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Two new species and a new record of the genus *Neolindus* Scheerpeltz, 1933 (Coleoptera: Staphylinidae: Paederinae)

Ulrich Irmler
Institute of Ecosystem Research, Dept. Applied Ecology, University, Olshausenstrasse 40, D-24098 Kiel, Germany; E-mail: uirmler@ecology.uni-kiel.de; phone: +49 431 880 4311.

Abstract. The two new species *Neolindus verhaaghi* from Peru and *Neolindus pastazae* from Ecuador are described. A new record from central Amazonia of *Neolindus densus* Herman, 1991, is presented.

Key words: Paederinae, new species, Ecuador, Peru, new record, central Amazon.

Resumen: Las dos especies nuevas *Neolindus verhaaghi* de Peru y *Neolindus pastazae* de Ecuador están descrito. Uno lugar nuevo de Amazonica Central de *Neolindus densus* Herman, 1991, está presentado.

Palabras clave: Paederinae, especie nueva, Ecuador, Peru, lugar nuevo, Amazonica Central.

INTRODUCTION

The genus *Neolindus* is restricted to Central and South America and distributed from Bolivia and southern Brazil in the south to Costa Rica in the north. Ecuador is the most species-rich country with 10 species. The first species was described by Sharp (1876) as *Lindus religans* Sharp, 1876. Later, Scheerpeltz (1933) renamed the genus *Neolindus,* since the name *Lindus* was already preoccupied. Irmler (1981) added five new species from Brazil and Peru, and Herman (1991) published a review of the genus, added 27 species, and published a cladistic analysis of the genus together with *Cylindroxystus* Bierig, 1943. Thus, the genus contained 33 species in the Neotropical region.

In 2009, I collected a new species of the genus in the Rio Pastaza basin, Ecuador. Earlier, I had found a further new species in the collection of my colleague Manfred Verhaagh, Natural History Museum in Karlsruhe, Germany. Inferred from the low number of specimens found, all species seem to be very rarely collected. Most species have been described by only one specimen. The two new species are also known by only one specimen. Overall, 72 specimens have been collected in the Neotropics. Therefore, a new record of *N. densus* Herman, 1991 found near Manaus in the central Amazon basin is also published, here.

MATERIAL AND METHODS

The new material is deposited in my private collection (UIC).

For the photographs, a Makroskop M 420 (Wild, Herbrugg) was used in combination with a digital camera (Nikon D100). Head length was measured from anterior edge of clypeus to posterior edge of head disc, pronotum along the midline from anterior edge to posterior edge, elytra from anterior edge of shoulders to posterior edge; width was measured at the widest part of tagmata. In the measurements of total length, the abdominal inter-segmental space is subtracted.

RESULTS

Neolindus verhaaghi, new species

(Figs 1 A–H)

Holotype. Male; Peru; Huanuco, Panguana, 150 km SW Pucallpa, tropical rain forest, pitfall trap, 2.–16.7.1984, leg. M. Verhaagh, #pWA65 (UIC).

Diagnosis. The species is attributed to the group of *N. agilis* Herman, 1991 and *N. densus* Herman, 1991. The central emargination of the 8th sternite [Fig. 1 F] is similar

