THE RAFFLES BULLETIN OF ZOOLOGY 2003 **51**(1): 143-147

A NEW SPECIES OF *DIBAMUS* (SQUAMATA: DIBAMIDAE) FROM PENINSULAR MALAYSIA

Indraneil Das
Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia
Email: idas@ibec.unimas.my

Norsham Yaakob
Forest Research Institute Malaysia,Kepong, 52109 Kuala Lumpur,Malaysia
Email: norsham@frim.gov.my

ABSTRACT. **–** A new species of *Dibamus* is described from Batu Gua Madu, Kelantan State, northern Peninsular Malaysia. The new species, *Dibamus booliati*, differs from its congeners in the following combination of characters: SVL to 102.7 mm; TL to 9.7 mm; TL/SVL% 9.4-13.0; postocular single; rostral suture absent; interparietal posteriorly bordered by four slightly smaller nuchal scales; supralabial one, bordering ocular ventrally; scales bordering posterior edge of infralabial after postmental three; ventrals 180-209; subcaudals 24-39; presacral vertebrae 113-120; postsacral vertebrae 11-25; and dorsum and venter brown with a pale neck band.

KEY WORDS. **–** *Dibamus booliati*, Dibamidae, systematics, new species, Batu Gua Madu, Kelantan, Peninsular Malaysia.

INTRODUCTION

The genus *Dibamus* was last reviewed by Greer (1985), when it contained nine nominal species. At present, there are 15 nominal species (Darevsky, 1992; Das, 1996; Das & Lim, 2003; Honda et al., 1997; 2001; Ineich, 1999), in addition to at least two unnamed populations in West Malaysia.

Dibamus alfredi was described by Taylor (1962) from "Na Pradoo, Pattani, Thailand at base of Bukit Besar". In a subsequent work, Taylor (1963: 1068) mentioned that an earlier record by Tweedie (1954) of *Dibamus novaeguineae* (Duméril & Bibron, 1839) from the limestone outcrop of Gua Madu, adjacent to the town of Gua Musang, Kelantan State, Peninsular Malaysia, might refer to this species. *Dibamus alfredi* was confirmed from extreme southern Thailand, as well as the island of Nias, off the west coast of Sumatra (Greer, 1985) and from Danum Valley in Sabah State, East Malaysia (Borneo) (Tan, 1993), leaving an apparent hiatus in the distribution of the species in Peninsular Malaysia. Denzer & Manthey (1991), while remarking that Tweedie's material needed reevaluation, identified the specimen from Gua Madu as *D. novaeguineae*, following the concept of Smith (1935), who referred nearly all species then known to this species.

We have examined Tweedie's material from Gua Musang, now in the collection of the Raffles Museum of Biodiversity Research, National University of Singapore, as well as a second specimen collected recently from the same locality. As these specimens can be distinguished morphologically from other *Dibamus*, they are described and named as a new species herein.

MATERIALS AND METHODS

The holotype was photographed prior to euthanasia with pentobarbitol, fixed in 10% buffered formalin and subsequently transferred to 70% ethanol within seven days of collection. Scute nomenclature follows Greer (1985) and scale counts and external observations of morphology were made using an Olympus SZX9 stereo dissecting microscope. Colour notes on the holotype were taken from Fujichrome Velvia 50 ASA 35 mm slide transparency film.

The following measurements were taken with Mitutoyo™ dial calipers (to the nearest 0.1 mm): snout-vent length (SVL; from tip of snout to vent); body width (BW; greatest width of body); tail length (TL; from vent to tip of unregenerated tail); tail width (TW; measured at base of tail); head length (HL; distance between posterior edge of last supralabial and snout-tip); head width (HW; measured at angle of jaws); head depth (HD; maximum height of head, from occiput to throat); eye to nostril distance (E-N; distance between anteriormost point of eyes and nostrils); eye to snout distance (E-S;

distance between anteriormost point of eyes and tip of snout); internarial distance (IN; distance between nares); and interorbital distance (IO; shortest distance between orbits). Radiographic examination was done at 40 Kv (2 mA) for 30 secs.

