



An unusual new species of Gyrinidae (Coleoptera), *Orectochilus orbisonorum* n. sp., from India

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Abstract

A new species of Gyrinidae, *Orectochilus orbisonorum* n. sp., is described to honor the late Roy Orbison, recording artist and songwriter, and his wife Barbara. The species is unique among Indian Gyrinidae and *Orectochilus* Lacordaire, in general, since the ventral surfaces are white as the result of clear areas of cuticle allowing internal tissues to be visible.

Key words: whirligig beetles, classification, taxonomy

Introduction

Orectochilus Lacordaire, 1835 is one of the most speciose genera of Gyrinidae with members occurring throughout the Old World tropics with a single species in Africa (*O. africanus* Ochs, 1923) and one in Europe (*O. villosus* Müller, 1776). Many species live in India where they can be collected in large numbers at lights or from small streams. Often numerous species can be found in the same habitat. A surprisingly homogeneous group in many respects, nearly all species in this genus are black, bronzy, brown or reddish, with the ventral surfaces black, reddish or testaceous. A new species from southwestern India was recently discovered, however, that is unique in being dorsally black but largely white ventrally, a highly atypical feature for this genus. *Orectochilus* species have not been comprehensively revised, but Indian species were treated by Vazirani (1984) who keyed the species and described and illustrated them. The genus is difficult because of great diversity, close similarity of many taxa and intraspecific variation (including sexual dimorphism in taxonomically important characters). However, Vazirani's (1984) work has made the species in India, at least, identifiable.

Materials and methods

Measurements. Measurements were obtained using an ocular scale on a Wild M3C dissecting microscope. All available intact specimens were measured. Measurements taken include total length (TL, distance from the anterior margin of the clypeus to the posterior margin of visible abdominal sternum VI), greatest width (GW, the greatest distance across the elytra), greatest height (GH, the greatest distance between the dorsal and ventral surfaces as viewed laterally), length of the protibia (TiL, the greatest length of the male tibia), protarsal length (TaL, the greatest length of the male tarsus) and protarsal width (TaW, the greatest width across the

male protarsus). The ratios TL/GW, TiL/TaL and TaL/TaW are also provided to give an indication of proportion and shape.

Material. This project is based on specimens collected in southwestern India during an expedition there in 2004. Nearly all species of *Orectochilus* were also examined by the second author as part of his revision of the genus in progress. This has included type specimens for most species. Numerous species of *Orectogyrus* Régimbart, 1844 from Africa and *Gyretes* Brullé, 1835 from North and South America (the two other genera in the tribe Orectocheilini) were also examined, as well as representatives of all other genera of Gyridae. The holotype and several paratypes are deposited in the Museum of Southwestern Biology, University of New Mexico (MSBC, K.B. Miller). Paratypes are also deposited in the Arizona State University Natural History Museum (ASUM, Q.D. Wheeler) and in the collection of P. Mazzoldi (Brescia, Italy).

***Orectochilus orbisonorum* Miller, Mazzoldi and Wheeler, new species**

(Figs 1–6)

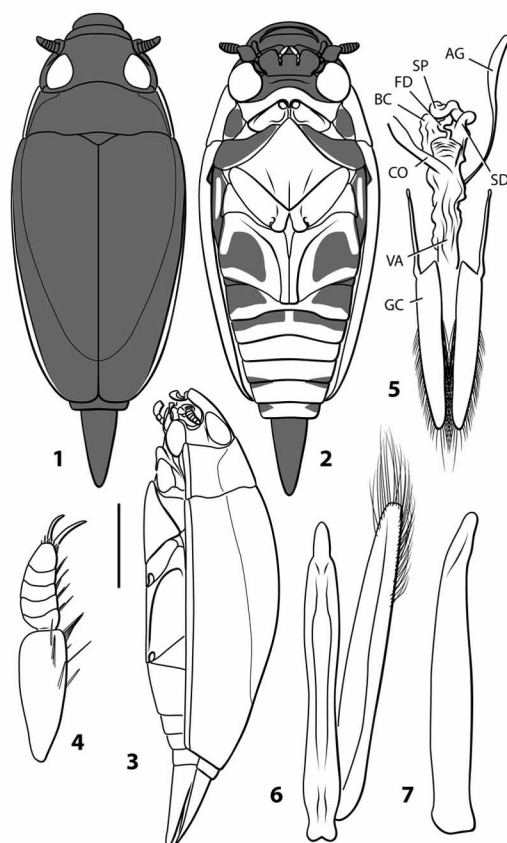
Diagnosis. This is the only species of Indian *Orectochilus* that is dorsally nearly entirely black (Fig. 1) with a largely white venter (Fig. 2). Other characters in diagnostic combination include: 1) the margin of the setose region on the elytron is evenly curved and slightly convex medially (Figs 1,3); 2) the apical 1/5 of the elytron is setose (Figs 1,3); 3) the margin of the setose region on the pronotum is concave and anteriorly extends medially to a level slightly past the middle of the compound eye (Figs 1,3); and 4) the labrum is broad (width/length = 3.9) (Fig. 1). The male genitalia are also diagnostic (Figs 6,7). The median lobe in ventral aspect is elongate and slender with the apex abruptly narrowed (Fig. 6). In lateral aspect it is slightly curved ventrad apically (Fig. 7).

