Larvae and pupae of some New Guinean Tabanidae (Diptera). II. Species of the genus *Tabanus* Linnaeus

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Abstract: The larvae and pupae of *Tabanus lenticulatus* Oldroyd and *T. papuensis* Oldroyd are described, illustrated, and compared with the other described larvae of Australasian species of *Tabanus* Linnaeus.

Introduction

In part I (Goodwin 2001), previous information on the immature stages of the Tabanidae of the Australasian and Oceanian Regions, and both materials and methods and larval and pupal morphology were discussed. In addition, the larvae and pupae of the two species of *Chrysops* Meigen known from New Guinea were described and illustrated. The present report presents the descriptions of the larvae and pupae of two species of *Tabanus*, and compares the larval stages with those of the other four Australasian species for which larval descriptions have been provided (Taylor 1917; Hill 1921). These are the first descriptions known for New Guinea *Tabanus* and bring the total to four New Guinea species of Tabanidae for which the immature stages are known.

Tabanus lenticulatus Oldroyd

Mature larva (Figure 1): Length 25-30 mm; entire larva dark brownish black dorsally and laterally except for small whitish dorsolateral spots on most segments and the pale beige pseudopodia; ventral surface whitish. Densely pubescent except for the middorsal, sublateral, and posterior surfaces of prothorax, midventral surface of mesothorax, metathorax, and abdominal segments 1-7 posterior to pseudopodia, midventral area of anal segment anterior to anal ridge, and a small dorsolateral spot on each side of mesothorax, metathorax, and abdominal segments 1-6 which are non-pubescent; pubescence dark brownish black except on pseudopodia where it is pale beige. Head capsule 3.62 mm long, greatest width 0.98 mm. Anal segment 2.88 mm long, ca. 1.5 times its greatest width. Respiratory siphon 0.58 mm long, ca. 1.5 times its basal diameter; stigmatal spine absent. Striations absent from non-pubescent areas, presumed absent elsewhere.

Pupa (Figures 2A-2C): Length 15-18 mm; yellowish-brown without obvious darkened areas except for darker brown of thoracic spiracular prominences. Antennal ridges evident, but not sharply divided into median and lateral parts, separated at the midline by a notch ca. 0.14-0.17 mm deep. Callus tubercles unisetose, more or less oval basally, not noticeably skewed at apex; elevated 0.15 mm above general surface. Frontal tubercles small, apically ridged, elevated 0.03-0.06 mm above general surface. Antennal sheaths 0.61 mm long, 0.48 mm wide, slightly exceeding epicranial suture in female. Thoracic spiracles ca. 0.63 mm long; spiracular prominence exceeding dorsal thoracic margin 0.29 mm. Abdominal fringes biseriate, completely encircling segments II-VII, progressively longer from anterior to posterior; dorsal fringe of 24-36 spines on tergite VII. Dorsal, lateral, and ventral or ventrolateral pre-anal combs of 3-5, 5-7, and 15-17 or 5-6 spines, respectively, the ventrolaterals and laterals not widely separated in females. Dorsal, lateral, and ventral tubercles of aster 0.36, 0.65, and 0.36 mm long, respectively; all rather slender and tapered to pointed apices; dorsals directed dorsoposteriorly, laterals directed lateroposteriorly with a sharp upward curve, ventrals directed ventroposteriorly.

Collections and Comments: A total of 20 larvae was collected of which 6 were preserved. Six adults were reared including both males and females. The pupal period averaged 10 days in duration with a range of 9-11 days. All larvae were collected at the crocodile rearing facility 6 km north of Lae along the Markham Highway. The larvae, all apparently full-grown, were found in moderately organic mud associated with the roots of tall grass growing in shallow rain-filled depressions. These irregularly shaped depressions, some made by tires of heavy trucks, were only about 20 cm deep at their deepest

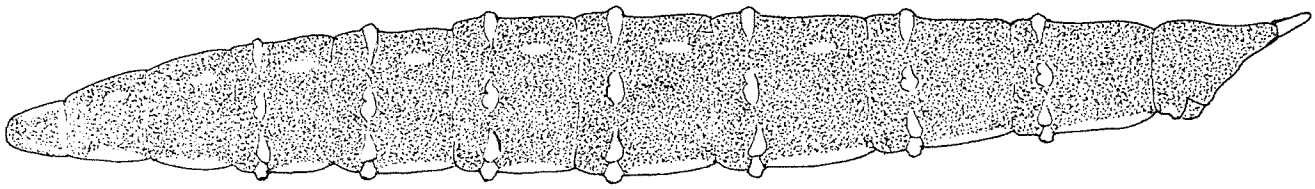

Figure 1. Lateral diagram of larva of *Tabanus lenticulatus*.

point and not more than 2 m across at their widest point. All larvae were collected in January and February, 1997. The depressions were completely dry by the beginning of March following a period of 30+ days without rain and remained so for several months.

