

Papéis Avulsos de Zoologia

THE TORRIDINCOLID GENUS *YTU* (COLEOPTERA, MYXOPHAGA)

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ABSTRACT

The genus Ytu (Coleoptera, Torridincolidae) is reviewed. The 16 recognized species are arranged in 5 species-groups; 8 new species are described (type-localities in parentheses): angra (Brazil, Rio de Janeiro, Angra dos Reis), cuyaba (Brazil, Mato Grosso, Cuiabá), godoyi (Brazil, São Paulo, Campos do Jordão), itati (Brazil, São Paulo, Águas da Prata), mirandus (Brazil, Paraná, Jaguariaíva), mirim (Brazil, Espírito Santo, Itatiba), yaguar (Brazil, Paraná, Jaguariaíva) and ysypo (Brazil, Minas Gerais, Jaboticatubas). A revised key for the species is included. Some characters (genitalia, elytral sculptures, elytral scales and setae) have been more carefully studied and discussed; the male genitalia, illustrated for each species, proved to be the best diagnostic character for the species. Some of the new species represent first records for the family outside southeastern Brazil, the only area where the group was previously known.

INTRODUCTION

Since the original description of *Ytu* Reichardt, 1973, about six-hundred specimens representing most of the known and several undescribed species, have been collected, especially by the authors. A revision of this large genus of Torridincolidae became necessary. Some important characters were originally overlooked; others, like the male genitalia, had not been studied in sufficient detail. The aedeagus is the best species character in this genus which includes several similar and usually sympatric species.

The discovery of several undescribed species is of great interest, as some represent the first records of the family outside the Atlantic Forest, an area to which the group had previously been considered as restricted (Reichardt, 1973: 99). Besides some species with a relatively wide area, as *zeus* and *demeter*, there are several other with extremely restricted distribution. As they are morphologically

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very similar (they could easily fit the definition of "sibling species"), frequently only distinguished by genitalic characters, it is clear that they are isolated populations with a very recent evolutionary history. They have probably evolved by parapatric speciation, through isolation of certain populations of formerly widespread species, following restriction of habitats during unfavorable (dry) periods. One example is the *morpheus* species-group: its three species, *morpheus*, *itati* and *angra*, extremely difficult to distinguish by external characters, have very characteristic aedeagus and a relatively restricted distribution. The same is true for the *phebo* species-group.

The new species rendered the previous key (Reichardt, 1973: 135) obsolete; it was necessary to present a new key and rearrange the species-groups.

The small size of the species of *Ytu* (usually slightly over 1 mm total length) poses great difficulties. Some characters such as the elytral scales of some species, and the elytral setae, which had not been previously observed, are difficult to observe but are present in all known species. For the same reason dissection of specimens is extremely difficult, but fortunately a sufficient number of specimens was available to allow dissection without fear of damage. The study of this genus (and other torridincolids) with modern equipments as the "Scanning Electron Microscope" will make possible the discovery of numerous other characters.

Nevertheless, the results of this study are rewarding. The present paper adds many new data to the already extensively studied morphology of Torridincolidae.

MATERIAL

Most of the material has been collected by the authors, and is in the Museu de Zoologia da Universidade de São Paulo (MZSP). Paratypes of some new species are in the British Museum (Natural History), London (BMNH), the National Museum of Natural History, Washington, D.C. (USNM) and the Museum of Comparative Zoology, Harvard University, Cambridge, Mass. (MCZC). In "Material examined" we are not listing specimens appearing in Reichardt, 1973.

Ytu Reichardt, 1973

Ytu Reichardt, 1973: 131 (Type-species, by original designation, *Ytu zeus* Reichardt, 1973); Reichardt & Vanin, 1976: 211 (in key).

Discussion. A more careful study of the species showed that some characters had been overlooked or misinterpreted. It is not, however, necessary to redescribe the genus.

Elytral sculpture. The elytra of all species are striate, usually striate-punctate, in some cases sulcate. There are two basic types of elytral striation, one easily derived from the other. In the first type there are 9 striae (fig. 1), which can be counted behind the humeral swelling, which usually is devoid of striae, but can bear irregularly placed punctures. Striae I-III start independently, their apices fusing

with the apices of IX, VIII and VII respectively (sometimes the fusion of the striae at apex is difficult to be seen clearly); IV and V are fused at the base, run a short way independently, and then fuse again apically; VI starts at the base, next to the humeral swelling, and fuses to VII shortly behind the middle; VII starts behind the humeral swelling.

In the second type there are 10 striae (fig. 2), but basically the pattern is the same, only there is a supplementary stria between VI and VII (VIa), which joins VI.

The type-species of *Ytu*, *zeus*, has 9 striae, and the number of striae in each species will be mentioned below; we have not found a clear correlation of this character with others: some groups of species are characterized by the same number of striae, while others have both types.

Elytral scales and setae. Originally, *cupidus*, *morpheus* and possibly *artemis* were cited as bearing small, white scales in the elytral interstices. This is not only confirmed in these species, but also discovered in others, as will be seen below.

All species bear semi-erect setae in the elytral striae. Although relatively long, these setae are difficult to observe, as they are frequently rubbed-off and usually only seen in profile.

It should be noted that the other Neotropical genera *Hintonia* and *Claudiella* also bear these setae; the African *Delevea*, on the other hand, has its dorsal surface, including head and pronotum, covered with fine, white and decumbent pubescence.

Male genitalia. The aedeagus of the species of *Ytu* was cursorily studied by Reichardt (1973: 132, figs. 40, 43-50). All known species were again dissected and this organ was studied more carefully, revealing most interesting characters (figs. 6-21).

Basically the aedeagus of Torridincolidae is of the Adephagan type, especially similar to that of some Carabidae (Jeannel, 1955: 66). The median lobe is elongate, in the resting position lying on the left side (as in all other Torridincolidae, and most Carabidae — see Reichardt & Vanin, 1976, figs. 1; Jeannel, 1955, fig. 60), more or less completely split from apex towards base, and with a globose basal piece. A pair of equally developed parameres, each bearing two apical setae, are articulated to the basal piece. The parameres are usually short (about one fifth or one sixth the length of the median lobe), but in one species of the otherwise homogeneous *phebo* group, *mirandus*, the parameres are more than half as long as the median lobe; in the group of *morpheus* the parameres are split in the apical half, and each apex bears a single seta.

The male genitalia of *Ytu* are basically the same as those of the other Torridincolidae (see Steffan, 1973, fig. 5; Reichardt, 1976, figs. 2-3; Reichardt & Vanin, 1976, figs. 1-4), but it must be noted that while in *Hintonia* the aedeagi of the three known species are extremely similar, practically identical, in *Ytu* the interspecific variation is very great.

Female genitalia. The female genitalia of *zeus* (figs. 3-5) is extremely similar to those of *Claudiella ingens* and *Hintonia borgmeieri* (see Reichardt & Vanin, 1976, figs. 5-7).

