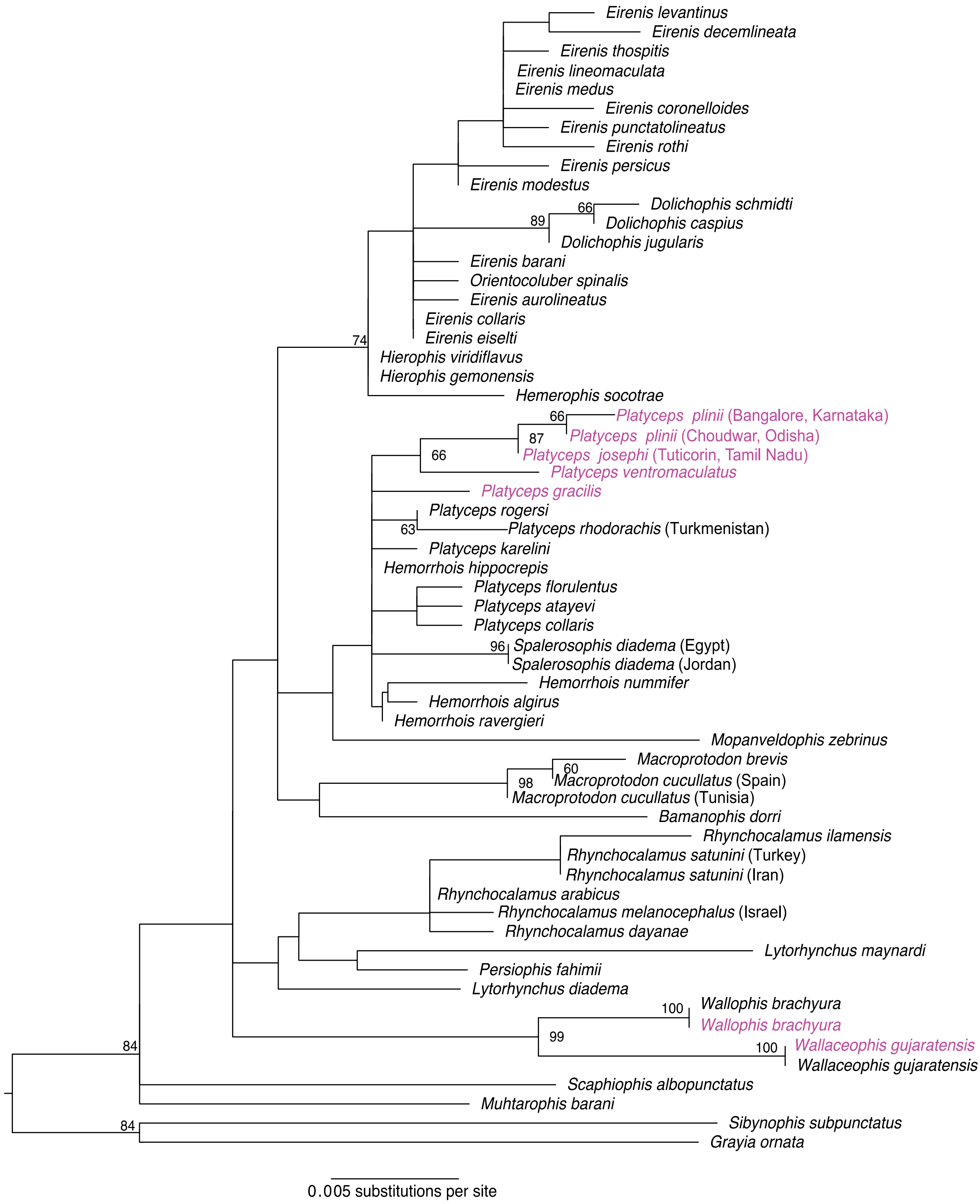
Appendix 4

BI phylogeny showing inferred phylogenetic relationships of old world racers. Labelled in pink color are the sequences generated in this study, colored blue is the sample from this study+GenBank sequence. Posterior probability support values shown at internal branches, values below 70 are not shown.



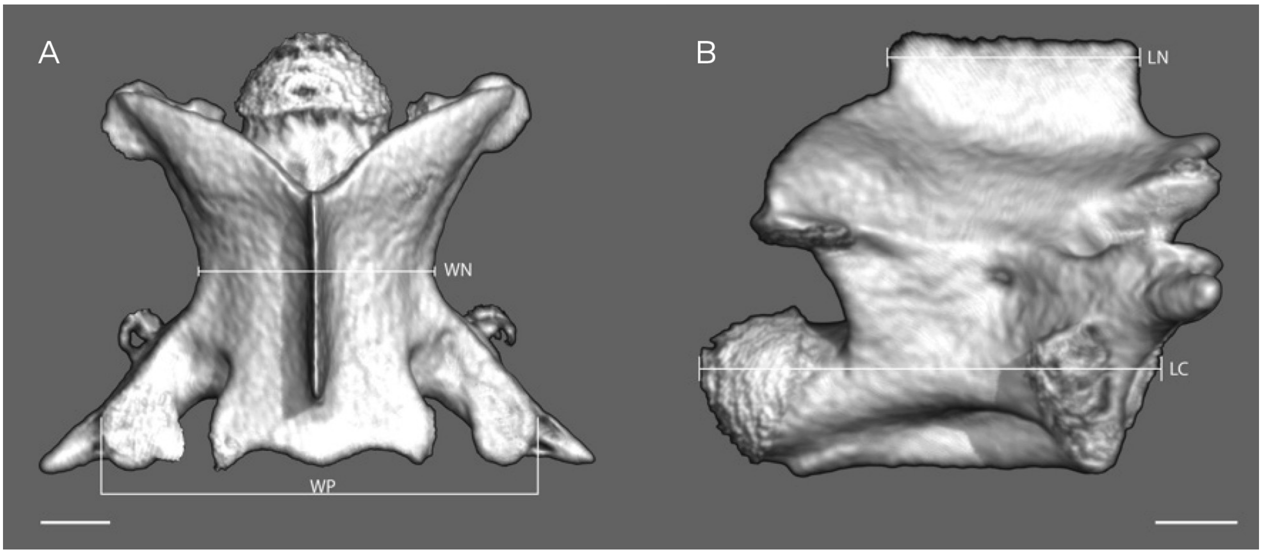
Appendix 5

Maximum Likelihood phylogeny constructed using *cmos* dataset. Number at internal branches are ML bootstrap support, values below 60 are not shown.



