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UPDATING THE SOUTHEAST ASIAN *NEPTOSTERNUS* SHARP FAUNA (COLEOPTERA: DYTISCIDAE)

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ABSTRACT. - The Southeast Asian species of the rheobiotic Dytiscidae genus *Neptosternus* were most recently revised by Hendrich & Balke (1997). Here, we add four new species, i.e. *N. feryi* , *N. latissimus* and *N. wewalkai* from Vietnam, and *N. thiambooni* from Maliau Basin, Sabah.

KEY WORDS. - Southeast Asia, *Neptosternus*, Coleoptera, Dytiscidae

INTRODUCTION

Water beetles of the genus *Neptosternus* are the predominant Dytiscidae in Southeast Asian forest streamlets up to an altitude of some 1000 m a.s.l. Species of this region were most recently revised by Hendrich & Balke (1997). Originally intended as a review of the nine valid *Neptosternus* known in the area then (see Hendrich & Balke, 1995) the work became a lesson in diversity for no less than 40 new species were named. Hendrich & Balke (1997) suspected that numerous new species of *Neptosternus* will be discovered shortly because of the vast areas in the region are still poorly sampled. This first update was started while the revision was still in press, again proving the incredible diversity of *Neptosternus* in the study area.

Neptosternus species are rheobiotic. Natural history data available so far show that the species inhabit primary forest streamlets with a stony and/or gravely ground. The beetles usually hide among floating roots and under small stones at the edge of the streamlets. With the exception of *N. hydaticoides* Régimbart, 1877, muddy or significantly disturbed streamlets are avoided. Thus, *Neptosternus* species are useful indicators for biomonitoring projects. Also, the rather surprising number of species occurring sympatrically, if not syntopically, facilitates this purpose. Hendrich & Balke (1997) noted that up to eight species were taken from the same streamlet (Sabah, Batu Punggul). Data from Bali (Indonesia) clearly show

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that increasing pollution shifts adundances towards those species that tolerate comparably high levels of eutrophication. The number of clear water species decreases at the same time, until they disappear completely. In the course of Environmental Impact Assessments (EIAs) and wetland management studies, we therefore suggest to carefully monitor the aquatic Coleoptera to maintain their incredible diversity at least in places.

This update adds four new species, three of them from Vietnam, and one from Sabah, rising the number of known species from the region under study to 53.

MATERIALS AND METHODS

The material mentioned herein was placed at our disposal by Drs G. Wewalka and Manfred A. Jäch (Vienna, Austria). Specimens are housed in CGW (collection of G. Wewalka), NMW (Naturhistorisches Museum Wien, Austria), UMS (Universiti of Malaysia Sabah, Kota Kinabalu, East Malaysia) and ZRC (Zoological Reference Collection, Singapore). Habitus drawings were made with a drawing tube attached to a Wild M8, the median lobes were traced from SEMs. The style of the descriptive notes follows Hendrich & Balke (1997).

TAXONOMY

The genus *Neptosternus* Sharp is characterized by two apomophies: prosternal process trifid (plesiomorphic character state: simple); posterior angles of pronotum greatly produced backwards and acute (plesiomorphic character state: not produced backwards, rounded).

Neptosternus feryi, new species

(Figs 1, 5; Table 1)

Material examined. - Holotype - male (CGW), VIETNAM, Northeast of Na Hang, 160 km northwest of Hanoi, 150-200 m; coll. Napolov & Roma, 11-13 Nov.1996.

Paratype - 1 female, same data as holotype (NMW).

Diagnosis. - Moderately large, ovate species (Table 1); body only slightly arched in lateral view. Upper side comparably light; head dark anteriorly and reddish posteriorly; sides of pronotum castaneous to blackish, reddish medially; elytra black with eight bright yellow patches (Fig. 1). Venter castaneous brown to blackish, epipleura yellow anteriorly; appendages yellowish to reddish.

Head covered with polygonal meshes but on posterior portion which is densely punctate, few larger punctures visible. Pronotum densely punctate, some larger punctures visible baso-medially; along anterior margin and laterally with microreticluation of polygonal meshes. Elytra with microreticulation consisting of slightly transverse orientated polygonal meshes; fine and densely punctate; numerous very rough punctures visible discally; the discal row of serial punctures dense and well defined, 1st and 2nd lateral row less distinct, a sutural row is not present.

