

## TWO NEW SPECIES OF *CRAWFORDIA* PIERCE FROM SOUTH AMERICA, (STREPSIPTERA: STYLOPIDAE)

MARCOS KOGAN

Office of Agricultural Entomology, University of Illinois, 172 Natural Resources Bldg., 607 E. Peabody,  
Champaign, IL 61820, USA

*Several stylopized specimens were found among the Hymenoptera collection of the Instituto Oswaldo Cruz (Rio de Janeiro, Brazil). A paper by Kogan & Oliveira (1966) described the parasites of Polybia represented among those specimens. I describe herein the first neotropical species of the genus Crawfordia parasitizing species of Psanenithia (Andrenidae, Panurgini). The presence of vestigial thoracic segmentation of the female cephalothorax is a peculiar trait of this genus of Strepsiptera. Triungulinids are described in detail for the first time in this genus.*

Key words: Hymenoptera – Strepsiptera – *Crawfordia* – systematics

The Collection of the Instituto Oswaldo Cruz (Rio de Janeiro, Brazil) was searched for the presence of stylopized specimens of Hymenoptera. The Strepsiptera that were found represent in many instances first records for the neotropical fauna. In a previous paper the parasites of *Polybia* were described (Kogan & Oliveira, 1966). In this paper I describe parasites of bees of the genus *Psanenithia* Gers-taeker, 1868 (Andrenidae, Panurgini). These descriptions are the first specific records of Strepsiptera parasitizing Apoidea in Brazil and the first specific record of parasitized *Psanenithia*. Three species of host bees, one specimen of each, were found stylopized by female Strepsiptera, and triungulinids were present in two of them. The parasites seem to be two new species of the genus *Crawfordia* Pierce and are described herein.

### *Crawfordia* Pierce, 1908

*Crawfordia* Pierce, 1908: 80, Pierce, 1909: 153, pl. 12, figs. 7-8, pl. 13, figs. 4-7; Pierce, 1911: 497; Ogloblin, 1924: 1; Bohart, 1941: 138-139, figs. C-15-16; Luna de Carvalho, 1961: 7; Kinzelbach, 1971: 164; Kinzelbach and Zoltan, 1977: 34-36, figs. 24 A-D, F.

*Xenoides* Pierce, 1909: 152.

According to Bohart (1941) female *Crawfordia* are characterized by having the head completely fused ventrally with the thorax and "a peculiar, rod like thickening" extending from

