

## SHORT NOTES

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**A NEW SPECIES OF *SCUTIGER*  
(ANURA: MEGOPHRYIDAE) FROM  
NAGALAND, NORTH-EASTERN  
INDIA**

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The anuran genus *Scutigera*, assigned by some (e.g. Frost, 1985 and Duellman, 1993) to the family Pelobatidae, and by other more recent workers (e.g. Fu *et al.*, 1997; Fu & Murphy, 1997) to Megophryidae, contains 32 nominal species. While the apparent centre of radiation of the genus is China, three species (*S. nyingchiensis* Fei, 1977; *S. occidentalis* Dubois, 1977 and *S. sikimensis* Blyth, 1854) have been recorded from India (Inger & Dutta, 1986; Dutta, 1997). Until now, a single species, *S. sikimensis*, has been recorded from the north-eastern region of India (see Chanda, 1994). A well-preserved adult male *Scutigera* received by the Zoological Survey of India serves as the basis for the description of a new species. The material was collected from Nagaland, in north-eastern India.

Measurements were taken with a Mitutoyo™ dial vernier calliper (to the nearest 0.1 mm) from specimens in 70 per cent ethanol. The following measurements were taken: snout-vent length, SVL (from tip of snout to vent); tibia length, TBL (distance between surface of knee to surface of heel, with both tibia and tarsus flexed); trunk length, TL (distance between posterior edge of forelimb at its insertion to body to anterior edge of hind limb at its insertion to body); head length, HL (distance between angle of jaws and snout-tip); head width, HW (measured at angle of jaws); head depth, HD (greatest transverse depth of head, taken at the posterior of the orbital region); eye diameter, ED (diameter of eye); interorbital width, IO (least distance between upper eyelids); internarial distance, IN (distance between nostrils); eye to snout-tip distance, E-S (distance between anterior-most point of eyes to tip of snout); eye to nostril distance, E-N (distance between anterior-most point of eyes and nostrils); and diameter of disk on finger II, FIID (width of disk at tip of finger II).

Measurements of fingers and toes were taken from base of each phalange to tip, on right fore and hind limbs, respectively. Sex was determined through examination of gonad.

*SCUTIGER MOKOKCHUNGENSIS* SP. NOV.

*Holotype.* ZSI A 8889 (adult male, with enlarged testes), from Mokokchung (26° 20'N; 94° 30'E), alt. ca. 1200 m above msl., Nagaland State, north-eastern India. Coll. Veena Tandon, 1996.

*Diagnosis.* A large species of *Scutigera* (SVL 87.2 mm in a mature male), that shows the following characteristics: interorbital region lacking tubercles; eye diameter about twice orbit-nostril distance; tongue small, oval; no spinous processes on tubercles of dorsum; undersurface of tibia without tubercles; a single pair of smooth, subtriangular axillary glands; nuptial pads absent; toes with large subarticular tubercles; toe IV webbing, on inner side, broadly to basal subarticular tubercle, reaching base of digit tip as a fringe, and on outer side, as a fringe of skin to base of digit tip; elongated, compressed, inner metatarsal tubercle; and maxillary and vomerine teeth present.

*Description.* Large body size (SVL 87.2 mm); habitus robust, bufonid-like, with a relatively narrow waist; head wide (HW/SVL ratio 0.36), exceeding length (HL/HW ratio 0.78), snout flattened (HL/HD ratio 0.33), rounded, projecting beyond mandible; nostrils equidistant from snout tip and orbit (E-N/E-S ratio 0.51); canthus rostralis sloping; lores not flattened. Eye large (ED/HL ratio 0.35), eye diameter about twice orbit-nostril distance (ED/E-N ratio 1.98), interorbital distance nearly twice width of upper eyelid (IO/UE ratio 1.94); no dermal fold in interorbital region; internarial region wide (IN/ED ratio 0.91); supratympanic fold glandular, commencing from the posterior border of orbit to a little over the forearm; tympanum absent; nares dorso-laterally oriented, protuberant, and slit-like in shape. Vomerine teeth in two oblique series, in a line between median-posterior of choanae, separated by a distance less than length of each group (vomerine length 2.2 mm; intervomerine distance 1.8 mm). Inferior aspect of snout weakly nicked; inner margin of mandible juncture with a slight w-shaped notch, without two sharp odontoids near symphysis. Tongue small (18.2 mm in length), oval (14.8 mm in width), its dorsal surface covered with papillae; weakly bifid, free posteriorly for 45.1 per cent of length. Vocal sac single, median, subgular. Sternum ossified, rounded posteriorly.

