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**Poecilocloeus (Acrididae, Proctolabinae) is not confined to Amazonia**

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**Abstract**

*Poecilocloeus septentrionalis* is described from the Caribbean slope of Costa Rica. This is the first record of the genus from outside the Amazon basin, where it is highly speciose, with some 50 described species. The new species is morphologically a typical member of its genus.

**Key words**

Orthoptera, Proctolabinae, Central America, taxonomy, new species, biogeography

**Introduction**

The subfamily Proctolabinae are a numerically important constituent of the acridid fauna of neotropical wet forests. In Central America the commonest Proctolabinae are members of the subtribe Lithoscirtae, whereas the South American forests are dominated by members of the Proctolabae, which are present but relatively poorly represented in Central America. This paper reports the presence in Costa Rica of a previously unsuspected proctolaban taxon, a genus previously recorded only from S. America.

The genus *Poecilocloeus* was erected by Bruner 1910, with the Peruvian species *ornatus* Bruner as its type. Further collecting has shown that the genus is speciose and widely distributed in western Amazonia, with several more species in Guyana and one species in the Brazilian Atlantic forest. Descamps (1980) reviewed the genus and recognized at least 39 species known from male specimens, and considered then that these were probably but a fraction of the total number of species. This speculation was supported by Amedegnato and Poulain (1987), who recorded a further 11 species, mostly from southern Amazonia, including Peru and Bolivia. They divided the 50 known species into nine morphological groups. *Poecilocloeus* are insects of forest trees, but in Amazonia are commonly found in secondary forest (Descamps *loc. cit.*). The genus is rather homogenous, most being medium-sized fully winged grasshoppers of dark green or brown coloration, sometimes ornamented with yellow spots and frequently having red hind tibiae and antennae. Little is known of their biology, but at least one species (*P. hamatus* Descamps, 1980) is associated with Solanaceae.

To date, *Poecilocloeus* is exclusively South American in its distribution. In the wet forests of northwestern Colombia and Central America, a closely related genus, *Balachowskyacris* Descamps & Amedegnato, 1972, appears to replace it. The two genera are very similar and Descamps (1976) considered them to be vicariants; Rowell & Flook (2004) found them to be closely related, but placed *Kritacris*, rather than *Balachowskyacris*, as the sister genus to *Poecilocloeus*. In both genera (*Balachowskyacris* and *Poecilocloeus*) the inferior valves

of the aedeagus are greatly hypertrophied into long filaments, and the pallium is distended into a large projecting sac to accommodate them. There are at least four species of *Balachowskyacris* in Costa Rica: *B. olivacea* (Bruner, 1908), *B. rhabdota* (Hebard, 1924); *B. ? robertsi* Descamps, 1976; *B. narinoana* Descamps & Amedegnato, 1972, which are largely allopatric in their geographical distribution. Only *olivacea* and *robertsi* have been reported from Costa Rica previously (Descamps 1976); *rhabdota* and *narinoana* were originally described from Panama and Colombia, respectively.

Descamps (1976: 70, 129, 147) distinguished the two genera as follows:

*Poecilocloeus*: male cercus always curved dorsally; wings infumate but not colored; inferior aedeagal valves not wrapped around the upper valve. Dorsal surface of superior valve of the ovipositor lacking a projecting inner border at its base. Amazonian distribution.

*Balachowskyacris*: male cercus not curved dorsally (usually having the form of a laterally flattened horizontal bar); wings brightly colored; inferior aedeagal valves crossing each other beneath the superior valve, their extremities twining around it. Dorsal surface of superior ovipositor valve having a projecting inner border at its base, clearly visible in lateral view. Central American and Pacific distribution.

These criteria, while generally satisfactory, are not perfect: in *P. insolitus* the male cercus is not upwardly hooked and could pass as that of a *Balachowskyacris*; in *B. rhabdota* and *B. ? robertsi* the hind wings are infumate as in *Poecilocloeus* spp., and are not brightly colored. However, no *Poecilocloeus* has colored hind wings, and no *Balachowskyacris* has an upwardly hooked cercus. The differences in the ovipositor also seem to be universal.

