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New records of the genus *Recifella* K. Viets, 1935 from Australia, with the description of four new species (Acari: Hydrachnidia, Unionicolidae)

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Abstract

The following new species are described from Australia: *Recifella insolitisetata* **sp. nov.**, *R. integra* **sp. nov.**, *R. quadriseta* **sp. nov.** and *R. rotundiseta* **sp. nov.** A redescription is given of *Recifella flagellata* Cook, 1986 and *R. kakadu* Smit, 2007. A key is given for all known *Recifella* species from Australia.

Key words: Systematics, new species, new records, species key

Introduction

Recifella K. Viets, 1935 has its main distribution in Central and South America and in Australasia. The genus is in Australia represented by two subgenera, i.e. *Eorecifella* Cook, 1986 and *Recifellida* Cook, 1986. The former has a widespread distribution in the Australasia and Central and South America, the latter is confined to the Australasian region (Smit 2020). The taxonomy of *Recifella* is based on males, and females can rarely be identified. To date, 22 species are known from Australia (Cook 1986, Smit 2007).

Previous studies of the genus in Australia were published by K.O. Viets (1975), Cook (1986) and Smit (1992, 2007, 2008). *Recifella* species occur in standing water like lakes and pools, in streams and one species in Australia is known from interstitial waters.

Material and methods

This study deals with material from eastern, southeastern and northern Australia. All material was fixed in Koenike's fluid. Material from Western Australia was published by Smit (2021). The holotypes are lodged in the following museums: AMS—Australian Museum, Sydney; QM—Queensland Museum, Brisbane; NTM—Museum and Art Gallery of the Northern Territory. Paratypes and non-type material are lodged in Naturalis Biodiversity Center, Leiden (RMNH). The following abbreviations have been used: asl—above sea level; Dgl-2—Dorsoglandularium 2; P1-5—palp segments 1–5; IV-leg-2-6—second to sixth segment of fourth leg. All measurements are in μm , measurements of palp and leg segments are of the dorsal margins. Ventral length is measured from the tip of Cx-I to posterior idiosoma margin. The photographs of selected structures were made using a camera on a Samsung Galaxy smartphone. Numbers are given as male/female/deutonymph.

Systematics

Family Unionicolidae Oudemans

Genus *Recifella* K. Viets, 1935

Subgenus *Eorecifella* Cook, 1980

Recifella australica Cook, 1986

Material examined. **Queensland.** 21/13/0, Yabba Creek at Peach Trees Campground, Jimna, 26°38.251 S 152°26.924 E, 465 m asl, 2-xi-2005; 6/2/0, Moss's Well, Spicers Gap, Main Range NP, 28°16.816 S 152°44.125 E, 207 m asl, 22-xi-2014.

Distribution. Tasmania, New South Wales, Victoria and Queensland.

Recifella crassipalpis Smit, 2007

Material examined. **Northern Territory.** 1/0/0, Gubarra Creek upstream of pool, Kakadu NP, 12°49.605 S 132°52.708 E, 27-ix-2005.

Distribution. Western Australia and Northern Territory.

Recifella pinguipalpifera Wiles, 1997

Material examined. **Queensland.** 0/1/0, West Claudie River at crossing with Portland Road, Iron Range NP, 12°44.352 S 143°15.246 E, 64 m asl, 26-x-2014.

Distribution. Queensland. Furthermore, known from New Guinea.

Recifella flagellata Cook, 1986

Figs 1–2, 16A

Material examined. **New South Wales.** 1/0/0, Wattamolla Creek, Royal NP, 34°07.911 S 151°06.907 E, 29 m asl, 23-i-2024; 0/2/0, Waterfall Creek at Waterfall Flat, Royal NP, 34°08.678 S 151°00.266 E, 185 m asl, 24-i-2024. **Queensland.** 1/1/0, Peter's Creek at crossing with Kenilworth-Jimna road, 26°40.911 S 152°36.577 E, 3-xi-2005; 1/1/0, Bundaroo Creek, Conondale NP, 26°41.653 S 152°36.767 E, 3-xi-2005; 3/7/0, Buaraba Creek, Ravensbourne NP, 4-xi-2005 (one male and one female slide-mounted); 5/2/0, Booloumba Creek upstream of falls, Conondale NP, 26°40.753 S 152°37.162 E, 465 m asl, 20-xi-2014.

Description. Male. Dorsal and ventral shield present; dorsal shield 469 long and 428 wide, with four pairs of glandularia (Figure 1B), fused posteriorly with ventral shield. Postocularia and one pair of glandularia lying in the dorsal furrow (as illustrated in Figure 1D), but occasionally fused with the dorsal shield. Posterior pair of dorsal shield on relative large tubercles. Dorsal shield with a peculiar coloration, as illustrated in Figure 16A: a large reddish patch in the posterior part of the shield. However, other specimens lack the reddish coloration, and are brownish. Ventral shield 628 long and 556 wide, tips of Cx-I somewhat pointed. Apodemes of anterior coxal plates extending beyond the middle of third coxal plates. Genital plates fused with the ventral shield with approximately 13–14 pairs of acetabula, 250 wide between outer margins of acetabula; gonopore 86 long. Excretory pore terminal and projecting (Figure 1A).

Palp as illustrated in Figure 1E: dorsal length/height: P1, 18/28; P2, 70/40; P3, 36/33; P4, 76/22; P5, 34/16; P4 not expanded distally and with a long dorsodistal seta; dorsal heavy seta at the tip of P5 widely diverging the more ventral two. Gnathosoma with anchoral process 136 long. Chelicera 119 long, claw 52 long, basal segment 75 long.

Dorsal lengths of I-leg: 50, 97, 117, 177, 150, 154; dorsal lengths of III-leg: 64, 80, 92, 119, 125, 138; III-leg-5 with a long, heavy distoventral seta with large pectinations (Figure 2B, inset); dorsal lengths of IV-leg: 66, 97, 111, 145, 163, 158; IV-L-5 not bowed, as illustrated in Figure 2C. III-leg-3 with one, III-leg-4 and 5 each with three swimming setae; IV-leg-3 with one distoventral, IV-leg-4 and 5 each with three distoventral swimming setae.

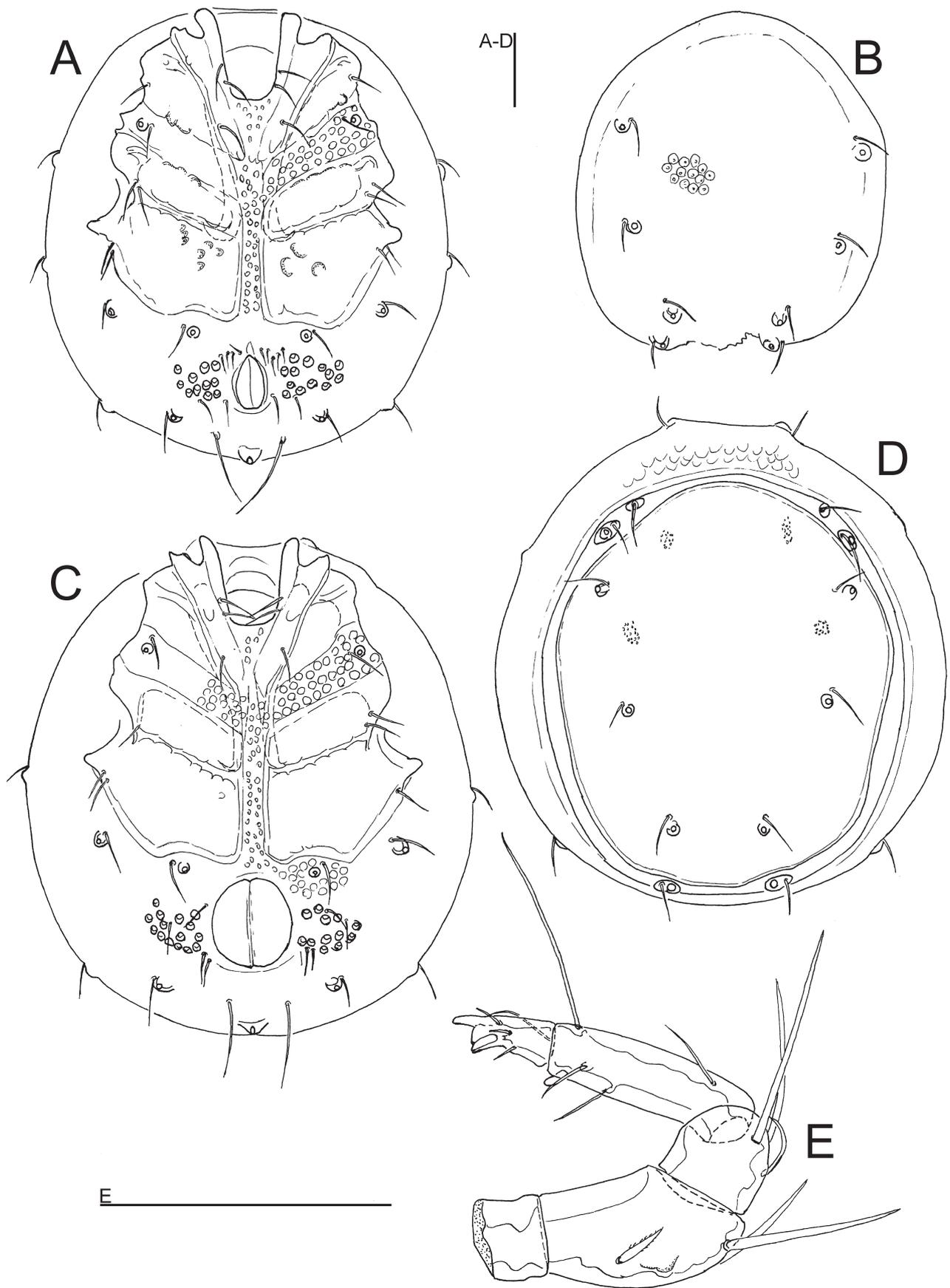


FIGURE 1. *Recifella flagellata* (A–B, E ♂; C–D ♀), Buaraba Creek: A, C—idiosoma, ventral view (unmounted); B—dorsal shield; D—idiosoma, dorsal view; E—palp. Scale bars = 100 μ m.

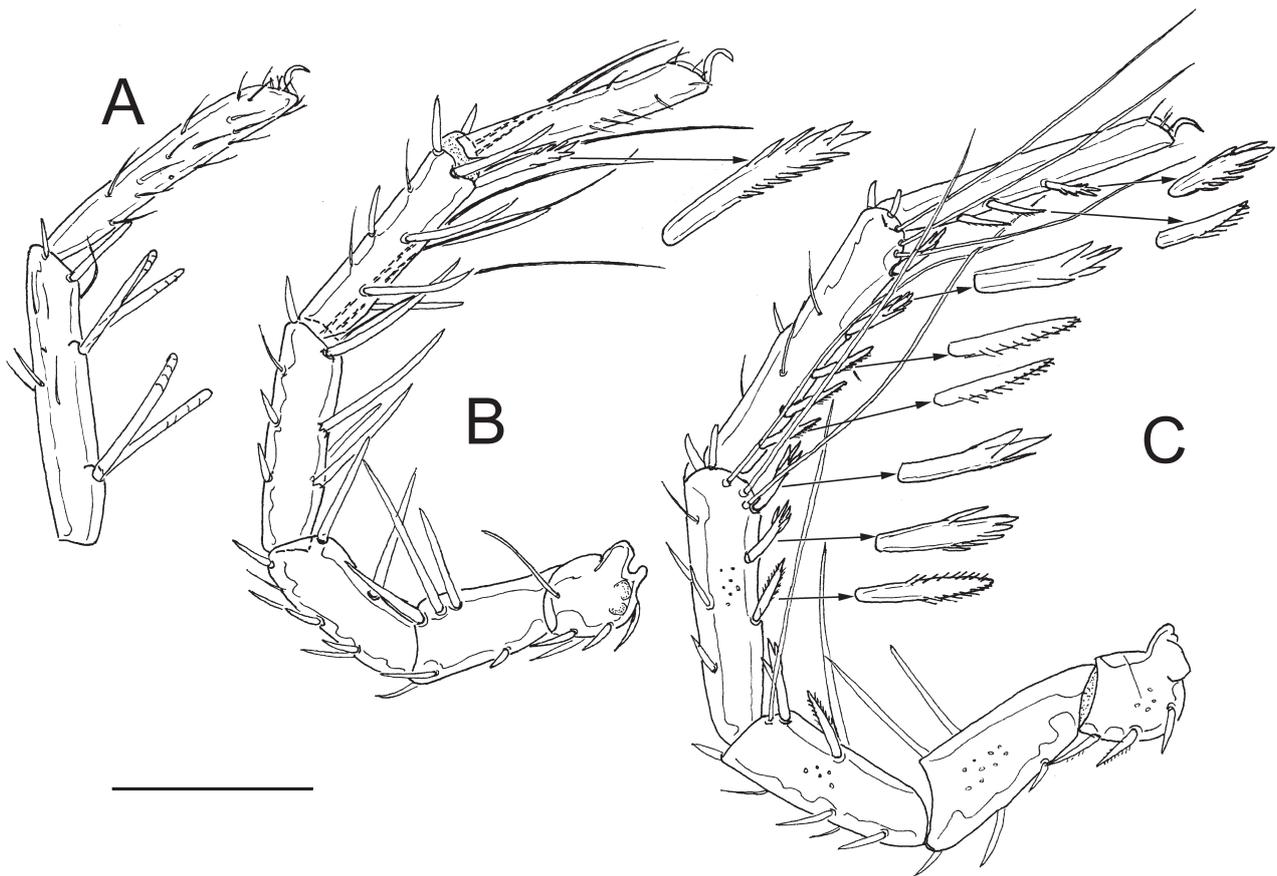


FIGURE 2. *Recifella flagellata* ♂, Buaraba Creek: A—I-leg-5 and 6; B—III-leg (inset: dorsodistal seta on III-leg-5, enlarged 2x); C—IV-leg (inset: selected ventral setae, enlarged 2x). Scale bars = 100 µm.

