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A new species of *Stenotarsus* Perty (Coleoptera: Endomychidae: Endomychinae) from Costa Rica, with the establishment of a new species group

Una nueva especie de *Stenotarsus* Perty (Coleoptera: Endomychidae: Endomychinae) de Costa Rica, con el establecimiento de un nuevo grupo de especies

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ABSTRACT

Stenotarsus is a mainly pantropical genus with nearly 270 species described. Here we describe a new species from Puntarenas, Costa Rica, belonging to the newly defined and diagnosed *Stenotarsus spiropenis* species group. The new species, *Stenotarsus noveloi,* is diagnosed, described in detail an illustrated. The species of the *S. spiropenis* species group show characteristics that are unique among Neotropical species of the genus.

Key words: handsome fungus beetles, Neotropical region, taxonomy, systematics.

RESUMEN

Stenotarsus es un género principalmente pantropical con cerca de 270 especies descritas. Describimos aquí una nueva especie de Puntarenas, Costa Rica, perteneciente al nuevo grupo de especies *Stenotarsus spiropenis*, el cual es definido y diagnosticado. Se diagnostica, describe e ilustra a la nueva especie. Las especies pertenecientes al grupo de especies *S. spiropenis* presentan características únicas entre las especies Neotropicales del género.

Palabras clave: escarabajos de los hongos, región neotropical, taxonomía, sistemática.

The Endomychidae, or handsome fungus beetles, are a moderately diverse family of mycophagous coleopterans related to ladybugs (family Coccinellidae). They are composed by nearly 1600 species in 9 subfamilies (Shockley *et al.* 2009; Robertson *et al.* 2015). The vastest diversity of this family is found in the tropical areas of the World.

Stenotarsus Perty, 1832 is a pantropical genus that stands as the most diverse in the family, with nearly 270 species described from tropical areas of the World. They can be found from Eastern USA to Argentina in the Americas, tropical areas of Africa including Madagascar, the Oriental region and Australia (Shockley *et al.* 2009). After the taxonomic rearrangement of Endomychidae done by Robertson *et al.* (2015) *Stenotarsus* is classified in Endomychinae along with other 11 genera (Arriaga-Varela *et al.* 2019; Tomaszewska *et al.* 2023). The morphological delimitation of *Stenotarsus* with respect to some of these genera, like *Ectomychus* Gorham, *Chondria* Gorham and *Paniegena* Heller, has not been studied in depth.

Preliminary phylogenetic results of a wide sampling of Endomychidae suggest that the monophyly of *Stenotarsus* is not sustainable as currently defined (Arriaga-Varela *et al*. in prep.). Rearranging the taxonomy of *Stenotarsus* and allied genera is a task that needs to be guided by the recovery of the phylogenetic relations among the species. However, the ignorance of the actual specific, morphological and ecological diversity in these lineages needs to be tackled systematically, starting from the treatment of regional faunas that surely will shed light on a large proportion of undescribed species.

The fauna of the Neotropical region is particularly poorly studied, and no modern revision has been done for most of its territory. A revision of the species from Mexico, Guatemala and Belize revealed 12 new species and five synonyms (Arriaga-Varela *et al.* 2013). Although relevant morphological differences among species were described, no formal attempt to establish species groups was done there, in wait for a more comprehensive overview of the fauna from Central and South America as well as phylogenetic insights into the genus. Among the species described there from Mexico, two of them stand out for a number of morphological differences with the rest of the known Neotropical fauna: *S. rulfoi* Arriaga-Varela, Zaragoza-Caballero, Tomaszewska and Navarrete-Heredia and *S. spiropenis* Arriaga-Varela, Zaragoza-Caballero, Tomaszewska and Navarrete-Heredia. At least two additional similar undescribed species from Mexico have been found posteriorly (EAV personal observation). All these species show characters like elytra with striae of punctation and ovipositor with terminal styli on the gonocoxites, that are found in species from the tropical areas of Africa and Asia and not in the other species from the Americas besides *Stenotarsus*

nigrivestis Shockley (Shockley 2007) from Dominican Republic. The unusual morphology of *Stenotarsus* from this group and these specimens baffled the main scholar of Endomychidae on the 20th century, H.F. Strohecker, who was surprised that species of *Stenotarsus* with this morphology could be found in the Neotropical region. He wrote under a female specimen from Mexico of an unidentified species "*Stenotarsus* sp., locality? This is an Asiatic type of *St*.!" (EAV, personal observation).