I here report from the Caribbean slope forests of Costa Rica a previously undescribed species of *Poecilocloeus*, this being the first species of the genus recorded from outside of South America. At first glance it was taken to be merely a new species of *Balachowskyacris*, but closer examination shows that it is in fact a *Poecilocloeus*.

**Abbreviations of repositories**

ANSP	Academy of Natural Sciences, Philadelphia, USA
INBC	Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica
RC	The author's collection.

***Poecilocloeus septentrionalis* n. sp.**

*Holotype*.— male: COSTA RICA Prov. Guanacaste: Volcan Tenorio: nr summit of trail from Tierras Morenas to Bajo Los Cartagos, 1040 m. LN 28720 426500, 09.10.2003 (Rowell C.H.F.). Specimen No. 2003304. (ANSP).

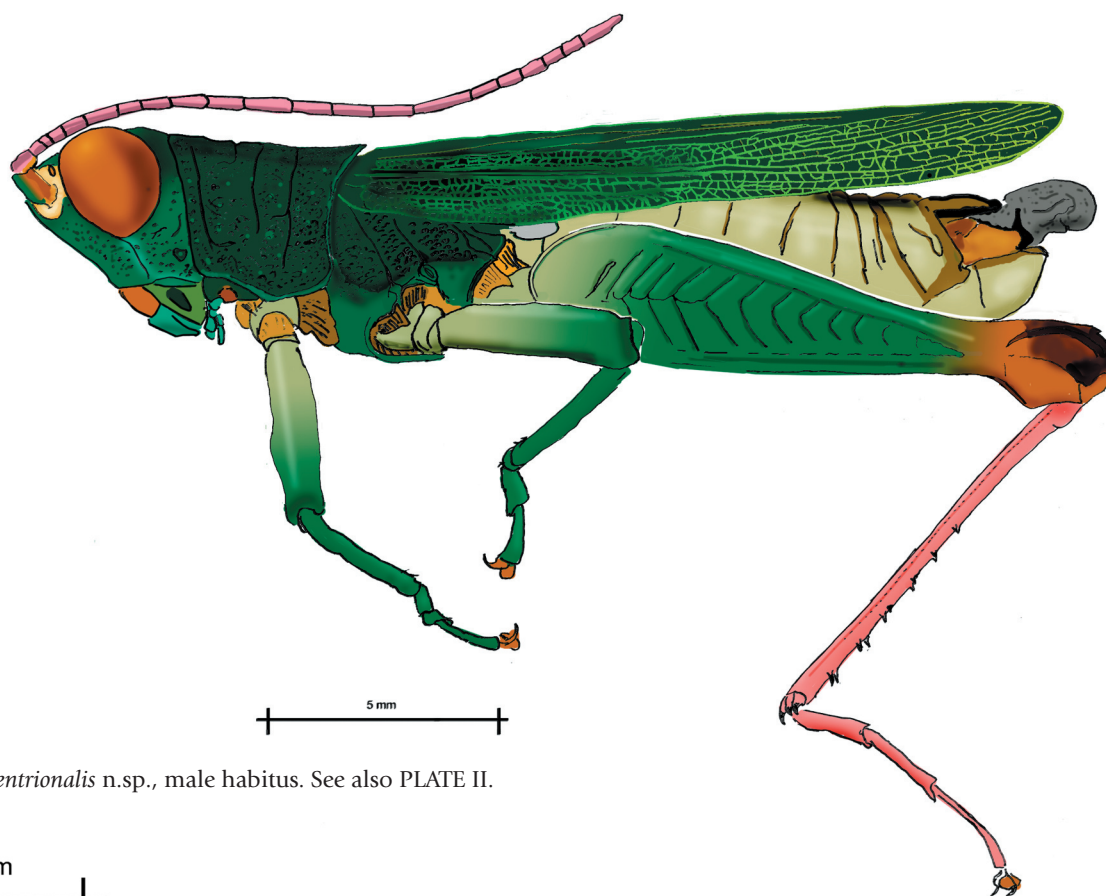


Fig. 1. *Poecilocloeus septentrionalis* n.sp., male habitus. See also PLATE II.

