# A CONTRIBUTION TO THE KNOWLEDGE OF THE BRAZILIAN STREPSIPTERA (Insecta)\*

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and

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(With 34 text-figures)

This paper, the first one that discusses in a little wider form the Strepsiptera fauna of the Brazilian sub-region, we judged wise to bring to the Brazilian entomologists somewhat about the present status of the group.

Since 1790, when Rossi described Xenos vesparum and placed it near Ichneumon, these insects have taken the more different categories in the insects classification (Pierce, 1911), and still now no agreement has been established. Modernly some of the greatest authorities that studied this problem more accurately agree that Strepsiptera constitutes a well defined order, but each of one gives to this order a different phylogenetic relationship (Pierce, 1936: Bohart, 1941; Jeannel, 1945). In the last years was tried once more to change the validity of the order: Ross (1948) put Strepsiptera as a sub-order of Coleoptera, latter Crowson (1955) created for them the series Stylopiformia in the sub-order Polyphaga (Coleoptera). In spite of all, is now accepted by almost all students of this group that Strepsiptera must be considered a good order, although the phylogenetic problem lays still open.

The terminology in the morphology of Strepsiptera, varies in a certain degree; we have used, together with the majority of authors the system employed by Pierce in his papers. A comparison between the classical and Silvestri's system, principally, is made in figure 20.

The usual ways of insects capture do not give satisfactory results for Strepsiptera, from here the scarceness of Brazilian material we have worked with, since until now no specific searches have been carried out in this region. Our male specimens were incidentally caught,

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during captures of other insects, specially Chironomidae (Diptera); in the single case of the new *Halictophagus* here described, larger series were caught on their hosts. We should be glad if Brazilian entomologists working on groups that can show stylopization (specially Hymenoptera, Homoptera and Hemiptera Cydnidae) in observing parasites, would notice us.

Up to now there are only two specific records of Brazilian Strepsiptera: Ophthalmochlus westwoodii (Templeton, 1841) (Stylopidae) from Rio de Janeiro, one male specimen, withdrawn from the puparium, parasite of Sphex ichneumoneus aurifluus Perty and Triozocera paulistana Kogan, 1958 (Mengeidae) from Monte-mór, State of São Paulo, one male specimen, attracted to light, the host of which is still unknown.

After Hofeneder & Fulmek (1942-43) the whole list of the Hymenoptera stylopized hosts found in Brazil is the following:

#### VESPIDAE

- 1 Montezumia infernalis M. Spin. Salt & Bequaert, 1929: 261 — Brazil
- 2 Odynerus spp. (Incl. Rhynchium and Rhygchium) SMITH, 1859: 130, 131 — Brazil
- 3 Pachodynerus nasidens Latr.
  SALT & BEQUAERT, 1929: 258; SALT, 1931: 148 Brazil
- 4 Polistes deceptor Schulz Schulz, 1905: 120 — Amazon basin \*
- 5 Polistes fuscatus var. cinerascens Sauss. Friese in Hofeneder & Fulmek, 1943: 44 — Campinas, Brazil
- 6 Polistes instabilis Sauss.

  SMITH, 1859: 131, 133 Brazil

  (After Salt & Bequaert, 1929: 269, misidentification of the host)
- 7 Polybia sericea Oliv. Smith, 1859: 131, 133 — Brazil

### SPHECIDAE

8 — Sphex costipennis M. Spin (Isodontia petiolata F. Sm., Sphex petiolata F.Sm.)
SMITH, 1859: 130, 133 — Brazil; Friese in Hofeneder & Fulmek, 1943: 53 — Campinas, Brazil

<sup>\*</sup> Not after Schulz. Hofeneder & Fulmek said that in the Schulz's text there is nothing written about, but the figure 11 shows a stylopized wasp. We do not agree with them because there is no clearness in that figure. Schulz's material is not from Amazon basin but was found in Surinam and the Brazilian State of Espírito Santo.

- 9 Sphex ichneumoneus L. var. aurifluus Perty (Sphex aurocapillus Templt., Chlorion, Proterosphex)

  Stylopidae: Ophthalmochlus (Homilopus) westwoodii (Templt.)
  TEMPLETON, 1841: 53 (as Xenos); Saunders, 1872: 41, 47 (as Paraxenos); Pierce, 1908: 80; 1909: 146 (as Homilopus); 1911: 31; 1918: 465 (as Ophthalmochlus) Rio de Janeiro, Brazil
- 10 Sphex neotropicus Kohl Friese in Hofeneder & Fulmek, 1943: 54 — Jundiaí, Brazil

#### UNDETERMINED HYMENOPTERA

11 — "Exotic species of wasp" Westwood, 1840: 304; 1852: 9 — Brazil

In this paper five new species of Strepsiptera are described a new record of *Pseudoxenos piercei* (Brèthes) described formerly from Argentine is made and complementary data about *Triozocera paulistana* Kogan, 1958 are given. It has been tried to assemble and criticize the available matter issued until now which deals with Brazilian Strepsiptera.

Myrmecolacidae Pierce, 1909

Coenocholax Pierce, 1909

Coenocholax brasiliensis sp.n.