In this contribution we describe a new species from Costa Rica with clear affinity to *S. rulfoi* and *S. spiropenis* and present a diagnosis based on other Neotropical species for a newly established species group for these.

Costa Rica holds one of the largest biodiversity per area ratio in the World (Obando 2007). The fauna of *Stenotarsus* can not be the exception. Shockley *et al*. (2009) reported eight species for the country. However, most of these records are dubious, probably based on misidentifications of species from other areas of the Neotropics (EAV personal observation). Based on the treatments of species from Mexico, Guatemala and Belize (Arriaga-Varela *et al*. 2013) and Panama (Roubik and Skelley 2001) only three species already described can be confidently confirmed from Costa Rica: *S. guatemalae* Arrow, *S. lemniscatus* Gorham and *S. purpuratus* Gerstaecker. However, examination of entomological material from various collections suggest that actual diversity of Costa Rica could include dozens of undescribed species (EAV personal observation). For this reason, we did not attempt to provide an identification key for the species of the country at this point.

MATERIAL AND METHODS

This work is based in the examination of a specimen deposited in the Colección de Artrópodos of the Museo Nacional de Costa Rica – MNCR (San José, Costa Rica), formerly in INBIO (Instituto de Biodiversidad). Measurements were made using an ocular micrometer as follows: body length measured dorsally from apical margin of clypeus to apex of elytra; width across elytra (at widest part); height of elytra (at highest part); the length of each antennomere, measured at mid length; antennomere width (at widest part); pronotal width (at widest part), elytral length from the base to apex, along suture, including scutellar shield. Aedeagus is described as positioned *in situ* in the abdomen. For the study of genitalia, the abdomen of the holotype was detached from the body and cleared in 10% KOH. Male genitalia were dissected and mounted on a paper triangle attached to the specimen. The morphological terms and criteria follow Arriaga-Varela *et al.* (2013). Photographs of the habitus were taken using a Leica Z16 APO A microscope with Leica DCM 2900 camera at laboratory of the Red de Ecoetología, INECOL A.C. A map with the distribution of the described species in *Stenotarsus spiropenis* group was generated using Quantum GIS 3.2 software (QGIS Development Team 2018).

RESULTS

Stenotarsus Perty, 1832

Type species: *Stenotarsus brevicollis* Perty, 1832

Stenotarsus noveloi sp. nov.

http://zoobank.org/861E0934-0B48-46C3-9B3A-2F019E883189

Diagnosis. This species is very similar to *S. spiropenis*, but it can be distinguished by the pronotum with sides almost subparallel in basal half (weakly subsinuate in basal half in *S. spiropenis*) and by the median lobe of aedeagus with width subequal along most of its length, broadening near apex, with a small projection in apex of internal margin in ventral view (width subequal all along and not expanded apically in *S. spiropenis*).

Description of holotype male. Body: 4.0 mm long, long oval (Fig. 1, 6), moderately convex; 1.95 times as long as wide, about three times as long as high (Fig. 5). Uniformly ferruginous red, except antennomeres 7–11 which are black, articles 5–6 gradually infuscate. Densely covered with long, suberect, golden setae.

