



Taxonomy of two endemic Indian skinks, *Eutropis bibronii* (Gray, 1838) and *E. nagarjunensis* (Sharma, 1969) (Reptilia: Scincidae), including redescriptions of their types

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Abstract

Tiliqua bibronii was described by J.E. Gray in December, 1838 based on two syntypes (MNHN-RA 2940, 7076), but the details for locality was missing. These syntypes are currently housed at the Muséum national d'Histoire naturelle, Paris, France (MNHN-RA). The same species (based on the same type specimens) was described by A.M.C. Duméril & G. Bibron in November, 1839 nearly one year after Gray's publication. As such, Gray's publication must therefore be given priority. Another species, *Euprepis trilineatus*, from Madras, Tamil Nadu, India, was described by Gray in 1846, and it is morphologically similar to *E. bibronii*. Later, Boulenger (1885) synonymised it with *E. bibronii*. *Eutropis bibronii* has subsequently been recorded from other parts of India and Sri Lanka by various authors. Many years later, a closely related species, *Mabuya nagarjuni* (sic) Sharma, 1969, was described from Andhra Pradesh, India, based on two specimens (a holotype and a paratype) housed at the Zoological Survey of India, Kolkata (ZSI). Here we make a correction for the species epithet as "*nagarjunensis*" which should be a toponym, not a patronym. Among the skink collections at the Natural History Museum, London (BMNH), ZSI, and MNHN-RA we found *E. bibronii* specimens collected from various locations in India, but we were unable to find any specimens from Sri Lanka. Based on morphological evidence, *E. bibronii* represents a single, fairly widespread, species which has to be considered endemic to India. Although, recent phylogenetic studies reveal a distinct genetic divergence between *E. bibronii* and *E. nagarjunensis*, both species are morphologically very similar to each other. Here, we examine the morphology of *E. nagarjunensis* based on the ZSI specimens. A comprehensive comparison between the syntypes of *E. bibronii* and *Euprepis trilineatus* confirms that the latter nomen is a junior synonym of the former. The original description of *E. bibronii* is extremely concise and lacks most of the important diagnostic characters, so here we provide a comprehensive redescription of the species based on the examination of its syntypes.

Key words: *Euprepis trilineatus*, India, *Mabuya*, species complex, Sri Lanka, *Tiliqua bibronii*

Introduction

Tiliqua bibronii was described by Gray (1838) from two syntypes (MNHN-RA 2940 and 7076) housed at the Muséum national d'Histoire naturelle, Paris, France (MNHN-RA). However, the species was first mentioned by Cocteau (1837) in his "Tableau Synoptique", without a formal description, under the name "Rachite de Bibron" (see Brygoo 1986: 12). A.M.C. Duméril and Bibron (1839: 675–677) placed them under the genus *Gongylus* (*Eumeces*) and also stated the following "Distribution. This species is known only from two specimens lacking a

precise locality; but we assume that they originated from South Africa” [English translation from French], and described them as new species with the same species epithet. However, the name designated by Gray (1838) was published before A.M.C. Duméril & Bibron’s (1839) publication. Later, A.M.C. Duméril and A.H.A. Duméril (1851: 160) confirmed the presence of two type specimens in the MNHN-RA collections. Guibé (1954) however, did not list the types of *E. bibronii* in his catalogue of MNHN-RA lizard types.

Gray (1846: 114) transferred the species to the genus *Euprepis* Wagler, 1830, and described *Euprepis trilineatus* from Madras (Tamil Nadu State, India). The description of *Euprepis trilineatus*, was based on five syntypes housed at the BMNH (1946.8.19.8–12). Boulenger (1887: 173) transferred *Euprepis bibronii* to the genus *Mabuya* Fitzinger, 1826 realising that it was, in fact, an Indian species. He also placed *Euprepis trilineatus* Gray, 1846 in its synonymy. Subsequent authors then recorded *E. bibronii* from other parts of India and Sri Lanka. Later still, Asian *Mabuya* species were placed in the genus *Eutropis* Fitzinger, 1843 by Mausfeld *et al.* (2000). The distribution records for this species were summarised by Chandramouli *et al.* (2012). Datta-Roy *et al.* (2012) demonstrated that the closest congener of *E. bibronii* is *E. quadricarinata* (Boulenger, 1887).

Another morphologically similar species, *Mabuya nagarjuni* (sic) Sharma, 1969, was described from Andhra Pradesh, India, based on two specimens: a holotype (ZSI 21170) and a paratype (ZSI 21171). Datta-Roy *et al.* (2012) showed that the closest congeners of *E. nagarjuni* are *E. trivittata* (Hardwicke & Gray, 1827) and *E. beddomei* (Jerdon, 1870). The original descriptions of *E. bibronii* and *E. nagarjuni* are extremely concise and lack details on most of the important diagnostic characters, so here we provide a comprehensive redescription of the species based on the examination of its syntypes.

Materials and methods

Museum acronyms are those of Sabaj Pérez (2014). We examined the specimens in the collections of Natural History Museum, London, UK (BMNH); Muséum national d’Histoire naturelle, Paris, France (MNHN-RA); National Museums of Sri Lanka, Colombo, Sri Lanka (NMSL); Zoological Survey of India, Kolkata, India (ZSI) and we also searched extensively for *Eutropis bibronii* specimens collected from Sri Lanka in both museums plus the Naturmuseum Senckenberg, Frankfurt am Main, Germany (SMF); Museum für Naturkunde, Berlin, Germany (ZMB); and Zoologisches Museum Hamburg, Germany (ZMH). In addition to this, several morphological characters of type and non-type specimens, original descriptions of *Eutropis bibronii*, *E. nagarjuni* and *Euprepis trilineatus* were compared and scrutinized. We obtained morphometric and meristic data for species comparisons from all examined specimens listed in Appendix I. We checked the external morphology of specimens with a Leicawild M3Z stereomicroscope. Sex was not determined from specimens unless the hemipenes were everted.

