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A new species of *Boiga* (Serpentes: Colubridae) from the Nicobar Archipelago

Indraneil Das*

Abstract

A new species of *Boiga* is described from the islands of Little and Great Nicobar, Bay of Bengal, India. In the literature, part of the material comprising the type series has been referred to *B. dendrophila*. The new species is diagnosed by the following suite of characters: SVL 735-1050 (mean 917 ± SE 42.8) mm; snout greater than orbit diameter; temporals 3 + 3; ventrals 227-233; subcaudals 77-104; hemipenis a single, subcylindrical organ, reaching subcaudal XII, with simple sulcus spermaticus, basally spinose to subcaudal VI, distally flounced to subcaudal XII; dorsum cinnamon, each scale edged with brownish olive; ventrum spectrum yellow with dark rounded blotches in the abdominal region and on subcaudals; labials unpatterned yellow; and dark postocular stripe lacking.

KEY WORDS: Colubridae; *Boiga wallachi*; new species; Nicobar Islands; India.

Introduction

Boiga Fitzinger, 1826 (type species: *Boiga irregularis* Merrem, 1802) is a speciose (> 25 nominal species; vide Rasmussen, 1979; Welch, 1988) group of colubrine snakes whose relationships are somewhat obscure. Although Leviton (1970) reviewed the contents of the genus from the Philippine Archipelago, little has appeared in the recent literature on the species found further west since Wall (1909), especially the Sundaic archipelago, mainland south-east Asia, and the Indian subcontinent, the apparent centre of radiation of the group.

A new species of *Boiga* is being described in this paper, based on a series of eight adults from the islands of Little and Great Nicobar, Bay of Bengal, India. Three of these have been reported before as *Boiga dendrophila* by Biswas and Sanyal, 1977 (see also Biswas and Sanyal, 1980). Allocation to the genus *Boiga* is based on the following characteristics: eyes large; pupil vertically narrowed; head relatively large; posterior maxillary teeth enlarged; nasal depression present; body compressed, covered with smooth, oblong oblique scales; ventrals angulate laterally, subcaudal rows double (Boulenger, 1912; De Rooij, 1917;

* Centre for Herpetology, Post Bag 4, Mamallapuram, Tamil Nadu 603 104, India.

Rasmussen, 1979; Smith, 1943). The new species has been compared with known congeners from the Sundas and the Andaman and Nicobar Islands.

Materials and methods

The holotype and one paratype collected in 1994 were fixed in four per cent formalin, washed in distilled water, and subsequently transferred to 70 per cent ethanol. Ventral scutes were counted using the Dowling (1951) method, and terminology of hemipeneal morphology follows Dowling and Savage (1960). The following measurements were taken with dial vernier calipers (for measurement up to 20.0 cm and with a tape measure for lengths exceeding this; SVL (snout-vent length, from tip of snout to vent); TL (tail length, from vent to tail tip); TW (tail width at level of vent); TBL (total body length, sum of SVL and TL); HL (head length, measured from angle of jaws to tip of snout); HW (head width, measured at angle of jaws); HD (head depth, greatest height of head, at occipital region); ED (eye diameter, greatest horizontal diameter of right eye); E-S (eye to snout distance, from anterior corner of right eye to tip of snout); E-N (eye to nostril distance; from anterior corner of right eye to posterior edge of nostril) and IO (interorbital distance; between anterior corners of orbit). Relative tail length is percent TL to SVL. Information on congeners are from comparative material examined (Appendix I). Additional data are from Cox (1991), De Rooij (1917), Kroon (1973) and Smith (1930; 1943). L and R refer to measurements/details of pholidosis taken on the left and right side of the head. Museum acronyms used include: UBD, Universiti Brunei Darussalam, Bandar Seri Begawan, Brunei Darussalam; ZSI, Zoological Survey of India, Calcutta, India; and ZSIP, Zoological Survey of India, Port Blair, India. Colour descriptions are made from Fujichrome 100 ASA transparency film of the live holotype. Colour nomenclature follows Smith (1975; 1981).

Boiga wallachi sp. nov.

Figures 1-2, Tables 1-2

Holotype. Male, 795 mm SVL, ZSI 25133 (Field Number ID/AN 97), Kopen Heat (=Dakoank), 06° 48'N; 93° 41'E, Great Nicobar Island (=Sambelong), Bay of Bengal, India; collected by Indraneil Das and Satish Bhaskar, 22 March 1994.

