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# Redescription of *Riethia truncatocaudata* (Edwards, 1931) (Diptera: Chironomidae), with description of female, pupa and larva and generic diagnosis for *Riethia*

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The discovery of the immature life history stages of *Riethia truncatocaudata* (Edwards, 1931) from South America allows diagnosis of *Riethia* Kieffer, 1917 in all stages, incorporating reared species from the complete austral range. *Pseudochironomus truncatocaudata* Edwards, 1931 is a senior synonym (syn. n.) of *Pseudochironomus melanoides* Edwards, 1931. We redescribe the male to complement the short original descriptions of *R. truncatocaudata* and *R. melanoides*. The species is congeneric with Australian *Riethia stictoptera* Kieffer, the type species of the genus *Riethia*. Extensive material available from the western Pacific (Australia, New Zealand and New Caledonia) confirms that the diagnosis extends to a gondwanan clade, likely sister group to the largely northern genus *Pseudochironomus* Kieffer.

**Keywords:** Riethia; Chironominae; Pseudochironomini; aquatic insects; Neotropical region

## Introduction

The chironomid genus *Riethia* was erected by Kieffer (1917) for adults of two species from Australia, with *Riethia stictoptera* Kieffer, 1917 accepted as the type (Ashe 1983). Modern identity, as a relative of *Pseudochironomus* Malloch, 1915 within the subfamily Chironominae, derives from Freeman (1959) who expanded the genus to include a New Zealand species, *Riethia zeylandicus*. To this concept, Freeman (1959) added two Patagonian species, *Pseudochironomus melanoides* (from Argentina) and *P. truncatocaudatus* (from Chile), described on the basis of adults by Edwards (1931). Subsequently Freeman (1961) revised the Australian Chironomidae and recognised the presence of four species of *Riethia*, namely two species described previously by Kieffer as being synonymous (*R. stictoptera, R. asticta*), the New Zealand species *R. zeylandicus* newly recognised as also Australian, and two species described as new to science (*R. cinctipes, R. plumosa*). *Riethia* was included by Sæther (1977) in his newly-erected tribe Pseudochironomini together with *Pseudochironomus* Malloch, 1915, *Manoa* Fittkau, 1963 and *Aedokritus* Roback, 1960. The generic composition,

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and indeed the monophyly of this tribe has remained uncertain, largely because many characters show purported plesiomorphic states, and the immature stages of many taxa were unknown. In Australia *Riethia* is diverse and widespread with many undescribed taxa, such that illustrations and tentative keys to larvae and pupal exuviae were provided by Cranston (2000). In the neotropics, pupal exuviae of *Riethia* have been recognised by Ospina-Torres (1992), Wiedenbrug (2000) and Roque et al. (2004) from disparate sites in Brazil. Now immature stages have been reared by the senior author in lotic systems in south-eastern Brazil that conform to the concepts for this genus developed for the Austropacific taxa. Furthermore, larvae and pupae evidently belonging to *Riethia* have been found in some lotic sites in Patagonian Chile and Argentina by the junior author. A newly-collected adult male *Riethia* from South America suggested that the two described species from the Neotropics, held in London in the Natural History Museum, needed to be examined.

Here we describe the previously unknown larva, pupa and female of what we infer to be a single, quite widespread southern Neotropical species. We redescribe the male, to complement the short original descriptions of *Riethia truncatocaudata* and *Riethia melanoides*, which we consider here to be synonymous. Further, we provide a generic diagnosis for each stage based on extensive material now available from the western Pacific/Australasia (Australia, New Zealand and New Caledonia). The expanded distribution of this genus seems to confirm Freeman's (1959, 1961) assertion that this is an ancient southern hemisphere group, including the related *Aedokritus* Roback, 1960, *Megacentron* Freeman, 1961 and *Manoa* Fittkau, 1963.

## Materials and methods

Brazilian material was collected in shallow-water canals by hand-net sampling with 250 $\mu$m mesh. Live larvae were reared individually in glasses covered by cotton-wool with small volumes of water from the collecting sites. In Patagonia, live larvae of *Riethia* were sought in depositional areas in running waters, corresponding to the known preferred larval habitat of Australasian species. Live larvae were placed individually in a few ml of native (or tap) water in cotton-wool stoppered 50 mm x 10 mm glass vials, and at ambient temperature, without aeration. Rearing success was poor: dead immature stages were preserved in 70% ethanol. Pupae and especially their exuviae (cast skins) were collected by exposing drift nets with a 300 $\mu$m mesh to intersect flowing water surfaces for up to 24 h. Some live larvae were preserved in propan-2-ol (isopropanol) for DNA extraction. All exuviae were preserved in the same medium and microscope slide prepared in Euparal with exuviae displayed by dissecting the cephalothorax from the abdomen.

