

***Najtaecesa* n. gen., a trigonidiine-like Cearacesaini Koçak & Kemal, 2010 cricket from the Amazonian rainforests (Grylloidea, Gryllidae, Hapithinae)**

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ABSTRACT

The morphological diversity of the Neotropical Cearacesaini Koçak & Kemal, 2010 (Grylloidea, Gryllidae, Hapithinae) is still poorly attested as it is known by only two genera very different in shape and morphology. A new genus and two new species are described: *Najtaecesa aratayensis* n. gen., n. sp., the type species of *Najtaecesa* n. gen., from French Guiana, and *N. lorentensis* n. gen., n. sp. from Eastern Peru. *Najtaecesa* n. gen. is characterized by its very small size, trigonidiine-like body shape, and male genitalia.

RÉSUMÉ

Najtaecesa n. gen., un grillon de la tribu des Cearacesaini Koçak & Kemal, 2010 (Grylloidea, Gryllidae, Hapithinae) originaire des forêts amazoniennes et ressemblant à un Trigonidiinae.

La diversité morphologique de la tribu néotropicale des Cearacesaini Koçak & Kemal, 2010 (Grylloidea, Gryllidae, Hapithinae) est encore très mal documentée; seuls deux genres sont en effet connus, très différents par leur forme et leur morphologie. Un nouveau genre et deux nouvelles espèces sont décrits: *Najtaecesa aratayensis* n. gen., n. sp., l'espèce type de *Najtaecesa* n. gen., originaire de Guyane française, et *N. lorentensis* n. gen., n. sp. du Pérou oriental. *Najtaecesa* n. gen. est caractérisé par sa très petite taille, son allure générale de grillon Trigonidiinae Saussure, 1874, et ses genitalia mâles.

KEY WORDS

Grylloidea,
Neotropical region,
Amazonia,
new genus,
new species.

MOTS CLÉS

Grylloidea,
région néotropicale,
Amazonie,
genre nouveau,
espèces nouvelles.

INTRODUCTION

Cearacesaini Koçak & Kemal, 2010 have been identified and separate as a distinct cricket clade under the name Neomorphini by Desutter (1987), from the analysis of male genitalia (Desutter 1987, 1988). This cricket clade is characterized by its endophallic dorsal cavity, strongly asymmetric, and by its ectophallic invagination, which is largely developed dorsally and sclerotized asymmetrically around the dorsal cavity, without elongate ectophallic apodemes. Also, the rami are fused ventrally.

The Cearacesaini have been defined as the sister group of the Hapithini Gorochoy, 1986 within the Neotropical subfamily Hapithinae Gorochoy, 1986 (Desutter 1988, 1990). However recent molecular evidence strongly support a sistership relation of the Cearacesaini with a clade comprising both the Hapithini and the Aphonomorphini Desutter-Grandcolas, 1988: this pattern gathers all the neotropical “podoscirtine” crickets in one large clade, which is the sister group of paleotropical Podoscirtinae Saussure, 1878 (Chintauan-Marquier *et al.* 2013, 2016).

From the point of view of their phenotype, even though the Cearacesaini are always devoid of an acoustic device in males, they are extremely diverse as far as body shape is concerned, as shown by undescribed material in the MNHN collections (Desutter 1990). Today, this morphological heterogeneity is not correctly documented, as only one genus has been formally described in addition to the type genus, i.e. *Taroba* de Mello & Souza-Dias, 2010 (Souza-Dias & de Mello 2010).

In the present paper, a new genus of Cearacesaini is described, which resembles small trigonidiine crickets by its size and body shape. Two new species are described, *Najtaecesa aratayensis* n. gen., n. sp., the type species of *Najtaecesa* n. gen., from French Guiana, and *N. lorentensis* n. gen., n. sp. from Eastern Peru. The new genus is described in honor of late Judith Najt, who revived research in insect systematics in the MNHN.

MATERIAL AND METHODS

TAXONOMY

The upper taxonomy is that proposed from the molecular phylogeny of crickets (Chintauan-Marquier *et al.* 2013, 2016). The authors of taxonomic categories above subfamily level are named after Eades *et al.* (2016) but see Dubois (2017) for a critical analysis of higher category names in Orthoptera.

ABBREVIATIONS AND SYMBOLS

Morphology

I, II, III	anterior, median, posterior;
DD	pronotum dorsal disc;
F	femur;
FW	forewing;
HW	hindwing;
LL	pronotum lateral lobe;
T	tibia.

