

New records of water mites of the family Limnesiidae Thor from Australia (Acari: Hydrachnidia), with the description of seven new species

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ABSTRACT

The following new species are described: *Limnesia* (*Limnesia*) *elongata* sp. nov., *Limnesia* (*Limnesia*) *gledhilli* sp. nov., *Limnesia* (*Limnesia*) *pseudomaceripalpis* sp. nov., *Limnesia* (*Limnesia*) *scutata* sp. nov., *Limnesia* (*Limnesia*) *victoria* sp. nov., *Tubophorella paluma* sp. nov. and *T. queenslandica* sp. nov. *Limnesia szalayi* K. Viets, 1955 is synonymized with *L. patens* K. Viets, 1935. The first description is given of the females of *L. babinda* Cook, 1986 and *L. hopa* Cook, 1986. Keys are provided for the genera *Limnesia* and *Tubophorella*. Many new records are given of the family in Australia.

Keywords systematics; new species; new records; *Limnesia*; *Tubophorella*

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Introduction

The water mite family Limnesiidae Thor has a cosmopolitan distribution. Within Australia, the family is represented by four genera, i.e. *Limnesia* Koch, 1836 *Physolimnesia* Halik, 1940 *Timmsilimnesia* K.O. Viets, 1984 and *Tubophorella* K.O. Viets, 1978. Most species rich genus is *Limnesia* with currently 26 species known from Australia, while *Physolimnesia*, *Timmsilimnesia* and *Tubophorella* have two, one and two species, respectively.

The most comprehensive study of this family in Australia is of Cook (1986). Smaller contributions are published by Halik (1940, 1941), Lundblad (1947), Szalay (1953), K. Viets (1955), K.O. Viets (1975, 1978, 1980, 1984), Imamura (1984) and Smit (1992, 1998). Harvey (1998) summarized the distribution within Australia.

Species of the genus *Limnesia* occur in lentic and lotic habitats as well as in hyporheic habitats. *Tubophorella* species are found in streams, *Physolimnesia* and *Timmsilimnesia* are found in standing waters.

This paper deals with records from all over Australia. Seven new species are described, and numerous new records are given. In addition, keys are provided for the genera *Limnesia* and *Tubophorella*.

Material and methods

All material from this study is collected by the author, unless stated otherwise. Collections are made in 1997, 1998, 2000, 2001, 2003, 2005, 2008, 2014 and 2019. All states of Australia and the Northern Territory have been visited in this period. Hyporheic collections are from interstitial digs or made with a small groundwater pump. Holotypes and paratypes will be lodged in the Queensland Museum, Brisbane (QM), the Museum Victoria, Melbourne (NMV) and the Museum and Art Gallery of the Northern Territory (NTM), paratypes and all non-type

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material in Naturalis Biodiversity Center, Leiden (RMNH). The material of this study is fixed in Koenike-fluid (5 parts glycerine, 2 parts glacial acetic acid, 3 parts water).

The following abbreviations are used: a.s.l. – above sea level; Cx-IV – fourth coxae; Cxgl-4 – coxoglandularia 4; NP – National Park; P1-5 – palp segments 1-5; IV-leg-2 – second segment of fourth leg, L – length; SMF – Senckenberg Museum, Frankfurt am Main; Vgl-1 – Ventroglandularia 1 (= V1 sensu Wiles 1997a, gland portion absent); Vgl-3 – ventroglandularia 3, W – width. The medial seta of Cx-III is here named associated seta of Cxgl-4. All measurements are in μm , measurements of palp and leg segments are of the dorsal margins, measurements of paratypes are given in parentheses. Ventral length is measured from the tip of Cx-I till posterior idiosoma margin. Numbers are given as male/female/deutonymph. All coordinates are taken with a GPS. Coordinates given as degrees, minutes and seconds are taken from Google Earth and are by approximation. Data on the world distribution are taken from Smit (2020).

Taxonomy

Family Limnesiidae Thor

Genus *Limnesia* Koch, 1836

Limnesia (Limnesia) australica Lundblad, 1941

New records — **Tasmania**. 1/1/0, Reservoir of Darlington, Maria Island NP, 42°35'23.28" S 148°5'7.78" E, 18 Oct. 1997; 11/13/0, Swamp 12 km S of Gladstone, along road B82, 20 Oct. 1997.

Distribution — Known from Tasmania and Victoria.

Limnesia (Limnesia) babinda Cook, 1986

(Figure 1)

New records — **Queensland**. 2/3/0, Mulgrave River, interstitial dig, Wooroonooran NP, 17°14.430' S 145°46.456' E, 69 m a.s.l., 1 Nov. 2014; 0/1/0, stream downstream of Kearney Falls, Goldsborough Valley, Wooroonooran NP, 17°14.286' S 145°46.907' E, 139 m a.s.l., 1 Nov. 2014.

Description — Male: Idiosoma dorsally 583-608 long and 374 wide, ventrally 612-640 long. Anterior dorsal platelets 158 long and 60-64 wide, posterior dorsal plate 292-300 long and 235-251 long.