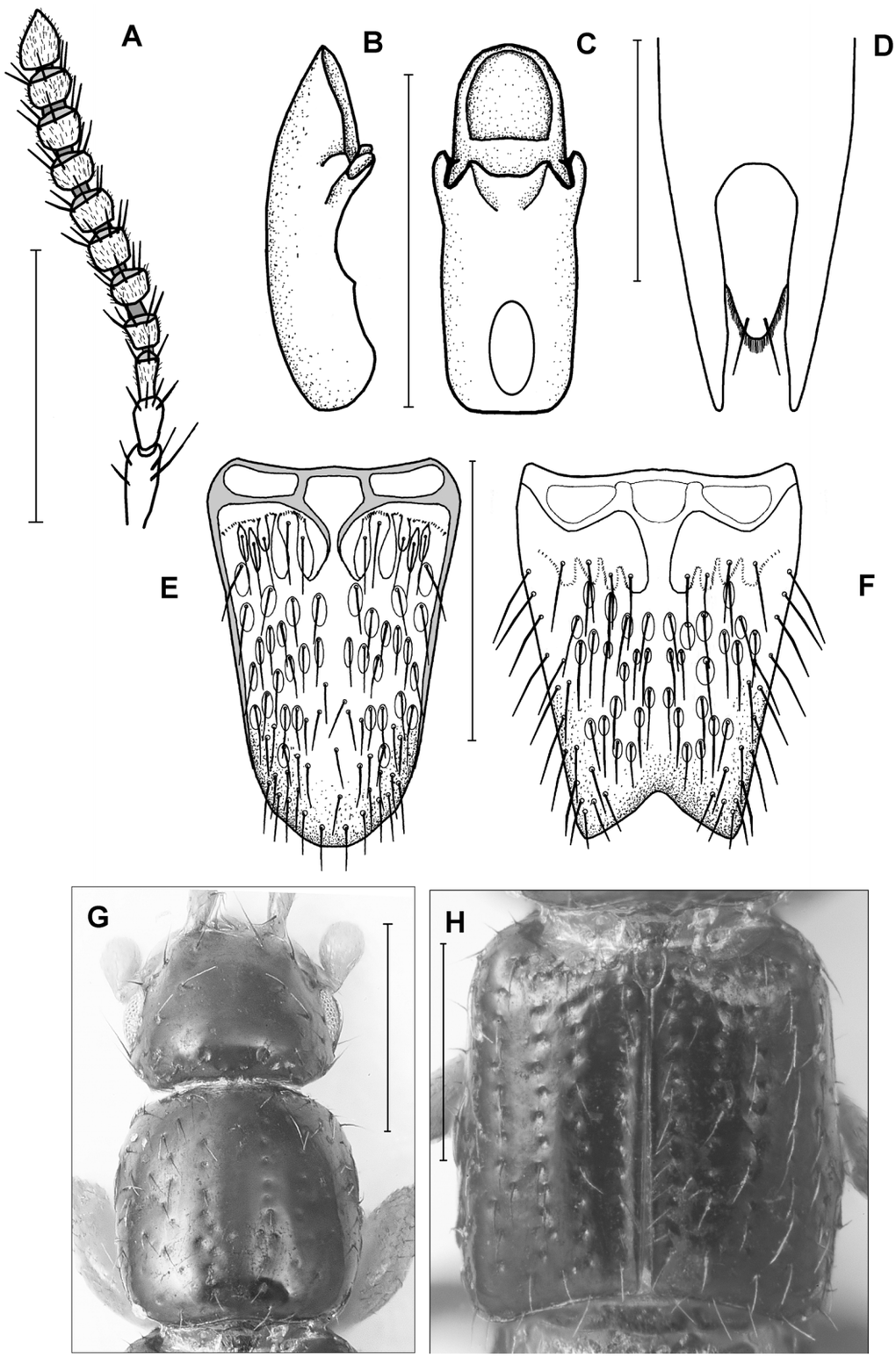

Fig. 1. *Neolindus verhaaghi*; antennae (A), aedeagus in lateral (B) and ventral (C) aspect, 7th and 8th visible tergites (D), 6th visible tergite (E) and sternite (F), dorsal aspect of head and pronotum (G) and elytra (H) showing punctation and surface (scale bar 0.5 mm).

to *N. densus* Herman, 1991 [Fig. 131 in Herman 1991] and *N. cephalochymus* Herman, 1991 [Fig. 139 in Herman 1991]. Antennomere 2 [Fig. 1 A] is slightly shorter than 3, whereas it is slightly longer in *N. densus* and *N. cephalochymus*. Furthermore, the penultimate antennomeres in *N. densus* are wider than they are long, but more or less quadrate in *N. verhaaghi*. As in *N. agilis* [Fig. 147 in Herman 1991], *N. verhaaghi* has no dense patch of setae on the 8th sternite [Fig. 1 F]. The apical emargination on the 8th sternite is deeper in *N. verhaaghi* than in *N. agilis,* and the aedeagus has an apical cavity [Fig. 1 B, C] which is absent in all related species.

