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A NEW *HYPHYDRUS* SPECIES FROM INDONESIA, WITH A LIST OF AND A KEY TO THE ORIENTAL AND AUSTRALASIAN SPECIES (COLEOPTERA: DYTISCIDAE)

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ABSTRACT. - Twenty-nine species of the genus *Hyphydrus* have so far been recorded from the Australasian and Oriental zoogeographical regions. The distribution of the species is given at the country-level. A key for the determination of species (males only) is presented. *Hyphydrus bistrimaculatus*, new species, is described on the basis of 12 specimens from the Aru Islands, Indonesia.

KEY WORDS. - *Hyphydrus bistrimaculatus*, new species, Coleoptera, Dytiscidae, Australasian, Oriental.

INTRODUCTION

The taxonomy and systematics of the genus *Hyphydrus* in the Oriental and Australasian zoogeographical regions have been treated in numerous papers over the years. Most articles, however, generally focus on a very limited number of taxa at the species level. Sometimes only one species is discussed, often causing problems of identification for those aware of all taxa, and their geographical ranges. Over the years larger revisionary works have also been published, enabling, for instance, possibilities for determination of material from the two regions in question. Foremost amongst these works is Sharp´s (1882) biosystematic monograph on Dytiscidae of the World; Régimbart´s (1899) revision of the Dytiscidae of the Oriental region; Vazirani´s (1968) study of the Indian hydroporines and; Watts´s (1978) revision of the Australian Dytiscidae. A world revision of the genus *Hyphydrus* was recently published by the senior author of this paper (Biström, 1982). Since that time seven separate articles have appeared, presenting new faunistic information, and description of new species from the two regions dealt with here. These papers are listed below under the section Key to species. To sum up, we now require, for practical reasons, a compilation of the faunistic and taxonomic situation in the Australasian region in order to acertain which species also

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occur in the Oriental region. The aim of the present paper is thus threefold:

1. To provide an up-to-date key for the determination of the *Hyphydrus* species in the Australasian and Oriental zoogeographic regions (see, also under point 2. below).

2. To provide distributional information at the country-level for the genus *Hyphydrus* in the areas treated. (Note, that there is a transition zone between Palearctis and the Oriental region in southern China; some in this context relevant records only referring to S. China are therefore included in Table 1.)

3. To describe and illustrate a recently detected undescribed *Hyphydrus* species from Indonesia.

The third author visited the Aru Islands in 1994 for a total of four weeks (Kirk-Spriggs, 1995). The expedition was carried out in order to promote knowledge of the insect fauna, especially the Coleoptera. The archipelago extends over 6325 square kilometers, and the main "island" is intersected by five narrow saltwater channels into six islands - Kola, Wokam, Kobroor, Maikoor, Koba and Trangan (Fig. 6). The islands are geologically part of western New Guinea (Austranesian), lying on the Sahul Shelf and was connected to that island 20000 years ago, when sea-levels were lower. The elevation of the islands seldom exceeds 90 meters. Mangrove swamps ring the islands and clog the mouths of the channels. The interior is covered with lowland decidious tropical rainforest, which includes areas of Sago palm (*Metroxylon* sp.), a staple food source of the indigenous peoples (Muller, 1991). The Victorian naturalist Alfred Russel Wallace (1823-1913) visited the islands in the 1860's (Wallace, 1890) but since that time the insect fauna of the islands has remained largely uncollected.

KEY TO THE SPECIES (BASED ON MALES)

Given the present state of our taxonomic knowledge of the genus *Hyphydrus* in the Australasian and Oriental regions we are unable to present a key to both sexes. The species-groups of *Hyphydrus* defined in Biström (1982) are not recognized in the key.

For necessary illustrations needed for the determination of species given in this key the reader is refered to Biström (1982, 1983a, 1983b, 1984), Biström et al. (1993), Biström & Sato (1988), and Wewalka & Biström (1989, 1993).