Comparative material examined is listed in Appendix I. Additional information on character states and distribution was obtained from Darevsky (1992), Das (1996), Das & Lim (2003), Greer (1985), Honda et al. (1999; 2001), Ineich (1999), Manthey & Grossmann (1997), Smith (1935), and Taylor (1963). Institutional abbreviations follow Leviton et al. (1985), except we retain ZRC for USDZ, following conventional usage.

SYSTEMATICS

Dibamus booliati, new species
(Figs. 1-2)

***Material examined.* –** Holotype – ZRC 2.5368., female, Batu Gua Madu (04º 50' 14.3" N; 101º 56' 58.7"E), alt. 121 m ASL, near the town of Gua Musang, Kelantan State, Peninsular Malaysia, coll. N. S. Yaakob, I. Das & B. L. Lim, 19 Oct.2001.

Paratype – ZRC 2.1944, adult female, same locality as holotype, coll. M. W. F. Tweedie, Aug.1939.

***Diagnosis.* –** SVL to 102.7 mm; TL to 9.7 mm; TL/SVL% 9.4-13.0; postocular single; rostral suture absent; interparietal posteriorly bordered by four slightly smaller nuchal scales; supralabial one, bordering ocular ventrally; scales bordering posterior edge of infralabial four; ventrals 180-209; subcaudals 24-39; presacral vertebrae 113-120; postsacral vertebrae 11-25; and dorsum and venter brown with a pale neck band.

***Description of holotype.* –** SVL 93.5 mm, TL 12.3 mm; snout bluntly rounded (IN/IO ratio 0.47), projecting beyond jaws; nostril laterally oriented, oval, situated closer to snout-tip than to orbit (E-N/E-S ratio 0.80); head short, shorter than wide, HL 2.1 mm, HW 3.3 mm (HL/HW ratio 0.64), slightly flattened, HD 2.5 mm (HL/HD ratio 0.84); rostral pad with a large number of evenly distributed sensory papillae; rostral suture absent, nasal suture incomplete, extending from ocular to slightly beyond half the distance to nostril; labial suture joining nasal suture behind nostril; posterior border of rostral curved; both frontonasal and frontal wider than long, width of former 1.1 mm, of the latter 1.5 mm; interparietal single, longer than frontonasal, posteriorly bordered by four slightly smaller nuchal scales; postocular single; supralabial single, elongate, bordering ocular ventrally; infralabial lanceolate, 2.3 mm in length (infralabial length/HW ratio 0.70), infralabials separated by a smaller, trapezoid mental; scales bordering posterior edge of infralabia after postmental three bilaterally; ear opening absent; eyes dimly visible through ocular; tongue short, undivided anteriorly, pointed; teeth small, acute.

Body vermiform, BW 3.4 mm (BW/SVL ratio 0.04); head slightly distinct from neck and from body; tail short (TL/SVL ratio 0.13), tip rounded, slightly bulbous, tail base thick (TW 3.5 mm; TW/TL ratio 0.28), wider than rest of tail; body scales smooth, subhexagonal, except near preanal region, where they are subcycloid; transverse scale rows immediately posterior to head 24; at midbody 20; and just

Fig. 1. Holotype of *Dibamus booliati*, new species (ZRC 2.5368) in life.

