



A new species of genus *Hyphydrus* Illiger (Coleoptera: Dytiscidae: Hyphydrini) from Arunachal Pradesh, India

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Abstract

Hyphydrus biswasi Ghosh, sp. nov. (Coleoptera: Dytiscidae: Hyphydrini), is described in *H. signatus* species group from Namdapha National Park, Arunachal Pradesh, India. An identification key to the Indian species of genus *Hyphydrus* Illiger, is also provided.

Keywords: Himalaya, Identification Key, Male Genitalia, Taxonomy

Introduction

The genus *Hyphydrus* Illiger, 1802 includes 139 described species, distributed in Afrotropical, Australian, Oriental and Palearctic Regions (Biström 1982; Nilsson & Hájek, 2019). The species in the genus are mainly found in ponds and pools with vegetation (Miller & Bergsten, 2016). Biström (1982) revised the genus and divided into 19 species groups. Of which, six species and two subspecies are so far known from India in two species groups; *H. lyratus* species groups (*H. lyratus lyratus* Swartz; *H. lyratus flavicans* Régimbart) and *H. signatus* species group (*H. gschwendtneri* Guignot, *H. sumatrae* Régimbart, *H. intermixtus* (Walker); *H. renardi* Severin, *H. birmanicus* Régimbart) (Vazirani, 1968; Biström, 1982; Ghosh & Nilsson, 2012; Jaiswal *et al.*, 2014; Ghosh *et al.*, 2018; Nilsson & Hájek, 2019).

While working on a collection of Dytiscidae, present in the Coleoptera Section of Zoological Survey of India, I found a population of an undiscovered *Hyphydrus*, which is herein described as new to science in *H. signatus* species group. The essential diagnostic characters of the new species are illustrated and compared. A key to the species of genus *Hyphydrus* from India is also prepared.

Material and Methods

The material of the new species was collected from Vijay Nagar, Namdapha National Park, currently located in

Changlang district of the state of Arunachal Pradesh, India. The aedeagus was dissected and cleaned in a KOH solution of 10% for 30 minutes and mounted on a coverslip using DPX and clove oil. The mounted aedeagus was attached below the specimen. The specimens were studied using a Nikon SMZ 25 stereo microscope. The measurements and photographs were taken through the microscope using the proprietary software. The morphological terms broadly follow after Biström (1982) and Hájek & Reitter (2014).

Taxonomy

Family Dytiscidae Leach, 1815
Subfamily Hydroporinae Aubé, 1836
Tribe **Hyphydrini** Sharp, 1880
Genus ***Hyphydrus*** Illiger, 1802

Hyphydrus biswasi Ghosh, sp. nov.

(Figures 1-7)

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Type material (14 specimens). Holotype, male: India: Arunachal Pradesh, Namdapha National Park, Vijay Nagar, 21.xii.1984, Collected S. Biswas (NZSI). Paratypes: 8 males, 5 females, locality data same as holotype (NZSI).

Type locality. India: Arunachal Pradesh, Namdapha National Park, Vijay Nagar.

Type depository. The type specimens are deposited in the national zoological collections of the Zoological Survey of India, Kolkata (NZSI). The specimens of the newly described species are provided with one red printed label, “*Hyphydrus biswasi* sp. nov., HOLOTYPE or PARATYPE” Det. Sujit Kumar Ghosh.

Description (Holotype, male). Length 3.9 mm, width 2.5 mm.

Colouration (Figure 1). Body colouring testaceous to ferruginous with brownish-black colour pattern. Head testaceous with two slightly darkened spots at vertex near posterior margin to eyes; Antennae and palpi testaceous. Pronotum dark brownish-black; lateral sides with a slightly paler band. Elytra shiny black ferruginous with slightly irregular testaceous markings anteriorly and posteriorly; two testaceous spots present posteromedially. Legs testaceous; meta-legs dark ferruginous; 3rd pro- and mesotarsomere and 3rd to 5th metatarsomere partly darkened, and blackish ferruginous. Ventral surface dark ferruginous, except testaceous head and prosternum.

Head (Figure 1). Anterior margin of clypeus slightly straight medially, somewhat rounded at sides, with a

partially raised border. Punctuation near clypeal margin fine and sparse, medially at vertex dense and fine. Clypeus micro-sculptured anteriorly. Clypeus with two large, and relatively shallow frontolateral depressions. 3rd and 11th antennomeres longer, 4th antennomere smaller.

Pronotum (Figure 1). Punctuation on surface of 2 types: coarse, and fine; coarse punctuation sparse at base to middle and dense at middle to apex; fine punctuation evenly distributed throughout. Sides of pronotum slightly curved and bordered. Angle between pronotum and elytra fairly distinct.

Elytra (Figure 1). Punctuation on surface of 2 types: coarse and fine; coarser punctuation sparsely distributed, whereas finer punctuation more evenly distributed; punctuation finer at lateral sides. Elytron with a discal row of punctures near elytral suture, disappearing after middle of elytron posteriorly; a row of irregular and an indistinct small line of punctures near lateral margins. Epipleura testaceous, with relatively fine punctuation.

Venter. Punctuation on metasternum fairly coarser; abdomen finely punctate. Apical sternite hooked.

