

A NEW TRIATOMINE HOST OF *TRYPANOSOMA* FROM THE
CENTRAL AMAZON OF BRAZIL: *CAVERNICOLA LENTI* N.SP.
(HEMIPTERA, REDUVIIDAE, TRIATOMINAE)

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Adults and nymphs of Cavernicola lenti, new species, from Amazonas state, Brazil, are described and illustrated. Observations on the biology of the new species are presented. Preliminary findings indicate that C. lenti is a probable vector of bat trypanosomes.

The tribe Cavernicolini Usinger, 1944 is known from a single, monotypic genus in Panama and South America to 20 degrees S. In their revision of the Triatominae, Lent & Wygodzinsky (1979) give a detailed description of the nymphs and adults of *Cavernicola pilosa* Barber, 1937 and remark that they were unable to find any differences that would indicate the presence of more than one species among the abundant material examined. In November, 1983 we carried out a survey of Triatominae in the area where the Balbina hydroelectric dam is being constructed on the river Uatumã, Amazonas, Brazil. Among the insects collected were 16 triatomines showing certain morphological and ecological similarities to *C. pilosa*. This material forms the basis of the present description of *Cavernicola lenti* n.sp.

MATERIAL AND METHODS

The adult description is based on holotype, allotype and two male and four female paratypes, that of the fifth instar nymph on three complete specimens and one exuvium; that of the first instar nymph on six slide mounted specimens and two preserved in 70% ethanol. Slide mounted specimens were macerated in a 10% potassium hydroxide solution for 12 hours, dehydrated in alcohol, cleared in xylene and mounted in Canada balsam. Male genitalia were boiled in 10% potassium hydroxide solution for 5 minutes, dissected in phenol and preserved in 70% ethanol. All measurements are in mm. Terminology follows Lent & Wygodzinsky (1979).

Cavernicola lenti n.sp.
(Figs. 1-5)

Adults (Figs. 1-3): length of male 9.5-10.0, of female 11.0-12.0; maximum width of pronotum of male 2.9-3.2, of female 3.1-3.4. Maximum width of abdomen of male 3.6-4.0, of female 3.8-4.2. Body abundantly pilose; general colour piceous except pale areas on fifth connexival segments, posterior half of abdomen and parts of membrane and corium of hemielytra.

Head slightly shorter than pronotum, about 1.5 times as long as wide across eyes. Antecular region shorter than postocular (1:1.1-1.2), the latter globose. Eyes in lateral view attaining level of ventral but distant from level of dorsal surface of head. Ratio of width of eye to interocular distance 1:2.3-2.5. Ocelli situated in postocular sulcus, their diameter slightly greater than one-third the distance between ocellus and posterior border of eye. Postocular sulcus strongly backwardly curved, with a distinct median longitudinal extension which becomes shallower as it approaches the hind border of the head. Antenniferous tubercles without denticles, situated close to anterior border of eye and directed downwards at an angle of about 45 degrees in lateral view. First antennal segment passing level of apex of clypeus. Ratio of antennal segments 1:2.3:3.0:3.1-3.3. Rostrum with first segment attaining level of apex of antenniferous tubercle, third segment shorter than first. Ratio of rostral segments 1:2.5:0.7.

Pronotum abruptly declivous anteriorly, fore lobe almost obscuring collar in dorsal view. Anterior lobe divided by a median longitudinal sulcus; its surface faintly granulose with irregular patches of a finer texture. Posterior lobe smoother, with 1 + 1 submedian carinae attaining hind border; sides of posterior lobe weakly carinate, hind border weakly margined between submedian carinae and strongly margined between the latter and the humeral angles. Scutellum elevated, with posterior process broad, bluntly rounded, not forming a sharp angle with disc in lateral view. Prosternal sulcus coarsely rugose, evidently not a functional stridulatory groove.

Hemielytra as in Fig. 2C, D, corium with two pale patches divided by the radial vein, anterior portion of membrane with an elongate pale area bordering the corium. Hindwing of specimen examined as in Fig. 2E, Cu terminating abruptly, hamus lacking.

