



A new species of *Bezzia* Kieffer from Argentina (Diptera: Ceratopogonidae)

GUSTAVO R. SPINELLI, MARÍA M. RONDEROS & CARLA G. CAZORLA

División Entomología, Museo de La Plata, CCT La Plata CONICET, Paseo del Bosque s/n, 1900 La Plata, Argentina.

E-mail: spinelli@fcnym.unlp.edu.ar; ronderos@fcnym.unlp.edu.ar; carlacazorla@fcnym.unlp.edu.ar

Abstract

Bezzia ventanensis Spinelli, a new Neotropical species, is described and illustrated based on pupae and adults. Pupae were collected from muddy water from the edge of a stream margin in Sierra de la Ventana, Buenos Aires province, Argentina. Specimens were carried back to the laboratory and conditioned in vials until adult emergence. This new species is similar to *Bezzia brevicornis* (Kieffer), from which it can be mainly distinguished by the female adult bearing two well developed spermathecae, and by the pupal respiratory organ with 13–15 spiracles.

Key words: *Bezzia ventanensis*, new species, Neotropical, taxonomy

Introduction

The genus *Bezzia* Kieffer is presently known by 313 species worldwide (Borkent, 2011). Borkent & Spinelli (2007), in their catalog of Neotropical Ceratopogonidae, pointed out that this is the most common genus in the tribe Palpomyiini in the region and the second most common predaceous genus after *Stilobezzia* Kieffer. They recorded 46 species, of which 44 were reviewed in a series of papers by Spinelli & Wirth (1989a, 1989b, 1990, 1991).

During a recent entomological survey in the Reserva Natural Parque Provincial Ernesto Tornquist in Sierra de la Ventana, Buenos Aires province, Argentina, a new species of *Bezzia* was collected, which is herein described as adult and pupa.

Material and methods

Pupae were collected with pipette, placing in a white tray muddy water from the edge of a stream margin. Specimens were carried back to the laboratory and they were conditioned in vials, individually, with a drop of water. Observations were done daily, until adult emergence.

Pupae exuviae were slide-mounted in Canada balsam following the technique described by Borkent and Spinelli (2007). Photomicrographs were taken with a digital camera Micrometrics SE Premiun, through Nikon Eclipse E200 microscope. Ink illustrations were drawn with a camera lucida.

For pupal terminology see Borkent and Craig (2001), and the Manual of Central America Diptera (Brown et al., 2009) for adults. Type material is deposited in the Museo de La Plata, Argentina (MLPA).

Results

Bezzia ventanensis Spinelli, n. sp.

(Figs. 1–25)

Diagnosis. The only species of Neotropical *Bezzia* in which male and female adults have short palpus, 0–1 spines on fore femur, and lacks distinct leg markings, the female has two well developed spermathecae, and the apex of

the male parameres is pointed. Pupa: very similar to *B. brevicornis* from which it can be mainly distinguished by the presence of 13–15 spiracles (23–25 in *B. brevicornis*).

Description of male adult (Figs. 1–3, 24–25). Similar to female with usual sexual differences. Interocular space with 4 setae; antenna and palpus as in Fig. 1; AR (11–13/1–10) 0.55–0.60 (0.58, $n = 4$). Hind tarsal ratio 1.82–2.20 (2.07, $n = 4$). Wing (Fig. 2) length 1.32–1.40 (1.36, $n = 4$) mm; width 0.50–0.52 (0.51, $n = 4$) mm; CR 0.74–0.76 (0.75, $n = 4$). Genitalia (Fig. 3): tergite 9 reaching distal level of gonocoxites, cercus stout, rounded; sternite 9 0.25 as long as wide, with very shallow posteromedian excavation. Gonocoxite stout, tapering distally, nearly twice as long as wide; gonostylus 0.5 as long as gonocoxite, deeply curved hook-like, tip pointed. Parameres (Fig. 24) elongate, anterolateral plates bilobed; distal process slightly narrowing mesally, distal 1/4 with fine pubescence, tip pointed. Aedeagus (Fig. 25) triangular, as long as basal width; basal arch low, extending to 4/5 of total length; lateral arms slender, tapering to blunt tip; ventral surface spiculate distally.