Table 1. Checklist of genus *Hyphydrus*, known from India

S.N.	Name of the Species	India (states)	Elsewhere
<i>H. lyratus</i> species group			
1.	<i>a. H. lyratus flavicans</i> Régimbart, 1892	Bihar, Delhi, Gujarat, Jharkhand, Madhya Pradesh, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, and Uttar Pradesh.	Pakistan and Sri Lanka.
	<i>b. H. lyratus lyratus</i> Swartz, 1808	Andaman and Nicobar Islands (Port Blair).	Australian region, China, Indonesia, Japan, Myanmar, Sri Lanka Taiwan, Thailand, and Vietnam.
<i>H. signatus</i> species group			
2.	<i>H. birmanicus</i> Régimbart, 1888	Manipur.	China, Bhutan, and Myanmar.
3.	<i>H. biswai</i> sp. nov.	Arunachal Pradesh.	-
4.	<i>H. gschwendtneri</i> Guignot, 1942	Himachal Pradesh, Madhya Pradesh, and Sikkim.	Afghanistan and Pakistan.
5.	<i>H. intermixtus</i> (Walker, 1858)	Gujarat, Kerala, Maharashtra, Rajasthan, and Tamil Nadu.	Sri Lanka.
6.	<i>H. renardi</i> Severin, 1890	Bihar, Dadra Nagar Haveli, Gujarat, Himachal Pradesh, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh, and West Bengal.	Bangladesh, Bhutan, Myanmar, Nepal, Pakistan, and Sri Lanka.
7.	<i>H. sumatrae</i> Régimbart, 1880	Assam and Manipur.	China and Indonesia.

Legs. Protochanters incised with a fairly long, backwardly curved process; a furrow present at base of hooked process (Figure 2).

Aedeagus. Median lobe of aedeagus in ventral view parallel, narrowing at apex (Figure 3); penis incision relatively deep (Figure 3); apex of penis truncates with several short setae anterolaterally, lateral lobe of penis



Figures 1-7. *Hyphydrus biswasi* Ghosh sp. nov. (holotype, male). (1) male habitus; (2) Protanchter; (3) Penis in ventral view (dry); (4) Apex of penis (in alcohol; arrow showing lateral seta); (5) Penis in lateral view (dry); (6) Right paramere; (7) Spermetheca.

straight (Figure 5); base of penis with a strongly curved hooked process (Figure 5); right paramere with inner margin curved (Figure 6).

Variations. Length 3.4-4.2 mm, width 2.3-2.9 mm. Females same as holotype except in following characters: pro-trochanters lacking curved process; apical sternite not hooked; spermatheca as in Figure 7.

Etymology. The species is named after Late Dr Shyamrup Biswas, Retired Scientist at Zoological Survey of India, Kolkata, who devoted his career studying a different group of beetles from India.

Distribution: So far known from the type locality only.

Differential diagnosis: *Hyphydrus biswasi* Ghosh, sp. nov. belongs to *Hyphydrus signatus* species group. *H. signatus* species group comprises *H. birmanicus* Régimbart, *H. gschwendtneri* Guignot, *H. intermixtus* (Walker), *H. renardi* Severin, *H. sumatrae* Régimbart and defined by the set of following characters: 1) border of anterior margin of the head without a furrow, 2) elytral punctation two types (coarse and fine), 3) male pro-trochanters incised, 4) longer spine of metatibiae not serrate, 5) metatibiae externally with a distinct row of punctures, and 6) lateral lobes of penis not curved outwardly (Biström, 1982).

The newly described species is closely related to *H. sumatrae* (India: Assam, Manipur; China, Indonesia) but differs from it by the following characters: punctation near clypeal margin fine and sparse, vertex fine and dense (punctation coarse evenly distributed in *H. sumatrae*), the base of the penis with a sharply curved hooked process (hooked process straight, not curved in *H. sumatrae*), incision of penis relatively deep (narrow in *H. sumatrae*), apex of penis dorsally truncate (slight rounded in *H. sumatrae*), lateral lobe of penis straight (slightly elevated near apices in *H. sumatrae*), and right paramere with inner margin curved (straight in *H. sumatrae*). Also refer to key for differentiating the species in *signatus* species group from India.

Key to the species of genus *Hyphydrus* from India

- 1 Elytral punctation uniform of one type (*H. lyratus* species group) 2
- Elytral punctation of two types (*H. signatus* species group) 3
- 2 Markings on elytra as in Biström (1982, Figure 16a) *H. lyratus lyratus*
- Markings on elytra as in Biström (1982, Figure 18) *H. lyratus flavicans*
- 3 Difference between two kinds of elytral punctures bigger 4
- Difference between two kinds of elytral punctures smaller 7
- 4 Lateral lobes of penis with sides posteriorly almost parallel 5
- Lateral lobes of penis with sides posteriorly not parallel 6
- 5 Base of penis with hooked process straight aedeagus; incision of penis relatively narrow lateral lobe of penis slight elevated apically; spermatheca and aedeagus as in Biström (1982, Figure 91b-d, e) *H. sumatrae*
- Base of penis with sharply curved hooked process; incision of penis relatively deep; lateral lobe of penis straight apically; spermatheca and aedeagus as in Figures 1 to 7 *H. biswasi* sp. nov.
- 6 Tarsi pale; aedeagus as Biström (1982, Figure 97b-e) *H. renardi*
- Tarsi partly darkened (in few specimens pale); aedeagus as Biström (1982, Figure 98b-e) *H. birmanicus*
- 7 Elytra with very dense punctation, interstices between punctures smaller than diameters of punctures; lateral lobes of penis apically curved outwards; aedeagus as Biström (1982, Figure 94b-d) *H. intermixtus*
- Elytra with sparser punctation, interstices between punctures bigger than diameters of punctures; lateral lobes of penis apically not curved outwards; aedeagus as Biström (1982, Figure 89b-d) *H. gschwendtneri*

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