Description. Length: 4 mm. Colour: red, legs, antennae and posterior edge of tergites yellow. Head: 0.50 mm long, 0.55 mm wide; eyes as long as temples, temples rounded in smooth curve without forming angles; extremely fine micro-punctation and without microsculpture; surface shiny; one trichobothrium and one setiferous puncture at front edge of eyes; two setiferous punctures on disc between eyes [Fig. 1 G]; distance between these punctures slightly wider than between upper edge of eye and adjacent puncture; transverse row of punctures at posterior edge of vertex, and two diagonal rows of punctures between eyes and posterior edge of vertex. Antennae as long as head and pronotum; 3rd antennomere slightly longer than 2nd antennomere [Fig. 1 A]; 4th antennomere slightly longer than wide; following antennomeres more or less quadrate, pubescent and with few apical setae. Pronotum: 0.65 mm long, 0.60 mm wide; with longitudinal row of 11–12 punctures on each side of smooth midline [Fig. 1 G]; several punctures on laterad to paramedial row of punctures; distance between these punctures at least as wide as diameter of punctures; surface without microsculpture, polished and shiny. Elytra: 0.75 mm long, 0.65 mm wide; with sutural row of 11–12 punctures and three more rows on disc [Fig. 1 H]; two rows of irregular punctures laterad to disc. Abdomen densely punctate; anterior segments distinctly more densely punctate than posterior segments; 8th tergite apically rounded [Fig. 1 E]; 8th sternite [Fig. 1 F] with triangular emargination, central impunctate stripe, and without clusters of setiferous punctures. Aedeagus with apical cavity and lateral truncate prominences behind cavity [Fig. 1 B, C].

Etymology. The specific name refers to the collector of the species, Manfred Verhaagh, from the Natural History Museum in Karlsruhe, Germany.

Neolindus pastazae, new species
(Figs 2 A–I)

Holotype. Male; Ecuador, Tungurahua, 10 km W of Baños, valley of Rio Pastaza, path near waterfall "Manto de la Novia" (78°20.16W, 1°24.12S), sifting litter, 28.7.2009, leg. U. Irmler (UIC).

Diagnosis. *Neolindus pastazae* is certainly closely related to *N. punctogularis* Herman, 1991, as determined by the transverse cluster of numerous setae at the apical edge of the gula. It can be easily differentiated from *N. punctogularis* by the darker colour of head and pronotum and the different punctation of pronotum [Fig. 2 H]. The last abdominal tergites and sternites [Fig. 2 E, F, G] are very similar to *N. punctogularis* Herman, 1991 [Figs 205–207 in Herman 1991]. Besides the development of the transverse row of numerous setae at the anterior edge of the gula, both species can be differentiated from *N. schubarti* Irmler, 1981, *N. religans* Sharp, 1876, and *N. bidens* Herman, 1991, since the latter are carinate on 8th sternites or have a ridge at the posterior edge [Figs 211, 220, 223 in Herman 1991].