Female adult (Figs. 4–8). Head (Fig. 4). Dark brown. Eyes bare, separated medially by width of about 3–4 ommatidia, with 11–14 setae on interocular space. Antenna (Fig. 4) dark brown, base of flagellomeres pale; scape with 1–2 setae; AR 0.86–1.00 (0.93, $n = 3$). Palpus (Fig. 5) dark brown; third segment short with few sensilla on inner margin; PR 1.57–1.86 (1.67, $n = 3$). Proboscis short, 0.3 times width of head. Mandible (Fig. 5) with 7–8 stout teeth.

Thorax (Fig. 6). Dark brown, scutum with narrow longitudinal paler lines, humeral areas paler; small anterior spine present; 4 prealar setae, one postalar; scutellum dark brown, with 6 setae. Legs brownish, hairy; fore, mid femora, fore tibia with inconspicuous, narrow pale rings, fifth tarsomeres dark brown; fore femur with 0–1 ventral spines; hind tibial comb with 7 slender spines; pair of black apical spines on tarsomeres 1–3 of mid leg; ventral palisade setae absent on tarsomere 1 of fore leg; in one row on tarsomeres 1–2 of mid leg and tarsomeres 3 of hind leg, in two rows on tarsomeres 1–2 of hind leg; hind tarsal ratio 2.27–2.33 (2.30, $n = 3$); fourth tarsomere of each leg cordiform; tarsal claws of each leg small, equal, each with short basal tooth. Wing (Fig. 7), length 1.84–2.14 (2.01, $n = 3$) mm; width 0.66–0.87 (0.75, $n = 3$) mm; CR 0.81–0.85 (0.83, $n = 3$); membrane slightly infuscated; veins pale brown except M dark brown; M narrowly sessile. Halter dark brown.

Abdomen. Pale brown except pleurae dark brown. Sternite 8 sclerotized as in Fig. 8, with tuft of setae anterior to sclerotization. Allotype and one paratype without gland rods, remaining paratype with single, lightly sclerotized pair of glands rods arising from anterior portion of tergite 6 and extending through segment 5. Two ovoid, strongly sclerotized, unequal spermathecae with short necks (Fig. 8), measuring 114–144 (129, $n = 3$) by 85 ($n = 3$) μm , 92–107 (104, $n = 3$) by 70–74 (71, $n = 3$) μm ; third rudimentary spermatheca present.

Female pupa (Figs. 9–18, 21–23). Total length 4.33–4.76 (4.55, $n = 2$) mm. Cephalothorax length 1.50–1.64 (1.57, $n = 2$) mm; width 0.98–1.13 (1.05, $n = 2$) mm. General coloration uniformly brown. Exuviae pale brown, body surface smooth. Operculum (Fig. 10) with disc wider than long; anterior margin pointed with single row of rounded tubercles; surface mostly smooth with mesal V-shaped band of spicules; dorsomedial area small, wrinkled; each side of mesal portion with wrinkled raised areas; anteromarginal (am) seta (Fig. 10) single, thin, long, located on rounded small tubercle, with pore at tubercle base; posterior margin slightly concave, smooth, only small spicules on mesal portion, OL 0.20 ($n = 2$) mm, OW 0.23–0.26 (0.245, $n = 2$) mm; OW/OL 1.15–1.30 (1.22, $n = 2$) mm. Thorax surface smooth, with mesal soft crest extending between bases of respiratory organs. Two stout, hyaline, anterodorsal seta on rounded tubercles (ad), one medium-sized, other short (Figs. 12–13, 21); one stout, medium-sized, dorsolateral seta (dl) (Fig. 21); 2 dorsomedian setae (dm), one long, thin, other short (Fig. 21); 6 dorsal sensillae (d) (Fig. 11): i, ii, iv elongate, thin setae, iii, v–vi pores. Respiratory organ (Figs. 9, 12) pale brown, short, about 5 times longer than broad, distal 1/3 darker, with 13–15 spiracles, length 0.19–0.25 (0.22, $n = 2$) mm; pedicel very short, not measurable (Fig. 12). Two long, thin ventromedian setae (vm) (Fig. 15); one short, thin ventrolateral seta (vl), associated pore (Fig. 14). Abdominal segments with dark spots; surface with scattered small spinules; tubercles short with single apex, some of them triangular-shaped. First abdominal segment (Figs. 9, 16, 22) with setae as follows: 2 thin anterior setae, one medium-sized, other long, both on rounded tubercle; 3 lateral setae on two tubercles, one seta long, thin, other short, thin, remaining short, stout; one mesal pore; 2 posterior setae, i very short, iv medium-sized, ii–iii pore. Fourth abdominal sensillar pattern (Figs. 9, 17, 23) as follows: 2 dorsal anterosubmarginal (d.a.s.m.): i, with short, thin seta on stout tubercle, ii with medium-sized, thin setae on small tubercle; 4 dorsal posteromarginal (d.p.m.) sensillae: i, minute seta, iii, iv pore, v medium-sized seta; one lateral anterosubmarginal (l.a.s.m.) short, hyaline seta on small tubercle; 3 lateral posteromarginal (l.p.m.) short, hyaline setae: i, iii on strong, raised base, ii small tubercle on small base; 3 ventral posteromarginal (v.p.m.): i, iii,

