Records of the Western Australian Museum **17**: 309–314 (1995).

The *Hipposideros bicolor* group (Chiroptera: Hipposideridae) from Sumbawa Island, Nusa Tenggara, Indonesia

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Abstract – Two unique specimens of *Hipposideros* from West Sumbawa are described.

INTRODUCTION

Surveys of islands in the Greater and Lesser Sundas and the Maluku Tenggara region of Indonesia by staff from the Western Australian Museum and Museum Zoologicum Bogoriense, between 1987 and 1993, has resulted in the recognition and/or redefinition of a number of mammalian taxa (Kitchener *et al.* 1993 a,b). In 1988, two specimens of a unique *Hipposideros* bat were collected in West Sumbawa.

The morphology of the above two West Sumbawa specimens are herein described. They belong in the *H. bicolor* group of Hill (1963). This group is characterised by: small to moderate body; large, broadly rounded ears, normally with an internal fold or thickening of the membrane of the ear at the antitragal lobe; elongate, narrow skull; moderately inflated braincase; narrow rostrum; unspecialised auditory region; upper incisors weak with outer lobe obsolescent or obsolete; and outer lower incisor crown dimensions subequal to those of the inner lower incisor.

METHOD

Measurements were recorded with vernier calipers. For skull, dentary, dental and baculum, measurements to 0.01 mm; for externals to 0.1 mm. Terminology used in the description of characters follows Hill (1963) and Smith (1984). Measurement points, where not explicit, are detailed in Kitchener and Maryanto (1993). Pelage colour description, when following the terminology of Smithe (1975), are capitalised.

SYSTEMATICS

Hipposideros sp. indet.

Material examined

Museum Zoologicum Bogoriense No. MZB 15905, adult male carcase weighing 9.5 g; fixed in 10% formalin and preserved in 75% ethanol; skull and mandible separate; liver stored in ultrafreeze at the Western Australian Museum (WAM); collected by D.J. Kitchener, R.A. How and Maharadatunkamsi, on 26 May 1988. WAM M 31489; adult male weighing 9.8 gm; carcase and liver preserved as for the holotype; skull removed and lost.

Locality

Collected from a small cave near the main limestone "cathedral" cavern of Gua (=cave) Batu Tering, 3 km S Desa Batu Tering, West Sumbawa (*c.* 8°48'S, 117°22'E), at an altitude of *ca.* 200 m. A stream passes within a few metres of this small cave. The surrounding vegetation is dense gallery rainforest.

Characteristics

A member of the *H. bicolor* group (*sensu* Hill 1963) but separated from all other members of that group by the following combination of characters: moderately large size with forearm length 47.9–48.0, condylocanine length 16.7, and C^1M^3 length 5.7; lateral supplementary leaflets on face absent; anterior upper premolar (PM^2) present, only slightly extruded from toothrow but separates canine from PM^4; anterior lower premolar (PM_2) length subequal to second lower premolar (PM_4); PM_2 height three-quarters that of PM_4; anterior leaf without median emargination; posterior leaf with three well defined septa; internarial septum slightly thickened; interorbital region constricted; glandular ridge on muzzle beneath margin of anterior leaf absent; anterior half of zygomata not particularly slender; superior projection of zygomata poorly developed; vomer posterior projection into mesopterygoid fossa blade-like, only very slightly thickened; and baculum moderately long (3.2), straight, narrow, bifurcated at distal tip with cranial proximal (projecting) margin of base evenly rounded and not bifurcated.