Head: Clypeus transverse, 2.2 times wider than long. Terminal labial palpomere broad, widely truncate apically. Interocular distance 0.6 times as wide as head including eyes. Antenna stout and moderately long (Fig. 2), 0.42 times as long as body; scape 1.3 times as long as wide, 1.3 times longer than pedicel; pedicel 1.1 times longer than wide; third antennomere 1.6 times as long as wide, 1.3 times as long as pedicel; fourth 1.4 times as long as wide, 1.2 times as long as pedicel; fifth 1.3 times as long as wide, 1.2 times as long as pedicel; sixth and seventh subequal to fifth; eighth 1.1 times as long as wide, 1.1 times longer than pedicel; antennal club 0.4 times as long as total antennal length; ninth antennomere weakly asymmetrical, widened apically, 0.9 times as long as wide, 1.5 times as long as pedicel; tenth slightly asymmetrical, strongly widened apically, 0.7 times as long as wide, 1.4 times as long as pedicel; terminal antennomere asymmetrical, short ovoid to subquadrate, widest near mid length, 1.2 times as long as wide, 2.4 times as long as pedicel.

Prothorax: Pronotum widest at base, moderately transverse (Figs 2-3), two times wider than long, 1.81 times wider at base than at front angles, 2.2 times wider than head. Sides almost parallel in basal half, then converging to front angles. Front angles almost right-angled, briefly rounded tip. Hind angles briefly acute. Anterior border with complete narrow margin, not arcuate medially. Lateral sides with margins broad and raised; weakly narrowing near base in posterior 1/4; width of margin at base less than 1/4 of the distance between basal pore and hind angle; area between marginal line and pronotal edge flat. Disc finely and closely punctate (Fig. 3), weakly convex. Longitudinal sulci distinctly long and deeply and widely excavated, weakly convergent. Basal pores moderately large, slightly curved, markedly oblique. Basal sulcus faint or absent. Pronotal base weakly lobed medially, straight to slightly emarginate near scutellum. Prosternal process narrow, parallel-sided at

base (Fig. 7); apical width about 0.6 times the longitudinal procoxal diamater.

Pterothorax: Scutellar shield subpentagonal, small (Fig. 1), 1.4 times wider than long. Elytra 2.7 mm long, 1.25 times longer than wide, 3.12 times longer and 1.25 times wider than pronotum; rather oblong, widest before basal third, weakly convergent in mid-length, then roundly convergent to the rounded apex. Foveolate punctures arranged in 9 well defined longitudinal striae, getting less conspicuous apically; punctures in striae comparatively large and deep, separated by one diameter to the next; setiferous punctures in the interstriae fine, moderately sparse separate by 24 diameters (Fig. 4). Humerus prominent. Epipleuron moderately wide at base, 0.85 times as wide as intercoxal process of mesoventrite. Mesoventrite scarcely excavated in front; bearing moderately large setose pores laterally; scarcely wider than longitudinal coxal diameter, with three subtriangular figures formed by carinae. Metaventrite (Fig. 7) weakly convex, without modifications on the anterior margin; with pair of moderately large setose pores of approximately same diameter posterior to each mesocoxa. Metanepisternum with moderately large setose pore.

Legs: moderately long and slender. Trochanters simple. Meso- and metafemora strongly widened at mid-length, unarmed; metafemur as long as mesofemur, bearing moderately long decumbent setae. Meso- and metatibiae moderately slender; metatibia as long as metafemur, 0.35 times as long as elytra, gradually widened distally, linear, unarmed. Metatarsus 0.55 times as long as metatibia; second tarsomere produced and lobed, 2.5 times as wide apically as the fourth tarsomere at mid-length.

Abdomen: ventrite 1 as long as metaventrite and as ventrites 2–5 combined, with moderately coarse foveolate punctation, without protuberances. Ventrite 5 twice as long as 4, rounded apically. Ventrite 6 rounded apically. Tergite VIII truncate. Median lobe very slender, flattened, curved, and weakly twisted (Figs 8-9), width subequal along most of its length, broadening near apex, with a small projection in apex of internal margin in ventral view (Figs. 8). Tegmen with moderately large submembranous tegminal plate.