Appendix 6

Platyceps plinii comb. nov. (BMNH 37a from Visakhapatnam, Andhra Pradesh state, India). Middorsal vertebrae virtually segmented in A. dorsal and B. lateral view shows exemplarily the measured distances of: least width of neural arch (WN), distance between outer edges of articular facets of prezygapophyses (WP), length of neural spine (LN) and length of centrum (LC). Scale bar 0.5 mm.



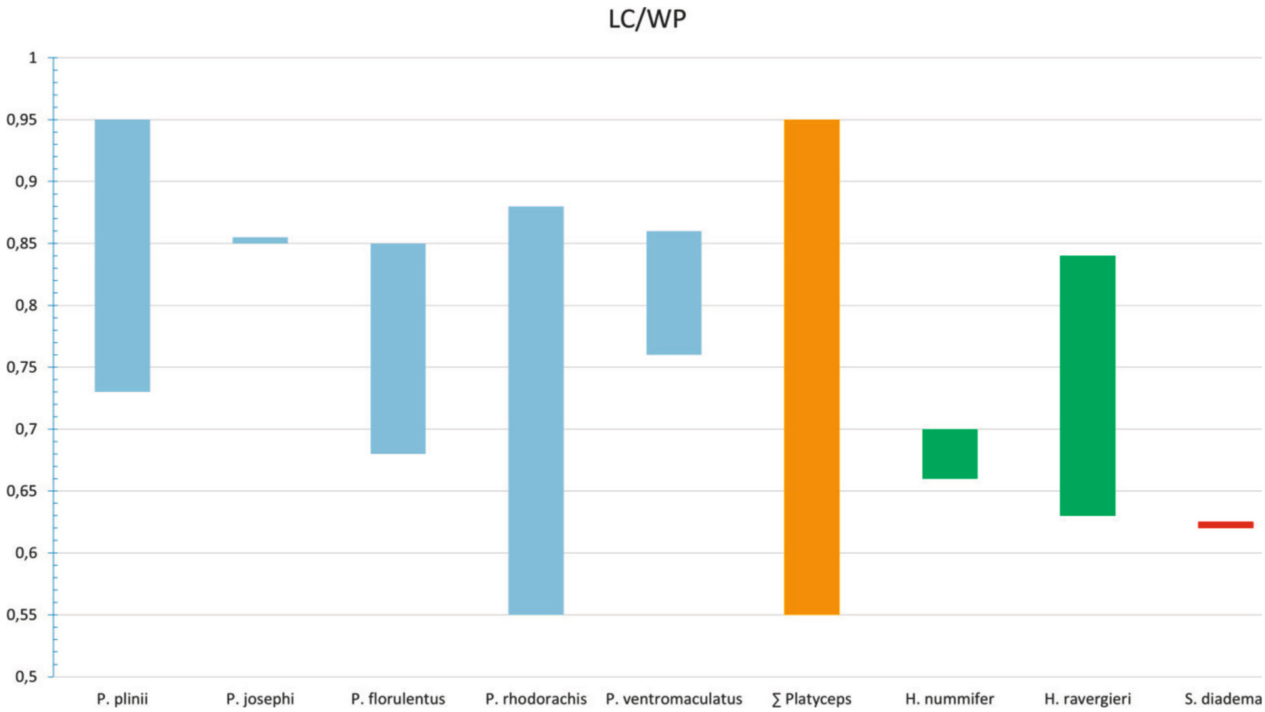
Appendix 7

Table with summarized characters used for osteological comparison of *Platyceps* spp. and related genera (*Hemorrhois* and *Spalerosophis*). LC/WN: ratio length of centrum to least width of neural arch, LC/WP: ratio length of centrum to distance between outer edges of articular facets of prezygapophyses, LN/WN: ratio length of neural spine to least width of neural arch. (1) Data from Schätti (1987) in square brackets; (2) Data from Schätti et al. (2014) in square brackets; (3) Data for one specimen only: NMW 25465:2, paratype from Salem, Tamil Nadu state, India.