Female: Idiosoma dorsally 624 (640-664) long and 413 (405-437) wide, ventrally 656 (688-713) long. Dorsum with one large posteromedial plate without glandularia, 292 (312-324) long and 267 (259-275) wide, and a pair of elongated platelets with the postocularia, 156 (166-174) long and 56 (62-66) wide. Venter in most aspects as in male, except genital field (Figure 1). Posterior to Cx-IV a small area of secondary sclerotization. However, in another female, this area of secondary sclerotization is larger, extending to the level of posterior margin of genital field. Genital field 146 long and 152 wide, with three pairs of glandularia. Posterior to genital field an area of secondary sclerotization. Length of P1-5: 24, 89, 66, 122, 34. Palp as in male. Length of I-leg-4-6: 110, 128, 120. Length of IV-leg-4-6: 134, 154, 134; subterminal seta of IV-leg-6 46 long. Legs without swimming setae.

Remarks — Thus far, this species was known only from the holotype male. Therefore, some measurements are given for the male and a description of the female.

Distribution — Queensland.

Limnesia (Limnesia) brinvoza Cook, 1986

New records — **New South Wales**. 0/1/0, Cabbage Tree Creek at crossing with Kings Highway, 35°34.367' S 150°02.537' E, 260 m a.s.l., 16 Dec. 2003. **Queensland**. 0/1/0, Anamoor Creek

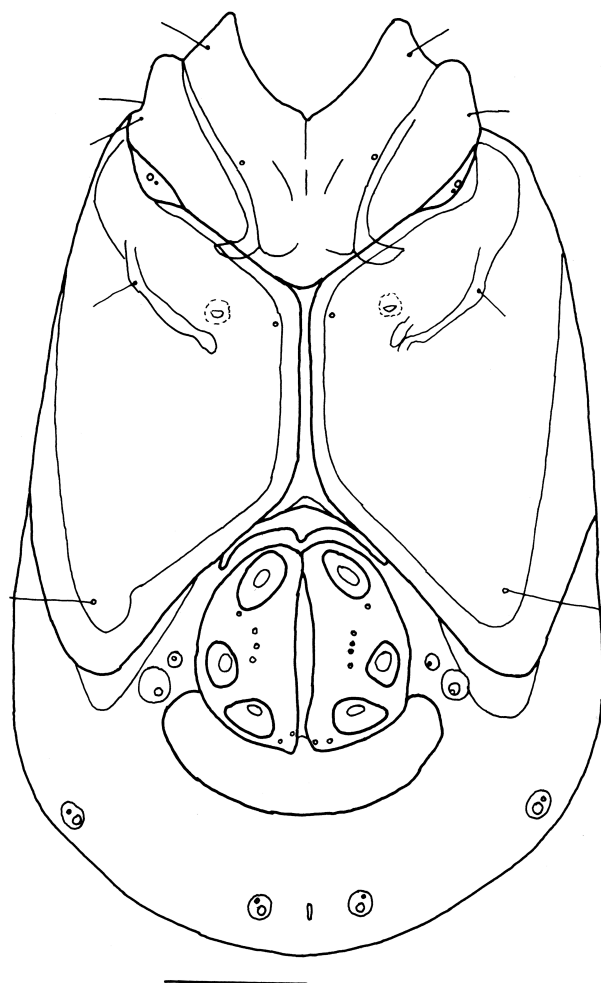


Figure 1 *Limnesia (Limnesia) babinda* Cook, venter female. Scale bar = 100 μ m.

at Anamoor Campground, Anamoor State Forest, 26°21.579' S 152°33.385' E, 119 m a.s.l., 2 Nov. 2005; 2/0/0, Little Yabba Creek, hyporheic, at crossing with road Kenilworth-Maleny, 26°37.427' S 152°41.334' E, 98 m a.s.l., 19 Nov. 2014; 2/0/0, same location, 1 Dec. 2014.

Distribution — Previously known from Queensland and New South Wales.

***Limnesia (Limnesia) corpulenta* K.O. Viets, 1984**

New records — — **Tasmania.** 2/1/1, stream downstream of Russell Falls, Mt Field NP, 17 Oct. 1997; 0/1/12, Nelson River at crossing with road A10, Franklin Gordon Wild Rivers NP, 42°06.247' S 145°44.186' E, 318 m a.s.l., 24 Mar. 2008; 0/0/2, Nelson Creek, Franklin-Gordon Wild Rivers NP, 42°06.152' S 145°43.282' E, 311 m a.s.l., 24 Mar. 2008; 0/0/1, Tyenna River at campground, Mt Field NP, 42°41.071' S 146°43.026' E, 350 m a.s.l., 26 Mar. 2008; 0/2/0, Franklin River at crossing with road A10, Franklin-Gordon Wild Rivers NP, 42°12.916' S 146°01.170' E, 421 m a.s.l., 26 Mar. 2008; 0/0/1, Russell Falls Creek downstream of falls, Mt Field NP, 27 Mar. 2008; 0/0/1, South Esk River, upstream of Upper Esk, 41°25.182' S 147°43.147' E, 362 m a.s.l., 29 Mar. 2008. **Victoria.** 0/3/0, Running Jump Creek, Mt Buffalo NP, 10 Oct. 1997; 1/3/0, Underground River, Mt Buffalo NP, 10 Oct. 1997; 0/4/0, Crystal Brook at Hospice Plain, Mt Buffalo NP, 10 Oct. 1997; 1/0/0, Crystal Brook, Mt Buffalo NP,