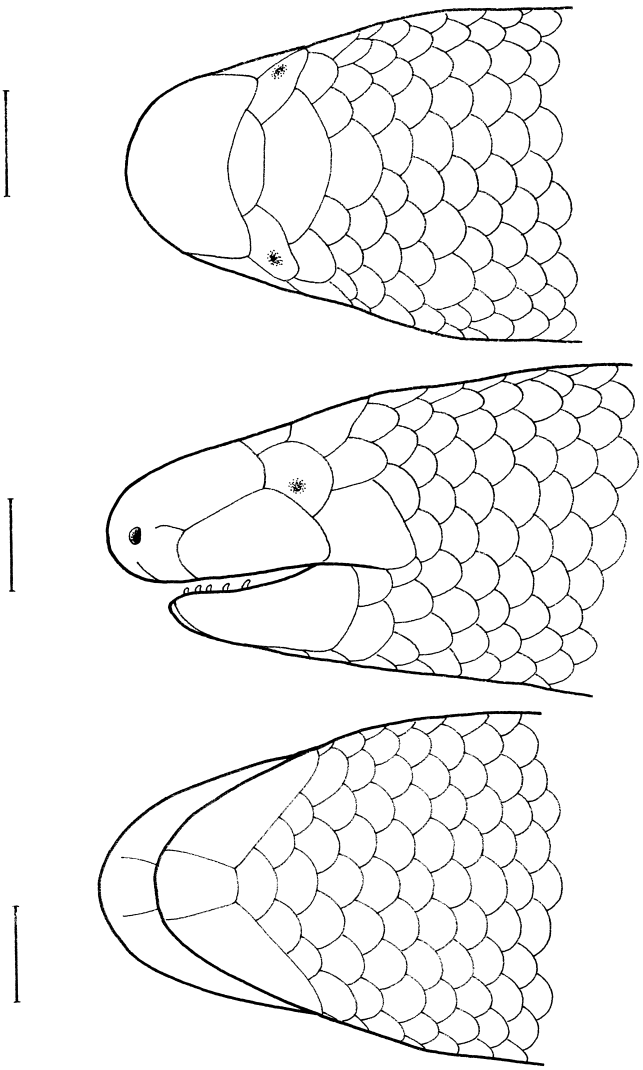

Fig. 2. Head of holotype of *Dibamus booliati*, new species (ZRC 2.5368) in dorsal (top), lateral (middle) and ventral (bottom) views. Scale bars = 5 mm.

anterior to vent 20; ventrals 180; subcaudals 39; presacral vertebrae 113; postsacral vertebrae 25; limbs absent; a single enlarged median scale in preanal region, overlapped by scales on sides; preanal pores absent; postanal scales not reduced.

Colouration. **–** In life, dorsum brownish-red, scales dark-edged; snout-tip paler; nape collar cream. In preservative, dorsum pale brown, each scale edged with dark brown; venter slightly paler; snout-tip and throat pinkish-white; anal region cream; nuchal band cream.

Variation. **–** The paratype (ZRC 2.1944), a female (lacking hind limb flaps that characterize males within the genus), measures 102.7 mm in SVL, 9.7 mm in TL; TL/SVL% 9.4%. It shows the following details of squamation and osteology: transverse scale rows at midbody 23; ventrals 209; subcaudals 24; presacral vertebrae 120; and postsacral vertebrae 11. Other characteristics including scale counts as in the holotype.

Although the subcaudal counts of the paratype (24) appear relatively lower (61.5%) than that for the holotype (39), similar, altbeit less dramatic differences are known within the *Anelytropsis* and *Dibamus*. For instance, Greer's (1985) Table 4 provided subcaudal counts for all species then known, the lower count 77-96.7% of the upper.

Etymology. **–** The species name honours Dr. Lim Boo Liat, pioneering Malaysian zoologist, colleague and friend.

Natural history. **–** Gua Madu is a large rock shelter, adjacent to the town of Gua Musang and close to the ancient Chinese settlement of Pulai, an early Neolithic site representing the Hoabinhian culture, similar to that of Hoa Binh of Indo-China (Chasen, 1940).

The holotype was taken ca. 3 cm from under the soil surface, ca. 15 cm from a limestone cliff. The soil at the site of collection was moist, reddish-brown in colour, and covered with fresh and dried leaves. The area is a recreational site for its impressive limestone formation, and is hemmed in by plantations of banana and cocoa. Tweedie's (1954) specimen which is here designated the paratype of the new species was dug up while excavating a rock shelter in August 1939.

