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Description of a new species of *Prolixus* (Acari: Trombidiformes: Tenuipalpidae) from *Austroderia splendens* (Poaceae) in New Zealand, with discussion of its ontogenetic patterns in chaetotaxy

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Abstract

A new species, *Prolixus splendens* **sp. nov.**, collected from leaves of the grass *Austroderia splendens* (Poaceae) in Auckland, New Zealand, is described and illustrated. Only five species of *Prolixus* have previously been reported, and all were recorded from the genus *Gahnia* (Cyperaceae). In this paper, we present the ontogenetic additions in idiosomal and leg chaetotaxy from larva to adult for the new species. A key to world species of *Prolixus* is also proposed.

Key words: Flat mites, false spider mites, ontogeny, taxonomy, systematics

Introduction

The flat mites of the genus *Prolixus* are tenuipalpids with an elongate, parallel-sided body that is more than four times as long as wide. The genus resembles *Acaricis*, *Cyperacarus*, and *Gahniacarus* (Beard & Ochoa 2011; Beard *et al.* 2012; Mesa *et al*. 2009), which are described from the sedge species in the genus *Gahnia* (Cyperaceae), but can be easily distinguished from other genera by its highly elongated body, 3-segmented palp (4-segmented in *Acaricis*) and the absence of c_1 (present in *Cyperacarus* and *Gahniacarus*). To date, five species of the *Prolixus* have been described: *P. corruginus* Beard, Fan & Walter, 2005 (Australia), *P. forsteri* Beard, Fan & Walter, 2005 (Australia), *P. meyerae* Xu & Zhang, 2014 (New Zealand), *P. nicholasi* Xu, Huang & Zhang, 2017 (New Zealand), and *P. setifolius* Xu, Huang & Zhang, 2017 (New Zealand).

In this paper, we describe and illustrate a new species of this genus, with specimens collected from the leaves of *Austroderia splendens* (Poaceae), a grass species (commonly known as toetoe) native to New Zealand. The ontogenetic development of this new species is examined, and all the life stages and the variations in idiosomal and leg chaetotaxy are also presented. A key to world species of *Prolixus* is also provided.

Material and methods

Leaves of *Austroderia splendens* (Poaceae) were collected and stored in a plastic bag that was brought to the laboratory for examination. Some leaves were cut and preserved in ethanol. Mites were removed from leaves with a fine hair brush and cleared in lactic acid before being mounted in Hoyer's medium. Mite slides were examined at 400x and 1000x with a DIC Leica DM5000B microscope. All measurements in micrometers (μm) were made from slide-mounted specimens using a stage-calibrated ocular ruler. Measurement data are presented for holotype, followed by ranges for paratypes in parentheses. Body size was measured by v_2–h_1 and sc_2–sc_2 (Saito *et al.* 1999). Setal length was measured from the centre

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of the setal base to the tip of the seta; distances between setae were measured as the distance from the centre of one setal base to that of the other. Legs were measured from the basal end of trochanter to the distal end of tarsus (excluding pretarsus). Coxal setae counts exclude *1a*, *3a* and *4a*. Terminology follows Zhang & Fan (2004) and Seeman & Beard (2011) who adapted from Lindquist (1985). We follow our previous studies (Xu & Zhang 2013, 2014; Xu *et al.* 2015, 2017a,b) in describing ontogenetic additions in idiosomal and leg chaetotaxy from larva to adult.

Family Tenuipalpidae

Genus *Prolixus* Beard, Fan & Walter, 2005

Prolixus Beard, Fan & Walter, 2005: 164; Mesa *et al*., 2009: 111; Beard & Ochoa, 2011: 32; Xu & Zhang, 2014: 2; Xu *et al*., 2017b: 1522.

Type species: *Prolixus forsteri* Beard, Fan & Walter, 2005.

Prolixus splendens sp. nov.

(Figs. 1–15**)**

Type specimens. Holotype ♀. New Zealand, Auckland, Muriwai Beach, Maori Bay Car Park, 5 May 2018, by Nicholas A. Martin, ex. *Austroderia splendens* (Poaceae). **Paratypes.** 13 females, 3 males, 12 deutonymphs, 9 protonymphs, 6 larvae, same data as holotype. The holotype and paratypes will be deposited in the New Zealand Arthropod Collection (NZAC), Landcare Research, Auckland, New Zealand.

Adult Female (n=14)

Gnathosoma. (Figs. 1B, 4C) Subcapitulum with setae *m*, or_1 and or_2, subcapitular seta *m* setiform, *m*=13 (13–15), *m–m*=11 (7–11). Palp 3-segmented, setal formula: 0, 2, 2; tarsus with two eupathidia 5 (5–6), 5 (5–6).

Idiosoma. (Figs. 1A) 465 (460–465) long, 105 (105–110) wide. Body elongate, more than 4 times longer than wide. Prodorsum smooth, covered with broken longitudinal striations sublaterally, bearing three pairs of setae (v_2, sc_1 and sc_2), setae v_2 setiform, sc_1 and sc_2 barbed, sc_1 about 4 times as long as v_2. Lengths: v_2 7 (7–8), sc_1 30 (28–31), sc_2 50 (45–50); distances: v_2–v_2 38 (37–40), v_2–sc_1 50 (47–52), sc_1–sc_1 70 (70–74), sc_1–sc_2 38 (38–40), sc_2–sc_2 105 (105–110). Body with broken, corrugated transverse striations between sc_2 and c_3; smooth mesally between c_3 and c_3, and broken oblique striae laterally; and broken transversal striae between d_1 and d_1; and posterior to d_1 smooth and broken longitudinal striae laterally. Bearing one pair of humeral setae (c_3), 2 pairs of dorsocentral setae (d_1 and e_1), and 6 pairs of dorsolateral setae (d_3, e_3, f_2, f_3, h_2 and h_1). All setae barbed, except h_2 elongate, ending in minute club. Setae d_1 and e_1 subequal in length. Lengths: d_1 13 (13–14), e_1 14 (13–15), c_3 33 (27–33), d_3 15 (10–15), e_3 32 (30–33), f_2 36 (33–36), f_3 37 (33–37), h_2 135 (125–135), h_1 37 (28–37); distances: d_1–d_1 40 (40–47), e_1–e_1 36 (36–39), c_3–c_3 105 (105–135), d_3–d_3 85 (85–92), d_3–e_3 140 (135–140), e_3–e_3 85 (85–97), e_3–f_2 25 (25–27), f_2–f_2 77 (77–90), f_2–f_3 21 (21–23), f_3–f_3 62 (62–67), f_3–h_2 22 (18–25), h_2–h_2 35 (35–45), h_2–h_1 12 (12–15), h_1–h_1 12 (12–15).

Venter. (Figs. 1B, 2) Venter with fine broken transverse striation between coxa II and III, broken longitudinal striae between coxa III and IV, longitudinal and oblique striae posterior to g_1. All coxal setae setiform, except for setae *1a*, *1b*, $4a_1$ and $4a_2$ flagelliform. Lengths: *1a* 140 (105–140), *1b* 50 (50–75), *1c* 19 (18–21), *2b* 30 (28–31), *2c* 30 (28–31), *3a* 20 (20–26), *3b* 17 (17–25), $4a_1$ 75 (75–88), $4a_2$ 82 (82–87), *4b* 15 (15–23). Distances: *1a–1a* 12 (12–13), *3a–3a* 15 (15–18), $4a_1$–$4a_1$ 6 (6–7), $4a_1$–$4a_2$ 7 (6–7), $4a_2$–$4a_2$ 17 (15–17). Genital and ventral plates with flap of cuticle (Figs. 1B, 2), bearing two pairs of setiform gential setae (g_1 and g_2). Anal plate with two pairs of pseudanal setae (ps_1 and ps_2), setiform and subequal in length. Setal lengths: *ag* 17 (17–20), g_1 22 (22–24), g_2 17 (17–22), ps_1 24 (20–24), ps_2 11 (8–11); distances: *ag–ag* 22 (15–22), g_1–g_1 22 (20–22), g_1–g_2 21 (15–21), g_2–g_2 33 (33–35), ps_1–ps_2 26 (26–28).

Spermatheca. (Fig. 2) A short, narrow, unsclerotised tube extending from genital opening and ending in a bulbiform vesicle with minute spinules.