short, hyaline setae on very small tubercle, ii longer, thinner than others. Anal segment (Figs. 9, 18) with dorsal surface with posteriorly directed spicules, extending to apicolateral processes. Apicolateral processes (Fig. 18) moderately short, nearly straight, base wide, extreme tip darkish, each with tuft of small, dark setae; length 0.32–0.34 (0.33, n = 2) mm, width 0.16–0.26 (0.21, n = 2) mm, apicolateral process length 0.11–0.13 (0.12, n = 3) mm.

Male pupa (Figs. 19–20). Similar to female with usual sexual differences; total length 4.01–4.40 (4.20, n = 2) mm. Operculum (Fig. 19) with stouter, rounded spicules, OL 0.208–0.223 (0.215, n = 2) mm; OW 0.223–0.238 (0.230, n = 2) mm. Respiratory organ length 0.24–0.26 (0.25, n = 2) mm. Anal segment (Fig. 20) length 0.342 (n = 2) mm, width 0.22–0.25 (0.235, n = 2) mm, apicolateral processes length 0.11–0.13 (0.12, n = 2) mm (Fig. 20).

Type material. Holotype male with pupal exuviae, labeled “Holotype *Bezzia ventanensis* Spinelli, Argentina, Buenos Aires, Sierra de la Ventana, Reserva provincial Tornquist, arroyo de la Clausura, 38° 02' 46.1" S, 61° 59' 10.1" W, 4/7-XII-2007, P. Marino-C. Cazorla, Malaise trap (MLPA)”; allotype female with pupal exuviae, same data except 520 m, 12-XII-2010, A. Siri, collected as pupa and reared in laboratory (MLPA). Other paratypes, 3 males, 2 females, as follows: same data as holotype, 1 male, 1 female (MLPA); same data except 21-III-2007, 2 males, 1 female (with pupal exuviae), C. Cazorla, collected as pupa and reared in laboratory (MLPA).

Distribution. Known only from the type-locality.

Bionomics. The pupa of this new species was collected in the same place as *Parabezzia balseroi* Spinelli & Grogan. *Bezzia ventanensis* completes its development in 8 days when placed in cotton-stopper vials individually, at a lab T 22°C–26°C (24° C, n = 4).