KEY TO SPECIES-GROUPS AND SPECIES

1. Abdominal sternite I keeled along midline 2
Abdominal sternite I unkeeled 9
2. Species under 1.4 mm total length. Elytra with 10 striae. Without
apparent sexual dimorphism. Aedeagus long and thin 3
..... *phebo* group 3
Species over 1.4 mm total length. Elytra with 9 or 10 striae. Females
usually iridescent, males opaque. Aedeagus long, hooked
or curved at apex *zeus* group 7
3. Elytral interstices with longitudinal row of fine granules Pro-
notum without clear depressions 4
Elytral interstices not granulate. Pronotum with clearly marked
depressions 5
4. 9th elytral interstice raised, cariniform. Parameres long, about
half as long as aedeagus (fig. 17). Paraná. *mirandus*, sp. n.
9th elytral interstice normal. Parameres short (fig. 14). Mato
Grosso *cuyaba*, sp. n.
5. Elytral interstices normal; punctures not foveolate. Atlantic
Forest *phebo* Reichardt, 1973
Elytral interstices raised, cariniform 6
6. Punctures of striae large, foveolate. 1.2-1.3 mm. Minas Gerais
..... *ysypo*, sp. n.
Punctures of striae normal, confluent. 1.1 mm. Espírito Santo
..... *mirim*, sp. n.
7. Each elytron with 9 striae. Sexual dimorphism very strong,
males with prosternal and metasternal white hairs. São
Paulo south to Rio Grande do Sul *zeus* Reichardt, 1973
Each elytron with 10 striae. Sexual dimorphism not as strong;
males without prosternal and metasternal hairs 8
8. Elytral interstices keeled, keels clearly but sparsely granulate.
Espírito Santo south to São Paulo
..... *hephaestus* Reichardt, 1973
Elytral interstices normal, not keeled. São Paulo south to Santa
Catarina *athena* Reichardt, 1973
9. Species over 1.4 mm, usually 1.7-2.3 mm total length. Elytra
with 9 or 10 striae. Metasternal carinae usually erased towards
hind coxae (complete only in *godoyi*). Males with or without
metasternal tubercles. Elytral epipleurae testaceous, a small
testaceous spot between striae VI and VIII, slightly behind
the middle. Pronotum widest in the middle, at base much
narrower than elytra. Aedeagus thin and flat, widened towards
apex *demeter* group 10
Species under 1.4 mm total length. Elytra with 9 or 10 striae.
Metasternal carinae always complete. Male with or without

- metasternal tubercles. Pronotum usually only slightly narrower than elytra 13
10. Metasternal carinae complete. Males without metasternal tubercles (or very faintly indicated). 1.85 mm. Paraná. *yaguar*, sp. n.
Metasternal carinae only clearly visible at base. Males with or without metasternal tubercles 11
11. Elytra with 9 striae; base of 3rd interstice swollen. Supra-orbital carinae ending abruptly between eye and clypeus. Male with metasternal tubercles. 2.3. mm. São Paulo (Serra da Mantiqueira) *godoyi*, sp. n.
Elytra with 10 striae; 3rd interstice normal at base. Supra-orbital carina normal. Males with or without metasternal tubercles 12
12. Males with metasternal tubercles. Elytral interstices barely convex. 1.4-2.0 mm. Espírito Santo to São Paulo (Serra do Mar) *demeter* Reichardt, 1973
Males without metasternal tubercles. Elytral interstices more convex. 1.4-1.6 mm. Espírito Santo to Rio de Janeiro (Serra do Mar) *artemis* Reichardt, 1973
13. Pronotum slightly angulate in front of the middle. Elytra striate-punctate. Aedeagus spear-shaped at apex, with simple parameres. Rio de Janeiro to São Paulo (Serra do Mar and Serra da Mantiqueira) *cupidus* group *cupidus* Reichardt, 1973
Pronotum not angulate laterally. Elytra sulcate. Parameres bifid *morpheus* group 14
14. Aedeagus with very short parameres (fig. 20). São Paulo *itati*, sp. n.
Aedeagus with normally developed parameres (figs. 18-19) .. 15
15. Dorsal surface testaceous, dark olive-brown on disc. Aedeagus with a longitudinal, dorsal keel (fig. 18). Rio de Janeiro *angra*, sp. n.
Dorsal surface dark black. Aedeagus without a dorsal keel (fig. 19). Rio de Janeiro *morpheus* Reichardt, 1973

Zeus SPECIES-GROUP

Relatively large species (over 1.4 mm total length), usually with strong sexual dimorphism (males microrugose, opaque; females shiny, usually metallic). Elytra with 9 or 10 striae each; interstices without scales. Metasternum longitudinally carinate on each side. Abdominal sternite I keeled. Aedeagus long, curved at apex.

Discussion: With the exclusion of *phebo*, this species-group includes *zeus*, *hephaestus* and *athena*. *Ytu zeus*, the type-species of the

genus, differs from the other two species by having 9 elytral striae, and also by the very strong sexual dimorphism.

Ytu zeus Reichardt, 1973

(Figs. 3-6)

Ytu zeus Reichardt, 1973: 137-138, figs. 8-17, 24, 34-35, 40, 48, 51, 73, 81, 83-86, 88-93, 101-104 (Holotype, Brazil, *São Paulo*, Itu; MZSP).

Material examined. BRAZIL. *São Paulo*: Xavantes, 25-31.I.1974 (Reichardt; 1 ♂, 2 ♀). *Paraná*: Ribeirão Claro, near Jacarezinho, 600 m, 29.I.1974 (H. & B. Reichardt; 14 ♂, 21 ♀).

Notes. Little is to be added to the original description. *Ytu zeus* has 9 striae on each elytron. Aedeagus (fig. 6).

Ytu hephaestus Reichardt, 1973

(Fig. 8)

Ytu hephaestus Reichardt, 1973: 138-139, figs. 25, 33, 36, 50 (Holotype, Brazil, *São Paulo*, São Sebastião; MZSP).

Material examined. BRAZIL. *Espírito Santo*: 18 km E of Itatiba, 906 m, km 138, BR 262, 7.II.1975 (H. & B. Reichardt; 10 exs.). *Minas Gerais*: Realeza, 650 m, km 242, BR 262, 7.II.1975 (H. & B. Reichardt; 4 exs.); 18 km N of Muriaé, 300 m, BR 116, km 276, 7.II.1975 (H. & B. Reichardt; 13 exs.). *Rio de Janeiro*: Nova Friburgo, Serra, 650 m, 1.II.1975 (H. & B. Reichardt; 4 exs.).

Notes. The elytra of *hephaestus* have 10 clearly punctate striae. Aedeagus (fig. 8).