Legs entirely dark, rarely with trochanter and base of femur lighter than distal portion of femur in dry specimens but pigmentation never contrasting strongly. Femora incrassate and sulcate, fore femora about four times as long as wide and 2.5 times as long as tarsi. Spongy fossae of tibiae absent in both sexes.

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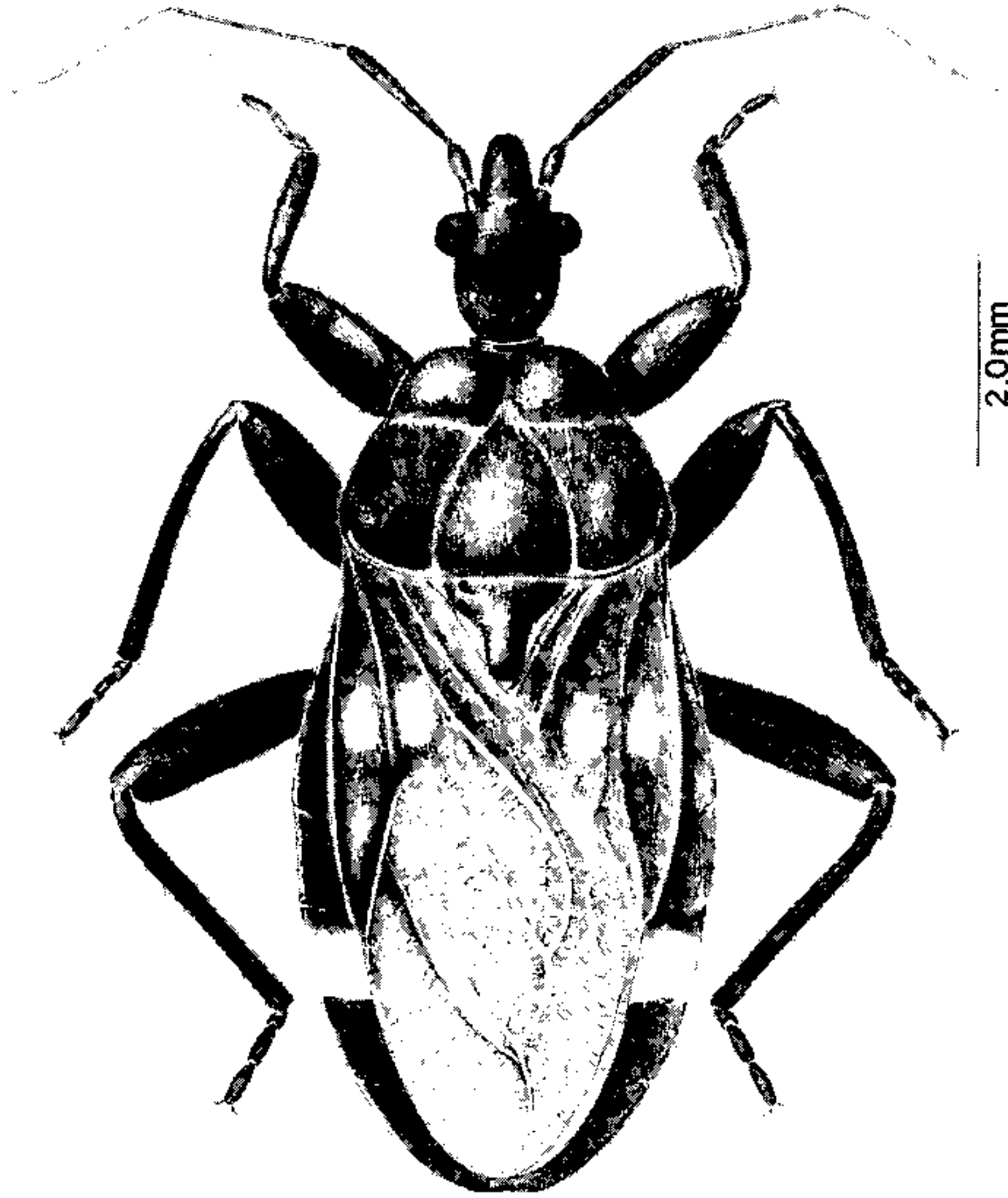


Fig. 1: *Cavernicola lenti*, male, holotype, Amazonas, Brazil.