Male genitalia

Male genitalia are cleaned with cold KOH and kept in glycérine in a small vial pinned under each dissected specimens. Membranous parts are figured with dots. In the Figures, the structures seen through the membranous are pointed with broken lines. Structures are named after Desutter (1987) and Desutter-Grandcolas (2003):

a.l.	apical lobes of pseudepiphallus;
arc	ectophallic arc;
d. cav.	dorsal cavity;
ec. a.	ectophallic apodeme;
ec. f.	ectophallic fold;
E.I.	ectophallic invagination;
gl	paired glands of ejaculatory duct;
ps.	pseudepiphallic sclerite;
ps. p.	pseudepiphallic parameres;
ps. pl.	transverse pseudepiphallic plate separating the pseudepiphallic sclerite and parameres;
r.	ramus;
r. pl.	ramal plate;
v. v.	ventral valves.

Measurements (in mm mean value in parentheses)

iod	interocular distance;
LFIII	length of hindfemur;
LFW	median length of forewings;
LHW	median length of hindwings;
Lovip	length of ovipositor;
Lpron	median length of pronotum dorsal disc;
LTIII	length of hindtibia;
wpron	posterior width of pronotum dorsal disc.

Repository

MNHN	Muséum national d'Histoire naturelle, Paris;
MZSP	Museu de Zoologia da Universidade de Sao Paulo, Sao Paulo.

Inventory numbers

Specimens deposited in the MNHN collections have a unique inventory number, MNHN-EO-ENSIFXXXX, and can be found in the collection data base of the MNHN at the following address, <https://science.mnhn.fr/institution/mnhn/collection/eo/search>

SYSTEMATICS

Order ORTHOPTERA Olivier, 1789
 Suborder ENSIFERA Chopard, 1920
 Infraorder GRYLLIDEA Laicharting, 1781
 Superfamily GRYLLOIDEA Laicharting, 1781
 Family GRYLLIDAE Laicharting, 1781
 Subfamily HAPITHINAE Gorochoy, 1986
 Tribe Cearacesaini Koçak & Kemal, 2010

Genus *Najtaecesa* n. gen.

TYPE SPECIES. — *Najtaecesa aratayensis* n. sp.

LIST OF INCLUDED SPECIES. — *N. aratayensis* n. gen., n. sp., *N. lorentensis* n. gen., n. sp.

ETYMOLOGY. — *Najtaecesa* n. gen. is named in honor of the great collembologist Judith Najt, who gathered and supported a CNRS research team focussing on insect systematics and evolution within the MNHN, thus reviving this discipline; the termination refers to the type genus of the tribe, *Cearacesa* Koçak & Komal, 2010.

DIAGNOSIS. — Small elongate crickets, broadly resembling Trigonidiinae (Trigonidiidae) by their general shape (body and head narrow, FW longer than the body; HWs much longer than FWs and pointed). Body surface regular, without corrugation. Head triangular with protruding eyes; scapes small; 5th joint of maxillary palpi widened apically, but longer than wide. TI with a large, open inner tympanum and inflated over its whole length (not only at level of tympanum); no outer tympanum. Male genitalia: pseudepiphallallic sclerite with distal margin V-shaped; with two flat and diverging lophi (*contra Cearacesa* Koçak & Komal, 2010); pseudepiphallallic ventral lobe nearly as wide as pseudepiphallallic sclerite.

DISTRIBUTION. — Eastern (French Guiana) and western (Peru) Amazonia.

HABITAT AND BIOLOGY. — Not documented.