36°43.277' S 146°48.354' E, 1303 m a.s.l., 11 Mar. 2008; 13/11/7, Jump Creek, Mt Buffalo NP, 36°46.350' S 146°47.636' E, 1468 m a.s.l., 11 Mar. 2008; 1/2/7, Aire River at Aire Crossing, Great Otway Ranges NP, 38°42.190' S 143°28.536' E, 202 m a.s.l., 1 Apr. 2008; 0/0/1, Aire River at crossing with Binns Road, Great Otway Ranges NP, 38°40.103' S 143°34.805' E, 240 m a.s.l., 1 Apr. 2008. **New South Wales.** 3/2/0, Bugong Creek near Morton NP, 5 Nov. 2001; 2/0/2, Tributary of Sawyers Creek, S of Kangaroo Valley, 6 Nov. 2001; 0/1/1, Barrengarry Creek upstream of falls, Morton NP, 6 Nov. 2001; 0/0/1, Urumbilum River, Bindarri NP, 30°15.966' S 152°57.042' E, alt. 137 m a.s.l., 7 Nov. 2003; 0/0/1, Six Miles Creek, SE Forests NP, 10 Dec. 2003; 0/0/11, Towamba River at Big Jack Rest Area, SE Forests NP, 36°53.885' S 149°27.807' E, 271 m a.s.l., 11 Dec. 2003; 2/5/0, Mumbulla Creek at Mumbulla Creek Picnic Area, Biamanga NP, 36°34'32.92" S 149°53'37.93" E, 12 Dec. 2003; 0/1/0, Sugarloaf Creek at crossing with Misty Mountain Road, Monga NP, 35°33'44.70" S 150°0'48.61" E, 15 Dec. 2003; 1/3/0, Minnemurra River, Minnemurra Rainforest, 34°38.183' S 150°43.272' E, 18 Dec. 2003. **Queensland.** 3/0/6, Babinda River, Wooroonooran NP, 17°20.484' S 145°52.113' E, 16 Oct. 2005; 2/9/2, Double Barrel Creek, Babinda, 17°20.852' S 145°53.075' E, 20 Oct. 2005; 0/1/0, unnamed creek with big boulders, Goldsborough Valley, Wooroonooran NP, 17°15.959' S 145°47.118' E, 105 m a.s.l., 2 Nov. 2014; 0/0/2, Tully River at campground, Tully Gorge NP, 17°46.280' S 145°39.073' E, 86 m a.s.l., 4 Nov. 2014; 2/0/0, Stony Creek, upstream of Wallaman Falls, Girringun National Park, 18°36.130' S 145°48.145' E, 549 m a.s.l., 8 Nov. 2014.

Remarks — The integument of this species is covered by short, spiny setae. Probably the presence of these setae is age-dependent. Deutonymphs and young specimens always have these setae, while in older specimens they are absent.

Distribution — Known from New South Wales and Tasmania and reported here for the first time from Victoria and Queensland.

Limnesia (Limnesia) dentifera K.O. Viets, 1980

New records — **South Australia.** 1/0/0, Round Swamp, Bool Lagoon Game Reserve, 12 Oct. 2001. **Victoria.** 1/2/0, Glenelg River at crossing with Siphon Road, Grampians NP, 29 Sept. 1997; 1/0/0, Glenelg River at crossing with Red Rock Road, Grampians NP, 29 Sept. 1997; 6/4/0, Victoria Lagoon, SW of Grampians NP, 30 Sept. 1997.

Remarks — In the key of Cook (1986) *L. dentifera* and *L. longigenitalis* Lundblad, 1941 were separated based on characters of the palp. Males, however, are easy to separate by the shape of the genital field. In *L. longigenitalis* the genital field consists of one sclerite, in *L. dentifera* the genital field consists of two genital flaps.

Distribution — Previously known only from New South Wales (Smit 1992) and reported here for the first time from South Australia and Victoria.

Limnesia (Limnesia) ekama Cook, 1986

New records — **Tasmania.** 1/1/0, unnamed creek at crossing of Rosendale Road, 2.5 km off Tasman Highway, Bicheno, 19 Oct. 1997; 0/1/0, Betka River at crossing with Stony Creek Road, SW of Genoa, 24 Oct. 1997. **Victoria.** 2/3/2, Aire River at Aire Crossing, Great Otway Ranges NP, 38°42.190' S 143°28.536' E, 202 m a.s.l., 1 Apr. 2008. **New South Wales.** 0/1/0, tributary of Sawyers Creek, N of Kangaroo Valley, 6 Nov. 2001. **Queensland.** 0/1/0, Lacey Creek, Mission Beach, 17 Sept. 2000; 2/2/0, Babinda River, Wooroonooran NP, 17°20.484' S 145°52.113' E, 16 Oct. 2005; 1/0/0, Tully River at campground, Tully Gorge NP, 17°46.280' S 145°39.073' E, 86 m a.s.l., 4 Nov. 2014.

Distribution — Previously known from Tasmania and New South Wales (Cook 1986) and reported here for the first time from Victoria and Queensland.