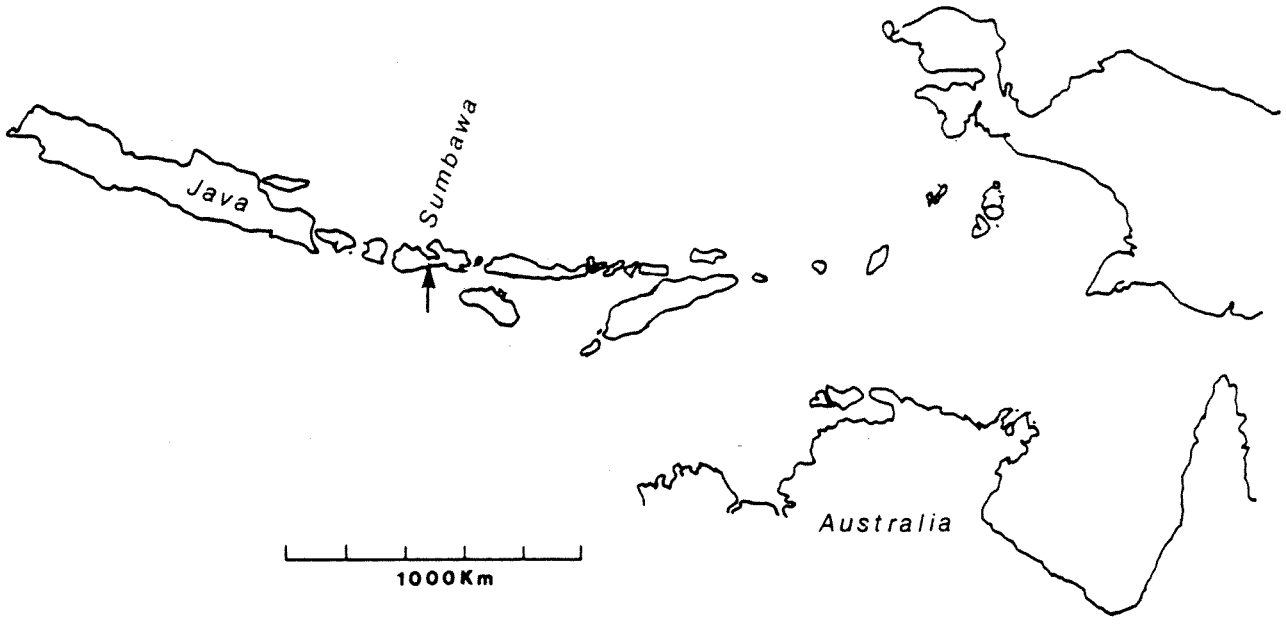

Figure 1 Location of Sumbawa Island and the locality of *Hipposideros* sp. indet.

Skull (Figure 2)

Moderately long, with greatest skull length 18.36 and condylocanine length 16.72, and slender; zygomatic width 9.43, considerably greater than mastoid width 9.05; cranium comparatively broad 8.81 and inflated; interorbital region much narrower than distance between anteorbital foramina 2.84 *v.* 5.15; sagittal crest low, reaches maximum height at cranial apex; rostral eminences slightly inflated, in lateral profile a little below junction of sagittal and supraorbital crests; in lateral profile, rostrum anterior edge slopes slightly downwards anteriorly and curves smoothly to maxilla; zygomata robust, superior jugal projection low; anteorbital foramen oval, closed by moderately wide bar of bone; premaxillae broad and closely oppose lingual margin of upper canine; premaxillae junction with a V shape; palate posterior margin a broad V shape without a median posterior spicule; mesopterygoid fossa narrow 1.74, projecting vomer blade-like, only very slightly thickened; sphenoidal bridge wide, viewed ventrally almost conceals sphenorbital sinus; sphenoidal depression, shallow, oval and wider than mesopterygoid fossa 3.02 *v.* 1.74; cochlea (the cochlea part of the petrosal) size moderate, their breadth considerably greater than their distance apart 2.64 *v.* 1.63; cochlea inflated, reaches depth level with tympanic bulla; tympanic bulla short, subequal in length to cochlea breadth, terminate *c.* 0.2 posterior to glenoid fossa margin.

Dentition

Upper incisors small, their tips markedly convergent, outer lobe obsolescent; anterior upper premolar (PM^2) small, basal surface area approximately that of upper incisor, slightly extruded from toothrow but such that C^1 is not in contact with PM^4; M^3 premetacrista half length of its preparacrista; M^2 and M^3 with pronounced hypocone; M^1 components of eocrista shorter than those of M^2 but lengths of these teeth subequal; outer lower incisor crown area about 15% larger than that of inner lower incisor; anterior lower premolar (PM_2) 80% length and three-quarters height of PM_4.

Externals (Figure 3)

Ears of moderate length 18.7–19.3, rounded, anterior margins strongly convex, posterior margin with very slight concavity immediately behind apex; antitragus with distinct fold; noseleaf simple; anterior noseleaf narrower than posterior noseleaf *ca.* 5.1 *v.* 5.8; lateral supplementary facial leaflets absent; internarial septum slightly expanded laterally, more so anteriorly to a maximum breadth of 0.8, vertically it is raised in a semicircle to a height of *c.* 1.0; laterally separated from anterior edge of nares by deep grooves; narial lappets border external narial margin, raised *c.* 0.4 above surface of anterior noseleaf; intermediate leaf unspecialised; posterior leaf supported by three prominent septa.