The terminology and abbreviations used in the descriptions follow Sæther (1980) except where we use taeniae (adj. taeniate) for broad flattened seta (Langton 1994). Larval head capsule size is given as the postmentum length measured from the tip of the mentum to the postoccipital margin. This measure is less susceptible to deformation during slide mounting than any 'total' length. All measurements are given as ranges, the smallest measurement followed by the largest (measurements $\mu$m were rounded to the nearest 5 $\mu$m). Illustrations of the abdomen of *Riethia* male adults show the colour patterns but omit details (e.g. of chaetotaxy). Colour is described based on uncleared mounted material. We include SEM photographs to

provide additional details of some male characters. Specimens were dried, mounted on a silver stub, gold coated, and analysed under a scanning electron microscope (SEM – JEOL 5800LV) of the Departamento de Quimica da Universidade de São Paulo, USP, São Carlos (IQSC). The material used in the description is deposited in the Laboratório de Entomologia Aquática collection at the Universidade Federal de São Carlos (LEA-UFSCar) and in the Museu de Zoologia of the Universidade de São Paulo (MZUSP). Cranston's collections, verified against these descriptions, will be deposited in the appropriate National Museums and vouchered also in the British Museum (Natural History) (BMNH). A male, identified from a mixed sample, will be returned to the Zoologische Staatsammlung München, Germany (ZSM).

## Taxonomy

### Genus *Riethia* Kieffer, 1917

*Type species*. *Riethia stictoptera* Kieffer, 1917, by original designation (as gen. n., sp. n.) (Ashe 1983: 48), not subsequent designation by Freeman (1959): 422 (unnecessary).

***Generic description*** (based on all known species)

*Adult male*

*Head*. Frontal tubercles absent. Temporals multiserial, extending from orbitals to outer verticals and post-oculars; clypeal setae numerous. Palp 5-segmented, basal segment may be poorly delimited, segment 3 with 0–4 subapical sensilla clavata. Antenna with 13 flagellomeres, A.R. ranging from 1.5–2.7. Eye bare with long parallel-sided extension, separated dorsally by less than the diameter of one scape.

*Thorax*. Vittae strongly marked. Antepronotal lobes well developed, dorsally tapering somewhat, medially separated by broad V-shaped suture; thorax ending above or slightly over-reaching antepronotum. Acrostichals numerous, uni- to multiserial; dorsocentrals moderate to numerous, uni- to tri-serial; prealars uniserial; scutellars numerous, bi- to multiserial.

*Wing*. Pale, or with darkening at forks of R and FCu. Membrane moderately to strong punctate. Anal lobe moderately developed, not protruding. RM at shallow oblique angled to $R_{4+5}$, Costa not extended, ending proximal to wing apex. $R_{2+3}$ ending at one third to midway between apices of $R_1$ and $R_{4+5}$; FCu slightly distal to RM. R, $R_1$ and $R_{4+5}$ setose. Squama with single uniserial to dense biserial setae.

*Legs*. Often with darkened areas and femur/tibia joint and bands on tarsomeres. Foreleg with one slender short comb with central protruding long spur, mid- and hindlegs with paired broadly triangular combs each with slightly protruding central spur. Pseudospurs and sensilla chaetica absent. Pulvilli virtually absent to distinct but less than half claw length.

*Abdomen*. Setae of tergite IX evenly distributed or divided medially into two lateral groups. Anal tergite bands weak or absent. Anal point absent. Pars ventralis absent. Superior volsella variable in shape, but usually divided into three parts, an anterior section usually with a cluster of long setae and with some microtrichia; mesally-directed pointed or triangular digitiform lobe with or without microtrichia

and with few occasionally broad and pectinate setae; posterior lobe variably developed, weakly rounded to strongly bulging posteriorly or postero-medially, usually setose; sometimes with broad pectinate scales. Inferior volsella ranging from small and nearly completely appressed to gonocoxite, to larger with elongate free section, always microtrichiose and setose, sometimes with broad, pectinate scales; median volsella recognisable as a slightly rounded contour to swollen tubercle, bearing 1-3 stout setae. Gonostylus variably shaped, often tapering and sometimes ending in spine. Lateral and transverse sternapodemes broad and strongly sclerotised, with rounded projections; phallapodeme very well developed.

*Adult female*

As male except dorsomedial extension of eye shorter, eyes separated by twice scape width; antenna 5 segmented with apical flagellomere scarcely longer than preceding; genitalia with large undivided tergite IX, long or rounded dorsomesal lobe, small ventrolateral lobe, quadrate and large cerci.

*Pupa*

Medium-sized to large; exuviae pale yellow to brown.

*Cephalothorax*. Frontal apotome smooth to weakly granulose, cephalic tubercles and frontal setae absent, frontal warts present or absent. Thorax moderately granulose to rugose dorsally. Tubular, unbranched, elongate, tapering, smooth to setose to moderately spinose thoracic horn, subequal to longer than thorax, arising from elliptical single tracheal base. Prealar tubercle weakly developed, an elongate low mound. Two median antepronotals; three precorneals; four dorsocentrals in two groups of two.

