Stirotarsinae, New Subfamily for *Stirotarsus abnormis* Bergroth (Heteroptera: Pentatomidae)

D. A. RIDER

Department of Entomology, North Dakota State University, Fargo, ND 58105

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ABSTRACT Stirotarsinae, new subfamily, is erected for the monotypic genus *Stirotarsus* Bergroth. Diagnoses for the subfamily and the genus, *Stirotarsus*, as well as a detailed description for the species *Stirotarsus abnormis* Bergroth are provided. The phylogenetic position of Stirotarsinae is discussed. Peru is reported as a new locality record for this species.

KEY WORDS *Stirotarsus*, Pentatomidae, taxonomy, new subfamily, Stirotarsinae

IN 1911, BERGROTH gave a detailed description of *Stirotarsus* and its only included species, *abnormis*, including figures of the unusual antennae and tarsi. He indicated that this taxon possessed many aberrant features, but placed the genus among the Arminae (=Asopinae), based primarily on the dilated structure of the tibiae. He placed it near the genera *Phyllochirus* Spinola (=*Heteroscelis* Latreille), *Heterosceloides* Schouteden (also = *Heteroscelis*), *Cecyrina* Walker, and *Stilbotes* Stål, all genera possessing dilated tibiae. Bergroth (1925) included *Stirotarsus* in a list of unrelated genera possessing 2-segmented tarsi, but made no further comment on its taxonomic placement. No other mention of this genus has appeared in print until Gapud (1991) excluded it from the Asopinae; he tentatively placed *Stirotarsus* in the Dinidoridae. Thomas (1992) confirmed *Stirotarsus*' exclusion from the Asopinae, but indicated that determination of its proper placement would require further study.

The tribal classification of the Pentatomidae is in a state of chaos, probably because of a lack of a modern catalog of the family, and the group has suffered greatly from regionalism (Schuh 1986). Most researchers who study the family focus only on the fauna from their region with little attempt to integrate information from other areas of the world, or they study only a portion of the family. Schuh and Slater (1995) recognized eight tribes, but actually there are well over 40 currently being used by various workers. Others (Gross 1975, 1976; Linnavuori 1982) avoided the problem by recognizing only generic groups, awaiting a more thorough phylogenetic analysis to determine the validity of the groups.

Even without a comprehensive phylogenetic analysis, there are several pentatomid groups containing sets of characters so different from all other pentatomids to warrant erection of supra generic categories. *Stirotarsus* is one such group. It is necessary to establish these groupings now to aid in the organization of the upcoming world catalog of Pentatomidae.

Stirotarsinae, new subfamily

Type Genus. *Stirotarsus* Bergroth, 1911.

Antennae 5-segmented, segment I not reaching apex of head; segments II and V distinctly inflated, segment III very short (Fig. 2). Rostrum 3-segmented, with only vague indication where segments III and IV fused (Fig. 1). Thoracic sterna medially sulcate, without indication of medial carina, lateral margins of sulcus obtusely elevated. Spiracles located laterally (Fig. 1), just ventrad of connexival margins; trichobothria transverse, located caudad, and mediad of each spiracle. Tarsi 2-segmented, carinate dorsally (Figs. 1–2). Spermatheca with sclerotized rod (Fig. 3); spermathecal bulb simple, lacking tubules (Fig. 4).

Stirotarsus Bergroth, 1911

Type Species. *Stirotarsus abnormis* Bergroth, 1911, by monotypy.

Stirotarsus Bergroth, 1911: 117–118 (placed in Arminae [= Asopinae]); Bergroth, 1925: 161 (list of genera with 2-segmented tarsi); Gapud, 1991: 870 (tentatively transferred from Asopinae to Dinidoridae); Thomas, 1992: 13 (confirmed exclusion from Asopinae).