When picked up or otherwise molested, it exhibited death feigning for up to four minutes, the body curved into a circle, with the belly up and the head slightly raised. The scales of the body additionally were raised nearly perpendicular to the body, presumably through the movement of underlying muscles, producing a wrinkled appearance, somewhat similar to that commonly seen in earthworms. These wrinkles disappeared after a few minutes, presumably when the perceived threat vanished. This latter habit, thought to be a mimicry of potentially noxious earthworms that may occur in syntopy, has been observed in *D. greeri* from Vietnam (Darevsky, 1992) and also in a hitherto undescribed species of *Dibamus* from Pulau Tioman (ID, unpubl. observ.).

Remarks. **–** *Dibamus booliati* is compared with all nominal and one undescribed species. In showing a single postocular, *Dibamus booliati*, new species, can be separated from *D. alfredi* Taylor, 1962 (southern Thailand), *D. celebensis* Schlegel, 1858 (Sulawesi, Indonesia), *D. ingeri* Das & Lim, 2003 (Mendolong, in Sabah, Borneo), *D. kondaoensis* Honda et al., 2001 (Kondao Island, formerly Pulau Condore, Vietnam), *D. novaeguineae* Duméril & Bibron, 1839 (New Guinea, Sulawesi, Philippines archipelago, and also apparently, Simuelue, in western Indonesia), *D. smithi* Greer, 1985 (Langbian Plateau, Vietnam), *D. seramensis* Greer, 1985 (Seram, Indonesia), *D. taylori* Greer, 1985 (Sumba, Lesser Sundas, Indonesia), *D. vorisi* Das & Lim, 2003 (Danum Valley, in Sabah, Borneo), and an undescribed species from Pulau Tioman, Pahang State, West Malaysia (illustrated by Lim & Lim, 1999; and Manthey & Grossmann, 1997), all of which have paired postoculars. The absence of rostral suture separates the new species from *D. bourreti* Angel, 1935 (Tam Dao, Vietnam), *D. deharvengi* Ineich, 1999 (Binh Châu, Vietnam), *D. nicobaricus* Fitzinger in: Steindachner, 1867 (Nicobar Islands, India; see below) and *D. somsaki* Honda et al., 1997 (Chanthaburi Province, Thailand). The subcaudal scale counts of 24-39 and presence of a pale nuchal band differentiate it from two remaining congeners, *D. leucurus* (Bleeker, 1860) (Sumatra, Borneo and the Philippines Archipelago) and *D. montanus* Smith, 1921 (Langbian Plateau, Vietnam).

Honda et al. (2001) did not include *Dibamus nicobaricus* in their key to the genus, arguing that Das' (1996) redescription and revalidation of the species was based on material possibly not conspecific with the name-bearing type. To support their argument, they provided the diagnosis for *D. leucurus* (Bleeker, 1860), apparently derived from Greer (1985), as relevant for the type of *D. nicobaricus*, that gives a range for the transverse rows of midbody scale counts as 20-23 and subcaudal counts of 41-52. Yet, Fitzinger's (in Steindachner, 1867) *Rhinophidion nicobaricum* was based on the holotype NMW 23461 and the midbody scale count of the original description was specified as "…circa 23 Längsreihen (in Mitte der Köperlänge..)" and the subcaudal count is 36. In fact, in Greer's (1985) review of the genus, there was some hesitation in synonymising the Nicobarese population with *leucurus* (presumably for the fact that only a single specimen- the NMW holotype- was examined). Based on the diagnosable characters separating the Nicobarese populations from *leucurus* (including complete vs incomplete rostral sutures; subcaudals 31-39 vs 41-52; snout acute vs rounded; lanceolate vs triangular infralabials; and infralabial length over 75% head width vs ca. 50% head width), and the fact that only a single (but locally widespread) species has been collected from these islands, despite recent intensive surveys (see Das, 1999), *D. nicobaricus* warrants retention as a valid species.