*Abdomen*. Tergite I bare, remaining tergites with quite variable patterns of shagreen, usually forming antero-lateral patches on each tergite. Each tergite with longitudinal creases anteriorly on the cuticle. Hook row continuous or (rarely) medially interrupted, occupying at least 2/3 tergite width. Conjunctives III and IV always, and V in some species, with transverse band of antero-dorsally directed spines. Pedes spurii A strong on sternite IV, variably developed on V and VI. Pedes spurii B usually absent, weakly indicated in some species. Tergite II with or without spine patches, III–VIII with variably developed patterns, often with anterior transverse band of differentiated stronger spines. Sternite I without tubercles or spine patches. Apophyses strongly developed. Posterolateral corner of VIII with comb of 2–6 teeth of which 1 is usually dominant as spur.

Abdominal setation: Segment I without L seta, II–IV with 3 L, V with 3 taeniate L, VI–VII with 4 taeniate L, VIII with 5 taeniate. Tergites I–VII with 5 D, VIII with 1D. Sternites I–VII with 4 V, VIII with I V. I pair of small, stout "O" setae on mid-conjunctive of sternites I–VI, absent on tergites.

Anal lobe as wide as long, sometimes broader, often with shagreen or spines, with fringe of 3- $>$ 150 setae in single to multiple rows. Dorsal seta absent. Male genitalic sac extends beyond anal lobe apex, that of female much shorter.

*Larva*

Moderate-sized larvae.

*Antenna*. With 5 segments, either successively shorter, 3rd longer than 2nd, or 4th longer than 3rd. Ring organ in basal ¼ of 1st antennal segment. Lauterborn organs on apex of 2nd segment, well developed but not longer than half segment length, without pedicels. Antennal blade shorter or longer than flagellum.

*Labrum*. SI seta broadly plumose, SII elongate, finely feathered, arising from strong pedestal, SIII closely approximated, fine, simple, SIVa simple sensillum. Chaetae laterales deeply serrate on inner margin. Labral lamellae broad, single, pectinate. Pecten epipharyngis of 3 subequal scales, or middle tooth smaller. Premandible with several teeth, brush strong; seta premandibularis very long.

*Mandible*. Often with differentiation in colour between pale apical tooth and darker inner teeth, or all teeth pale. Apical tooth subequal in length to, or slightly longer than, longest of three inner teeth, without dorsal tooth or pecten mandibularis. Seta subdentalis long, extending to base of apical tooth, inserted on mid-surface of mola, but lying along the inner surface. Seta interna of 4–6 plumose branches. External surface of mandible smooth, molar margin with or without spines.

*Dorsal surface of head*. Frontal apotome separate from clypeus, labral sclerite 2 isolated, labral sclerites 3 and 4 fragmentary.

*Mentum*. Rather variable in depth of pigment but uniform in structure, with single, shallow-domed median mental tooth, first pair of laterals long, second short, remaining outer four on even line of slope. Ventromental plates slender, broad, gently curved, only narrowly separated medially; striae numerous linear, parallel, fine.

*Body*. Anterior parapods with dense spines, posterior parapods with fewer hooked claws. Procercus large, conical, with strong procercal seta at about mid-point, and 6–9 strong apical setae.

*Remarks*

Five genera are recognized as belonging to the tribe (or if paraphyletic, grade) Pseudochironomini: *Aedokritus, Megacentron, Pseudochironomus, Riethia*, and *Manoa*. The distinction between species of *Riethia* and *Manoa* are becoming more problematic as new species have been described (Fittkau 1963; Andersen and Sæther 1997; Jacobsen and Perry 2002). According to Jacobsen and Perry (2002), diagnostic autapomorphic character states for *Manoa* include: for females, the medially divided floor under the vagina; for pupae, the elongate thoracic horn with characteristic tracheation, and presence of spine-like setae on the anal lobes; and for larvae, the stout, posteriorly curved procerci that arise close together from a posteromedian tubercle. As shown below, the procercus of the larva of

*Riethia truncatocaudata* also is stout, posteriorly curved arising close together from a posteromedian tubercle, rendering this character uninformative for distinguishing *Manoa* from *Riethia truncocaudata*. The distribution of this feature in other *Riethia* species is difficult to verify on slide-mounted material, but where visible, the procerci are separated and do not arise from such a tubercle. In the current understanding, *Riethia* and *Manoa* cannot be separated on external morphology on either the male or larva alone: the spine-like pupal anal lobe setae remain characteristic. A further complication is the presence of *Pseudochironomus* in South America: apparently these larvae conform to the generic diagnosis provided in Pinder and Reiss (in Wiederholm, 1983).

## Species treatment

***Rietha truncatocaudata* (Edwards, 1931)** (Figures 1 – 22)

*Pseudochironomus truncatocaudata* Edwards, 1931: p. 309.
*Riethia truncatocaudata* (Edwards); Freeman, 1959: p. 422.
*Pseudochironomus melanoides* Edwards, 1931: p. 310. **Syn. n**.
*Riethia melanoides* (Edwards); Freeman, 1959: p. 422.