Forearm robust; tips of fingers swollen, but not dilated into disks; fingers free; relative lengths of fingers (measurements in parentheses; in mm): 3 (17.9) > 4 (13.8) > 2 (13.0) > 1 (10.7). Thigh muscular; tibia robust, long (TBL/SVL ratio 0.52); tips of toes weakly swollen but not disk-like; large, oval subarticular tubercles on hand and foot. Webbing reaches: toe I (outer) broadly to base of digit tip; (inner) as fringe to base of

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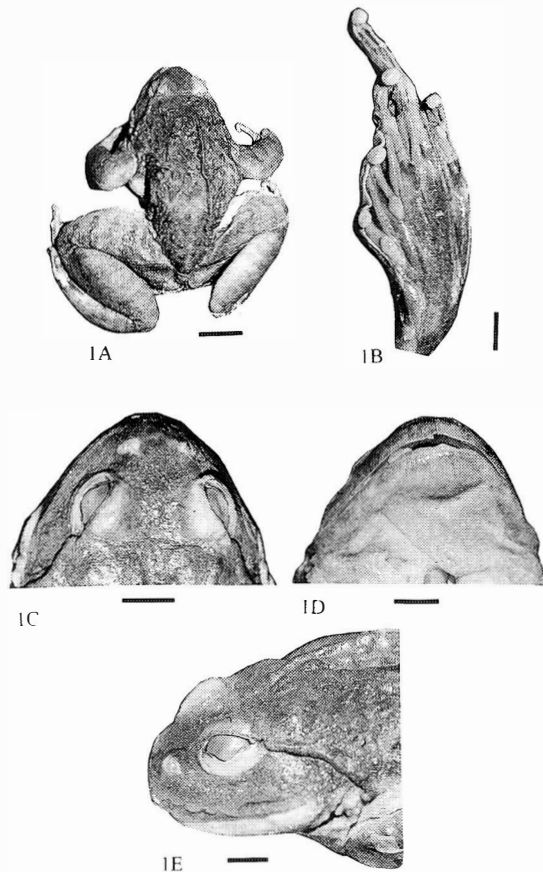


FIG. 1. Holotype of *Scutigera mokochungensis* (ZSI A 8889). 1A: Body in dorsal view (scale = 15 mm); 1B: Hind limb, showing extent of webbing (scale = 5 mm); 1C: Head in dorsal view (scale = 5 mm); 1D: head in ventral view (scale = 5 mm); and 1E: Head in lateral view (scale = 5 mm).

digit tip; II (outer) broadly to base of digit tip; (inner) broadly to base of digit tip; III (outer) broadly to penultimate subarticular tubercle, reaching base of digit tip as a fringe; (inner) broadly to base of digit tip; IV (outer) broadly to the middle subarticular tubercles, reaching the base of digit tip as a fringe of skin; (inner) broadly to basal subarticular tubercle, reaching base of digit tip as a fringe; V (outer) as a fringe to base of digit tip; and (inner) broadly to penultimate subarticular tubercle; reaching base of digit tip as a fringe of skin. Tarsal fold absent. No outer metatarsal tubercle; elongated, compressed, inner metatarsal tubercle; relative lengths of toes (measurements in parentheses; in mm): 4 (35.1) > 3 (24.7) > 5 (24.4) > 2 (18.1) > 1 (12.7).

Dorsum of body with large scattered conical tubercles, especially beyond sagittal region to level of axilla, with interspaces larger than tubercles that lack spinous processes; upper eyelids smooth; upper surface of thighs tuberculate, tubercles arranged in a linear series; around cloaca, tubercles distinctly clustered. Throat and pectoral region smooth; lower part of venter up to inguinal region smooth; thigh venter smooth. Paired subtriangular, axillary glands at the pectoral region smooth. Undersurface of forelimbs and rest of hind

limbs smooth. Cloacal opening directed postero-ventrally, on upper level of thighs.

*Coloration (in preservative)*. Dorsum unpatterned grey, thighs with diffused bands, upper eyelids yellowish-grey, mandible light grey; ventrum, including throat, pectoral region and abdomen cream with greyish variegations. Subarticular tubercles dark grey.

*Measurements (in mm)*. SVL 87.2; BL 31.2; TBL 45.0; HL 24.3; HW 31.2; HD 13.2; IO 10.1; IN 7.7; UE 5.2; ED 8.5; E-N 4.3; E-S 8.4.

*Natural history*. No ecological data are associated with the unique holotype. The relatively long tibia (TBL/SVL ratio 51.6) and highly webbed hindlimbs are suggestive of the utilization of lotic habitats, such as streams, rather than smaller mountain torrents (Ohler & Dubois, 1992).

The hills of Mokochung, the home of the Ao Naga tribesmen, have altitudinal elevations between 1000 and 1400 m above msl. Average annual precipitation is high, with a protracted wet season (the South-West Monsoons) between May and October (extending in some years to December). The temperature range of the locality is 8.6–25° C.