Head longer than broad, antennifers clearly visible from above. Antennae as in subfamilial description. Rostrum not crassate, but segment III (=III and IV fused) very flat, segment I not reaching caudal margins of bucculae, apex reaching between hind coxae. Thoracic sterna as in subfamilial description. Ostiole obsolete, evaporatoria very small. Abdominal venter unarmed at base; abdominal sternites not sulcate medially. Femora unarmed ventrally, superior surface of each with blunt tubercle apically; tibiae foliate; tarsi 2-segmented, dorsally carinate.

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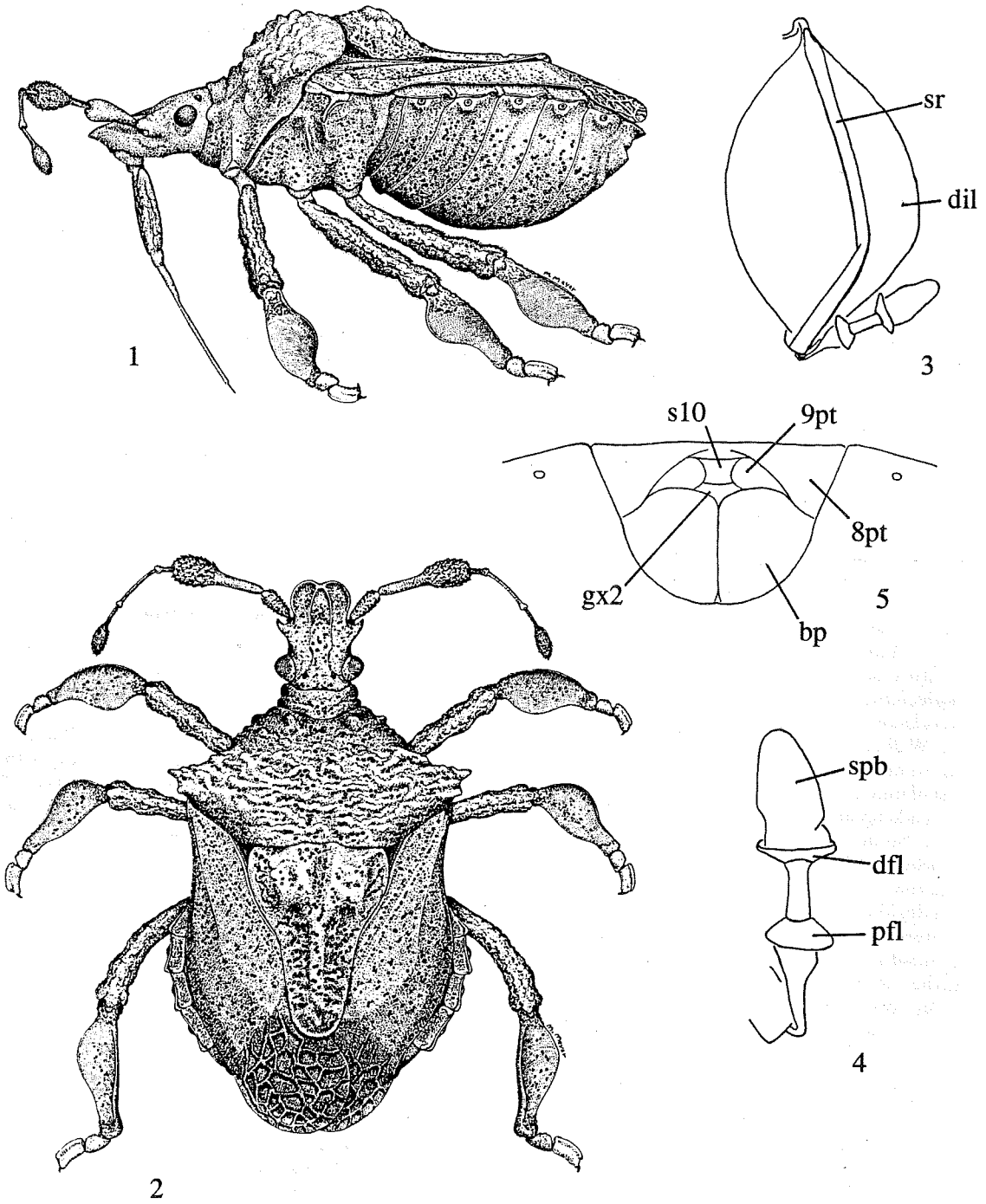