Median lobe of aedeagus as in Fig. 5.

Affinities. - *Neptosternus feryi* superficially resembles *N. strnadi* Hendrich & Balke, 1997, from NW Thailand. However, the latter is distinctly smaller, is not densely punctate on the pronotum, and lacks the rough discal punctation on the elytra. Moreover, the median lobe of *N. feryi* is much longer than in *N. strnadi.*

Etymology. - Named for Hans Fery, Berlin, the most enthusiastic explorer of the West Palaearctic Dytiscidae fauna.

Neptosternus latissimus, new species
(Fig. 2; Table 1)

Material examined. - Holotype - female (CGW), VIETNAM, Northwest of Na Hang, 160 km northwest Hanoi, 150-200 m; coll. Napolov & Roma, 11-13 Nov.1996.

Paratype - 1 female, same data as holotype (NMW).

Diagnosis. - Large, very broad (Table 1), almost roundish species; body distinctly arched in lateral view. Upper side black, except for eight bright yellow elytral patches (Fig. 2). Venter castaneous brown to blackish; appendages yellowish to reddish.

Head covered with polygonal meshes but on posterior portion which is densely punctate, few larger punctures visible. Pronotum densely punctate, some larger punctures visible baso-medially; along anterior margin and laterally with microreticluation of polygonal meshes. Elytra with microreticulation consisting of slightly transverse orientated polygonal meshes; fine and densely punctate; numerous very rough punctures visible discally; the discal row of serial punctures dense and well defined, 1st and 2nd lateral row less distinct, a sutural row is not present.

Affinities. - This species cannot be confused with any of the known species of *Neptosternus* because of the extremely broad habitus.

Etymology. - "latissimus" (Latin) - the broadest.

Neptosternus thiambooni, new species
(Figs. 3, 6; Table 1)

Material examined. - Holotype - male (UMS), MALAYSIA, Sabah, Maliau Basin, Sungai Maliau, upstream of Dhan Falls, 900 m; coll. T.B. Lim, 21 May.1996, MB24.

19 Paratypes (NMW, UMS, ZRC). - 13 inds, same data as holotype . — 1 ind. idem, near to base camp (helipad); coll. G. Gunsalam, 17 May.1996, MB36. — 2 inds idem, near base camp; coll. T.B. Lim & K.L. Yeo, 14 May.1996, MB4. — 3 inds idem, MB2.

Diagnosis. - Moderately large, broadly-ovate species (Table 1); body slightly arched in lateral view. Upper side black, elytra with four small dark reddish patches that are almost invisible in most specimens; head dark reddish anteriorly (Fig. 3). Venter blackish, appendages yellowish to reddish, hind legs darker, castaneous.

Head covered with distinct polygonal meshes, few larger punctures visible. Pronotum densely punctate laterally, some larger punctures visible baso-medially; in the middle, along

anterior margin and laterally with distinct microreticluation of polygonal meshes. Elytra with microreticulation consisting of slightly transverse orientated polygonal meshes; fine and densely punctate; numerous very rough punctures visible discally; the discal row of serial punctures very dense and deeply impressed, 1st and 2nd lateral row less distinct but still rather dense, an obsolescent sutural row visible.

Median lobe of aedeagus as in Fig. 6.

Affinities. - This appears to be the darkest known species of the genus. Besides the very dark coloration, it is well characterized by its puncturation and the shape of the median lobe so that it cannot be confused with the other comparably dark Borneo species (see Hendrich & Balke, 1997).

Habitat. - Specimens were taken from among leaf litter at the edge of a shaded streamlet with a rather sandy ground.

Etymology . - Named for Lim Thiam Boon, Singapore, collector of most of the type specimens.

Neptosternus wewalkai, new species
(Fig. 4)

Material examined. - Holotype - female (CGW), VIETNAM, Northeast of Na Hang, 160 km northwest Hanoi, 150-200 m; coll. Napolov & Roma, 11-13 Nov.1996.