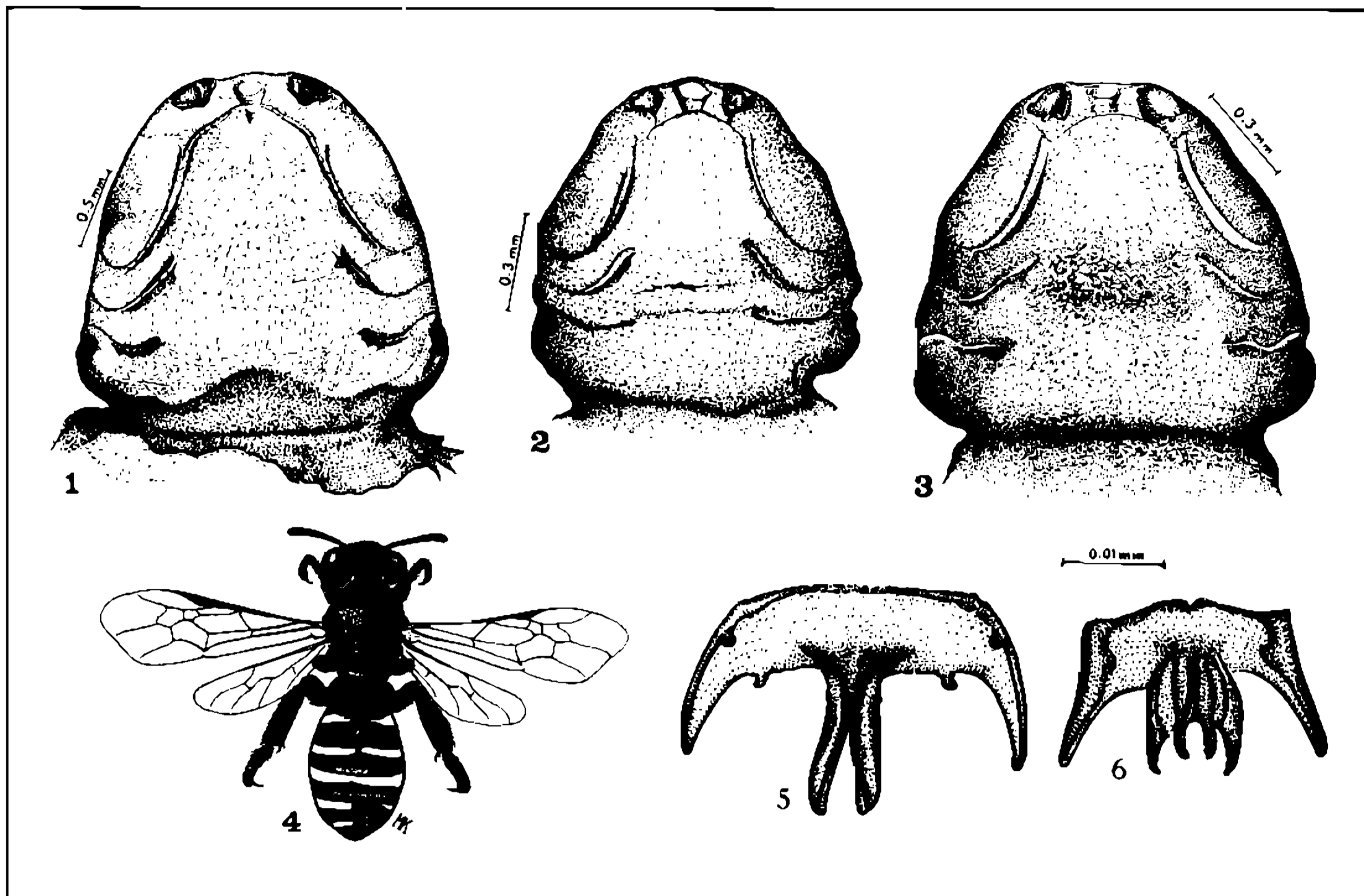
the brood-canal opening to the region of the spiracles ending in three groups of enlarged cells resembling the pori of *Halictoxenos*. With the materials now available the peculiar "rod like" thickenings are interpreted to be remnants of the primitive thoracic segmentation; this vestigial segmentation represents an interesting evolutionary trait because most signs of segmentation have disappeared in all known adult endoparasitic female Strepsiptera, except in *Callipharixenos* in which the remaining two pairs of thoracic stigmata are evidence of the original segmentation. *Crawfordia* is also characterized by having a prominent basal band, roughly triangular mandibles, and an abdomen with three genital openings.

With the description of two new species parasitic on *Psanenithia*, *Crawfordia* remains confined as parasites of panurgine andrenid bees and probably are the most primitive known genus of Stylopidae because of the vestigial thoracic segmentation.

*Crawfordia* triungulinids are described for the first time in detail and are typified by having bifid-tipped hairs, flat hairs dorsally and strong hairs ventrally, and long and stout femoral processes which are bifid at the tips.

### *Crawfordia lopesi* n. sp. (Figs 1,4,5,7,8,9,10)

*Female* (Figs 1,7) – Cephalothorax sub-ovate, constricted at base; pale brown; with the