Fifth connexival segments white to brick-red except for a dark anterior margin, rarely with a more extensive dark area on the inner half, but postero-lateral quadrant invariably pale. Remainder of connexivum entirely dark. Connexivum wide dorsally, perceptible ventral portion very narrow, urosternites covering part of ventral connexival plates and connected to the latter by a simple membrane. Spiracles remote from connexival margin. Pale pattern of abdomen as in Figs. 3F, G, somewhat variable in extent.

Parameres of male genitalia (Fig. 3A, B) rounded distally with a strongly salient subapical process; similar in shape to a bird's head. Median process of pygophore (Fig. 3C) spatulate. Articulatory apparatus of aedeagus as in Fig. 3E, the proximal portion apparently folded back on itself; median bridge and pedicel lacking. A subrectangular sclerotized plate lies near the base of each paramere in the undissected genitalia. Dorsal phallosomal plate (Fig. 3E) deltoid, the basal angles salient and elevated. Basal plate struts free apically, fused basally. Vesica crescent-shaped, thickened and pigmented.

Fifth instar nymph (Fig. 4): length 6.4-8.5, maximum width of pronotum 1.9-2.0. Body and appendages covered with numerous erect or semidecumbent very long hairs. All setae simple, not microscopically spinulose. Head, thorax and legs uniformly piceous except unpigmented gular region between eyes and pale areas on coxae, trochantera and base of femora. Head strongly convex dorsally, about twice as long as pronotum. Eyes situated near middle of head laterally. The unpigmented area between the eyes is deformable, so that in dry specimens the ventral surface of the head may be strongly constricted at the level of the eyes in lateral view. In live or freshly dead specimens the eyes approach the level of the ventral surface of the head, but the latter is not constricted. Antenniferous tubercles without denticles, situated close to eyes and well behind middle of antecocular region. Fourth and distal four-fifths of third antennal segments microscopically annulate. Ratio of antennal segments 1:2.7:3.3:3.7. Rostrum with third segment slightly shorter than first, ratio of rostral segments 1:2.5:0.9. Pronotum abruptly declivous anteriorly, strongly convex dorsally. Rostrum attaining prosternum, stridulatory sulcus lacking. Femora without denticles, incrassate and sulcate. Urotergites without median tubercles.

First instar nymph (Fig. 5): length 2.2-2.3. Head, thorax and legs dark, with light areas on coxae, trochantera, base of femora and gular region between eyes. Membranous portion of abdomen brick-red in unfed nymphs. Surface of body, head and legs covered by numerous long, erect setae: these mainly simple, but minutely spinulose on parts of head, thorax and femora. Antecocular region of head slightly longer than postocular (1:0.8). Antennal segments 1-3 dark; apical four-fifths of fourth segment pale, flexuous and delicately annulate. Fourth antennal segment longer than any of the preceding, but shorter than first, second and third combined. Ratio of antennal segments 1:1.9:2.8:4.5-4.8. Rostrum broad, first segment almost as wide as long, second segment distinctly longer than first and third combined. Ratio of rostral segments 1:3.0:1.2. Prosternal sulcus not a stridulatory groove, coarsely rugose transversally. Mesonotum