Female. Dorsal shield 569 long and 469 wide, with three pairs of glandularia, completely separated from the ventral shield (Figure 1D). Ventral shield 694 long and 619 wide. Genital plates with approximately 15–19 pairs of acetabula, 313 wide between outer margins of acetabula; gonopore 106 long and 92 wide.

Palp: dorsal length/height: P1, 16/28; P2, 77/41; P3, 39/36; P4, 81/23; P5, 33/16. Gnathosoma with anchoral process 130 long. Chelicera 117 long.

Dorsal lengths of III-leg: 62, 88, 97, 122, 131, 136; dorsal lengths of IV-leg-2–6: 108, 120, 156, 176, 166; swimming setae as in male.

Remarks. Cook (1986) based his description of the species on one male. Later on, Smit (2007) described the female. Now more material is available, it is clear that these descriptions need an emendation. According to Cook (1986) and Smit (2007) there are no free glandularia in the dorsal furrow, but all but one specimen have a pair of glandularia (Dgl-2) and the postocularia in the dorsal furrow. In one specimen one gland and the postocularia are fused with the dorsal shield. In specimens with a narrow dorsal furrow, this gland and the postocularia are lying separately on the dorsal furrow.

Subgenus *Recifellida* Cook, 1986

Recifella baltoona Cook, 1986

Figs. 3, 4A–E

Material examined. **Queensland.** 1/0/0, Broken River, Eungella NP, 21°10.069 S 148°30.676 E, 25-x-2005; 1/2/0, Little Yabba Creek at Charlie Moreland Campground, Kenilworth, 26°36.928 S 152°39.105 E, 107 m asl, 2-xi-2005; 9/17/0, Emu Creek at Clancy's Camping Area, Benarkin State Forest, 26°58.334 S 152°09.916 E, 162 m asl, 3-xi-2005; 3/1/0, Archer River, Cape York Peninsula, 13°26.041 S 142°56.546 E, 93 m asl, 23-x-2014; 6/10/0,

unnamed creek 7.6 km N of Archer River, Cape York Peninsula, 13°23.157 S 142°54.316 E, 103 m asl, 23-x-2014; 2/3/0, Pascoe River, Cape York Peninsula, 12°52.988 S 143°00.616 E, 63 m asl, 25-x-2014; 1/9/0, Wenlock River at crossing with road to Iron Range NP, 13°05.734 S 142°56.526 E, 108 m asl, 25-x-2014, 1/0/0 dissected and slide mounted; 3/5/0, Pandanus Creek, Cathu State Forest, 20°47.843 S 148°32.598 E, 147 m asl, 16-xi-2014; 2/0/0, Takilberan Creek, N of Gin Gin at crossing with Bruce Highway, 24°49.680 S 151°42.479 E, 85 m asl, 18-xi-2014; 1/8/0, Rocky Creek, SW of Agnes Water, 24°21.471 S 151°46.177 E, 30 m asl, 25-xi-2014. **Northern Territory.** 1/0/0, Lily Pond, Katherine Gorge, Nitmiluk NP, 14°18.801 S 132°28.326 E, 3-x-2005; 2/3/0, 17 Mile Creek, Nitmiluk NP, 14°18.318 S 132°25.293 E, 4-x-2005, 1/1/0 dissected and slide mounted.

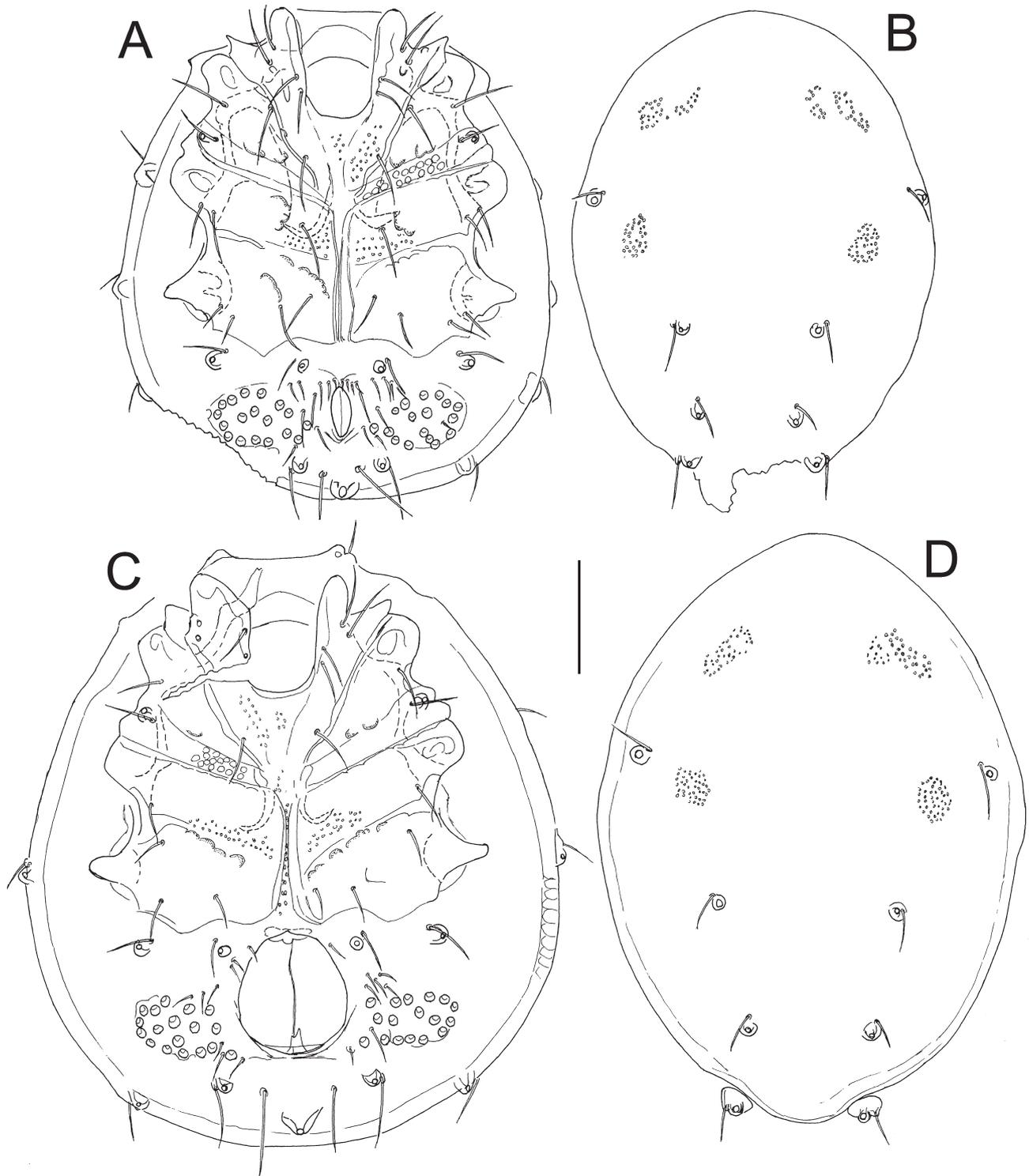


FIGURE 3. *Recifella baltoona* (A–B ♂; C–D ♀), 17 Mile Creek, Northern Territory: A, C—idiosoma, ventral view (unmounted); B, D—dorsal shield. Scale bars = 100 μ m.

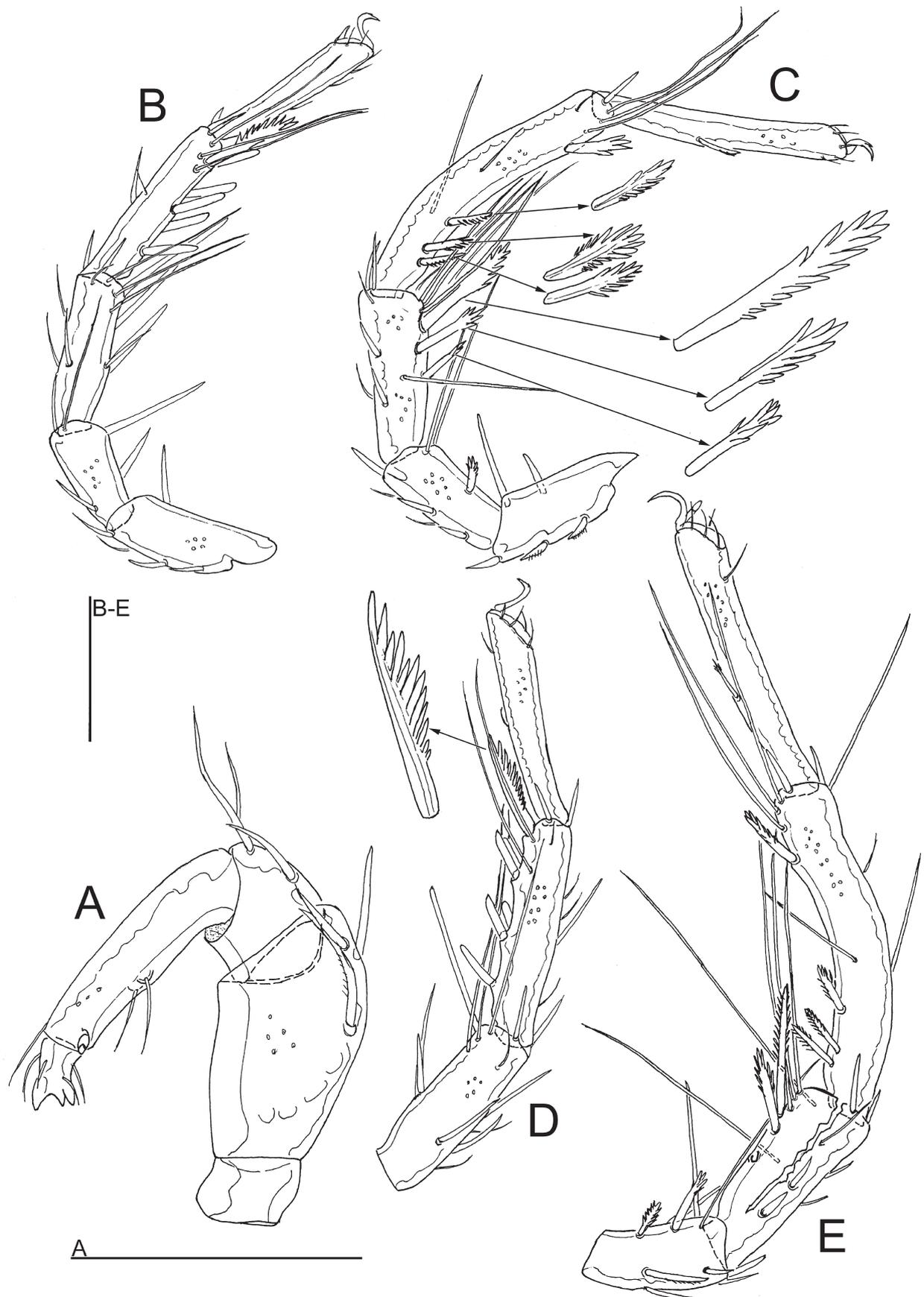


FIGURE 4. ♂ **A–C** *Recifella baltoona*, 17 Mile Creek, Northern Territory; **D–E** *Recifella baltoona*, Wenlock River, Queensland: **A**—palp; **B**—III-leg-2-6; **C**—IV-leg-2-6 (inset: selected ventral setae, enlarged 2X); **D**—III-leg-4-6 (inset: dorsodistal seta on III-leg-5, enlarged 2x); **E**—IV-leg-2-6. Scale bars = 100 μ m.