Figs. 1–5. *S. abnormis.* (1) Habitus, lateral view. (2) Habitus, dorsal view. (3) Spermatheca. (4) Spermathecal pump. (5). Female genital plates, caudoventral view. bp, basal plate; dfl, distal flange; dil, dilation of spermatheca; gx2, gonacoxae 2; pfl, proximal flange; spb, spermathecal bulb; sr, sclerotized rod; s10, sternite 10; 8pt, eighth paratergite; 9pt, ninth paratergite.

Stirotarsus abnormis Bergroth, 1911

Stirotarsus abnormis Bergroth, 1911: 119–120, figures 1 and 2a, b.

Obovate, strongly convex below; overall color greyish black with scattered black punctures between the irregularly placed obtuse, brown tubercles and rugulae.

Head elongate, length greater than width across eyes. Vertex transversely convex; apical third of head slightly declivant, surface slightly concave. Head con-

stricted near antennal insertions; lateral margins sharply edged for anterior half, basal half margins obtusely rounded; apex of head broadly rounded, juga distinctly longer than tylus and meeting anterior to it (Fig. 2). Eyes relatively small, located near pronotum; ocelli distinct, located on imaginary line drawn through posterior margins of eyes (Fig. 2). Antennifers distinctly visible from above, apex of each roundly produced laterally. Antennal segment I relatively short and robust, not reaching apex of head, diameter becoming greater distally, surface covered with short, dense greyish black hairs. Segment II ≈2.5 times longer than segment I, greyish black, basal half slender, distal half clubbed, dorsal surface of slender portion also dorsally flattened, forming anterior and posterior longitudinal ridges near base of club, basal half nearly glabrous, distal half with dense covering of slightly longer and stouter bristles. Segment III shorter than segment I, slender, apex slightly enlarged, pale yellowish brown except extreme apex fuscous, nearly glabrous. Segment IV slender, slightly shorter than segment II, black except apical one-sixth pale brown, nearly glabrous. Segment V slightly shorter than IV, but longer than I, basal half slender, black, apical half forming spindle shaped club, brown with medium coat of fine silver-brown hairs (Fig. 2).

Pronotum obtusely tuberculate over most of its surface, a few tubercles coalescing to form obscure rugulae near posterior margin. Anterior margin evenly concave for reception of head, anterior angles not toothed, but somewhat swollen. Lateral margins rounded with only very feeble indication of edge, straight anteriorly becoming concave posteriorly; humeral angles shortly, but acutely spinose, each with a second obtuse tooth posteriorly. Posterior margin nearly straight anterior to each corium, somewhat sinuous anterior to scutellum.

Scutellum subtriangular, apically tapering to a rounded apex, lateral margins beyond frena not quite parallel; large black fovea in each basal angle, basal half greatly swollen with shallow medial sulcus, forming obtusely rounded longitudinal carina that becomes irregularly rugulose on tongue, carina not reaching apex, apical margin slightly reflexed on each side of middle. Coria irregularly punctured, punctures somewhat more dense near lateral margins, width of embolium much greater apically than basally, a small pale spot near apex of each r+m vein, apex of coria narrowly round, nearly acute. Membrane fumose, venation distinctly reticulate. Connexivum exposed, with indication of pale area on middle of each segment, and a small dorsal swelling on each intersegmental incisure; obtuse lateral tubercles on abdominal venter distinctly visible from above (Fig. 2).