*Material examined*. Holotype ♂ (slide), 2♂ ♂ paratypes, *Pseudochironomus truncatocaudata*: Chile, Llanquihue, Puerto Monte, 24.xii.1926, ♀, Chile, Llanquihue, Casa Pangue, 1 ♂ Chile, Chiloe, Ancud; *leg*. F. & M. Edwards, B.M. 1927–63 (BMNH).
Holotype ♂ pinned, micropreparation of hypopygium, 2♂ ♂, 1 ♀, paratypes, *Pseudochironomus melanoides*, Argentina, Bariloche, 1.xii.1926, *leg*. F. & M. Edwards, B.M. 1927–63 (BMNH).

*Material used for descriptions*. 1 ♂ with Pe, ♂, 2 ♀ ♀ with Pe, 1 P with Le, and 3 L, P ♂, all slide-mounted in Euparal, Brazil, São Paulo, Pirassununga, CEPTA, 47°22′00″S 21°55′35″W & 47°24′00″S 21°57′30″W, 24.v.2000, *leg*. S. Trivinho-Strixino (LEA-UFSCar). 9 Pe (2 slides), Argentina, Rio Negro, San Carlos de Bariloche, Lago Nahuel Huapi, Puerto Blest, 41°01′S 71°50′ W, 2.i.1997, *leg*. P.S. Cranston (BMNH). 1 ♂, Chile, Chiloe, Los Lagos, Rio Puntra, 31.i.1986 *leg*. M. Spies (ZSM); 1 Pe, 2 L (3rd i.), Chile, X region, P.N. Alerce Andina, Correntosa section, Rio Chamiza, 41°08′ 38″S 72°24′ 07″W, 19.ii.2006, *leg*. P.S. Cranston (BMNH).

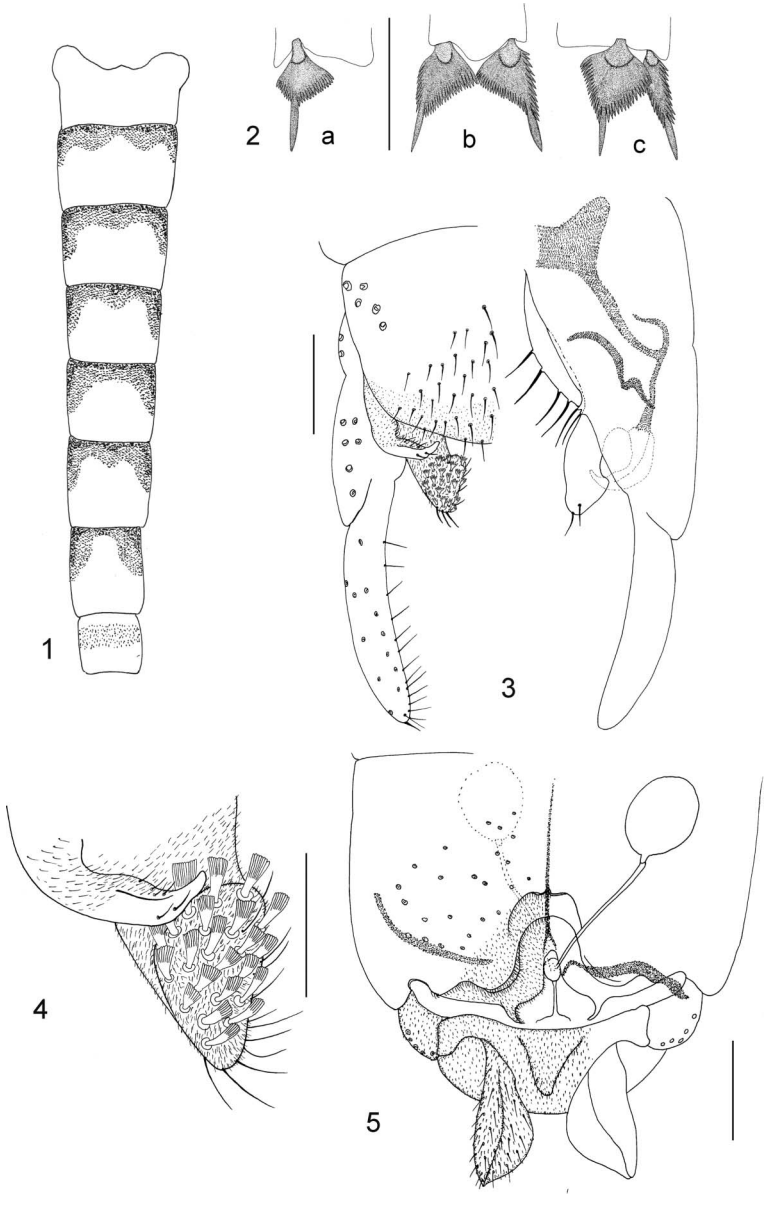
*Male* ($n = 2$, except when otherwise stated)

Total length about 5.5 mm. Wing 2.5 mm long and 0.73–0.78 mm wide.

*Colour*. Head yellowish-brown, third and fourth palpomere, and antennae brownish. Abdomen yellowish-brown with dark brown marks (Figure 1). Legs yellowish brown; fore tibia with proximal and distal brown band; tarsomeres 1 to 4 with distal brown band; tarsomere 5 brownish. Median and hind legs with the same but lighter bands.