1. Male protrochanters incised (a minute excavation with sharp edges; often exhibiting an extended process), symmetrical 2
- Male protrochanters not incised (but symmetrical) or extended, asymmetrical 19

2 Penis lacking apico-lateral hairtufts; frontal outline of penis (lateral aspect) straight 3
- Penis exhibiting apico-lateral hairtufts (Fig. 2); frontal outline of penis (lateral aspect) curved (Fig. 3) 4

3. Penis (dorsal aspect) with a deep frontal incision; three basal joints of male pro- and mesotarsus narrow towards apex ..... *H. celebensis*
- Penis (dorsal aspect) with moderately deep frontal incision; three basal joints of male pro- and mesotarsus equally broad ..... *H. excoffieri*

4. Lobes of penis (dorsal aspect) distinctly extended outwards apically ..... *H. intermixtus*
- Lobes of penis (dorsal aspect) not extended outwards apically 5

5. Robust species (length of body 4.5-5.0 mm); basal segment of male mesotarsus strongly enlarged ..... *H. jaechi*
- Smaller species (length of body max. 4.2 mm); basal segment of male mesotarsus not, or moderately enlarged 6

6. Elytra dark coloured; some species with a few well delimited humeral and preapical, pale spots (e.g. as in Fig. 1) 7
- Elytra with extensive pale colouration (at least basally with a pale, transversely located pale area) 10

7. Penis (lateral aspect) robust, broad, apex curved (Fig. 3) ..... *H. bistrimaculatus*, new species
- Penis (lateral aspect) not robust, narrow, apex only indistinctly curved 8

8. Elytral punctation (central region) almost equal; coarse punctures at maximum twice as large as fine punctures ..... *H. eldenbecki*
- Elytral punctation (central region) distinctly of two kinds; coarse punctures about 3-4 times larger than finer punctures 9

9. Elytra dark, without distinct pale spots; small species (length of body 3.2-3.5 mm); penis apex (dorsal aspect) quite broad ..... *H. holomelas*
- Elytra dark, with pale humeral and preapical spots; larger species (length of body 3.8-4.1 mm); penis apex (dorsal aspect) narrow ..... *H. gibbosus*

10. Pronotum pale, only with indistinct basal darkened area; elytra almost totally pale, with minute darkened areas ..... *H. gschwendtneri*
- Pronotum dark, with pale, quite narrow, lateral areas; elytra extensively dark, with pale areas 11

11. Male pro- and meso-tarsi dark ..... *H. schoedli*
- Male pro- and meso-tarsi totally pale or with one darkened joint 12

12. Apices of lateral lobes (penis, dorsal aspect) broadly rounded ..... *H. fangensis*
- Apices of lateral lobes (penis, dorsal aspect) not broadly rounded; pointed or narrowly rounded 13

13. Elytral punctation (central region) almost equal, not distinctly of two kinds 14
- Elytral punctation (central region) distinctly of two different kinds; coarser punctures at least twice as large as fine punctures 15

14. Elytral punctation (central region) sparser, distance between punctures approximately twice the diameter of one puncture; incision of penis apex (dorsal aspect) less deep ..... *H. jacobsoni*
- Elytral punctation (central region) dense, distance between punctures approximately as diameter of one puncture; incision of penis apex (dorsal aspect) deep ..... *H. boettcheri*

15. Penis (lateral aspect) narrows quite evenly towards apex; penis (dorsal aspect) with lateral outline angulate 16
- Penis (lateral aspect) narrows abruptly close to apex; penis (dorsal aspect) with lateral outline rounded, not distinctly angulate 17

16. Male protrochanters at incision generally provided with an extended process ..... *H. sumatrae*
- Male protrochanters at incision without an extended process. ..... *H. pulchellus*

17. Male head frontally without densely microsculptured area; lateral lobes of penis apically close to each other ..... *H. holmeni*
- Male head frontally with a densely microsculptured area; lateral lobes of penis apically clearly separated 18

18. Pro- and meso-tarsi pale ..... *H. renardi*
- Pro- and meso-tarsi with third segment generally darkened ..... *H. birmanicus*

19. Male protrochanters asymmetrical, elongated, and modified 20
- Male protrochanters symmetrical, not elongated, unmodified 22

20. Male pro- and meso-tarsi slender ..... *H. effeminatus*
- Male pro- and meso-tarsi flattened, broad 21

21. Pronotum dark with pale lateral areas; larger species (length of body 3.9-4.7 mm) ..... *H. decemmaculatus*
- Pronotum pale, at base and foremargin with a narrow darkened area; small species (length of body 3.4-3.9 mm) ..... *H. contiguus*

22. Male abdomen provided with a sharp spine (three sub-species; see Biström 1982) or a distinct tubercle (subspecies *H. l. xanthomelas*) ..... *H. lyratus*
- Male abdomen lacks spine or tubercle 23

23. Penis (lateral aspect) angulate, frontally provided with two soft extensions; body elongate ... 24
- Penis (lateral aspect) not angulate, frontally not provided with two soft extensions; body quite globular 25

24. Male pro-tarsus broader than meso-tarsus; paramere lacking preapical constriction .. *H. elegans*
- Male pro- and meso-tarsus equally broad; paramere with preapical constriction ..... *H. dani*