DESCRIPTION

Small species with bright and contrasted coloration (attested in *N. aratayensis* n. gen., n. sp., Fig. 1A, suspected in *N. loretensis* n. gen., n. sp., Fig. 1G). Head, body, FWs and legs abundantly covered with small setae and with numerous longer ones. Head small and triangular (Fig. 1B, H). Eyes slightly protruding. Ocelli (Fig. 1D) small and vertical; arranged in a flat triangle located on a low, transverse, curved crest between eyes; median ocellus subapical in position. Fastigium much broader than scape, rounded (Fig. 1B, H). Scapes small, slightly longer than wide (Figs 1C; 2A). Face broad; distance between each antennal pit and epistomal suture almost equal to fastigium width (Fig. 1B, H). Maxillary palpi very small (Fig. 2A); last 3 joints subequal in length; 5th joint greatly enlarged from its base, but longer than wide, with convex posterior margin, concave anterior margin, straight apical margin (Fig. 2A). Pronotum transverse (Fig. 1A, G). DD posterior margin bisinuated. LL squared, slightly longer than high (Fig. 1C); anterior angle slightly raised. Legs (legs I and II after *N. aratayensis* n. gen., n. sp. only). FI thick. TI inflated and squared; a large inner tympanum, open, with a thickened ovoid membrane in dorsal part; 3 apical spurs, small and conical, outer dorsal spur lacking, inner dorsal spur dejected ventrally; inner ventral spur the smallest. TII with 4 apical spurs, short, gathered on/near TII ventral side. FIII thick at base (Fig. 1A, G), somewhat filiform over about 1/3 of its length (Fig. 1E, I). TIII shorter than FIII, flattened and grooved dorsally; 3 inner and 3 outer apical spurs; inner dorsal spur the longest, well longer than median inner spur; most often 5 inner and always 5 outer subapical spurs, the inner twice as long as the outer; TIII serrulated over whole length, but without spine between dorsal apical spur and first subapical spur, and with 0 or 1 spine between the first two (more distal) subapical spurs; spines of irregular size, but most often large, the more proximal spines (above subapical spurs) usually smaller. Tarsi all very short; tarsomeres 1 only hardly longer than tarsomeres 2 (Fig. 1A); tarsomeres 3 nearly as long as tarsomeres 1 and 2 together. Claws simple. Cerci very

long and thin, going beyond HW tip (*N. aratayensis* n. gen., n. sp.) or not (*N. loretensis* n. gen., n. sp.).

Male

Metanotum glandular (at least in *N. aratayensis* n. gen., n. sp.: Fig. 1F). FW longer than body (Fig. 1A, G); with strong, longitudinal veins, little bifurcated, and weaker transverse veins (Fig. 2B, C). No stridulatory device. HWs greatly longer than FWs (Fig. 1A, G).

Male genitalia (Fig. 2D-I)

Pseudepiphallus split transversally into a dorsal pseudepiphallallic sclerite and a more ventral membranous plate, located dorsally to ectophallallic fold and ectophallallic invagination; this plate connected laterally to pseudepiphallallic parameres and laterally to an invagination on pseudepiphallus (Fig. 2D, I, arrow). Pseudepiphallallic sclerite quite flat and homogeneously sclerotized; anterior margin deeply emarginated; distal margin V-shaped, with two flat and diverging lophi. Pseudepiphallallic plate conspicuous between lophi (Fig. 2D, G); posterior margin variously convex; anterior margin bumping against ectophallallic arc. Pseudepiphallallic parameres large and more or less concave on outer side (Fig. 2E, H). Rami circular; separate from pseudepiphallallic sclerite by an elongate ramal plate. Ectophallallic invagination broad, encompassing the whole dorsal side of dorsal cavity; sclerotized on whole margin; protruding at dorsal midpoint (ectophallallic arc, Fig. 2D, G) as a more or less elongated free process; ectophallallic apodemes very short, without a free apex (Fig. 2F, I). Ectophallallic fold wide and conical, regularly narrowed toward apex, hardly sclerotized ventrally; not reaching posterior margin of pseudepiphallallic parameres (Fig. 2E, H). Ventral valves united as one membranous lobe, dejected anteriorly. Dorsal cavity largely open ventrally, quite irregular in shape, and quite low.

Female

Unknown.

REMARK

This taxon was mentioned as a putative new genus in Desutter (1988, 1990).

Najtaecesa aratayensis n. sp. (Figs 1A-F; 2A-F; Table 1)

TYPE LOCALITY. — French Guiana, Arataye, 8 km NE Saut Parare.

TYPE MATERIAL. — **Holotype**. French Guiana, Arataye, Affl. Approuague, 8 km pied Saut Parare, 10.V.1988, 1 ♂, nuit, L. Desutter, MNHN-EO-ENSIF4209.

ETYMOLOGY. — Species named after Arataye river.

DIAGNOSIS. — Species characterized by its contrasted black and yellow coloration (at least in males, Fig. 1A), and by its male genitalia (small; lophi almost parallel, regularly and only slightly narrowed toward apex; distal margin of pseudepiphallallic ventral plate strongly protruding and conical; other characters: see below and Fig. 2D-F).



FIG. 1. — *Najtaecesa* n. gen.: **A-F**, *Najtaecesa aratayensis* n. gen., n. sp.; **G-I**, *Najtaecesa lorentensis* n. gen., n. sp.: **A**, **G**, male holotype, dorsal views; **B**, **H**, face, front views; **C**, Head and pronotum, lateral view; **D**, head, dorsal view; **E**, **I**, III outer side, lateral views; **F**, metanotum, dorsal view (wings apart). Scale bars: 1 mm.