Limnesia (Limnesia) elongata sp. nov.

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(Figure 2A-D)

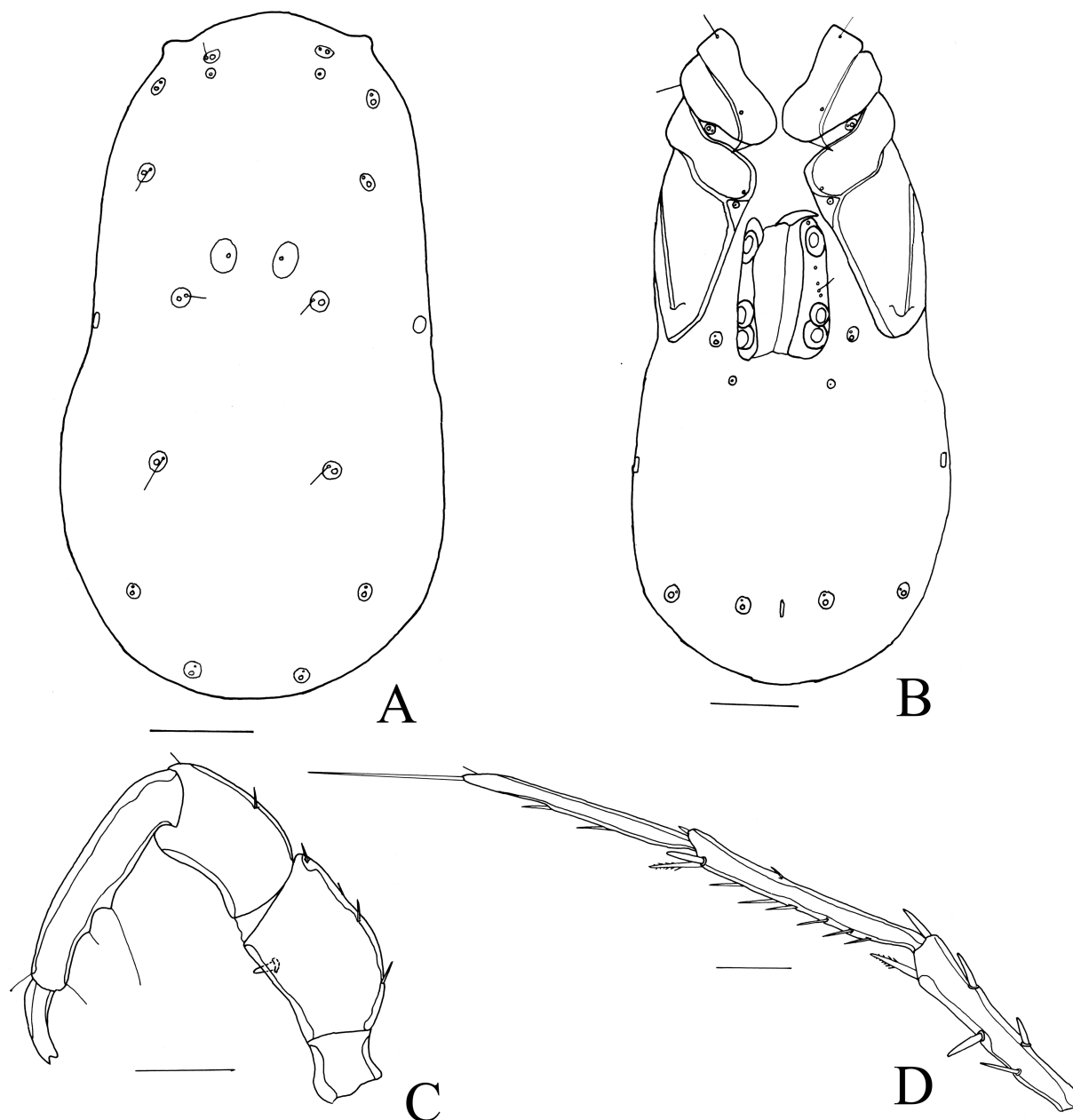


Figure 2 *Limnesia (Limnesia) elongata* sp. nov., holotype female. A – dorsum; B – venter; C – palp; D – IV – leg-4-6. Scale bars: A-B = 100 μ m, C-D = 50 μ m.

Material examined — Holotype female, Booloumba Creek at picnic area, hyporheic, Conondale National Park, Queensland, Australia, 26°38.686' S 152°39.013' E, 144 m a.s.l, 19 Nov. 2014 (QM).

Diagnosis — Idiosoma elongated; posteromedial dorsal platelet absent; Cx-I medially separated; Cxgl-4 lying in a bifurcation of suture lines of Cx-III/IV; Vgl-1 posterior to Vgl-3; P4 with distinct setal tubercles.