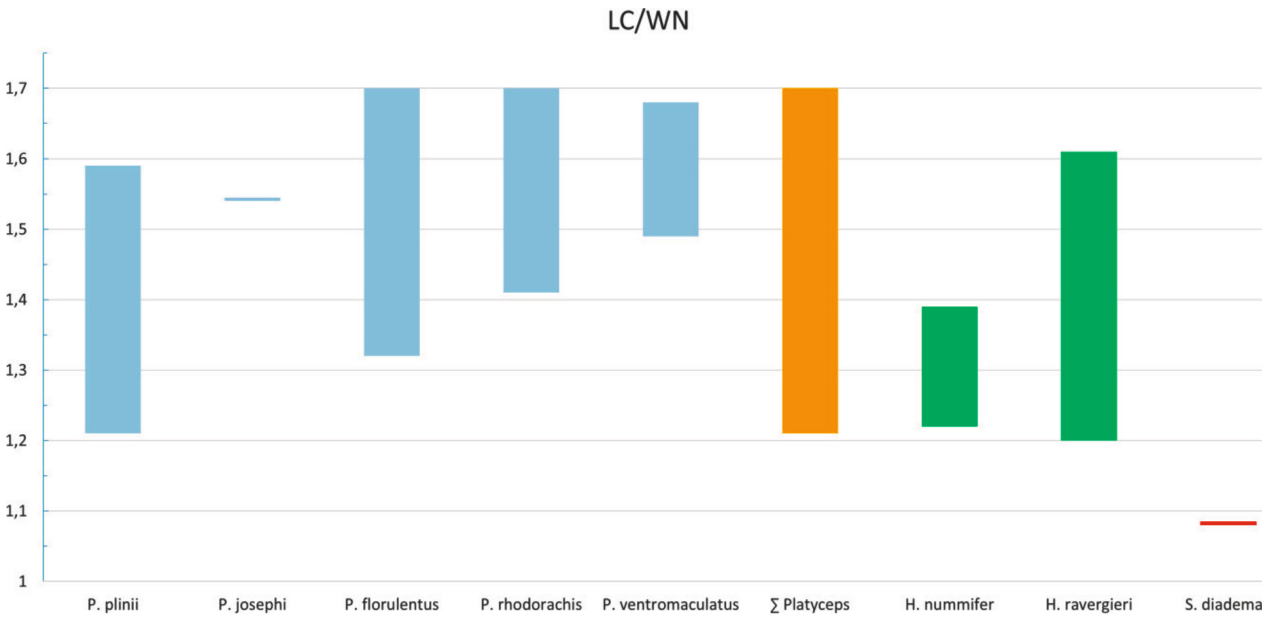
Taxon	Lateral processes of premaxilla	Ascending process of premaxilla	TLn/TWn	TLln/Lns	Mesial process of pterygoid	Pterygoid process at basioccipital	LC/WN	LC/WP	LN/WN
Platyceps plinii comb. nov.	individually short or long, one tip	short, in contact with nasals	0.93–1.04	40%–50%	present only in 60% of examined specimens	individually unstructured or structured	1.21–1.59	0.73–0.95	0.81–1.01
Platyceps josephi **sp. nov.**	short, one tip	short, in contact with nasals	1.16–1.18	47%–58%	present	individually unstructured or structured	1.54 [3]	0.85[3]	1.02[3]
Platyceps florulentus [1]	long, two tips	short, in contact with nasals	1.24	68%	absent	structured	1.70 [1.32–1.48]	0.85 [0.68–0.79]	1.15 [0.95–1.05]
Platyceps rhodorachis [2]	long, one tip or stout	long, not in contact with nasals	1.27–1.39	60%–77%	absent	structured	1.60–1.70 [1.41–1.55]	0.83–0.88 [0.55–0.64]	1.20–1.27 [1.09–1.25]
Platyceps ventromaculatus [1]	long, stout	long, in contact with nasals	1.28	56%	absent	unstructured	1.68 [1.49–1.51]	0.86 [0.76–0.78]	1.10 [1.16–1.18]
Hemorrhois nummifer [1]	/	/	/	/	/	/	[1.22–1.39]	[0.63–0.71]	[0.84–1.07]
Hemorrhois ravergieri [1]	/	/	/	/	/	/	1.61 [1.20–1.41]	0.86 [0.66–0.70]	0.80 [0.87–1.16]
Spalerosophis diadema	/	/	/	/	/	/	1.08	0.62	0.80

Appendix 8

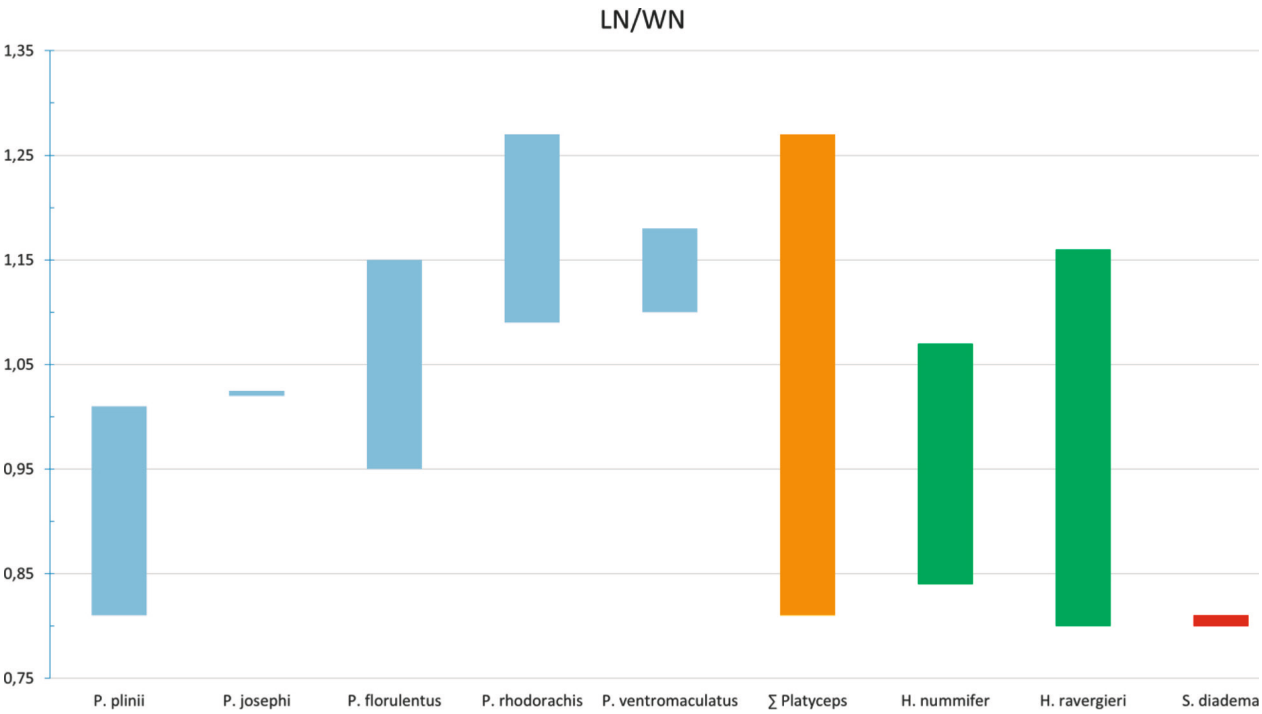
Segment plots of characters related to middorsal vertebrae values between *Platyceps* spp. and related genera (*Hemorrhois* and *Spalerosophis*). For abbreviations see Appendix 6.