*Head*. AR 2.0. Apical (13th) flagellomere 837–862 $\mu$m long. Temporals 30–37. Tentorium 240 $\mu$m long. Clypeus with 18–21 setae. Length of palp segments 2–5 ($\mu$m): 81–87; 218–225; 237–243; 337–356.

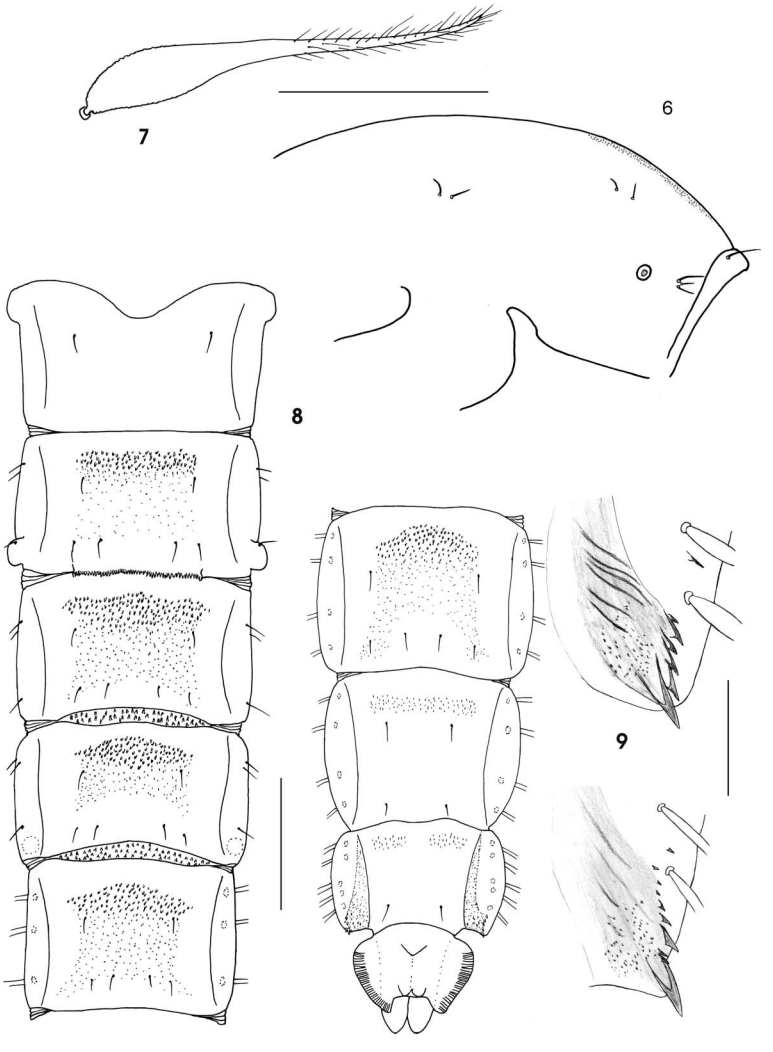
*Thorax*. Antepronotal lobes reduced, separated medially, each lobe with 5 lateral setae. Thorax chaetotaxy: acrostichals 14–15, dorsocentrals 15–16, prealars 4, scutellars 24.




Figures 1–5. *Rietha truncatocaudata* (Edwards, 1931), adult. (1) Dorsal abdomen, (2) tibial spurs (a) fore, (b) mid, (c) hind, (3) male genitalia (left: dorsal, right: ventral), (4) apex of superior and inferior volsella, (5) female genitalia (ventral). Scales: Figures 2, 3, 5 = 100 $\mu$m, Figure 4 = 50 $\mu$m.

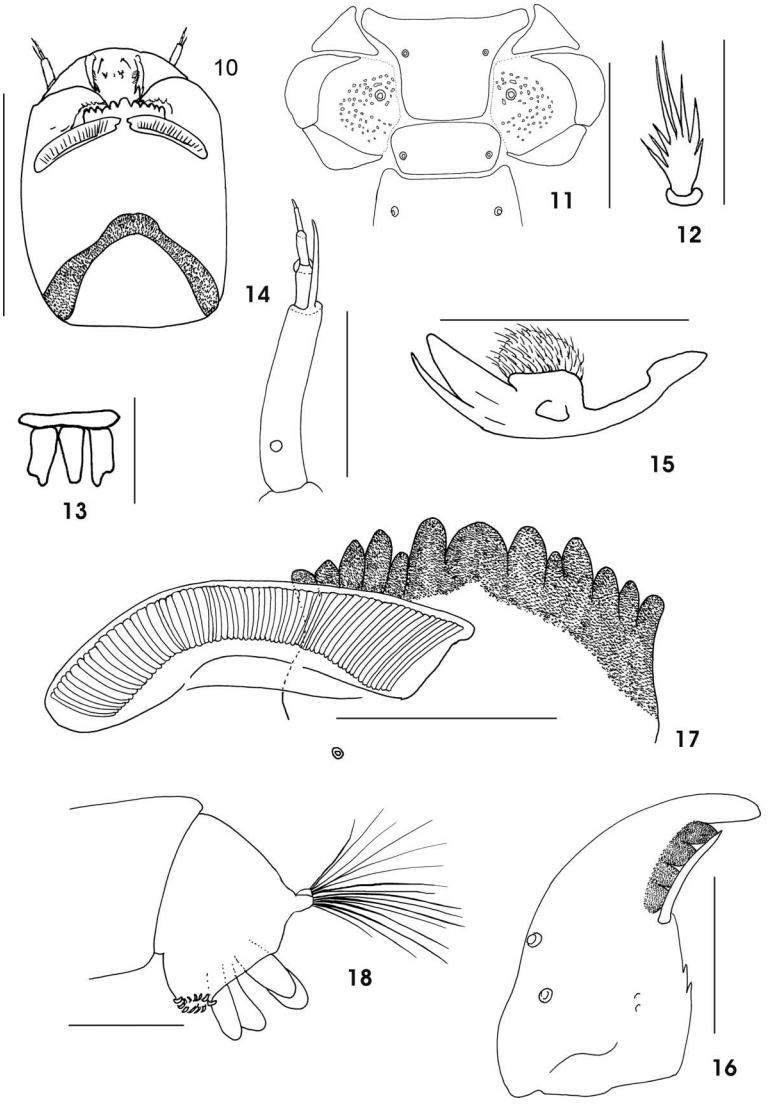
*Wing*. VR 1.04. Brachiolum without setae. R with 16; $R_1$ with 8–10; $R_{4+5}$ with 11, remaining veins bare. Squama 22–27 setae.