25. Lateral edge of longer metatibial spur serrate ..... *H. orientalis*
- Lateral edge of metatibial spur non-serrate 26

26. Maxillary palpus apically broadly flattened ..... *H. coccinelloides*
- Maxillary palpus apically not flattened 27

27. Large species (length of body 4.5-4.9 mm) ..... *H. keiseri*
- Smaller species (length of body max. 4.0 mm) 28

28. Medium sized species (length of body 3.8-4.0 mm) ..... *H. ceramensis*
- Small species (length of body 3.0-3.1 mm) ..... *H. loriae*

The distribution of *Hyphydrus* species at the country-level in the Australasian and the Oriental Regions is given in Table 1.

DESCRIPTION OF A NEW SPECIES FROM THE ARU ISLANDS, INDONESIA

SYSTEMATICS

FAMILY DYTISCIDAE LEACH, 1815
SUBFAMILY HYDROPORINAE ERICHSON, 1837

Genus *Hyphydrus* Illiger, 1802
***Hyphydrus bistrimaculatus*, new species**
(Figs. 1-7)

***Type locality*.** - Indonesia, Aru Islands, Trangan, 1 km South of Popjetur.

***Material examined*.** - Holotype - male - Aru Islands, Trangan, 1 km S of Popjetur, 6°48´S134°4´E, 10 Aug.1994, 90 m (A.H. Kirk-Spriggs), Temporary/Sago pools, Primary mixed forest (National Museums & Galleries of Wales).

Paratypes - Four males and seven females - same data as holotype; but 6 exx. 1 km E of Ngaiguli,

Table 1. List of *Hyphydrus* species recorded in the Oriental and Australasian zoogeographical regions, with country-level distribution indicated. Abbreviations used: Pak = Pakistan, Ind = India, Nep = Nepal, Bhu = Bhutan, Bgd = Bangladesh, SL = Sri Lanka, Mya = Myanmar (Burma), Tha = Thailand, La = Laos, Vtm = Vietnam, SC = S. China (regional affiliation unclear; see point 2. under Introduction), HK = Hong Kong, Twn = Taiwan, OJ = Okinawa, Japan, Mal = Malaysia, Indon = Indonesia, Phi = Philippines, PNG = Papua New Guinea, SI = Solomon Islands, Van = Vanuatu, F = Fiji, NC = New Caledonia, Aus= Australia, NZ = New Zealand. Uncertain records are indicated by ?.

decemmaculatus Wehncke: Indon, PNG, Aus
effeminatus Watts: Aus
contiguus Wehncke: Aus
elegans (Montrouzier): Indon, PNG, Van, NC, Aus, NZ
dani Biström, Balke & Hendrich: Indon
l. lyratus Swartz: SL?, Mya, Tha, La, Vtm, SC, HK, Twn, OJ, Mal, Indon, PNG, F, Aus
l. foveolatus Régimbart: PNG
l. flavicans Régimbart: Pak, Ind, SL
l. xanthomelas Régimbart: Mal, Phi
orientalis Clark: Vtm, SC, Twn
coccinelloides Zimmermann: Indon
keiseri Mouchamps: Indon
gschwendtneri Guignot: Pak, Ind
boettcheri Biström: Phi
schoedli Wewalka & Biström: Indon
sumatrae Régimbart: Mya, Tha, Vtm, SC?, Mal, Indon
pulchellus Clark: India?, Mya, La, Vtm, SC, Twn
jacobsoni Biström: Tha, Vtm, Indon
fangensis Biström & Sato: Tha
intermixtus (Walker): Ind, SL
gibbosus Biström: PNG
bistrimaculatus, new species: Indon
eldenbecki Biström: SI
ceramensis Wewalka & Biström: Indon
loriae Régimbart: PNG
holomelas Biström: Mal
renardi Severin: Ind, Nep, Bhu, Bgd, SL, Mya, Vtm?
birmanicus Régimbart:: Mya
holmeni Biström: Nep, Bhu
excoffieri Régimbart: Vtm, SC
celebensis Biström: Indon
jaechi Wewalka & Biström: Indon

29 Jul.1994 (all A.H. Kirk-Spriggs Maluku Tenggara Coll. NMW. Z 1994. 061). (5 exx. deposited in National Museum & Galleries of Wales, Cardiff; 3 exx. in coll. Hendrich, Berlin; 2 exx. in Zoological Museum, Helsinki; 1 ex. in the Natural History Museum, London). 12 specimens examined in all.