Fur long, mid dorsal *c.* 8.5, mid rump *c.* 12.0 chest *c.* 7.5, external pinna furred to apex *c.* 9.0. dorsum predominantly Cinnamon colour of distal one-quarter of hairs of which basal part a dull White; face Tawny. Venter, including chin, pale Smoke Gray; patagia Olive Brown.

Penis long 8.8, lightly furred; glans penis flattened in craniocaudal axis, distal tip evenly semicircular except for two small projecting lobes surrounding the urethral opening (Figure 4). Baculum moderately long 3.22, thin, straight

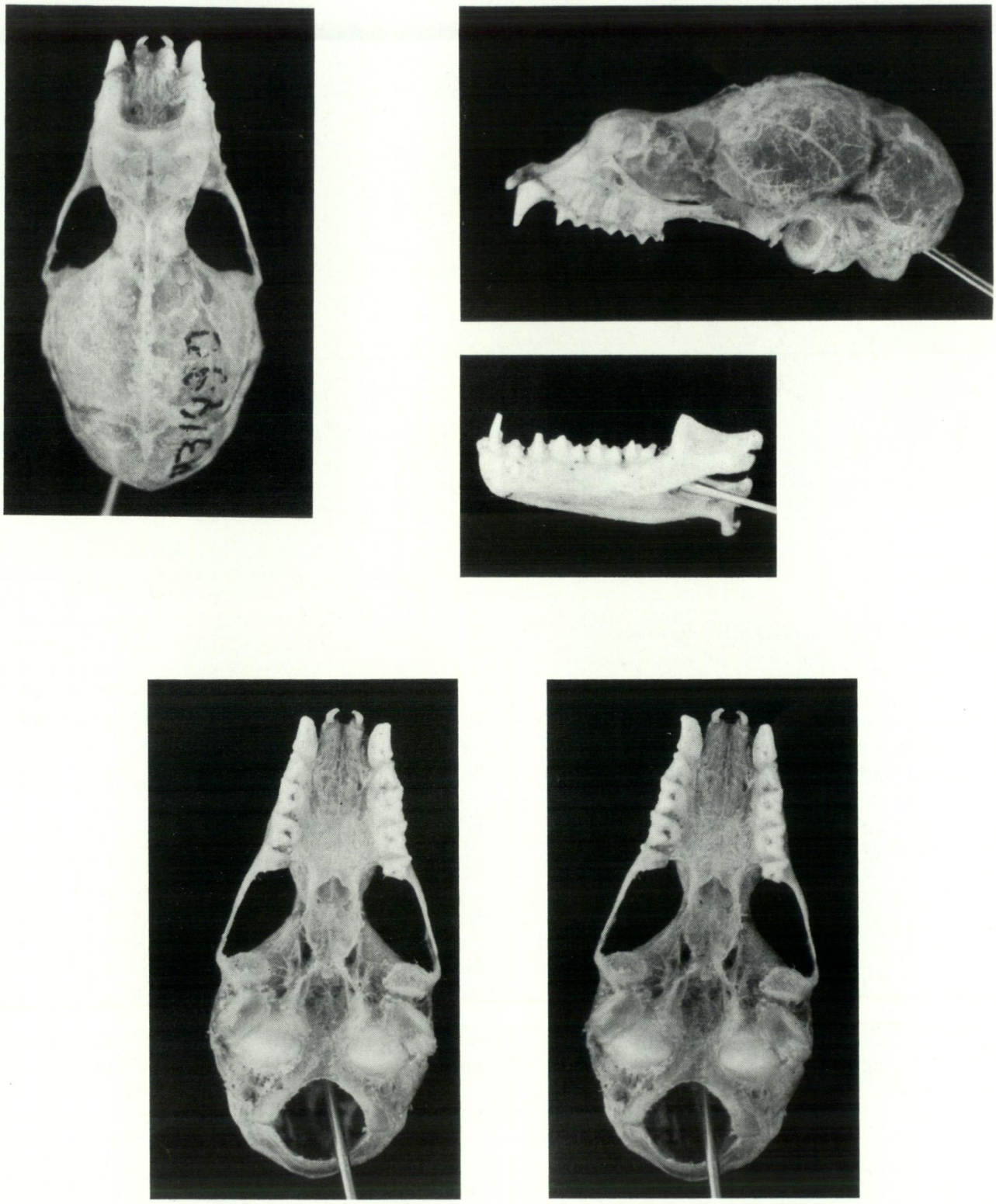

Figure 2 Photograph of skull, dorsal, lateral and ventral (as stereopair) view and dentary of *Hipposideros* sp. indet. from Sumbawa (MZB 15905).

cranial aspect, with distal tip bifurcated, caudal aspect of bifurcation slightly grooved, base with cranial part extending posteriorly beyond caudal part, cranial part with posterior margin smoothly convex, caudal margin of base bifurcated, base lateral breadth 0.41, base craniocaudal breadth 0.50 (Figure 5).