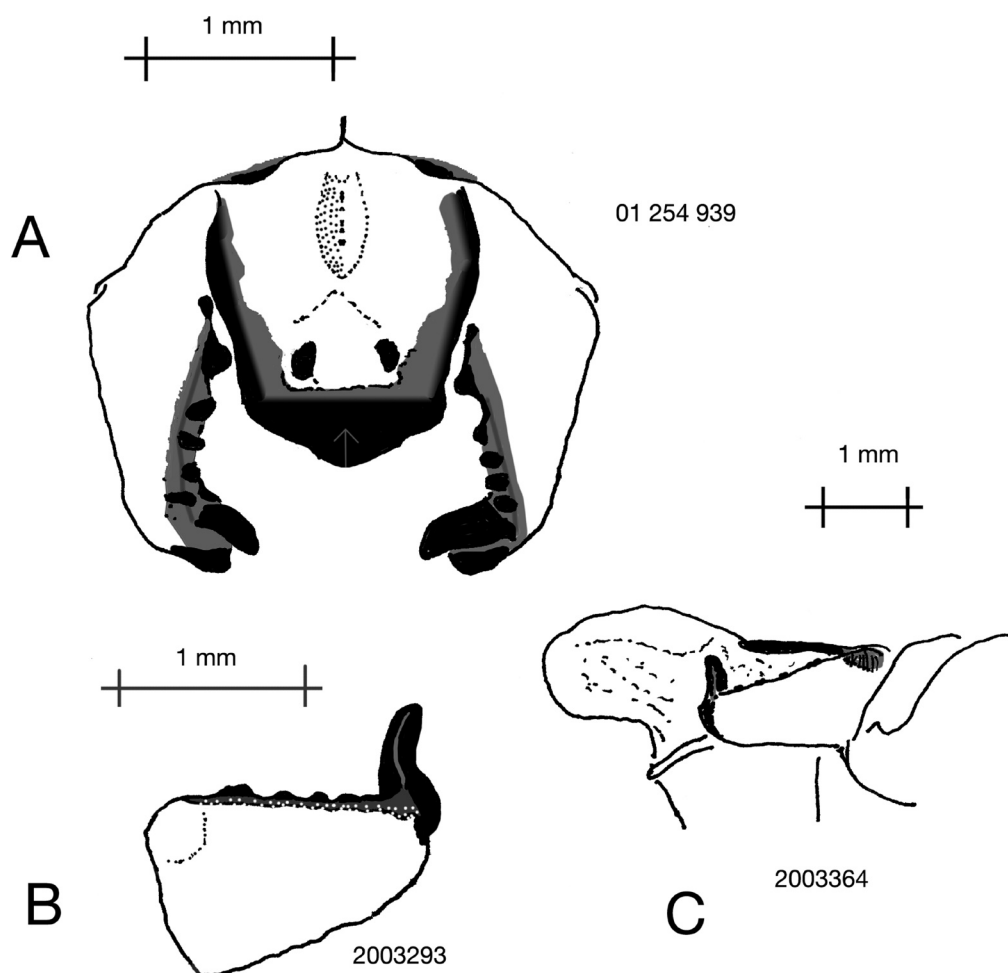