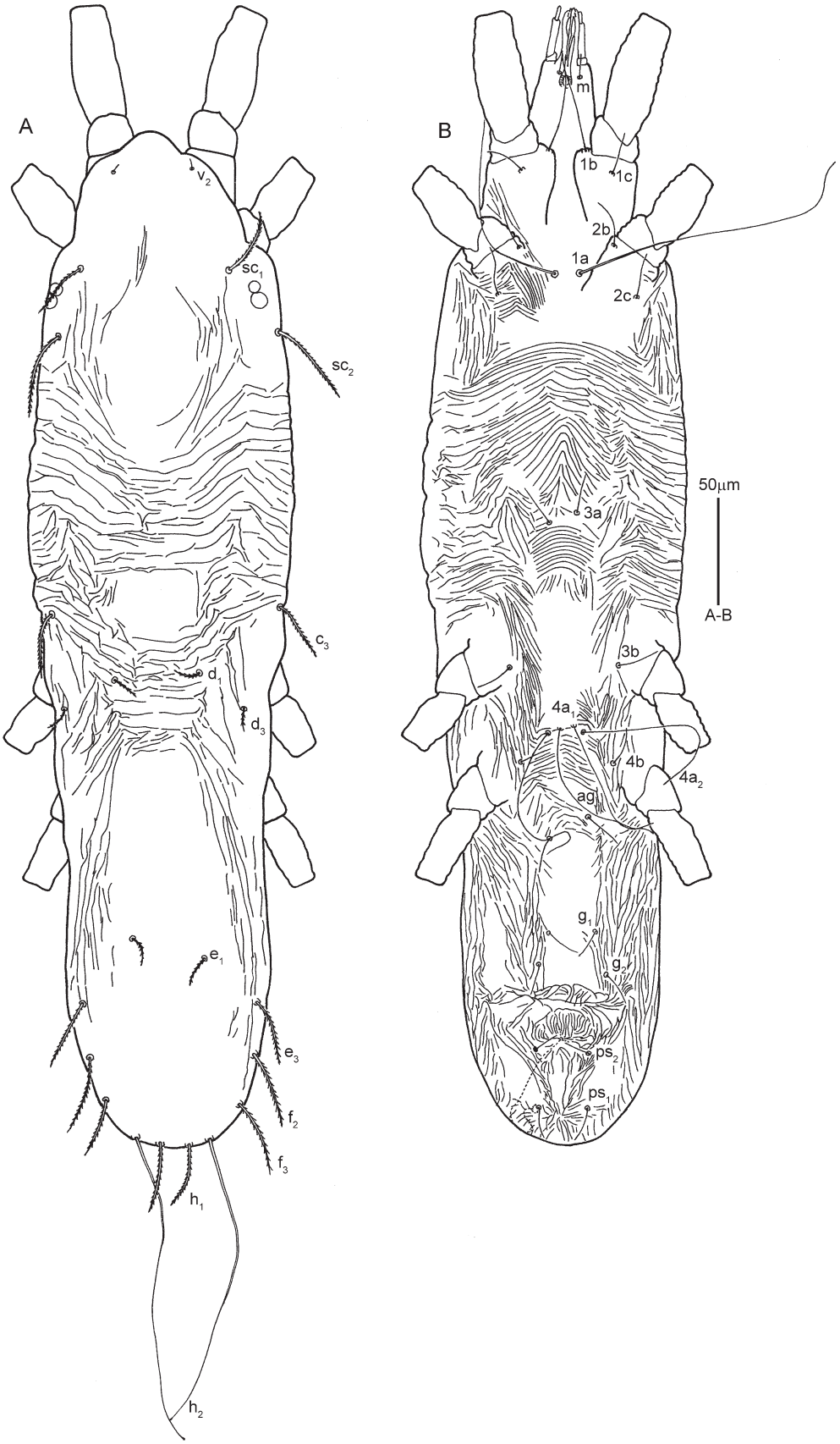

FIGURE 1. *Prolixus splendens* **sp. nov.** (adult female). A, dorsal view of idiosoma; B, ventral view of idiosoma.

FIGURE 2. *Prolixus splendens* **sp. nov.** (adult female). Genitoanal area with spermatheca.

Legs. (Figs. 3, 4A–B) Lengths of legs I–IV: 130 (130–135), 100 (97–105), 85 (85–93), 105 (100–105). Chaetotaxy: coxae 2-2-1-1; trochanters 1-1-2-1; femora 4-4-2-2; genua 2-2-0-0, tibiae 5-5-3-3, tarsi 7+ω-7+ω-5-5. Dorsal and lateral setae on femora lanceolate and barbed, and on genua and tibiae setiform; ventral setae setiform, except *bv″* on femur II lanceolate and barbed. Setae *ft′* on tarsi I–IV flagelliform, *ft″* absent; unguinal setae *u* pectinate and

equal in length; proral setae *p'ζ* and *p''ζ* eupathidial; tectal setae *tc* setiform. Lengths of solenidia: I *ω''* 6 (6–7), II *ω''* 6 (6–7). Claws developed with tenent hairs on each side.

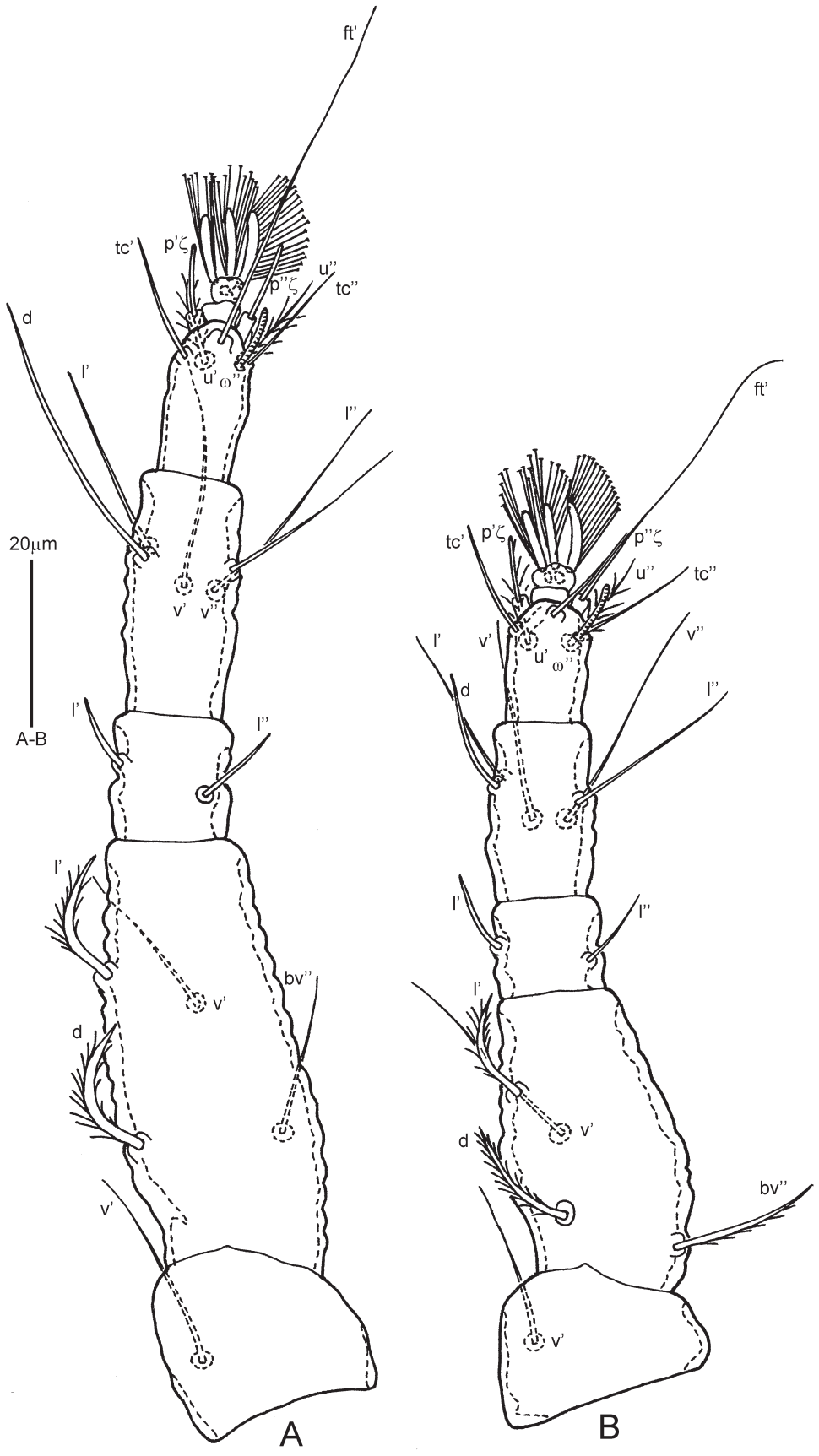

FIGURE 3. *Prolixus splendens* **sp. nov.** (adult female). A, leg I; B, leg II.

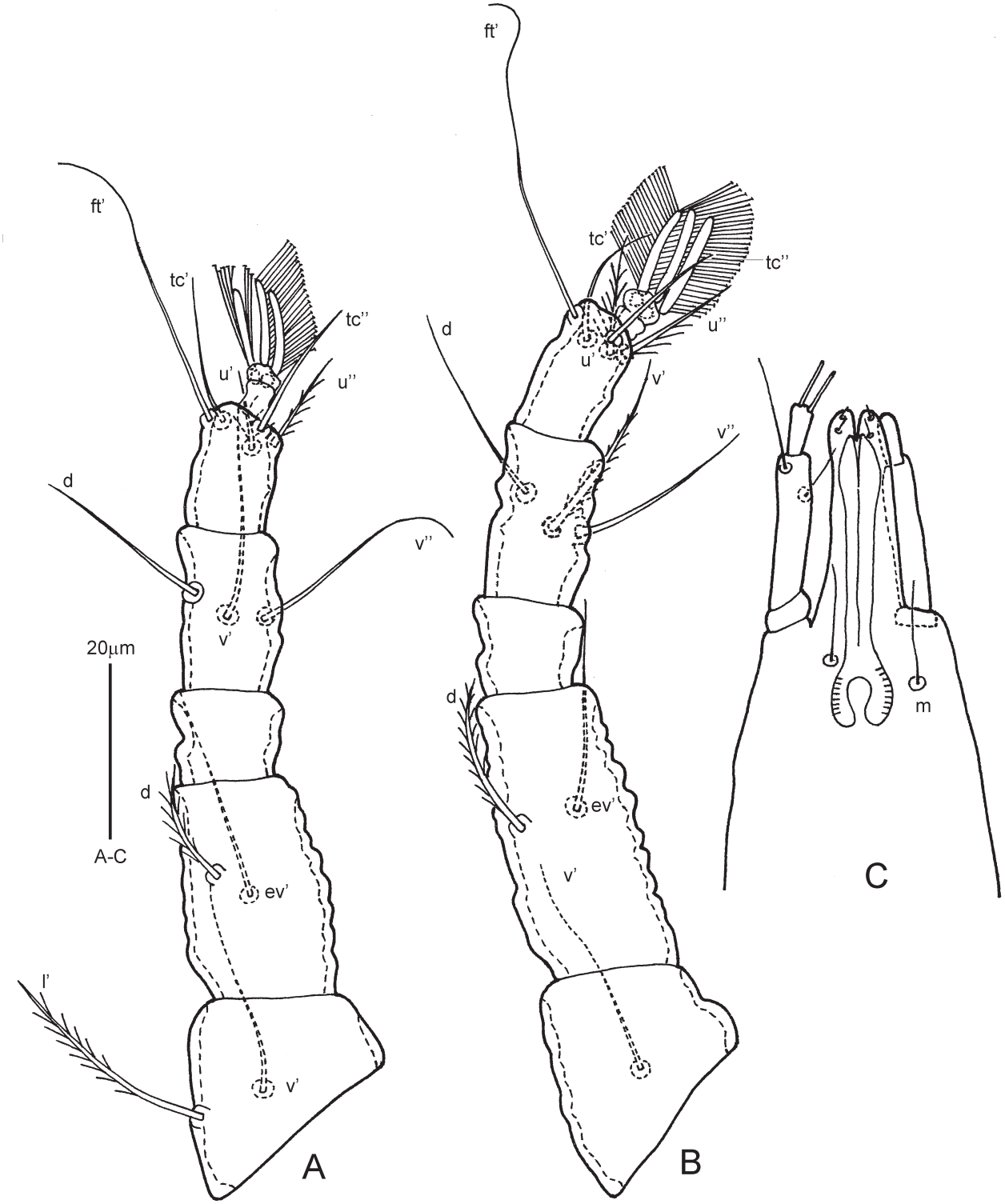

FIGURE 4. *Prolixus splendens* **sp. nov.** (adult female). A, leg III; B, leg IV; C, ventral aspect of distal infracapitulum.