Taxonomic discussion

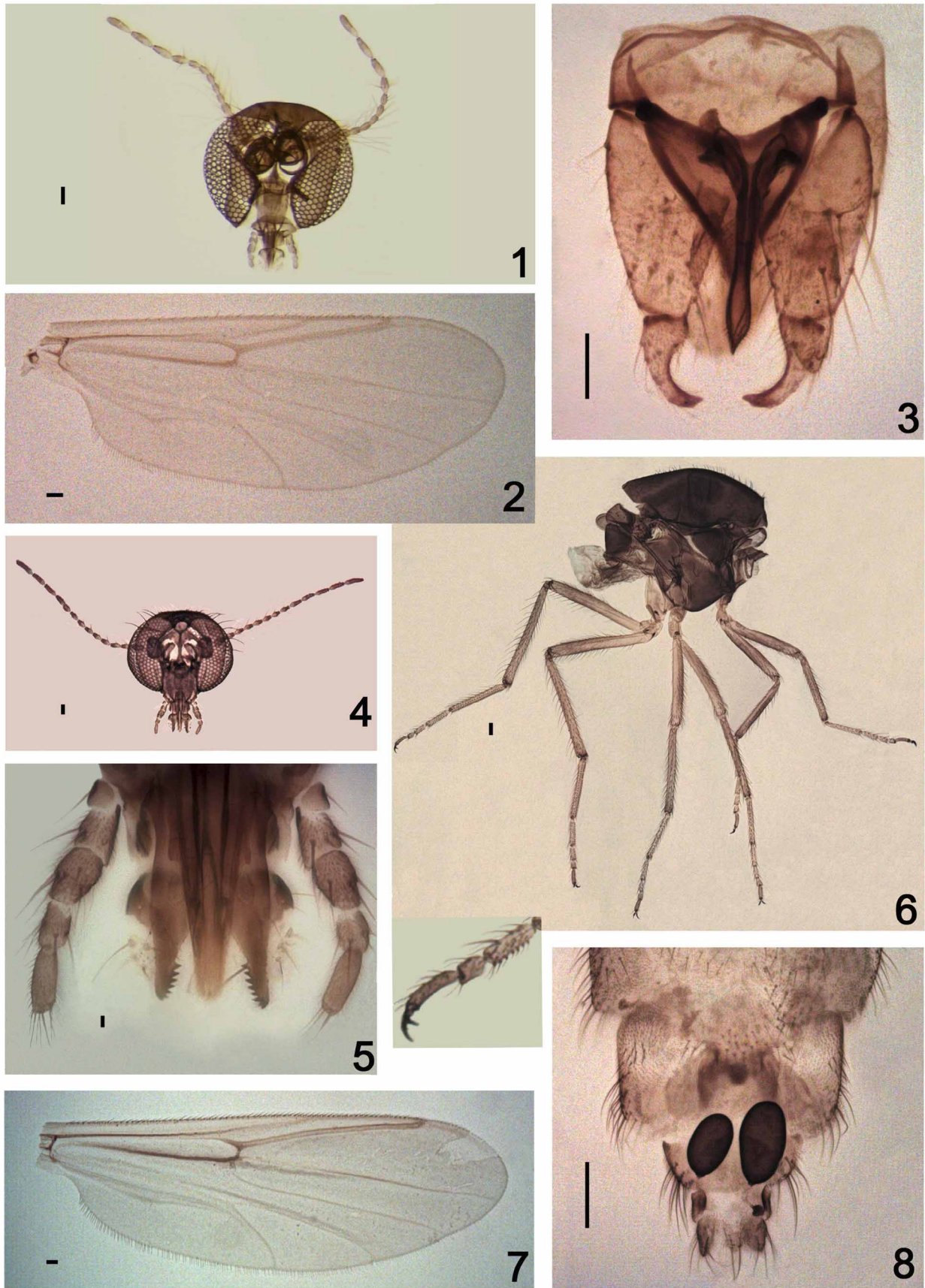
Spinelli & Wirth (1991), in their last paper of the series of contributions reviewing the Neotropical *Bezzia*, recognized the *gibbera*, *nobilis* and *punctipennis* groups within the subgenus *Bezzia* (*Bezzia*) Kieffer, and the *dentifemur*, *glabra*, *venustula* and *brevicornis* groups within the subgenus *Bezzia* (*Homobezzia*) Macfie. Nevertheless, the groups recognition was performed within a phenetic framework, with most of the chosen characters (e.g., presence/absence of setae, legs coloration, presence of one or two well developed spermathecae) clearly susceptible to homoplasy. A cladistic analysis is needed in order to propose a phylogenetic classification of the genus.