ACKNOWLEDGEMENTS

Permission to collect in the Gua Musang area as well as logistic support were provided by Sahir bin Othman, Director of Research and Conservation Division, Jabatan

Perlindungan Hidupan Liar dan Taman Negara (PERHILITAN), Kuala Lumpur. We thank Lim Boo Liat for companionship in the field and Peter Kee Lin Ng, Chang Man Yang and Kelvin Kok Peng Lim for facilities at the ZRC. Heok Hui Tan assisted with the radiographic examination of the types. The visit of the first author to the ZRC was supported by a Raffles Museum Fellowship. Finally, we thank Hidetoshi Ota and an anonymous reviewer for comments on an earlier draft of the manuscript.

The curatorial staff of the following additional institutions provided facilities and/or loans of specimens: BMNH (C. J. McCarthy); BNHM (N. Chaturvedi and J. C. Daniel); FMNH (R. F. Inger, A. Resetar and H. K. Voris); MCZ (J. Rosado and the late E. E. Williams); ZMA (A.Groenveld and L. van Tuijl) and ZSI (J. R. B. Alfred, B. Datta Gupta, S. K. Chanda and N. C. Gayen). R. Gemel and H. Grillitsch, NMW, examined the holotype of *Rhinophidion nicobaricum* for us. K. K. P. Lim executed Fig. 2. Finally, we thank Allen Greer, Hidetoshi Ota and an anonymous reviewer for comments on the manuscript.

LITERATURE CITED

Boulenger, G. A., 1887. *Catalogue of lizards in the British Museum (Natural History). Second edition. Volume III. Lacertidae, Gerrhosauridae, Scincidae, Anelytropidae, Dibamidae, Chamaeleontidae.* British Museum (Natural History), London. xii + 575 pp + Pls. I-XL.

Chasen, F. N., 1940. Annual report of the Raffles Museum and Library for the year 1939. Straits Settlements. Government Printing Office, Singapore. 9 pp.

Darevsky, I. S., 1992. Two new species of worm-like lizard *Dibamus* (Sauria: Dibamidae), with remarks on the distribution and ecology of *Dibamus* in Vietnam. *Asiatic Herpetological Research*, **4**: 1-12.

Das, I., 1996. The validity of *Dibamus nicobaricum* (Fitzinger in Steindachner, 1867)(Squamata: Sauria: Dibamidae). *Russian Journal of Herpetology*, **3**(2): 157-162.

Das, I., 1999. Biogeography of the amphibians and reptiles of the Andaman and Nicobar Islands. In: Ota, H. (ed.), *Tropical island herpetofauna. Origin, current diversity and conservation.* Pp. 43-77. Elsevier Science B.V., Amsterdam.

Das, I. & K. K. P. Lim, 2003. Two new species of *Dibamus* (Squamata: Dibamidae) from Borneo. *Raffles Bulletin of Zoology*, **51**(1): 143-147.

Denzer, W. & U. Manthey, 1991. A nominal checklist of the lizards inhabiting Peninsular Malaysia and Singapore. *Raffles Bulletin of Zoology*, **39**(2): 309-322.

Greer, A. E., 1985. The relationships of the lizard genera *Anelytropsis* and *Dibamus*. *Journal of Herpetology*, **19**(1): 116-156.

Honda, M., J. Nabhitabhata, H. Ota & T. Hikida, 1997. A new species of *Dibamus* (Squamata: Dibamidae) from Thailand. *Raffles Bulletin of Zoology*, **45**(2): 275-279.

Honda, M., H. Ota, T. Hikida & I. S. Darevsky, 2001. A new species of the worm-like lizard, *Dibamus* Duméril & Bibron, 1839 (Squamata Dibamidae), from Vietnam. *Tropical Zoology*, **14**: 119-125.

Ineich, I., 1999. Une nouvelle espèce de *Dibamus* (Reptilia, Squamata, Dibamidae) du Vietnam. *Bulletin de la Société de Zoologique de France*, **124**(3): 279-286.