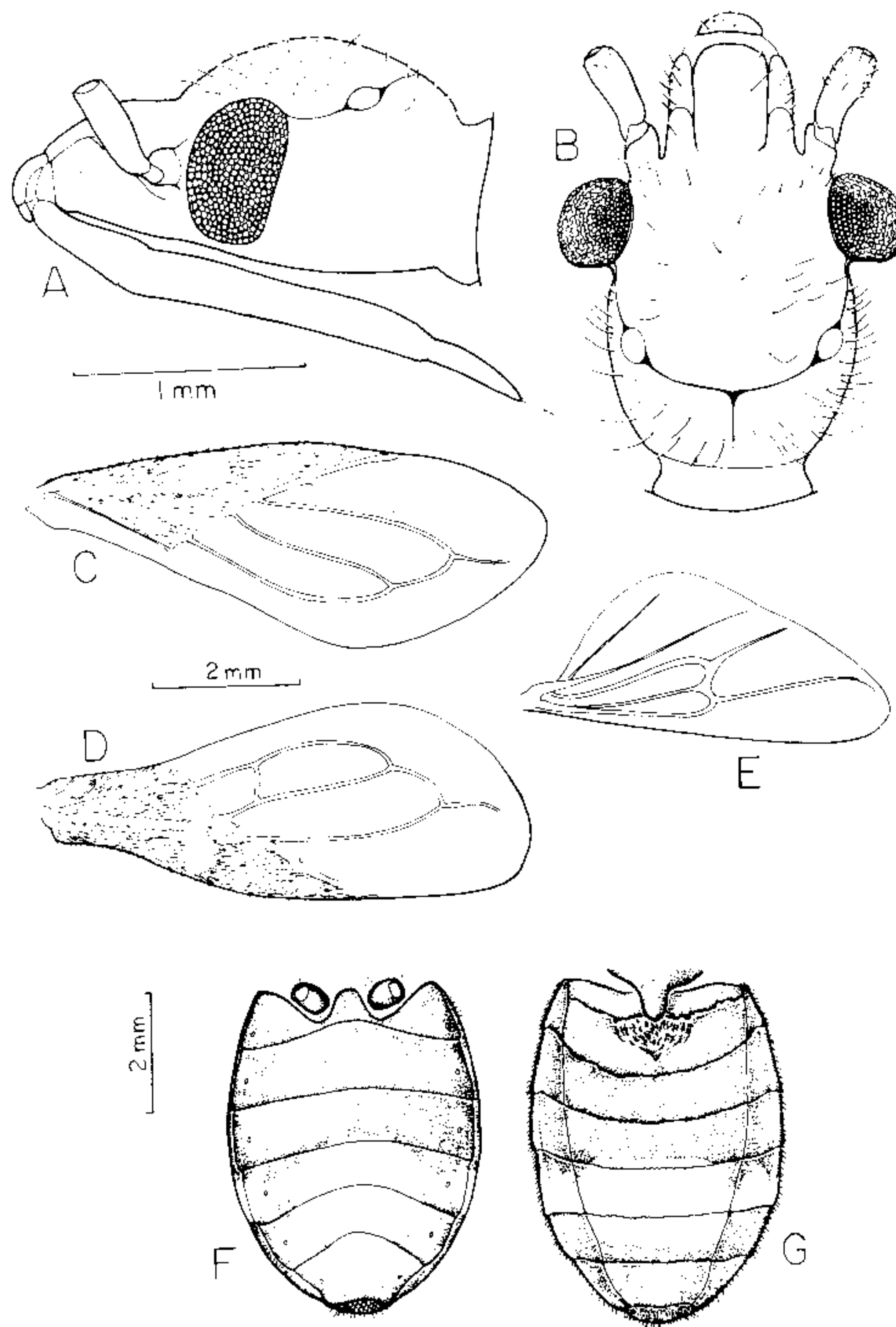


Fig. 2: *Cavernicola lenti*, adult — A: head, lateral view; B: head, dorsal view; C: normal hemelytron; D: hemelytron from same female, with spurious transverse vein. E: hindwing; F: abdomen of female, ventral view (terminal segments dissected); G: same specimen, dorsal view.

a narrow transverse band, slightly shorter at middle than at sides. Metanotal plates very small, their distance much greater than twice their width. Femora with trichobothria. Hind tarsi without specialized hairs apically. Setae of urotergites arranged in two transverse rows. Terminal segments of abdomen sclerotized as in Fig. 5A.

Etymology: the species is named for the distinguished Brazilian entomologist and authority on the Triatominae Dr. Herman Lent.

Type material: type material to be distributed as follows: male, holotype and female, allotype: Instituto Oswaldo Cruz, Rio de Janeiro, Brazil. Paratypes and voucher specimens of nymphs: Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil; National Museum of Natural History, Smithsonian Institution, Washington D.C., U.S.A.; American Museum of Natural History, New York, U.S.A.; Dr. Herman Lent, Rio de Janeiro, Brazil. All specimens were collected at Balbina, site of hydroelectric dam, north of the river Uatumã, Amazonas, Brazil, from a single hollow tree; 27 November 1983 (T.V. Barrett et al. coll.).