Characters were measured with a Mitutoyo digital caliper to the nearest 0.1 mm under a Leicawild M3Z dissecting microscope on the left side of the body for symmetrical characters. The following characters were measured based on Amarasinghe *et al.* (2016): snout–vent length (SVL, from tip of snout to anterior margin of vent), thigh length (FEL, from the anterior margin of the hind limb at its insertion point on the body to the knee while flexed), shank length (TBL, from the posterior surface of the knee while flexed to the base of the heel), head length (HL, from posterior edge of mandible to tip of snout), head width (HW, maximum width of head at the angle of the jaw level), orbit diameter (ED, the greatest antero-posterior diameter of the orbit), tympanum–eye length (TYE, from posterior border of orbit to anterior border of tympanum), snout length (ES, from anterior border of orbit to tip of snout), eye–nostril length (EN, from anterior border of orbit to middle of nostril), and toe IV length (TL, from tip of claw to the nearest fork).

A subset of seven morphometric variables standardized to SVL (HL, HW, ES, TYE, ED, TBL and FEL) along with three meristic characters (midbody scale rows, number of paravertebrals and the number of subdigital lamellae under toe IV) were subjected to a principal component analysis with PAST 3.0 to discern patterns in morphological variation among the specimens examined. The resulting factor scores were plotted against each other to examine the morphometric separation of the species.

We counted supralabial and infralabial scales from the gape of the lips to the rostral and mental plates respectively (excluded). Our counts of ventrals include all scales from the first scale anterior to cloaca to the median gular scale touching the postmental. We counted paravertebral scales between nuchals (excluded) to the posterior margin of the thigh in a straight line immediately left of the mid-dorsum. We counted subdigital lamellae

on Toe IV from the first proximal enlarged scansor wider than the width of the largest foot scale to the distal-most lamella at the base of the claw. We counted the number of longitudinal scale rows at midbody.

All the distribution records mapped here are based on our personal observations, locality data recorded along with museum specimens examined, and reliable published literature. Source of location is always indicated.

Results

A comprehensive comparison between the syntypes of *Tiliqua bibronii* and *Euprepis trilineatus* shows that the latter name is a junior synonym of the former (Table 1). In the original description, Sharma (1969) did not mention the reason he gave the species epithet as “*nagarjuni*”. It could be that he wanted to honour a person (male) called “Nagarjun”. However, Sharma (1971) in his publication “The reptile fauna of the Nagarjunasagar Dam Area (Andhra Pradesh, India)” clearly stated the distribution of this species as the “Nagarjunasagar Area”. Therefore, here we infer that Sharma (1969) intended to name his species epithet as a toponym, but mistakenly named it as a patronym. Therefore, here we correct the species epithet as a participle adding the genitive termination “-ensis” to the stem of the name (i.e. Nagarjun) according to the generic name (i.e. *Eutropis*) which is feminine. Also, we provide a comprehensive comparison between *Eutropis bibronii* and *Eutropis nagarjunensis*. Morphometric, meristic, and morphological data taken for all the specimens are given in Tables 1 and 2. As the original description of *E. bibronii* (Gray, 1838) is extremely concise and lacks most of the important diagnostic characters, we here provide a comprehensive redescription of the species based on its two syntypes (MNHN-RA 2940, 7076).

Datta-Roy *et al.* (2012) showed that the closest congener of *E. bibronii* is *E. quadricarinata*, and the closest congeners of *E. nagarjunensis* are *E. trivittata* and *E. beddomei*. Here we compared the morphological, morphometric, and meristic data of the above species with *E. bibronii* and *E. nagarjunensis*. Our analysis of standardized morphometric characters from the examined adult specimens generated two distinct clusters (Fig. 4, Table 3). One cluster consists of the specimens of *Eutropis bibronii* and *E. nagarjunensis* while the other, *E. beddomei*. However, specimens of *E. bibronii* examined, from various parts of India did not generate any distinct clusters corresponding to their collection localities.

Eutropis bibronii (Gray, 1838)

(Figs. 1–4; Tables 1–3)

Rachite de Bibron Cocteau, 1837 (*nomen nudum*)

Tiliqua bibronii Gray, 1838

Gongylus (Eumeces) bibronii A.M.C. Duméril & Bibron, 1839

Euprepis trilineatus Gray, 1846

Syntypes (two specimens). Adult male (hemipenes partially everted), MNHN-RA 2940, SVL 50.0 mm; Adult female, MNHN-RA 7076, SVL 48.5 mm; “South Africa” (in error), collector and date unknown; here we suggest the type locality as Madras, South India based on the type locality of the syntypes for *Euprepis trilineatus*, a confirmed synonym of *E. bibronii*.

Diagnosis. The following combination of characters distinguishes *Eutropis bibronii* from all other Indian congeners: two dark paravertebral stripes separated by a pale median stripe on the back, undivided lower-eyelid disc, single postnasal, 28–30 midbody scale rows, 37–41 paravertebral scale rows, 46–52 ventrals, 5 keels on dorsal scales, 15–19 subdigital lamellae under fourth toe, two long pre-auricular lobules on each anterior tympanum, prefrontals slightly or broadly separated, two pairs of large nuchals (rarely three).

Redescription of the syntypes. Characters of the male syntype (MNHN-RA 2940) are followed, where appropriate, by those of the female syntype (MNHN-RA 7076) in brackets. Male, SVL 50.0 mm, tail length 76.0 mm (female, SVL 48.5 mm, tail length 59 mm); head moderately large, head length 22.6% of SVL (21.8%), head length 45.7% of axilla-groin distance (44.7%), narrow, head width 60.2% of head length (55.7%), head width 13.6% of SVL (12.2%), indistinct from neck; snout short, snout length 42.5% of head length (37.7%), snout length 70.6% of head width (67.8%), slightly concave in lateral profile; rostral shield large, hemispherical, distinctly visible from above, posterior margin of midpoint curved towards the frontonasal; frontonasal slightly separated