The extent of pubescence and its pattern and color give larvae of *T. lenticulatus* an appearance unlike any other known larvae of the genus. Preserved specimens are superficially similar to larvae of the Neotropical/Nearctic genus, *Chlorotabanus*, but the latter are usually greenish in life. The color and pattern of pubescence makes larvae of this species distinctive among the known larvae of the Australasian Region, but it is not unlikely that similar color and pubescent pattern may be found in the larvae of related species such as *T. selene* Schuurmans Stekhoven and *T. sepikensis* Oldroyd.

Tabanus papuensis Oldroyd

Mature larva (Figure 3): Length 28-36 mm, yellowish-white with contrasting dark brownish pubescent markings. Head capsule 4.71mm long, greatest width 1.06 mm. Anal segment 4.78 mm long, ca. 1.67 times its greatest width. Respiratory siphon 1.72 mm long, ca. 2.5 times its basal diameter; stigmatal spine absent. Striations absent. Anterior pubescence encircles thoracic and first four abdominal segments, being absent dorso- and ventrolaterally from abdominal segment V and from entire lateral area of segment VI, and present only as small dorso- and ventrolateral spots on segment VII, totally absent from anal segment; prothoracic anterior annulus with a broad caudally projected fan-shaped pubescent extension laterally on each side crossing more than 80% of the length of the