Ratio of the length of centrum to the width across prezygapophyses between outer edges of articular facets (LC/WP).



Ratio of the length of centrum and the least width of neural arch (LC/WN).



Ratio of length of neural spine to least width of neural arch (LN/WN).

Appendix 9

Gazetteer of confirmed locality records for *Platyceps plinii* comb. nov. and *P. josephi* **sp. nov.** from India and Pakistan mentioned in this study.

***Platyceps plinii* comb. nov.**							
Locality verbatim	**Current locality**	**State**	**Country**	**Latitude**	**Longitude**	**elevation in m**	**References**
Casemcottah [type locality]	Kasimkota	Andhra Pradesh	India	17.66.660	82.967.483	26	Russell (1796).
Ellore	Eluru	Andhra Pradesh	India	16.710425	81.115381	17	Wall (1914), Blanford (1879).
Nallamala Hills		Andhra Pradesh	India	16.283332	79.483329	350	Srinivasulu and Das (2008).
Pulicat Lake		Andhra Pradesh	India	13.640242	80.167158	1	Bhuvaneswari (2003).
Rajamundry North Circars	Rajamundri	Andhra Pradesh	India	16.983906	81.555929	67	Bauer et al. (2015).
Rollapenta	Rollapenta	Andhra Pradesh	India	15.889621	78.807225	474	Rao et al. (2005).
Sundipentha/Sikharam	Sundipenta	Andhra Pradesh	India	16.076749	78.915278	470	Rao et al. (2005).
Sunnipenta, Nagarjunasagar Srisailam Tiger Reserve	Sunnipenta	Andhra Pradesh	India	16.033398	78.903697	414	Srinivasulu et al. (2006).
Thummalapalle uranium mining station, Kadapa and Anantapur districts		Andhra Pradesh	India	16.947528	78.998504	250	Reddy et al. (2013).
Vizagapatam	Visakhapatnam	Andhra Pradesh	India	17.723127	83.301284	26	Boulenger (1893).
Monghyr	Munger	Bihar	India	25.37556	86.47352	54	Sclater (1891), Wall (1914).
Pancht Hill, 2.5 miles from Inanpur, Manbhum		Bihar	India	23.475107	86.048262	213	Dasgupta and Raha (2004).
Patna	Patna	Bihar	India	25.60932	85.12352	60	Wall (1914).
Tinpahar, Rajmahal	Rajmahal	Bihar	India	24.98333	87.73333	34	Dasgupta and Raha (2004).
Kaberdham	Kabirdham	Chhatisgarh	India	22.095278	81.256667	365	This study.
Pharsabhar block	Jashpur	Chhatisgarh	India	22.7702329	83.9680735	504	Ingle (2011).
Bondla Wildlife Sanctuary	Bondla Wildlife Sanctuary	Goa	India	15.4367676	74.1074772	199	Lobo (2002).
Goa	Goa City	Goa	India	15.3004543	74.0855134	90	Bethencourt Ferreira (1897), Porob et al. (2014).
Alcock Ashdown & Co., Old Port Bhavnagar		Gujarat	India	21.7130565	71.9608306	40	Vyas (1987).
Baroda	Vadodara	Gujarat	India	22.3324777	73.2174206	41	Whitaker and Captain (2004).
Bharuch	Bharuch	Gujarat	India	21.7518176	73.0016822	22	Sharma (2000, 2003, 2007).
Bhavnagar	Bhavnagar	Gujarat	India	21.7669734	72.1406835	32	Sharma (2000, 2003, 2007), Patel et al. (2019b).