Distribution. Tasmania, New South Wales, Queensland, Northern Territory and Western Australia.

Remarks. This species is characterized by the shape of III-leg (III-L-5 with a long, heavy distoventral seta with pectinations, ventral heavy setae comparatively short, Figure 4D) and IV-leg-5 with three specialized setae placed further apart on a slight ventral bulge (Figure 4E).

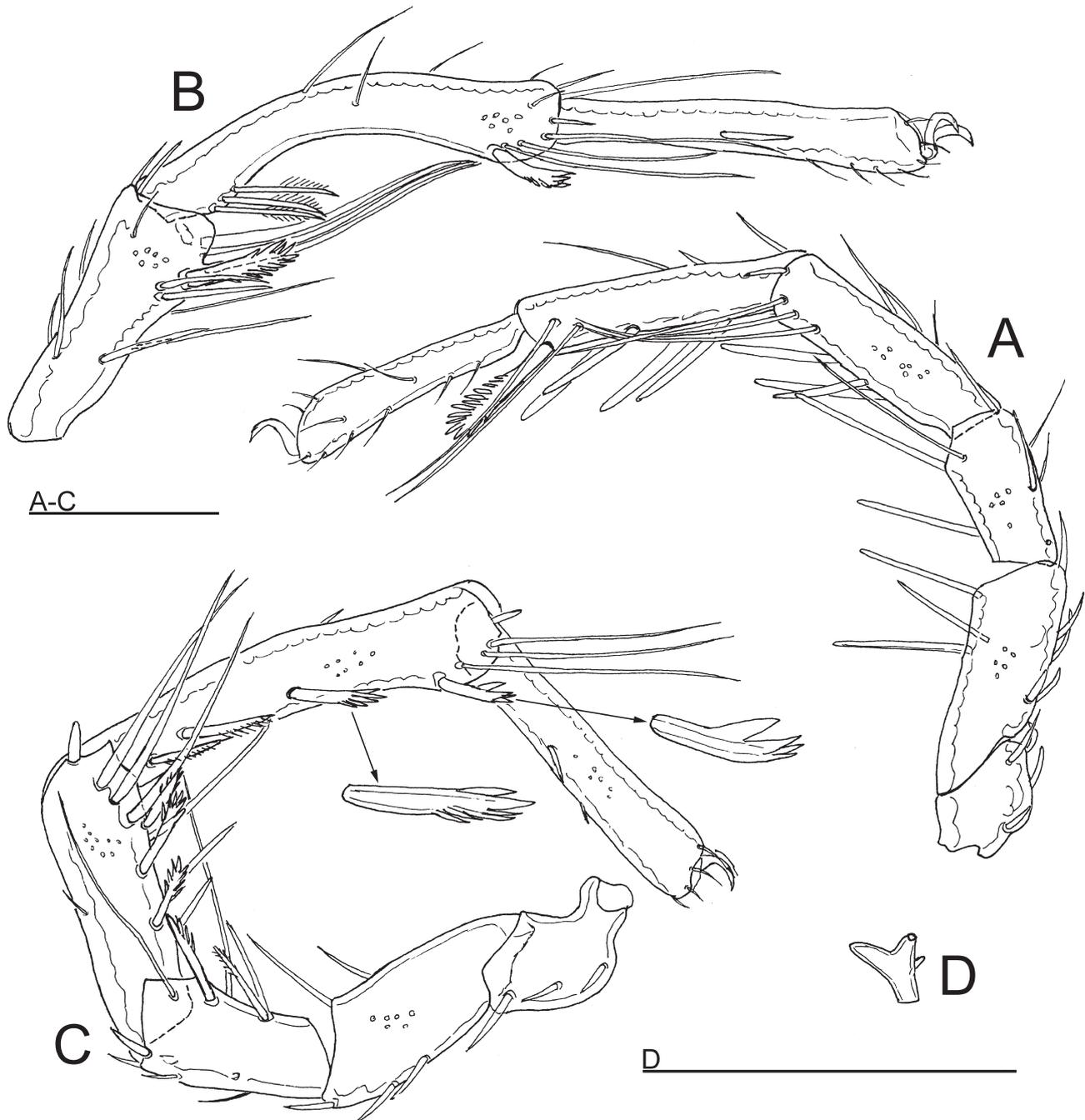


FIGURE 5. A–B *Recifella tinka*, ♂, Lake Moondarra, Queensland: Buaraba Creek: A—III-leg-2-6; B—IV-leg-4-6. C *Recifella doomba*, ♂, Little Yabba Creek, Queensland: IV-leg (inset: selected ventral setae, enlarged at 2x). D *Recifella bifida*, ♂, Jardine River, Queensland: middle of the three specialized setae on IV-leg-5.

***Recifella bifida* Cook, 1986**

Fig. 5D

Material examined. **Northern Territory.** 1/0/0, Walker Creek, Litchfield NP, 13°04.694 S 130°41.929 E, alt. 161 m asl, 25-ix-2005. **Queensland.** 2/1/0, Elliot Creek at Fruit Bat Falls, Cape York Peninsula, 11°26.370 S 142°26.086

E, 72 m asl, 19-x-2014; 2/8/0, Canal Creek at Twin Falls, Cape York Peninsula, 11°22.976 S 142°24.788 E, 54 m asl, 20-x-2014; 7/5/0, Jardine River, Cape York Peninsula, 11°09.070 S 142°21.335 E, 7 m asl, 22-x-2014, 1/0/0 dissected and slide mounted; 6/14/0, Jacky Jacky Creek, Jardine River NP, 11°01.381 S 142°23.277 E, 16 m asl, 22-x-2014.

Remarks. *Recifella bifida* can easily be separated from all other *Recifella* species by the three specialized setae in the middle of IV-leg-5, which are much shorter than the other setae and are bifurcate as illustrated in Fig. 5D.

***Recifella doomba* Cook, 1986**

Figure 5C

Material examined. **Queensland.** 3/6/0, Lake Moondarra, Mt Isa, 20°35.274 S 139°34.357 E, 8-x-2005; 1/3/0, Fletcher Creek, Dalrymple NP, 19°49.125 S 146°03.771 E, 260 m asl, 22-x-2005; 1/3/0, Porcupine Creek, Porcupine Gorge NP, 20°21.039 S 144°27.852 E, 23-x-2005; 1/3/0, Alligator Creek, pool, upstream, Bowling Green Bay NP, 19°26.740 S 146°58.471 W, 79 m asl, 11-xi-2014; 1/8/0, Little Yabba Creek at crossing with road Kenilworth-Maleny, 26°37.427 S 152°41.334 E, 98 m asl, 19-xi-2014, 1/0/0 dissected and slide mounted; 1/0/0, Kolan River crossing Gin Gin-Kalpowar Road, 24°44.348 S 151°28.339 E, 149 m asl, 29-xi-2014.

Distribution. New South Wales, Queensland and the Northern Territory.

Remarks. *Recifella doomba* is characterized by combination of a long, heavy distoventral seta on III-leg-5 with large pectinations, and IV-leg-5 with three specialized setae widely separated, with the most distal one located in the distal half of the segment, as illustrated in Fig. 5C.

***Recifella insolitseta* sp. nov.**

Figs 6–7

Material examined. Holotype, male, **Queensland**, Takilberan Creek, N of Gin Gin at crossing with Bruce Highway, 24°49.680 S 151°42.479 E, 85 m asl, 18-xi-2014, dissected and slide mounted (QM).

Diagnosis. III-leg-2 with a long, heavy ventral seta, located in the centre of the segment, distally expanded and bluntly pointed; three specialized setae of IV-leg-5 somewhat widened distally, placed close together on a noticeable ventral bulge.

Description. Male. Dorsal and ventral shield present; dorsal shield 540 long and 425 wide, with four pairs of glandularia (Figure 6B), fused posteriorly with ventral shield. Postocularia fused with the ventral shield; no glandularia lying in the dorsal furrow. Ventral shield approximately (partly squeezed) 556 long, tips of first coxal plates rounded. Apodemes of anterior coxal plates extending beyond the middle of third coxal plates. Genital plates fused with the ventral shield with approximately 19–23 pairs of acetabula, 277 wide between outer margins of acetabula; gonopore 66 long. Ejaculatory complex 113 long.

Palp as illustrated in Figure 6C: dorsal length/height: P1, 28/36; P2, 110/63; P3, 58/45; P4, 107/33; P5, 31/20; dorsal heavy seta at the tip of P5 widely diverging of the more ventral two. Gnathosoma with anchoral process 136 long. Chelicera (Figure 6D) 131 long, claw 45 long, basal segment 86 long.

Dorsal lengths of I-leg: 55, 114, 120, 159, 200, 190; dorsal lengths of III-leg: 77, 111, 103, 161, 178, 163; III-leg-2 with a long, heavy seta, located in the centre of ventral margin, distally expanded and bluntly pointed as illustrated in Figures 7A–B; III-leg-5 with a long, heavy distoventral seta with large pectinations, ventral heavy setae longer (Figures 7A–B); dorsal lengths of IV-leg: 92, 119, 118, 167, 263, 219; IV-leg-5 bowed; the three specialized setae of IV-leg-5 placed close together and located on a noticeable ventral bulge (Figure 6F, inset), these setae somewhat widened distally and with small pectinations. III-leg-3 with one, III-leg-4 and 5 each with three swimming setae; IV-leg-3 with one distoventral, IV-leg-4 and 5 each with three distoventral swimming setae.

Etymology. Named for the unusual seta of III-leg-2.

Remarks. With Smit (2007) the examined specimens key out as *Recifella triradiata*, a species known from Queensland (Cook 1986). From the new species, *R. triradiata*, differs in the ventral seta on III-leg-2 normal in shape, similar to two other setae, not expanded distally (compare figure 7C with figures 7A–B).