Ytu athena Reichardt, 1973

(Fig. 7)

Ytu athena Reichardt, 1973: 139-140, figs. 26, 49, 54-56 (Holotype, Brazil, *Paraná*, Morretes; MZSP).

Material examined. BRAZIL. *Santa Catarina*: Blumenau, 2.XII.1975 (Froehlich & Vanin; 1 ♂, 3 ♀).

Notes. Aedeagus (fig. 7) long and thin, similar to that of *hephaestus*, but more curved at the apex.

Phebo SPECIES-GROUP

Small species, finely microrugose, shiny and metallic, without apparent sexual dimorphism. Elytra with 10 striae each; interstices without scales. Metasternum longitudinally carinate on each side. Abdominal sternite I keeled. Aedeagus thin and long.

Discussion. *Ytu phebo* was originally placed in the *zeus* species-group, but considered as aberrant, especially because of the differently shaped aedeagus. The discovery of new species in this group, *cuyaba*, *ysypo*, *mirim* and *mirandus*, closely related to *phebo*, disclosed a distinct species-group. The species are all very homogeneous, but easily distinguished by genitalic characters. *Ytu mirandus* is unique in the genus by having very long parameres.

Ytu phebo Reichardt, 1973

(Fig. 13)

Ytu phebo Reichardt, 1973: 140-141, figs. 27, 47, 82, 87 (Holotype, Brazil, São Paulo, Salesópolis, Estação Biológica de Boracéia, 850 m; MZSP).

Material examined. BRAZIL. *Rio de Janeiro*: Angra dos Reis, 30 km N. BR 101, 27.XII.1974 (H. & B. Reichardt; 4 exs.). *São Paulo*: Bananal, BR 101, km 210, 29.II.1976 (Vanin & Pires; 13 exs.); Ubatuba, Saco da Ribeira, 13.IV.1975 (Vanin & Pires; 53 exs.); idem, Praia do Lázaro, 3.III.1976 (Vanin & Pires; 32 exs.); Caraguatatuba, Serra, km 90, 17.IV.1975 (Vanin & Pires; 38 exs.).

Note. Aedeagus (fig. 13).

Ytu mirim, sp. n.

(Fig. 15)

Holotype ♂. BRAZIL. *Espírito Santo*: 18 km E Itatiba, 900 m, BR 262, km 138, 7.II.1975 (H. & B. Reichardt).

Very finely microrugose, dark with metallic sheen. Sides of pronotum curved; margins finely granulate. Surface convex, with two deep impressions on each side near basal angle. Elytra striate-punctate, each with 10 striae, punctures large but confluent, not foveolate; interstices more or less carinate. Abdominal sternite I keeled. Aedeagus (fig. 15).

Measurements (mm)

total length	1.13
elytral length	0.75
pronotal width	0.48
elytral width	0.60

Discussion. *Ytu mirim*, represented by a single male, is extremely similar to *ysypo*, being distinguished by its smaller size (*mirim* is the smallest known species of *Ytu*), and by the confluent, non-foveolate punctures of the elytral striae. The aedeagi of the two species are also very similar.

In spite of the small differences found between the two species, there seems to be no doubt that the two are different, especially because the two occur in allopatric localities.

Ytu ysypo, sp. n.

(Fig. 16)

Holotype ♂. BRAZIL. *Minas Gerais*: Jaboticatubas, Serra do Cipó, intermitent creek, km 117, 1320 m, 8.X.1975 (Vanin & Froehlich; MZSP).

Paratypes. Same data as holotype (9♂, 10♀). Same locality, intermitent creek, Km 117, 1250 m, 8.X.1975 (Vanin & Froehlich, 3♂, 2♀); same locality, Rio Brauninha, km 117, 6.X.1975 (Vanin & Froehlich, 2♂, 2♀); same locality, intermitent creek, on *Leiothrix*, km 121, 7.X.1975 (Vanin & Froehlich, 1♀).

One male and one female paratypes each in USNM, MCZC and BMNH; remaining paratypes in MZSP.

Finely microrugose, shiny and metallic. Sides of pronotum only very slightly, almost imperceptibly, angulate in front of the middle; margins finely and irregularly serrate; surface convex, with irregular depressions, especially at basal angles and along sides. Elytra striate-punctate, each elytron with 10 striae of large and coarse, foveolate punctures; striae with semierect pubescence; interstices elevated, convex, carinate, but without granules or scales. Abdominal sternite I keeled. Aedeagus (fig. 16).

Measurements (mm)

	♂	♀
total length	1.20-1.30 (1.23)	1.18-1.25 (1.21)
elytral length	0.78-0.93 (0.84)	0.78-0.88 (0.84)
pronotal width	0.48-0.58 (0.54)	0.50-0.73 (0.68)
elytral width	0.65-0.73 (0.69)	0.65-0.70 (0.68)

Discussion. *Ytu ysypo* is extremely similar to *mirim*, as seen under that species; it is also quite similar to *phebo*, but easily distinguished by the very different aedeagus.

Ytu ysypo has been collected in intermitent creeks, in sandstone (quartzite) area.

Ytu mirandus, sp. n.

(Fig. 17)

Holotype ♂. BRAZIL. *Paraná*: Jaguariaiva, 950 m, PR 151, km 224, 20.V.1976 (Reichardt & Vanin; MZSP).

Paratypes. Same data as holotype (13 exs.); same locality, PR 151, km 229, 20.V.1976 (Reichardt & Vanin; 23 exs.); same locality, 30.VIII.1974 (Reichardt & Martins; 7 exs.).

One male and one female paratypes each in USNM, MCZC and BMNH; remaining paratypes in MZSP.

Finely microrugose, with faint metallic sheen. Sides of pronotum curved, not angulate; margins irregular; surface convex, but regular, in some specimens with slight indication of depressions. Elytra striate-punctate, each with 10 striae, punctures clearly indicated, not very coarse; 9th interstice raised, cariniform; interstices with longi-

tudinal row of fine granules. Abdominal sternite I carinate. Aedeagus (fig. 17).

Measurements (mm)

	♂ and ♀
total length	1.28 - 1.45 (1.35)
elytral length	0.93 - 1.05 (0.96)
pronotal width	0.55 - 0.63 (0.60)
elytral width	0.65 - 0.78 (0.71)

Discussion. *Ytu mirandus* is easily distinguished from the other species of the *phebo* group by the raised 9th elytral interstice (in some males the character is not too clearly visible) and by the wider and almost smooth pronotum. As in *cuyaba*, the elytral interstices bear a longitudinal row of small and fine granules, absent in the other species; the two species, *cuyaba* and *mirandus*, widely allopatric, are extremely similar in external characters; *mirandus*, however, is unique in the whole genus by the extremely long parameres.

Ytu mirandus (and *yaguar*) also occurs in the hygropetric habitat as the other species of the genus, but the area of Jaguariaiva, characterized by sandstone, is placed in the middle of an area of "cerrado". All other known species (except *ysypo*) have been collected on granite, and in forests.