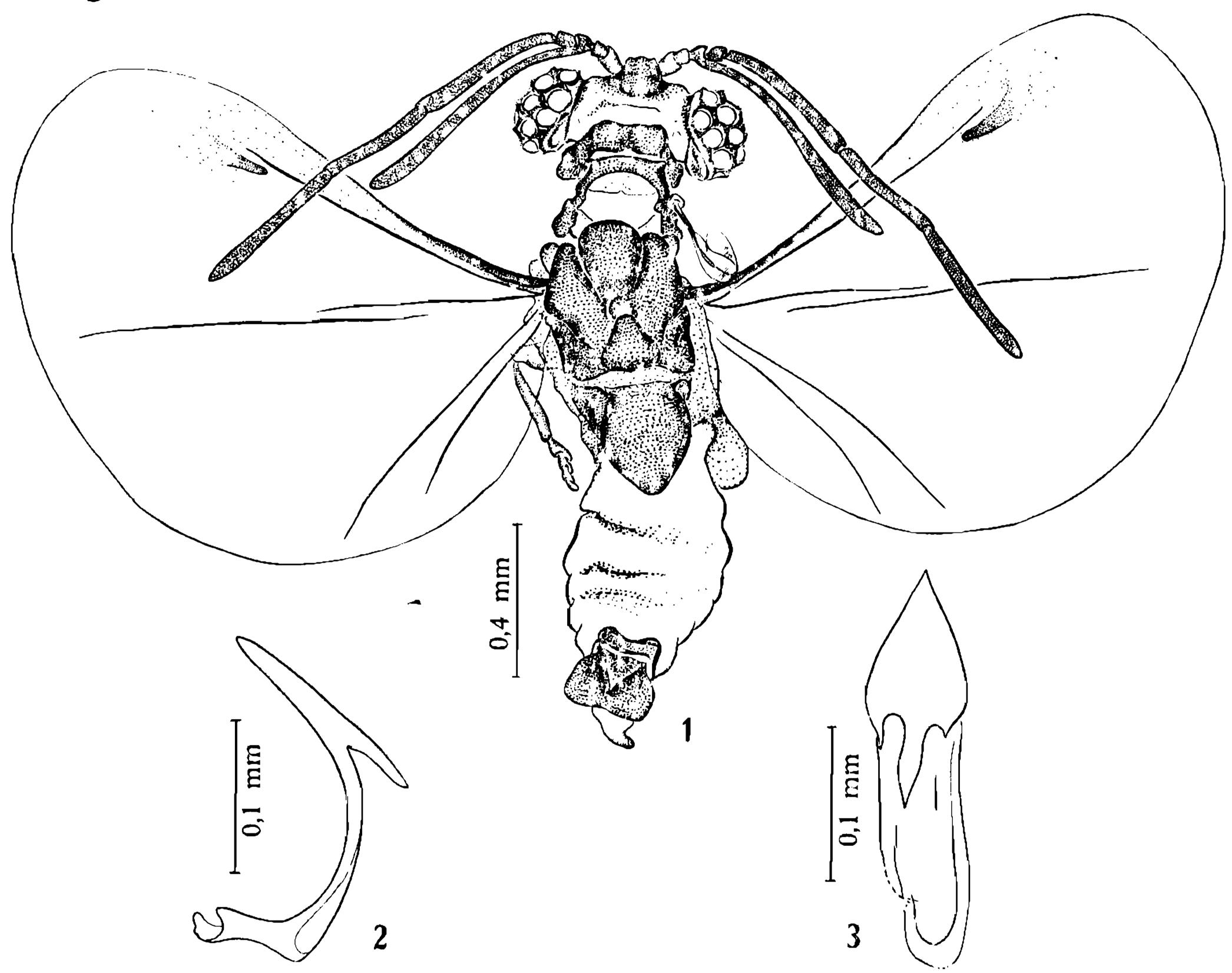
(Figs. 1-3, 11)

Male — General colour of the dried specimen pale brown.

Head: Greatest width — 0.63 mm; width between the eyes — 0.29 mm. Eyes with 8-9 facets on dorsal view, the facets are surrounded by a short, close and erected pubescence. Occipital area membranous. In the anterior median portions there is a produced process of rigid tegument which we have called the "frontal-tubercle" from the sides of which the antennae arise. 1st and 2nd antennal segments without noticeable sensorial organs, the other ones, including the flabellum, entirely covered with minute sensorial organs; length of the antennal segments (in millimeters): I-II together — 0.08; III (with flabellum) — 0.78; IV — 0.04; V — 0.38; VI — 0.27; VII — 0.24. Mandibles reaching the mouth opening, maxillary palpi long and slender with the basal segment contiguous to the posterior-inferior margin of the head and the distance between both of them approximately equal to the distance from each of them to the margin of the eyes.

Thorax: Pro and mesothorax reduced; metathorax broader than the former thoracic segments and about 5.5 times longer. Praescutum

separated from the scutum by a groove which is evanescent towards the last 1/5 of the joining of those sclerites. Scutellum subtriangular. Postlumbium clearly delimited on the scutellar confluence but indistinct towards the post-scutellum. Length of metathoracic sclerites: praescutum + scutellum 0.46 mm; post-scutellum 0.29 mm; total length of the metanotum 0.79 mm.