Holotype. San Luis Monteverde, A. C. Arenal, Prov. Punta, COSTA RICA 1000-1350 m, Jun 1993, Z. Fuentes, Malaise, L N 449250_250850 #2588 // INB0003412536 INBIOCRI COSTA RICA (MNCR).

Etymology. This species is dedicated to Rodolfo Novelo (INECOL A.C., Xalapa, Mexico) for his work on Odonata and other aquatic insects.

Diagnostic combination of *Stenotarsus spiropenis* group. Species of this group can be distinguished from other species in the Neotropical region by the next combination of characters: pronotum with longitudinal sulci relatively long, wide and distinctly excavated; intercoxal process of the mesoventrite with three subtriangular or subsemicircular figures formed by carinae; elytron with larger foveolate setiferous punctures arranged in 9 longitudinal striae; median lobe of aedeagus very slender, flattened, curved, and at least weakly twisted; ovipositor with gonocoxites with terminal styli.

Comment. As recognized here this group includes *Stenotarsus spiropenis*, *S. rulfoi* and *S. noveloi* sp. nov. Additionally, the authors are aware of at least two undescribed species from Mexico. In one of these species the longitudinal striae of on elytra are less conspicuous since they are formed by more diffuse rows of two or three foveolate punctures with very similar size to those in the interstriae. *Stenotarsus nigrivestis* Shockley, 2007 from Dominican Republic fits most of the diagnostic characters proposed here. However, its affinity is still not completely clear as no female genitalia has been studied.

Having a robust and comprehensive phylogenetic hypothesis for *Stenotarsus* and related genera will shed light on how this Neotropical lineage with a salient morphology is related with other New and Old World groups. This will be a task for the future that should include a wide taxonomic and biogeographic sampling.