*Legs*. Lengths ($\mu$m) and proportions of legs as in Table 1. Mid and hind leg spurs paired, subequal in length. Tibial spur lengths ($\mu$m) (Figure 2): front 64–73; middle 75–76, hind 75–84.




Figures 6–9. *Rietha truncatocaudata* (Edwards, 1931), pupa. (6) Cephalothorax, (7) thoracic horn, (8) abdominal tergites, (9) posterolateral spurs on VIII, variants. Scale: Figures 6, 7 = 1000 $\mu$m; Figure 8 = 500 $\mu$m; Figure 9 = 100 $\mu$m.

*Hypopygium (Figures 3 and 4)*. Tergite IX truncate, without anal point or median longitudinal seta-free band, with 50–55 small setae. Laterosternite IX with 3–6 setae. Transverse sternapodeme 83–106 $\mu$m long. Phallapodeme 112–126 $\mu$m long. Gonocoxite 198–215 $\mu$m long; inferior volsella bent almost at right angles in middle, with about 20 flattened and apically fringed setae (Figures 4, 21, 22); superior volsella curved, digitiform, apically pointed, 66–70 $\mu$m long; median volsella recognisable as a swollen tubercle, bearing 1–2 stout setae. Gonostylus 181–190 $\mu$m long well delimited from gonocoxite, slightly curved, somewhat slender at base and slightly wider medially, narrowed with apical seta that is more stout than other setae on subapex and median margin of gonostylus. HR 0.82–0.84.




Figures 10–18. *Rietha truncatocaudata* (Edwards, 1931), larva. (10) ventral head, (11) frontal apotome and labral sclerites, (12) S1 seta of labrum, (13) pecten epipharyngis, (14) antenna, (15) premandible, (16) mandible, (17) mentum, (18) posterior abdomen. Scale: Figures 9, 17 = 500 $\mu$m; Figure 11 = 25 $\mu$m; Figure 12 = 50 $\mu$m; others = 100 $\mu$m.

*Female* ($n = 2$)

Total length 4.5–4.9 mm. Wing length 2.5–2.7 mm. Colour as in male but darker and with dark markings more extensive. Legs as male.

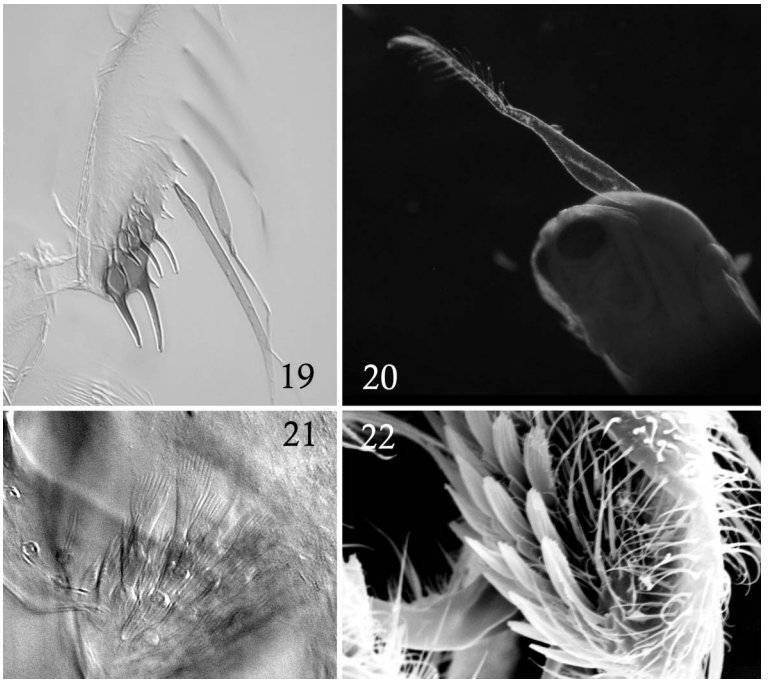
*Head*. Antenna length ($\mu$m): 518. AR 0.40. Tentorium 276 $\mu$m long. Temporals 24–29. Clypeus with 27–31 setae. Length of palp segments 2–5 ($\mu$m): 81–87; 206–225; 256–281; 343 (1).