Ventral surface of head gray black with irregularly spaced small black punctures. Bucculae most elevated medially, slightly convex at level of antennophores, tapering anteriorly, unarmed anteriorly, tapering posteriorly, curving slightly mediad before evanescent posterior terminations. Rostral segment I short and robust, not reaching apices of bucculae, pale brown with black punctures (Fig. 1); segment II longer, cylindrical, reaching anterior margin of fore coxae, surface gray black, of same texture as body with dense, short hairs; segment III (=fused III and IV) extremely flattened (Fig. 1), smooth, pale yellow becoming blackish on apical third; segment II twice as long as segment I, both much shorter than III, apex of rostrum reaching between hind coxae.

Coxae relatively widely separated, those of the middle legs more so than front legs, and those of the hind legs even more widely separated. All three thoracic sterna medially sulcate, prothoracic sterna only slightly so, without further modification. Mesothoracic sterna appearing swollen between coxal bases with very distinct medial longitudinal sulcus, center of sulcus smooth, pale yellow. Swelling and sulcus continued posteriorly on metasternum, but less distinct, center of sulcus piceous. Thoracic pleura irregular, yellow-brown to greyish-brown with irregular black punctures; scent gland obsolete, slight indication of small swelling laterad of middle coxae; evaporative areas small, indistinct. Legs gray-black, with irregular swellings on femora, superior surface of each with small obtuse tubercle apically. All tibiae greatly foliate. Tarsi 2-segmented with distal segment dorsally carinate. Tarsal claws anteapical, black (Figs. 1–2).

Abdominal venter yellowish brown to gray brown, paler and smoother medially except piceous markings medially on first two visible segments; irregularly brown to black punctured; slight medial depression on base of segment III. Spiracles lateral, positioned on distinct swelling just ventrad of connexival margin (Fig. 1), with an obtuse angular tooth posterior to each spiracle becoming obsolete on last pregenital segment. Trichobothria transverse, located mediad and slightly posteriorad of each spiracle.

Genital plates appearing to be slightly recessed into eighth paratergites. Basal plates relatively large, medial margins straight, posterior margins slightly convex, each with a transverse submarginal swelling along posterior margin. Ninth paratergites relatively small, apically widened but truncate. Triungulin small (Fig. 5). Spermatheca typically pentatomoid, with distinct sclerotized rod slightly swollen apically (Fig. 3); spermathecal duct relatively short, not coiled, slightly swollen below proximal flange; spermathecal bulb elongate oval, lacking tubules (Fig. 4).

Measurements (millimeters). Total length 13.08; transhumeral width 7.30, abdominal width 7.45; medial length of pronotum 3.39. Medial length of scutellum 4.51; basal width 4.24; width at distal end of frena 2.14. Length of head 2.81; width across eyes 2.31; intraocular width 1.60; intraocellar width 0.85; ocellar diameter 0.27; distance from ocellus to adjacent eye 0.30. Length of segments I-V of antennae 1.04, 2.47, 0.49, 1.41, and 1.44, respectively. Length of segments I-IV of rostrum 0.78, 1.65, 0.91, and 2.47, respectively.

Type Material. My colleague, Donald Thomas, examined the type specimen of this species, and kindly sent me photomicrographs. He also examined the specimen described in this article and confirmed its identity. The type, a ♂, is conserved in the Zoologiska Muset, Universitets Helsinki, Finland.

Material Examined. One female labeled "Peru, Huanuco: Tingo Maria (1 km S.) 4 February 1984 Wayne N. Mathis." I have added a determination label and a voucher label. This specimen is conserved in the National Museum of Natural History, Washington, DC. It is in very good condition with only the last two segments of the right antennae missing; I have also dissected the internal genitalia.

Distribution. French Guiana, Peru.

Discussion

In general, this species is similar in appearance to some members of *Brochymena* Amyot & Serville (Pentatominae: Halyini), several genera of the Aeschrocorini (Pentatominae), the Cyrtocorinae, and *Megymenum* Guérin-Méneville (Dinidoridae: Megymeninae). Species of *Brochymena* are much flatter, have 3-segmented tarsi, and differ in rostral, ostiolar, and spiracular structure; aeschrocorine members lack the stirotarsine tarsal, antennal, and rostral characters; cyrtocorines are smaller, and lack the antennal, rostral, and spiracular characters seen in the Stirotarsinae; and species of *Megymenum* lack the sclerotized rod in the female genitalia, which is diagnostic of the family Pentatomidae. The following is a review of some of the more distinctive stirotarsine characters:

Three-Segmented Rostrum. Unique within the Pentatomoidea.