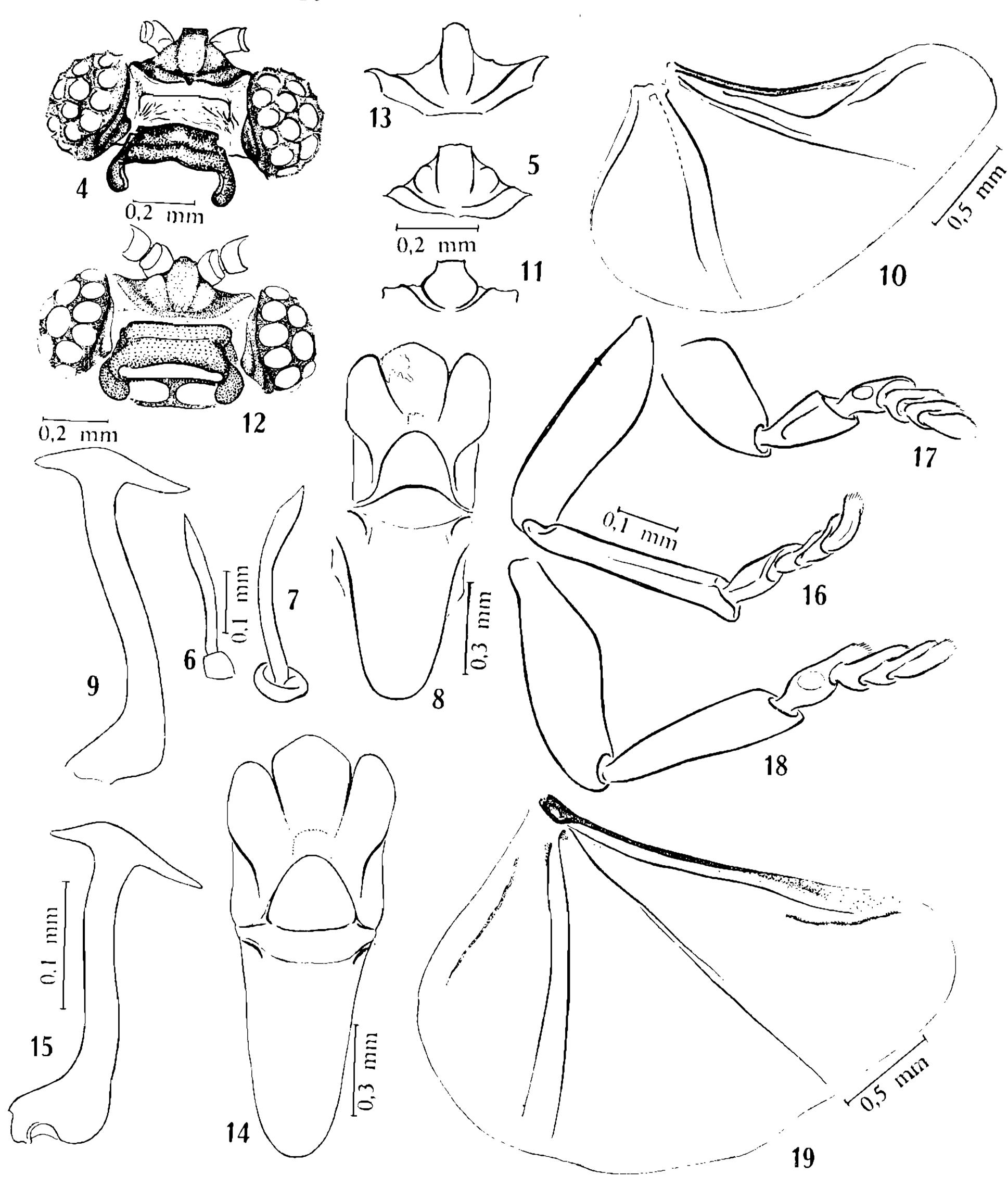
Coenocholax brasiliensis sp.n. — Fig. 1: Male, holotype: fig. 2: lateral view of aedeagus, paratype n.º 3; fig. 3: posterior view of aedeagus, holotype.

Abdomen: Terminalia with a large proctiger as in fig. 1. Aedeagus with a blade-like descendent branch bearing a sharply angled hook at tip (figs. 2-3). (In some other species of this genus, the whole aedeagus is tubulose).

Legs: Metatarsus with a conspicuous sensorial organ, 4th segment rounded at tip, all segments slightly pubescent.

Wings: First pair reduced to a coriaceous blade. Second pair with the seven longitudinal veins well marked; the fragment of Radius or inter-radio-median vein (Luna de Carvalho) bended in the proximal portion inclosing a pigmented area which forms a slight depression. Length of Median vein, from the beginning of M1 to the tip of M2: 1.25 mm.

Holotype: Male n.º 2, Km 47, antiga Estrada Rio-São Paulo, Município de Itaguaí, Estado do Rio de Janeiro, Brazil, XI. 1944, P. Wygodzinsky coll. Paratype: Male n.º 3, same place and collector as holotype, I.1945. Other material studied: One male n.º 4, same data as holotype. All specimens in the collection of Strepsiptera of the Section of Entomology of the Instituto Oswaldo Cruz.



Coenocholax beckeri sp.n. — Fig. 4: Dorsal view of head, holotype; fig. 5: frontal-tubercle, holotype; fig. 6: mandible, paratype n.º 6; fig. 7: maxillary palpus, paratype n.º 6; fig. 8: metathorax, holotype; fig. 9: lateral view of aedeagus, holotype; fig. 10: 2nd wing, paratype n.º 6. Coenocholax brasiliensis sp.n. — Fig. 11: Frontal-tubercle, holotype. Coenocholax wygodzinskyi sp.n. — Fig. 12: Dorsal view of head, holotype; fig. 13: frontal-tubercle, idem; fig. 14: metathorax, idem; fig. 15: lateral view of aedeagus, idem; fig. 16: fore leg, idem; fig. 17: mid leg, idem; fig. 18: hind leg, idem; fig. 19: 2nd wing, paratype n.º 9.

Female, larva and host: Unknown.

Discussion — C. brasiliensis sp.n. closely resembles C. fenyesi Pierce, 1909, from which it can easily be distinguished by the shape of the proctiger and aedeagus.