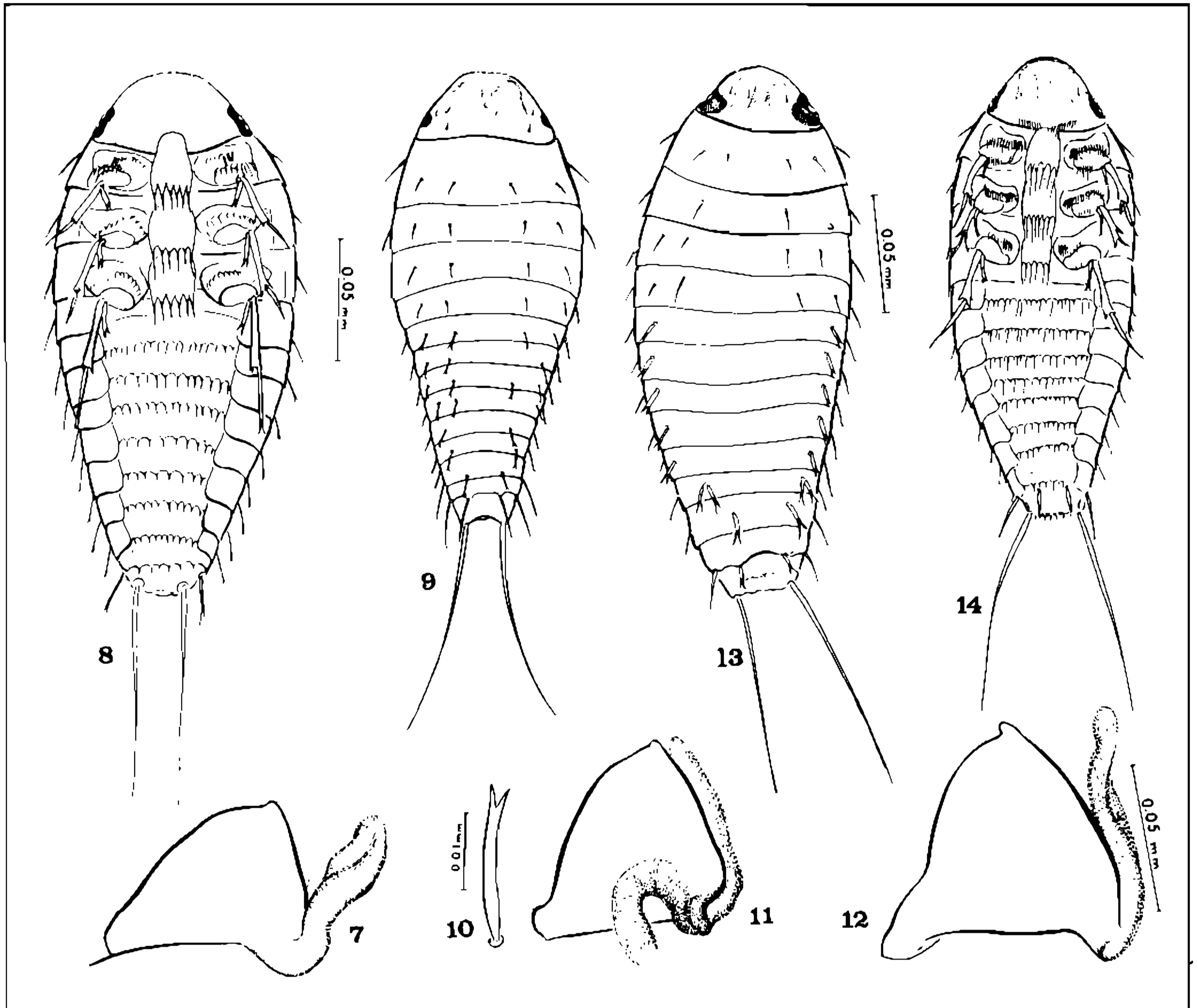
*Crawfordia lopesi* n. sp. — Fig. 1: ventral view of cephalothorax, holotype. Fig. 5: tentorium of the triungulinid. *Crawfordia acincta* n. sp. — Fig. 2: ventral view of cephalothorax, female holotype. Fig. 3: ventral view of cephalothorax, female paratype no. 128. Fig. 6: tentorium of the triungulinid. *Psaenithia bergi* Holm. — Fig. 4: dorsal view showing the tip of the cephalothorax of *C. lopesi*; the abdominal marks are misformed as a consequence of the stylopization.

dark brown basal band ventrally extended cephalad in middle and sides, thus cephalic margin with bisinuous appearance; basal band moderately extended into abdomen. Mandible sub-triangular, with slightly rounded tooth at tip. Clypeus almost straight, not produced anteriorly; anterior margin of head, between mandibles, only slightly bisinuous. Mouth rounded, opening laying very close to cephalothoracic membrane. Cephalothoracic membrane inconspicuous, inter-cephalothoracic suture with bell-shaped appearance, reaching the margins ca. mid-distance between front of head and rear margin of thorax; suture prolonged dorsally. Second incomplete ventral sutural line occurs on both sides of thorax, between base of inter-cephalothoracic suture and metathoracic spiracles; extending from border towards base of thorax turning cephalad in regular curve, parallel to the basal one-third of inter-cephalothoracic suture; also slightly prolonged dorsally. Vestigial inter-meso-metathoracic suture arising just above spiracle at each side and forming a horizontal "S" shaped curve. Spiracles close to basal membrane. Number of brood-canal openings not observed.