Ytu cuyaba, sp. n.

(Fig. 14)

Holotype ♂. BRAZIL. *Matô Grosso*: Cuiabá, Serra, BR 364, km 66, 19. IV. 1976 (S. A. Vanin; MZSP).

Paratypes. Same data as holotype (76 exs.).

One male and a female paratype each in USNM, MCZC and BMNH; remaining paratypes in MZSP.

Male. Finely microrugose, shiny and metallic. Sides of pronotum slightly angulate in front of the middle, its margins irregularly serrate; surface convex, with weak, irregular depressions, especially near basal angles. Elytra striate-punctate, each with 10 striae, all clearly punctate; each stria with a series of semierect pubescence; interstices slightly elevated, with a longitudinal row of small and fine granules along midline, without scales; elytral margin, especially in anterior half, finely but clearly serrate. Abdominal sternite I keeled. Aedeagus (fig. 14).

Female. Microrugose and metallic as male.

Measurements (mm)

	♂	♀
total length	1.25 - 1.38 (1.33)	1.28 - 1.38 (1.33)
elytral length	0.85 - 0.93 (0.91)	0.90 - 0.98 (0.94)
pronotal width	0.58 - 0.65 (0.61)	0.60 - 0.63 (0.62)
elytral width	0.75 - 0.80 (0.78)	0.75 - 0.83 (0.79)

Discussion. *Ytu cuyaba* is related to *phebo*, being distinguished by the different size (*cuyaba* is larger) and proportions (*cuyaba* is relatively wider), and by the different elytral sculpture (in *cuyaba* all elytral striae are clearly punctate, the punctures being relatively well individualized; in *phebo* the two or three discal striae are sulcate, while the remaining striae are punctate, with large punctures which sometimes run into each other; in *cuyaba* the interstices have a row of small granules along midline, while they are normally rounded in *phebo*).

As seen above *Ytu cuyaba* is most closely related to *Ytu mirandus*.

Demeter SPECIES-GROUP

The main characters of the group are the relatively large size, the finely microrugose, sometimes metallic dorsal surface, and absence of very clear sexual dimorphism; pronotum with curved sides, widest in the middle, and slightly narrowed towards base, at base much narrower than elytra with 9 (*godoyi*) or 10 striae (remaining species); interstices scaled in some species; a testaceous spot laterally, slightly behind middle; abdominal sternite I unkeeled; aedeagus large, flattened and widened towards apex.

Discussion. *Ytu demeter* and *artemis* were originally placed in the *cupidus* group (Reichardt, 1973: 141), together with *cupidus* and *morpheus*. The two are, however, unrelated to the latter, and a new group is established for their inclusion, along with other undescribed species.

In some species, males have two small, conic tubercles on the metasternum (absent in *yaguar* and *demeter*). The metasternal carinae are erased towards the coxae in *demeter*, *artemis* and *godoyi*. In *yaguar* the metasternal carinae are complete.

Ytu demeter Reichardt, 1973

(Fig. 10)

Ytu demeter Reichardt, 1973: 142, figs. 28, 45, 46, graph 2 (Holotype, Brazil, Rio de Janeiro, Teresópolis, 1250 m; MZSP).

Material examined. BRAZIL. *Espírito Santo*: 18 km E of Itatiba, 900 m, BR 262, km 138, 7.II.1975 (H. & B. Reichardt; 5 ♂, 7 ♀). *Rio de Janeiro*: Angra dos Reis, Alto da Serra, 645 m, 23.XII.1974 (H. & B. Reichardt; 10 ♂, 11 ♀); 25 km N Angra dos Reis, 25 m, 27.XII.1974 (H. & B. Reichardt; 4 ♂, 8 ♀); Nova Friburgo, Serra, 650 m, 1.II.1975 (H. & B. Reichardt; 12 ♂, 24 ♀).

Notes. In the original description of this species, specimens from the northern limits (State of Espírito Santo) were not included in the type-series because they apparently lacked the metasternal tubercles of males. As the above series from near Itatiba, Espírito Santo, has no tubercles, the Espírito Santo specimens were re-examined, and in spite of the sometimes less developed metasternal tubercles, they are typical *demeter*.

Ytu demeter was originally distinguished from *artemis* by size (Reichardt, 1973: 144, graph 2); the two samples from Angra dos

Reis, however, are smaller than the normal individuals of *demeter*, and agree in having the matasternal tubercles and in shape of aedeagus. Re-examination of the São Sebastião paratypes (the southernmost known specimens of the species), showed that they are also smaller. All these samples are considered as typical *demeter*, a species varying from 1.4 to 2.0 mm total length, and ranging from the State of Espírito Santo to the State of São Paulo, along the coastal mountain range. In most localities *demeter* is sympatric with *artemis*, the latter being distinguished by the different aedeagus, and the slightly more convex elytral interstices. Both species bear scales on elytral interstices. Aedeagus (fig. 10).

Data plotted on graph 1; measurements in mm.

	Angra dos Reis, RJ	
	Alto da Serra (n= 16)	25 Km N of (n= 11)
total length	1.43-1.78 (1.61)	1.43-1.73 (1.63)
elytral width	0.80-1.00 (0.88)	0.85-1.08 (0.95)
	São Sebastião, SP paratypes (n= 7)	Itatiba, ES (n= 10)
	1.70-1.77 (1.74)	1.85-2.00 (1.91)
	0.95-1.05 (0.98)	0.95-1.10 (1.01)

Ytu artemis Reichardt, 1973

(Fig. 9)

Ytu artemis Reichardt, 1973: 143-144, figs. 29, 44, 74, 76, graph 2 (Holotype, Brazil, *Espírito Santo*, Venda Nova; MZSP).

Material examined. BRAZIL. *Espírito Santo*: Itatiba, 900 m, BR 262, km 138, 7.II.1975 (H. & B. Reichardt; 4 exs.). *Rio de Janeiro*: Nova Friburgo, Serra, 950 m, 1.II.1975 (H. & B. Reichardt; 15 exs.); Itatiaia, 1000 m, 2.IX.1971 (H. & B. Reichardt; 4 exs.).

Notes. See notes under *demeter* (p. 128). Aedeagus (fig. 9).

Ytu godoyi, sp. n.

(Fig. 11)

Holotype ♂. BRAZIL. *São Paulo*: Campos do Jordão, 23-31. I. 1976 (H. & B. Reichardt; MZSP).

Paratype ♀. Same data as holotype; MZSP.

Male. Finely microrugose, opaque, with slight indication of metallic sheen. Supra-orbital carina high, ending abruptly at about midpoint between front margin of eye and clypeo-labral suture. Sides of pronotum curved, widest in the middle, and slightly narrowed towards base; surface more or less regularly convex. Elytra sulcate,

each with 9 striae; 3rd interstice swollen anteriorly, before transverse depression. Sides of elytra testaceous, and a small testaceous spot in 8th interstice, slightly behind middle. Metasternum with a conic tubercle on each side, closer to hind than to middle coxae; metasternal carinae only indicated in front. Abdominal sternite I unkeeled. Aedeagus (fig. 11).