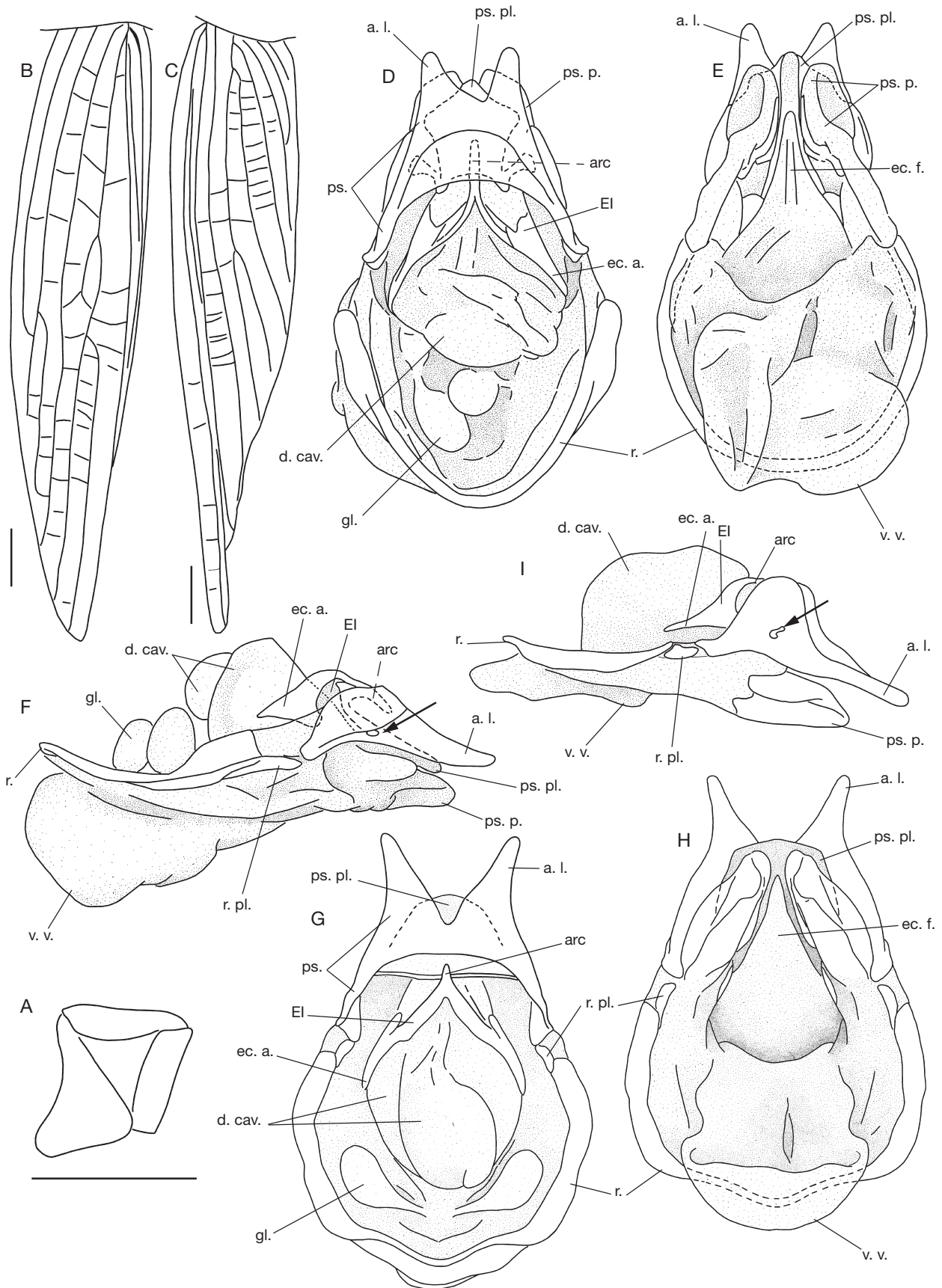


FIG. 2. — *Najtaecesa* n. gen.: **A–F**, *Najtaecesa aratayensis* n. gen., n. sp.; **G–I**, *Najtaecesa lorentensis* n. gen., n. sp.: **A**, maxillary palpus; **B, C**, ♂ FW, dorsal and lateral fields, coloration as on Fig. 1A, C; **D–I**, ♂ genitalia, dorsal (**D, G**), ventral (**E, H**), lateral (**F, I**) views. Abbreviations: see Material and methods. Scale bars: 1 mm.