Description — Female: Idiosoma elongated (Figure 2A), dorsally 648 long and 348 wide, ventrally 689 long. Dorsum without a posteromedial dorsal platelet, postocularia on small

platelets. Cx-I medially separated. Apodemes of anterior coxae short, extending onto Cx-III. Cxgl-4 lying in a bifurcation of suture line of Cx-III/IV; associated setae lying on Cx-III close to Cxgl-4 (Figure 2B). Genital field 150 long, with three pairs of acetabula. Vgl-1 posterior to Vgl-3. Length of P1-5: 22, 54, 77, 124, 44. P2 with a peg-like seta, P4 ventrally with distinct setal tubercles, the posterior tubercle larger than the anterior tubercle; P5 slender (Figure 2C). Length of I-leg-4-6: 120, 140, 130. Length of IV-leg-4-6: 142, 172, 168; terminal seta of IV-leg-6 94 long (Figure 2D). All leg segments slender, swimming setae absent.

Remarks — The only two Australian *Limnesia* species without swimming setae and with little dorsal sclerotization are *L. ugava* Cook, 1986 and *L. brinvoza* Cook, 1986. The new species differs from *L. ugava* in the medially separated Cx-I, from *L. brinvoza* in the absence of the small dorsalia, the elongated idiosoma and more slender palp segments (especially P2 and P3).

***Limnesia (Limnesia) gledhilli* sp. nov.**

Zoobank: [6B036679-A3D6-41B3-9406-413CE473335C](https://doi.org/10.24349/6B036679-A3D6-41B3-9406-413CE473335C)

(Figure 3A-E)

Material examined — Holotype male, Toolona Creek downstream of Toolona Falls, Lamington National Park, Queensland, Australia, 28°14'50.63" S 153°10'11.36" E, 16 Nov. 2003 (QM). Paratypes: one male, three females (QM), two males, three females (RMNH), same data as holotype; 3 females, one deutonymph, Coomera River upstream of Coomera Falls, Lamington National Park, Queensland, Australia, 28°14'7.21" S 153°11'28.81" E, 14 Nov. 2003 (RMNH).

Diagnosis — Idiosoma with extensive secondary sclerotization surrounding Cx-IV and genital field in male, posterior to Cx-IV in female; Cxgl-4 located on Cx-III close to associated seta. Male: Gonopore large, nearly as long as genital field; Cxgl-3 distanced from Vgl-1.

Description — Male: Idiosoma dorsally 895 (919-936) long and 672 (689-725) wide, ventrally 842 (875-895) long. Integument coarsely lineated. Postocularia on small platelets. Dorsum with a relatively large posteromedial platelet (Figure 3A), 186 (194-198) long and 130 (120-134) wide. Gnathosomal bay shorter than fused portion of Cx-I. Cx-I fused medially. Cxgl-4 lying on Cx-III, close to associated seta (Figure 3B). Extensive secondary sclerotization surrounding Cx-IV, this sclerotization extending onto lateral margins of dorsum. Genital field 174 long and 184 wide, with three pairs of glandularia, surrounded by secondary sclerotization. Anterior acetabula elongated, posterior two pairs of acetabula more rounded. Gonopore large, nearly as long as genital field, 154 (154-164) long and 66 (64-76) wide. Cxgl-3 distanced from Vgl-1. Length of P1-5: 26, 110, 72, 154, 44. P2 ventrally with a relatively small peg-like setae (Figure 3C). Length of I-leg-4-6: 112, 132, 106. Length of IV-leg-4-6: 204, 202, 188. Terminal seta of IV-leg-6 102 long. IV-leg-5 with one long, stiff seta, and IV-leg-4 with two such setae (Figure 3D). III-leg-5 with 5-6 thin, relatively long setae along entire segment, these a little more than half the length of segment, which could act as swimming setae.

Female: Idiosoma and integument as described for male, dorsally 883 (895-1000) long and 753 (721-778) wide, ventrally 867 (830-927) long. Dorsum with a posteromedial platelet, 190 (186-211) long and 130 (112-128) wide. Cx-I fused medially. Gnathosomal bay shorter than fused portion of Cx-I. Cxgl-4 lying on Cx-III, close to associated seta. Extensive secondary sclerotization surrounding Cx-IV, this sclerotization extending onto lateral margins of dorsum. Cxgl-3 incorporated in sclerotization, well distanced from Vgl-1 (Figure 3E). Genital field 178 long, pregenital sclerite 182 wide. Posterior to genital field a large platelet. Length of P1-5: 22, 134, 72, 155, 44. Palp as in male. Length of I-leg-4-6: 110, 130, 142 (till tip of segment). Length of IV-leg-4-6: 194, 194, 190; terminal seta of IV-leg-6 96 long. Legs as in male.

Deutonymph. Idiosoma coarsely lineated, dorsally 551 long and 470 wide, ventrally 543 long. Along Cx-IV an indistinct small band of secondary sclerotization. Provisional genital field with two pairs of acetabula. P2 without peg-like setae.

Etymology — Named after Terry Gledhill for working 60 years on water mites.