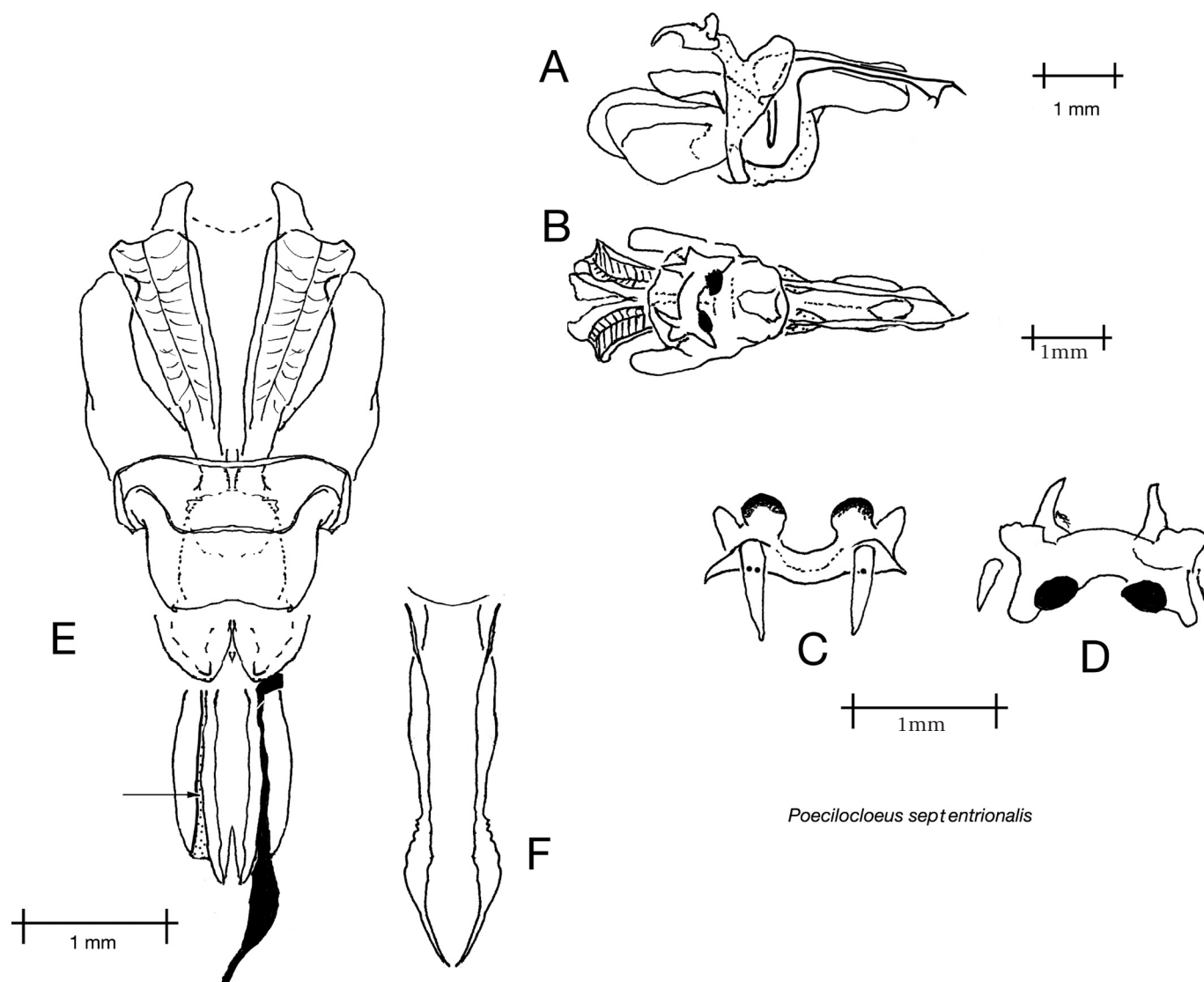