# Coenocholax beckeri sp.n.

(Figs. 4-10)

Male — General colour of the dried specimen dark brown.

Head: Greatest width — 0.86 mm; width between the eyes — 0.35 mm. Eyes with 11 facets on dorsal view, the facets are surrounded by a short, close and erect pubescence. Occipital area membranous. Frontal tubercle as in fig. 5. 1st and 2nd antennal segments without noticeable sensorial organs, the other ones, including the flabellum entirelly covered with minute sensorial organs; length of antennal segments (in millimeters): I-II together — 0.10; III (with flabellum) — 0.79; IV — 0.03; V — 0.73; VI — 0.36; VII — 0.42. Mandibles reaching the mouth opening, maxillary palpi long and slender with the basal segments contiguous to the posterior-inferior margin of the head and approximated to the inferior margin of the eyes.

Thorax: Pro and mesothorax reduced; metathorax broader than the former thoracic segments and about 6 times longer. Praescutum separated from the lateral lobes of scutum by a groove which becomes evanescent towards the confluence with the scutellum. Scutellum anteriorly rounded. Postlumbium with the anterior and posterior edges, rounded. Length of metathoracic sclerites: praescutum + scutellum 0.50 mm; post-scutellum 0.67 mm; total length of the metanotum 1.23 mm.

Abdomen: Terminalia with a short proctiger, the margins of which are twisted upwards. Aedeagus as in fig. 9, entirely tubulose.

Legs: Femora with the longitudinal groove present. Metatarsus with a conspicuous sensorial organ; 4th segment rounded at tip, all segments slightly pubescent at tip.

Wings: First pair reduced to a coriaceous blade. Second pair with 8 longitudinal veins, all well marked; jugal vein a slightly irregular; inter-radio-median vein extending normally. Length of Median vein -1.25.

Holotype: Male n.º 5, Rio de Janeiro, D.F., Brazil, 28.V.1951, J. Becker coll. Paratype: Male n.º 6, Km 47, antiga Estrada Rio-São Paulo, Município de Itaguaí, Estado do Rio de Janeiro, Brazil, I.1945, P. Wygodzinsky coll., in the collection of Strepsiptera of the Section of Entomology of the Instituto Oswaldo Cruz.

Female, larva and host: Unknown.

Discussion — C. becker is sp.n. differs from the exotic species in the shape of the aedeagus and general features.

This species is named in honour of our friend Dr. Johann Becker who kindly furnished us some specimens reported in this paper.

## Coenocholax wygodzinskyi sp.n.

(Figs. 12-20)

Male — General colour of the exemplar in alcohol, dark reddish brown.

Head: Greatest width — 0.85 mm; width between the eyes — 0.44 mm. Eyes with, at least, 12 facets on dorsal view, interfacetal area pubescent. Occipital area membranous. Frontal tubercle as in fig. 13. 1st and 2nd antennal segments without noticeable sensorial organs, the other ones, including the flabellum entirely covered with minute sensorial organs; length of the antennal segments (in millimeters): I-II together — 0.09; III (with flabellum) — 1.06; IV — 0.06; V — 0.71; VI — 0.40; VII — 0.52. Mandibles overpassing the mouth opening, maxillary palpi long and slender, reaching, in rest, the middle of the front trochanters; basal segments of the maxillary palpi contiguous