Measurements

External measurements of MZB 15905 are followed by those of WAM M31489. Greatest skull length (posteriormost point to C^1 alveoli anterior edge) 18.36; condylocanine length (to anteriormost face of canine) 16.72; cranial breadth 8.81; zygomatic width 9.43; mastoid width 9.05;

Figure 3 Photograph of face of *Hipposideros* sp. indet. (MZB 15905).

maximum cranium height 6.53; rostrum height 4.45; rostrum length 3.46; least interorbital breadth 2.84; distance between anteorbital foramina 5.05; braincase length 12.64; nasal inflation length 4.02; nasal inflation breadth 4.93; palatal length 2.60; premaxilla length 3.98; mesopterygoid fossa breadth 1.74; tympanic bulla length 2.64; tympanic bulla breadth 1.62; cochlea length (anteroposterior diameter) 2.64; M^3M^3 breadth (alveoli, from outer edge) 5.94; C^1C^1 width (alveoli, from outer edge) 4.15; intercochlear distance 1.63; sphenoidal depression breadth 3.02; C^1 width 1.05; P^4 breadth x length 1.16 x 1.14; M^1 breadth x length 1.21 x 1.52; M^2 breadth x length 1.30 x 1.47, M^3 breadth x length 1.21 x 1.04; C^1M^3 length (alveoli) 5.70; M^1M^3 crown length 3.90; I_1M_3 length (alveoli) 7.56; dentary length (from condyle) 12.06; snout to vent length 51.0, 48.2; tail to vent length 28.6, 34.3; ear length 18.7, 19.3; tibia length 21.2, 21.0; pes length (excluding claw) 6.7, 6.6; forearm length 48.0, 47.9; digit 2 metacarpal length 38.7, 38.7; digit 3 metacarpal length 35.6, 35.5; digit 3 phalanx 1 length 19.1, 18.0; digit 3 phalanx 2 length (along

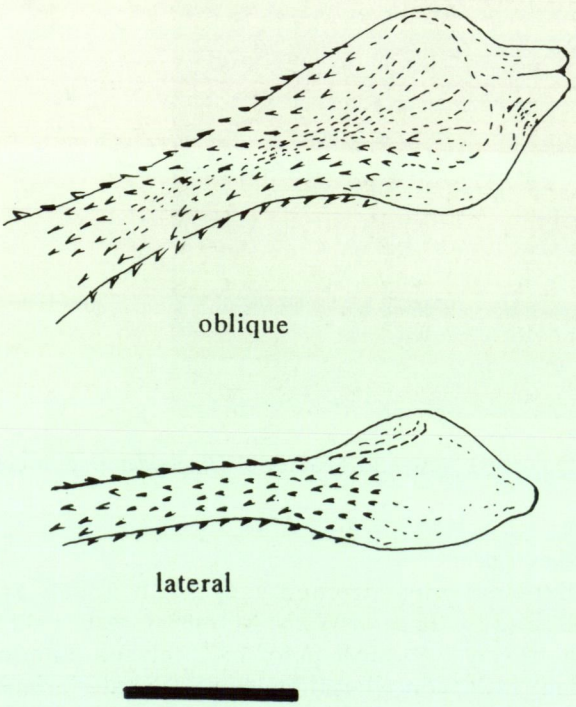

Figure 4 Drawings of glans penis of *Hipposideros* sp. indet. (WAM 31489); scale line, 1 mm.