Adult Male (n=3)

Gnathosoma. (Figs. 5B, 7C) Subcapitulum with setae *m*, or_1 and or_2, subcapitular seta *m* setiform, *m*=10–12, *m*–*m*=10–11; palp 3-segmented, setal formula: 0, 2, 2; tarsus with two eupathidia 5, 5–6.

Idiosoma. (Fig. 5A) 360–400 long, 100–105 wide. Body elongate. Prodorsum smooth, with a narrow band of transverse striatons in sejugal furrow immediately anterior to setae c_3; setae v_2 setiform, sc_1 and sc_2 thin and barbed. Lengths: v_2 7–10, sc_1 21–27, sc_2 30–37; distances: v_2–v_2 30–32, v_2–sc_1 37–40, sc_1–sc_1 70, sc_1–sc_2 27–30, sc_2–sc_2

100–105. Hysterosoma divided into metapodosoma and opisthosoma by narrow band of horizontal striations; with same setae as adults. All setae barbed, except h_2 elongate, ending in minute club. Setae d_1 and e_1 subequal in length. Lengths: d_1 13–16, e_1 13–16, c_3 20–25, d_3 16–17, e_3 25–28, f_2 27–32, f_3 28–33, h_2 110–140, h_1 19–25; distances: d_1–d_1 30–33, e_1–e_1 23–25, c_3–c_3 100–105, d_3–d_3 72–74, d_3–e_3 110–115, e_3–e_3 67–70, e_3–f_2 20–23, f_2–f_2 68–70, f_2–f_3 20–21, f_3–f_3 60–62, f_3–h_2 20–23, h_2–h_2 38–39, h_2–h_1 9–12, h_1–h_1 17–18.

Venter. (Figs. 5B–C) Venter with fine transverse and oblique striae between coxae II and III, forming an inverted "V" shape anterior to *3a*. Lengths: *1a* 96–100, *1b* 38–52, *1c* 20–22, *2b* 17–24, *2c* 22–30, *3a* 18–22, *3b* 20–22, $4a_1$ 77–86, $4a_2$ 70–95, *4b* 15–20. Distances: *1a–1a* 13, *3a–3a* 16–18, $4a_1$–$4a_1$ 7–8, $4a_1$–$4a_2$ 5–6, $4a_2$–$4a_2$ 17–20. Genital and ventral plates bearing two pairs of setiform gential setae (g_1 and g_2);. Anal plate with two pairs of pseudanal setae (ps_1 and ps_2), setiform, ps_1 about twice as long as ps_2. Setal lengths: *ag* 21–22, g_1 20–23, g_2 19–22, ps_1 13–17, ps_2 5–7; distances: *ag–ag* 2 17–19, g_1–g_1 12–15, g_1–g_2 5, g_2–g_2 20–21, ps_1–ps_2 11–12.

Aedeagus. (Fig. 5C) A narrow, elongate, sclerotised aedeagus tapering to a point posteriorly (at genital opening); very long membranous duct running from sclerotised aedeagus to flared, lightly sclerotised, cone-shaped cup distally, appearing to open into a soft membranous vesicle. Aedeagus is broken in drawn specimen (Fig. 5B), intact aedeagus as shown in Fig. 5C.

Legs. (Figs. 6, 7A–B) Lengths of legs I–IV: 120–125, 95–100, 95–97, 105–115. Chaetotaxy: coxae 2-2-1-1; trochanters 1-1-2-1; femora 4-4-2-2; genua 2-2-0-0, tibiae 5-5-3-3, tarsi 7+2*ω*-7+2*ω*-5+*ω*-5. Dorsal and lateral setae on trochanters, femora and genua lanceolate and barbed, and on tibiae setiform except on tibia III lanceolate and barbed; ventral setae setiform, except *bv″* on femur II lanceolate and barbed. Setae *ft′* on tarsi I–IV flagelliform; unguinal setae *u* pectinate and equal in length; proral setae p′*ζ* and *p″ζ* eupathidial; tectal setae *tc* setiform. Lengths of solenidia: I *ω′* 11–13, *ω″* 11–12, II *ω′* 8–10, *ω″* 8–10, III *ω′* 5–6. Claws developed with tenent hairs on each side.

Deutonymph (n=12)

Gnathosoma. (Figs. 8B, 9C) Subcapitulum with setae *m*, or_1 and or_2, subcapitular seta *m* setiform, *m*=12–13, *m–m*=10–12; palp 3-segmented, setal formula: 0, 2, 2; tarsus with two eupathidia 4–5, 4–5.

Idiosoma. (Fig. 8A) 305–475 long, 97–100 wide. Body elongate, with strong corrugated transverse striations between sc_2 and d_1, and weak, broken longitudinal and oblique striae, posterior to d_1. Setae v_2 setiform, sc_1 and sc_2 thin and barbed. Lengths: v_2 4–5, sc_1 30–37, sc_2 33–38; distances: v_2–v_2 31–33, v_2–sc_1 41–51, sc_1–sc_1 70–75, sc_1–sc_2 23–28, sc_2–sc_2 97–100. Hysterosoma with same setae as adults. Setae v_2, d_1, e_1 and d_3 setiform, c_3, e_3, f_2, f_3 and h_1 barbed, and setae h_2 elongate, ending in minute club. Lengths: d_1 10–12, e_1 8–9, c_3 22–30, d_3 7–10, e_3 20–24, f_2 30–31, f_3 26–33, h_2 100–125, h_1 17–27; distances: d_1–d_1 30–34, e_1–e_1 25–31, c_3–c_3 98–105, d_3–d_3 72–82, d_3–e_3 86–110, e_3–e_3 67–78, e_3–f_2 13–17, f_2–f_2 65–72, f_2–f_3 13–17, f_3–f_3 53–62, f_3–h_2 15–20, h_2–h_2 31–35, h_2–h_1 12, h_1–h_1 11–13.

Venter. (Figs. 8B, 10C) Venter similar to female. All coxal setae setiform. Setae *1a*, *1b* and $4a_1$ flagelliform. Lengths: *1a* 70–105, *1b* 45–54, *1c* 12–17, *2b* 14–18, *2c* 20–33, *3a* 12–17, *3b* 12–16, $4a_1$ 55–67, *4b* 14–17. Distances: *1a–1a* 15–16, *3a–3a* 13–15, $4a_1$–$4a_1$ 7–13. Posterior opisthosoma with transverse striae surrounding setae g_1, and longitudianal striations laterally. Setal lengths: *ag* 13–14, g_1 10–15, ps_1 8–11, ps_2 5–6; distances: *ag–ag* 11–17, g_1–g_1 12–15, ps_1–ps_2 17–23.

Legs. (Figs. 9A–B, 10A–B) Lengths of legs I–IV: 95–100, 70–75, 70–75, 70–75. Chaetotaxy: coxae 2-2-1-1; trochanters 1-1-2-0; femora 4-4-2-2; genua 2-2-0-0, tibiae 5-5-3-3, tarsi 7+ω-7+ω-5-5. Dorsal and lateral setae on trochanters, femora and genua lanceolate and barbed, and on tibiae setiform; ventral setae setiform, except *bv″* on femur II lanceolate and barbed. Setae *ft′* on tarsi I–IV flagelliform; unguinal setae *u* pectinate and equal in length; proral setae *p′ζ* and *p″ζ* eupathidial; tectal setae *tc* setiform. Lengths of solenidia: I *ω″* 5–6, II *ω″* 4–6. Claws developed with tenent hairs on each side.

Protonymph (n=9)

Gnathosoma. (Figs. 11B, 12C) Subcapitulum with setae *m*, or_1 and or_2, subcapitular seta *m* setiform, *m*=7–10, *m–m*=10–12; palp 3-segmented, setal formula: 0, 2, 2; tarsus with two eupathidia 4, 4.

Idiosoma. (Fig. 11A) 310–325 long, 87–105 wide. Body smooth, similar to deutonymph; setae v_2 setiform, sc_1 and sc_2 thin and barbed. Lengths: v_2 3–4, sc_1 26–33, sc_2 29–35; distances: v_2–v_2 25–30, v_2–sc_1 34–40, sc_1–sc_1 59–70, sc_1–sc_2 25–31, sc_2–sc_2 87–105. Hysterosoma with same setae as adults. Setae v_2, d_1, e_1 and d_3 setiform, c_3, e_3, f_2, f_3 and h_1 barbed, and setae h_2 elongate, ending in minute club. Lengths: d_1 7–10, e_1 7–9, c_3 18–28, d_3 6–8, e_3 11–17, f_2 20–30, f_3 21–27, h_2 85–110, h_1 12–22; distances: d_1–d_1 17–30, e_1–e_1 17–24, c_3–c_3 90–100, d_3–d_3 63–70, d_3–e_3 60–64, e_3–e_3 53–61, e_3–f_2 7–12, f_2–f_2 51–60, f_2–f_3 8–13, f_3–f_3 40–47, f_3–h_2 9–13, h_2–h_2 26–28, h_2–h_1 8–10, h_1–h_1 8–10.