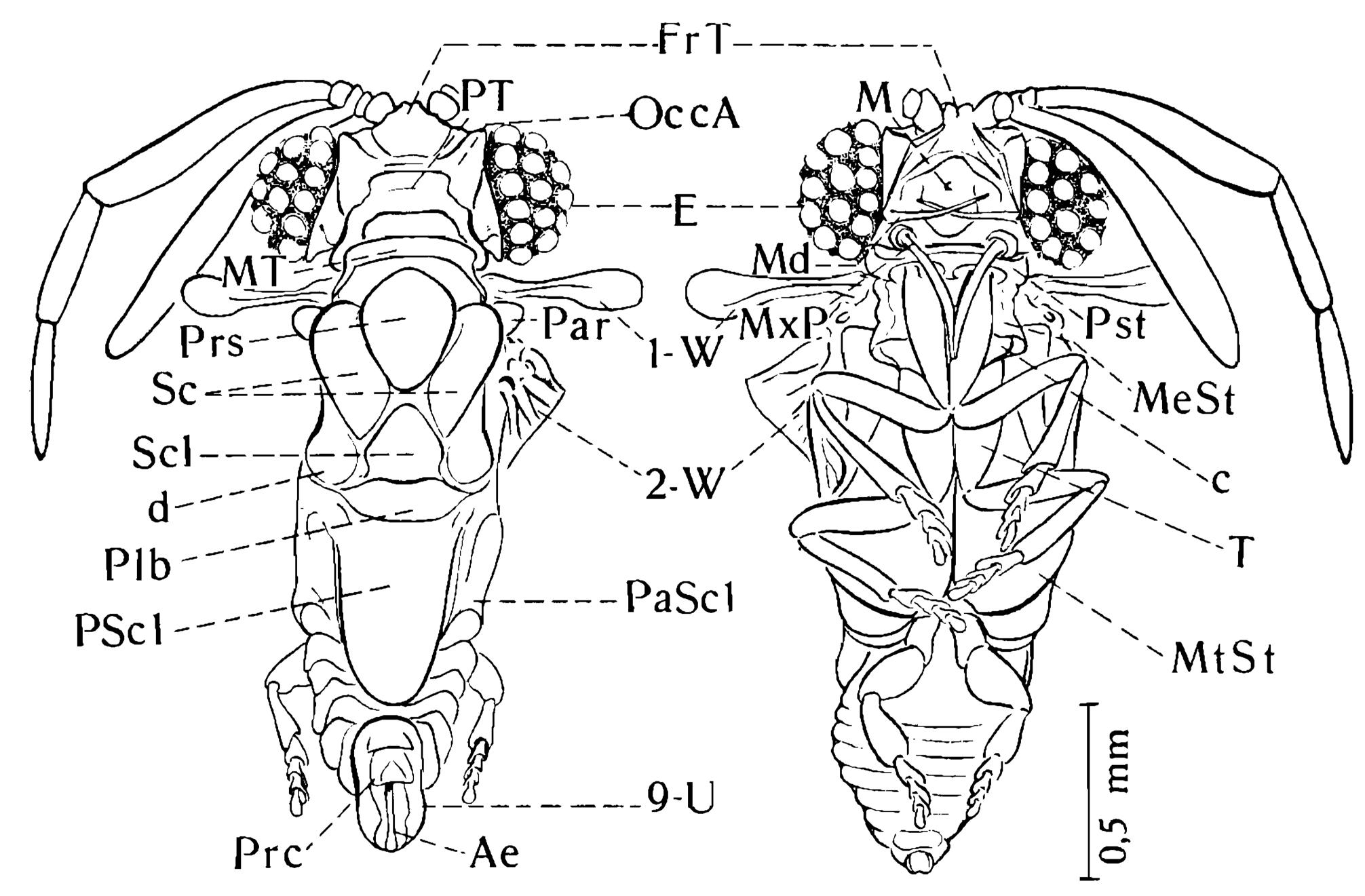


Fig. 20 — Coenocholax wygodzinskyi sp.n., male, dorsal and ventral view, paratype n.º 9 (Ae = Aedeagus, c = coxa, d = area lateral posteriore dello scuto metatoracico, Silvestri, E = eyes, FrT = frontal-tubercle, Oliveira & Kogan, 1-W = 1st pair of wings, M = mouth opening, Md = mandibles, MeSt = mesosternum, MT = mesothorax, MtSt = metasternum, MxP = maxillary palpi; 9-U = ninth uromerus, OccA = occipital area, Oliveira & Kogan, Par = paraptera, Silvestri, PaScl = parascutellum, Ulrich = lateroscutello, Silvestri, Plb = postlumbium, Prc = proctiger, Pasteels, PrS = praescutum = lobo anteriore dello scuto metatoracico, Silvestri, PScl = post-scutellum = scutello, Silvestri, Pst = praesternum, PT = prothorax, Sc = Scutum, Bohart = lobo lateral e anteriore dello scuto, Silvestri, Scl = Scutellum = area mediana posteriore dello scuto, Silvestri, 2-W = 2nd pair of wings, detached, T = trochanter).

to the posterior-inferior margin of the head but slightly distant to the inferior margin of the eyes.

Thorax: Pro and mesothorax reduced; metathorax broader than former thoracic segments and about 7 times longer. Praescutum separated from lateral lobes of scutum by a sharp groove; confluence of praescutum, scutellum and lateral lobes of scutum very depressed. Scutellum anteriorly slightly angled. Posterior edge of the postlumbium rounded backwards. Length of the metathoracic sclerites: praescutum + scutellum 0.66 mm; post-scutellum 0.62 mm; total length of metanotum 1.42 mm.

Abdomen: Terminalia with a short proctiger, the margins of which are twisted upwards. Aedeagus as in the fig. 15, entirely tubulose.

Legs: Femora with longitudinal groove present. Metatarsus with a conspicuous sensorial organ; 4th segment rounded at tip, all segments slightly pubescent at tip.

Wings: First pair reduced to a coriaceous blade, second pair with 8 longitudinal veins, distal end of subcosta, inter-radio-median and jugal vein edged by a thin pigmented area; length of Median vein — 1.80.

Holotype: Male n.º 7, Km 47, antiga Estrada Rio-São Paulo, Município de Itaguaí, Estado do Rio de Janeiro, Brazil, II.1945, P. Wygodzinsky coll. Paratypes: One male n.º 8, same place and collector as holotype, XI. 1947; one male n.º 9, Nova Teutônia, Estado de Santa Catarina, Brazil, II. 1959, F. Plaumann coll., T. Borgmeier leg., in the collection of Strepsiptera of the Section of Entomology of the Instituto Oswaldo Cruz.

Female larva and host: Unknown.

Discussion — C. wygodzinskui sp. n. is closely related to C. beckeri sp.n. from which it chiefly differs by the shape of the frontal tubercle, the length of the two branches of the Median vein, and relative proportions of the antennal segments.

We are pleased to name this species in honour of our friend Dr. P. Wygodzinsky, to whom we are greatly indebted for most of the specimens reported in this paper.

### KEY TO THE BRAZILIAN SPECIES OF "COENOCHOLAX"

- 1. Second pair of wing without jugal vein; proctiger wider than 9th urite; inter-radio-median vein bended, inclosing a pigmented depressed area ...... brasiliensis sp.n.
- 2. Median vein (from the beginning of M1 to the tip of M2) as long as the total length of the metanotum ..... beckeri sp.n.
- 2'. Median vein longer than the metanotum, at least 0.4 mm longer ..... wygodzinskyi sp.n.

## Myrmecolax Westwood, 1861

## Myrmecolax incautus sp.n.

(Figs. 21-26)

Male \* — General colour brown.