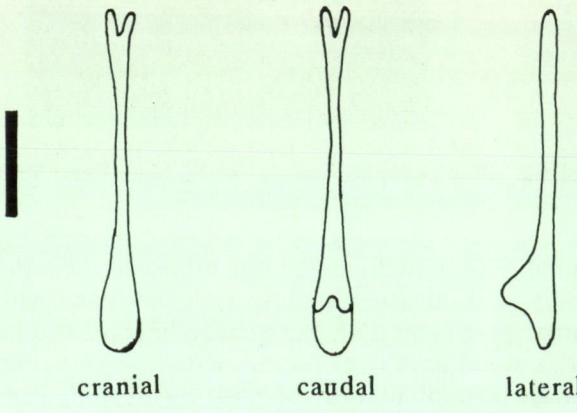

Figure 5 Drawings of baculum of *Hipposideros* sp. indet. (MZB 15905); scale line, 1 mm.

curvature) 19.2, 19.6; digit 4 metacarpal length 38.6, 37.4; digit 4 phalanx 1 length 11.4, 10.9; digit 4 phalanx 2 length 9.0, 9.7; digit 5 metacarpal length 37.2, 36.5; digit 5 phalanx 1 length 13.8, 13.4 digit 5 phalanx 2 length 11.4, 11.8; anterior noseleaf breadth 4.9, 5.3; posterior noseleaf breadth 5.5, 6.0.

Remarks

These Sumbawa specimens are a member of the *bicolor* subgroup (*sensu* Hill 1963) although it is an unusual member of this subgroup in that its zygomatic width considerably exceeds its mastoid width (9.43 *v.* 9.05) rather than being usually less than or subequal to the mastoid width. Within this subgroup they are most similar to *H. bicolor* Temminck, 1834, *H. ater* Templeton, 1848, *H. cineraceus* Blyth, 1853, *H. pomona* Andersen, 1918, and *H. macrobullatus* Tate, 1941. They are clearly distinct from *H. fulvus* Gray, 1838 and *H. nequam* Andersen, 1918, both of which are smaller and have a much reduced PM_2 (Hill 1963, Hill *et al.* 1986).

They differ from *H. ater* in being much larger (cf. forearm length 47.9–48.0 *v.* 35.0–42.5, condylocanine length 16.8 *v.* 13.2–15.0, zygomata width 9.4 *v.* 7.0–7.6); their baculum differs greatly in size and shape (see Topál 1975).

They differ from *H. cineraceus* in being larger (cf. forearm length 32.5–36.0, condylocanine length 12.6–13.7, zygomatic width 7.0–7.6); anterior half of zygomata more robust and baculum longer and without bifurcation of projecting basal part of baculum (see Zubaid and Davison 1987).

They differ from *H. pomona* in being generally larger (cf. forearm length 37–43, condylocanine length 14.5–15.9, zygomatic width 8.3–9.0); intercochlear distance slightly larger 1.63 *v.* 1.14–1.50: tympanic bulla shorter 2.64 *v.* 2.76–3.20; and ears shorter 18.7–19.3 *v.* 20.1–23.6.

They differ from *H. macrobullatus* in being larger (cf. forearm length *v.* 40–42, condylocanine length 14.4–15.0, zygomatic width 7.9–8.3); tympanic bulla shorter 2.64 *v.* 2.90–2.94 and wider 1.62 *v.* 1.46–1.58; intercochlear distance wider 1.63 *v.* 1.27–1.45; ear shorter 18.7–19.3 *v.* 21.1–21.9.

They differ from *H. bicolor* in being larger (cf. 40–46, condylocanine length 15.4–16.3, and zygomatic width 8.6–9.5); tympanic bulla wider 1.62 *v.* 1.27–1.57 and intercochleae distance slightly narrower 1.63 *v.* 1.66–2.03; vomer projection into mesopterygoid fossa only faintly thickened; and baculum differing as for the distinction with *H. cineraceus* (measurements from Hill 1963, Hill *et al.* 1986, Hill *in* Corbet and Hill 1992 and J.E. Hill pers. comm.).

ACKNOWLEDGEMENTS

We gratefully acknowledge the support of Mr J. Bannister, previous Director, Western Australian Museum; Dr M. Amir, Director, Balitbang Zoologi (LIPI); and the Director of the Indonesian Department responsible for the conservation of wildlife in Nusa Tenggara Barat, Dr Ir. P. Supriadi, who provided us with assistance in the field, as did a number of his staff. To our colleagues Dr Ric How and Mr Ron Johnstone, Western Australian Museum, who participated in the exhausting field work, we extend our thanks for both their effort and companionship. Mrs Norah Cooper produced the photographs.

Mr John Edwards Hill provided constructive comments on the manuscript and made available measurements additional to those in the literature.

Expedition costs were defrayed by grants to Dr D. Kitchener from the National Geographic Society, Washington. Garuda Indonesia kindly defrayed freight costs of the expeditions. Mrs Susan Dalton and Mrs Anne Nevin, Western Australian Museum, typed the manuscript.

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Manuscript received 17 December 1993; accepted 21 May 1995.