*Comparisons*. We assign the specimen to the genus *Scutigera* Theobald, 1868 (type species: *Bombinator sikimensis* Blyth, 1854, by monotypy) within the family Megophryidae for the following characteristics that are considered diagnostic of the genus by Dubois (1980; “1986” 1987; Ohler & Dubois, 1992): rough dorsal skin; presence of axillary glands; absence of tympanum; oval tongue that is slightly notched posteriorly; median internal vocal sac in adult male; glandular tubercles on dorsum; snout exceeding mandible; tips of digits without expanded disks; and jaws lacking spinous border. In addition, along with *S. adungensis* Dubois, 1979 (Dubois, 1979), *S. mokochungensis* shows maxillary teeth, a feature that, along with the lack of a tympanum, was used by Myers and Leviton (1962) to diagnose the megophryid genus *Oreolalax* Myers and Leviton, 1962; and by Dubois (“1986” 1987) to diagnose the subgenus *Aelurolalax* within *Scutigera*. The separation of the subgenera *Scutigera* and *Oreolalax* is supported by both morphological and karyological data (see Li *et al.*, 1990). China is apparently the centre of diversity of both megophryid genera (Fei & Ye, 1989; Frost, 1985; Zhao & Adler, 1993).

In the following section, we compare *S. mokochungensis* with congeners from the Indian region (India and Nepal), in addition to adjacent parts of eastern Asia, including northern Myanmar (formerly Burma) and south-western China. We list characters in these species that separate them from the species from the Naga Hills.

*Scutigera nepalensis* Dubois, 1974 (distribution: western Nepal): interorbital region smooth, lacking tubercles; tubercles on dorsum with spinous processes;

toes free; subarticular tubercles on toes absent; and undersurface of tibia with tubercles. *S. occidentalis* Dubois, 1978 (distribution: Kashmir and Ladakh [northern India]): tubercles on dorsum with spinous processes; double pair of smooth, subtriangular axillary glands; eye-snout distance exceeds eye diameter; nuptial pads present (although it is possible that the holotype of the new species was taken outside of the breeding season, at which time a regression of this secondary sexual character may have occurred); both inner and outer metatarsal tubercles present; finger II without subarticular tubercle; inner edge of finger I with a fringe of skin; back of forearm with tubercles; subarticular tubercles absent; rounded metatarsal tubercle; undersurface of tibia with tubercles; and toes 1/3 webbed. *S. sikimensis* (Blyth, 1854) (distribution: Nepal, Sikkim and north-eastern India and southern Tibet [China]; the record from Kashmir by Ahmed ("1945" 1946 requires verification): toes with a vestige of webbing; subarticular tubercles indistinct; tongue elongate; warts larger laterally than on dorsum; undersurface of tibia with tubercles; two pairs of axillary glands; and smaller male SVL (that of ZSI 9854, a syntype of *Cophophryne sikimensis* Blyth, 1854, an adult male, 54.4 mm). *S. boulengeri* (Bedriaga, 1898), (including its synonym *S. alticola* Procter, 1922; distribution: Tibet [= Xizang, south-western China] and north-western Nepal): subarticular tubercles absent; outer edge of toe IV without a sheath of skin; tubercles on dorsum with spinules; and belly and undersurface of tibia with tubercles. *S. nyingchiensis* Fei, 1977 (distribution: Tibet [China] and Kashmir and Ladakh [northern India]): smaller size (SVL 52.0-73.0 mm); toes 1/2 to 1/3 webbed; and tubercles on dorsum with spinules. *S. adungensis* Dubois, 1979 (distribution: northern Myanmar [formerly Burma]): eye-snout distance exceeds eye diameter; axillary patch isolated, not in contact with forelimb; nuptial pad present; toes with a vestige of webbing; metatarsal tubercle oval in shape; and subarticular tubercle absent. *S. glandulosus* (Liu, 1950) (distribution: Western Sichuan and north-western Yunnan, China): male SVL 58-78 (mean 67) mm; maxillary and vomerine teeth absent; eye diameter approximately equal to eye-nostril distance, upperlips pink; and dorsum with brick-red blotches. *S. gongshanensis* Yang and Su, 1979 (distribution: Western Yunnan, China): male SVL 47-57 (mean 51.7) mm; dorsum without conical tubercles; toes webbed at base; eye diameter approximately equal to eye nostril distance; and tips of digits pink. *S. mammatus* (Günther, 1896) (distribution: Yunnan, Sichuan, Qinghai and Xizang [= Tibet], China): male SVL 61-85 (mean 71.1) mm; maxillary and vomerine teeth absent; slender habitus; toes half webbed; eye diameter approximately equal to eye nostril distance; and dorsum with dark brown blotches. *S. mokochungensis* further differs from all described species of *Scutiger* in showing vomerine teeth, a feature that, within the megophryids,

is found only within certain (though not all) species of the genus *Megophrys* (see Dubois, 1980).

In the absence of an existing phylogeny, we speculate that *Scutiger mokochungensis* is most closely related to the northern Burmese *S. adungensis*, with which it shares many phenetic characters, in addition to showing maxillary teeth, which, among congeners, is found only in the species from Myanmar. The type locality of *S. adungensis* lies about 415 km to the north-east of Mokochung (the type locality of *S. mokochungensis*).

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