Principal measurements: length of cephalothorax 1.18 mm; width at base of cephalothorax 0.94 mm; distance between spiracles 1.17 mm; greatest width 1.24 mm; distance between mandibles 0.29 mm; width through cephalothoracic membrane 0.73 mm; length of head on median line 0.13 mm; length of head laterally 0.58 mm.

*Triungulinid* (Figs 5,8,9,10) — Total length without apical stylets 0.205 mm; greatest width (at metathorax) 0.087 mm.

Head: Length 0.028 mm; width at base 0.065 mm. Ocular area with striated appearance with three or four ablique bands formed by heavily pigmented stripes; one or two ocelli observed dorsally. Tentorium with outer branch bent backwards at almost right angle; inner branch with posterior wings twisted inwards, enclosing central process. At least two pairs of minute hairs present on dorsal side; one pair close to posterior margin and one pair close to antero-interior margin of eyes.



*Crawfordia lopesi* n. sp. — Fig. 7: right mandible of the holotype. Fig. 8: triungulinid, ventral side. Fig. 9: triungulinid, dorsal side. Fig. 10: detail of abdominal bifid hair. *Crawfordia acincta* n. sp. — Fig. 11: right mandible of the holotype. Fig. 12: right mandible of paratype no. 128. Fig. 13: triungulinid, dorsal side. Fig. 14: triungulinid, ventral side.

Thorax: Prothorax slightly narrower but longer than meso- and metathorax; each segment with dorsal transverse row of four bristles, bent backwards; pro- and mesothorax each with one pair of lateral bristles. Sternites plate-like, posterior margins fringed with six or seven long hairs arising from acuminate processes.

Abdomen: Segments progressively narrower caudad. First tergite with four bristles similar to those present on thorax; tergites II to VIII each with four hairs flattened and bifid at tip and one marginal hair; tergite IX with four hairs, the central pair acute at tip and lateral pair bifid at tip. Posterior margin of urosternites fringed with short but very conspicuous hairs, sub-equal in length and separated from each other by distance equivalent to their length;

posterior margin of first urosternite smooth, without such hairs. Length of apical stylets approximately 0.10 mm.

Legs: Coxae broad and ovate, those of first pair with two rows of hairs, internal hairs of distal row transformed into peg-like structures; coxae of second and third pairs with only one row of hairs. Femora with a long and stout inner process almost half as long as tibiae; these processes are also bifid at tip. Tibiae long and slender without noticeable hairs or bristles. Tarsi uniaarticulated, long and slender, first two pairs of tarsi setiform, third pair bifid at tip.

Host: *Psaenithia bergi* Holmberg, 1884 (Andrenidae, Panurgini), Father J. Moure det., 1965.

*Holotype*: Female no. 126. *Paratypes*: triangulids no. L1-126; Fazenda dos Campos, Passa Quatro, Estado de Minas Gerais, Brazil, altitude 1,400 m; March 21, 1921; J. F. Zikan coll. In the collection of the Instituto Oswaldo Cruz.

The female cephalothorax was located between the fifth and sixth tergites, on the right side of the host.

*Male*: Unknown

*Discussion*: *Crawfordia lopesi* n. sp. is distinguished from the other six species of the genus [mainly *C. pulvinipes* (Pierce, 1904), *C. cockerelli* Pierce, 1909, and *C. labiata* Ogloblin, 1924], by the very distinct signs of the primitive thoracic segmentation; by the shorter basal band and by the cephalothorax being more constricted at base. This species is named in honor of Professor Hugo de Souza Lopes, whose integrity and devotion to science helped shape the character of several generations of Brazilian entomologists.