This new species could be placed in the *brevicornis* group except for the presence of two well developed spermathecae. However, due to the weakness of the groups recognition referred above, we have decided not to place *B. ventanensis* in any of the already described groups.

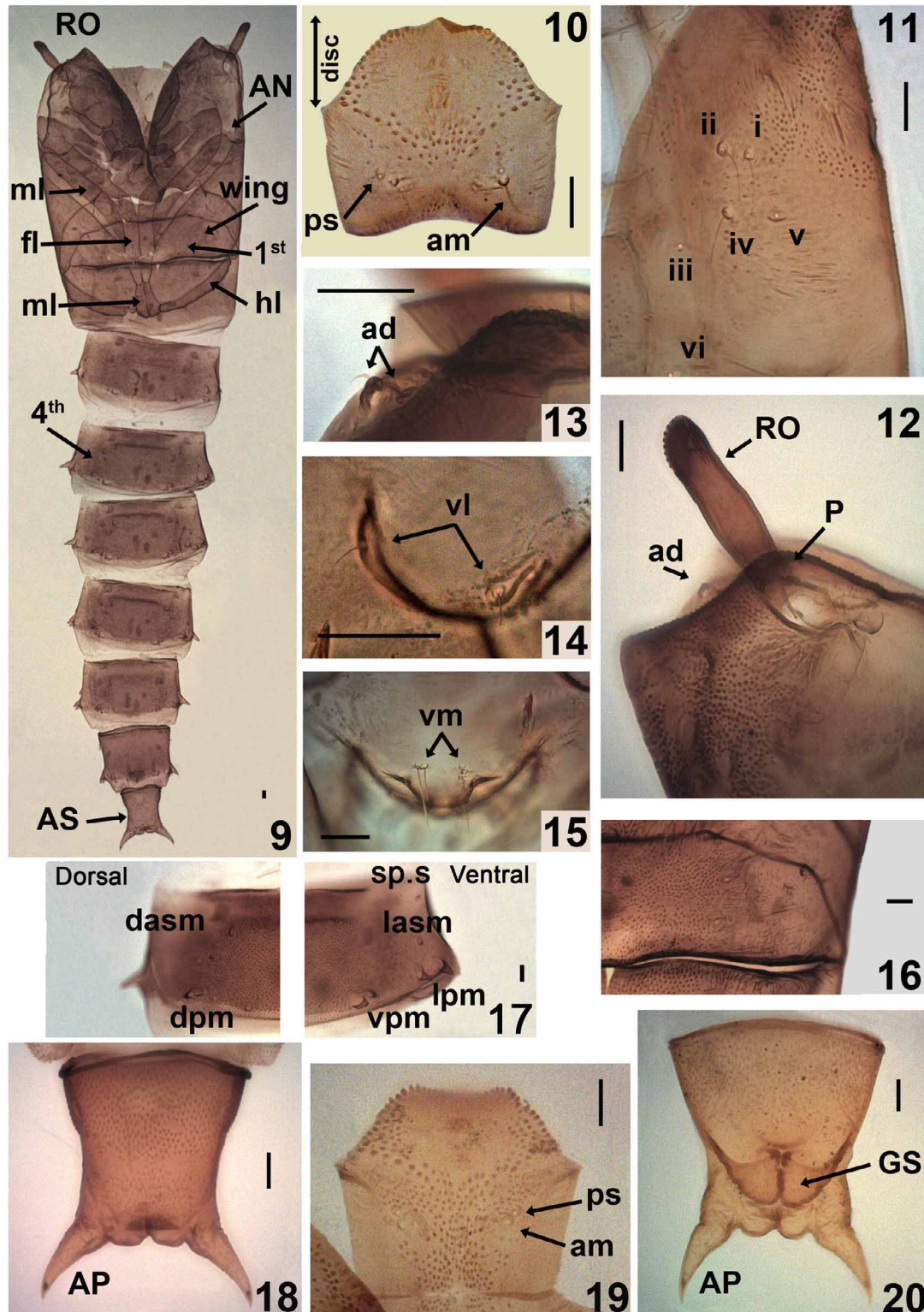
The adult of *Bezzia ventanensis* is very similar to *Bezzia brevicornis* (Kieffer). However, the latter species exhibits a larger third palpal segment (female PR 2.00–2.90), the scutum is entirely dark brown, and the anterior spine is absent. The female has 3–5 elongate gland rods and a single well developed spermatheca, and the apex of the distal process of the male parameres is rounded, lacking pubescence.