Paratypes. (See Table 1 for measurements.) ZSI 25134 (Field Number ID/AN 117), Pulo Ulan (= Tiden), 07° 03'N; 93° 35'E, Little Nicobar Island, Bay of Bengal, India; collected by Indraneil Das and Satish Bhaskar, 28 March 1994; ZSI 23662, Campbell Bay (= Bananga), 06° 50'N, 93° 50'E, Great Nicobar Island, Bay of Bengal, India; collected by Krishna Kant Tiwari, 27 March 1977; ZSI 23660 (1-2), 3 km post on East-West Road, Great Nicobar Island, Bay of Bengal, India; collected by Krishna Kant Tiwari, 5 April 1977; ZSI 23361, Lakshman Bay, 3 km NW Campbell Bay, Great Nicobar Island, Bay of Bengal, India; collected by Krishna Kant Tiwari, 30 March 1977.

Diagnosis

A medium-sized species of *Boiga*, distinguished from congeneric Sundaic (including Andaman and Nicobar species) in possessing the following

Figure 1 (*a* and *b*). Holotype of *Boiga wallachi* (ZSI 25133) in life.

Table 1. Measurements and sex of the type series of *Boiga wallachi* (in mm). Missing values (as a result of damage) indicated with asterisks.

	ZSI 25133	ZSI 25134	ZSI 23661	ZSI 23660.1	ZSI 23660.2	ZSI 23662	ZSI 22491	ZSI 22492	mean (± SE)
sex	male	male	female	female	male	male	male	male	
SVL	795.0	1032.0	1050.0	854.0	865.0	1037.0	735.0	969.0	917.13 ±42.82
TBL	1006.0	1312.0	1308.0	1034.0	1100.0+	1259.0+	958.0	1232.0	1141.67 ±65.47
TL	211.0	280.0	258.0	180.0	235.0+	222.0+	223.0	263.0	235.83 ±15.36
TL%SVL	26.5	27.1	24.6	21.1	*	*	30.3	27.1	26.13 ± 1.26
TW	10.6	10.7	11.6	8.3	9.6	11.7	8.3	15.6	10.80 ± 0.83
HL	27.9	29.9	33.2	27.7	29.4	31.6	27.7	30.9	29.79 ± 0.72
HW	20.7	20.2	22.0	18.2	18.5	22.9	18.1	26.8	20.93 ± 1.05
HD	13.5	13.1	15.9	12.6	12.7	13.8	15.9	*	13.93 ± 0.53
ED	6.7	6.5	6.7	5.8	6.5	6.8	5.3	7.4	6.46 ± 0.23
E-S	7.6	10.2	10.2	8.6	8.2	8.8	8.4	10.1	9.01 ± 0.36
E-N	4.6	4.4	4.3	4.3	4.3	4.9	5.2	4.8	4.60 ± 0.12
IO	11.3	11.7	12.2	10.5	10.5	11.6	11.4	12.8	11.50 ± 0.28

characteristics: SVL 735-1050 (mean 917 ± SE 42.8) mm; snout longer than orbit diameter; temporals 3 + 3; ventrals 227-233; subcaudals 77-104; hemipenis a single, subcylindrical organ, reaching subcaudal XII, with simple sulcus spermaticus, basally spinose to subcaudal VI, distally flounced to subcaudal XII; dorsum cinnamon, each scale edged with brownish olive; ventrum spectrum yellow with dark rounded blotches in the abdominal region and on subcaudals; labials unpatterned yellow; and dark postocular stripe lacking.

Description

(Based on holotype, an adult male.) Head small, distinct from neck, flattened in the orbital region, rounded in the sagittal region; snout projecting slightly beyond mandible; rostral trapezoidal in shape, barely visible from above, twice as high as wide, concave at base; internasals slightly longer than wide, internasal suture 3.0 mm; prefrontals squarish, wider than long, prefrontal suture 5.3 mm; frontal trapezoidal, contacting parietals which are the largest of the head shields, rectangular in shape, short-sided posteriorly; supraocular subtriangular, contacting prefrontal, frontal, parietal, as well as orbit, upper preocular and upper postocular; nuchals undifferentiated; supralabials 8/8, III-V (L/R) entering orbit and II (L)/II-III (R) contacting loreal; nostril lateral in the centre of a single concave nasal; loreal elongate, trapezoidal; two preoculars and two postoculars; orbit large, contained in head length 0.24 times and head depth 0.50 times, pupil vertically narrowed; ocular ring (sensu Marx et al., 1987) comprising eight scales—two preoculars, two postoculars, one supraocular and three supralabials; temporals 3 + 3; mental small, triangular, wider than deep (width 3.9 mm; depth 1.8 mm); infralabials 11 (L/R), first 5 (L)/6 (R) contacting anterior genials; infralabials VI-VIII (L)/V-VII (R) contact posterior genials; infralabial I contacts anterior genial; infralabial VII largest; two pairs of genials, with the anterior larger than posterior; two elongated gular scales follow the posterior mental, the outer longer than the inner;

Table 2. Pholidosis in the type series of *Boiga wallachi*.