from rostral by slightly separated supranasals; frontonasal narrow, lateral border touching first loreal; prefrontals broadly (slightly) separated, and the frontal and the frontonasal in contact, distance along the longitudinal axis of frontonasal equals the prefrontals in length, lower border touching both loreal scales, the posterior border touching the first supraocular, and frontal; frontal large, elongate, subtriangular, rounded posteriorly, equal in length of combined frontoparietals and interparietal; two frontoparietals in contact, distinct, larger than interparietal; parietals large and completely separated by interparietal, touching temporals laterally; two pairs of keeled nuchals, overlapping middorsally behind interparietal; interparietal with faint grey coloured parietal eye (pineal eye). Nostril large and situated posteriorly on a single nasal plate; single postnasal; loreals two, anterior loreal touching supranasal, frontonasal and prefrontal; posterior loreal longer than the anterior loreal in the longitudinal axis, touching prefrontal and first supraciliary; presuboculars two; eye large, orbit diameter 23.9% of head length (20.7%), orbit diameter smaller than tympanum-eye length, pupil rounded; interorbital distance broad; postoculars two; four wide supraoculars, second is the longest in the longitudinal axis and the widest in the transverse axis and fully contacts the frontal; first supraocular in contact with prefrontal; third and fourth supraoculars in contact with frontoparietals; fourth supraocular in contact with frontoparietal, parietal, and supraciliaries; two pretemporals; supraciliaries six; moveable eyelid covered with an undivided transparent disc. Supralabials six, fifth largest at mid orbit position; primary temporals three, secondary temporals three; infralabials six; ear opening deep, small, near spherical and approximately one quarter of eye diameter; two long pre-auricular lobules on each anterior tympanum, upper one longest. Mental large; a single large postmental followed by two chin shield pairs, the first chin shield in contact with 2nd and 3rd infralabial scales, the second pair in contact with 3rd and 4th infralabials.

Parietals and nuchals multicarinate, all body scales with five keels per scale; all scales imbricate and lacking apical pits; body slender, elongate, axilla-groin distance 49.4% of SVL (48.9%); midbody scale rows 28; paravertebral scale rows 41; ventrals 49 (damaged); five enlarged preanal scales.

Fore-limbs short, hind limbs relatively long, thigh length 15.0% of SVL (14.6%), shank length 15.2% of SVL (13.2%); thigh short and 98.7% of shank length (thigh long, 110.9%); scales on the dorsal surface of fore-limbs, thigh, and shank strongly carinate; subdigital lamellae on toe IV 16 (19); relative length of fingers: IV > III > II > V > I; those of toes: IV > III > V > II > I.

Tail complete, original (regenerated), median scale row of subcaudals similar to body scales while the median row of the regenerated tail is enlarged, wider than long.

Colouration. After more than 178 years in preservative fluid, dorsal head, body and limbs dark brown. Two dark vertebral stripes on the back separated by a median pale stripe, two additional dark stripes situated laterally and commencing from posterior eye to posterior member level approximately; the vertebral stripes extend up to mid body point and then fading away; the lateral stripes extend to flank over tympanum and end on the hind limbs. The medio-dorsal band covers a distance of approximately half to one scale width, whereas the lateral band is larger and covers a distance of 1 to 1.5 scale width – the second band is also much more visible anteriorly and fades away posteriorly. Lateral body and belly creamy white including subcaudals.

Comparison. Related congeners from India and Sri Lanka have suites of characters that distinguish them from *Eutropis bibronii*. *Eutropis bibronii* is most similar to *E. nagarjunensis* (characters in brackets), but it can be distinguished from the latter by having narrow vertebral stripes (broad); 28–30 midbody scale rows (33–35); 15–19 subdigital lamellae under fourth toe (21–24).

Unlike *E. bibronii*, *E. andamanensis* (Smith, 1935) [Andaman Islands]; *E. beddomei* [Sri Lanka and India]; *E. carinata* (Schneider, 1801) [Sri Lanka and India]; *E. clivicola* (Inger, Shaffer, Koshy & Bakde, 1984) [Western Ghats, Peninsular India]; *E. floweri* (Taylor, 1950) [Sri Lanka]; *E. gansi* (Das, 1991) [Western Ghats, Peninsular India]; *E. macularia* (Blyth, 1853) [Sri Lanka and India]; *E. madaraszi* (Méhely, 1897) [Sri Lanka]; *E. multifasciata* (Kuhl, 1820) [Northeast India and Sundaland]; *E. quadricarinata* Boulenger, 1887 [Northeast India]; *E. rugifera* (Stoliczka, 1870) [Nicobar Islands and Sundaland]; *E. tammanna* Das, de Silva & Austin, 2008 [Sri Lanka]; *E. tyleri* (Theobald, 1868) [Andaman Islands]; and *E. trivittata* (Hardwicke & Gray, 1827) [India] has a scaly lower-eyelid disc (vs. undivided and transparent eyelid disc). *E. dissimilis* (Hallowell, 1857) [North India] has 47–52 paravertebrals (vs. 37–41). *E. innotata* (Blanford, 1870) [India] has a single pair of nuchals (vs. two or three pairs). *E. novemcarinata* (Anderson, 1871) [Northeast India and Burma] has nine keels on dorsal scales (vs. five).