The pupa of *B. brevicornis* was incompletely described by Spinelli (1983) based on three pupal exuviae, one male and two females, associated with adults. During the present study these exuviae were re-examined together with one male and 4 females from Uruguay, and they also resemble the pupa of *B. ventanensis* herein described. However, *B. brevicornis* is longer and darker, the respiratory organ is stouter and bears 23–25 spiracles, the operculum is covered with stouter spicules and the am seta is longer and stouter. Other observed differences, those related with presence/absence of some tubercles and setae, as well as their different length and shape, are: the cephalothorax bears 3 hyaline dorsomedian setae, two very elongate and one medium-sized; the ventrolateral seta is elongate and hyaline. The first abdominal segment bears 2 elongate, hyaline anterior setae, and 3 lateral setae, one basiconica, one elongate and hyaline, and the remaining one stout and medium-sized. Finally, the dorsal posteromarginal seta iv of the fourth abdominal segment is hyaline, elongate and thin.

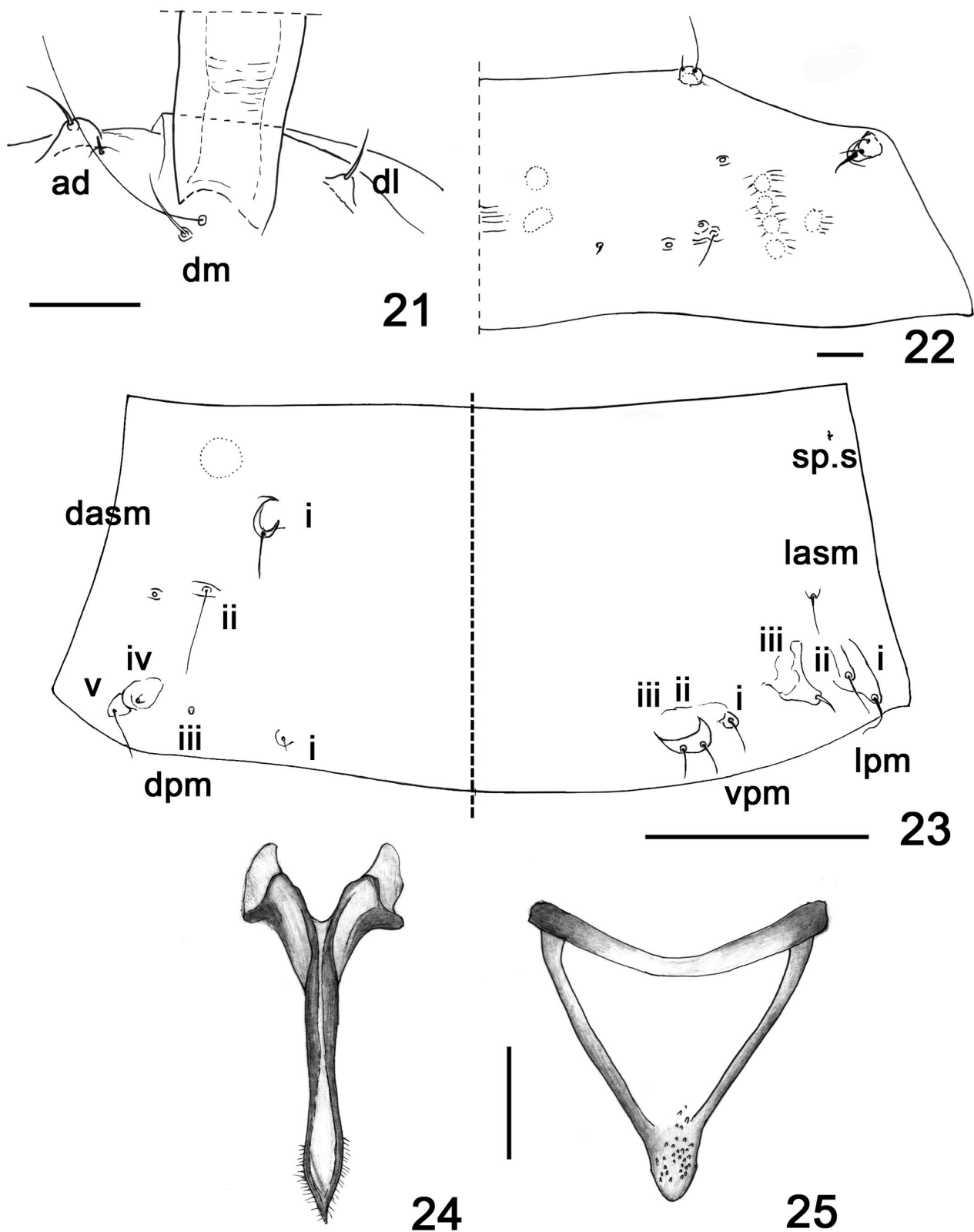
The pupa of this new species exhibits features typical of ceratopogonids inhabiting shallow water bodies or sandy bottoms, such as medium-sized respiratory organs and a short anal segment.