Tarsal Segments Dorsally Carinate. Another unique character within the Pentatomoidea, possibly unique within the Heteroptera.

Distal Half of Rostrum Flattened. Appears to be unique within the Pentatomoidea, and may be unique within the Heteroptera.

Inflated Antennal Segments. Although this character is sometimes seen in other heteropteran families (Aradidae, Berytidae, and so on), it is relatively rare in the Pentatomidae. Members of the African genus *Phricodus* Spinola (Pentatominae: Phricodini) have 4-segmented antennae with segments 4–5 inflated. Otherwise, it has little in common with *Stirotarsus*. Also, the South American asopine genus, *Discocera* Laporte, has the fourth antennal segment inflated, although it is usually flattened. *Discocera* species are quite rounded in shape with an enlarged scutellum, and they are often brightly colored—very different from *Stirotarsus*. Undoubtedly, the combination of the length, shape, and vestiture of the segments is unique within the Pentatomoidea.

Obsolete Ostiolar Apparatus. This is diagnostic of the pentatomine tribe Strachiini, but nearly all strachiines are smaller, brightly colored, and possess fairly typical pentatomine antennal, rostral, and spiracular characteristics.

Two-Segmented Tarsi. Although not unique, this is relatively rare in the Pentatomidae. Pentatomine examples include *Rolstoniellus* Rider (an Indo-Malaysia genus in the tribe Rolstoniellini), *Nealeria* Bergroth (a madagascaran genus now placed in its own tribe), and *Phalaecus* Stål (a South American genus currently placed in the Pentatomini, but may actually belong in the Edessinae). Two-segmented tarsi are also diagnostic for members of the pentatomid subfamily Cyrtocorinae. The members of the Cyrtocorinae have recently been treated at the family level (Packauskas and Schaefer 1998, Schaefer et al. 1998), but the presence of a sclerotized rod in the spermatheca indicates that its proper placement is probably as a pentatomid subfamily (Gapud 1991). Two-segmented tarsi are also found in the Acanthosomatidae and the tessaratomid genus *Platytatus* Bergroth.

Foliate Tibiae. This character is seen in a few asopine genera (see introductory discussion), but otherwise it is rare in the Pentatomoidea.

Lateral Position of Spiracles. Once again, this is relatively rare in the Pentatomidae, although it does serve as one of the diagnostic characteristics of the tribe Aeschrocorini. *Stirotarsus* does superficially resemble members of the Aeschrocorini; they share several other characters: medially sulcate thoracic sterna and reticulate wing venation. Members of the Aeschrocorini, however, lack the distinctive stirotarsine antennal, rostral, and tarsal structure. All Aeschrocorini species occur in Africa or Indo-Malaysia. Also, the New World genus *Caonabo* Rolston has laterally positioned spiracles, but it does not possess any of the other stirotarsine characters discussed above.

The unique antennal, rostral, and tarsal characters, along with the relatively rare ostiolar, tibial, and spiracular characters easily justify erection of this new subfamily; in fact, an argument for familial status could be made. The possession of a sclerotized rod in the female spermatheca, however, clearly allies this species with the Pentatomidae. It has some general resemblance to some members of the Dinidoridae, and also to some members of the pentatomine tribes Halyini and Aeschrocorini. It is clearly unrelated to any of these groups. It also shares several characters with the Cyrtocorinae (roughened drab appearance, 2-segmented tarsi), and in fact these two groups may be related. The Cyrtocorinae, however, lacks several of the stirotarsine characters (antennal, rostral, spiracular structure). The actual phylogenetic position of these groups will probably remain obscure until a thorough, comprehensive phylogenetic analysis can be conducted on the entire family.

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