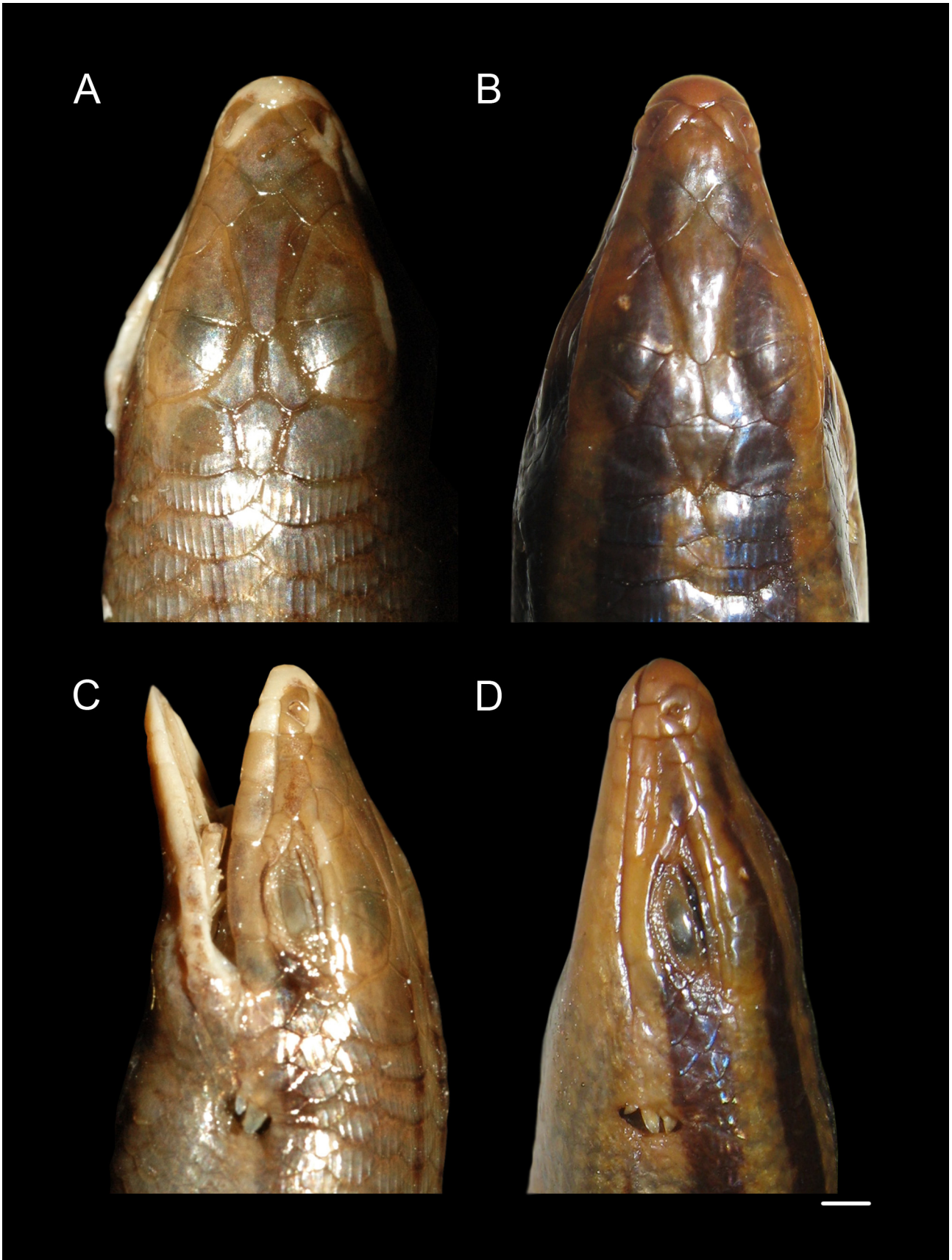


FIGURE 1. Dorsal view of the head of (A) *Eutropis bibronii* syntype (MNHN-RA 7076, SVL 48.5 mm), (B) *E. nagarjunensis* holotype (ZSI 21170, SVL 47.5 mm); lateral view of the head of (C) *E. bibronii* syntype (MNHN-RA 7076), and (D) *E. nagarjunensis* holotype, (ZSI 21170) (scale = 2 mm).

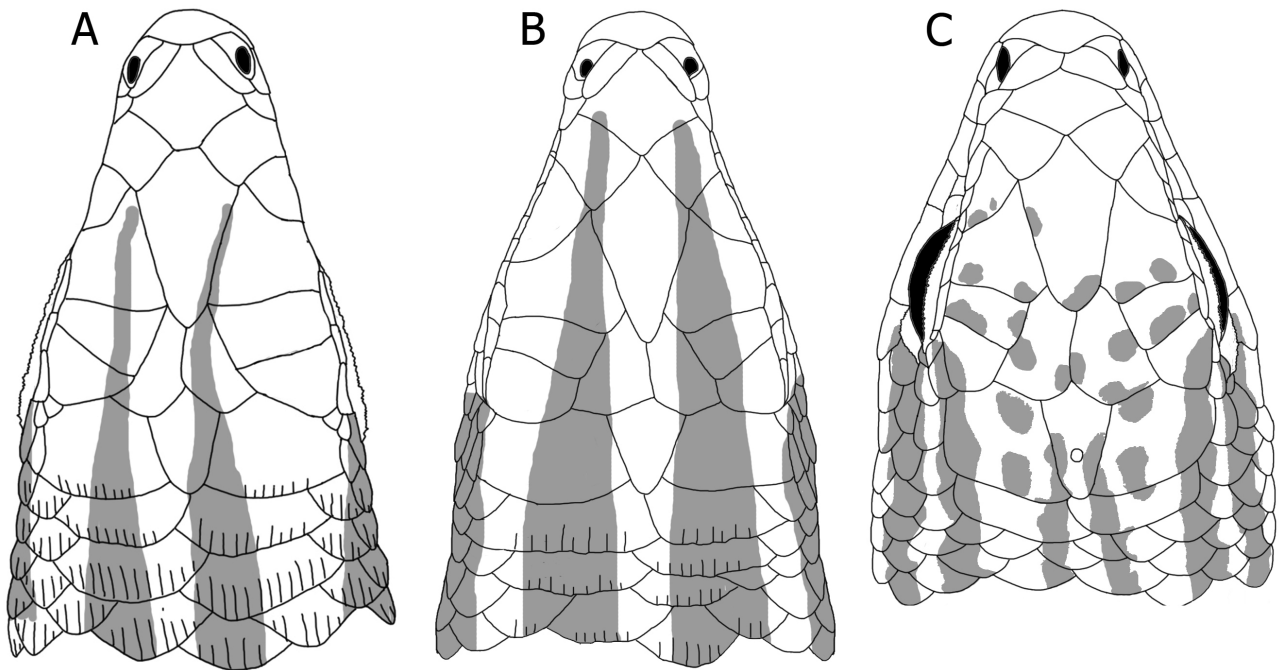


FIGURE 2. Illustration showing the comparison of dorsal head scales of (A) *Eutropis bibronii* syntype (MNHN-RA 7076), (B) *E. nagarjunensis* holotype (ZSI 21170); and *E. beddomei* holotype (BMNH 1946.8.19.17).

***Eutropis nagarjunensis* (Sharma, 1969)**

(Figs. 1–4; Tables 1–3)

Mabuya nagarjuni (sic) Sharma, 1969

Holotype. Adult female, ZSI 21170 (SVL 47.5 mm), collected from Vijaypuri South near right bank of River Krishna, Andhra Pradesh, India by I.N. Maligi on 23 August 1962.

Paratype. Adult female, ZSI 21171 (SVL 48.6 mm), other details the same as holotype above.

Diagnosis. The following combination of characters distinguishes *Eutropis nagarjunensis* from all other Indian congeners: two dark paravertebral bands on the back, undivided lower-eyelid disc, single postnasal, 33–35 midbody scale rows, 41 paravertebral scale rows, 51 ventrals, five keels on dorsal scales, 21–24 subdigital lamellae under fourth toe, two long and one short pre-auricular lobule on each anterior tympanum, prefrontals slightly separated, two pairs of large nuchals.