	ZSI 25133	ZSI 25134	ZSI 23662	ZSI 23660.1	ZSI 23660.2	ZSI 23661	ZSI 22491	ZSI 22492
Midbody	27:21:13	29:21:13	31:15:15	31:19:15	31:21:13	31:15:17	29:21:15	27:21:15
Ventrals	231	234	229	229	228	233	232	230
Subcaudals	83	100	104	77	91+	74+	106	100
Supralabials	8	8	8	8	8	8	8	8
Infralabials	11	10	10	10	10	10	10	10
Anterior temporals	3	3	3	3	3	3	3	3
Posterior temporals	3	3	3	3	3	3	3	3
Anal	1	1	1	1	1	1	1	1

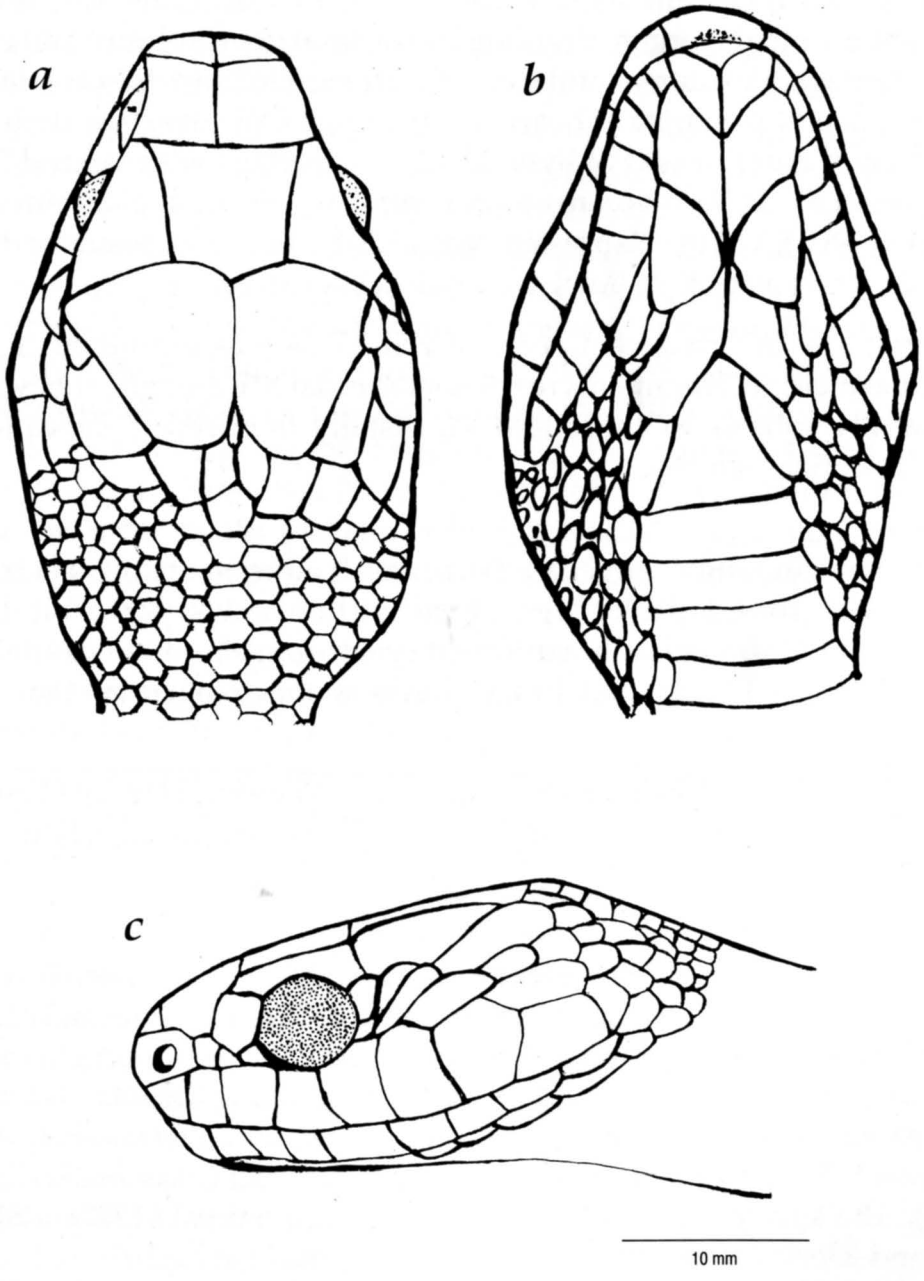

Figure 2. (*a*) Dorsal , (*b*) ventral and (*c*) lateral views of the head of the holotype (ZSI 25133) of *Boiga wallachi*.