Female. Metallic, finely microrugose. Swelling of 3rd interstice less developed. Metasternum without tubercles.

Measurements (mm)

	♂	♀
total length	2.30	2.27
elytral length	1.65	1.60
pronotal width	0.92	0.92
elytral width	1.20	1.20

Discussion. *Ytu godoyi* is the largest species of the genus (all other known species measure less than 1.85 mm), and is easily distinguished from the other species by the swollen base of the third elytral interstice, and by the abruptly ending supra-orbital carina.

Ytu godoyi shares several characters with *artemis* and *demeter*, being placed in the same species-group. They are characterized by the testaceous spot on the 8th elytral interstice, the practically erased metasternal carinae, and the presence of two conic tubercles on metasternum of males.

The characters cited above are sufficient for distinction of the three species.

Ytu godoyi is named after Paulo Godoy, near whose farm the species was collected.

***Ytu yaguar*, sp. n.**

(Fig. 12)

Holotype ♂. BRAZIL. *Paraná*. Jaguariaiva, 950 m, PR 151, km 229. 20.V.1976 (Reichardt & Vanin; MZSP).

Paratypes. Same data as holotype, 9♂, 11♀. Same locality, 30.VIII.1974 (Reichardt & Martins, 2♂, 3♀).

One male and one female paratypes each in USNM, MCZC and BMNH; remaining paratypes in MZSP.

Male. Finely microrugose, opaque, without metallic sheen. Supra-ocular carina not very high, ending midway between front margin of eye and clypeo-labral suture. Pronotum with curved sides, at base much narrower than elytra; surface with two contiguous circular impressions next to midline. Elytra sulcate, each with 10 striae; interstices 2-5 swollen at base; with testaceous spot between striae VI and VIII, just behind middle; interstices with a single row of scales along midline. Metasternum without conic tubercles, with clearly developed metasternal carinae. Abdominal sternite I unkeeled. Aedeagus (fig. 12).

Female. Metallic iridescent.

Measurements (mm)

	♂ and ♀
total length	1.83 - 1.88 (1.87)
elytral length	1.25 - 1.30 (1.28)
pronotal width	0.73 - 0.78 (0.74)
elytral width	0.98 - 1.10 (1.03)

Discussion. *Ytu yaguar* is the only species of the *demeter* species-group where the aedeagus, although flattened, is not widened toward apex. Furthermore, the metasternal carinae are complete, while they are erased toward the coxae in *demeter*, *artemis* and *godoyi*. *Ytu yaguar* was collected together with *mirandus*.

Morpheus SPECIES-GROUP

These species are characterized by the elytra with 9 sulci each, one or two rows of interstitial scales, the presence of metasternal tubercles on males and abdominal sternite unkeeled. The aedeagus is very characteristic, with bifid parameres, each bearing one seta at apex.

Discussion. Originally placed with other species in the *cupidus* group, *morpheus* now forms a distinct group together with *angra* and *itati*. The species are extremely similar and difficult to be identified by external characters, but are well distinguished by the conspicuous aedeagi.

***Ytu morpheus* Reichardt, 1973**

(Fig. 19)

Ytu morpheus Reichardt, 1973: 145-146, fig. 30 (Holotype, Brazil, *Rio de Janeiro*, Areal, 10 km SE; MZSP).

Notes. The male genitalia of *morpheus* was not studied by Reichardt (1973). The aedeagus (fig. 19) has a short and robust median lobe; the parameres are split in the apical half, each bearing a single seta.

***Ytu angra*, sp. n.**

(Fig. 18)

Holotype ♂. BRAZIL. *Rio de Janeiro*: 30 km N of Angra dos Reis, BR 101, 27.XII.1974 (H. & B. Reichardt; MZSP).

Paratypes. Same data as holotype, 21♂, 19♀. *Rio de Janeiro*: Angra dos Reis, Alto da Serra; 645 m, 23.XII.1974 (H. & B. Reichardt; 1♀); Nova Friburgo, Serra, 950 m, 1.II.1975 (H. & B. Reichardt; 3♂, 4♀); same locality, 650 m, 1.I.1975 (H. & B. Reichardt, 2♂, 4♀).

One male and one female paratypes each in USNM, MCZC and BMNH; remaining paratypes in MZSP.

Male. Finely microrugose, shiny; sides of pronotum and elytra light brown; disc dark olive-brown. Surface of pronotum very regularly convex, with only a lateral impression, parallel to lateral margins; lateral margin curved, finely serrate; pronotum widest at base, and here visibly narrower than elytra. Elytra sulcate, with 9 striae; interstices moderately convex, each with a double row of scales. Metasternum with two conic tubercles. Abdominal sternite I unkeeled. Aedeagus (fig. 18).

Female. Metasternum without tubercles.

Measurements (mm)

	♂	♀
total length	1.28-1.38 (1.34)	1.33-1.45 (1.40)
elytral length	0.88-0.98 (0.98)	0.88-0.98 (0.94)
pronotal width	0.58-0.63 (0.60)	0.58-0.90 (0.85)
elytral width	0.80-0.88 (0.83)	0.80-0.90 (0.84)

Discussion. *Ytu angra* is extremely similar to the other two species of the group, but is easily distinguished by the aedeagus, which is similar to that of *morpheus*, but has a longitudinal, dorsal keel.

Ytu itati, sp. n.

(Fig. 20)

Holotype ♂. BRAZIL. *São Paulo*: Águas da Prata, 14.VII.1974 (H. & B. Reichardt; MZSP).

Paratypes. Same data as holotype, 3♂, 3♀; MZSP.

Male. Finely microrugose, dark, with metallic sheen. Pronotum smooth, convex, with a weak impression parallel to sides, and a second, U-shaped, with its arms towards base. Elytra sulcate, each with 9 sulci; sides of elytra slightly testaceous, especially near humeri, with a testaceous spot on each side. Elytral interstices apparently with a single row of white scales. Metasternum with two conic tubercles. Aedeagus (fig. 20).

Female. Without metasternal tubercles.

Measurements (mm)

	♂ and ♀
total length	1.58-1.65 (1.62)
elytral length	1.13-1.18 (1.16)
pronotal width	0.60-0.75 (0.70)
elytral width	0.98-1.00 (0.99)

Discussion. As already discussed, the species of the *morpheus* group are extremely similar, and difficult to be distinguished by ex-

ternal characters. *Ytu itati* is characterized by the completely different aedeagus, with bifid, but much shorter parameres than the other two species.