Biology: the species was collected from within a large, living hollow tree in association with *Eratyrus mucronatus* Stal (Triatominae), *Rhipidomys* sp. (Rodentia) and *Phyllostomus elongatus* Geoffroy (Microchiroptera). The adults and nymphs are extremely active when disturbed, and their impressively rapid movements along with the habit of hiding in tight crevices makes them difficult to capture without injury. The eggs are fixed singly in narrow crevices. In the laboratory, nymphs feed readily on man, mice and chickens. Nymphs from eggs laid in the laboratory have so far been reared to eggs of the second filial generation on mouse blood (generation time approximately 17 weeks).

Trypanosomes identified (on the basis of host range and morphology) as *Trypanosoma cruzi marinkellei* Baker et al., 1978 were isolated from the bugs and associated *P. elongatus*.

Distribution: at present this species is known only from the type locality.

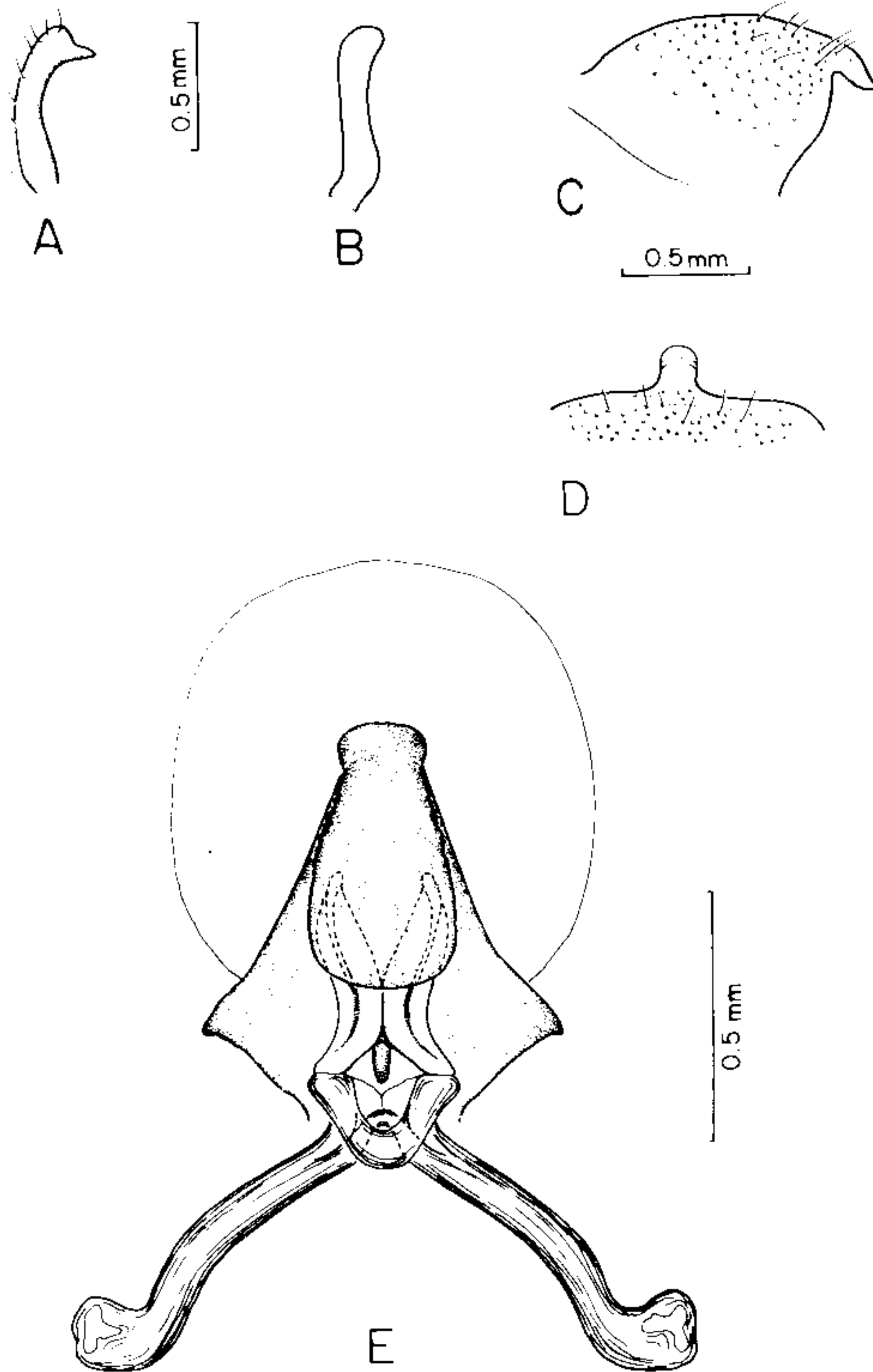


Fig. 3: *Cavernicola lenti*, external genitalia of male – A: paramere; B: paramere, different aspect; C: lateral view of pygophore; D: dorsal view of posterior process of pygophore; E: articular apparatus (below) and dorsal phallosomal plate (above); phallosoma shown in outline only.

KEY TO ADULTS OF *CAVERNICOLA*

- 1a. Connexivum uniformly dark. Coxae, trochantera and base of femora stramineous. First rostral segment not attaining level of antenniferous tubercles in lateral view . . . *Cavernicola pilosa*
- 1b. Fifth connexival segment mainly white to pale brick-red. Coxae, trochantera and base of femora dark. First rostral segment attaining level of antenniferous tubercles in lateral view *Cavernicola lenti*

Observation: adults of *C. lenti* are unique in the subfamily Triatominae in having the antecular region of the head shorter than the postocular.

KEY TO FIFTH-INSTAR NYMPHS OF *CAVERNICOLA*

- 1a. Antenniferous tubercles situated near middle of antecular region *Cavernicola pilosa*
- 1b. Antenniferous tubercles inserted close to eyes *Cavernicola lenti*