***Platyceps plinii* comb. nov.**							
Locality verbatim	**Current locality**	**State**	**Country**	**Latitude**	**Longitude**	**elevation in m**	**References**
Dahod City	Dahod	Gujarat	India	22.8358542	74.2556782	309	Vyas (2013).
Dangs	Dang	Gujarat	India	20.7413779	73.7421809	352	Sharma (2000, 2003, 2007).
Gandhinagar	Gandhinagar	Gujarat	India	23.2248144	72.6676020	82	Sharma (2000, 2003, 2007).
Gir forest	Gir forest	Gujarat	India	21.1704377	70.7998130	278	Vyas (2000a, 2001c).
Girnar Hill		Gujarat	India	21.5178298	70.5504226	409	Patel et al. (2019a)
Kala Gadba		Gujarat	India	21.5270538	70.6093521	201	Patel et al. (2019a).
Mehsana	Mehsana	Gujarat	India	23.5936593	72.3893739	86	Sharma (2000, 2003, 2007).
near Mahal	Mahal	Gujarat	India	20.9293702	73.6756351	318	Vyas (2007).
Panchmahals	Panchmahal	Gujarat	India	22.8205309	73.6689945	146	Sharma (2000, 2003, 2007).
Sabarkantha	Sabarkantha	Gujarat	India	24.0294885	73.0459884	209	Sharma (2000, 2003, 2007).
Samot village, Shoolpaneshwar WS	Samot village, Shoolpaneshwar WS	Gujarat	India	21.9506182	74.3400571	199	Vyas (2011).
Saurashtra		Gujarat	India	21.844703	70.812761	122	Patel & Vyas (2019).
Surat, suburban residential complex		Gujarat	India	21.153	72.7719	8	Patel et al. (2019b).
Valsad	Valsad	Gujarat	India	20.5547169	72.9961447	28	Sharma (2000, 2003, 2007).
Vansda National Park		Gujarat	India	20.7663784	73.4517517	144	Vyas (2004).
Vizapur	Vijapur	Gujarat	India	23.56015	72.7576757	126	Gharpurey (1932a).
Ambala	Ambala	Haryana	India	30.3843674	76.770421	281	Wall (1924).
Hazaribag district		Jharkhand	India	23.9979667	85.3642044	608	Prakash & Raziuddin (2009).
Balekola, Mysore	Bealgola	Karnataka	India	12.38914	76.602571	751	Aengals & Pradhan (2013).
Belgaum	Belgaum	Karnataka	India	15.8572666	74.5069343	759	Gharpurey (1935a).
Bengaluru	Bengaluru	Karnataka	India	12.9791198	77.5912997	924	This study.
Chincholi Forest, Kalaburagi district		Karnataka	India	17.566072	77.488044	617	Pasar and Paul (2016).
Coorg	Coorg	Karnataka	India	12.4724402	75.7506400	951	Satish (2008).
Hosar, near Bangalore		Karnataka	India	12.715852	77.828768	873	Das et al. (2019).
Mysore	Mysuru	Karnataka	India	12.3051828	76.6553609	752	Nicholson (1874), Wall (1914), Smith (1943).
Collagelly Hills, Coimbatore dist	Kollegal Hills	Karnataka	India	12.1560966	77.1071726	644	Beddome (1862), Sclater (1891), Wall (1914), Sharma, R. C. (1982).
Shivamogga City Corporation		Karnataka	India	13.921822	75.566029	575	Sayeswara et al. (2015).
Muthanga Wildlife Sanctuary	Muthanga, Wayanad district	Kerala	India	11.69427	76.386329	868	Radhakrishnan (1998)
Barkatullah University, Bhopal		Madhya Pradesh	India	23.199352	77.451636	481	Manhas et al. (2018).
Bhopal district		Madhya Pradesh	India	23.265819	77.41763	497	Manhas et al. (2015b).
Dewas	Dewas	Madhya Pradesh	India	22.9962075	76.1275282	540	Ingle (2002), Chandra and Gajbe (2005), Gajbe and Gupta (2005).
Dumna Nature Park, Jabalpur		Madhya Pradesh	India	23.169869	80.01304	462	Sheikh (2017).
Gwalior	Gwalior	Madhya Pradesh	India	26.2037247	78.1573628	220	Boulenger (1893), Wall (1914, 1921), Whitaker and Captain (2004), Chandra and Gajbe (2005), Gajbe and Gupta (2005).
Indore	Indore	Madhya Pradesh	India	22.7203851	75.8682103	554	Ingle (2002), Chandra and Gajbe (2005), Gajbe and Gupta (2005).
Jabalpur	Jabalpur	Madhya Pradesh	India	23.1608938	79.9497702	420	Chandra and Gajbe (2005), Gajbe and Gupta (2005).
Kanha National Park	Kanha National Park	Madhya Pradesh	India	22.2766989	80.6300919	602	Argawal (1976), Chandra et al. (2008), Thakur (2011).
Katra Hills, Bhopal		Madhya Pradesh	India	23.151928	77.429774	472	Manhas et al. (2018).
Mandla	Mandla	Madhya Pradesh	India	22.5986352	80.3713545	450	Chandra and Gajbe (2005), Gajbe and Gupta (2005).
Pachmarhi Biosphere Reserve		Madhya Pradesh	India	22.470498	78.432348	1053	Fellows (2014).
Satpura Tiger Reserve		Madhya Pradesh	India	22.502599	78.444456	968	Amol et al. (2012), Kumbhar et al. (2012).
Saugor	Sagar	Madhya Pradesh	India	23.847761	78.743331	519	Wall (1914).
Shahdol	Shahdol	Madhya Pradesh	India	23.2804320	81.2360533	510	Chandra and Gajbe (2005), Gajbe and Gupta (2005).
Sita Hill, Jabalpur	Sita Hill, Jabalpur	Madhya Pradesh	India	23.1290407	79.9433157	423	Sharma, R.C. (1982).
Sonemuda (Anuppur District)		Madhya Pradesh	India	22.662328	81.767258	972	Ingle (2020).