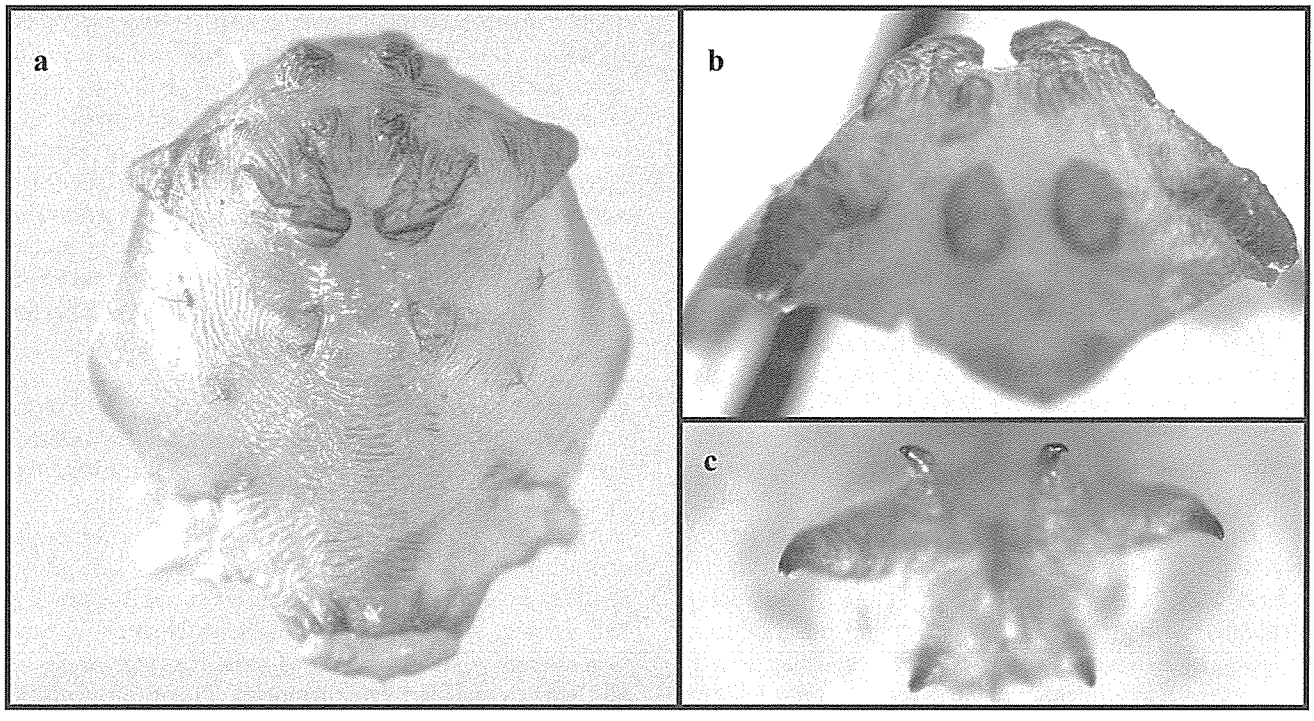

Figure 2. Photographs of portions of the pupa of *Tabanus lenticulatus*: 2a, ventral view of frontal plate; 2b, anterior view of frontal plate; 2c, aster. All photographs by Jeffrey Lotz, FDACS-DPI, Gainesville, FL.

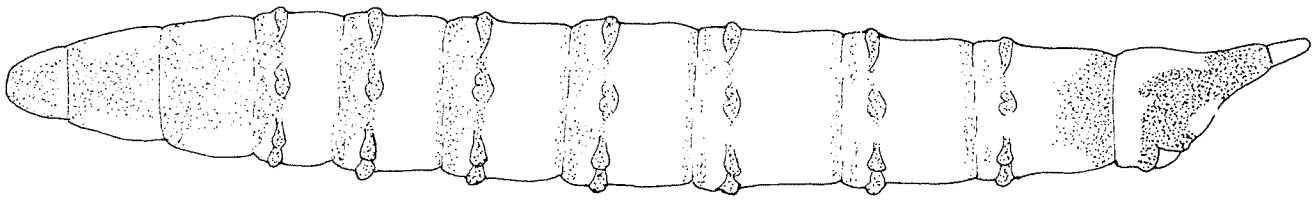

Figure 3. Lateral diagram of larva of *Tabanus papuensis*.

segment, anterior annuli of the meso- and metathorax with broad lateral posterior projections that attain posterior margins of the segments. Pseudopodial pubescence forming complete annuli on first four pseudopodial segments, being absent between lateral and ventrolateral pseudopodia on remaining segments; united with anterior pubescence dorso- and ventrolaterally on first four segments. Posterior pubescence encircles all abdominal segments, faintly and narrowly on first six; posterior annulus of abdominal segment VII expanded laterally to project anteriorly to near the middle of the segment; broad, dark posterior annulus of anal segment with a broad lateral anterior projection on each side that curves sharply downward to unite with the pubescence covering the anal ridge and lobes; each anterior projection bearing a short anterior projection near the midline.

Pupa (Figure 4a-4c): Length 24-28 mm; yellowish-brown without obvious darkened areas except for slightly darker brown of thoracic spiracular prominences. Antennal ridges evident only as rather smoothly rounded, swollen area separated at the midline by a notch ca. 0.06-0.09 mm above deep. Callus tubercles unisetose, more or less oval basally, slightly skewed laterally at apex; elevated 0.22 mm above general surface. Frontal tubercles small, elevated at most 0.02-0.03 mm. Antennal sheaths 0.67 mm long, 0.53 mm wide, slightly exceeding epicranial suture in female. Thoracic spiracles ca. 1.38 mm long; spiracular prominence exceeding dorsal thoracic margin by 0.72 mm. Abdominal fringes biseriate, complete dorsally and laterally on segments II-VII, progressively longer from anterior to posterior; ventrally limited to a single relatively long pair located sublaterally on sternites II-IV, to a similar pair plus numerous short spines lateral of the two long spines on sternite V, completely