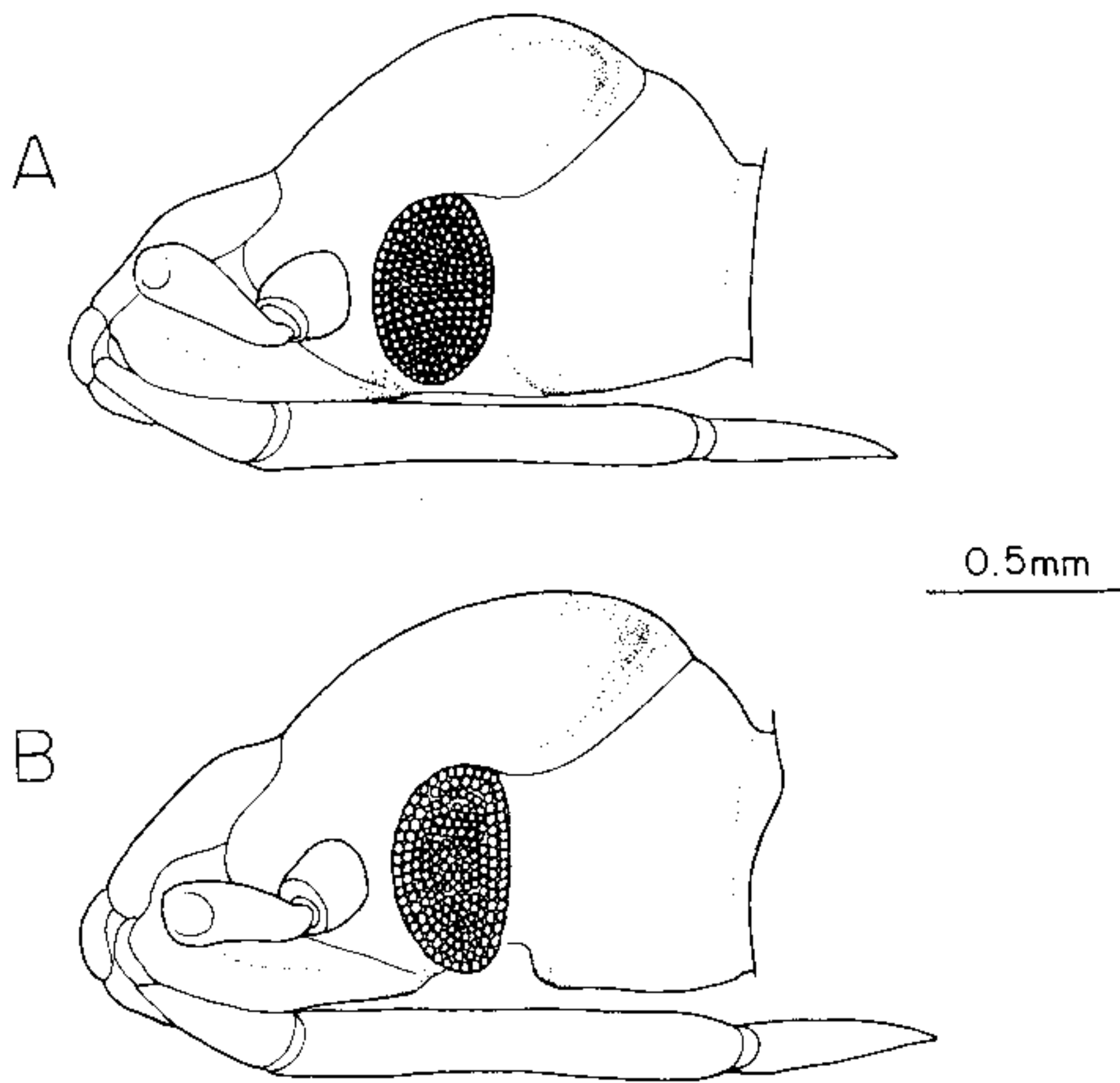


Fig. 4: *Cavernicola lenti*, fifth instar nymph – A: head, recently dead specimen; B: head, dry specimen.