FIGURES 1–8. *Bezzia ventanensis* Spinelli, adult—Figs. 1–3: male. Figs. 4–8: female. Figs. 1, 4: head. Figs. 2, 7: wing. Fig. 3: genitalia. Fig. 5: mouth parts. Fig. 6: thorax. Fig. 8: tip of abdomen. Scale bars 0.05 mm.



FIGURES 9–20. *Bezzia ventanensis* Spinelli, pupa—Figs. 9–18: female. Figs. 19–20: male. Fig. 9: entire pupa (ventral view). Figs. 10, 19: operculum. Fig. 11: cephalothorax, dorsal setae (right side). Fig. 12: respiratory organ. Fig. 13: anterodorsal setae. Fig. 14: ventrolateral setae. Fig. 15: ventromedian setae. Fig. 16: 1st abdominal segment (ventral view). Fig. 17: 4th abdominal segment (ventral view). Figs. 18, 20: anal segment (ventral view). Scale bars 0.05 mm. anterodorsal setae (ad); anteromarginal setae (am); antenna (AN); anal segment (AS); apicolateral processes (AP); dorsal anterosubmarginal setae (dasm); dorsal posteromarginal setae (dpm); dorsal sensillae (d); foreleg (fl); genital sac (GS); hindleg (hl); lateral anterosubmarginal seta (lasm); lateral posteromarginal setae (lpm); midleg (ml); pedicel (P); pore at tubercle base (ps); respiratory organ (RO); spiracular scar (sp.s); ventrolateral setae (vl); ventromedian setae (vm); ventral posteromarginal setae (vpm).



FIGURES 21–25. *Bezzia ventanensis* Spinelli—Figs. 21–23: female pupa. Figs. 24–25: male adult. Fig. 21: anterodorsal setae, dorsolateral seta and dorsomedian setae. Fig. 22: detail 1st abdominal segment (ventral view). Fig. 23: detail 4th abdominal segment (ventral view). Fig. 24: parameres. Fig. 25: aedeagus. Scale bars 0.05 mm. anterodorsal setae (ad); dorsolateral seta (dl); dorsomedian setae (dm); dorsal anterosubmarginal setae (dasm); dorsal posteromarginal setae (dpm); lateral anterosubmarginal seta (lasm); lateral posteromarginal setae (lpm); spiracular scar (sp.s); ventral posteromarginal setae (vpm).

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