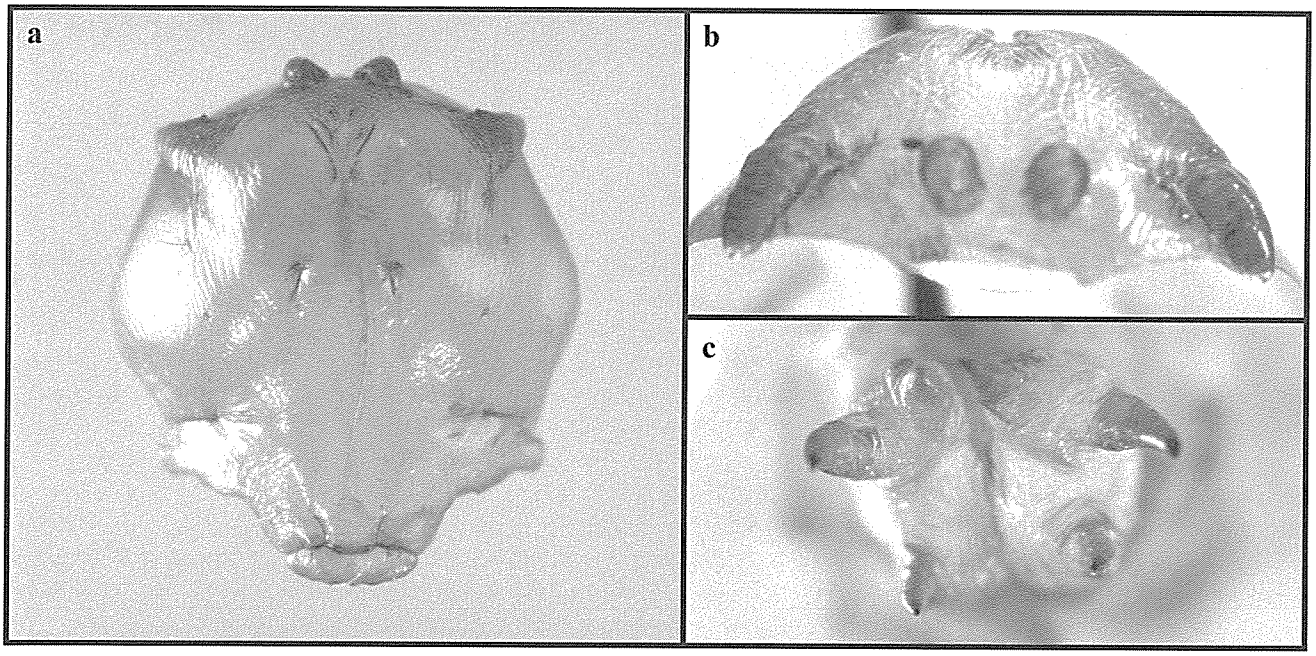

Figure 4. Photographs of portions of the pupa of *Tabanus papuensis*: 2a, ventral view of frontal plate; 2b, anterior view of frontal plate; 2c, aster. All photographs by Jeffrey Lotz, FDACS-DPI, Gainesville, FL.

traversing sternites VI & VII but small on VI; dorsal fringe of 40-54 spines on tergite VII. Dorsal, lateral, and ventral or ventrolateral pre-anal combs of 6-7, 0, and 16-18 or 6-7 spines, respectively. Dorsal, lateral, and ventral tubercles of aster 0.21, 0.42, and 0.29 mm long, respectively; all tapered to pointed apices; dorsals directed dorsoposteriorly, laterals directed lateroposteriorly with a slight upward curve, ventrals directed ventroposteriorly.

Collections and Comments: Collecting at two locations yielded a total of 16 larvae from which 7 adults were reared including both males and females. One location was the crocodile rearing facility where the previous species was collected. However, the actual collecting site for larvae of *T. papuensis* was a narrow, shallow drainage ditch that drained the crocodile rearing ponds and feeding areas. This is the same site that yielded larvae of *Chrysops albicinctus* and *C. australis* described previously (Goodwin 2001). Larvae of *T. papuensis* were in highly organic, silty mud and usually associated with roots of tall grasses growing at the edge of the ditch. The second location was the Markham Ranch about 55 km outside Lae along the Markham Highway. Larvae were collected at two sites, both sluggish streams, and from locations similar to that noted for larvae found at the crocodile rearing facility.

The larvae of *T. papuensis* have a pubescent pattern and appearance more typical of the genus based on known larvae from other parts of the world. They are readily distinguished from those of the heavily pubescent *T. lenticulatus* described above and can be separated from the four other Australasian species of *Tabanus* for which larvae are known by the pubescent pattern of the thoracic segments. In *T. papuensis*, this pubescence includes an anterior annulus and a broad fan-shaped lateral posterior projection on each side of the prothorax and an anterior annulus with a broad midlateral band that attains the posterior margin on both the meso- and metathorax, whereas the other known Australasian *Tabanus* larvae (*T. dorsobimaculatus* Macquart, *T. pallipennis* Macquart, *T. particaecus* Hardy, and *T. townsvilli* Ricardo) have the lateral posterior pubescent extensions from the anterior annuli of the thoracic segments comprised of two (prothorax) or four (meso- and metathorax) slender projections that cross no more than 70% of the segments, or no posterior projections at all.

Literature cited

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