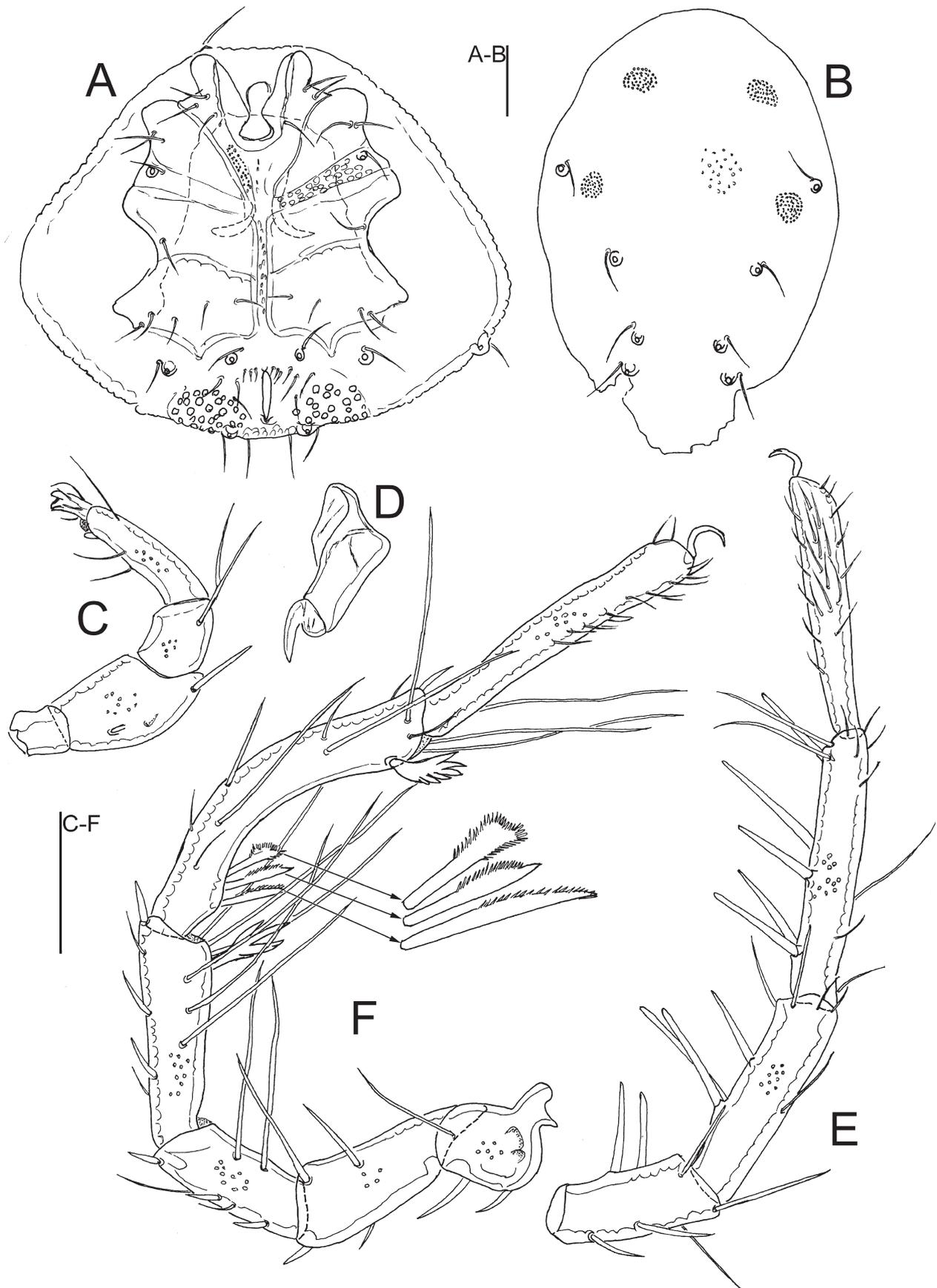


FIGURE 6. *Recifella insolitseta* sp. nov., ♂ holotype, Takilberan Creek, Queensland: A—idiosoma, ventral view (mounted, partly squeezed); B—dorsal shield; C—palp; D—chelicera; E—I-leg-3-6; F—IV-leg (inset: specialized setae on IV-leg-5, enlarged 2x). Scale bars = 100 µm.

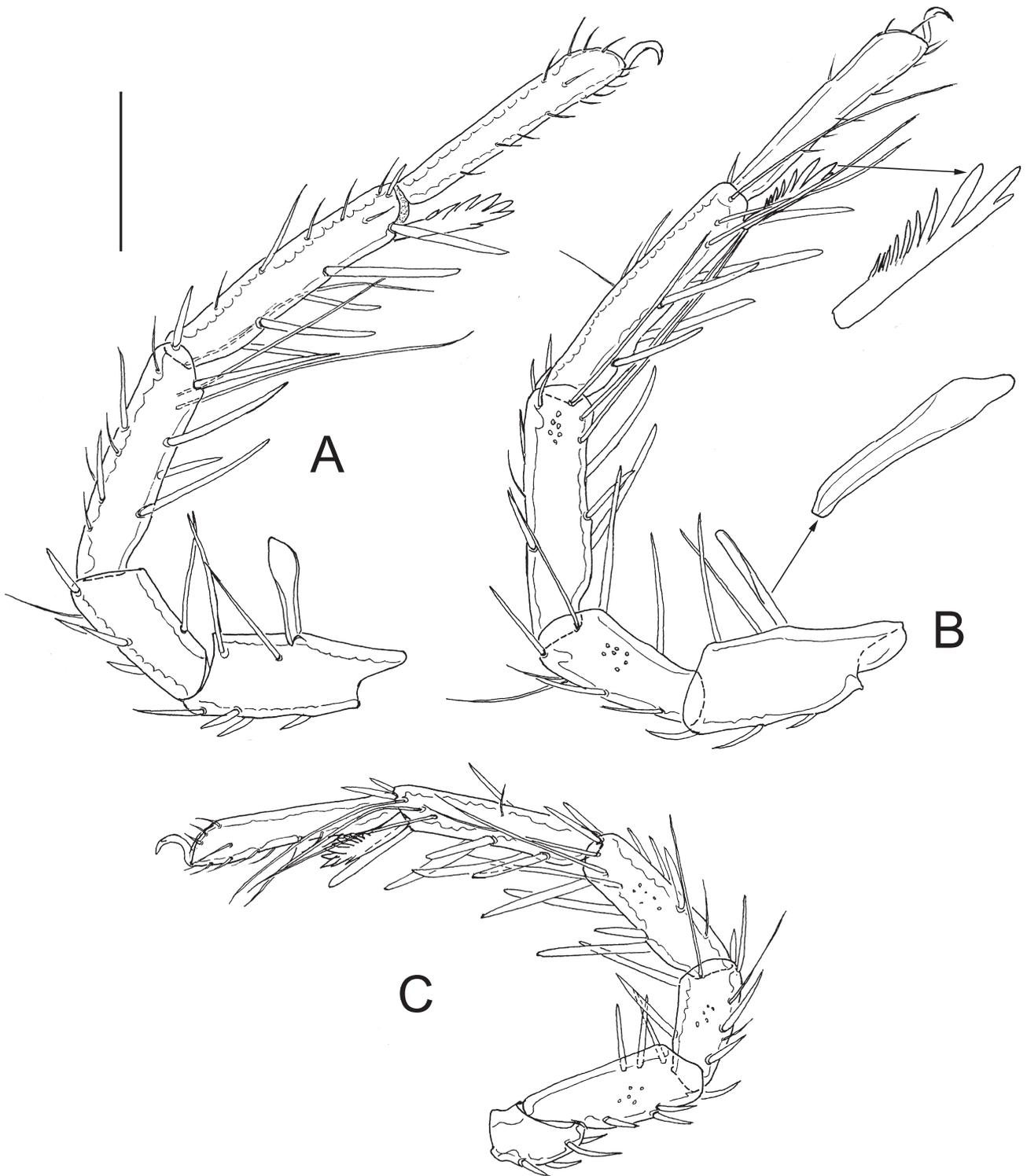


FIGURE 7. A–B *Recifella insolitiseta* sp. nov., ♂ holotype, Takilberan Creek, Queensland: A—III-leg-3-6; B—III-leg-2-6 (inset: selected setae, enlarged 2x). C *Recifella triradiata*, ♂, Waterfall Creek, Queensland: III-leg. Scale bars = 100 µm.

***Recifella integra* sp. nov.**

Figs. 8–9

Material examined. Holotype, male, **Queensland**, small lake S of Biggenden, along road Biggenden-Maryborough, 25°33.583 S 152°07.345 E, 1-xi-2005, dissected and slide mounted (QM). Paratypes: same data as the holotype, 0/1/0 dissected and slide mounted (QM), 7/10/2 (in fluid, RMNH).

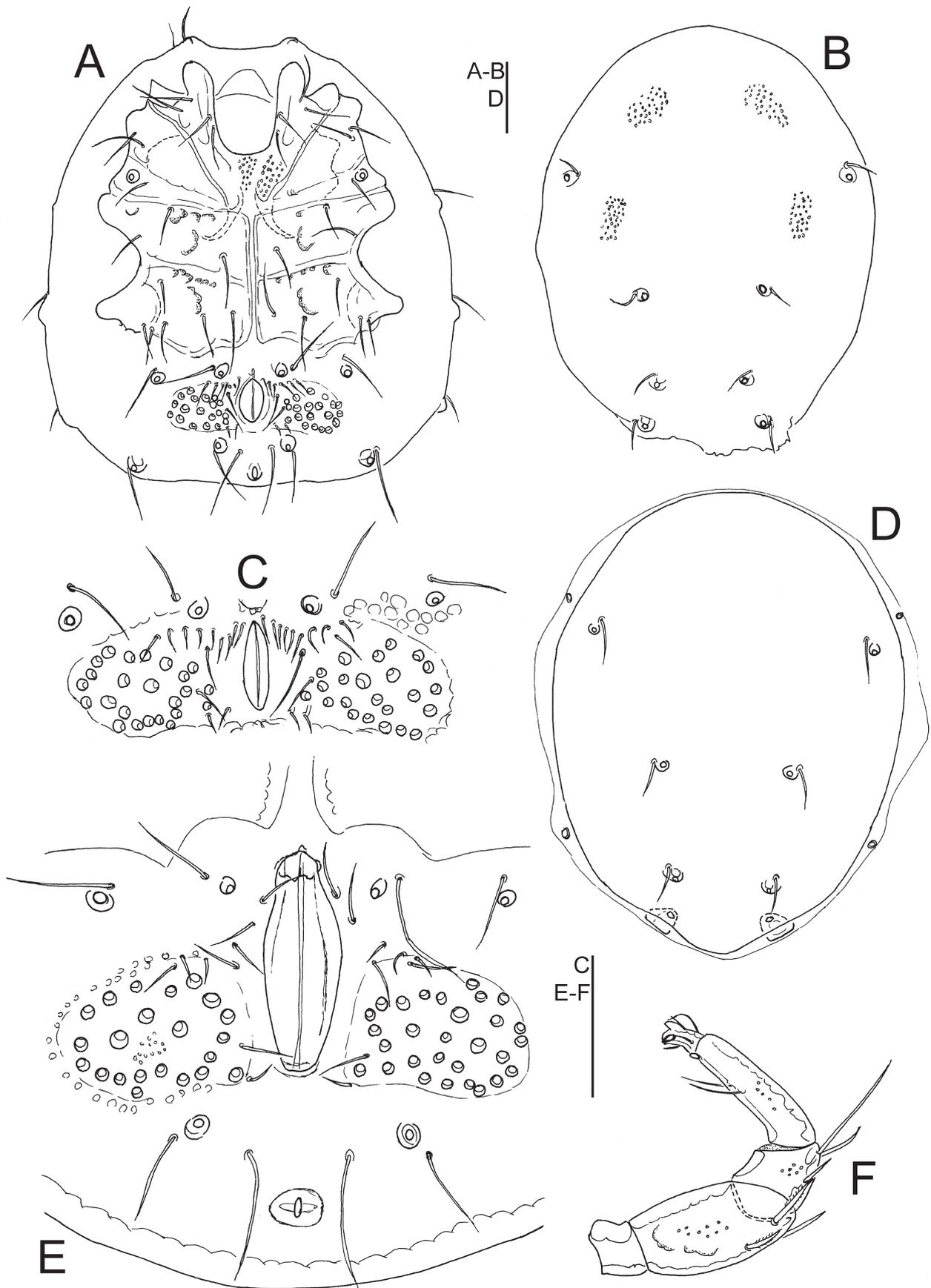


FIGURE 8. *Recifella integra* sp. nov. (A–C, F ♂ holotype, D–E ♀ paratype), small lake S of Biggenden, Queensland: A—idiosoma, ventral view (mounted, partly squeezed); B, D—dorsal shield; C—genital field; E—posteroventral part of ventral shield; F—palp. Scale bars = 100 µm.