Cupidus SPECIES-GROUP

The *cupidus* species-group is here restricted to a single species, *cupidus* Reichardt, 1973. This species is medium-sized (about 1.5 mm total length), shiny, with very dark metallic sheen; without apparent sexual dimorphism. The pronotum is strongly angulate near anterior angles. Elytra with 9 striae each, the interstices scaled. Abdominal sternite I unkeeled. Aedeagus long, spear-shaped at apex.

Ytu cupidus Reichardt, 1973

(Fig. 21)

Ytu cupidus Reichardt, 1973: 146, figs. 31, 43, 71-72, 77-78, 80 (Holotype, Brazil, *Rio de Janeiro*, Teresópolis; MZSP).

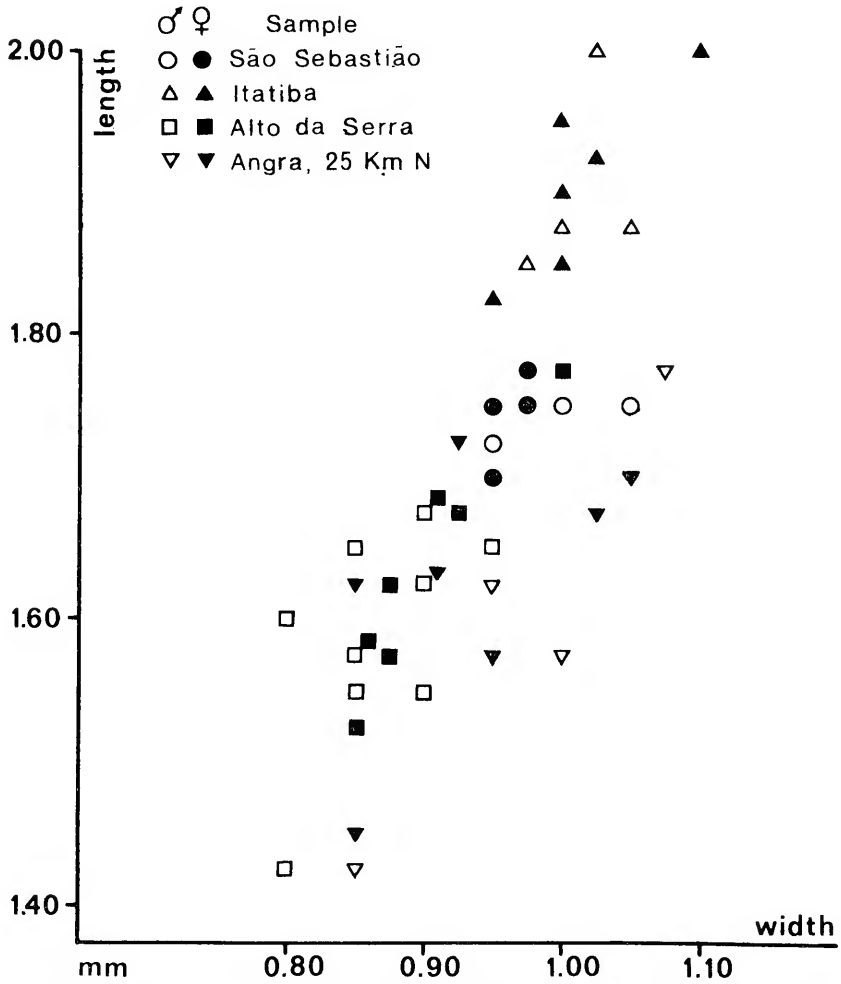
Material examined. BRAZIL. *Rio de Janeiro*: Mangaratiba, 7-8.III.1973 (H. & B. Reichardt; 16 exs.). *São Paulo*: Campos do Jordão, 1.650 m, 24-31.I.1976 (H. & B. Reichardt; 25 exs.); Ubatuba, Praia da Sununga, 3.III.1976 (Vanin & Pires; 29 exs.).

Notes. *Ytu cupidus*, a widespread species (States of *Rio de Janeiro* and *São Paulo*), is best characterized by the spear-shaped aedeagus (fig. 21).