Head: Greatest width — 0.73 mm; width between the eyes 0.44 mm. Eyes with 8-9 facets on dorsal view, the facets are surrounded by a very short pubescence. Occipital area membranous. Frontal tubercle as in fig. 22. 1st and 2nd antennal segments without noticeable sensorial organs, the other ones entirely covered with minute sensorial organs. Length of the antennal segments (in millimeters): I — II together — 0.09; III (with flabellum) — 0.96; IV — 0.04; V — 0.72; VI — 0.34; VII — 0.47. Mandibles curved, the distal end enlarged. Maxillary palpi long, with the basal articles contiguous to the posterior-inferior margin of the eyes.

Thorax: Pro and mesothorax reduced. Total length of the metanotum — 1.56 mm.

Abdomen: Aedeagus entirely tubulose, as in fig. 24.

Wings: Second pair with the typical venation of the genus but the first inter-radio-median vein is not furcate, extending linearly.

Legs: Metatarsus with a conspicuous sensorial organ; 4th segment rounded at tip, all segments slightly pubescent at tip.

Holotype: Male n.º 10, Carmo do Rio Claro, Estado de Minas Gerais, Brazil; 16.1-1958; J. Becker coll. Specimen caught at light. In the collection of Strepsiptera of the Section of Entomology of the Instituto Oswaldo Cruz.

Female, larva and host: Unknown.

Discussion: This species can easily be separated from the majority species of the genus, including M. borgmeieri Hofeneder, 1949, the only other described Neotropical species, in having the 1st inter-radio-median vein without fork. In this respect it resembles the African species M. afurcifer Luna de Carvalho, 1959, but differs from it by the shape of the wing and general features.

Halictophagidae Pierce, 1908

Halictophagus Dale, 1832

Halictophagus lopesi sp.n.

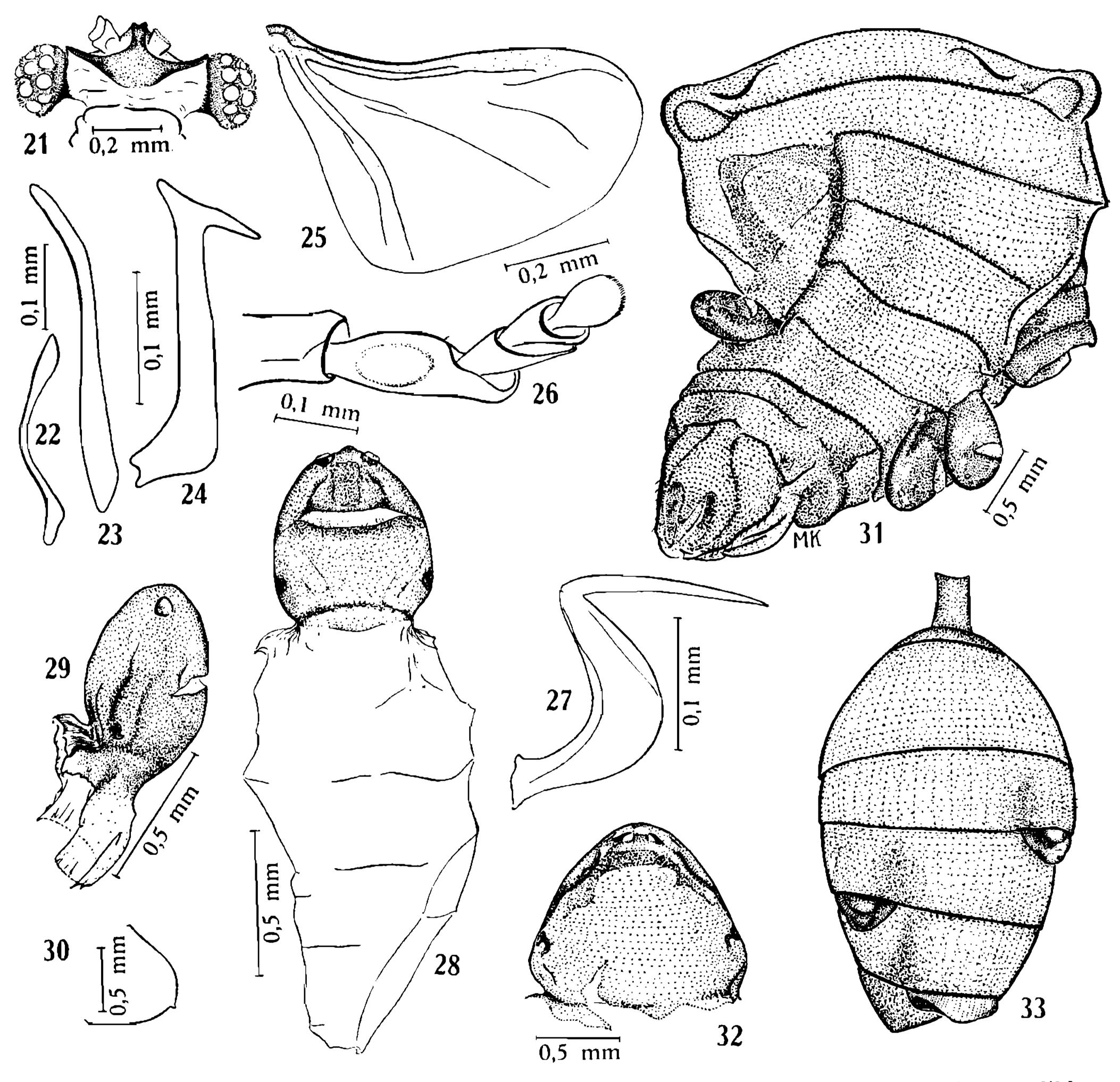
(Figs. 27-31, 34)

Male — General colour of the exemplar in alcohol, black.