Redescription of the holotype. Characters of the holotype (ZSI 21170) followed, where appropriate, by those of other examined materials ($n=3$) within brackets. Female, SVL 47.5 mm (SVL 46.4–48.6 mm; ZSI 24698B without head), tail broken; head moderately large, head length 27.6% of SVL (23.9–28.9%), and 55.3% of axilla-groin distance (45.7–59.3%), narrow, head width 55.7% of head length (52.2–60.3%), and 15.4% of SVL (14.4–15.1%), indistinct from neck; snout short, snout length 35.1% of head length (39.5–40.5%), snout length 63.0% of head width (67.8–75.7%), slightly concave in lateral profile; rostral shield large, hemispherical, distinctly visible from above, posterior margin of midpoint curved towards the frontonasal; frontonasal slightly separated from rostral by supranasals which are also slightly separated; frontonasal narrow, lateral border touching the anterior loreal; prefrontals slightly separated, and the frontal and the frontonasal in slight contact, distance along the longitudinal axis of frontonasal equals the prefrontals in length, lower border touching both loreal scales, the posterior border touching the first supraocular, and frontal; frontal large, elongate, subtriangular, rounded posteriorly, equal in length to combined frontoparietals and interparietal lengths; two frontoparietals in contact, distinct, equal in size with interparietal; parietals large and completely separated by interparietal, touching temporals laterally; two pairs of nuchals, overlapping middorsally behind interparietal; interparietal with grey coloured parietal eye (pineal eye). Nostril large and situated in posterior nasal; single postnasal; loreals two, anterior loreal touching supranasal, frontonasal and prefrontal; posterior loreal longer than the anterior loreal in the

longitudinal axis, touching prefrontal, first supraocular and first supraciliary; presuboculars two; eye large, orbit diameter 26.7% of head length (20.7–24.6%), orbit diameter larger than tympanum-eye length, pupil rounded; interorbital distance broad; postocular one; four wide supraoculars, second is the longest in the longitudinal axis and the widest in the transverse axis and fully contacts the frontal; first supraocular in contact with prefrontal; 2nd–4th supraoculars in contact with frontoparietals; 4th supraocular in contact with frontoparietal, parietal, and supraciliaries; three pretemporals; supraciliaries six; moveable eyelid covered with an undivided transparent disc. Supralabials six, fifth largest at mid orbit position; primary temporals three, secondary temporals three; infralabials six; ear opening deep, large, almost spherical and approximately one third of eye diameter; two long and one short pre-auricular lobule on each anterior tympanum. Mental large; a single large postmental followed by two chin shield pairs, the first pair not meeting along midline, the first chin shield in contact with second and third infralabial scales, the second pair in contact with 3rd and 4th infralabials.



FIGURE 3. (A) A live male of *Eutropis bibronii* (not collected) from Hosur, Eastern Ghats, India (photo: S.R. Chandramouli); (B) A live male of *E. nagarjunensis* (not collected) from the type locality, Nagarjunsagar, Andhra Pradesh, India (photo: D. Adimallaiah).

TABLE 1. Comparison of morphological, mensural, and meristic characters of *E. bibronii* and *E. nagarjunensis* including type materials; Note: * in previous publications (e.g. Sharma 1969, 1971; Srinivasulu & Das 2007; Srinivasulu et al. 2005) erroneously counted as 3 nuchal pairs.

	<i>E. bibronii</i>			<i>E. nagarjunensis</i>		
	Syntypes (<i>n</i> =2)	<i>Euprepis trilineatus</i> syntypes (<i>n</i> =5)	Other (<i>n</i> =18)	Holotype	Paratype	Other (<i>n</i> =1)
SVL	48.5–50.0	30.0–52.0	31.0–47.9	47.5	48.6	46.4
Head length	10.6–11.3	8.2–12.8	8.5–11.9	13.1	11.6	13.4
Head width	5.9–6.8	5.5–7.3	4.8–6.8	7.3	7.0	7.0
Snout length	4.0–4.8	3.1–5.5	3.2–4.6	4.6	4.7	5.3
Orbit diameter	2.2–2.7	1.6–2.4	1.5–3.0	3.5	2.4	3.3
Tympanum–eye length	3.1–3.3	2.7–4.8	2.1–3.4	3.0	3.1	3.0
Axilla–groin length	23.7–24.7	12.0–21.1	15.4–25.3	23.7	25.4	22.6
Thigh length	7.1–7.5	3.8–7.7	4.4–7.8	7.1	5.8	7.8
Shank length	6.5–7.7	4.2–7.5	4.5–7.5	8.4	7.6	7.6–8.3 (<i>n</i> =2)
Midbody scale rows	28	28–30	28–30	33	33	33–35 (<i>n</i> =2)
Paravertebrals	41	37–39	37–41	41	41	41
Ventrals	49	46–50	46–52	51	51	51
Lamellae on toe IV	16–19	15–18	15–19	22	22	21–24 (<i>n</i> =2)
Nuchal pairs	2	2	2	2*	2*	2*
Keels on middorsal scales	5	5	5	5	5	5
Short pre-auricular lobes	1	1	1	1	1	1
Long pre-auricular lobes	2	2	2	2	2	2
Parietals smooth (0), keeled (1)	1	1	1	0	0	0
Prefrontals broadly separated (0), in slightly contact (1)	0	0	0	1	1	1
Temporal scales smooth (0), keeled (1)	1	1	1	0	0	0
Dark middorsal bands narrow (0), broad (1)	0	0	0	1	1	1

Nuchals multicarinate, all body scales with five keels per scale; all scales imbricate and lacking apical pits; body slender, elongate, axilla-groin distance 49.9% of SVL (48.7–52.3%); midbody scale rows 33 (33–35); paravertebral scale rows 41; ventrals 51; five enlarged precloacal scales.

Fore-limbs short, hind limbs relatively long, thigh length 14.9% of SVL (11.9–16.8%), shank length 17.7% of SVL (15.6–17.8%); thigh shorter than shank and 84.5% of shank length (76.3–97.4%); scales on the dorsal surface of fore-limbs, thigh, and shank strongly tricarinate; subdigital lamellae on toe IV, 22 (21–24); relative length of fingers: IV > III > II > V > I; those of toes: IV > III > V > II > I.

Tail broken (complete in ZSI 24698B), median scale row of subcaudals subequal, while the median row of the broken tail is enlarged and wider than antero-posterior length.