Fig. 2. *Poecilocloeus septentrionalis* n.sp., male terminalia. A. Supra-anal plate and cerci, dorsal view. B. Male left cercus, lateral view. C. Tip of abdomen, showing distended pallium. Specimen numbers are indicated.



*Poecilocloeus septentrionalis*

**Fig. 3.** *Poecilocloeus septentrionalis* n. sp., phallic complex. A. Phallic complex, lateral view. Note upwardly reflexed and produced ventral aedeagal valves, running in grooves in the fused upper valve. B. Phallic complex, dorsal view. C & D. Epiphallus, axial and dorsal views. E. Phallic complex after removal of epiphallus, dorsal view. The right hand ventral aedeagal valve is in black, and the groove in the dorsal valve where the left-hand ventral valve would run, is marked with an arrow. F. Dorsal view of distal extremities of ventral aedeagal valves, to show their twisted nature.

**Paratypes.**—female, data as holotype, specimen no. 2003305 (paired with holotype). (ANSP).

Female, data as above, but Specimen No. 2003314, not paired. (RC)

Male: COSTA RICA Prov. Guanacaste: P.N. Tenorio, 1 km N.E. of Estacion Los Jilgueros, 1000 m. LN 288800 428600, 07.10.2003 (Rowell C.H.F., Azofeita J.A.). Specimen No. 2003293. (RC).

Female: COSTA RICA Prov. Heredia: Puerto Viejo: Est. Biologica La Selva, 50-150 m. 10° 26'N 84° 01'W Sep. 1995 (INBio-OET Nasrecki P). At light. Specimen No. INB CRI001 254938. (INBC).

Male: as above, but specimen No. INB CRI001 254939. *In cop.* with 001 254938 (INBC).

Male: as above, but Oct 1995. Specimen No. INB CR001 254939 (INBC).

Male: As above, but 12 Aug 1987 (H. E. Braker). Specimen N. 87009 (= Braker 87-15) (RC).

Female, as above, but 6 April 1982 (H. E. Braker). Specimen No. 82006 (= Braker 82-57) (RC).

Male: COSTA RICA Prov. Guanacaste: P.N. Guanacaste: Estacion Pitilla, 5 km S. of Sta Cecilia. 700 m. LN330200 389200. October 1983 (Rios, P). Specimen No. INB CRI001 144355 (INBC).

**Etymology.**—Latin *septentrionalis*, northern, alluding to the species being the most northerly of its genus to date.

**Description.**—The generic description (e.g., Descamps 1976: 129) applies completely; this is a very typical member of the genus. It seems to fall into Descamps' *ferus* group, according to his key.

**Male.** Medium in size, overall length (fastigium to tip of abdomen) 20 to 24 mm; sexually dimorphic, males are 0.78 (P) to 0.84 (L) times as large as females (see Table 1), and more slenderly built. Fastigium longer than wide, tapering, slightly grooved on