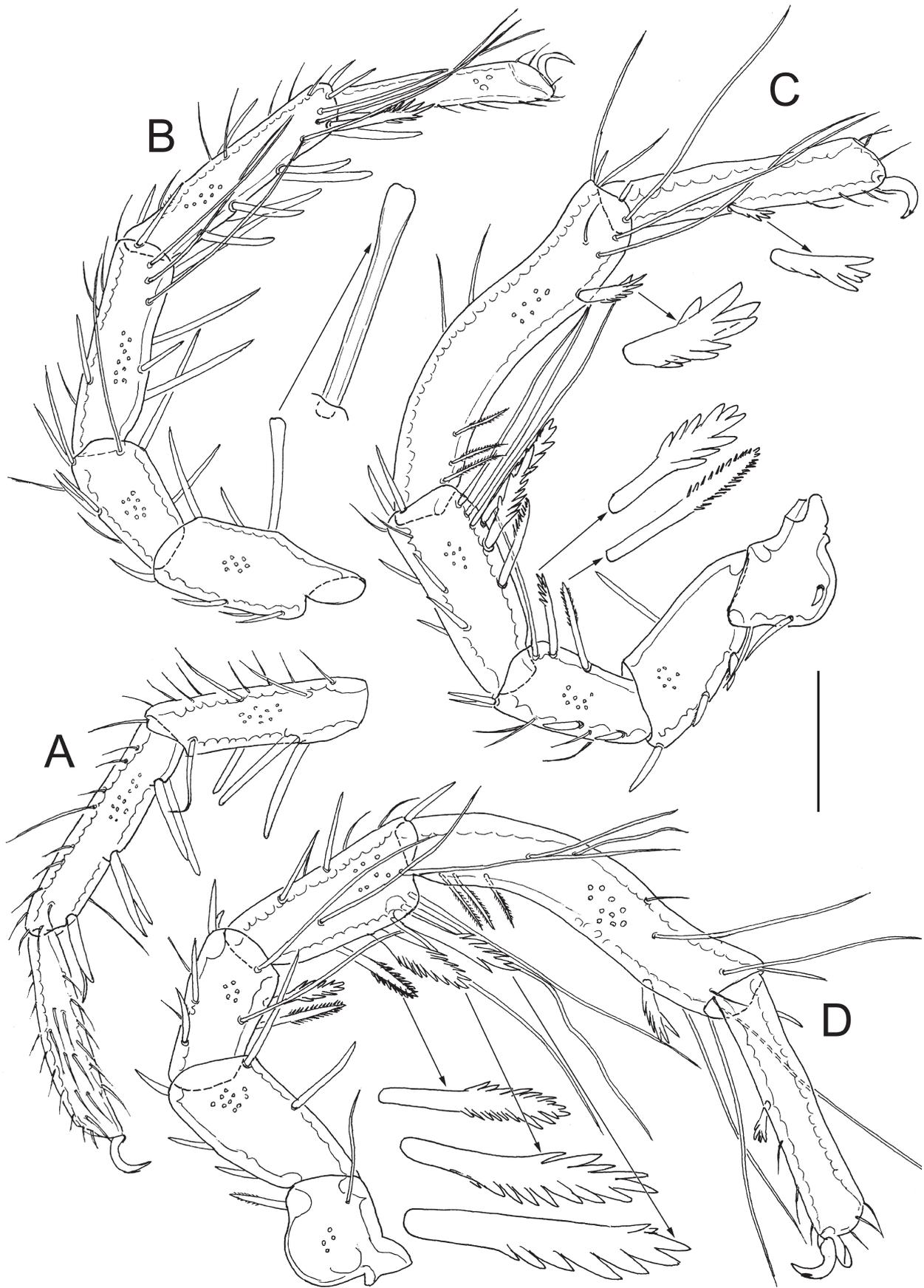


FIGURE 9. *Recifella integra* sp. nov., ♂ holotype, small lake S of Biggenden, Queensland: A—I-leg-4-6; B—III-leg-2-6 (inset: selected seta, enlarged 2x); C—D—IV-leg (inset: selected setae, enlarged 2x). Scale bars = 100 μ m.

Diagnosis. III-leg-2 with a very long, heavy ventral seta, located nearly in the centre of the segment, distally slightly expanded, nearly truncated tip; the three specialized setae of IV-leg-5 slender, hair-like, placed close together and located on slight ventral bulge.

Description. Male. Dorsal and ventral shield present; dorsal shield 606 long and 475 wide, with four pairs of glandularia (Figure 8B), fused posteriorly with ventral shield. Postocularia fused with the ventral shield; no glandularia lying in the dorsal furrow. Dorsal shield without a peculiar coloration. Ventral shield 637 long and 569 wide, tips of first coxal plates rounded. Apodemes of anterior coxal plates extending beyond the middle of third coxal plates. Genital plates fused with the ventral shield with approximately 23-24 pairs of acetabula, 256 wide between outer margins of genital acetabula; gonopore long. Excretory pore subterminal. Ejaculatory complex 117 long.

Palp as illustrated in Figure 8F: dorsal length/height: P1, 31/39; P2, 113/61; P3, 53/45; P4, 108/33; P5, 30/17; dorsal heavy seta at the tip of P5 widely diverging the more ventral two. Gnathosoma with anchoral process 145 long. Chelicera 141 long, claw 52 long, basal segment 107 long

Dorsal lengths of I-leg-2–6: 115, 113, 163, 178, 158; dorsal lengths of III-leg: 80, 109, 100, 159, 186, 159; III-leg-2 with a very long, heavy ventral seta, located nearly in the centre of the segment, distally slightly expanded, nearly truncated tip (Figure 9B, inset); III-leg-5 with a long, heavy distoventral seta with large pectinations, heavy setae longer (Figure 9B); dorsal lengths of IV-leg: 91, 116, 119, 153, 281, 206; IV-L-5 bowed; the three specialized setae of IV-leg-5 slender, a hair-like, placed close together and located on slight ventral bulge (Figure 9C-D). III-leg-3 with one, III-leg-4 and 5 each with three swimming setae; IV-leg-3 with one distoventral, IV -leg-4 and 5 each with three distoventral swimming setae.

Female. Dorsal shield 656 long and 494 wide, with three pairs of glandularia (Figure 8D). Ventral shield 763 long and 731 wide. Genital plates with approximately 22-29 pairs of acetabula, 319 wide between outer margins of acetabula; gonopore 156 long.

Palp: dorsal length/height: P1, 31/38; P2, 108/66; P3, 58/52; P4, 106/38; P5, 31/19. Gnathosoma with anchoral process 166 long. Chelicera 165 long, claw 50 long, basal segment 102 long. Dorsal lengths of III-leg: 72, 106, 93, 150, 166, 159; dorsal lengths of IV-leg: 84, 123, 126, 184, 228, 200; swimming setae setation as in male.

Etymology. Named for the untoothed seta of III-leg-2.

Remarks. The new species resembles *Recifella triradiata*, but clearly differs in III-leg-2 with a large strange, truncated seta which is absent in *triradiata*. Moreover, the three specialized setae in the new species are much more slender, hair-like (these setae in *triradiata* are somewhat widened distally, compare figure 942 in Cook 1986 with figures 9C-D). *Recifella tinka* resembles the new species in having three specialized setae on IV-leg-5 not widened distally, placed close together and located on a slight ventral bulge (see Figure 5B). From the latter, the new species differs in slender palpal segments and the three specialized setae on IV-leg-5 comparatively more slender, and the most anterior one somewhat more distanced from the two others (compare figures 9C-D and figure 5B)

***Recifella kakadu* Smit, 2007**

Figs. 10–11, 16D

Material examined. **Northern Territory.** 1/0/0, Florence Creek downstream of Florence Falls, Litchfield NP, 13°05.885 S 130°46.999 E, 25-ix-2005, dissected and slide mounted..

Description. Male. Dorsal and ventral shield present; dorsal shield colouration conspicuous reddish, 477 long and 422 wide, with four pairs of glandularia (Figure 10B), fused posteriorly with ventral shield. Postocularia fused with the ventral shield; no glandularia lying in the dorsal furrow. Dorsal shield with a peculiar coloration as illustrated in Figure 16D. Ventral shield 528 long and 475 wide, tips of first coxal plates rounded. Apodemes of anterior coxal plates extending the middle of third coxal plates. Genital plates fused with the ventral shield with approximately 24-25 pairs of acetabula, 280 wide between outer margins of acetabula; gonopore 72 long. Ejaculatory complex 122 long.

Palp as illustrated in Figures 10C-D: dorsal length/height: P1, 24/33; P2, 117/72; P3, 50/50; P4, 84/30; P5, 35/18; dorsal heavy seta at the tip of P5 widely diverging the more ventral two. Gnathosoma ventrally 53 long, 113 with anchoral process. Chelicera 141 long,

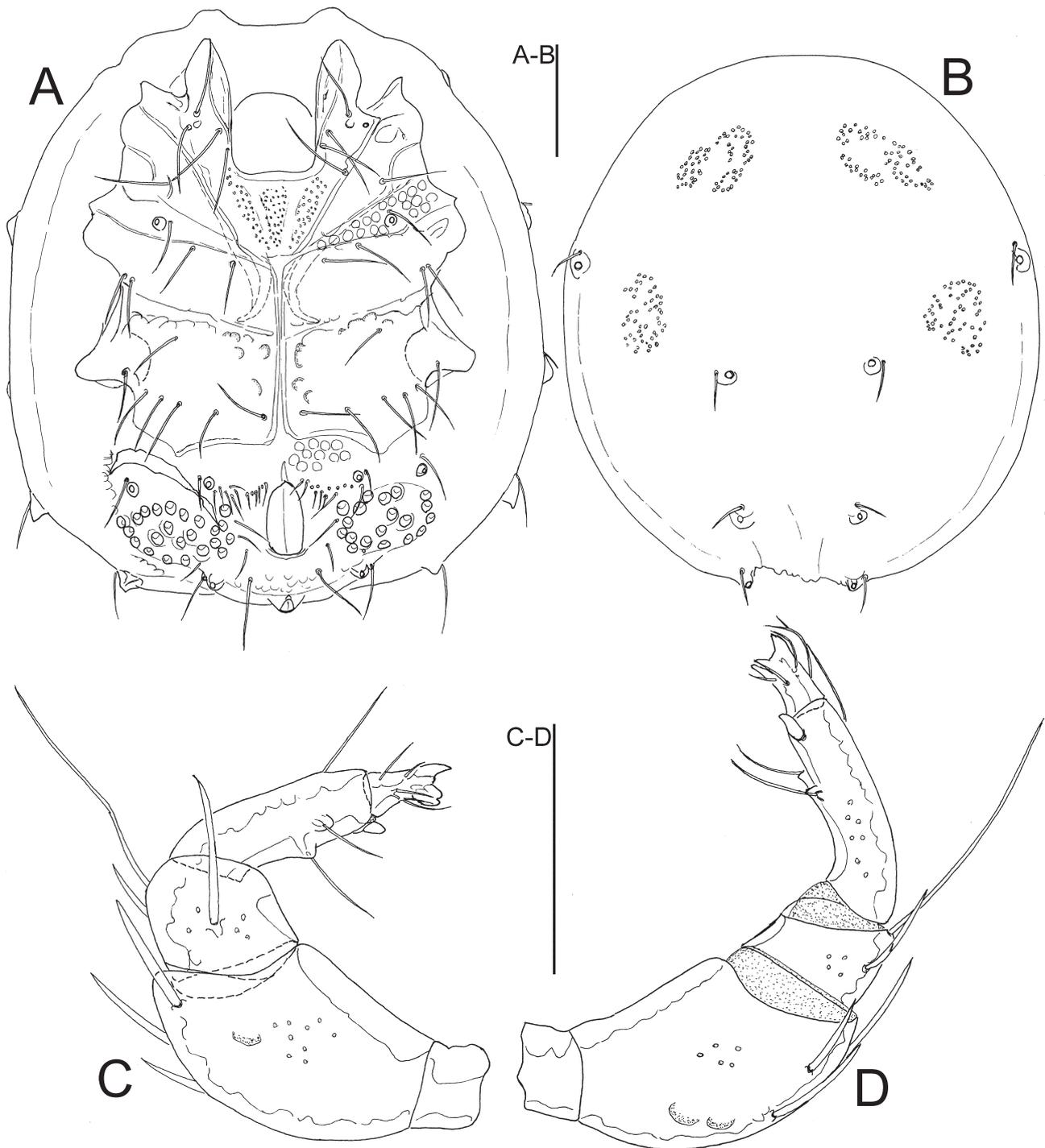


FIGURE 10. *Recifella kakadu*, ♂, Florence Creek, Northern Territory: A—idiosoma, ventral view; B—dorsal shield; C-D—palp. Scale bars = 100 μ m.

Dorsal lengths of I-leg: 55, 91, 86, 117, 129, 134; dorsal lengths of III-leg: 61, 102, 83, 127, 136, 133; III-leg-5 with a short distal seta, distally bluntly pointed and without a large pectinations (Figure 11B); dorsal lengths of IV-leg: 66, 128, 109, 153, 194, 166; IV-L-5 not bowed, comparatively short, with four setae, the most anterior one bowed and with large pectinations, the three specialized setae placed in posterior part of the segment, most proximal of them with small pectinations, two other specialized setae with large pectinations (Figure 11C-D). III-leg-3 with one, III-leg-4 and 5 each with three swimming setae; IV-leg-3 with one distoventral, IV-leg-4 and 5 each with three distoventral swimming setae.

Remarks. We give here a redescription of *Recifella kakadu* Smit, 2007 a species known previously from a single male from Baboalba springs in Northern Territory (Smit 2007). Smit (2007) mentioned the presence of five pectinate setae on IV-leg-5, four so-called specialized setae with small pectinations and the most anterior one bowed and with large pectinations. In the new specimen from Florence Creek, IV-leg-5 possesses three specialized setae, most proximal of them with small pectinations, two other specialized setae with large pectinations, especially the most distal one, which is also larger than the other specialized setae. More material is needed to know the number of specialized setae of IV-leg-5. For the time being, we assign specimens with IV-leg-5 with three or four specialized setae to *R. kakadu*.