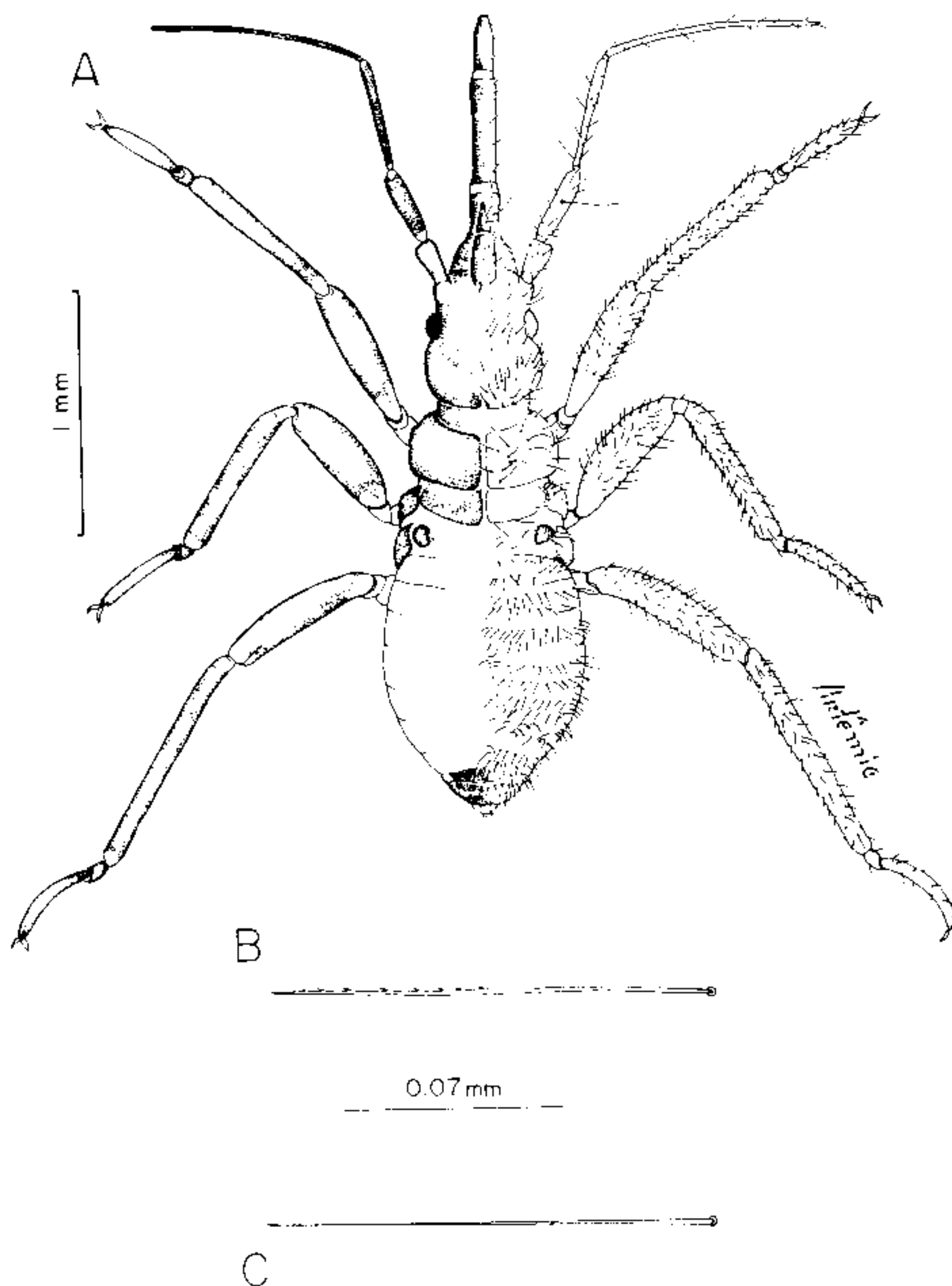


Fig. 5: *Cavernicola lenti*, first instar nymph – A: dorsal view, to show pigmentation (left) and arrangement of setae (right); B: seta from post-ocular region of head; C: thoracic seta.

KEY TO FIRST INSTAR NYMPHS OF *CAVERNICOLA*

- 1a. Head, thorax and legs uniformly dark; fourth antennal segment longer than remaining segments combined *Cavernicola pilosa*
- 1b. Pale areas on coxae, trochantera, base of femora and gular region between eyes; fourth antennal segment shorter than remaining segments combined *Cavernicola lenti*

DISCUSSION

Of the known Triatominae, *Cavernicola lenti* is clearly closest to *Cavernicola pilosa*, the only other known species of the tribe Cavernicolini. The two species are most easily distinguished by the characters given in the keys – particularly the striking difference in colouration, and by the relative lengths of the rostral and antennal segments.

Previous concepts of the genus *Cavernicola* and the tribe Cavernicolini now require slight modification as the result of the discovery of this second species. For *C. lenti* to be properly accommodated in the latest and most complete definitions of these higher taxa (Lent & Wygodzinsky, 1979), the following morphological details of the new species need to be considered, particularly when using their generic key to first instar nymphs: in the first instar nymph, the colouration, the presence of spinulose setae, and the relative length of the fourth antennal segment; in the fifth instar nymph, the relative length of the