Colouration. After about 53 years in preservative fluid, dorsal head, body and limbs appear dark olive-brown. Two dark vertebral bands on the back separated by a median olive-brown band, two additional dark longitudinal bands commencing from posterior eye over tympanum and fore-limbs; another two bands between axilla and groin; all vertebral and lateral bands extend to the tail. These bands covering approximately two-scale widths in length. Lateral body and belly light brown including subcaudals.

Comparison. Congeners from India and Sri Lanka have suites of characters that distinguish them from *Eutropis nagarjunensis*. *Eutropis nagarjunensis* is most similar to *E. bibronii* (characters in brackets), but it can be

distinguished from the latter by having broad vertebral stripes (narrow); 33–35 midbody scale rows (28–30); and 21–24 subdigital lamellae under fourth toe (15–19).

Unlike *E. nagarjunensis*, *E. andamanensis*; *E. beddomei*; *E. carinata*; *E. clivicola*; *E. floweri*; *E. gansi*; *E. macularia*; *E. madaraszi*; *E. multifasciata*; *E. quadricarinata*; *E. rugifera*; *E. tammanna*; *E. tyleri*; and *E. trivittata* has a scaly lower-eyelid disc (vs. undivided and transparent eyelid disc). *E. dissimilis* has 47–52 paravertebrals (vs. 41). *E. innotata* has a single pair of nuchals (vs. two pairs). *E. novemcarinata* has nine keels on dorsal scales (vs. five).

TABLE 2. Comparison of morphological, mensural, and meristic characters of *Eutropis bibronii*, *E. quadricarinata*, *E. nagarjunensis*, *E. trivittata* and *E. beddomei*; “–” not measured.

	<i>E. bibronii</i> (n=25)	<i>E. quadricarinata</i> (n=3)	<i>E. nagarjunensis</i> (n=3)	<i>E. trivittata</i> (n=2)	<i>E. beddomei</i> (n=21)
SVL	30.0–52.0	28.9–48.0	46.4–48.6	64.5–78.7	41.2–57.3
Head length	8.2–12.8	8.2–11.3	11.6–13.4	14.5–19.0	10.1–13.8
Head width	4.8–7.3	5.2–6.4	7.0–7.3	10.0–12.8	5.9–9.9
Snout length	3.1–5.5	2.6–3.7	4.6–5.3	4.9–6.4	3.4–4.7
Orbit diameter	1.5–3.0	1.6–2.9	2.4–3.5	3.2–5.3	1.7–4.1
Tympanum–eye length	2.1–4.8	2.5–3.0	3.0–3.1	4.5–5.8	2.6–4.5
Axilla–groin length	12.0–25.3	–	22.6–25.4	–	19.8–35.4
Thigh length	3.8–7.8	4.8–6.3	5.8–7.8	9.7–10.0	4.5–7.9
Shank length	4.2–7.7	4.1–6.0	7.6–8.4	9.3–11.0	4.5–7.9
Midbody scale rows	28–30	27–30	33–35	34–36	28–34
Paravertebrals	37–41	41–43	41	48–53	48–54
Ventrals	46–52	46–47	51	57–63	53–59
Lamellae on 4 th toe	15–19	16–19	21–24	13–14	12–16
Nuchal pairs	2 (3)	1	2 (3)	1	1
Keels on middorsal scales	5	4	5	4 (5)	3 (4)
Short pre-auricular lobes	1	not visible	1	not visible	6
Long pre-auricular lobes	2	not visible	2	not visible	0
Parietals smooth (0), keeled (1)	1	1	0	0	0
Prefrontals separated (0), in contact (1)	0	0	1	1	1
Temporal scales smooth (0), keeled (1)	1	1	0	0	0
Lower-eyelid divided/scaly (0), undivided (1)	1	0	1	0	0
Dark middorsal bands narrow (0), broad (1)	0	0	1	0	0

Discussion

John Edward Gray’s “Catalogue of the slender-tongued saurians, with descriptions of many new genera and species” was published in the journal *Annals and Magazine of Natural History* in three parts; two in 1838 and one in 1839. The first part was published in June 1838, the second in December of 1838 and the third in January 1839. The description of *Tiliqua bibronii* appeared in the second part, published in December 1838 on page 290. The date printed on the first page (page 241) at the bottom, of this issue as follows “Ann. Nat. Hist. Vol. 2 No. 10 Dec. 1838”. The same species based on the same type specimens, was described by A.M.C. Duméril & Bibron in “the fifth volume of *Erpétologie Générale*” (page 675). A.M.C. Duméril & Bibron’s publication was published on 23

November 1839 (Bour 2012). Therefore, according to the principle of priority (Article 23) and the principle of homonymy (Article 52) of the International Code of Zoological Nomenclature (ICZN, 1999), the description of Gray (1838) has priority over that of A.M.C. Duméril & Bibron (1839).

TABLE 3. Factor loadings and the percentage of variance explained by the principal components.

	PC 1	PC 2	PC 3
Head length	0.31	0.43	0.11
Head width	-0.13	0.59	0.02
Snout length	0.34	0.35	-0.14
Tympanum-eye length	-0.10	0.51	-0.36
Eye diameter	0.30	-0.07	0.41
Tibia length	0.37	0.07	0.27
Femur length	0.38	-0.06	-0.07
midbody scalarrows	-0.22	0.25	0.72
lamellae on toe IV	0.40	-0.08	0.12
paravertebrals	-0.42	0.05	0.25
Eigenvalue	4.73	2.05	1.01
% variance	47.26	20.51	10.14