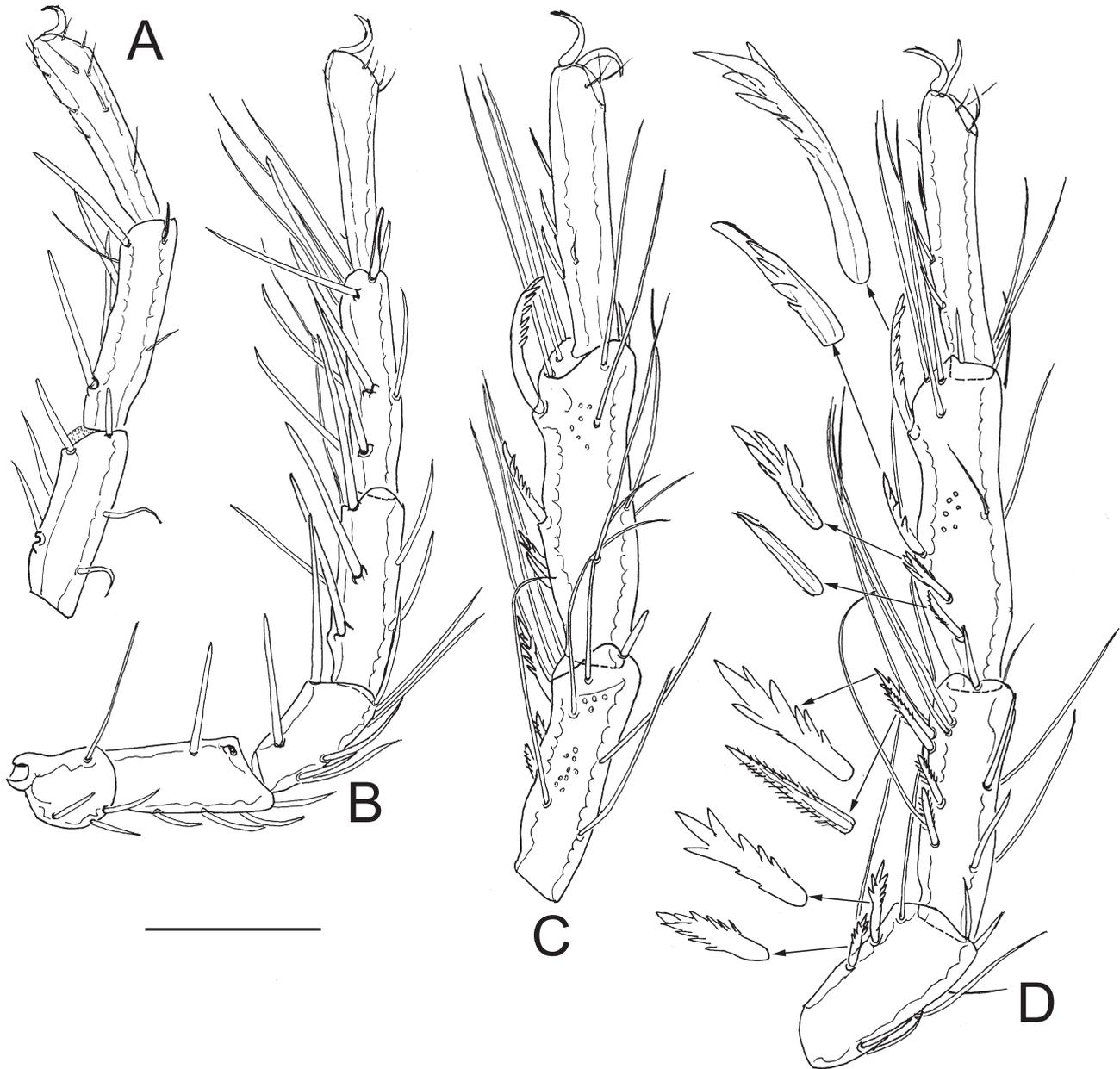


FIGURE 11. *Recifella kakadu*, ♂, Florence Creek, Northern Territory: A—I-leg-4-6; B—III-leg; C—IV-leg-4-6; D—IV-leg-3-6 (inset: selected ventral setae, enlarged at 2x). Scale bars = 100 μ m.

***Recifella quadriseta* sp. nov.**

Fig. 12, 13A–B, 16C

Material examined. Holotype male, **New South Wales**, Shoalhaven River, E of Burrier, 34°52.364 S 150°27.865 E, 0 m asl, 29-i-2024, dissected and slide mounted (AMS).

Diagnosis. III-leg-5 with a distal robust seta, distally bluntly pointed and with very fine serrations. IV-L-5 bowed, with four specialized setae, three of these located in distal half of segment, the posterior one, spoon-shaped, with anterior margin very finely serrated.

Description. Male. Dorsal and ventral shield present; dorsal shield 563 long and 478 wide, with four pairs of glandularia (Figure 12B), fused posteriorly with ventral shield. Postocularia fused with the ventral shield; no glandularia lying in the dorsal furrow. Dorsal shield without a peculiar colouration (as illustrated in Figure 16C). Ventral shield (partly squeezed) approximately 600 long, tips of first coxal plates rounded. Apodemes of anterior coxal plates extending to the middle of third coxal plates. Genital plates fused with the ventral shield with approximately 36 pairs of acetabula, 319 wide between outer margins of acetabula; gonopore 76 long. Excretory pore subterminal. Ejaculatory complex 123 long.

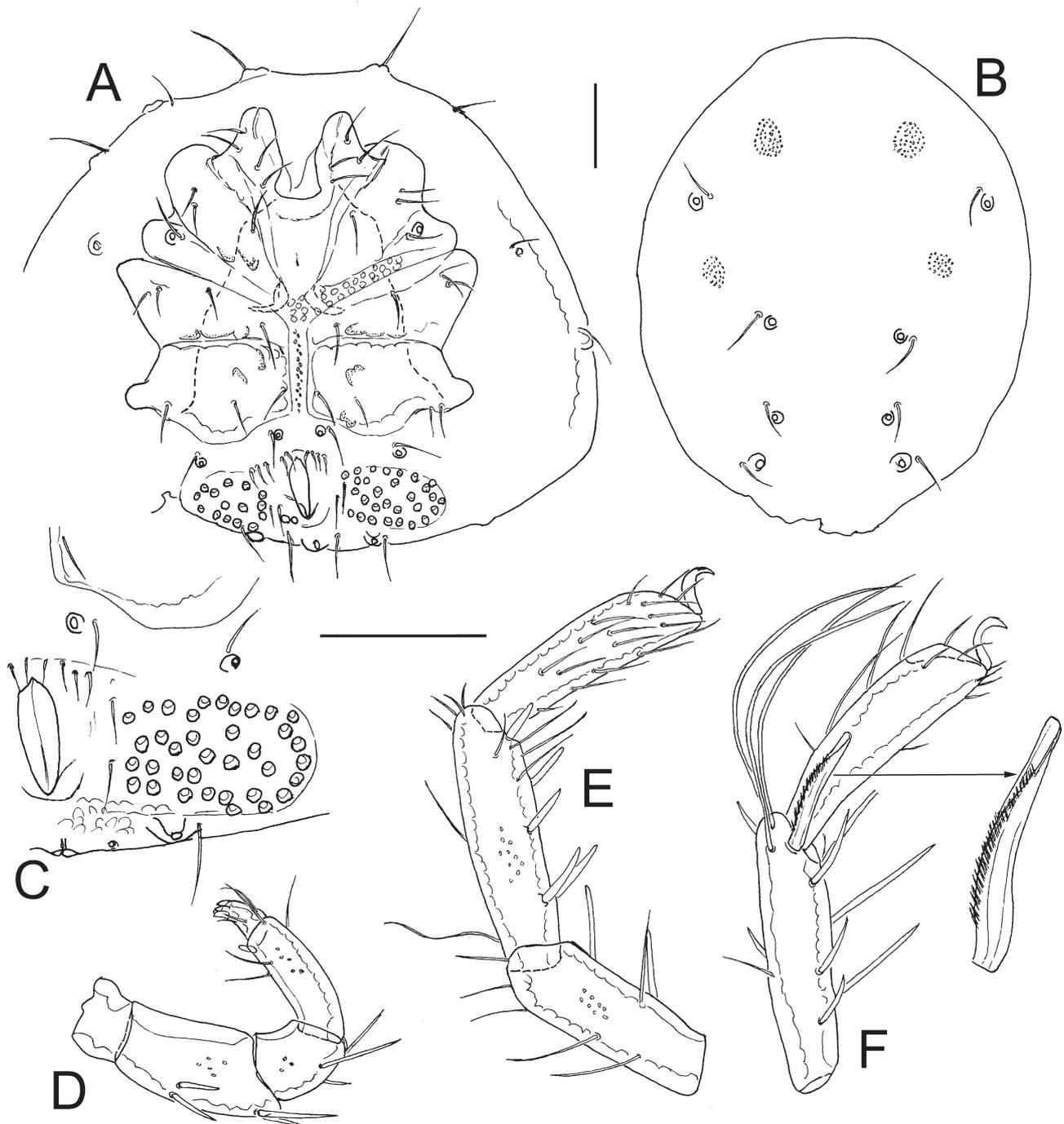


FIGURE 12. *Recifella quadriseta* sp. nov., ♂ holotype, Shoalhaven River, New South Wales: A—idiosoma, ventral view (mounted, partly squeezed); B—dorsal shield; C—genital field; D—palp; E—I-leg-4-6; F—IV-leg-5 and 6 (inset: selected seta, enlarged at 2x). Scale bars = 100 µm.

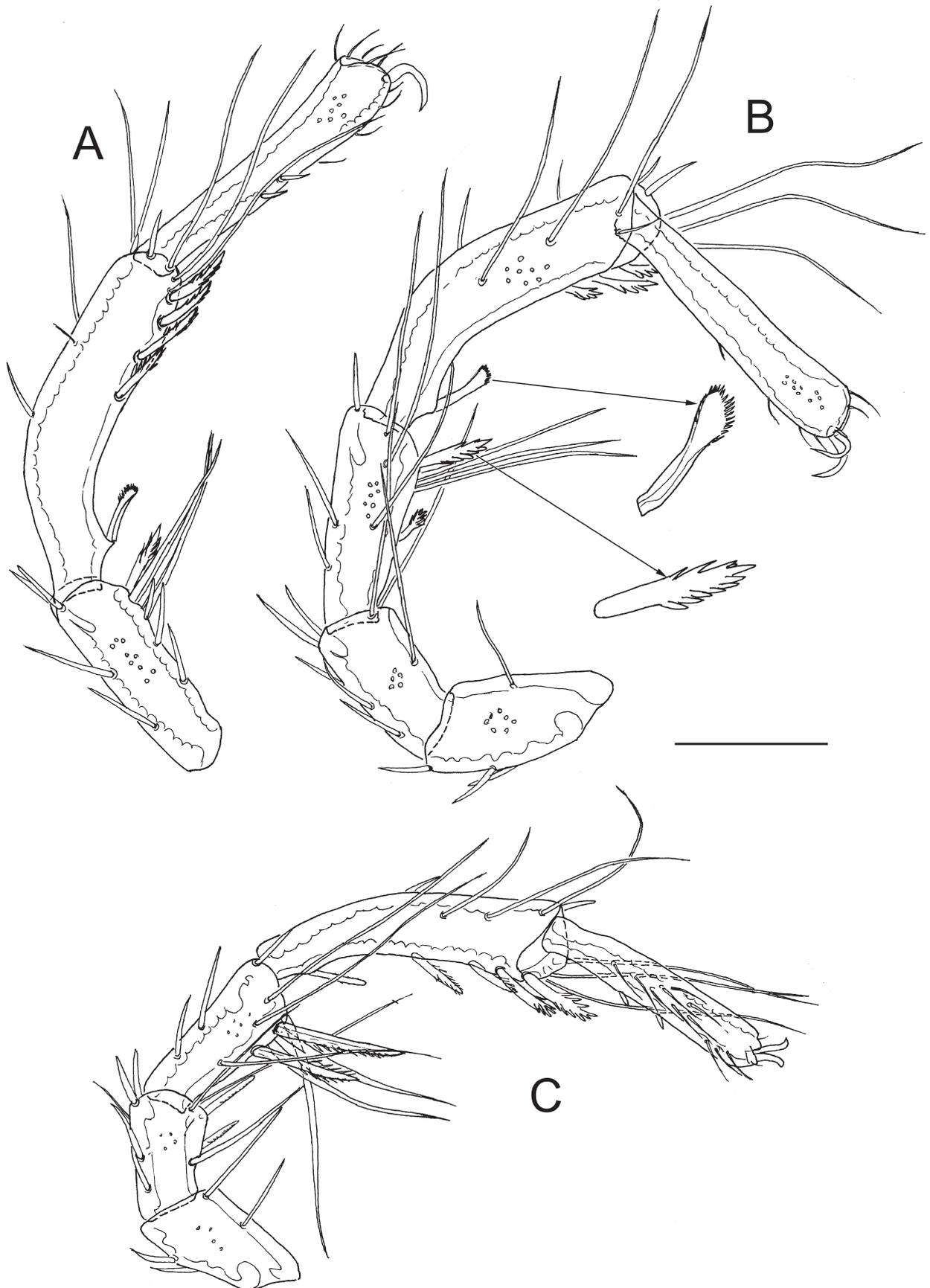


FIGURE 13. A–B *Recifella quadriseta* sp. nov., ♂ holotype, Shoalhaven River, New South Wales: A–B—IV-leg-2-6 (inset: selected seta, enlarged at 2x). C *Recifella szalayi*, ♂, unnamed creek 7.6 km N of Archer River, Queensland: IV-leg-2-6. Scale bars = 100 μ m.