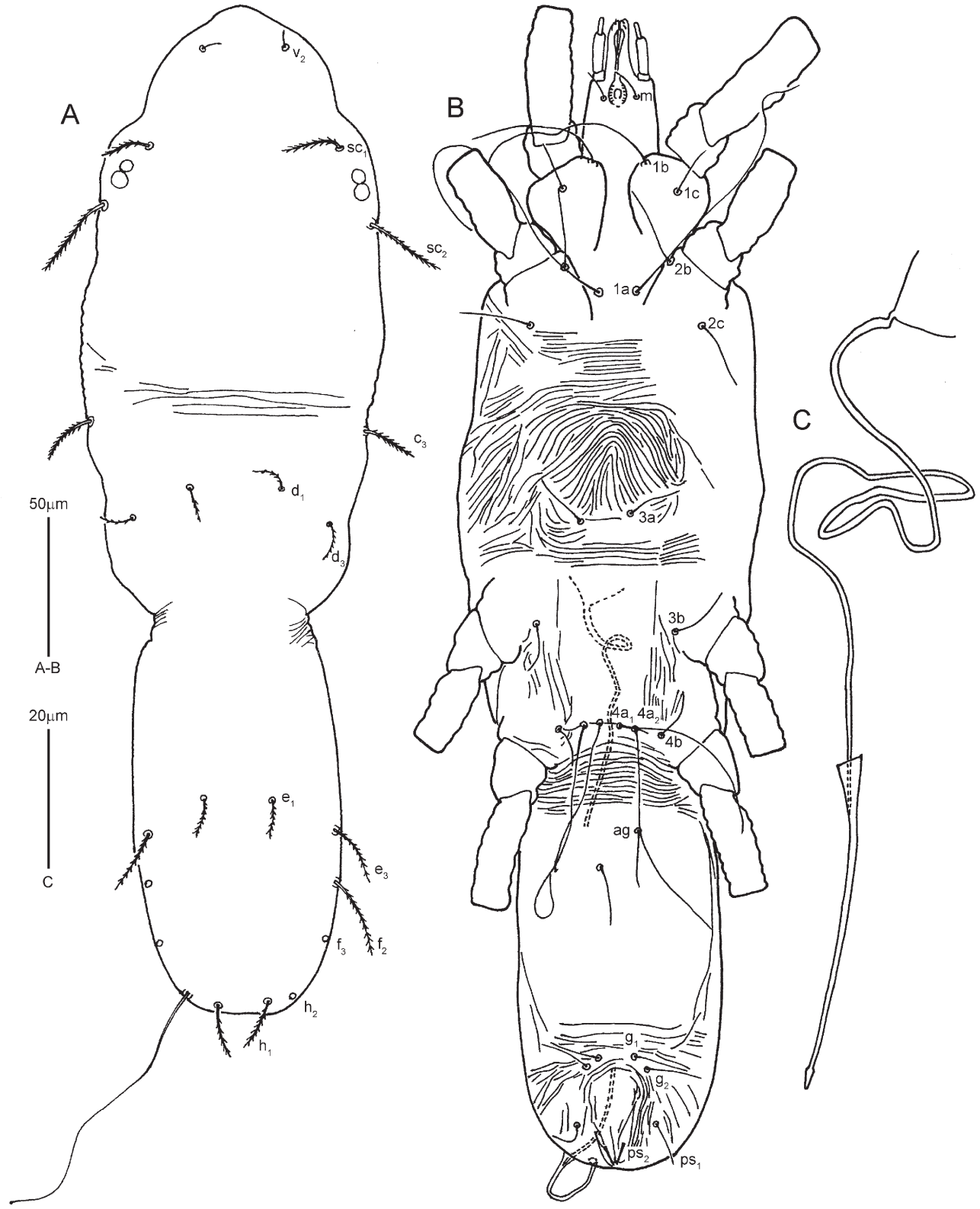

FIGURE 5. *Prolixus splendens* **sp. nov.** (adult male). A, dorsal view of idiosoma; B, ventral view of idiosoma; C, aedeagus.

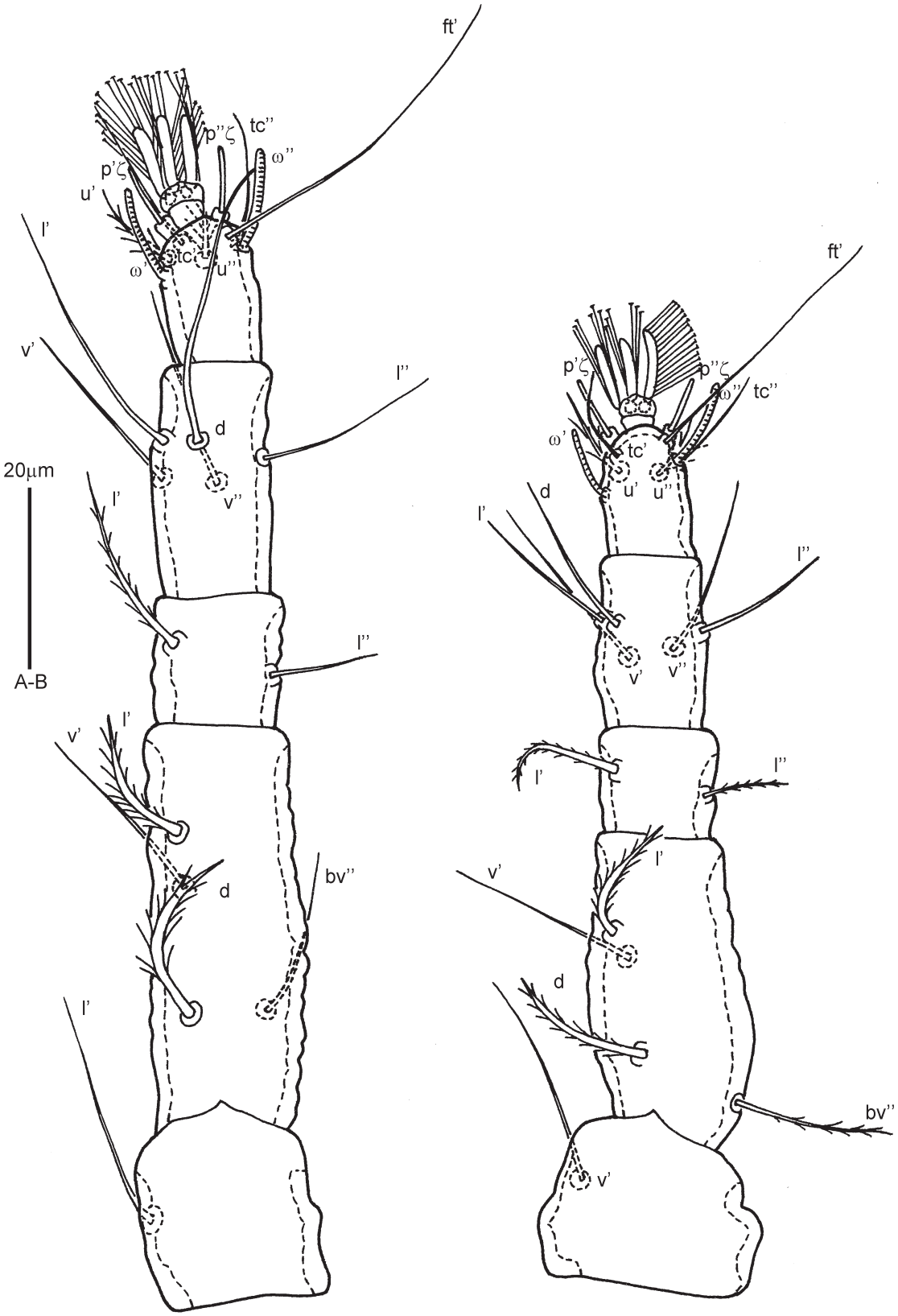

FIGURE 6. *Prolixus splendens* **sp. nov.** (adult male). A, leg I; B, leg II.

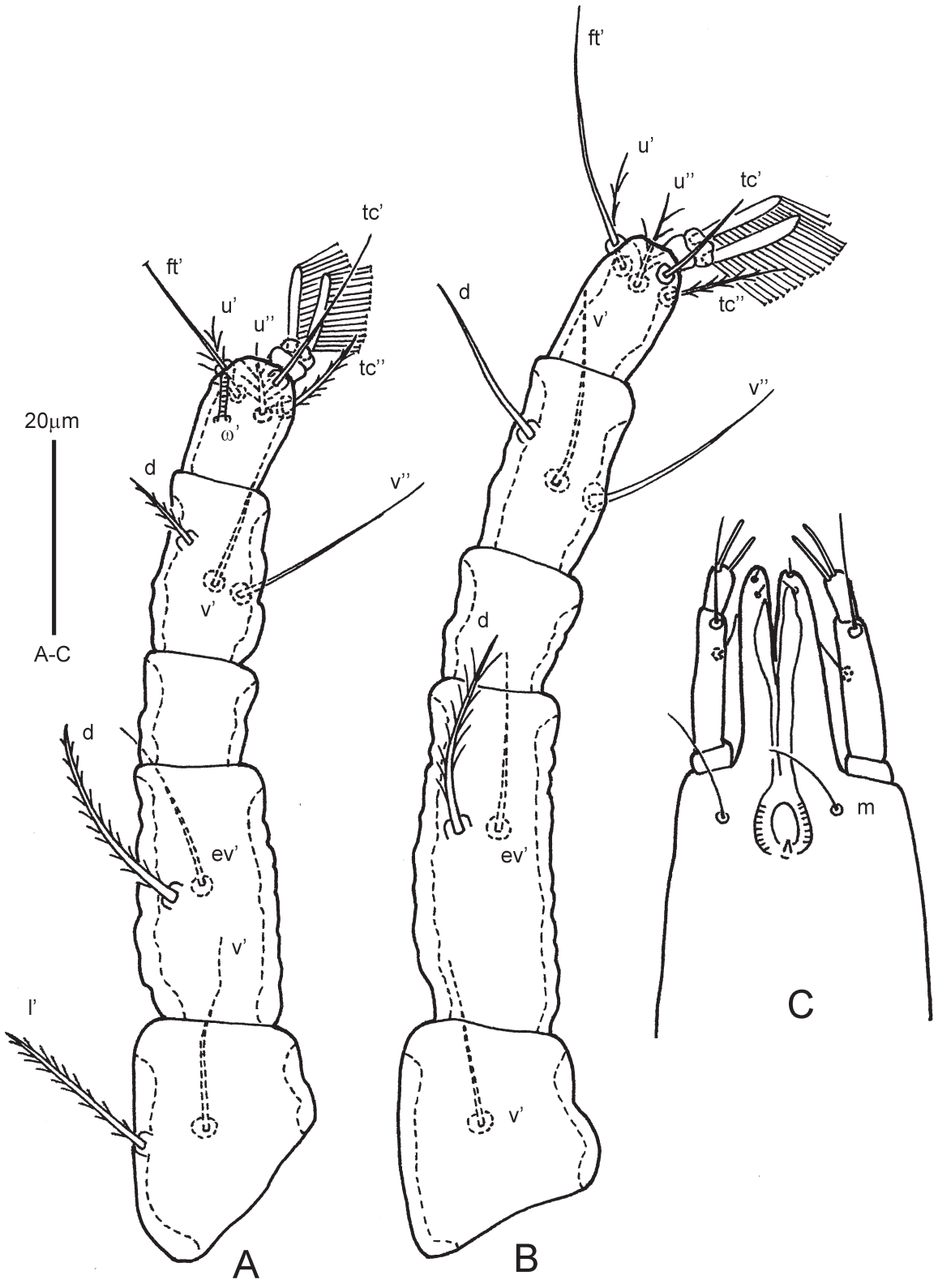

FIGURE 7. *Prolixus splendens* **sp. nov.** (adult male). A, leg III; B, leg IV; C, ventral aspect of distal infracapitulum.