TABLE 1. — *Najtaecesa aratayensis* n. gen., n. sp. measurements (in mm). Abbreviations: see Material and methods.

	iod	Lpron	wpron	LFW	LHW	LFIII	LTIII
Male holotype	1.5	1.5	2.7	9.7	12.7	8.1	7.8

DESCRIPTION

Head shape, tympanum, legs and wings as in genus definition. DD anterior margin slightly convex. TIII with four (right) or five (left) inner, and five outer subapical spurs. Inner serrulation: no spine between dorsal apical spur and subapical spur 1; one spine between subapical spurs 1 and 2, and between subapical spurs 2 and 3; three spines between subapical spurs 3 and 4; two spines between left subapical spurs 4 and 5; 11 (left) and 16 (right) spines above last (proximal) subapical spur. Outer serrulation: no spine between dorsal apical spur and subapical spur 1, and between subapical spurs 1 and 2; one spine between subapical spurs 2 and 3; two or three spines between subapical spurs 3 and 4; four spines between subapical spurs 4 and 5; 17 (left) and 18 (right) spines above last (proximal) subapical spur.

Coloration

Head dorsum (Fig. 1D) black with yellow pattern, limited anteriorly by a wide, transverse yellow band: one short line behind each eye, extending yellow line on eye and pronotum (see below); a yellow line along inner margin of each eye, prolonged posteriorly to occiput and anteriorly to transverse yellow band; on occiput, a pair of short, convergent yellow lines. Between eyes, yellow transverse band crossed by a thin black Y-shape line, located behind ocelli; this band abundantly covered with golden setae, and delimited anteriorly and posteriorly by a yellow transverse line; anterior transverse yellow line crest-like, including ocelli. Fastigium (Fig. 1D) brown; sides yellow; median part below median ocellus black. Eyes (Fig. 1B) brown, crossed by a pair of parallel, longitudinal yellow lines; upper anterior half yellowish, extending yellow transverse band on head dorsum. Scapes dark brown, lighter at base. Antennae brown at base (broken in holotype). Cheeks (Fig. 1C) dark brown; lower margins lighter. Area behind eyes dark brown, marbled with yellow. Face (Fig. 1B) black, shining, largely bordered with light yellow along epistomal suture. A small, light yellow dot under lower angle of each eye. Clypeus and labrum light yellow; upper margin of postclypeus and labrum, and complete margin of preclypeus dark brown. Palpi dark brown. DD black with yellow pattern (Fig. 1A, C): a yellow band along lateral margins, extended on anterior margin, and almost interrupted after midlength; a small median dot on anterior margin; a pair of median, oval dots close to posterior margin; a small, median longitudinal line in DD posterior $\frac{1}{4}$. Lateral lobes dark brown, slightly lighter in anterior angle; an inconspicuous longitudinal yellowish line at midlength; a small yellow line on upper anterior margin. Legs: Coxae I black, yellow and white. Trochanter white. FI black, with yellow dots dorsally (Fig. 1A). TI light

brown; three or four yellow dots on upper, inner margin. Tarsi I and II light brown; distal part of tarsomeres 2 and 3 yellowish. Coxae II and trochanters II black and white. FII brown; dorsal base yellow; yellow dots on distal dorsal part and on outer side. TII dark brown; three or four yellow dots on upper, outer margin. FIII (Fig. 1E) dark brown in apical $\frac{1}{4}$; a wide, longitudinal brown line on outer side; FIII otherwise light yellow with brown dorsally, and whitish ventrally (on both inner and outer sides). TIII brown dorsally, lighter ventrally; four whitish lines along inner margin; spurs light yellow, darker at base and apex; basitarsi III white; spines white with black apex, spurs light yellow; tarsomeres 2 brown; tarsomeres 3 light yellow. Cerci black laterally, white dorsally and ventrally.

Male

Metanotum glandular (Fig. 1F). FWs black, with a wide, yellow band along dorsal field lateral margins; veins dark brown to black, except along FW outer margin (Fig. 1A). Tergites black, their distal margin bordered with yellow. Sternites black, shining, their lateral parts light yellow. Subgenital plate black, its lateral margin inconspicuously marked with whitish.