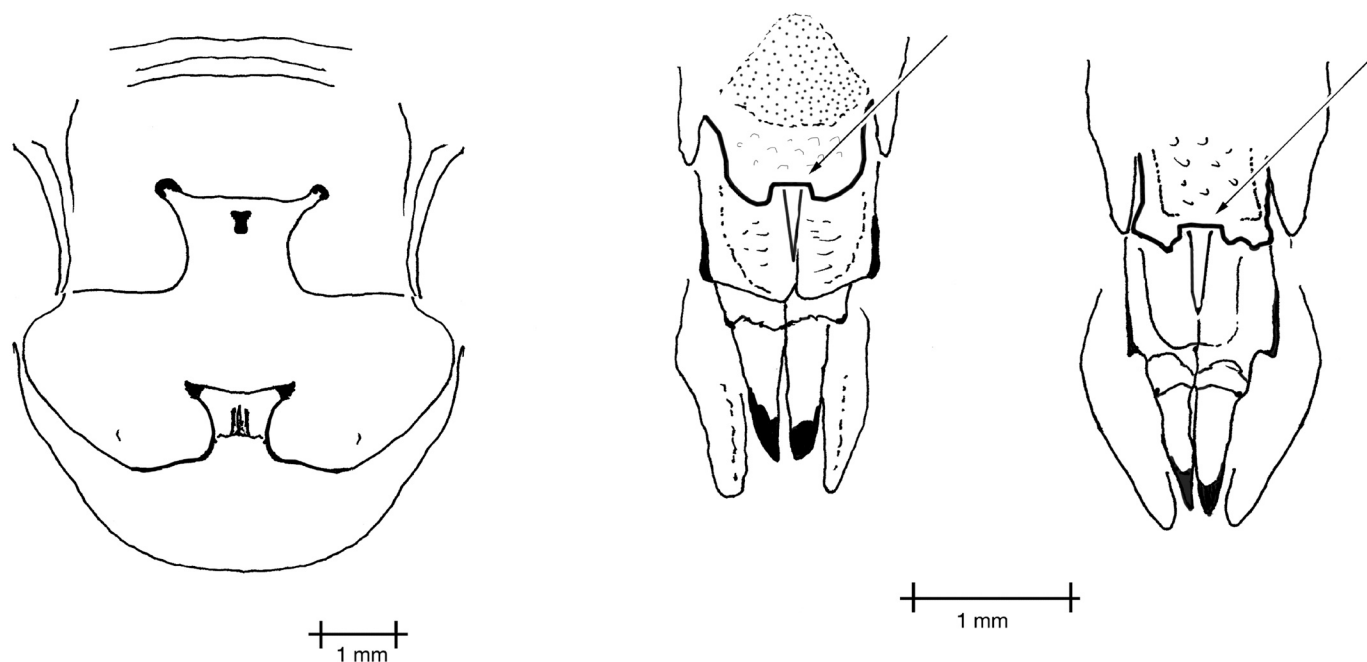


Fig. 4. *Poecilocloeus septentrionalis* n. sp., Female. A. Ventral surface of pterothorax. B & C. Subgenital plate and ovipositor valves, ventral view, in two different individuals. The arrows mark the medial oblong embayment which is characteristic of the species.

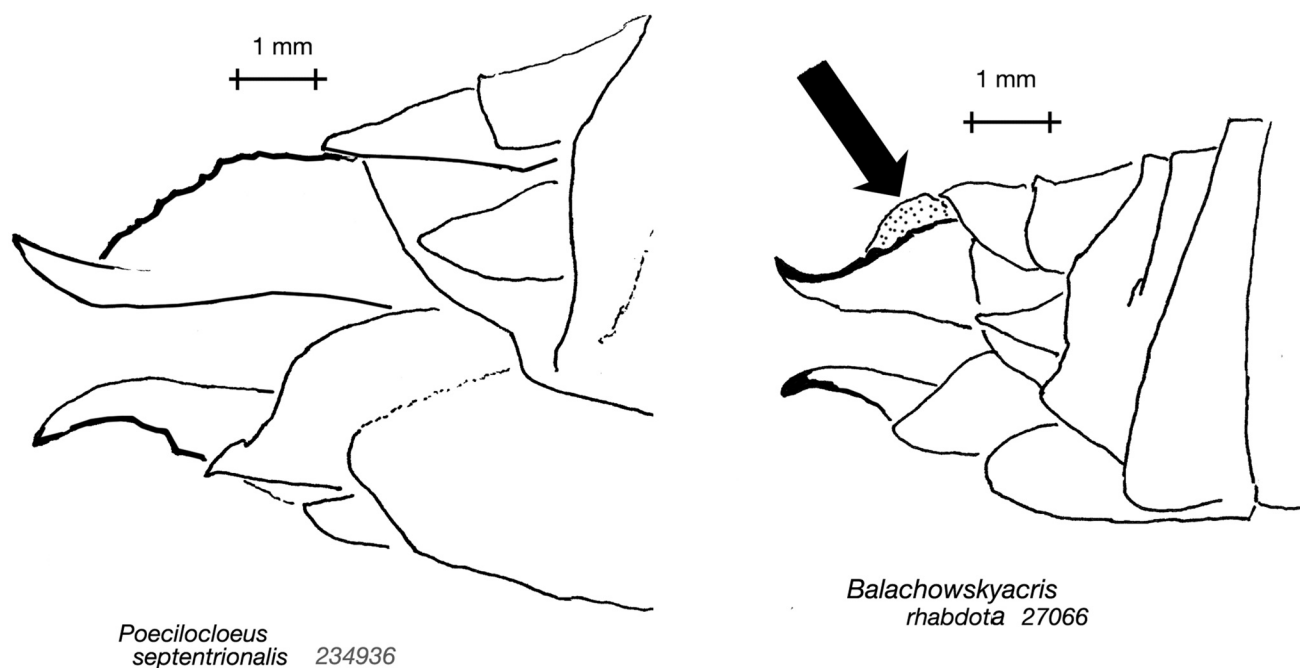


Fig. 5. Ovipositor of A. *Poecilocloeus septentrionalis* n. sp., B. Ovipositor of *Balachowskyacris rhabdota*, showing the protruding inner margin of the dorsal ovipositor valve (arrow), characteristic of the latter genus. Note also the relatively small cercus in female *Poecilocloeus*.