maxillary teeth 9, recurved and stout, not compressed, gradually increasing in size posteriorly, lacking diastema; palatine teeth 7; pterygoid teeth 3; dentary teeth 13.

Snout-vent length 795 mm, tail length 211 mm, relative tail length 26.5%; body laterally compressed, much deeper than broad, midbody vertical diameter 28.7 mm, midbody horizontal diameter 15.1 mm; vertical diameter/horizontal diameter ratio 1.90; 236 scales along body, the vertebral row enlarged, ca. x 1.5, especially on midbody; 85 scales along tail, 231 angulate ventrals plus two gulars between first ventral and genials, 83 paired subcaudals, anal shield single; 27-21-13 oblique rows of unkeeled scales that lack apical pits.

Internal anatomy. The location of visceral organs are known to be of sytematic value (Wallach, 1991). The position of the heart and liver of ZSI 25134 are described in terms of percent ventral scale (%VS), by calculating the number of ventrals anterior to the organ, dividing by the total ventral count and converting to percentage. Position of anterior of heart auricle 28.6%VS (overlaps with ventral 66), that of posterior of heart ventricle 29.8%VS (overlaps with ventral 69). Position of anterior end of liver 30.3%VS (overlaps with ventral 70), that of its posterior 37.2%VS (overlaps with ventral 86). Position of anterior end of right kidney 88.3%VS (overlaps with ventral 204), that of its posterior 99.1%VS (overlaps with ventral 229). Anal sac reaches subcaudal VI.

Hemipenis. The inverted hemipenis of ZSI 25134 was examined in situ by longitudinal incision. Hemipenis reaches subcaudal XII, a single, subcylindrical organ, basally spinose to subcaudal VI, distally flounced to subcaudal XII; sulcus spermaticus simple.

Coloration

In life; dorsum cinnamon, edged with brownish olive; ventrum spectrum yellow with dark rounded blotches. Head without dark postorbital stripe; supralabials and infralabials unpatterned spectrum yellow; subcaudals straw yellow, with rounded dark blotches. Coloration not changed in ethanol.

Etymology

For Van Wallach of the Museum of Comparative Zoology, Harvard University, in recognition of his contributions to systematics and nomenclature of the snakes of the world.

Natural history notes

Both specimens taken in 1994 were found along infrequently used forest trails within undisturbed tropical moist forests. ZSI 25133 was collected at 1825 hours, while ZSI25134 was taken at circa 1800 hours. Other reptiles found in sympatry with the new species of *Boiga* include *Xenochrophis trianguligerus*, *Cyrtodactylus* sp., *Gekko smithii*, *Mabuya rudis*, *Dasia olivacea*, *Dendrelaphis pictus* and *Cnemaspis* sp. (on Great Nicobar) and *Lipinia macrotympanum* and *Gekko smithii* (on Little Nicobar). The specimens reported by Biswas and Sanyal (1977), ZSI 23663, 23660.1 and 23660.2 were collected "from the ground at night".

The vernacular for the species in Nicobarese is Bo-aouna, the derivation of which is unclear. The Nicobarese on the west coast of Great Nicobar Island

claim that the species often raids chicken runs in search of eggs, and remains of an avian egg were discovered in the stomach of the holotype.

Comparisons

Boiga wallachi sp. nov. is compared with congeneric species from south-east Asia. Although part of the type series have in the past been allocated to *B. dendrophila* (Boie, 1827), it can be differentiated from this Sundaic species (distribution: Thailand, West Malaysia and Singapore, Sumatra, Borneo, Java, Sulawesi, and smaller associated islands, in addition to some of the islands of the Philippines) in showing a relatively small (vs. large) head; 3 + 3 (vs. 2 + 2/ 2 + 3) temporals; a yellow dorsum without dark bands (vs. blackish dorsum with yellow or white cross bars/bands, the pattern geographically correlated; see Brongersma, 1934); labials unpattemed (vs. dark-edged) and maximum TBL 1308 (vs. 2310) mm.