Head: Greatest width — 0.64 mm; width between the eyes — 0.42 mm. Eyes with 10 facets on dorsal view, interfacetal area of the

<sup>\*</sup> This exemplar was partially damaged, therefore its description is obviously incomplete.

eyes, pubescent. Antennae with 1st and 2nd segments short and without noticeable sensorial organs, the next four segments are flabellate and



Myrmecolax incautus sp.n., holotype — Fig. 21: Dorsal view of head; fig. 22: mandible; fig. 23: maxillary palpus; fig. 24: lateral view of aedeagus; fig. 25: 2nd wing; fig. 26: fore tarsi. Halictophagus lopesi sp.n. — Fig. 27: Lateral view of aedeagus, holotype; fig. 28: dorsal view of female, allotype; fig. 29: lateral view of female cephalothorax, paratype n.º 13; fig. 30: female mandible, paratype n.º 13; fig. 31: dorsal view of the abdomen of Nersia florens Stal, stylopized by H. lopesi sp. n. Pseudoxenos piercei (Brèthes) — Fig. 32: Dorsal view of female cephalothorax n.º 20; fig. 33: dorsal view of the abdomen of Isodontia costipennis Spin. stylopized by P. piercei.

covered with minute sensorial organs, the 7th looks like the flabellum of the former segments also with sensorii; length of the antennal segments: I-II (difficult to measure with accuracy); III (with flabellum) — 0.44; IV (idem) — 0.35; V (idem) — 0.29; VI (idem) — 0.27; VII — 0.25; the antennae are well separated at base.

Mandibles and labial palpi very short. Maxillary palpi seem to be absent.

Thorax: Pro and mesothorax reduced; metathorax broader than the former thoracic segments and about 6 times longer. Praescutum

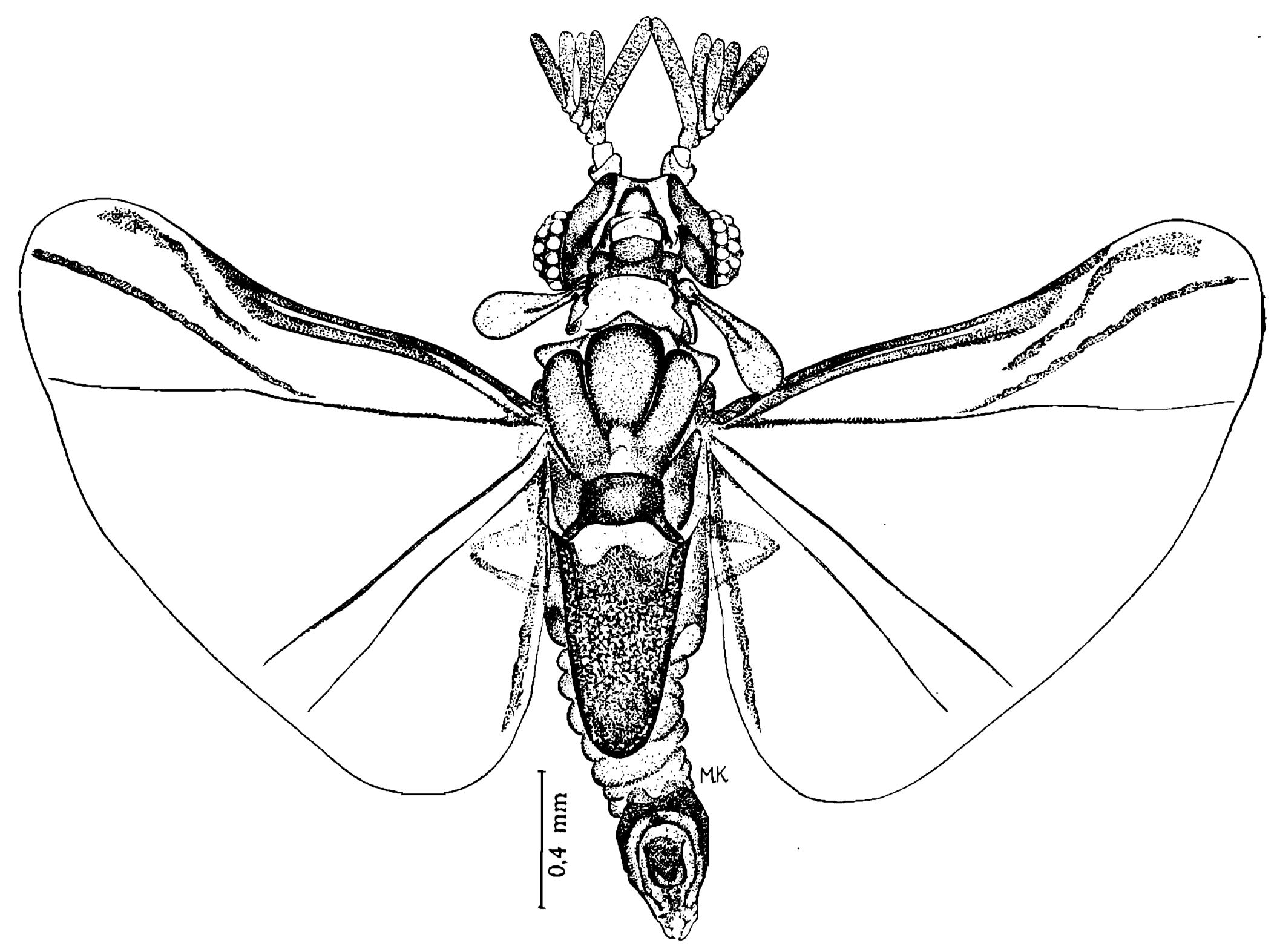


Fig. 34 — Halictophagus lopesi sp.n., male, holotype.

rounded anteriorly. Confluence from praescutum and the two lobes of the scutum forming a depressed area. Scutellum quadrangular extending postero--laterally into two branches that emarginate the post-lumbium bilobed posteriorly. Length of metathoracic sclerites: praescutum + scutellum 0.58 mm; post-scutellum 0.29 mm; total length of the metanotum 1.33 mm.