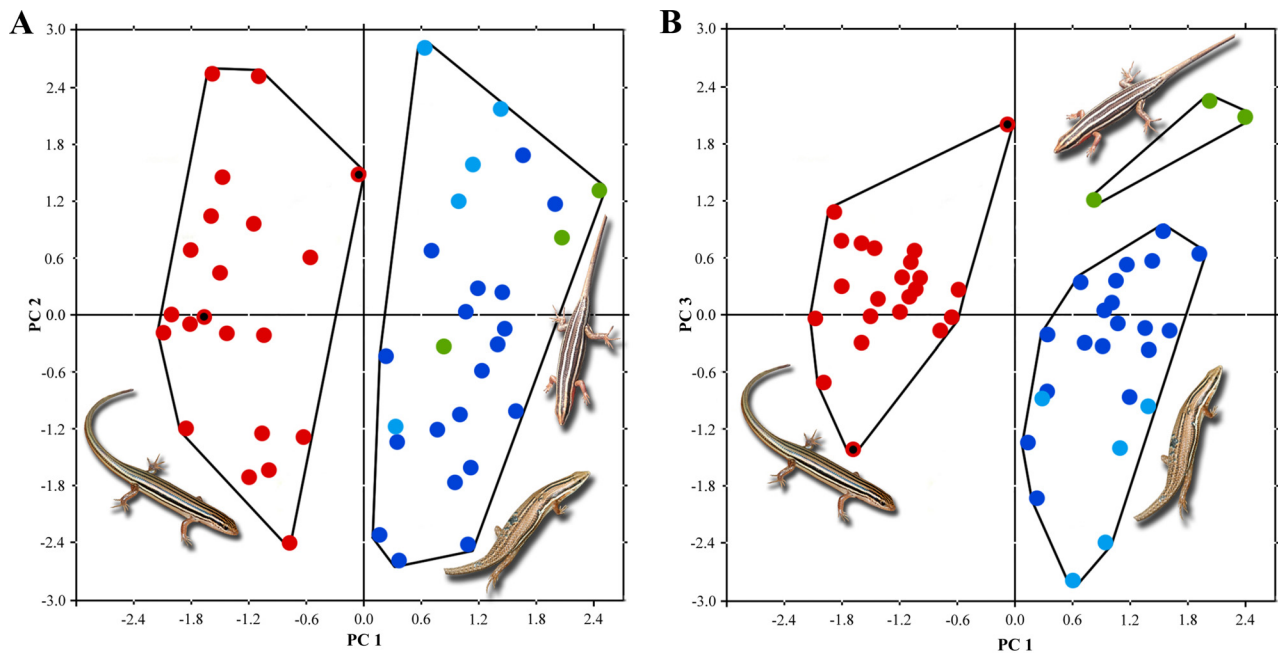


FIGURE 4. Plot of (a) PC1 vs. PC2 and (b) PC1 vs. PC3 showing morphometric similarity between the taxa *Eutropis bibronii* and *E. nagarjunensis*, and their distinction from *E. beddomei*. *Eutropis bibronii* (dark blue), syntypes of *Euprepis trilineatus* in light blue; *Eutropis nagarjunensis* (green); and *Eutropis beddomei* (red), the circle with dot in the middle represents the examined Sri Lankan specimens.

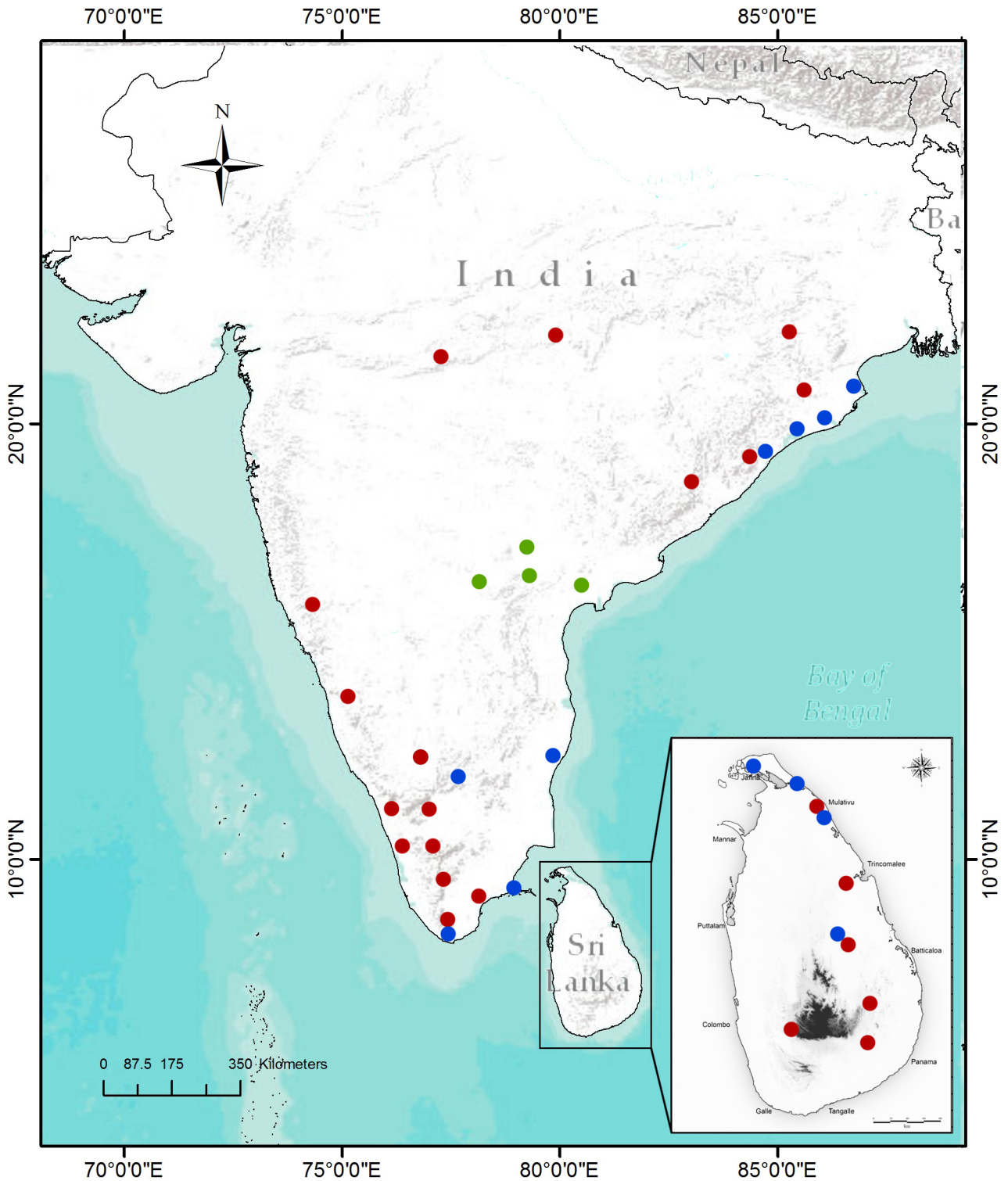


FIGURE 5. Current distribution pattern of *E. beddomei* (red), *E. nagarjunensis* (green), and *Eutropis bibronii* (blue), modified after Amarasinghe *et al.* (2016). Note: the locations of *E. bibronii* depicted as from Sri Lanka are most likely result of wrong identifications.