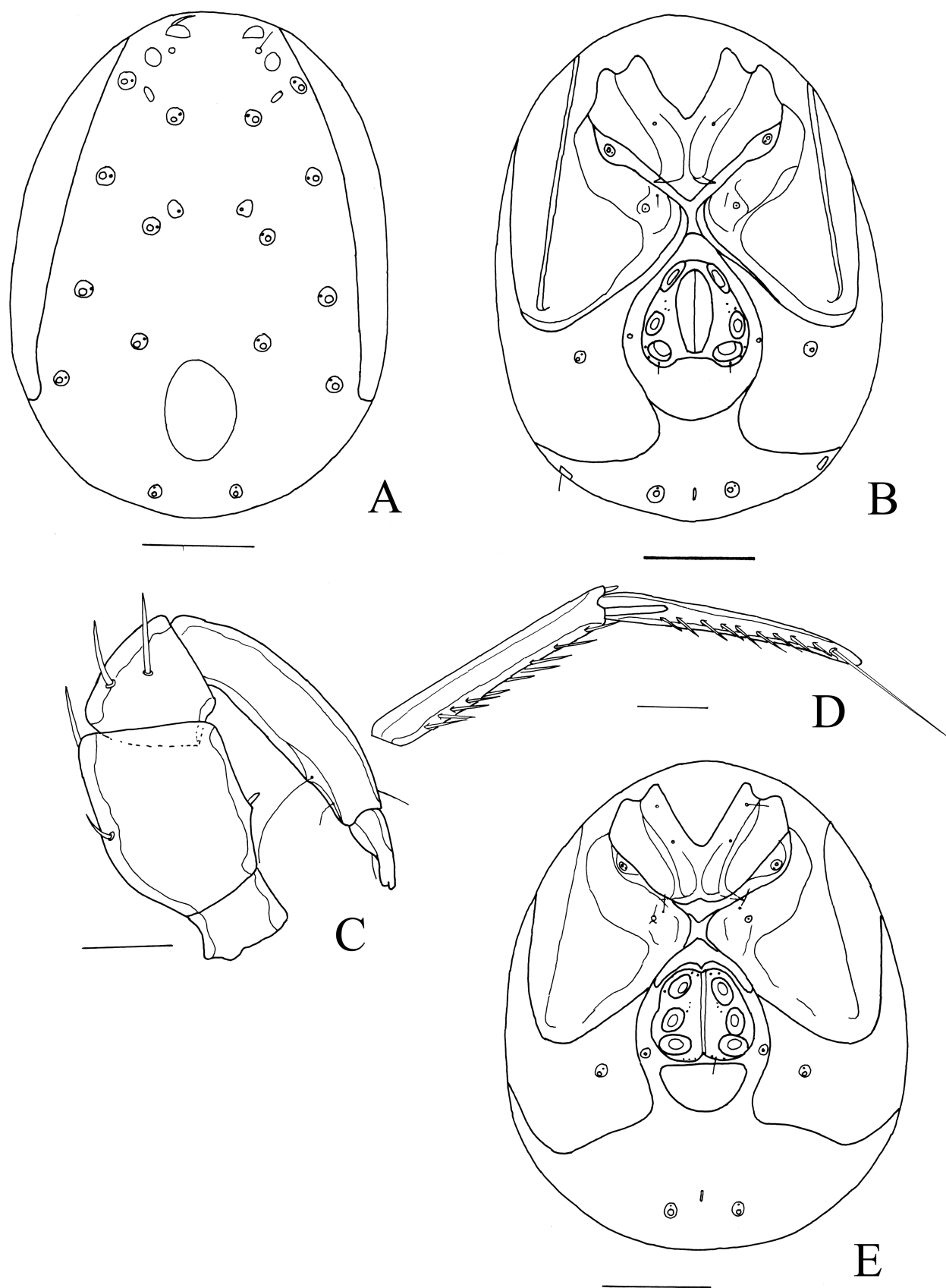


Figure 3 *Limnesia (Limnesia) gledhilli* sp. nov., A-D – holotype male, E – paratype female. A – dorsum; B – venter; C – palp; D – IV-leg-5-6; E – venter. Scale bars: A-B, E = 200 µm, C-D = 50 µm.

Remarks — The new species is most similar to *L. parasolida* K.O. Viets, 1984. The latter species has Cxgl-4 well distanced from the associated seta, the secondary sclerotization is less extensive and the male genital field is larger (207-237 versus 154 in the new species). The deutonymph has no diagnostic characters, and is therefore, not separable from many other deutonymphs.

***Limnesia (Limnesia) hopa* Cook, 1986**

(Figure 4)

New records — **Queensland.** 0/1/0, Little Yabba Creek, hyporheic, at crossing with road Kenilworth-Maleny, 26°37.427' S 152°41.334' E, 98 m a.s.l., 19 Nov. 2014; 1/0/0, same location, 1 Dec. 2014; 0/1/0, Sandy Creek, W of Maleny, 26°42.241' S 152°41.120' E, 115 m a.s.l., 1 Dec. 2014.