Platyceps plinii comb. nov.							
Locality verbatim	**Current locality**	**State**	**Country**	**Latitude**	**Longitude**	**elevation in m**	**References**
Ujjain	Ujjain	Madhya Pradesh	India	23.174597	75.7851423	494	Ingle (2001a, 2001b, 2002, 2008), Chandra and Gajbe (2005), Gajbe and Gupta (2005), Ingle et al. (2019).
Ahmednagar	Ahmednagar	Maharashtra	India	19.1573347	74.8602861	855	Gharpurey (1931a, 1932a–c).
Akola district		Maharashtra	India	20.698656	77.094612	289	Charjan and Joshi (2015).
Ale village, ca. 20 km N of Narayan-gon	Ale, Pune	Maharashtra	India	19.1751985	74.1154813	668	Sharma, R. C. (1982).
Atpadi Tahasil, Sangli district		Maharashtra	India	17.4130689	74.9148231	573	Vibhute (2018).
Aurangabad	Aurangabad	Maharashtra	India	24.7674588	84.3719718	111	Captain and Thakur (1999), Khedkar et al. (2014).
Bassein Fort, Thane		Maharashtra	India	19.329422	72.8143531	10	Walmiki et al. (2012b).
Bhanadara, Nagpur	Bhanadara, Nagpur	Maharashtra	India	21.1464501	80.0483394	263	This study.
Bohali	Bohali	Maharashtra	India	17.6081786	75.2511101	495	Lindberg (1932).
Bombay Presidency	Mumbai	Maharashtra	India				Das et al. (2019).
Borivali (Gorai) Mangroves		Maharashtra	India	19.2393602	72.8772926	91	Chauhan and Shingadia (2012).
Buldhana district, Amravati division		Maharashtra	India	20.5739476	76.2452802	473	Joshi (2011, 2015).
Chink Hill	Chink Hill	Maharashtra	India	19.5014239	75.9872283	459	Lindberg (1932).
Dahanu Forest Division		Maharashtra	India	19.9887244	72.733848	15	Singh and Ngullie (2010).
Deolali	Deolali, Nasik	Maharashtra	India	19.9378005	73.8564835	555	Fraser (1936).
Devagad, Sindhudurg district		Maharashtra	India	16.37512	73.38455	50	Anonymous (2017).
Ghorawadi, near Talegaon, Pune district	Talegaon, Pune	Maharashtra	India	18.7395380	73.7467945	599	Captain and Thakur (1999).
Jalgaon district		Maharashtra	India	21.0137606	75.5627048	218	Anonymous (2010).
Juvem, Salsette	Salsette, Mumbai	Maharashtra	India	19.167216	72.892399	171	Prater (1924).
Kaas Plateau	Kas plateau, Satara district	Maharashtra	India	17.7158767	73.8207854	1191	Chikane and Bhosale (2012).
Katraj Snake Park Pune		Maharashtra	India	18.4536792	73.8563196	665	Khedkar et al. (2014).
Khandalla	Khandala	Maharashtra	India	21.3469486	79.3930965	297	Phipson (1886), Wall (1914).
Kolhapur district		Maharashtra	India	16.6854647	74.1368103	570	Patil (2018).
Kurduvadi	Kurduvadi	Maharashtra	India	18.090766	75.4139381	516	Lindberg (1939).
Maharashtra Nature Park	Mumbai	Maharashtra	India	19.052278	72.862815	6	Walmiki et al. (2012a).
Malegaon Tehsil, Washim district		Maharashtra	India	20.5575459	74.5242544	432	Ingle et al. (2014).
Mokhada and Jawhar, Palghar district		Maharashtra	India	19.9221490	73.3311272	353	Bansode et al. (2016).
Nagar	Nagarm, Ah-mednagar	Maharashtra	India	19.1475366	74.8027099	734	Gharpurey (1935b).
Nagpur	Nagpur	Maharashtra	India	21.1500964	79.0127049	344	Wall (1914, 1921), Khedkar et al. (2014), Deshmukh et al. (2015).
Nanded city		Maharashtra	India	19.0874765	77.3279922	388	Jadhav et al. (2018).
Navegaon NP, Gondia district		Maharashtra	India	21.4644517	79.1706991	331	Bhandarkar et al. (2012), Paliwal and Bhandarkar (2017).
Palghar region, Thane		Maharashtra	India	19.6978751	19.6978751	47	Raut et al. (2014), Bansode and More (2018).
Panchgani	Panchgani, Satara	Maharashtra	India	17.9239543	73.7992681	1258	Mullan (1927).
Parel, Bombay	Parel, Mumbai	Maharashtra	India	19.0094817	72.8376614	5	Prater (1924).
Parvati-Pachgaon Hills, Pune	Pune	Maharashtra	India	18.4969269	73.8452906	606	Pande et al. (2013).
Poona	Pune	Maharashtra	India	18.520306	73.854318	556	Wall (1914), This study.
Powai, Salsette	Powai, Mumbai	Maharashtra	India	19.1187195	72.9073476	43	Prater (1924).
Puna	Pune	Maharashtra	India	18.520306	73.854318	556	Dasgupta et al. (2012).
Ranidoh region, Pench NP	Pench NP	Maharashtra	India	21.8854685	79.1877054	551	Pradhan (2004).
Santa Cruz, Salsette	Salsette, Mumbai	Maharashtra	India	19.167216	72.892399	171	Wall (1914), Prater (1924).
Swami Ramanand Teerth Marathwada University, Nanded		Maharashtra	India	19.100176	77.285152	384	Tambre and Chavan (2016).
Thana	Thane	Maharashtra	India	19.194329	72.970177	20	Phipson (1886), Wall (1914), Das et al. (2019).
Uran wetland, Navi, Mumbai	Mumbai	Maharashtra	India	19.07283	72.88261	8	Thakur (2010).
Vidarbha region		Maharashtra	India	21.0163970	78.9863482	291	Joshi et al. (2014, 2017).
Vidyanagari campus Mumbai Uni, Maharashtra	Vidyanagari Campus	Maharashtra	India	20.9702409	74.8026808	258	Upadhye et al. (2012).