Eutropis bibronii has long been recorded in India from the northeastern coastal plains of Orissa to the southern coastal plains of Travancore, and inland in the Eastern-Ghats (Smith 1935, Venugopal 2010; Chandramouli *et al.* 2012). This skink has been reported from northeastern Sri Lanka (Jaffna, Mullaitivu, Chundikulam, Nilgala and Pollonnaruwa) by several authors (e.g. Smith 1935, Deraniyagala 1953, Somaweera & Somaweera 2009, Karunarathna & Amarasinghe 2011)—see Fig. 5. However, our attempts to locate any Sri Lankan voucher

specimens of *E. bibronii* proved unsuccessful. There is also the possibility that previous authors may have mistaken *E. beddomei* for *E. bibronii* as it has a very similar body colouration and is also distributed in northeastern Sri Lanka (see Amarasinghe *et al.* 2016). As there are no confirmed records of this species, we here remove *E. bibronii* from the list of Sri Lankan skinks and we consider it an endemic species to India. However, should any live specimens from Sri Lanka or any museum specimens with accurate locality records from Sri Lanka be uncovered in the future then the status of *E. bibronii* will have to be reassessed. Based on morphological examination of our specimens in order to obtain accurate identifications, we consider *E. bibronii* to be common wherever they occur. The close morphometric similarities existing between each specimen examined along with their relative distributions may indicate a morphological homogeneity between different geographic populations. Hence, we treat them as a single morphologically homogenous species distributed widely across peninsular India.

Sharma published his new species, *Mabuya nagarjuni* in the second issue of the first volume of the Bulletin of Systematic Zoology, Calcutta in December 1969 (printed at the top of page 71). The type locality of the species was given as “Vijaypuri South near right bank of River Krishna” which is close to the Nagarjuna Hills in Andhra Pradesh, India. Although Sharma (1969: 72) very clearly designated a holotype and a paratype, Srinivasulu & Das (2007) erroneously argued “The original description did not formally designate a holotype”. Furthermore, they erroneously identified the original type series comprised of four specimens “.....for which reason, all four specimens from the original type series need to be considered syntypes”. They also recovered two specimens as missing syntypes of *E. nagarjunensis* (see Srinivasulu & Das, 2007). However, it seems that the misleading information came from Srinivasulu *et al.* (2005). The phylogeography, intraspecific variation and speciation processes in the Asian genus *Eutropis* were investigated by Mausfeld and Schmitz (2003). However, their taxonomic rearrangement started a debate (see Datta-Roy *et al.* 2012). Based on morphological, morphometric, and meristic characters the closest congener of *E. bibronii* is *E. nagarjunensis* (see Figs. 1, 2, 4; Tables 2, 3). Both species possess a transparent lower eyelid disc and most of their scale counts fall within very close ranges. Body colouration is also very similar except in the case of the broader black paravertebral bands which occur in *E. nagarjunensis* (vs. narrower bands in *E. bibronii*). However, Datta-Roy *et al.* (2012) showed that the closest congener of *E. bibronii* is *E. quadricarinata*, and the closest congeners of *E. nagarjunensis* are *E. trivittata* and *E. beddomei* (see Table 2 for comparison of morphological, morphometric, and meristic characters). Furthermore, Sharma (1969) and Srinivasulu *et al.* (2005) considered the closest congener of *E. nagarjunensis* to be *E. beddomei*, and they provided a detailed diagnosis in order to distinguish *E. nagarjunensis* from *E. beddomei*. In their diagnosis (page 73 and page 1865 respectively), the number of lamellae beneath the fourth toe of *E. nagarjunensis* was stated to be within the range 16–22 (vs. 12–15 in *E. beddomei*). Based on our observations from three specimens of *E. nagarjunensis* (including the types) we counted 21–24 lamellae, while *E. bibronii* has 16–19 and *E. beddomei* has 12–16. However, Srinivasulu *et al.* (2005) examined a total of 18 specimens [12 live individuals + 4 syntypes (sic) + 2 additional museum specimens] of *E. nagarjunensis*. Therefore, the actual range of subdigital lamellae for this species could be much wider. However, based on our observations, the difference in the number of lamellae is a major distinguishing character between *E. nagarjunensis* and *E. bibronii* (21–24 and 16–19 respectively). Therefore, we discount the lamellae count given in Sharma (1969) and Srinivasulu *et al.* (2005) due to its dubious nature and we provide additional evidence for the distinction of *E. nagarjunensis* based on the findings resulting from our examination of the type specimens as described above.

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APPENDIX I. Other specimens examined.

Eutropis beddomei: Mysore, Karnataka, India: BMNH 1946.8.19.17 (holotype); Mahé, Kerala, India: MNHN 1902.0161, 1902.0161A; Berar, Madhya Pradesh, India: ZSI 2354, 2355, 2356 (holotype of *Euprepes septemlineatus*); Tamil Nadu, India: ZSI 12921, BMNH 1882.5.22.106–108, 1874.4.29.141–145; Kerala, India: ZSI 21872, 721873a–b, BMNH 1874.4.29.1296b–d; Maharashtra, India: BMNH 1874.4.29.1452; Pundalu Oya(?), Sri Lanka: BMNH 1905.3.25.21; Polonnaruwa, Sri Lanka: NMSL uncatalogued (1 specimen).

Eutropis bibronii (India): Locality uncertain: MNHN-RA 2940, 7076 (syntypes); Madras, Tamil Nadu: BMNH 1946.8.19.8–12 (syntypes of *Euprepis trilineatus*), ZSI 19730a–d; Rameswaram, Tamil Nadu: ZSI 15357–8, 15363–4; Pondicherry, Tamil Nadu: MNHN-RA 1948.0229–30; Orissa: ZSI 16711, 23415; Travancore, Kerala: ZSI 4363; Thoothukudi, Tamil Nadu: ZSI 23533a–b; Kaveri River, Karnataka: ZSI 22221a–c.

Eutropis nagarjunensis (India): Andhra Pradesh: ZSI 21170 (holotype), ZSI 21171 (paratype), ZSI 24698a–b.

Eutropis quadricarinata: Burma: BMNH 1946.8.18.35–36 (syntypes); Assam, India: ZSI 25807.

Eutropis trivittata (India): South India: BMNH 1946.8.18.34 (holotype), ZSI 2359.