dorsal surface, downwardly curved, ending in a thick transverse ridge. Interocular space narrow, about same width as the antennal flagellum. Antenna of male long, about 2× length of head and PN together. Profile of frons straight or slightly concave, strongly receding. Frontal ridge parallel-sided in its dorsal part, smooth; in lower part rugose, pitted, and divergent, becoming obsolete before reaching the clypeus.

Pronotum lacking both medial and lateral carinae. Anterior margin of pronotum produced, overhanging the vertex, with a slight embayment medially. Posterior margin convex, rounded or obtusely angulate. Disc of pronotum crossed by three sulci. Cuticle of pronotum and of thoracic pleura rugose and densely pitted. Prosternal process small, conical, vertical, with a fine rounded point, not spiniform, mounted on a raised cuticular pedestal. Mesosternal interspace approximately as long as wide, open, widening towards the rear, its lateral lobes with rounded angles; metasternal interspace small and narrow, almost closed (Fig. 4A). Tympanate. Elytra straight and narrow, extending to base of hind knees or in some males to tip of abdomen, but never exceeding it. E/F 1.03-1.19 (Table 1). Wings cycloid, brownish infumate, very weakly tinged with blue basally.

Hind femur slender, about 4.5× as long as deep. Dorsal margin carinate, smooth. Dorsal carina of knee does not terminate in a point. Upper lateral lobes of knee rounded, lower lateral lobes pointed. Hind tibia with six external and seven internal spines. Inner pair of tibial spurs larger than outer pair. Of the inner pair, the more lateral (no. 3) is larger than the innermost one (no. 4).

Abdominal segments with a weak medial carina and smooth, glossy cuticle. Furcula (Fig. 2A) with small, widely separated melanized points. Supra-anal plate roughly oblong, with a short terminal point, medially excavated proximally, margins thickened and melanized. Two melanized knobs decorate its posterior surface (Fig. 2A). Cerci (Fig. 2B) of typical generic form, wide basally, tapering to a vertical melanized process distally; dorsal margin of cercus decorated with four to five melanised tubercles or teeth. Subgenital plate cupuliform, with a thickened dorsal margin. Pallium thick, grey and wrinkled, projecting dorsally and posteriorly beyond the subgenital plate (Fig. 2C).

Phallic complex (Fig. 3) of normal generic type. The very elongate ventral aedeagal valves have no apophyses, run in grooves (arrowed in Fig. 3E) along the upper surface of the fused dorsal aedeagal valve, and terminate in angular spatulate tips (Fig. 3A, F) which are unlike those of any other described species of the genus.

**Coloration.**— General color, dark green, tending to blackish on vertex of head. The abdominal segments are lighter in hue, as are the coxae and proximal areas of the femora of all the legs. Eyes olive brown. Clypeus, dorsal surface of antennal stipe, lower central area of prothoracic episternum, and outer surface of cercus, brownish. Hind knee brown proximally and ventrally, blackish brown dorsally. Antennal flagellum, rose pink with a blackish line dorsally; hind tibiae and tarsus scarlet. Tibial spines scarlet with black tips. The dorsal surface of the terminal abdominal segments is marked with dark olive brown or black.

**Female:** Similar to male in coloration and appearance, but of heavier build and having relatively much shorter, darker, antennae and slightly shorter hind feet. The legs of females tend to be a more uniform dark green than in the males. The posterior margin of the subgenital plate is roughly four lobed; the internal lobes are of rather variable shape, but are always separated by a conspicuous oblong excision (arrowed in Fig. 4). Ovipositor (Fig. 5) of the normal type for this genus.