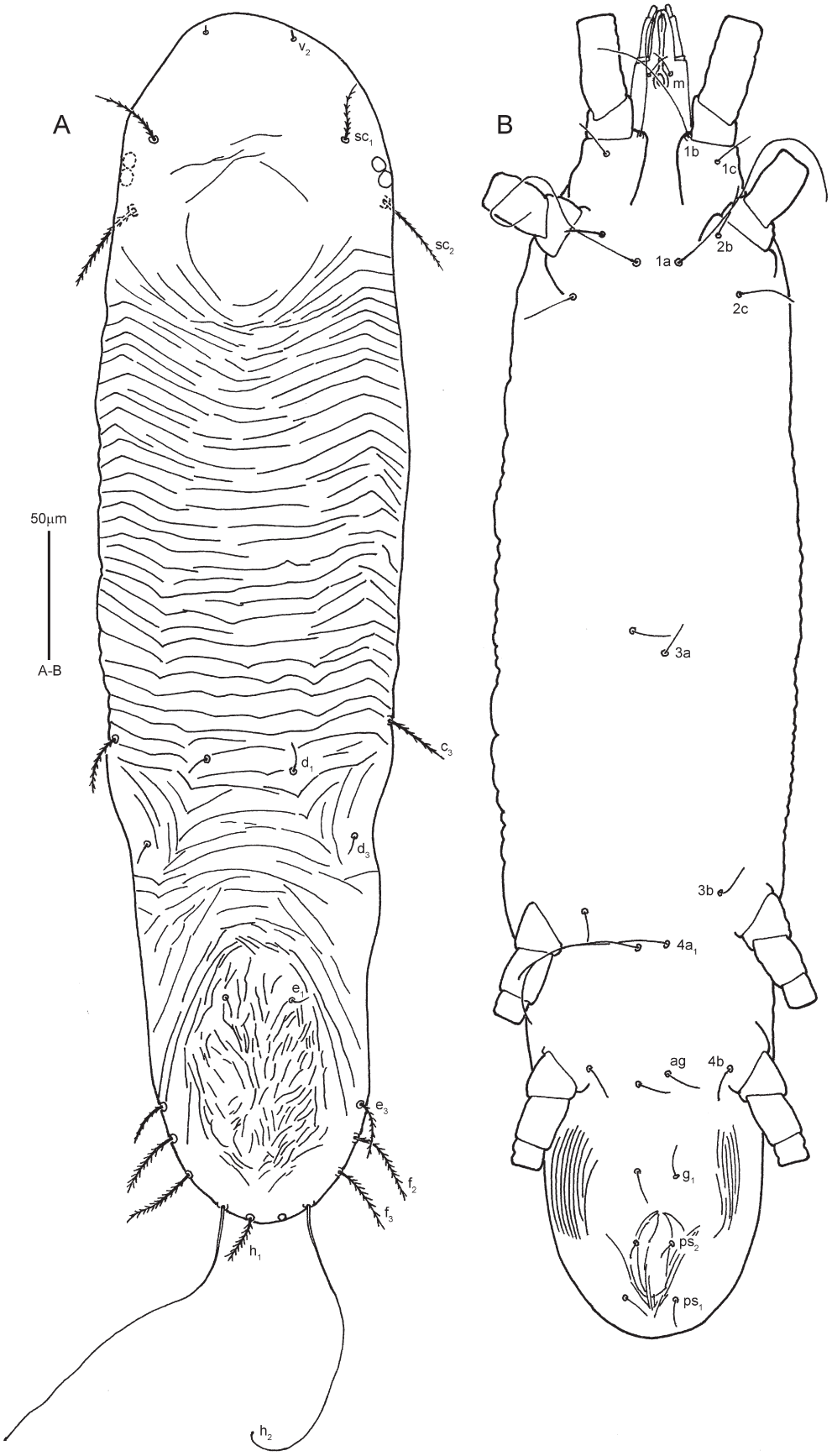

FIGURE 8. *Prolixus splendens* **sp. nov.** (deutonymph). A, dorsal view of idiosoma; B, ventral view of idiosoma.

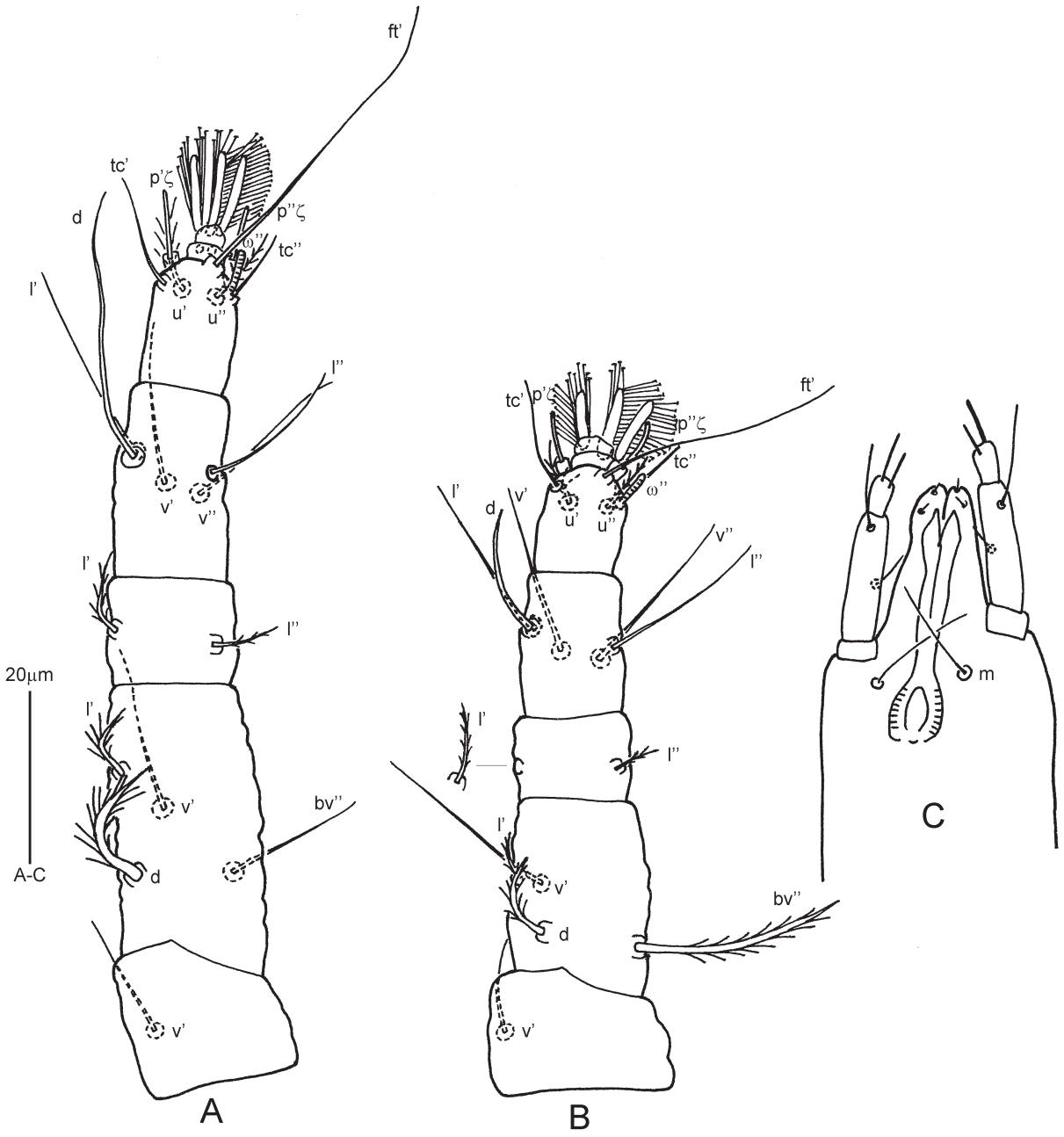

FIGURE 9. *Prolixus splendens* **sp. nov.** (deutonymph). A, leg I; B, leg II; C, ventral aspect of distal infracapitulum.

Venter. (Figs. 11B, 13C) Venter similar to female. All coxa setae setiform, except *1a* and *1b* flagelliform. Lengths: *1a* 59–97, *1b* 35–50, *1c* 9–13, *2c* 13–16, *3a* 8–15, *3b* 7–13. Distances: *1a–1a* 15–17, *3a–3a* 11–14. Pseudanal setae ps_1 and ps_2 setiform. Setal lengths: *ag* 7–10, ps_1 4–8, ps_2 3–5; distances: *ag–ag* 11–13, ps_1–ps_2 10–13.

Legs. (Figs. 12A–B, 13A–B) Lengths of legs I–IV: 73–80, 57–63, 59–60, 54–57. Chaetotaxy: coxae 2-1-1-0; trochanters 0-0-1-0; femora 3-3-2-2; genua 1-1-0-0, tibiae 5-5-3-3, tarsi 7+ω-7+ω-3-3. Dorsal and lateral setae on trochanters, femora and genua I–II lanceolate and barbed, and on tibiae setiform; ventral setae setiform, except *bv″* on femur II lanceolate and barbed. Setae *ft′* on tarsi I–IV flagelliform; unguinal setae *u* pectinate and equal in length; proral setae *p′ζ* and *p″ζ* eupathidial; tectal setae *tc* setiform. Lengths of solenidia: I *ω″* 4–5, II *ω″* 3–4. Claws developed with tenent hairs on each side.