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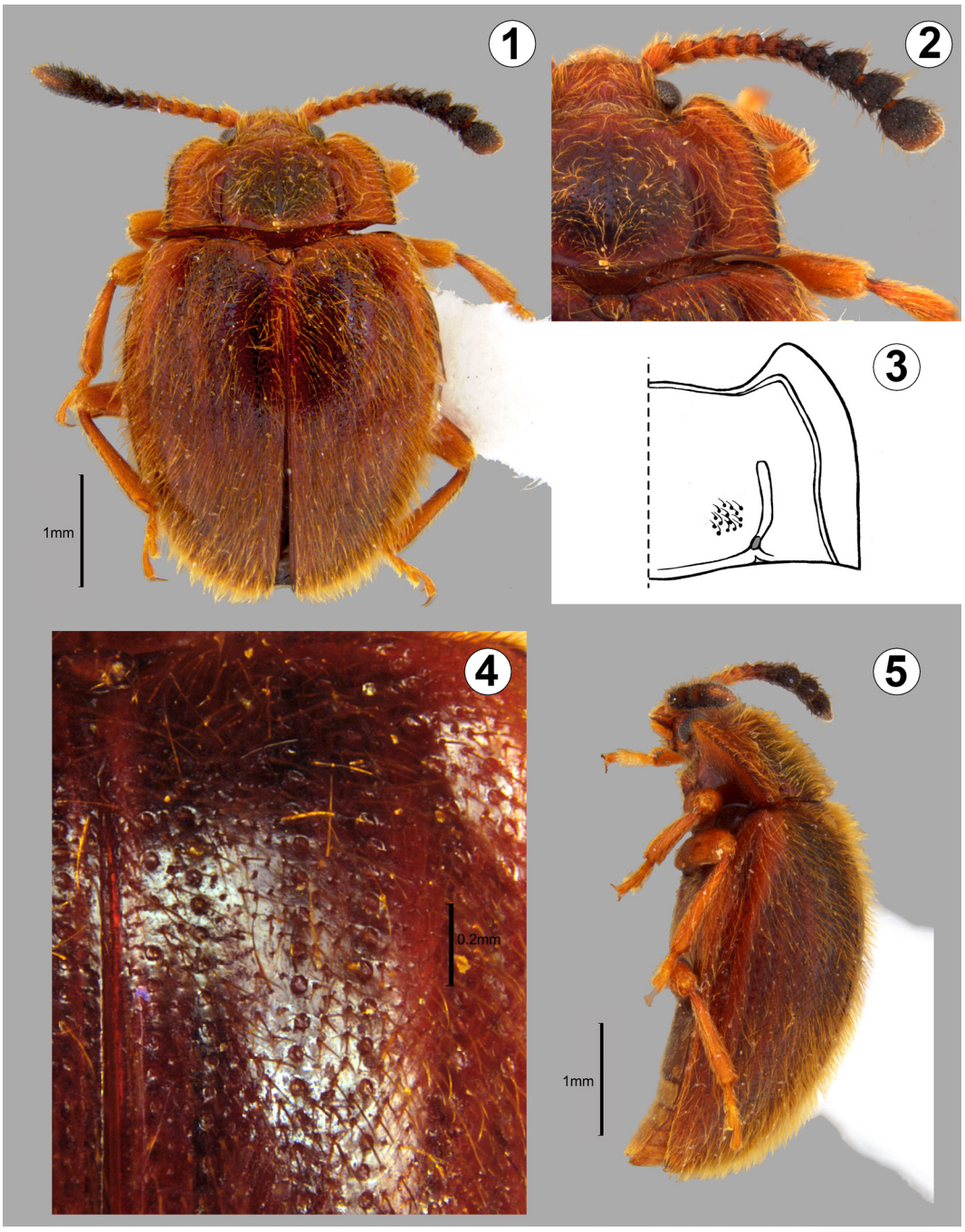
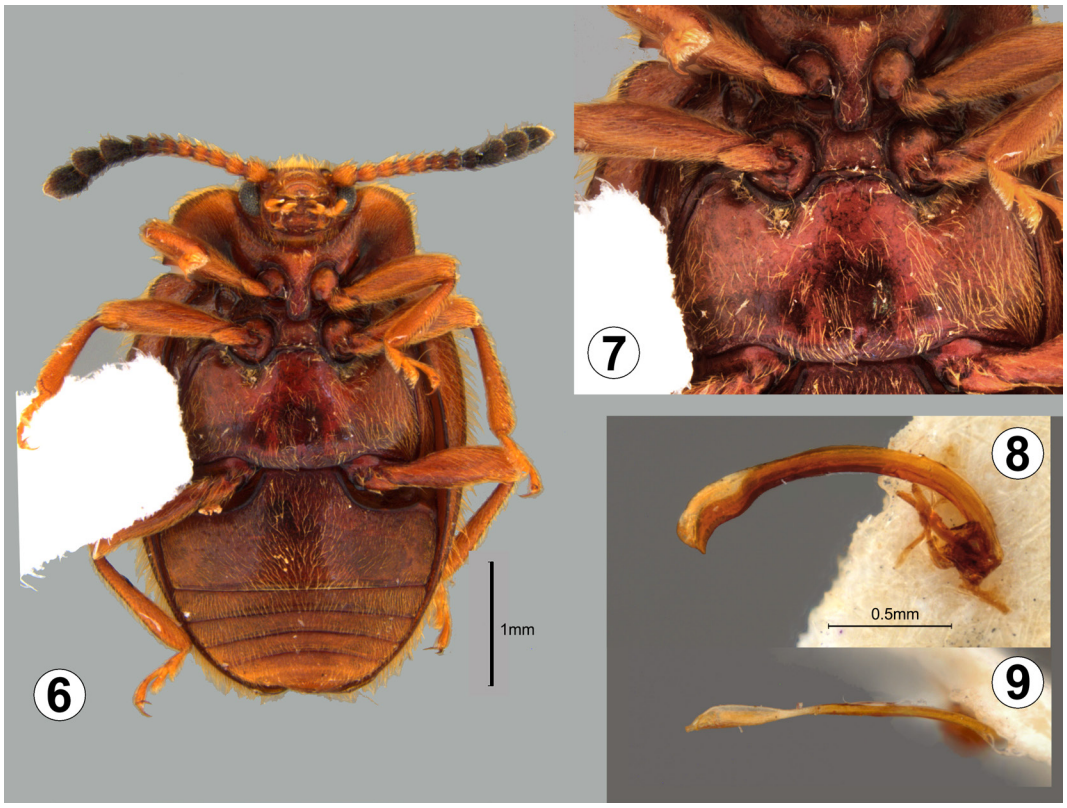