Description. Length: 10.5 mm. Colour: brown, antennae, palpae and legs yellow. Head: 0.90 mm long, 1.5 mm wide; with eyes slightly prominent [Fig. 2 H]; temples 1/4 as long as eyes; temples obtusely angled to posterior edge, outer part of posterior edge transversely narrowed to neck; labrum with pair of apically rounded denticles near the middle, with five setae at anterior edge; disc with fine micro-punctation; surface polished; two large punctures on each side of vertex between eyes; distance between these punctures wider than between each puncture and adjacent eye; few setiferous supraocular punctures; central puncture with trichobothrium; row of setiferous punctures along posterior edge; supraocular punctures and posterior row of punctures smaller than two large punctures between eyes, but much larger than micro-punctures; gula with transverse row of numerous setae near anterior margin. Antennae with first antennomere elongate and as long as antennomeres 2 and 3 combined [Fig. 2 A]; 2nd antennomere short, only 1/3 as long as 3rd antennomere; following antennomeres elongate and decreasing in length; antennomeres 3 to 11 pubescent. Maxillary palp at 2nd segment with several long setae at inner side. Pronotum: 1.35 mm long, 1.65 mm wide; with sides more or less parallel in anterior half [Fig. 2 H]; in posterior half, smoothly rounded to posterior edge without forming angle; margin continuing from posterior edge to anterior edge and covered by anterior angles in dorsal aspect; disc polished and shiny; irregular row of 11 to 12 punctures on each side of smooth midline; two transverse rows laterad to paramedial rows of punctures and few scattered punctures laterad. Elytra: 1.95 mm long, 1.85 mm wide; surface polished and shiny; with irregular rows of dense punctures [Fig. 2 I]; average distance between punctures distinctly narrower than half diameter of punctures; partly coriaceous. Abdomen densely and deeply punctate; anterior tergites more densely punctate than posterior tergites; 8th tergite trilobed