This species keys to Vazirani's (1984) Group 2 of *Orectochilus* (*Patrus*). Although this group may be largely artificial, it is easily diagnosed from all other species in that group by the white venter. This new species is also similar in several respects to three species from southern India, *O. discifer* (Walker, 1859), *O. punctulatus* Régimbart, 1886 and *O. fraternus* Régimbart, 1886 (the last not included in Vazirani's (1984) work since it is known from Sri Lanka). From these three species our new one can be distinguished by the shape of the aedeagus (Fig. 6), the more rounded shape of the pronoto-elytral glabrous area at the posterior apex (Fig 1) and the microsculpture which in *O. orbisonorum* is formed by small isodiametric cells, whereas it is almost obsolete in *O. discifer* and indistinct and formed by narrow, transversely elongated meshes in both *O. punctulatus* and *O. fraternus*.

Description. Measurements: TL = 4.98–5.38 mm, GW = 2.03–2.22 mm, GH = 1.62–1.83, TL/GW = 2.42–2.45.

Coloration: Dorsal surfaces black, lateral margins of pronotum and elytra white (Fig. 1). Head appendages testaceous except labial palpi white (Figs 1–3). Legs white except protarsi, apex of profemur, margins of protibia and lateral surface of metaxocae testaceous. Ventral surfaces white and testaceous to black (Fig. 2). Prosternum white medially, laterally testaceous; pronotal epipleuron white; propleuron testaceous. Mesepisternum testaceous, other mesosterna white. Metasternum white. Two basal visible abdominal sterna medially white, laterally testaceous; visible abdominal sterna III–VI white, sometimes with lateral margins testaceous; apical visible sternum rufotestaceous. Epipleuron white.

Sculpture and structure: Surface of head, pronotum and elytra with distinct microreticulation consisting of small, isodiametric cells. Labrum broad, width/length = 3.9, anterior margin broadly curved (Fig. 1). Pronotum with lateral pubescence extending medially to middle of eye along anterior margin, posteriorly abruptly constricted, medial margin evenly concave (Figs 2,3). Elytron with lateral pubescence relatively broad anteriorly, medial margin slightly convex medially (Figs 2,3); pubescence confluent along suture in posterior 1/5 of elytra (Figs 2,3). Posterolateral elytral angle obtuse, rounded (Figs 1–3).



FIGURES 1–7. *Orectochilus orbisonorum* n. sp. 1) dorsal habitus showing color pattern, labrum extended anteriorly, 2) ventral habitus showing color pattern, 3) left lateral habitus, 4) male left protibia and protarsus, anterior aspect, 5) female genitalia (AG = accessory gland; BC = bursa copulatrix; CO = common oviduct; FD = fertilization duct; GC = gonocoxa; SD = spermathecal duct; SP = spermatheca; VA = vagina), 6) male median lobe and left lateral lobe, dorsal aspect, 7) male median lobe, right lateral aspect. scale bar = 1mm for 1–3 only.

Male genitalia: Median lobe in ventral aspect slender, elongate, medially slightly constricted, subapically abruptly narrowed, apex narrow and apically narrowly rounded (Fig. 6); median lobe in lateral aspect slender, apically slightly but distinctly bent ventrad, apex narrowly rounded (Fig. 7). Lateral lobe moderately broad, apex broadly rounded, with dense series of elongate, fine setae along apical margins (Fig. 6).

Female: Gonocoxosternite narrow, elongate, apically narrowly rounded, anterior apodeme slender (Fig. 5); vagina elongate, broad (Fig. 5); bursa short, broad (Fig. 5); spermathecal duct arising apicoventrally on bursa, broad, not strongly differentiated from tubular, contorted spermatheca (Fig. 5); fertilization duct narrowed to broad, flattened sac which opens at base of common oviduct (Fig. 5); with elongate, slender accessory gland inserting dorsally on bursa (Fig. 5).

Sexual dimorphism: Male protarsus large and broadly expanded compared with female (Fig. 4, TiL = 34.3–36.1mm, TaL = 22.6–24.4mm, TaW = 9.4–9.9mm, TiL/TaL = 1.5–1.6, TaL/TaW = 2.4–2.5).

Etymology. This species is named in honor of recording artist, songwriter and rock and roll pioneer, Roy Orbison and his wife Barbara

Distribution. This species is known only from central areas of the Western Ghats in southwestern India.

Material examined. Holotype, male in MSBC labeled, “INDIA: Karnataka, Agumbe Ghats 13°29.852’N 75°04.221’E 09 October 2004 coll. K.B. Miller/ HOLOTYPE *Orectochilus orbisonorum* Miller, Mazzoldi and Wheeler, 2007 [red label with black line border].” Four paratypes (2 males, 2 females) with same label data as holotype. Two paratypes (females) labeled, “INDIA: Karnataka 20km E Udupi, forest 04 October 2004 coll.

K.B. Miller.” One paratype (female) labeled, INDIA: Maharashtra, Mulshi 18°26.665'N 75°25.654'E 28 September 2004 coll. K.B. Miller.”

Discussion. The ventrally white condition in this species is atypical for *Orectochilus*, but is a relatively common character state in the primarily Africotropical *Orectogyrus* and numerous species of *Aulonogyrus* Motschulsky, 1853. A white venter is also present in very few Enhydrini Régimbart, such as the genus *Porrorhynchus* Gemminger and Harold, 1871, and the putatively plesiomorphic *Spanglerogyrus albiventris* Folkerts, 1979 the only member of the subfamily Spanglerogyrinae Folkerts. The white condition in these species, and *O. orbisonorum*, is due not to white cuticle, but rather to clear cuticle through which the white internal tissues are easily visible.

Specimens were found primarily while collecting at mercury vapor lamps at night in the Western Ghats regions of southwestern India. However, specimens were also collected rarely from the small torrential streams in this area where other *Orectochilus* can be found abundantly in sheltered areas behind rocks.

Acknowledgments

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References

Vazirani, T.G. (1984) *The fauna of India. Coleoptera. Family Gyrinidae and family Haliplidae*. Zoological Survey of India, Calcutta.