Description. - (only diagnostically important differences from the description of *H. gibbosus* are recognized, cf. Biström 1984:91). - Length of body 3.04-3.52 mm, breadth 2.12-2.44 mm. Body globular, dorsally slightly flattened. Angle between pronotum and elytra not strongly pronounced but clearly visible.

Head: Blackish brown, anteriorly and close to pronotum indistinctly paler, dark brownish. Punctation quite evenly distributed, quite dense, except narrowly at pronotum where head is impunctate. Frontally submat, finely microsculptured; posteriorly head becomes gradually more shiny and with weaker microsculpture. At pronotum head narrowly non-microsculptured except posterior to eyes (finely microsculptured). Maxillary palpi with apical segment almost totally brownish.

Pronotum: Almost total surface punctate. Rather shiny, microsculpture almost totally absent. Laterally and mediofrontally with indistinct reticulation discernible.

Elytra: Black to blackish-ferrugineous, humeral region with three, quite distinct, paler spots (Fig. 1). Preapical region with vague paler areas. Punctures slightly finer than in *H. gibbosus*, but difference between the two kinds still clear.

Ventral aspect: Prosternal process with a somewhat sparse hairtuft. Apical sternite transversely slightly depressed.

Male genitalia: Figs. 2-4. Apical half of penis (lateral aspect) broad, robust.

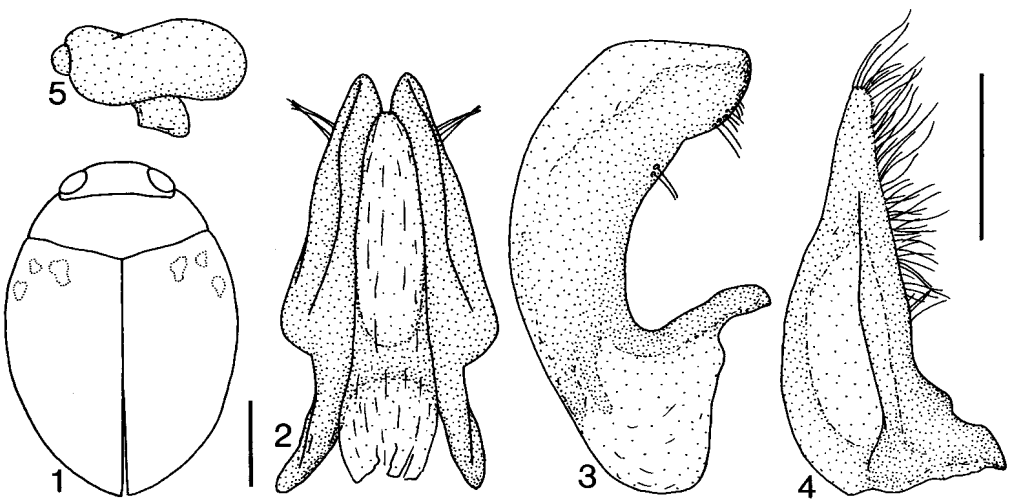
Legs: Pro- and meso-tarsi rather slender. Protrochanters moderately deeply incised.

Female: Body dorsally totally submat, microsculptured. Protrochanters not incised. Prosternal process with a few hairs. Apical sternite without transverse depression. Spermatheca as in Fig. 5.

Remarks. - A distinct species, which belongs to the *H. signatus* species-group as defined by Biström (1982). The species is particularly characterized by the following features: General body colour (including head) dark (humeral region with three pale spots and preapical region of elytra with diffuse, slightly paler areas), body-size comparatively moderate, apical half of penis broad in lateral aspect. The closest relative to the new species is probably *H. gibbosus*. This species has a pale ferrugineous head, its body size is distinctly larger (length 3.8-4.1 mm) and the penis (lateral aspect) is distinctly narrower than in the new species.

Etymology. - The name *bistrimaculatus* refers to the three pale spots on each elytron.

Known distribution. - Aru Islands, Indonesia (Fig. 6).



Figs. 1-5. *Hyphydrus bistrimaculatus*, new species. 1, Habitus; 2, Penis, dorsal aspect; 3, Penis, lateral aspect; 4, Paramere; 5, Spermatheca. Left scale 1 mm, habitus; Right scale 0.2 mm, genitalia.