Figures 1-5. Morphology of *Stenotarsus noveloi* sp. nov. 1. Dorsal habitus. 2. Detail of pronotum and right antenna. 3. Drawing of right half of pronotum. 4. Detail of punctation on anterior third of right elytron. 5. Lateral habitus.



Figures 6-9. Morphology of *Stenotarsus noveloi* sp. nov. 6. Ventral habitus. 7. Thoracic ventrites. 8. Ventral view of median lobe of aedeagus. 9. Lateral view of median lobe of aedeagus.

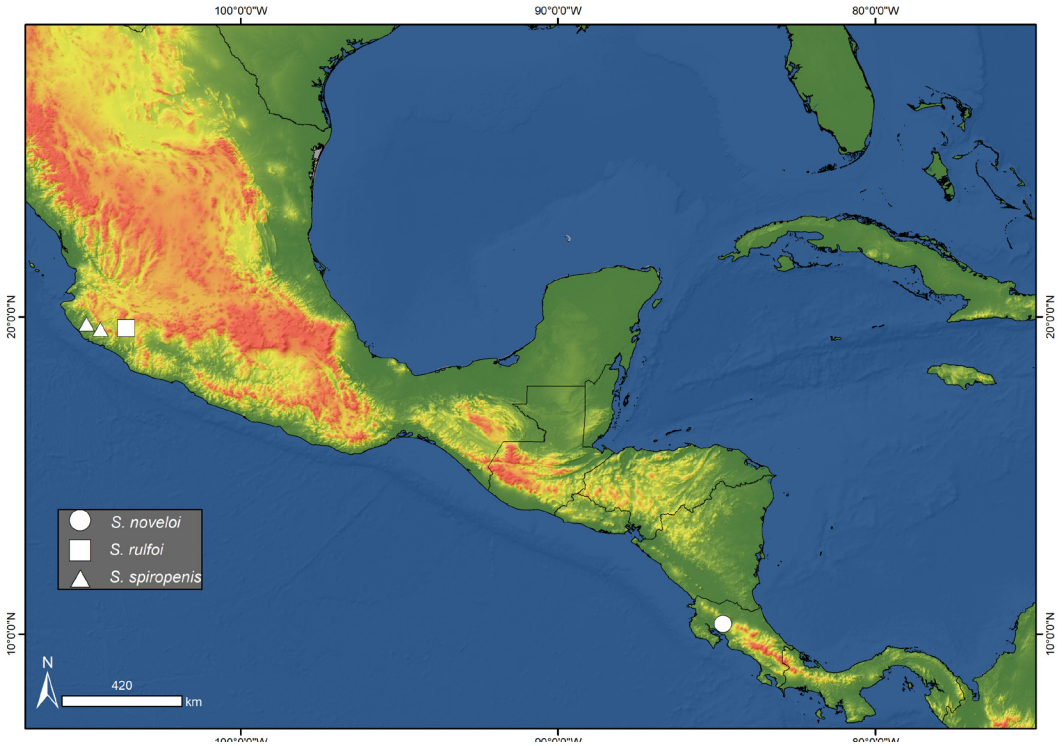


Figure 10. Map showing the distribution of described species in *Stenotarsus spiropenis* species group; triangles: *S. spiropenis*; square: *S. rulfoi*; circle: *S. noveloi* sp. nov.