Abdomen: Uromeri well demarked, terminalia as in fig. 34. Aedeagus as in fig. 27, with the horizontal branch very long.

Legs: Tarsi three segmented, the last one without claws.

Wings: First pair reduced. Second pair with 7 longitudinal veins. Second anal and the two inter-radio-median veins diffused into pigmented stripes.

Female (figs. 28-29) — Cephalothorax constricted at base, pale brown; general shape sub-oval. Mandibles with one very little tooth

(fig. 30). Clypeus slightly produced between the mandibles and rounded forward. Cephalothoracic membrane almost reaching the margins of the cephalothorax, uniformely broad in the middle and getting acute towards both sides. Principal proportions: length of cephalothorax 0.59 mm; width at base of the cephalothorax 0.36 mm; width between the spiracles 0.52 mm; distance between the mandibles 0.10 mm; width of the head through the cephalothoracic membrane 0.50 mm; length of the head, in the median line 0.24 mm.

Larva — Trianguline not found in the allotype and female paratypes.

Holotype: Male n.º 11, cidade do Salvador, Estado da Bahia, Brazil, I-1949, H. de Souza Lopes coll. Allotype: female n.º 12, same data as holotype. Paratypes: 2 females and 1 male puparium, imago hatched, n.ºs 13-15, same data as holotype. Other specimens: n.ºs 16a-b, 2 male puparia, imago hatched; n.º 17a, 1 male puparium, imago hatched; n.º 17b, 1 female cephalothorax; n.ºs 18a-b, 2 male puparia, imago not hatched; n.º 18c, 1 female cephalothorax; n.ºs 19a-b, 2 male puparia, imagos hatched; n.º 19c-d, 2 female cephalothoraces. These specimens were not select as paratypes because they were not withdraw from their hosts (All these specimens in the collection of Strepsiptera of the Section of Entomology of the Instituto Oswaldo Cruz). 2 male puparia, imagos not hatched; 3 females cephalothoraces, and 2 male puparia, imagos not hatched; 3 females cephalothoraces on 2 hosts in the M. Kogan's collection.

Host — Nersia florens Stal, 1858 (Homoptera, Dyctiopharidae).

Discussion — By the shape of the aedeagus, H. lopesi sp.n. is related to H. piperi Bohart, 1943, from the Philippines Islands, from which it differs by its size and the one toothed mandible of the female.

All specimens were collected on their hosts by our friend Prof. Hugo de Souza Lopes, to whom this species is dedicate with pleasure.

STYLOPIDAE Kirby, 1813

Pseudoxenos Saunders, 1872

Pseudoxenos piercei (Brèthes, 1922) Bohart, 1941

(Figs. 32-33)

Ophthalmochlus (Homilops) piercei Brèthes, 1922: 50

Host — Isodontia costipennis Spin.

From the specimen n.º 42/747 (Rio de Janeiro, D.F., Arlé coll.) of the Collection of the Museu Nacional, we studied the following material withdrawn from its abdomen: 1 female cephalothorax in the right side, between the 3rd and the 4th urotergiti; 1 female cephalothorax in the left side, between the 4th and the 5th urotergiti; 1 male puparium in

the right side, between the 5th and 6th urotergiti. Collection of Strepsiptera of the Section of Entomology of the Instituto Oswaldo Cruz n. 20-22.

Distribution — La Rioja, Argentina (Brèthes, 1922) and Rio de Janeiro, Distrito Federal, Brazil.

## MENGEIDAE Pierce, 1909

## Triozocera Pierce, 1911

## Triozocera paulistana Kogan, 1958

The campanulate shape of the 4th tarsal segment, may be considered a generic character of the genera *Triozocera* and *Dundoxenos*, as remarked by Luna de Carvalho, in a letter to the authors. Therefore the discussion of the species must be changed as following: *T. paulistana* is closely related to *T. mexicana* Pierce, from which it differs by the widely separated epicranian plates and the shape of the proctiger (remark of L. de Carvalho). The male holotype of this species is in the collection of Strepsiptera of the Section of Entomology of the Instituto Oswaldo Cruz, under n.º 1.

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### RESUMO

Neste trabalho procuramos atualizar e acrescentar observações novas ao conhecimento dos Strepsiptera do Brasil. Descrevemos 4 espécies novas da família Myrmecolacidae, representados apenas por machos e uma espécie nova da família Halictophagidae, representada por macho, fêmea e hospedador. Registramos a ocorrência, no Brasil, de uma espécie da família Stylopidae, conhecida anteriormente da Argentina e fornecemos dados adicionais sôbre uma espécie da família Mengeidae, Triozocera paulistana Kogan, 1958.

Baseados em Hofeneder & Fulmek (1942-43) damos a lista dos hospedadores encontrados estilopizados no Brasil.

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