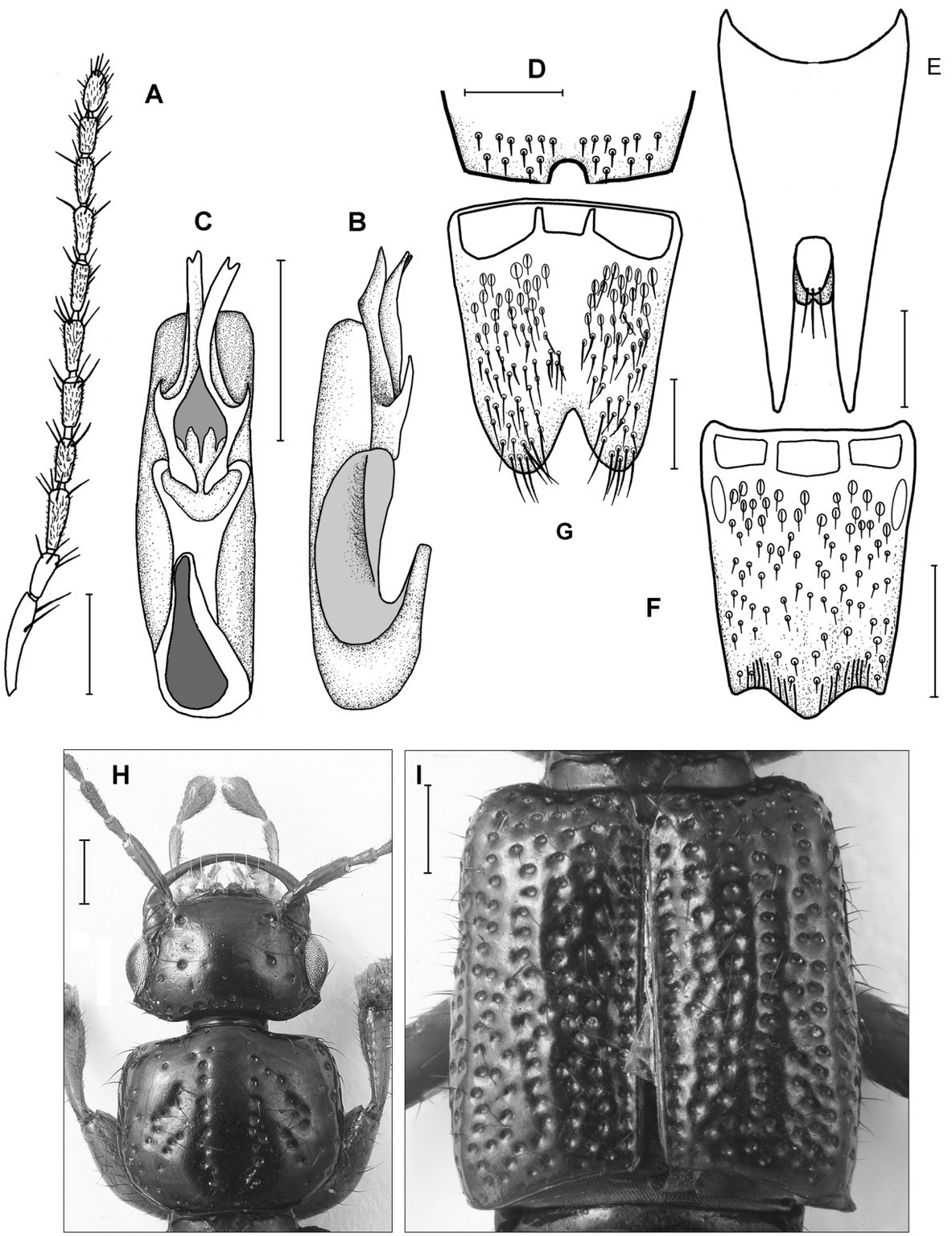

Fig. 2. *Neolindus pastazae*; antennae (A), aedeagus in lateral (B) and ventral (C) aspect, 5th visible sternite in ventral aspect (D), 7th and 8th visible tergites (E), 6th visible tergite (F) and sternite (G), dorsal aspect of head and pronotum (H) and elytra (I) showing punctation and surface (scale bar 0.5 mm).

with triangular central prominence and with striate structures at posterior edge [Fig. 2 F]; 7th sternite with semicircular emargination at posterior edge [Fig. 2 D]; 8th sternite with deep central emargination and glabrous central stripe [Fig. 2 E]. Aedeagus slightly asymmetric, with two long bifurcate prominences apically and one pair of hooks in apical half [Fig. 2 B, C]; ventral surface with deep cavity in paramedial position.

Etymology. The specific name derives from the location in the valley of the Rio Pastaza where it was found.

Neolindus densus Herman, 1991

New record. Brazil, Amazonas, 15 km SW Manaus, on Ilha de Marchanteria (59°55.21W, 3°13.59S), inundation forest in Varzea, tree eclector #50E, 1 male, 1 female, 18.2.1982, leg. J. Adis (UIC).

DISCUSSION

Together with the two new species the total number of *Neolindus* species increased to 35 species with Ecuador (11) and Peru (7) as countries with high numbers of species. Only Brazil, which has a much larger area than these two countries, has a similarly high number with nine species. The species have been very rarely collected. As *N. densus* Herman, 1991 shows, the distribution can nevertheless cover a wide area. This species seems to occur along the Amazon valley from its mouth near Belém to the Andean foot hills near Leticia (Columbia). A more detailed analysis of the ecology is difficult. According to the information given by Herman (1991) many species have been found in leaf litter of rain forests. In some labelled information the habitat was described as "under felled tree". The habitat of *N. pastazae* was also in litter layer under a felled tree. The collection of *N. densus* Herman, 1991 by a tree eclector in the central Amazon basin suggests that the tree habitat might be a more important habitat than can be derived from the labelled information. Thus, soil litter layer might be only an accidental habitat of the normally inhabited tree trunks, which are rarely investigated.

According to Herman (1991), the *Neolindus* species can be separated more or less in three species groups which are closer related. *N. verhaaghi* can be attributed to clade (17) with *N. punctventris, N. densus, N. agilis, N. cephalochymus, N. bullus, N. hamatus, N. procarinatus,* and *N. retusus*. This group is characterised by the presence of parallel carinae at the base of sternum VIII. The species of this group are distributed over the whole equatorial region, from the lowland rain forest of the Amazon basin to the western rainforest in Ecuador. *Neolindus pastazae* seems to be related to clade (24) with *N. punctogularis*, *N, hangarthi*, *N. schubarti*, *N. bidens*, and *N. religans*. In this group, species are characterised by a pronotum wider than it is long and tergum VIII being trilobed. Whereas *N. religans* and *N. schubarti* are distributed in eastern Brazil, *N. bidens*, *H. hanagarthi*, and the new *N. pastazae* represent a western branch of this group.

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