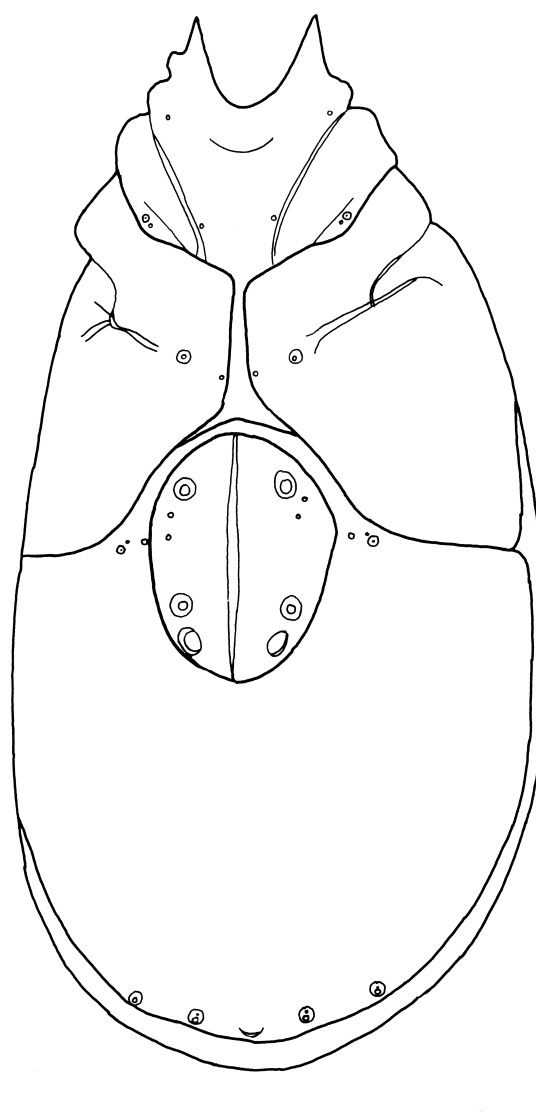


Figure 4 *Limnesia (Limnesia) hopa* Cook, venter female. Scale bar = 100 µm.

Description — Female: Idiosoma dorsally 494 long and 284 wide. Dorsum with two large plates, anterior plate with two pairs of glandularia and the postocularia, 184 long and 202 wide. Posterior dorsal plate with three pairs of glandularia, 292 long and 232 wide. Coxae in most aspects similar to male, except Cx-IV, these forming a genital bay (Figure 4). Genital field 136 long and 104 long, with three pairs of acetabula, the anterior pair distanced from the two posterior pairs. Length of P1-5: 28, 58, 44, 76, 30. Palp as in male. Length of I-leg-4-6: 82, 98, 82. Length of IV-leg-4-6: 92, 108, 103; subterminal seta of IV-leg-6 52 long. Legs without swimming setae.

Remarks — Thus far, known from the holotype male only. Therefore, a description is given of the female.

Distribution — Queensland.

Limnesia (Limnesia) jolova Cook, 1986

New record — New South Wales. 2/0/0, Waterfall Creek at Gunulla Flat, Royal NP, 8 Nov. 2001.

Distribution — Thus far known only from the holotype male collected in Queensland and reported here for the first time from New South Wales.

Limnesia (Limnesia) lembangensis Piersig, 1906

New records — New South Wales. 2/1/0, Lake Hiawatha, Yuragir NP, 29°49.070' S 153°15.558' E, 25 m a.s.l., 10 Nov. 2003. **Queensland**. 1/1/0, Fitzroy River, Rockhampton, 15 Mar. 1983, leg. A.P. Mackay; 0/2/0, Fitzroy River, Rockhampton, 29 Mar. 1983, leg. A.P. Mackay; 2/2/0, Fitzroy River, Rockhampton, 26 Apr. 1983, leg. A.P. Mackay; 1/0/0, Lake Emma, Lakefield NP, 15°17'47.43" S 144°38'48.05" E, 3 Sept. 2000; 15/7/1, shallow pool along road to Hanush Waterhole, Lakefield NP, 4 Sept. 2000; 21/18/3, While Lily Lagoon, Lakefield NP, 4 Sept. 2000; 33/17/1, Freshwater Lake, Centenary Lakes, Cairns, 16°54.177' S 145°44.965' E, 17 Oct. 2005; 6/7/0, Fletcher Creek, Dalrymple NP, 19°49.125' S 146°03.771' E, 260 m a.s.l., 22 Oct. 2005; 8/29/1, rockpool Porcupine Creek, Porcupine Gorge NP, 20°21.039' S 144°27.852' E, 23 Oct. 2005; 6/3/0, small lake S of Biggenden, along road Biggenden-Maryborough, 25°33.583' S 152°07.345' E, 1 Nov. 2005; 2/0/0, Yabba Creek at Peach Trees Campground, Jimna, 26°38.251' S 152°26.924' E, 465 m a.s.l., 2 Nov. 2005; 2/1/1, Emu Creek at Clancy's Camping Area, Benarkin State Forest, 26°58.334' S 152°09.916' E, 162 m a.s.l., 3 Nov. 2005; 1/7/0, Double Creek West, S of Mt Elliot, 19°34.610' S 147°01.977' E, 41 m a.s.l., 10 Nov. 2014; 7/16/0, Ewen Maddock Dam, NE of Landsborough, 26°47.795' S 152°59.416' E, 29 m a.s.l., 1 Dec. 2014. **Northern Territory**. 1/2/2, Lake Jabiru, Jabiru, 12°40.264' S 132°50.436' E, 43 m a.s.l., 27 Sept. 2005. **Western Australia**. 6/5/0, pool Silent Grove (behind ranger station), the Kimberley, 11 Sept. 1998; 0/1/0, Lily Creek lagoon, Kununurra, 17 Sept. 1998.