Male genitalia. Fig. 2D-F. Small compared to *N. loretensis* n. gen., n. sp. Pseudephallic lophi slightly asymmetrical, almost parallel, regularly and only slightly narrowed toward apex; pseudepiphallallic plate connected to parameres quite posteriorly, distal margin strongly protruding and conical; pseudepiphallallic parameres with a small outer lobe, its main lobe conical and regularly narrowed toward apex; ectophallic apodemes broad, located laterally related to dorsal cavity.

Female unknown.

Measurements (in mm)

See Table 1.

Najtaecesa loretensis n. sp.
(Figs 1G-I; 2G-I; Table 2)

TYPE LOCALITY. — Peru, Loreto, Ampiyacu, Estiron.

TYPE MATERIAL. — **Holotype.** Peru, Loreto, Rio Ampiyacu, Estiron, X.1981, fn 20 (S. Poulain), MNHN-EO-ENSIF4208. Specimen not in good condition, PI and PII missing, antennae broken, coloration probably altered (specimen entirely light brown with few contrasted orange brown marks, see below).

ETYMOLOGY. — Species named after type locality, in Loreto district.

DIAGNOSIS. — Species close to *N. aratayensis* n. gen., n. sp., from which it can be separated by its male genitalia (size, shape of lophi and ventral plate of pseudepiphallus; ectophallic invagination), and putative coloration.

TABLE 2. — *Najtaecesa loretensis* n. gen., n. sp. measurements (in mm). Abbreviations: see Material and methods.

	iod	Lpron	wpron	LFW	LHW	LFIII	LTIII
Male holotype	1.4	1.2	2.1	9	12.9	7.8	7

DESCRIPTION

Head shape, hind legs (FIII shape, TIII shape and spurs, tarsi), pronotum shape (but DD anterior margin slightly concave), and male FW venation as in genus definition. TIII with five subapical spurs on each side. Inner serrulation: no spine between dorsal apical spur and subapical spur 1; one or two spines between subapical spurs 1 and 2; one spine between subapical spurs 2 and 3; two or three spines between subapical spurs 3 and 4; three spines between left subapical spurs 4 and 5; 11 spines above last (proximal) subapical spur. Outer serrulation: no spine between dorsal apical spur and subapical spur 1, and between subapical spurs 1 and 2; one or two spines between subapical spurs 2 and 3; two or three spines between subapical spurs 3 and 4; four spines between subapical spurs 4 and 5; 17 (left) and 19 (right) spines above last (proximal) subapical spur.

Coloration (Fig. 1G-I)

Specimen very light brown, with darker pattern: lateral margin of pronotum DD orange brown, head abundantly marked with orange brown.

Male

FW coloration homogeneous, with contrasted orange brown bands along FW lateral margins (Fig. 1G). Subgenital plate longer than wide.

Male genitalia (Fig. 2G-I)

Large compared to *N. aratayensis* n. gen., n. sp. Pseudepiphallic lophi strongly diverging from the base, thin, and strongly narrowed at midlength; distal margin of pseudepiphallic ventral plate concave but only slightly conical; pseudepiphallic parameres wider than in *N. aratayensis* n. gen., n. sp., abruptly narrowed before apex; ectophallic apodemes thin, emerging from lower parts of ectophallic invagination.

Measurements (in mm).

See Table 2.

DISCUSSION

Only two genera have been formally described up to now in the Cearacesaini: the type genus, *Cearacesa* Koçak & Kemal, 2010 (described under the name *Neomorpha* Desutter, 1988) and *Taroba*. *Najtaecesa* n. gen., described in the present paper but mentioned as an undescribed genus in Desutter (1990), is the third genus of the tribe. Three additional new genera are still awaiting formal description in the MNHN collections,

with about 20 new species, while many species of *Cearacesa* are present in MZSP (Souza-Dias & Mello 2010). All these taxa are distributed in South America, documenting the Neotropical distribution of the clade.

All these taxa are very thin, fusiform and fully winged, both pairs of wings covering the abdomen, and the hindwings longer than the forewings, except for *Taroba*, characterized by very short, not overlapping forewings, which cover less than half abdomen. Several new taxa present a strongly corrugate appearance, resembling tree bark and lichen. Because of their morphology, most Cearacesaini could be easily taken for Aphonomorphini, but *Najtaecesa* n. gen. resembles Trigonidiinae crickets, many undescribed species resemble the Hapithine genus *Laurepa* Walker, 1869, and *Taroba* could resemble a very bizarre Gryllinae Laicharting, 1781.

Cearacesaini are quite uncommonly encountered during field work, and their biology is still largely unknown.

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