*Crawfordia acincta* n. sp.  
(Figs 2, 3, 6, 11, 12, 13, 14)

*Female* (Figs 2, 3, 11, 12) – Cephalothorax strongly constricted at base; dark brown (paratype no. 128 is paler). Basal band inconspicuous, reduced and darkened, diffuse area along with cephalothoracic constriction. Margins of thorax sub-parallel and irregular; cephalic region laterally convergent then broadly rounded at tip. Mandibles sub-triangular, almost as broad as long at base, with short but clear rounded tooth at tip. Clypeus almost straight, not produced anteriorly; anterior margin of head, between mandibles, only slightly bisinuous. Mouth ovate, placed closer to anterior margin of head than to cephalothoracic membrane. Cephalothoracic membrane inconspicuous; inter-cephalothoracic suture bell-shaped, ventrally complete and slightly prolonged dorsally. Second incomplete sutural line developed from margin, inclined toward base then turning cephalad in an open curve parallel to basal one-half of inter-cephalothoracic suture; all sutures slightly produced dorsally. Vestigial inter-meso-metathoracic suture arising just above spiracles and directed straight inwards in sinuous curve. Spiracles located at a short distance from base. Basal band inconspicuous, basal area only slightly

darker than remainder surface of cephalothorax. Number of brood-canal openings not observed.

Principal measurements (those of paratype no. 128 given *in parentheses*): length of cephalothorax 0.91 mm (0.97); width at base of cephalothorax 0.65 mm (0.73); distance between spiracles 0.78 mm (0.91); greatest width 0.97 mm (0.99); distance between mandibles 0.17 mm (0.19); width through cephalothoracic membrane 0.52 mm (0.60); length of head on median line 0.10 mm (0.10); length of head laterally 0.32 mm (0.34).

*Triungulinid* (Figs. 6, 13, 14) – Total length without apical styles 0.210 mm; greatest width (at first abdominal segment) 0.087 mm.

Head: Length 0.029 mm; width at base 0.051 mm. Ocular area striated, with four oblique bands formed by heavily pigmented stripes; one dorsal ocellus. Tentorium with outer branch bent backwards at almost right angle; inner branch with posterior wings not twisted. At least four minute hairs present on dorsal side, on a transversal row, equidistantly located on distal area.

Thorax: Prothorax narrower but almost as long as meso- and metathorax together; pro- and metathorax with two pairs of dorsal bristles, mesothorax with only one pair; all segments with one lateral bristle on each side. Sternites plate-like, posterior margins fringed with six to eight long hairs arising from acuminate processes.

Abdomen: Not very sharply narrowed posteriorly. First tergite with four bristles similar to those of thorax; tergites II to VI with one pair of flattened, bifid tipped hairs, one close to each side and one pair of lateral bristles also bifid but not distinctly flattened; segment VII with two groups of two flattened bifid bristles, in each group the bristles arising at same point; segments VIII and IX with four bristles, and two central bristles flattened and bifid. Posterior margin of urostermites fringed with alternated short and long hairs, keeping between each other a distance equivalent to length of shorter hairs; posterior margin of first urosternite smooth, without hairs.

Legs: Coxae broad and with two rows of hairs; inner hairs of distal row slightly thicker. Femora with long and stout inner processes,

bifid at tip, almost half as long as tibiae. Tibiae long and slender, tibiae of first pair with long apical tooth. Tarsi uninarticulated, long and slender, setiform.

*Hosts:* (1) *Psaenithia philantoides* Gerstaecker, 1868 (host of the holotype no. 127), Friese det. (2) *Psaenithia annulata* Gerstaecker, 1868 (host of the paratype no. 128), Friese det.

*Holotype:* Female no. 127. *Paratypes:* Triungulinids no. L1-127; Mendoza, Argentina; January 10, 1906; coll.?. Paratypes female no. 128 and triungulinids no. L1-128; Barbacena, Estado de Minas Gerais; 1906; Ducke coll. In the collection of the Instituto Oswaldo Cruz. Holotype and paratype females located both between fifth and sixth tergites, left side of the hosts.

*Male:* Unknown.

*Discussion:* Female *C. acincta* is distinguished from *C. lopesi* n. sp. by the less conspicuous basal band, the mandibles longer in proportion to the width at the base and located closer together; the cephalothorax more triangular in front and the basal half of the lateral margins more irregular. The main differences between the triungulinids can be observed in the absence of the inner pair of the dorsal flat, bifid hairs on the abdominal tergites II to VI; the fringed hairs of the urosternites of at least two different lengths and more densely inserted. The

tentoria of both species differ slightly in the structure of the inner branch.

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