Leviton, A. E., S. C. Anderson, R. H. Gibbs, E. Heal & C. E. Dawson, 1985. Standards in herpetology and ichthyology. Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia*, **1985**: 802-832.

Lim, K. K. P. & L. J. Lim, 1999. The terrestrial herpetofauna of Pulau Tioman, Peninsular Malaysia. *Raffles Bulletin of Zoology*, Supplement **6**: 131-155.

Manthey, U. & W. Grossmann, 1997. *Amphibien & Reptilien Südostasiens*. Natur und Tier Verlag, Münster. 512 pp.

Smith, M. A., 1935. *The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol. II.- Sauria.* Taylor and Francis, London. xiii + 440 pp + 1 pl.

Steindachner, F., 1867. Zoologischer Theil, Band 1. Reptilien. In: *Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. von Wüllerstorf-Urbair*. Kaiserlich-Königlischen Hof-und Staatsdruckerei, Wien. 98 pp + Pls. I-III.

Tan, F. L., 1993. *Checklist of lizards of Sabah*. Sabah Parks Trustees, Kota Kinabalu. (2) + 18 pp.

Taylor, E. H., 1962. New Oriental reptiles. *University of Kansas Science Bulletin*, **43**(7): 209-263.

Taylor, E. H., 1963. The lizards of Thailand. *University of Kansas Science Bulletin*, **44**(14): 687-1077.

Tweedie, M. W. F., 1954. Notes on Malayan reptiles. No. 3. *Bulletin of the Raffles Museum*, **25**: 107-117; Pl. I.

Underwood, G. & M. S. Y. Lee, 2000. The egg tooth of *Dibamus* and their bearing on possible relationships with gekkotan lizards. *Amphibia-Reptilia*, **21**(4): 507-511.

APPENDIX I

Comparative material examined

Dibamus alfredi Taylor, 1962 - FMNH 178336 (holotype), from "Na Prado, Pattani, Thailand at base of Bukit Besar" (= Maprado, Pattani, 06º 52'N; 101º 16'E, Pattani Province, southern Thailand).

Dibamus celebensis - ZMA 10153, Loewoe, Sulawesi, Indonesia.

Dibamus leucurus - BMNH 63.12.4.29 (holotype of *Typhlina leucurus* Bleeker, 1860; specimen 'h' of Boulenger, 1887: 435), "Agam" (00º 15'S; 100º 05'E, north of Bukittinggi, Sumatera Barat Province, Indonesia); FMNH 138679, FMNH 145666, Nanga Tekalit Camp at Sungei Mengiong, Kapit, Sarawak, East Malaysia (Borneo); ZMA 11736, Kajoe Tanam, at present spelt Kayutanam, Sumatera Barat Province, Indonesia; ZMA 15501, Deli, at present spelt Delitua and equivalent to Medan, Sumatera Utara Province, Indonesia.

Dibamus nicobaricus - BNHM 977, Great Nicobar, India; MCZ 181338, Shompen Hut, Great Nicobar, India; ZSI 6970, Kamorta, Central Nicobar, India; ZSI 7036, "Nicobars", India; ZSI 22511, Station 10, Casuarina Bay, Great Nicobar, India; ZSI 22512, Casuarina Bay, Great Nicobar, India.

Dibamus novaeguineae.- ZMA 15500, Sinabang, Pulau Simeulue, Aceh Province, Indonesia.

Dibamus taylori - ZMA 15499 (paratype of *Dibamus taylori* Greer, 1985), Kamanggan, Sumba, Nusa Tenggara Province, Indonesia.

Dibamus sp. - ZRC 2.3418, Pulau Tioman, Pahang, West Malaysia.

Dibamus ingeri - FMNH 239756, Mendolong, Sipitang, Sabah, East Malaysia (Borneo).

Dibamus vorisi - FMNH 230187, 246232, Danum Valley, Lahad Datu, Sabah, East Malaysia (Borneo).