fourth antennal segment; in the adult, the presence of small but not obsolescent ocelli, the shape of the scutellum and the venation of the hindwing. A comparative study of the genitalia is not at present feasible with the limited material available.

C. lenti shares with *C. pilosa* an association with phyllostomid bats, although in the case of the former species this association is apparently not obligatory, at least in the laboratory. Characterization of the trypanosomes found in the faeces of *C. lenti* and in the blood of associated *Phyllostomus elongatus* is not yet complete, but their morphology agrees with *Trypanosoma cruzi* and their infectivity to triatomines but not to laboratory mice is suggestive of *T. cruzi marinkellei*.

RESUMO

Cavernicola lenti, n.sp. é descrita com base em exemplares coletados em uma árvore viva, oca, perto das obras da usina hidrelétrica de Balbina, Estado do Amazonas, Brasil. Incluímos descrições dos adultos e ninfas de primeiro e quinto estágio, e observações sobre a biologia da nova espécie. Salientamos alguns detalhes morfológicos da nova espécie que ampliam os conceitos prévios do gênero e da tribo Cavernicolini. Flagelados encontrados nas fezes de *C. lenti* foram identificados provisoriamente como o parasita de morcegos, *Trypanosoma cruzi marinkellei*.

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REFERENCE

- LENT, H. & WYGODZINSKY, P., 1979. Revision of the Triatominae (Hemiptera, Reduviidae), and their Significance as Vectors of Chagas' Disease. *Bull. Am. Mus. Nat. Hist.*, 163 :123-520.