***Platyceps plinii* comb. nov.**							
Locality verbatim	**Current locality**	**State**	**Country**	**Latitude**	**Longitude**	**elevation in m**	**References**
Visapur	Visapur, Ahmed-nagar	Maharashtra	India	20.9702409	73.4927555	115	Gharpurey (1935b).
Yavatmal	Yavatmal	Maharashtra	India	20.3367414	78.2295788	377	Rameshwaran (2008), This study.
Marol, Mumbai	Mumbai	Mahrashtra	India	19.116801	72.884675	15	Patel et al. (2015).
Baripada	Baripada	Odisha	India	21.9207475	86.8553154	64	This study.
Choudwar, Cuttack	Choudwar, Cuttack	Odisha	India	20.5276823	85.910155	32	This study.
Gandhamardan Hills		Odisha	India	20.8609068	82.7775689	293	Pradhan et al. (2014).
Nandankanan Biological Park	Nandankanan Biological Park. Cuttack	Odisha	India	20.3977336	85.8138633	36	Murthy and Acharjyo (1987), Dutta and Acharjyo (1990).
Patharakali area, Bhadrak district		Odisha	India	20.973825	86.615244	19	Mohalik et al. (2019).
Pondicherry	Pondicherry	Puducherry	India	11.820894	79.697454	14	This study.
near Hemavas Dam, Pali district	Hemwas, Pali	Rajasthan	India	25.7456159	73.3473000	220	Sharma and Diksit (1976).
Pratapgarh district		Rajasthan	India	23.9936599	74.7284642	459	Anonymous (n. d., p. 13)
Ramri		Rajasthan	India	26.04698	76.297146	253	Theobald (1868a).
Farahabad		Telangana state	India	16.282541	78.680858	537	Seetharamaraju (2014)
Hyderabad Region		Telangana state	India	17.344307	78.531531	486	Walmiki)2012b), Pasar (2018).
Ippalapally		Telangana state	India	16.354054	79.074511	419	Seetharamaraju (2014).
Jannaram		Telangana state	India	19.115557	78.999515	190	Seetharamaraju (2014).
Kerimeri		Telangana state	India	19.44283	79.051793	277	Seetharamaraju (2014).
Khanapur		Telangana state	India	19.041383	78.648385	248	Seetharamaraju (2014).
Kinnerasani		Telangana state	India	17.67149	80.676419	94	Seetharamaraju (2014).
Old Bowenpally		Telangana state	India	17.481334	78.478662	548	Seetharamaraju (2014).
OU Tarnaka		Telangana state	India	17.415796	78.533936	517	Seetharamaraju (2014).
Rushulacheruvu		Telangana state	India	14.421364	77.801929	354	Seetharamaraju (2014).
Vijayapuri		Telangana state	India	16.589441	79.335993	149	Seetharamaraju (2014).
Allahabad	Prayagraj	Uttar Pradesh	India	25.4381302	81.8338005	103	Anonymous (1877), Sclater (1891), Wall (1914).
Benares	Varanasi	Uttar Pradesh	India	25.3356491	83.0076292	79	Günther (1858), Boulenger (1893), Wall (1914).
Fyzabad	Faizabad	Uttar Pradesh	India	26.7431323	82.0898131	105	Wall (1907, 1914).
Mathura region		Uttar Pradesh	India	27.491322	77.688805	165	Sharma and Warman (2011).
Calcutta	Kolkata	West Bengal	India	22.5677459	88.3476023	10	Anonymous (1870), Anderson (1871), Stoliczka (1871b), Sclater (1891), Wall (1914, 1924), Ahmed and Dasgupta (1992).
Dum Dum		West Bengal	India	22.647.051	88.431.686	10	Smith (1943).
Durgapur city	Durgapur	West Bengal	India	23,5788078	87,3264641	88	Gayen et al. (2017).
Hosur Hills		Tamil Nadu	India	12.739657	77.856756	851	Ganesh et al. (2018).
Tambaram, Chennai		Tamil Nadu	India	12.918878	80.119084	36	Günther (1858), Boulenger (1890, 1893), Wall (1914), Werner (1929), Sharma, R. C. (1982)
Tambaram, Chennai		Tamil Nadu	India	12.918878	80.119084	36	Günther (1858), Boulenger (1890, 1893), Wall (1914), Werner (1929), Sharma, R. C. (1982)
Lal Suhanra National Park, Baha-walpur	Bahawalpur	Punjab	Pakistan	29.313483	71.905294	125	Khan et al. (2018).
Badin	Badin	Sindh	Pakistan	24.6332316	68.88634238	10	Minton (1966).
Hala	Hala	Sindh	Pakistan	25.5971858	68.4454874	25	Mertens (1969).
Jati	Jati	Sindh	Pakistan	24.3533505	68.2678116	-50	Mertens (1969).
Jogis	Jogi	Sindh	Pakistan	27.67621	68.216521	50	Wilson (1967).
Larkana district	Larkana	Sindh	Pakistan	27.5564798	68.2101509	48	Minton (1962, 1966).
Makli Hills near Tatta	Makli hills nr. Tatta	Sindh	Pakistan	24.7529974	67.9002813	30	Mertens (1969).
Mohenjo-daro	Mohenja-daro	Sindh	Pakistan	27.3268899	68.1371029	52	Minton (1966).
Pir Patho	Pir Patho, Thatta	Sindh	Pakistan	24.55964	67.88535	20	Minton (1966).
Raj Malk, Thatta district, Mirpur Sakro Area	Raj Malk, Thatta	Sindh	Pakistan	24.7459022	67.9465502	7	Anderson (1964).
Sonda (1 mile east of)	Sonda, Thatta district	Sindh	Pakistan	24.9865058	68.7537357	15	Minton (1966).

Platyceps plinii comb. nov.							
Locality verbatim	**Current locality**	**State**	**Country**	**Latitude**	**Longitude**	**elevation in m**	**References**
Tatta (4 miles east of)	Thatta	Sindh	Pakistan	24.7486460	67.8235033	10	Minton (1966).
***Platyceps josephi* sp. nov.**							
Anaikatty, Coimbatore	Anaikatti, Coimbatore	Tamil Nadu	India	11.114903	76.756551	582	This study.
Anamalai Hills	Anamalai hills	Tamil Nadu	India	10.479552	77.17458	404	Beddome (1862), Sclater (1891), Wall (1914), Sharma, R. C. (1982), Hutton and David (2008).
Auroville, Villupuram	Auroville, Villupuram	Tamil Nadu	India	12.005421	79.8111	52	Sagadevan et al. (2019).
Batlagundu, Dindugal district	Batlagundu, Dindugal	Tamil Nadu	India	10.163609	77.759098	237	This study.
Coimbatore	Coimbatore `by implication'	Tamil Nadu	India	10.973923	77.110244	415	Sclater (1891), Wall (1914), Sharma, R. C. (1982), Ganesh and Asokan (2010), this study.
Coutrallam	Courtallam	Tamil Nadu	India	8.924261	77.289739	190	This study.
Karur	Karur	Tamil Nadu	India	10.960405	78.077561	133	This study.
Madurai	Madurai	Tamil Nadu	India	9.925201	78.119775	139	Kutty et al. (1981), this study.
Manimutharu	Tirunelveli	Tamil Nadu	India	8.654005	77.425398	79	This study.
Maruthuvazhmalai, Kanyakumari	Maruthuvazhmalai, Kanyakumari	Tamil Nadu	India	8.124244	77.512661	243	Rajendran (1986).
Meghamalai Hills	Meghamalai Hills	Tamil Nadu	India	9.6678528	77.283688	445	Hutton (1949), Hutton and David (2008), Bhupathy and Satishkumar (2013), Chaitanya et al. (2018).
Pollachi I	Pollachi	Tamil Nadu	India	10.658823	77.00873	293	This study.
Pollachi II	Pollachi	Tamil Nadu	India	10.746908	77.089955	342	This study.
Salem	Salem	Tamil Nadu	India	11.741785	77.938889	314	This study.
Tiruneveli	Tirunelveli	Tamil Nadu	India	8.7012212	77.776077	44	Rajendran (1986), Kutty et al. (1981), Whitaker and Captain (2004), Sagadevan et al. (2019).
Trichinopoly	Tiruchirapalli	Tamil Nadu	India	10.804973	78.686904	84	Anonymous (1879).
Tuticorin (type locality)	Thoothukudi	Tamil Nadu	India	8.8052602	78.145275	7	Rameshwaran (2008), Sagadevan et al. (2019), this study.
Vadipatti, Madurai dist	Vadipatti, Madurai dist	Tamil Nadu	India	10.11222	77.97659	214	This study.