Palp as illustrated in Figure 12D: dorsal length/height: P1, 30/42; P2, 111/59; P3, 59/47; P4, 97/31; P5, 30/21. Gnathosoma ventrally 72 long. Chelicera 139 long.

Dorsal lengths of I-leg-2–6: 106, 98, 138, 164, 148; dorsal lengths of III-leg-2–6: 127, 99, 151, 173, 166; III-leg-5 with a distal robust seta, distally bluntly pointed and with very fine serrations (Figure 12F, inset); dorsal lengths of IV-leg-2–6: 121, 106, 144, 248, 217; IV-L-5 bowed, with four specialized setae, three of these located in distal half of segment, the posterior one, spoon-shaped, with anterior margin very finely serrated (Figures 13A–B). III-leg-3 with one, III-leg-4 and 5 each with three swimming setae; IV-leg-3 with one distoventral, IV-leg-4 and 5 each with three distoventral swimming setae.

Etymology. Named for the four specialized setae of IV-leg-5.

Remarks. The new species resembles *Recifella szalayi* in similar shape of legs (ventral setae of I-leg-5 relatively short and pointed; III-leg-5 with a broad and curved distal seta, III-leg-6 with three long, curved setae on dorsal surface) and palp (the four claw-like setae at the tip of P4 of approximately the same length and lie more or less parallel to each other). However, *R. szalayi* has IV-leg-5 with three specialized setae while the new species has IV-leg-5 with four specialized setae.

Recifella ligulifera Smit, 2007, a species known from Northern Territory and Western Australia (Smit 2007) resembles the new species in shape of IV-leg-5 with three specialized setae located in distal half of segment, and a peculiar spoon-shaped seta in the posterior part of the segment. Following Smit (2007) the later species differs in ventrodiscal seta on III-leg-5 with a large pectinations.

***Recifella rotundiseta* sp. nov.**

Figs. 14–15, 16B

Material examined. Holotype, male, Northern Territory, Wangi Creek upstream of Wangi Falls, Litchfield NP, 13°09.832 S 130°41.166 E, 25-ix-2005, dissected and slide mounted (NTM). Paratype: same data as the holotype, 1/0/0 (in fluid, RMNH).

Diagnosis. Dorsal shield coloration conspicuous blue; III-leg-5 with a long, heavy distoventral seta with large pectinations; IV-leg-5 with an S-shaped ventral margin; three specialized setae of IV-leg-5 short and with thick pectinations, the middle seta not blade-like but rounded at its tip.

Description. Male. Dorsal and ventral shield present; dorsal shield 422 long and 338 wide, with four pairs of glandularia, fused posteriorly with the ventral shield. Postocularia fused with the ventral shield; no glandularia lying in the dorsal furrow. Posterior pairs of dorsal shield on large tubercles (Figure 14B). Dorsal shield with a peculiar coloration, as illustrated in Figure 16B: two longitudinal blue bands fused in the anterior part of the shield. Ventral shield 481 long and 419 wide, tips of first coxal plates rounded. Apodemes of anterior coxal plates extending beyond the middle of third coxal plates. Genital plates fused with the ventral shield with approximately 20–26 pairs of acetabula, 209 wide between outer margins of acetabula; gonopore 70 long. Excretory pore terminal (Figure 14A)

Palp as illustrated in Figures 14C–D: dorsal length/height: P1, 21/28; P2, 84/48; P3, 40/39; P4, 89/28; P5, 29/16. dorsal heavy seta at the tip of P5 widely diverging the more ventral two. Gnathosoma with anchoral process 104 long. Chelicera 131 long,

Dorsal lengths of I-leg: 48, 101, 95, 142, 166, 166; dorsal lengths of III-leg-2–6: 100, 94, 141, 156, 133; III-leg-5 with a long, heavy distoventral seta with large pectinations (Figure 15B, inset); dorsal lengths of IV-leg-2–6: 81, 97, 156, 209, 141; IV-leg-5 bowed, with an S-shaped ventral margin; the three specialized setae of IV-leg-5 short and with pectinations as illustrated in Figure 15D (inset). The middle of the three specialized setae rounded at its tip. III-leg-3 with one, III-leg-4 and 5 each with three swimming setae; IV-leg-3 with one distoventral, IV-leg-4 and 5 each with three distoventral swimming setae.

Etymology. Named after the middle of the three specialized setae having a rounded tip.

Remarks. The new species resembles *Recifella kimberleyensis* Smit, 2007, a species known from Western Australia (Smit 2007). The latter species differs in one of the three specialized setae of IV-leg-4 is without pectinations, while all specialized setae of the new species have pectinations. Smit (2007) did not mention the peculiar colouration of the dorsal shield of *R. kimberleyensis*.

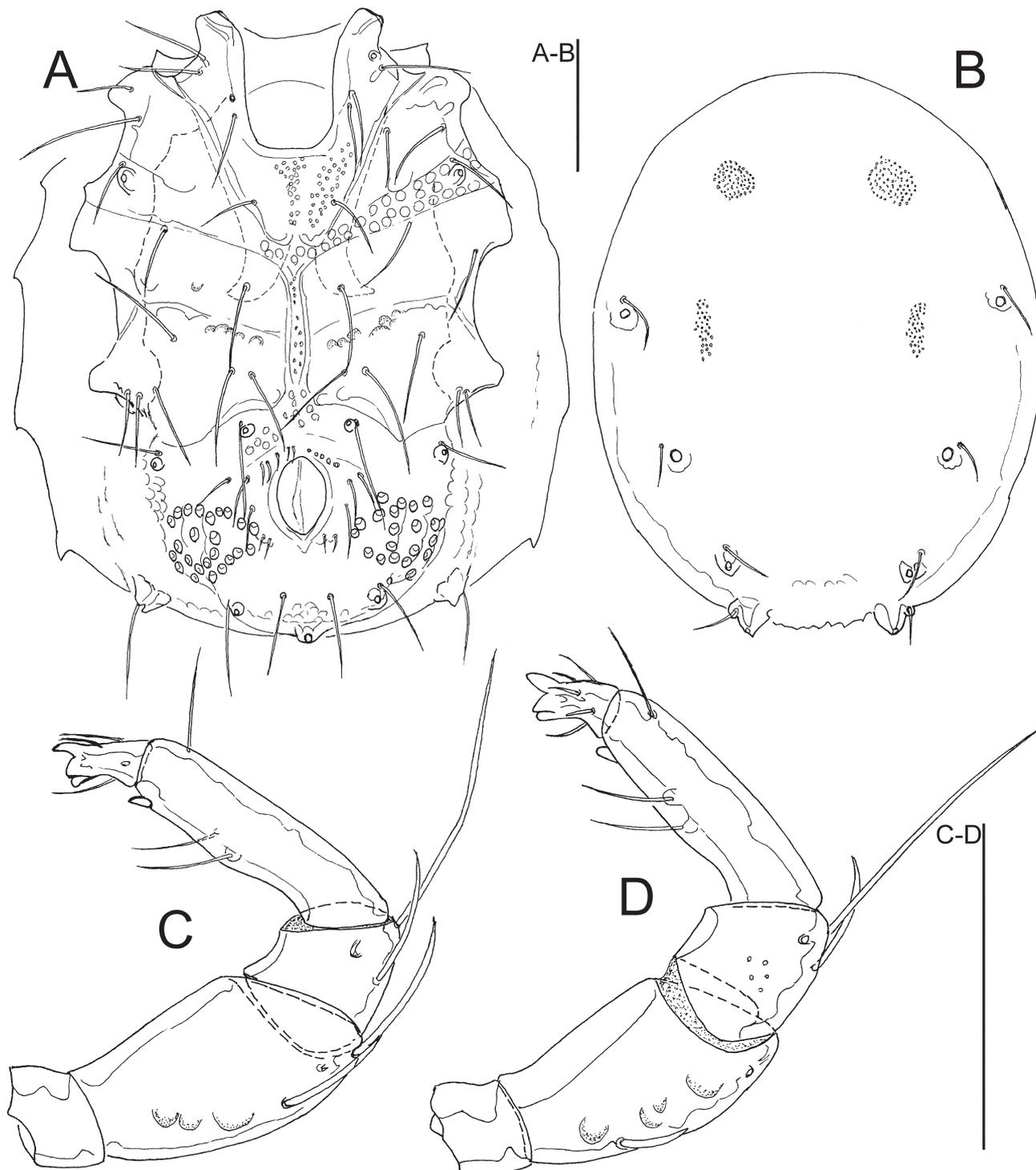


FIGURE 14. *Recifella rotundiseta* sp. nov., ♂ holotype, Wangi Creek, Northern Territory: A—idiosoma, ventral view (unmounted); B—dorsal shield; C–D—palp. Scale bars = 100 µm.

***Recifella szalayi* Cook, 1986**

Fig. 13C

Material examined. **Queensland.** 1/0/0, unnamed creek 7.6 km N of Archer River, Cape York Peninsula, 13°23.157 S 142°54.316 E, 103 m asl, 23-x-2014, dissected and slide mounted.

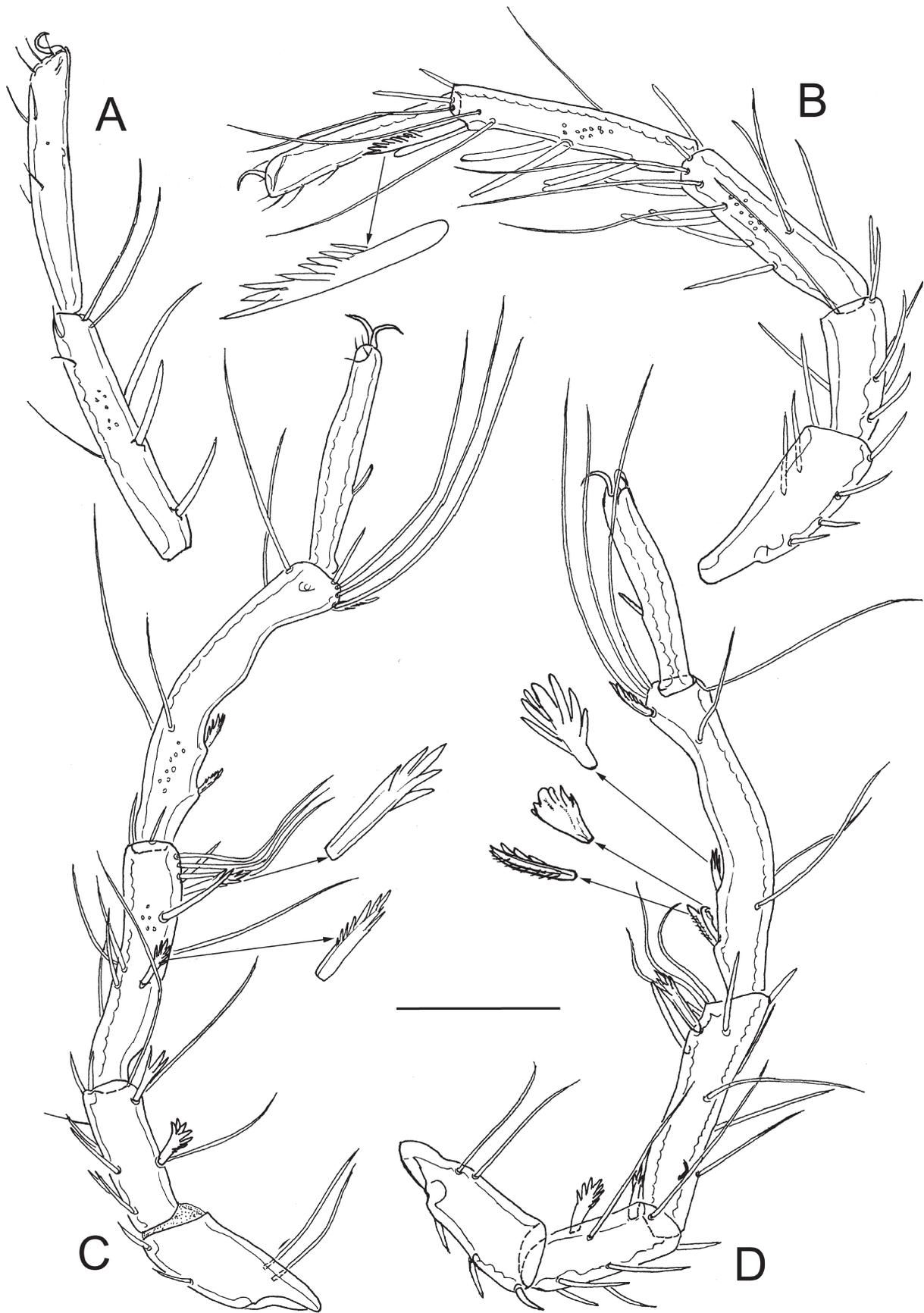


FIGURE 15. *Recifella rotundiseta* sp. nov., ♂ holotype, Wangi Creek, Northern Territory: A–I-leg-5 and 6; B–III-leg-2-6 (inset: dorsodistal seta on III-leg-5, enlarged 2x); C–D–IV-leg-2-6 medial and lateral view (inset: selected ventral setae, enlarged 2x). Scale bars = 100 μ m.