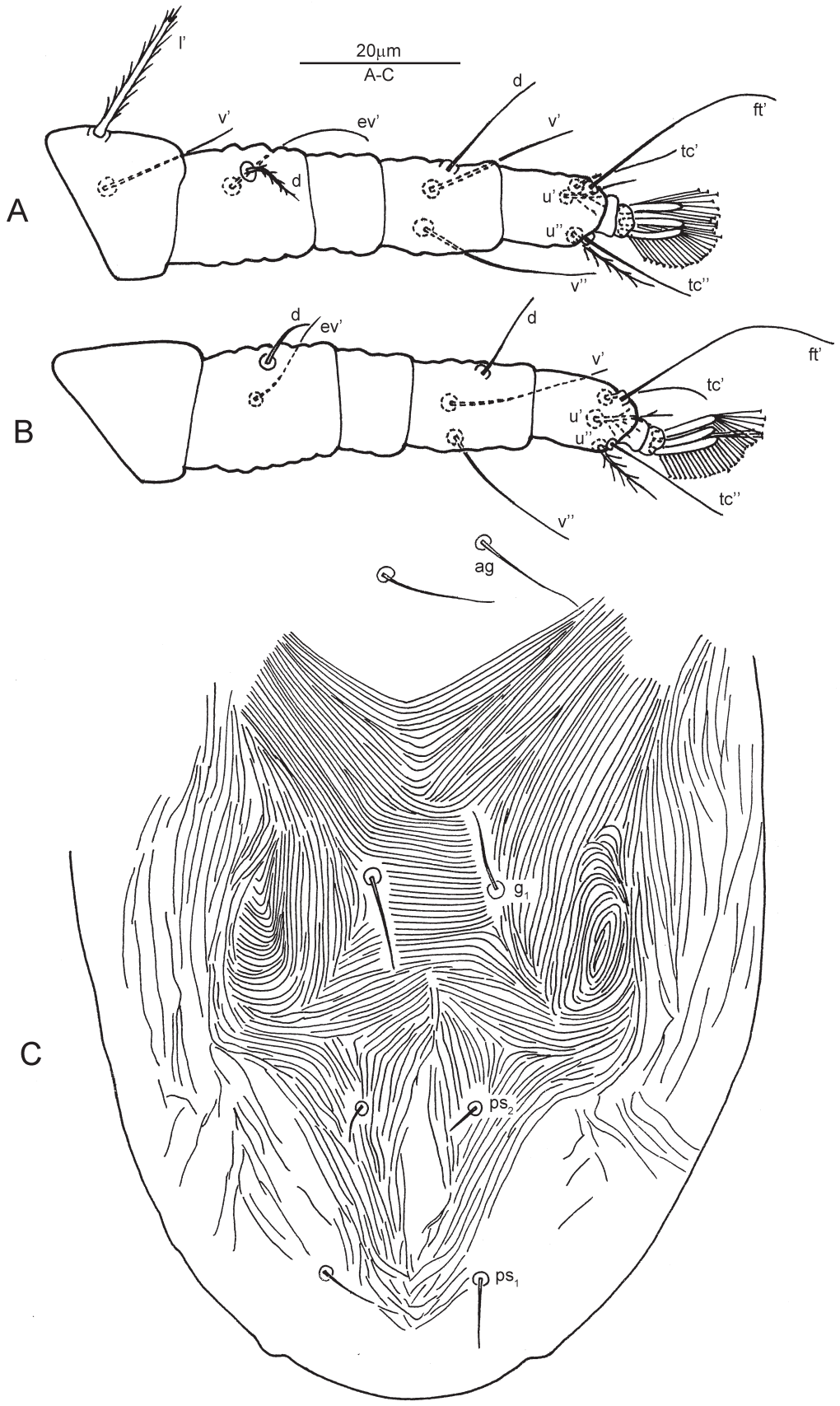

FIGURE 10. *Prolixus splendens* **sp. nov.** (deutonymph). A, leg III; B, leg IV; C, genitoanal area.

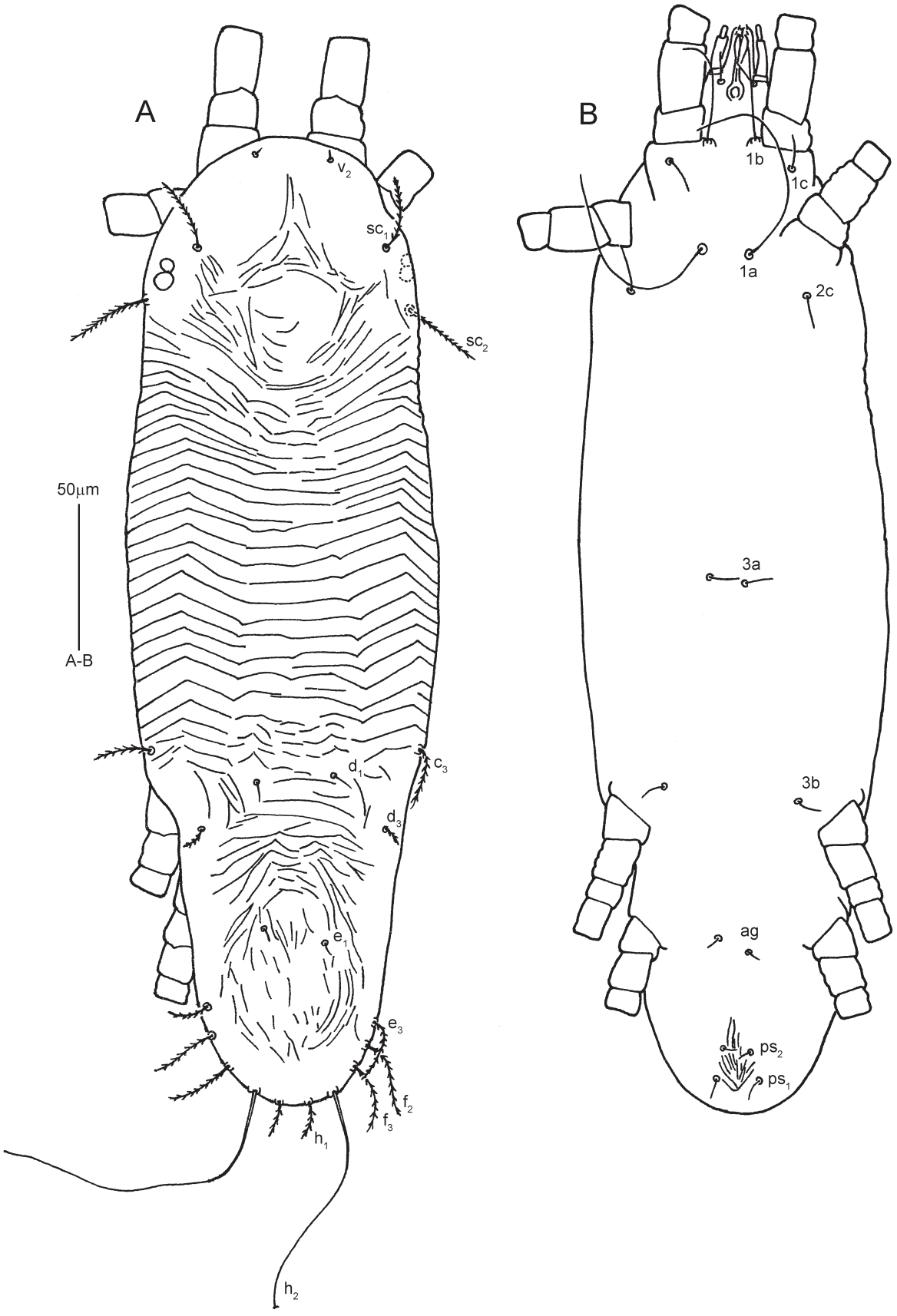

FIGURE 11. *Prolixus splendens* **sp. nov.** (protonymph). A, dorsal view of idiosoma; B, ventral view of idiosoma.

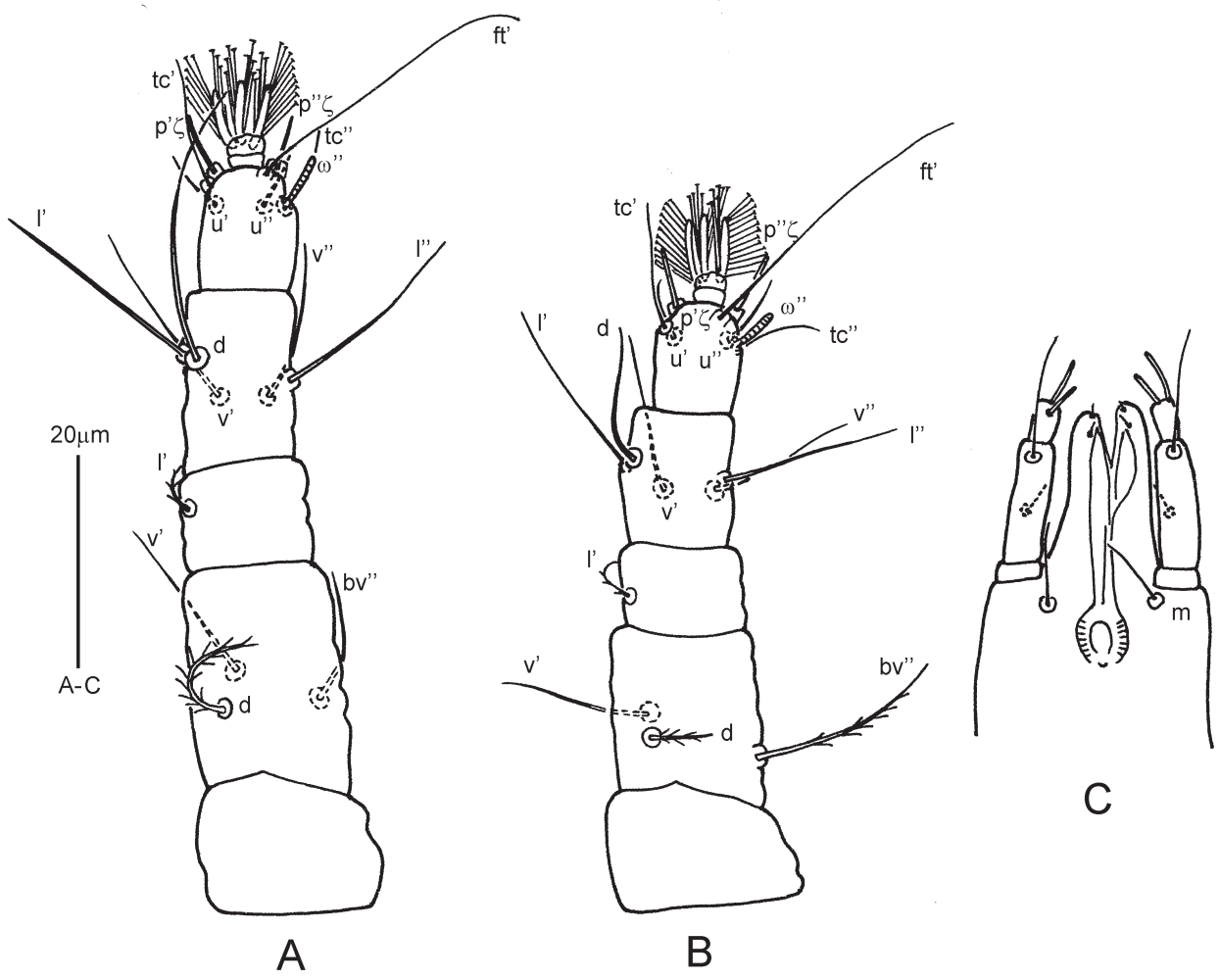

FIGURE 12. *Prolixus splendens* **sp. nov.** (protonymph). A, leg I; B, leg II; C, ventral aspect of distal infracapitulum.