Appendix 10

Material examined

(Material examined for this study. Symbol * denotes for specimens CT scanned for analysis of the osteology and symbol ° for specimens used in analysis of dorsal scale reduction.)

Hemorrhois ravergieri (1)
Without specified locality: ZMB 66018*.

Lycodon* cf. *aulicus (7)
INDIA – without specified locality, Russell's dried snake skin collection: BMNH 1904.7.27.34, BMNH 1904.7.27.48, BMNH 1904.7.27.55, BMNH 1904.7.27.89, BMNH 1837.9.26.50–52.

Lycodon fasciolatus (15)
INDIA – Andhra Pradesh: ZSI-CZRC-V 6902 from Bellupada, Ichchapuram; Odisha: ZSI-CZRC-V 6411, 6447, 6450, 6451, 6460, 6463, 6464 and 6530, all from Ganjam; without specified locality: BMNH 1904.7.27.43; Russell's dry skin collection: BMNH 1904.7.27.43, BMNH 1904.7.27.52, BMNH 1904.7.27.55, BMNH 1904.7.27.72, BMNH 1904.7.27.93.

Platyceps bholanathi (3)
ZSI-K 21337, Nagarjuna hills, Andhra Pradesh (Holotype); ZSI-K 21335–36, Nagarjuna hills, Andhra Pradesh (paratypes)

Platyceps florulentus (1)
EGYPT – ZMB 35198*, Cairo.

***Platyceps josephi* sp. nov.** (11)
INDIA –Tamil Nadu: BNHS 3516°, Tuticorin (paratype); NCBS AU-732*°, Tuticorin (holotype); NCBS AU-733°, Tuticorin (paratype);

NMW 25465:1°, Salem; NMW 25465: 2*°, Salem (paratype); ZSI-CZRC-6639, Karur (paratype); ZSI-CZRC-6521–22, Tuticorin; ZSI-CZRC-6522, Anaikatti, Coimbatore; without specified locality: ZSI-K 12374, South India; ZSI-K 4379, Anamalai Hills.

Platyceps plinii comb. nov. (n=50)

PAKISTAN – Sindh: SMF 62921*°–22*°, Hala; SMF 50409°–10*°, SMF 50446°, SMF 57311°–12*°, Jati; SMF 50406°–07°, Makli Hills.

INDIA – Andhra Pradesh: BMNH 37A*°, Visakhapatnam; Chhattisgarh: ZSI-CZRC-7111, Kabeerdham; Gujarat: BNHS 3353, Old Port Bhavnagar; Karnataka: BMNH 1920.7.7.5° and BMNH 1921.6.15.14°–15, Bangalore; MCZ R-28645*, Bangalore; NCBS AQ-492°, Bangalore; Madhya Pradesh: ZSI-CZRC-1326, ZSI-CZRC-6968, Jabalpur; BNHS 657°, Satna; BNHS 639 Saugor; Maharashtra: BNHS 642°, Chembur, Mumbai and BNHS 646°, Mumbai; BNHS 3093° and BNHS 3107°, Ghoti, Nashik; BNHS 3095 and 3193°, Pune; BNHS 2857° and BNHS 3175°, Talegaon; ZMA-RENA 12554°, Thana; ZSI-CZRC-V 6331, Bhandara; ZSI-CZRC-V 6413, Yavatmal; ZSI-CZRC-V 6416, Pune; Odisha: ZSI-CZRC-V 6329–30, Choudwar, Cuttack; ZSI-CZRC-V 6384, Baripada; Puducherry: MNHN-RA-0.6230*°, Puducherry; Punjab: BNHS 637, Ambala; Tamil Nadu: ZMB 4786A*°–B°, Madras; Uttar Pradesh: BMNH 1940.3.4.45°, Prayagraj (Allahabad); West Bengal: NMW 25465:3*°, Kolkata; ZMB 8053°, Bengalen; without specified locality: BMNH 1851.9.13.260*° and BMNH 1862.8.14.29 from „India"; BMNH 1837.9.26.48–49 and BMNH 1904.7.27.81 from Russell's dry skin collection; BNHS 49; NMW 18160°, erroneously stated from "Argentinien" (holotype of *Argyrogena rostrata*); ZSI-K 7333, South India without specified locality.

Platyceps rhodorachis (4)

TURKMENISTAN – ZMB 38725*, Firjuza Gorge; ZMB 38815*, Seraks; ZMB 51839* and ZMB 56081*, Saivan valley.

Platyceps ventromaculatus (1)

PAKISTAN – Sindh: ZMB 9957*, near Karachi.

Spalerosophis diadema (1)

Without specified locality: ZMB 47946*.