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Sphenomorphus aquaticus Malkmus, 1991, a junior synonym of *Tropidophorus beccarii* (Peters, 1871) (Reptilia: Squamata: Scincidae)

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Abstract. Re-examinations of literature descriptions and specimens revealed that the water skink, *Sphenomorphus aquaticus* Malkmus, recently described from Mt Kinabalu, Sabah, is identical with *Tropidophorus beccarii* (Peters). Thus, we synonymize the former name with the latter.

Key words. Reptilia, Scincidae, taxonomy.

Malkmus (1987, 1988, 1989, 1991 a, b, 1992) surveyed the Mt Kinabalu region of Sabah, Borneo, and described a new skink *Sphenomorphus aquaticus*. However, scale characters and general appearance of the species given in the original description (Malkmus 1991 b) exhibited close resemblance with those of *Tropidophorus beccarii* (Peters, 1871), a water skink common in the mountain streams of Sabah and Sarawak (Rooij 1915, Smith 1925, 1931, Hikida 1980). Thus, we examined paratypes of *S. aquaticus* and compared their characters with those of *T. beccarii* on the basis of available specimens from both parts of Borneo. Results have brought us to the conclusion that *S. aquaticus* is identical with *T. beccarii*, and hence the former name should be regarded as a junior synonym of the latter.

Materials and Methods

Two paratypes of *S. aquaticus*, loaned from Zoologisches Forschungsinstitut und Museum Alexander Koenig (i. e., ZFMK 49766, 49784) were examined. Specimens of *T. beccarii* used for comparisons were: Matang, Sarawak: Kyoto University, Zoological Collection (KUZ) 12423, 12451; Poring, Ranau and Bundu Tuhan, Sabah: four uncatalogued KUZ specimens. Data for morphological features of the holotype of *S. aquaticus* were taken from the detailed description with figures given by Malkmus (1991 b).

Results and Discussion

Generic Status of „*Sphenomorphus aquaticus*". — Several authors have suggested that the genera *Sphenomorphus* Fitzinger, 1843 and *Tropidophorus* Duméril et Bibron, 1839 are closely related to each other within the subfamily Lygosominae (Greer 1979, Brown & Alcala 1980, Ota et al. 1991). The two genera actually share many character states such as the scaly lower eyelids and the absence of supranasals. However, they differ from each other in the tympanum and preanal scale conditions: *Tropidophorus* has a superficial tympanum and one to three enlarged preanal scales,

whereas *Sphenomorphus* has a tympanum located more or less inward of the ear opening and usually more than two, not much enlarged preanal scales (a few species with two preanal scales, but no species with a single preanal scale: Taylor 1963, Brown & Alcala 1980). Besides these, *Sphenomorphus* generally occurs in forest floors and grasslands, whereas *Tropidophorus* prefers more aquatic habitats (Taylor 1963, Brown & Alcala 1980), although this might not always be the case (e. g., *S. multisquamatus* is found around the stream: Inger 1958, Matsui personal communication). Mittleman (1952) resurrected the genus *Norbea* Gray, 1845 for the species having a single enlarged preanal scale and five supraoculars, but this account has not been adopted by the subsequent authors (e. g., Taylor 1963, Greer 1970, Brown & Alcala 1980).

It is evident, from both the original description and the morphological features of the paratypes directly examined, that *S. aquaticus* also has a single enlarged preanal scale. The description did not mention the condition of tympanum, but paratypes, as well as a photograph of the holotype given in Malkmus (1991 b), showed that the tympanum of this lizard is prominent externally. Malkmus (1991 b) wrote that the species has only four supraoculars, but an illustration provided therein and the condition in the two paratypes suggest that the species actually possesses five supraoculars; it is highly probable that Malkmus (1991 b) inappropriately excluded the last small supraocular when counting this character. The natural habitat of *S. aquaticus* appears quite aquatic as the specific name bears; Malkmus (1991 b, 1992) stressed that he found his specimens in and around mountain streams with numerous rocks. All these indicate that *S. aquaticus* belongs to the genus *Tropidophorus* in reality.

Specific Status of „*Sphenomorphus aquaticus*". — Five species of the genus *Tropidophorus* are currently recognized from Borneo — *T. beccarii* (Peters, 1871), *T. brookei* (Gray, 1845), *T. iniquus* Lidth de Jeude, 1905, *T. micropus* Lidth de Jeude, 1905, and *T. perplexus* Barbour, 1921. Of these, the latter four are distinct from *aquaticus* in having keeled dorsal scales (Rooij 1915, Barbour 1921); only *T. beccarii* shares smooth dorsal scales with *aquaticus*. Detailed comparisons of the description and paratypes of *aquaticus* with specimens of *T. beccarii* from Sabah and Sarawak have yielded no differences to separate them as distinct taxa.

In the Mt Kinabalu region, *T. beccarii* was first reported by Mocquard (1890). Boulenger (1894) stated that Mocquard's (1890) specimens differ from those of *T. beccarii* from Sarawak, the type locality, by having a greater number of scales around the midbody (34 versus 30), and described *Tropidophorus mocquardii* to encompass the population around Mt Kinabalu. However, Smith (1923) considered the difference provided by Boulenger (1894) as reflecting an intraspecific variation, and synonymized *T. mocquardii* with *T. beccarii*. Later, he demonstrated that the number of midbody scale rows actually varies within each locality and overlap between samples from around Mt Kinabalu (32—36) and Sarawak (28—36: Smith 1931). No morphological differences are evident between samples from Mt Kinabalu and Sarawak examined by us, either. Thus, we follow Smith's (1923) account, and synonymize *Sphenomorphus aquaticus* Malkmus, 1991 with *Tropidophorus beccarii* (Peters, 1871) as below.

Tropidophorus beccarii (Peters, 1871)

Amphixestus beccarii Peters, 1871: 574. (type locality: Sarawak)
Tropidophorus beccarii, Boulenger, 1887: 360; Mocquard, 1890: 135; Rooij, 1915: 276; Smith, 1923: 777.
Tropidophorus mocquardii Boulenger, 1894: 735 (type locality: Mt Kinabalu)
Tropidophorus mocquardi, Rooij, 1915: 276.
Norbea beccarii, Mittleman, 1952: 22.
Norbea mocquardi, Mittleman, 1952: 27.
Sphenomorphus sp., Malkmus, 1987: 286, 1988: 9, 1989: 197.
Sphenomorphus aquaticus Malkmus, 1991 b: 23 (type locality: Poring, southeast to the major peak of Mt Kinabalu), 1992: 131.

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Zusammenfassung

Eine Überprüfung des Status des 1991 nach Exemplaren aus Sabah beschriebenen Wasserskinks *Sphenomorphus aquaticus* Malkmus hat ergeben, daß dieser Name ein jüngeres Synonym von *Tropidophorus beccarii* (Peters) ist.

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