In subsequent comparisons with other nominal species of *Boiga*, only characters that separate them from the new species have been listed: *B. multomaculata* (Boie, 1827) (distribution: Bangladesh, east and south-east through Myanmar, Indo-China, to eastern China, including Hong Kong), snout shorter than orbit; temporals 2 + 2 or 2 + 3; SVL 585 mm; *B. drapiezii* (Boie, 1827) (distribution: Sumatra, Java, Borneo and the southern portion of the Malay Peninsula), snout as long as orbit; midbody scale rows 19, ventrals 250-276, subcaudals 114-163, light brown dorsally with dark brown transverse spots or with dark transverse bands, maximum TBL 1524 mm; *B. nigriceps* (Günther, 1863) (distribution: Sumatra, Borneo, Java, Peninsular Malaya, including southern Thailand, West Malaysia and Singapore), ventrals 240-263, subcaudals 140-154, SVL to 1240 mm; *B. jaspidea* (Duméril, Bibron and Duméril, 1854) (distribution: Sumatra, Borneo, Java, peninsular Malaya, including West Malaysia and Singapore), orbit as long as snout, temporals 2 + 2, ventrals 243-266, subcaudals 140-166, SVL to 1030 mm; *B. cyndon* (Boie, 1872) (distribution: Java, Borneo, Sumatra, the smaller associated islands of the Sundas, the Philippines, the Malay Peninsula, north of the Isthmus of Kra), midbody scale rows 23 or 25, ventrals 248-290, subcaudals 114-159, SVL to 2765 mm, dark postocular stripe, dorsum dark banded; *B. ceylonensis* (Günther, 1858) (distribution: Sri Lanka, India and Nepal), midbody scale rows 19, dorsum grey with black spots, snout shorter than orbit, subcaudals 111, SVL to "4 feet" (vide Wall, 1921); *B. quincunciata* (Wall, 1908) (distribution: north-eastern India and northern Myanmar), ventrals 237-253, subcaudals 118, midbody scale rows 19, anals divided, dorsum with dark cross-bars, SVL to 1550 mm; *B. cyanea* (Duméril, Bibron and Duméril, 1854) (distribution: eastern and north-eastern India, east and south-east through Myanmar and Thailand to Indo-China), temporals 2 + 2, ventrals 237-257, subcaudals 121-138, green dorsally in adults (coral red in juveniles), distal half of hemipenis calyculate, the cups scalloped with spinose edges, TBL to 1400 mm; *B. ochracea* walli Smith, 1935 (distribution: southern Myanmar and the Andaman Islands of India), midbody scale rows 19, temporals 2 + 2 or 2 + 3; *B. ocellata* Kroon 1973 (distribution: north-eastern India, south-east through Myanmar, Thailand, Vietnam, Cambodia, up to the Isthmus of Kra in the Malay Peninsula), dark postocular stripe, ventrals 247-270, subcaudals 116-129,

midbody scale rows 23, dorsum dark banded, SVL 1670 mm, and *B. andamanensis* (Wall, 1909) (distribution: Andaman Islands of India), dorsum dark banded, subcaudals 121-128, temporals 2 + 3, and maximum SVL 773 mm.

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Appendix I

List of comparative material examined

Boiga andamanensis: ZSI 7928-30; 15189, 15192, 23362; syntypes of *Dipsas andamanensis* Wall, 1909), Andaman Islands, Bay of Bengal, India.

Boiga cyanea: ZSIP 8513, Galathea, Great Nicobar, Bay of Bengal, India (referred by Das and Chandra, 1994).

Boiga cynodon: ZSI 7829, Malacca, Peninsular Malaysia: ZSI 7830, Mergui, Myanmar.

Boiga dendrophila: UBD 0560, Serasa-Mentiri, Brunei-Muara District, Brunei Darussalam; ZSI 15268, "Malay Archipelago", ZSI 20475, locality unknown.

Boiga multomaculata: ZSI 8564, Moulmein, Myanmar; ZSI 6701, Rangoon (= Yangon). Myanmar; ZSI 7858, Pegu, Myanmar.

Boiga ocellata: ZSI 12777-78, "Hills between Burma and Siam" (= Myanmar and Thailand); ZSI 8718, Cachar, Assam State, north-eastern India; ZSI 7832, Myanmar; ZSI 8662, Garo Hills, Meghalaya State, north-eastern India; ZSI 7831, Samagooting, Nagaland State, north-eastern India.