Larva (n=6)

Gnathosoma. (Figs. 14B, 15D) Subcapitulum with or_1 and or_2; palp 3-segmented, setal formula: 0, 2, 2; tarsus with two eupathidia 2–3, 6–7.

Idiosoma. (Fig. 14A) 240–260 long, 80–94 wide. Body elongate, smooth, similar to deutonymph and protonymph; setae v_2 setiform, sc_1 and sc_2 thin and barbed. Lengths: v_2 3–7, sc_1 25–28, sc_2 28–33; distances: v_2–v_2 18–21, v_2–sc_1 28–33, sc_1–sc_1 58–60, sc_1–sc_2 17–22, sc_2–sc_2 80–94. Hysterosoma with same setae as adults. Setae v_2, d_1, e_1 and d_3 setiform, c_3, e_3, f_2, f_3 and h_1 barbed, and setae h_2 elongate, ending in minute club. Lengths: d_1 10–13, e_1 8–10, c_3 18–22, d_3 5–9, e_3 9–13, f_2 21–25, f_3 20–24, h_2 83–125, h_1 13–17; distances: d_1–d_1 22–25, e_1–e_1 10–13, c_3–c_3 80–86, d_3–d_3 53–58, d_3–e_3 35–39, e_3–e_3 47–51, e_3–f_2 5–7, f_2–f_2 44–48, f_2–f_3 5–7, f_3–f_3 35–38, f_3–h_2 9–10, h_2–h_2 20–21, h_2–h_1 6–8, h_1–h_1 7–9.

Venter. (Figs. 14B, 15E) Venter similar to deutonymph. All coxal setae setiform except *1a* and *1b* flagelliform. Lengths: *1a* 45–72, *1b* 25–35, *3a* 10–16. Distances: *1a–1a* 13–17, *3a–3a* 14–15. Pseudanal setae ps_1 and ps_2 setiform. Setal lengths: ps_1 6–10, ps_2 4–7; distances: ps_1–ps_2 7–9.

Legs. (Figs. 15A–15C) Lengths of legs I–III: 60–64, 50, 53–58. Chaetotaxy: coxae 1-0-0; trochanters 0-0-0; femora 3-3-2; genua 1-1-0, tibiae 5-5-3, tarsi 5+ω-5+ω-3. Dorsal and lateral setae on trochanters, femora and genua lanceolate and barbed, and on tibiae setiform; ventral setae setiform, except *bv″* on femur II lanceolate and barbed. Setae *ft′* on tarsi I–IV flagelliform; unguinal setae *u* pectinate and equal in length; proral setae *p′ζ* and *p″ζ* eupathidial. Lengths of solenidia: I *ω″* 3, II *ω″* 3. Claws developed with tenent hairs on each side.

Etymology. The species name refers to the specific name of the plant on which it was collected, *Austroderia splendens* (Poaceae).

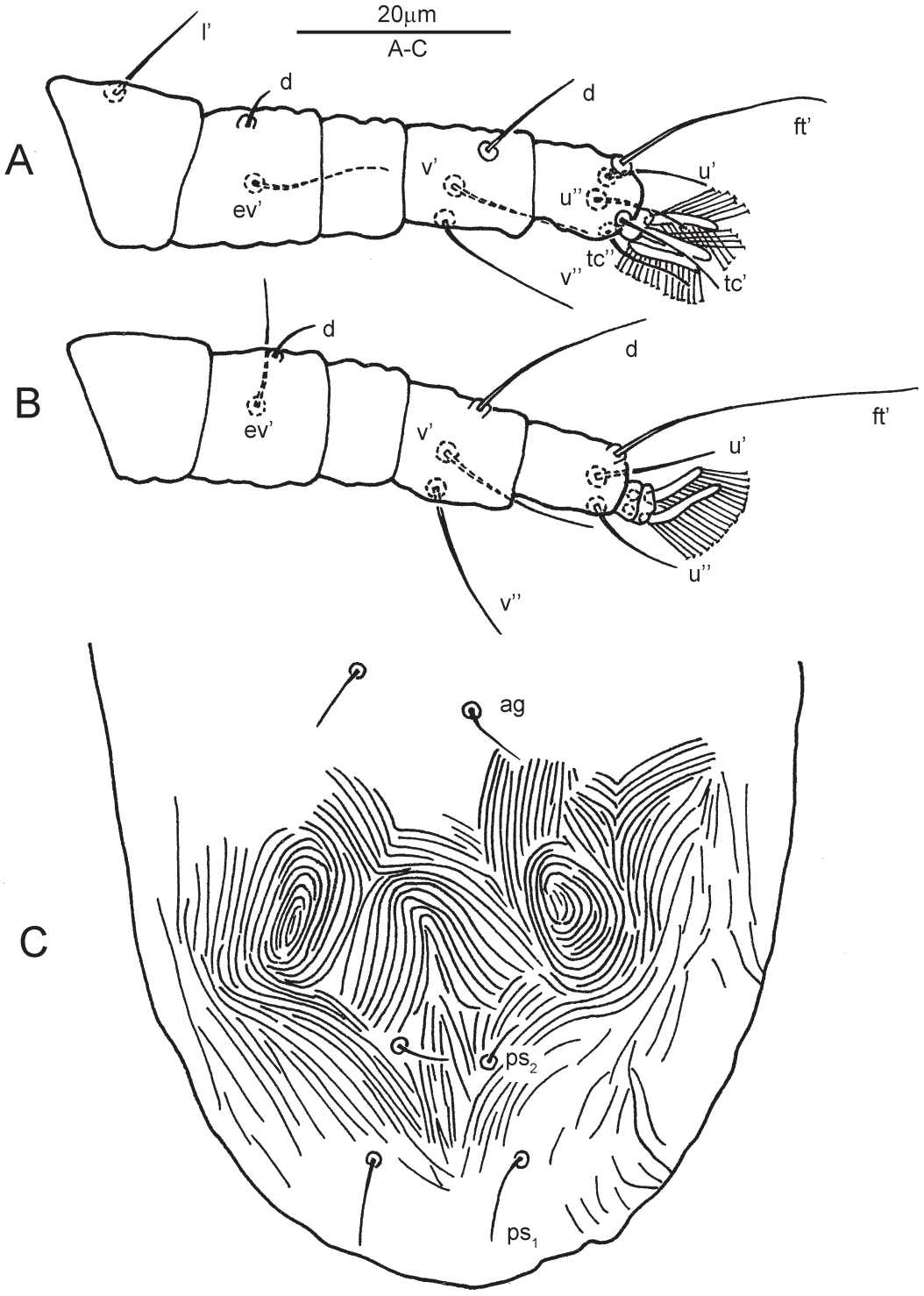

FIGURE 13. *Prolixus splendens* **sp. nov.** (protonymph). A, leg III; B, leg IV; C, genitoanal area.

Remarks. Before this paper, five species of *Prolixus* had been described and all of them were recorded from *Gahnia* (Cyperaceae), residing in the tight grooves along the leaf blades of host plants. *Prolixus splendens* **sp. nov.** was collected from *Austroderia splendens* (Poaceae), which is a new host plant for this mite genus.

Prolixus splendens **sp. nov.** is similar to *Prolixus forsteri* Beard, Fan & Walter, 2005 in having six pairs of dorsolateral setae (f_2 present) and a pair of aggenital setae *ag* (setae f_2 and *ag* absent in all other known species of *Prolixus*), but mainly differs in the following characters: adult female with spermatheca ending in a bulb-shaped vesicle; setal counts (legs I–IV): coxae 2-2-1-1; femora 4-4-2-2; genua 2-2-0-0; adult male with 7+2ω-7+2ω-5+ω-5

setae on tarsi (adult female with spermatheca ending in a cylinder-shaped vesicle; coxae 1-2-1-1; femora 4-4-2-1; genua 2-1-0-0; adult male with 7+2*ω*-7+2*ω*-5-5 setae on tarsi in *P. forsteri*).

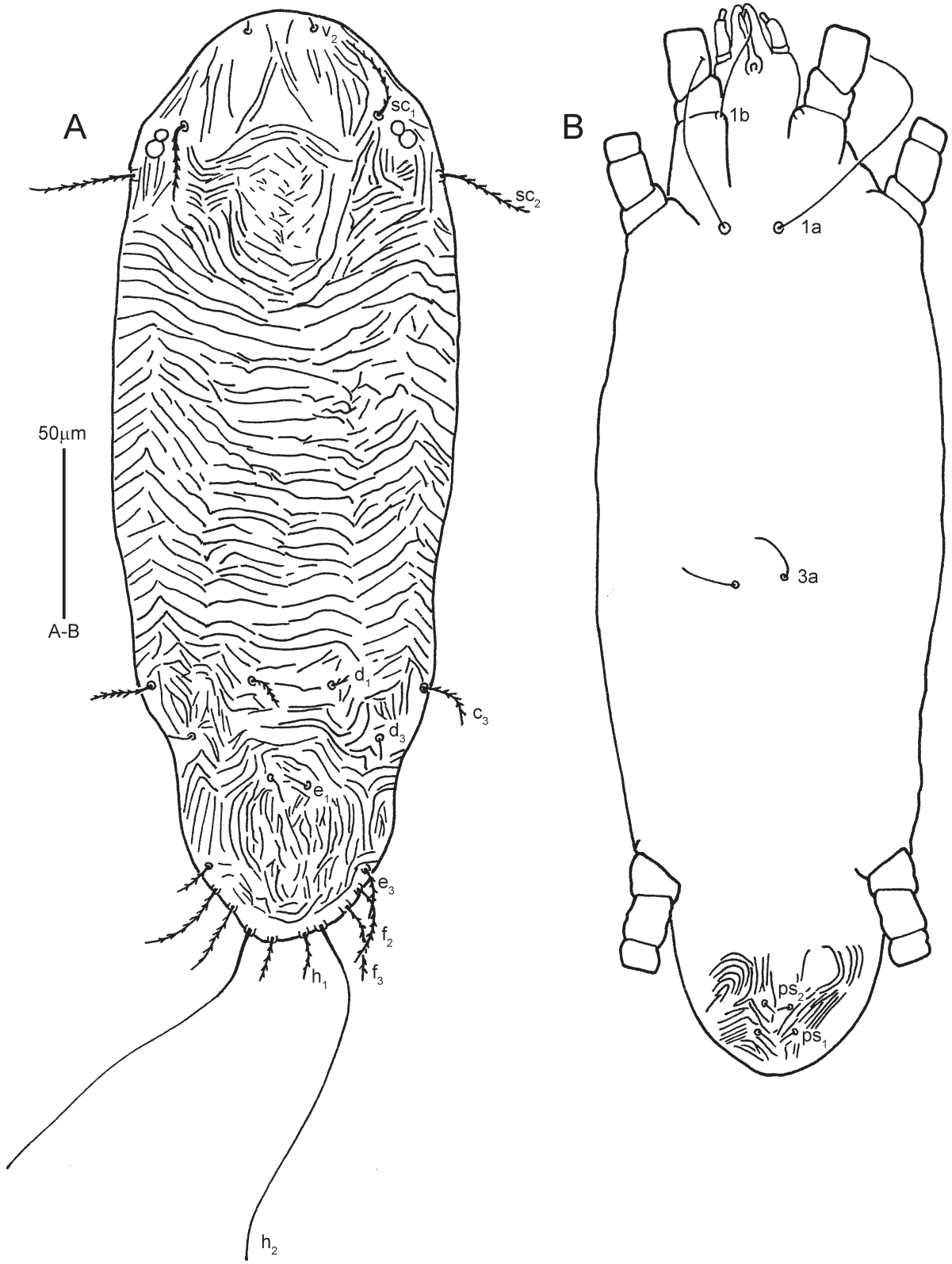

FIGURE 14. *Prolixus splendens* **sp. nov.** (larva). A, dorsal view of idiosoma; B, ventral view of idiosoma.