*Thorax chaetotaxy*. Acrostichals 16, dorsocentrals 19, prealars 7, scutellars 24.

*Wing*. VR 1.05–1.11. Brachiolum with 0 setae. R with 22–23; $R_1$ with 19–20; $R_{4+5}$ with 23–26, remaining veins bare. Squama with 24–26 setae.

*Legs*. Lengths ($\mu$m) and proportions of legs as in Table 2. Mid and hind leg spurs paired, subequal in length. Tibial spur lengths ($\mu$m) front 66–69; middle 73–75, hind 72–81.

*Genitalia* (Figure 5) (1): Gca VIII strong, rounded posteriorly. S VIII bearing 28–29 setae irregularly distributed at each side, does not form floor ventral to the vagina.




Figures 19–22. *Rietha truncatocaudata* (Edwards, 1931), pupa. (19) Posterolateral segment VIII ('comb'), (20) thoracic horn. Male genitalia, scale-like setae of inferior volsella, (21) AutomontageTM photograph, (22) scanning electron micrograph.

Table 1. Lengths ($\mu$m) and proportions of male legs of *Riethia truncatocaudata*.

| | fe | ti | $ta_1$ | $ta_2$ | $ta_3$ | $ta_4$ | $ta_5$ | LR |
|---|---|---|---|---|---|---|---|---|
| $L_1$ | 1107–1123 | 1292–1353 | 1353–1400 | 523–600 | 476–492 | 430–476 | 230–246 | 1.03–1.04 |
| $L_2$ | 1200–1323 | 1261–1292 | 723–769 | 323–338 | 261–276 | 169–184 | 123–138 | 0.57–0.59 |
| $L_3$ | 1323–1338 | 1415–1430 | 969–1000 | 476 | 384–400 | 246 | 123–138 | 0.68–0.69 |

Table 2. Lengths ($\mu$m) and proportions of female legs of *Riethia trucatocaudata*.

| | fe | ti | $ta_1$ | $ta_2$ | $ta_3$ | $ta_4$ | $ta_5$ | LR |
|---|---|---|---|---|---|---|---|---|
| $L_1$ | 1076–1169 | 1200–1384 | 1261–1415 | 523–600 | 446–523 | 430–492 | 215–276 | 1.02–1.05 |
| $L_2$ | 1292–1446 | 1246–1369 | 661–754 | 323–338 | 246–261 | 169 | 123 | 0.53–0.55 |
| $L_3$ | 1230–1400 | 1353–1507 | 876–1046 | 430–492 | 384–415 | 200–230 | 123–153 | 0.64–0.69 |

GPVIII as in Figure 5. Tergite IX with 5 setae. Seminal capsule 96 $\mu$m long and 73 $\mu$m wide, collar-like neck 10 $\mu$m long. Spermathecal ducts without loops. Notum 200 $\mu$m long. Coxosternapodeme IX 155 $\mu$m long. Cercus 165 $\mu$m long.

*Pupa* (n = 3, except when otherwise stated)

Abdomen total length 4.7–5.1 mm. Colouration (exuviae): cephalothorax brownish; abdomen weakly infuscate, lateral junctions of intersegmental membranes conjunctives preferred brownish on I/II, II/III, III/IV, IV/V; lateral margins of tergites V–VIII with a brown longitudinal apophysis (stripe) which becomes progressively broader posteriorly.

*Cephalothorax (Figure 6)*. Antennal sheath usually with minute pearl row above pedicel. Frontal setae and cephalic tubercles absent. Frontal warts not discernible. Thoracic horn elongate, near 2 mm, widest at base and gradually tapering to the apex, with spicules at the middle distal portion (Figures 7 and 20). Basal ring as Figure 7. Antepronotal seta 1; precorneal setae 3; dorsocentral setae 4. Distance between $Dc_1$ and $Dc_2$ 3 $\mu$m; between $Dc_2$ and $Dc_3$ 500–555 $\mu$m; between $Dc_3$ and $Dc_4$ 3 $\mu$m (1).

*Abdomen (Figure 8)*. Tergite I bare; II–VI with anterior transverse band of strong shagreen connecting with anterior longitudinal creases; VII with diffuse anterior field of small fine points; VIII with two anterior fields of small scattered points. Hooklets continuous occupying about 1/2 width of the segment II. Conjunctives III/IV and IV/V with anteriorly recurved hooklets. Pedes spurii A and B present. Anal comb somewhat variable, usually with 5–6 marginal teeth and several ventral short teeth (Figures 9, 19). Abdominal setation: S I without L setae; S II–IV with 3 L setae, S V with 3 taeniae, S VI–VII with 4 taeniae. S VIII 5 with taeniae. About 60 taeniate fringe setae in multiple rows at each anal lobe. Genital sac 418 $\mu$m long (1); anal lobe 280–335 $\mu$m long.