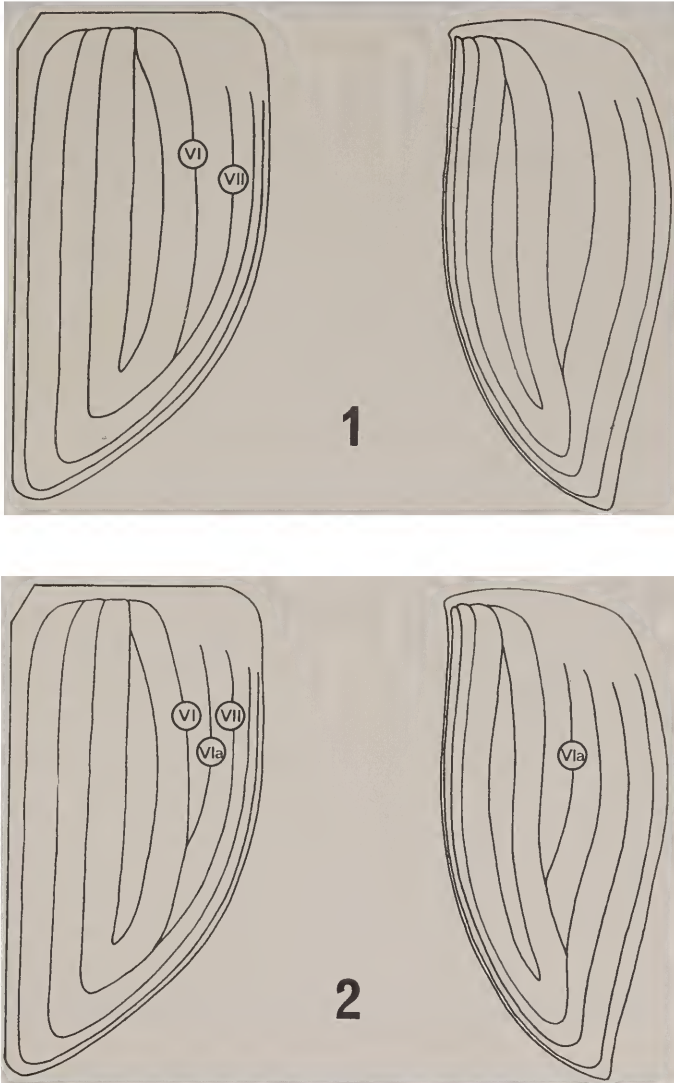
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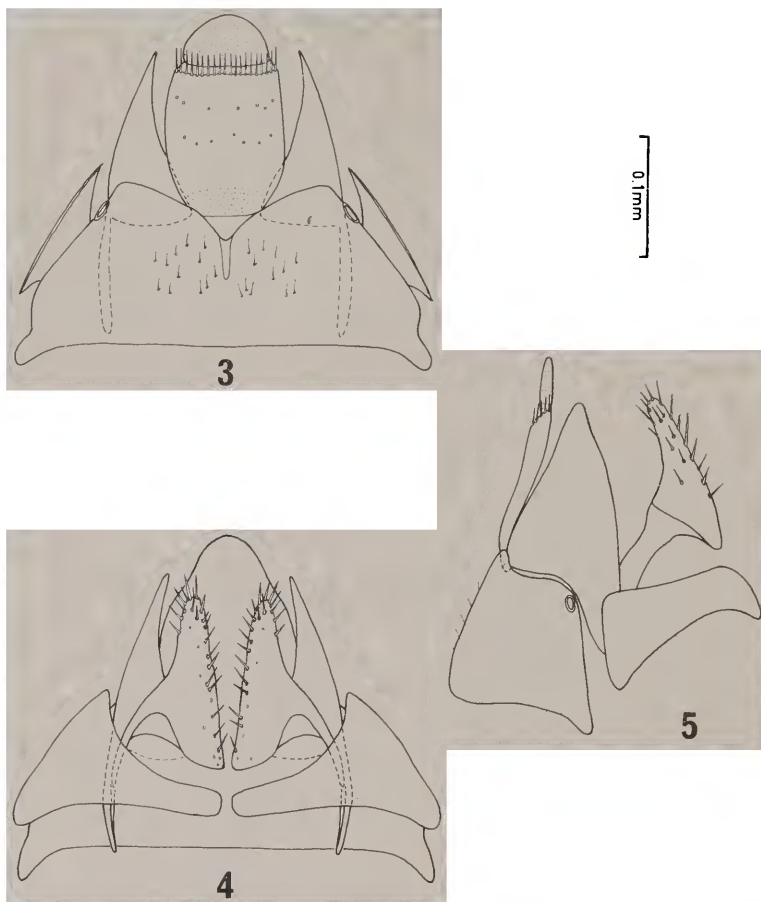
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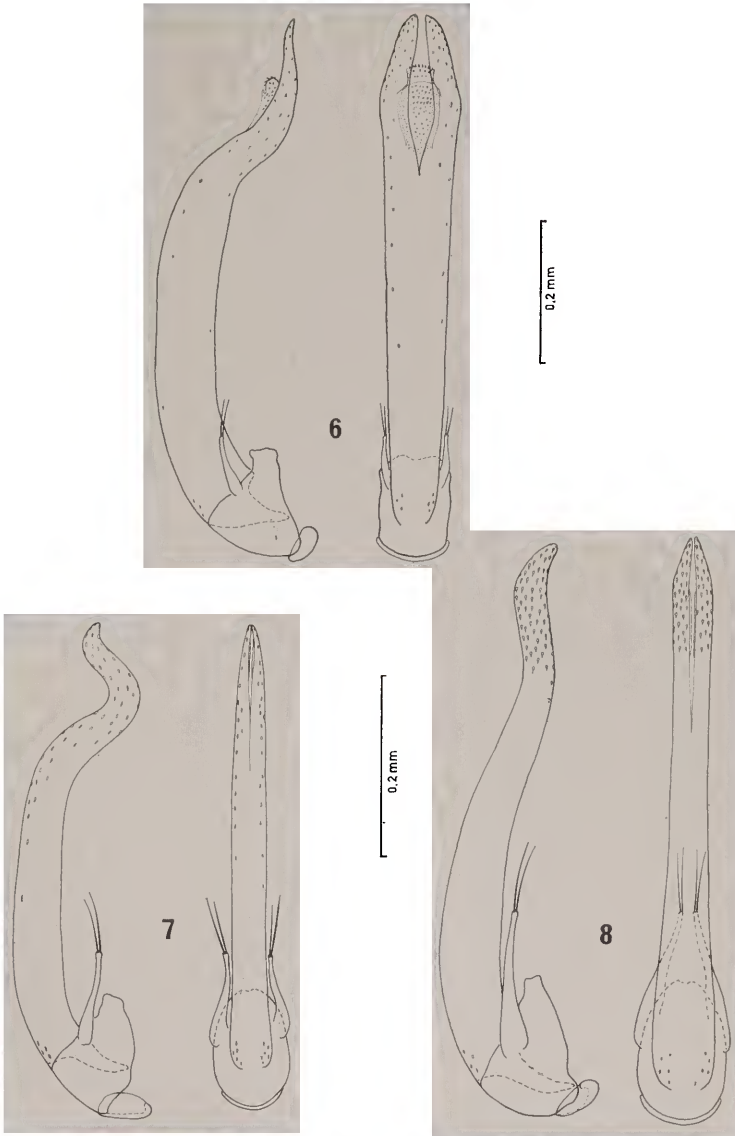
Graph 1. Linear regression for total length against maximum width of specimens of *Ytu demeter*.



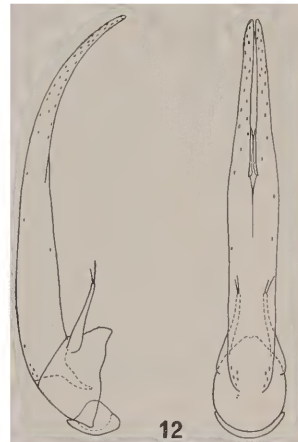
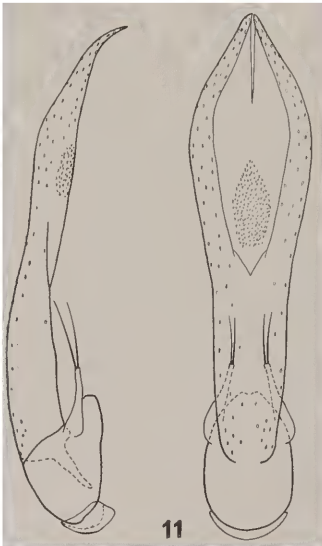
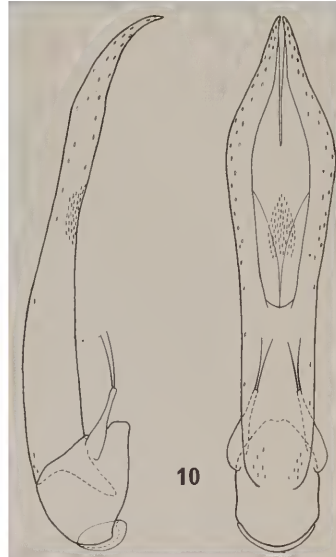
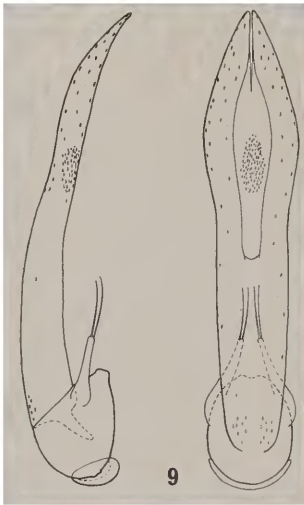
Figs. 1 and 2. Types of elytral striation, diagrammatic (dorsal and lateral views).