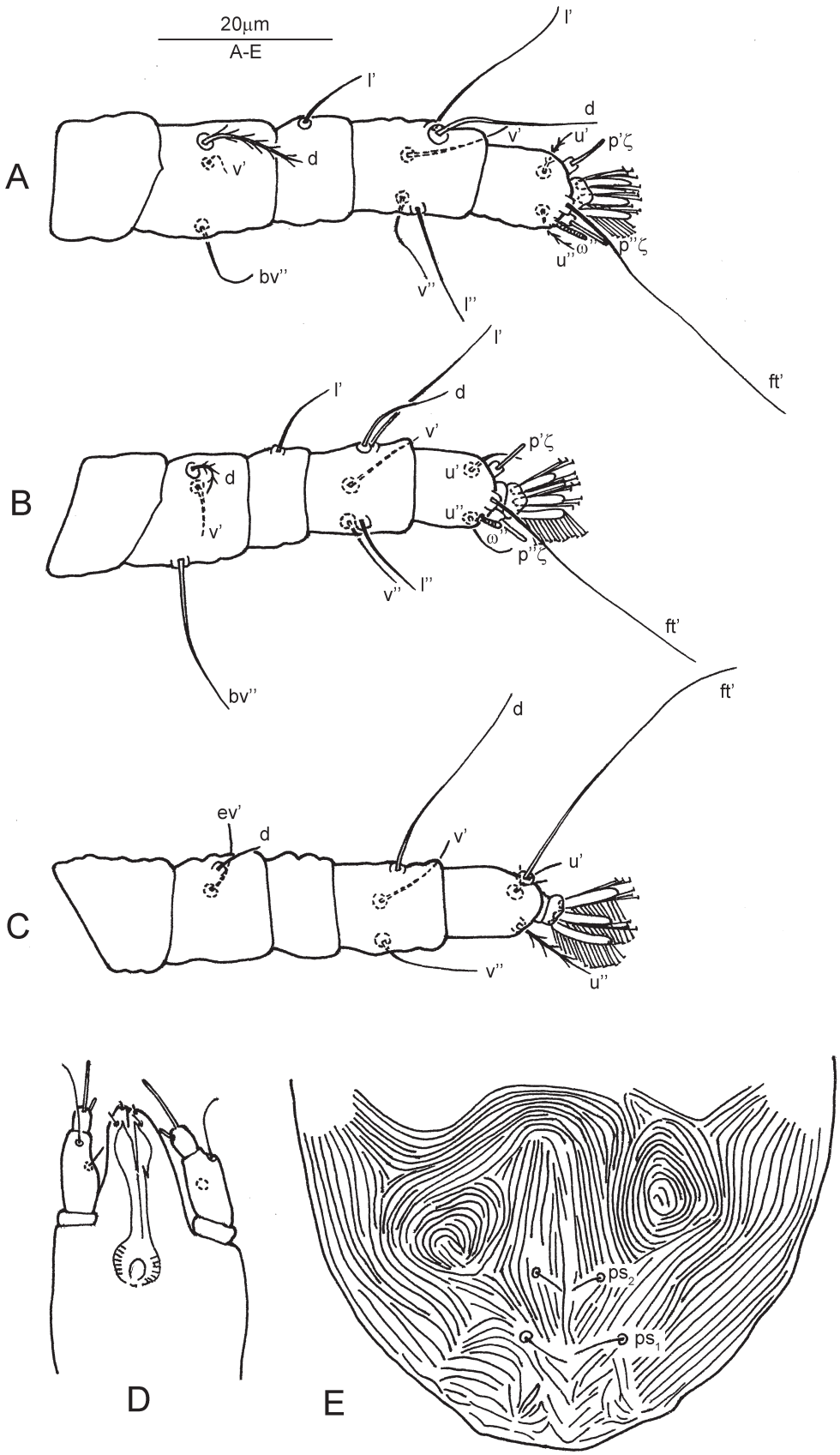

FIGURE 15. *Prolixus splendens* **sp. nov.** (larva). A, leg I; B, leg II; C, leg III; D, ventral aspect of distal infracapitulum; E, genitoanal area.

There have been several papers discussing the ontogeny of *Prolixus* recently (Beard *et al.* 2005; Beard & Ochoa 2011; Xu & Zhang 2014; Xu *et al*. 2017b): setae *1a*, *3a*, ps_1 and ps_2 are present from the larval stage; *1c*, *2c*, *3b* and *ag*, if present, appear in the protonymph; *2b* and *4b* and $4a_1$, if present, appear in the deutonymph; genital setae g_1 appear in deutonymph; $4a_2$ (if present) and g_2 are added in the adult. All of these setae appear in their expected life stage for the Tenuipalpidae (Lindquist 1985; Beard *et al.* 2014).

The ontogenetic changes in the chaetotaxy of leg segments are presented in Table 1. For Tenuipalpidae, females and males share similar chaetotaxy in most cases, and on adult male a solenidion is usually added to tarsi I–II (Lindquist 1985), sometimes to tarsi III–IV, such as on *Acaricis urigersoni* (Xu & Zhang 2013). In contrast, differences in chaetotaxy are usually present between females and males of *Prolixus* (e.g. *P. forsteri* and *P. corruginus*), even throughout their entire ontogenetic cycle (e.g. *P. setifolius*). In this new species *Prolixus splendens* **sp. nov.**, females and males have similar leg chaetotaxy except that the male adds a solenidion to tarsi I–III.

TABLE 1. Ontogeny of leg chaetotaxy in *Prolixus splendens* **sp. nov.** Setae are indicated where they are first added. Setae in parentheses represent pairs. Hyphen indicates no additions.

	Coxa	Trochanter	Femur	Genu	Tibia	Tarsus
Leg I		-				
Larva	*1a*, *1b*	-	*d*, *bv″*, *v′*	*l′*	*d*, (*v*), (*l*)	(*u*), (*pζ*), *ft′*, *ω″*
Protonymph	*1c*	-	-	-	-	(*tc*)
Deutonymph	-	*v′*	*l′*	*l″*	-	-
Adult female	-	-	-	-	-	-
Adult male	-	-	-	-	-	*ω′*
Leg II						
Larva	-	-	*d*, *bv″*, *v′*	*l′*	*d*, (*v*), (*l*)	(*u*), (*pζ*), *ft′*, *ω″*
Protonymph	*2c*	-	-	-	-	(*tc*)
Deutonymph	*2b*	*v′*	*l′*	*l″*	-	-
Adult female	-	-	-	-	-	-
Adult male	-	-	-	-	-	*ω′*
Leg III						
Larva	*3a*	-	*d*, *ev′*	-	*d*, (*v*)	(*u*), *ft′*
Protonymph	*3b*	*l′*	-	-	-	(*tc*)
Deutonymph	-	*v′*	-	-	-	-
Adult female	-	-	-	-	-	-
Adult male	-	-	-	-	-	*ω′*
Leg IV						
Protonymph	-	-	*d*, *ev′*	-	*d*, (*v*)	(*u*), *ft′*
Deutonymph	$4a_1$, *4b*	-	-	-	-	(*tc*)
Adult female	$4a_2$	*v′*	-	-	-	-
Adult male	$4a_2$	*v′*	-	-	-	-

Key to adult females of *Prolixus*

1. Dorsolateral setae f_2 present; aggenital setae *ag* present 2
- Dorsolateral setae f_2 absent; setae *ag* absent 3
2. Spermatheca ending in a bulb-shaped vesicle; coxae I–IV with 2, 2, 1, 1 setae, seta *1c* present; femora I–IV with 4, 4, 2, 2 setae; genua I–IV with 2, 2, 0, 0 setae ..... *P. splendens* **sp. nov.**
- Spermatheca ending in a cylinder-shaped vesicle; coxae I–IV with 1, 2, 1, 1 setae, seta *1c* absent; femora I–IV with 4, 4, 2, 1 setae; genua I–IV with 2, 1, 0, 0 setae ..... *P. forsteri* Beard, Fan & Walter
3. Dorsocentral setae e_1 absent; medioventral setae *4a* absent; tarsi I–IV with 6+*ω*, 6+*ω*, 3, 3 setae, (seta *tc″* absent); spermatheca ending in a bulbiform-shaped vesicle ..... *P. setifolius* Xu, Huang & Zhang
- Dorsocentral setae e_1 present; medioventral seta *4a* present, $4a_1$ and $4a_2$; tarsi I–IV with 7+*ω*, 7+*ω*, 4, 4 setae, (seta *tc″* present); spermatheca ending in a cylinder-shaped vesicle 4
4. Setae l′ on femora I absent; coxal setae *1c*, *3b* and *4b* present ..... *P. meyerae* Xu & Zhang
- Setae l′ on femora I present; coxal setae 1c, *3b* and *4b* absent 5
5. Coxal setae 2c present; trochanters I–IV nude; femora I–IV with 4, 3, 2, 2 setae; genus I–IV with 2, 1, 0, 0 setae; setae *3a* setiform ..... *P. corruginus* Beard, Fan & Walter
- Coxal setae *2c* absent; trochanters I–III with setae v′, v′ and l′ respectively, trochanter IV nude; femora I–IV with 4, 4, 2, 2 setae; genus I–IV with 2, 2, 0, 0 setae; setae *3a* flagelliform ..... *P. nicholasi* Xu, Huang & Zhang

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