*4$^{th}$ instar larva* (n = 3)

Head capsule yellowish with mandibular tips, mentum and occipital margin brownish. Ventral head 230–245 $\mu$m long.

*Head (Figure 10)*. Antenna as in Figure 14; lengths of antennal segments ($\mu$m): 92–103, 18–23, 16–18, 9–12, 4–6. AR 1.7–1.9. Lauterborn organs moderate lengthed, (8–12 $\mu$m), reaching middle of 3$^{rd}$ segment. Blade 53 $\mu$m long (1), not surpassing segment 5. Dorsal sclerites of head as in Figure 11. Labrum SI plumose (Figure 12), arising from common base; SII narrow, apically plumose. Pecten epipharyngis composed of 3 digitiform plates (Figure 13). Seta premandibularis simple; premandible 86–96 $\mu$m long, bifid, with brush (Figure 15). Mentum 155–170 $\mu$m width, with rounded median tooth and 5 pairs of lateral teeths, 2$^{nd}$ lateral tooth smaller than 1$^{st}$ and 3$^{rd}$. Ventromental plates almost touching medially, width 180–200 $\mu$m (Figure 17). Mandible (Figure 16) 175–180 $\mu$m long; dorsal tooth and pecten mandibularis absent; apical tooth pale; 4 inner teeth darkened. Outer margin smooth; mola with 2 spines; seta subdentalis 37–38 $\mu$m long, slender, curved, inserted on dorsal side of mandible, seta interna with 2 major trunks, each extensively branched.

*Body*. Without conspicuous setae. Long claws of anterior parapods smooth, short claws with a few minute inner teeth. Lateral tubules absent. Procerci (Figure 18) arise close together from broad base overhanging segment XIII; digitiform, posteriorly curved, with 15 setae. Anal tubules blunt, 300 $\mu$m long.

*Diagnosis*

Males of *Riethia truncatocaudata* can be distinguished from other *Riethia* species (described and formally undescribed) by the combination of banded legs and possession of the flattened, apically fringed setae on the inferior volsella. Australian taxa including *R. zeylandica*, one undescribed species from East Australia ('split-hook row' type, and one undescribed species from northern tropical Australia ('kakadu type') (Cranston 2000) that have similar pectinate setae have unbanded legs. Further differences include the bent-shaped inferior volsella with higher number of flattened and fringed setae apically, and the sickle-like superior volsella. At this stage we are unable to diagnose the female pending study of Australasian species. The pupa and larva of *R. truncatocaudata* resemble those of 'typical' *R. zeylandica* illustrated by Cranston (2000), but differ in the arrangement posterolateral spurs of VIII in the pupa, and in the larval with antennal blade not surpassing segment 5, the dorsal sclerite I being rectangular, and the apical mandibular tooth light.

*Comments*

The pupal exuviae designated as 'Gattung 16' by Ospina-Torres (1992) from Igarape in the Brazilian Amazon conform to this generic diagnosis for *Riethia*, but are not conspecific with *R. truncatocaudata*. The thoracic horn is long and tapering, but without any setae. Wiedenbrug's (2000) pupa exuviae from Rio Grande do Sul in south-eastern Brazil, identified as a putative member of *Riethia*, also conforms well with the generic diagnosis above and is not conspecific with *R. truncatocaudata* based on the apparent absence of hairy spinules on the (mostly obscured) thoracic horn and the weaker spinules on the anterior of each tergal segment. In this regard the specimen and 'Gattung 16' more closely resemble Australiasian taxa than does *R. truncatocaudata*. Evidently besides the rather widespread *R. truncatocaudata* there are at least two other species clearly allocated to *Riethia* present in the region.

**Ecology and distribution**

In Australasia *Riethia* larvae are found in depositional areas in low order streams, often naturally shaded by riparian vegetation. Records range from New Zealand's temperate North Island, southern New Caledonia, Tasmania and along the eastern margin of Australia to monsoonal tropical Northern Territory, and in temperate southern Western Australia. Larvae of *R. truncatocaudata* occur in habitats characterised by high amounts of fine particle organic matter in both lotic and lenthic systems. Larval guts tend to be filled with rather characteristic discrete boluses of fine particulate organic matter. In Brazil, specimens were collected from shallow-water canals connected to the low-order stream Córrego Barrinha belonging to Mogi-Guaçu River Basin. The artificial canals were constructed to maintaining the water level of pisciculture tanks of the Center of Research in Tropical Fish (CEPTA/IBAMA) at Pirassununga, São Paulo in Brazil. Larvae of *Riethia* have

been found also in two small reservoirs in the same locality (Oliveira 2006). The occurrence of *Riethia truncatocaudata* in Southeastern Brazil expands its distributional records from more temperate environments in Patagonian Chile and Argentina to somewhat warmer environments.

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