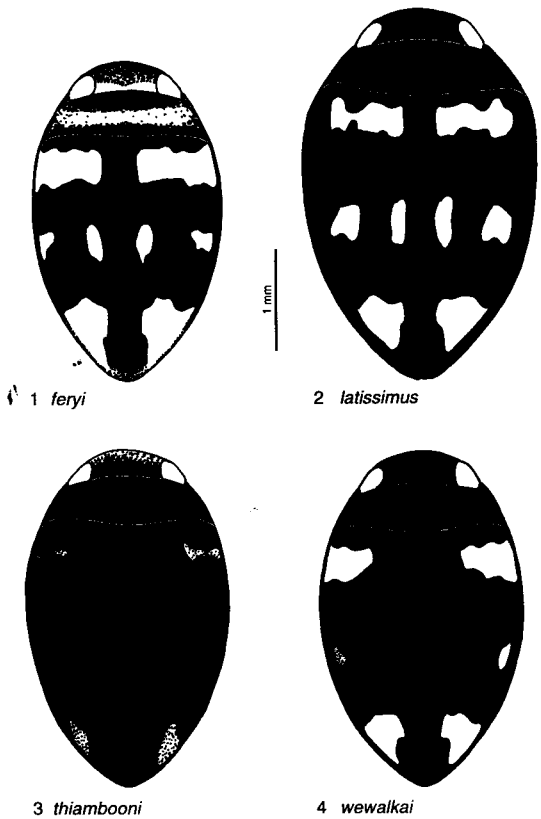
Diagnosis. - Large, broadly-ovate species (Table 1); body only slightly arched in lateral view. Upper side black, except for six bright yellow elytral patches (Fig. 4). Venter castaneous brown to blackish; appendages yellowish to reddish.

Head covered with indistinct polygonal meshes but on posterior portion which is densely punctate, few larger punctures visible. Pronotum densely punctate, some larger punctures visible baso-medially; along anterior margin and laterally with microreticluation of polygonal meshes. Elytra with indistinct microreticulation consisting of slightly transverse orientated polygonal meshes; fine and densely punctate; numerous large punctures visible discally; the discal row of serial punctures dense, well defined and deeply impressed, 1st and 2nd lateral row obsolescent, a sutural row is not present.

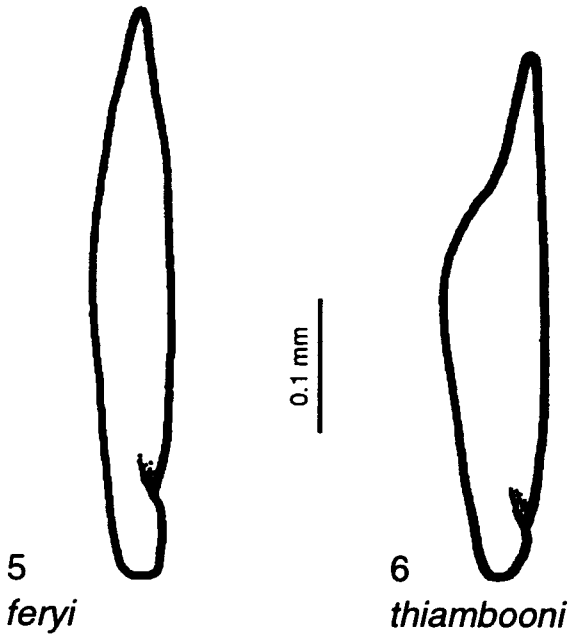
Affinities. - A species well characterized by its size, body form, colouration and puncturation. Taking this set of features, *N. wewalkai* cannot be confused with any of the known species.

Table 1. - *Neptosternus* spp., selected measurements (TL - total lenght of body; TL-h - idem without head; TW - total width of body, all measurements taken at the beetle in a horizontal position).

	TL	TL-h	TW
N. feryi	3.0 - 3.2 mm	2.7 - 2.8 mm	1.8 mm
N. latissimus	3.6 - 3.7 mm	3.3 - 3.4 mm	2.3 - 2.4 mm
N. thiambooni	3.2 - 3.4 mm	2.9 - 3.1 mm	1.9 - 2.0 mm
N. wewalkai	3.3 mm	3.0 mm	2.0 mm



Figs. 1-4. *Neptosternus* spp., dorsal habitus and color, appendages omitted. Fig. 3 depicts a dark specimen at the left half, and the lightest we had at the right half of the drawing).



Figs. 5-6. *Neptosternus* spp., median lobe of aedeagus in dorsal view.

Etymology. - Named for our friend and colleague Professor Günther Wewalka, Vienna, who placed this specimen at our disposal.

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