**Natural history.**— One pair of the above nine specimens was taken at light. All the others were found on low understorey vegetation in primary forest, on *Witheringia* (Solanaceae) and Melostomaceous spp. In comparison with most other acridoid species of this habitat, it is a very rare animal.

As a result of this report, *Poecilocloeus* now has a disjunct recorded distribution: Amazonia and Costa Rica. This distribution may well be artifactual: it is at least equally likely that the genus also occurs, though rarely, in Colombia and Panama too, but has not yet been recorded. Its occurrence at Pitilla, near the border to Nicaragua, suggests that it may extend into that country as well.

## Acknowledgments

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**Table 1.** Dimensions of *Poecilocloeus septentrionalis* n.sp, in mm. Abbreviations: P, pronotum, dorsal midline. IOS , Interocular space. L, Body length from rostrum to tip of abdomen. F, length of hind femur. FD, depth of hind femur. T1-T3, lengths of hind tarsi; Ant, length of antennal flagellum. E. length of elytron. FF, foot formula. n.d., no data. Note the relatively large variation in elytron length and in body length of females.

Males														
Specimen no.	Locality	P	IOS	L	F	FD	F/FD	T1	T2	T3	T1+2+3	Ant	Elytron	E/F
2003304	Bajo Los Cartagos	4.16	0.27	23.71	13.3	2.97	4.48	1.82	2.12	2.68	6.62	15.5	15.8	1.19
2003293	Los Jilgueros	3.96	0.25	22.02	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	14.48	13.98	n.d.
254939	La Selva	3.76	0.19	21.28	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	13.08	n.d.
144355	Pitilla	3.48	0.19	20.86	11.34	2.41	4.71	1.82	1.84	2.26	5.92	n.d.	12.47	1.10
											0			
	Mean	3.84	0.23	21.97	12.32	2.69		1.82	1.98	2.47	6.27	14.99	13.83	1.14
	Max	4.16	0.27	23.71	13.30	2.97		1.82	2.12	2.68	6.62	15.50	15.80	1.19
	Min	3.48	0.19	20.86	11.34	2.41		1.82	1.84	2.26	5.92	14.48	12.47	1.10
	N	4	4	4	2	2		2	2	2	2	2	4	2
							FF	0.29	0.32	0.39				
	max/Min	1.20	1.42	1.14	1.17	1.23		1.00	1.15	1.19	1.12	1.07	1.27	1.08
Females														
Specimen no.	Locality	P	IOS	L	F	FD	F/FD	T1	T2	T3	T1+2+3			
2003305	Bajo Los Cartagos	5.36	0.34	28.65	15.55	3.4	4.57	2.23	2.57	3.2	8	7.73	17.34	1.12
2003314	Bajo Los Cartagos	5.37	0.27	29.25	16.12	3.56	4.53	2.02	2.68	3.15	7.85	n.d.	18	1.12
254938	La Selva	4.83	0.26	26.94	14.31	3.21	4.46	2	2.15	2.75	6.9	n.d.	14.87	1.04
87009	La Selva	4.33	0.24	20.88	13.93	2.72	5.12	2.01	1.97	2.52	6.5	n.d.	14.3	1.03
82006	La Selva	4.61	0.28	25.54	13.93	2.56	5.44	1.83	1.93	2.6	6.36	n.d.		
	Mean	4.90	0.28	26.25	14.77	3.09	4.82	2.02	2.26	2.84	7.12	7.73	16.13	1.07
	Max	5.37	0.34	29.25	16.12	3.56	5.44	2.23	2.68	3.20	8.00	7.73	18.00	1.12
	Min	4.33	0.24	20.88	13.93	2.56	4.46	1.83	1.93	2.52	6.36	7.73	14.30	1.03
	N	5	5	5	5	5	5	5	5	5	5	1	4	4
							FF	0.28	0.32	0.40				
	max/Min	1.24	1.42	1.40	1.16	1.39	1.22	1.22	1.39	1.27	1.26	1.00	1.26	1.09
Sex dimorph m/f		0.78	0.81	0.84	0.83	0.87		0.90	0.88	0.87	0.88	1.61	0.86	1.06