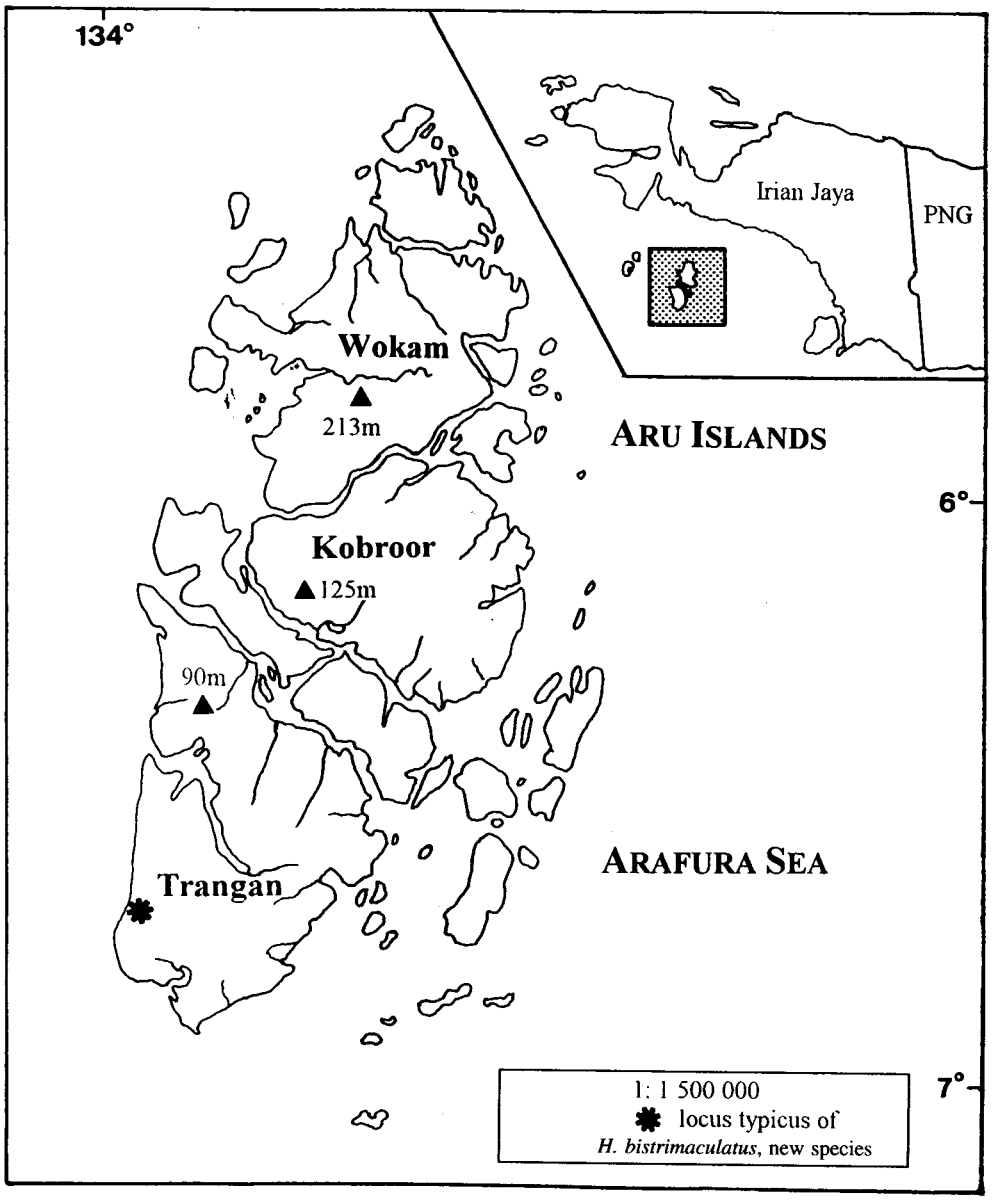


Fig. 6. Map of Aru Islands, showing locus typicus of *Hyphydrus bistrimaculatus*, new species.

Collecting notes. - *H. bistrimaculatus*, new species, was collected in artificial, small and shaded pools situated in sago groves in small clearings of primary mixed forest. These pools were holes dug by the local people to collect rainwater for processing sago in the forest. All holes were approximately one meter deep and half a meter across and contained clean fresh water (Fig. 7). Specimens were collected using a metal hand sieve at a depth of half meter from roots growing in from the sides of the pool. Apart from the new species, the water beetle coenosis there included one species of *Hydaticus* Leach (*pacificus*-group sensu Balke & Hendrich, 1992), three species of *Copelatus* Erichson and one species of *Clypeodytes* Régimbart.

Fig. 7. Habitat of *Hyphydrus bistrimaculatus*, new species, sago pool 1 km E of Ngaiguli, Trangan, Aru Islands.

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