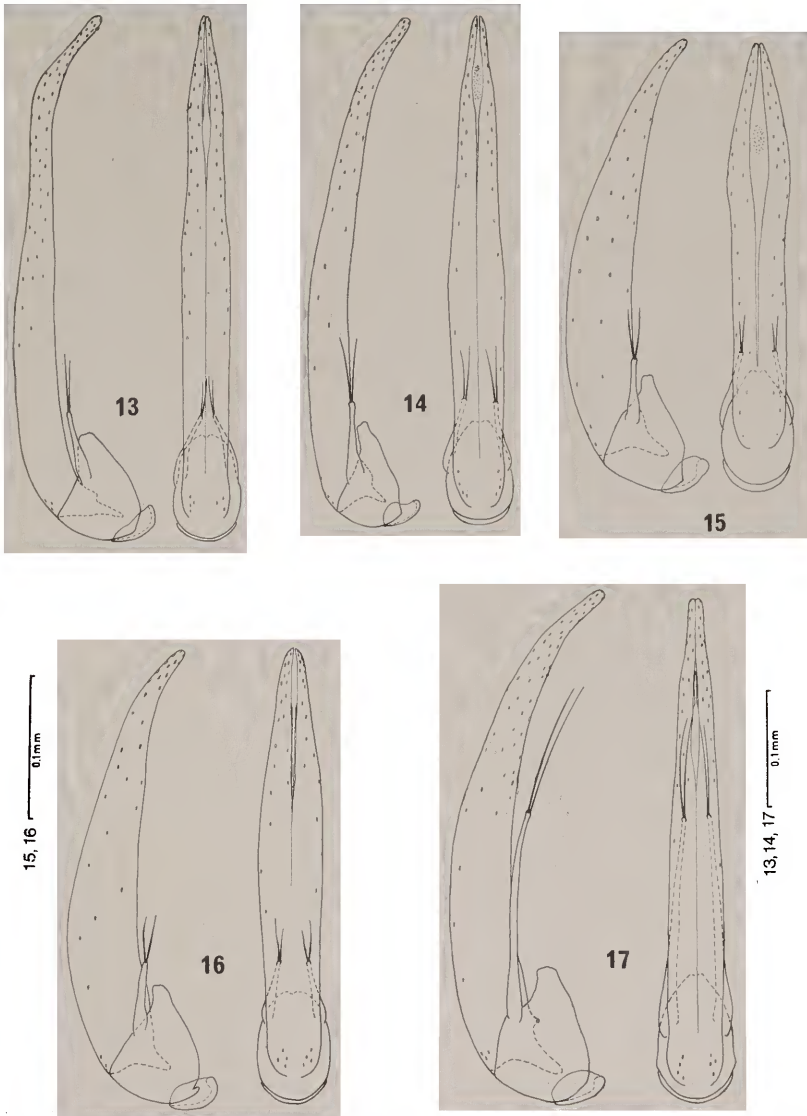
Figs. 3, 4 and 5. Dorsal, ventral and lateral views, respectively, of female genitalic segments of *Ytu zeus*.



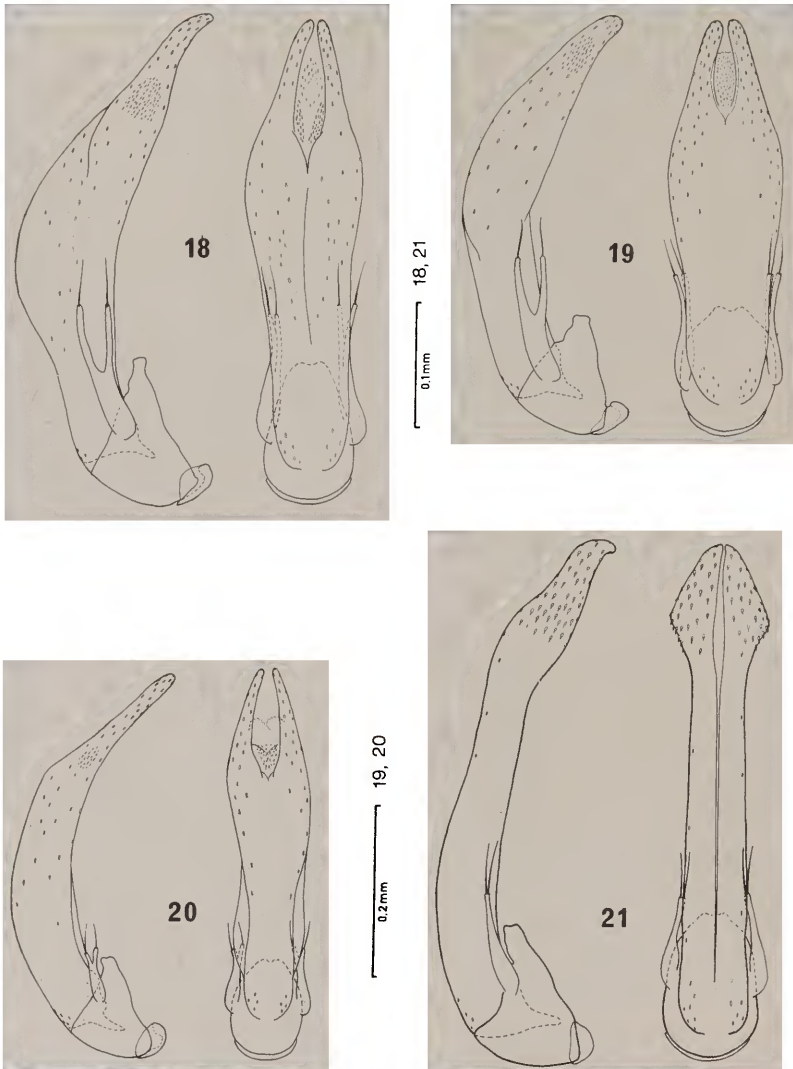
Aedeagus, lateral and dorsal views, *zeus* species-group. Fig. 6: *zeus*.
Fig. 7: *athena*. Fig. 8: *hephaestus*.



Aedeagus, lateral and dorsal views, *demeter* species-group. Fig. 9: *artemis*.
 Fig. 10: *demeter*. Fig. 11: *godoyi*. Fig. 12: *yaguar*.



Aedeagus, lateral and dorsal views, *phebo* species-group. Fig. 13: *phebo*.
Fig. 14: *cuyaba*. Fig. 15: *mirim*. Fig. 16: *ysypo*. Fig. 17: *mirandus*.



Aedeagus, lateral and dorsal views. Figs. 18-20, *morpheus* species-group; fig. 21, *cupidus* species-group. Fig. 18: *angra*. Fig. 19: *morpheus*. Fig. 20: *itati*. Fig. 21: *cupidus*.