Remarks. *Recifella szalayi* can be separated from all other *Recifella* species in the combination of a broad and distally pointed heavy seta of III-leg-5 and IV-leg-5 with one of the four specialized setae placed in the proximal part of the segment (as illustrated in Figure 13C).

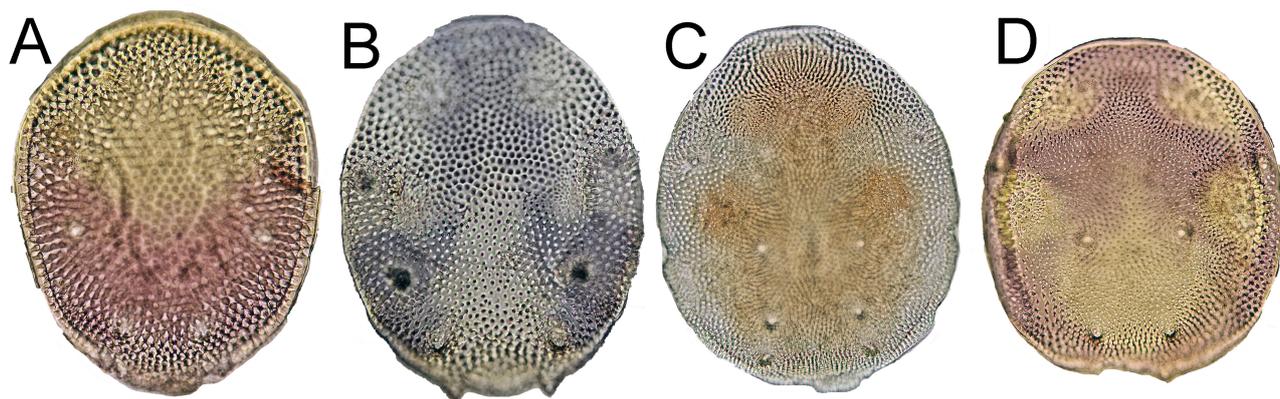


FIGURE 16. Photographs of male dorsal shield of selected species (photographed immediately after dissection). A—*Recifella flagellata*; B—*Recifella rotundiseta* sp. nov.; C—*Recifella quadriseta* sp. nov.; D—*Recifella kakadu*.

Recifella tinka (K.O. Viets, 1975)

Fig. 5A–B

Material examined. **Queensland.** 32/29/0, Lake Moondarra, Mt Isa, 20°35.274 S 139°34.357 E, 8-x-2005, 1/0/0 dissected and slide mounted; 10/8/0, Porcupine Creek, Porcupine Gorge NP, 20°21.039 S 144°27.852 E, 23-x-2005; 1/2/0, Little Yabba Creek at Charlie Moreland Campground, Kenilworth, 26°36.928 S 152°39.105 E, 107 m asl, 2-xi-2005.

Distribution. Queensland, Northern Territory and Western Australia.

Recifella triradiata Cook, 1986

Fig. 7C

Material examined. **Queensland.** 2/11/0, Pandanus Creek, Cathu State Forest, 20°47.904 S 148°32.658 E, 24-x-2005; 3/9/0, Waterfall Creek, Mt Walsh NP, 25°38.422 S 152°05.363 E, 197 m asl, 1-xi-2005, 1/0/0 dissected and slide mounted; 1/1/0, Prospect Creek, 33 km SW of Sarina, 21°37.285 S 149°01.595 E, 185 m asl, 17-xi-2014; 1/2/0, Spring Creek, N of Woolooga, 25°44.497 S 152°14.442 E, 111 m asl, 18-xi-2014; 1/0/0, Kolan River crossing Gin Gin-Kalpowar Road, 24°44.348 S 151°28.339 E, 149 m asl, 29-xi-2014; 2/2/0, Neurum Creek downstream of Rockhole, d'Aquilar NP, 27°02.804 S 152°41.516 E, 197 m asl, 30-xi-2014.

Distribution. Tasmania, New South Wales and Queensland.

Recifella umala Cook, 1986

Material examined. **New South Wales.** 3/8/0, pool in Mogo Creek, Yengo NP, 33°10.915 S 151°03.560 E, 44 m asl, 25-i-2024; 33/20/0, Wheeny Creek, Wollemi NP, 33°27.367 S 150°42.998 E, 75 m asl, 26-i-2024.

Distribution. New South Wales.

Recifella vonjama Cook, 1986

Material examined. **Tasmania.** 7/5/0, Nive River at crossing with road A10, 42°09.456 S 146°28.130 E, 588 m asl, 26-iii-2008.

Distribution. Tasmania and New South Wales.

Key to males of Australian *Recifella* species

- 1 Palp large and robust, P2 with large robust seta 2
 Palp slender, P2 without heavy seta 3
- 2(1) P4 and P5 less robust, P5 length > width, P4 ventrally with smaller setal tubercle and distally with recurved seta.
 *Recifella pinguipalpifera*
 P4 and P5 robust, P5 length subequal to width, P4 ventrally with a very large setal tubercle *Recifella crassipalpis*
- 3(1) Postocularia and Dgl-2 not in dorsal furrow 5
 Postocularia and Dgl-2 in dorsal furrow near eyes, but occasionally fused with dorsal shield 4
- 4(3) P4 with a long dorsodistal seta *Recifella flagellata*
 P4 without a long dorsodistal seta *Recifella hyporheica* Smit, 2007
- 5(3) Leg IV sexually dimorphic, either dorsal shield with four glandularia pairs or dorsal shield with three glandularia pairs and one pair posterior to dorsal shield. 6
 Leg IV not sexually dimorphic, dorsal shield with three glandularia pairs, no glandularia in dorsal furrow posterior to dorsal shield. *Recifella australica*
- 6(5) III-leg-2 with a large, not pectinate seta. 7
 III-leg-2 without such large seta. 8
- 7(6) Seta of III-leg-2 spatulate, the three specialized setae of IV-leg-5 distally slightly expanded, not hair-like.
 *Recifella insolitiseta* **sp. nov.**
 Seta of III-leg-2 not spatulate, specialized setae of IV-leg-5 hair-like, not distally expanded. *Recifella integra* **sp. nov.**
- 8(6) III-leg-5 distal robust seta without pectinations 9
 III-leg-5 distal robust seta with pectinations 12
- 9(8) III-leg-5 distal robust seta not truncated. 10
 III-leg-5 distal robust seta truncated. *Recifella ornata* Smit, 2007
- 10(9) III-leg-5 distal robust seta broad and distally pointed *Recifella szalayi*
 III-leg-5 distal robust slender and distally blunt. *Recifella kakadu*
- 11(8) Coxa I apex broad, tending to be rounded 12
 Coxa I apex narrow, acute *Recifella plana* Cook, 1986
- 12(11) III-leg-5 distal robust seta of usual shape and with marginal pectinations 13
 III-leg-5 distal robust seta with few large teeth ventrally. *Recifella emma* Smit, 2007
- 13(12) IV-leg-5 proximal most specialized setae not spatulate 14
 IV-leg-5 proximal most specialized setae spatulate, margins finely serrated *Recifella ligulifera* Smit, 2007
- 14(13) IV-leg-5 specialized setae located in distal and proximal half. 15
 IV-leg-5 specialized setae located only in proximal half 17
- 15(14) IV-leg-5 with one specialized seta proximally and four seta distally (of which three are specialized setae)
 *Recifella quadriseta* **sp. nov.**
 IV-leg-5 with one specialized seta proximally and two specialized setae distally. 16
- 16(15) IV-leg-5 proximal half with one specialized seta, IV-leg-4 distally with small seta enlarged distally
 *Recifella pseudoszalayi* Smit, 2007
 IV-leg-5 proximal half with at least two specialized setae, IV-leg-4 distally with large pectinate seta *Recifella doomba*
- 17(14) IV-leg-5 with 2 or 3 specialized long seta and with small pectinations 18
 IV-leg-5 specialized setae relatively short and with large pectinations 22
- 18(17) IV-leg-5 specialized setae with small pectinations. 19
 IV-leg-5 distal most specialized seta with large pectinations. *Recifella vonjama*
- 19(18) IV-leg-5 specialized setae farther apart 20
 IV-leg-5 specialized setae close together 21
- 20(19) IV-leg-5 strongly curved, III-leg-5 robust setae comparatively short *Recifella baltoona*
 IV-leg-5 hardly curved, III-leg-5 robust setae relatively long *Recifella colorata* (K.O. Viets, 1980)
- 21(19) IV-leg-5 specialized setae on distinct bulge, palp slender *Recifella triradiata*
 IV-leg-5 specialized setae on slight bulge, palp robust *Recifella tinka*
- 22(17) IV-leg-5 middle specialized setae much shorter than others and bifurcate *Recifella bifida*
 IV-leg-5 middle specialized setae not noticeably shorter than others and not bifurcate 23
- 23(22) IV-leg-5 specialized setae all pectinate, IV-leg-4 ventral margin straight or sinuate 24
 IV-leg-5 with one specialized setae mucronate, without pectinations; IV-leg-4 and-5 with ventral margin sinuate
 *Recifella kimberleyensis* Smit, 2007
- 24(23) IV-leg-5 with the middle specialized seta blunt, IV-leg-5 ventral margin sinuate *Recifella rotundiseta* **sp. nov.**
 IV-leg specialized setae with the middle seta pointed, IV-leg-5 ventral margin more or less straight or concave 25
- 25(24) Excretory pore terminal *Recifella agnosta* Cook, 1986
 Excretory pore subterminal *Recifella umala*

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References

- Cook, D.R. (1986) Water mites from Australia. *Memoirs of the American Entomological Institute*, 40, 1–568.
- Smit, H. (1992) Water mites from New South Wales and Queensland, Australia (Acari: Hydrachnellae). *Tijdschrift voor Entomologie*, 135, 91–112.
- Smit, H. (2007) The water mite genus *Recifella* from Australia (Acari: Hydrachnidia: Unionicolidae). *Records of the Western Australian Museum*, 23, 397–415.
[https://doi.org/10.18195/issn.0312-3162.23\(4\).2007.397-415](https://doi.org/10.18195/issn.0312-3162.23(4).2007.397-415)
- Smit, H. (2008) On the identity of *Recifella colorata* (K.O. Viets) (Acari: Hydrachnidia: Unionicolidae). *Systematic & Applied Acarology*, 13, 244–247.
<https://doi.org/10.11158/saa.13.3.11>
- Smit, H. (2021) The water mites of Western Australia (Acari: Hydrachnidia), with the description of 13 new species. *Acarologia*, 61 (4), 928–966.
<https://doi.org/10.24349/2ew3-Djkg>
- Viets, K.O. (1975) Neue Wassermilben (Acari: Hydrachnellae) aus Australien. *Zoologica Scripta*, 4, 93–100.
<https://doi.org/10.1111/j.1463-6409.1975.tb00721.x>