Distribution — Widespread in Asia, New Caledonia. Within Australia, known from New South Wales, Queensland and the Northern Territory (Harvey 1998), and reported here for the first time from Western Australia.

Limnesia (Limnesia) longigenitalis Lundblad, 1941

New records — Tasmania. 10/18/0, temporary pond 2 km W of Musselroe Bay, Mt Williams NP, 20 Oct. 1997. **Victoria**. 7/7/0, Victoria Lagoon, SW of Grampians NP, 20 Sept. 1997. **South Australia**. 1/0/0, temporary pool W of Mark Point, Coorong NP, 9 Oct. 2001; 0/4/0, Hacks Lagoon, Bool Lagoon Game Reserve, 11 Oct. 2001; 3/17/0, Round Swamp, Bool Lagoon Game Reserve, 12 Oct. 2001; 0/4/0, Bool Lagoon near Big Hill, Bool Lagoon Game Reserve, 12 Oct. 2001; 7/28/0, Hacks Lagoon (behind reed bed), Bool Lagoon Game Reserve, 13 Oct. 2001; 7/17/0, swamp at Gunawar Track, Bool Lagoon Game Reserve, 13 Oct. 2001; 2/2/0, Big Swamp, 20 km W of Port Lincoln, 27 Oct. 2001.

Distribution — Previously reported from Victoria, New South Wales, and Western Australia (Smit 1998), and reported here for the first time from Tasmania and South Australia.

Limnesia (Limnesia) maceripalpis K.O. Viets, 1975

New records — **New South Wales.** 6/5/0, Lake Ainsworth, N of Ballina, 28°47.053' S 153°35.569' E, 8 Nov. 2005. **Queensland.** 1/0/1, Cockatoo Creek, Cape York Peninsula, 11°39'2.31" S 142°27'29.59" E, 11 Sept. 2000; 2/2/0, Twin Falls, Cape York Peninsula, 11 Sept. 2000; 0/1/0, Lacey Creek, Mission Beach, 17 Sept. 2000; 0/0/1, Waterfall Creek, Mt Walsh NP, 25°38.422' S 152°05.363' E, 197 m a.s.l., 1 Nov. 2005; 3/0/5, Mango Lagoon, Oyala Thumotang NP, 13°37.838' S 142°34.627' E, 73 m a.s.l., 24 Oct. 2014; 5/1/0, Elliot Creek at Fruit Bat Falls, Cape York Peninsula, 11°26.370' S 142°26.086' E, 72 m a.s.l., 19 Oct. 2014; 0/1/03, Canal Creek at Twin Falls, Cape York Peninsula, 11°22.976' S 142°24.788' E, 54 m a.s.l., 20 Oct. 2014; 2/0/1, Jacky Jacky Creek, Jardine River NP, 11°01.381' S 142°23.277' E, 16 m a.s.l., 22 Oct. 2014; 6/4/10, Alligator Creek, pool, upstream, Bowling Green Bay NP, 19°26.740' S 146°58.471' E, 79 m a.s.l., 11 Nov. 2014. **Northern Territory.** 0/0/1, Walker Creek, Litchfield NP, 13°04.694' S 130°41.929' E, 161 m a.s.l., 25 Sept. 2005; 4/4/0, Plunge pool Edith Falls, Nitmiluk NP, 14°10.899' S 132°11.342' E, 149 m a.s.l., 2 Oct. 2005. **Western Australia.** 1/2/0, Cockatoo Creek at crossing with Great Northern Highway, 8 Sept. 1998; 2/0/2, pools 3 km from Lennard Gorge, the Kimberley, 10 Sept. 1998; 27/14/7, pool Lennard Gorge, the Kimberley, 10 Sept. 1998; 8/2/0, pool Silent Grove Spring, the Kimberley, 11 Sept. 1998; 0/1/0, pool Silent Grove (behind ranger station), the Kimberley, 11 Sept. 1998; 14/22/0, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 4/5/2, pool Galvans Gorge, the Kimberley, 12 Sept. 1998; 3/1/1, pool Manning Gorge Falls, the Kimberley, 13 Sept. 1998; 5/6/0, Jack's Waterhole, Gibb River Road, 14 Sept. 1998; 0/1/0, Russ Creek at crossing with Gibb River Road, the Kimberley, 14 Sept. 1998; 1/6/0, Jackaroo's Waterhole, El Questro Station, the Kimberley, 15 Sept. 1998; 0/1/0, plunge pool Emma Gorge, the Kimberley, 16 Sept. 1998; 0/2/0, pool Valentine Springs, W of Kununurra, 18 Sept. 1998; 7/5/0, Middle Springs W of Kununurra, 15°38'1.38" S 128°40'10.67" E, 18 Sept. 1998; 2/2/0, plunge pool Black Rock Falls, W of Kununurra, 18 Sept. 1998; 1/1/0, Spillway Creek near Lake Argyle, 20 Sept. 1998; 12/8/0, plunge pool Frog Hole Gorge, Purnululu NP, 23 Sept. 1998; 10/5/0, plunge pool Cathedral Gorge, Purnululu NP, 17°28'49.60" S 128°22'22.47" E, 24 Sept. 1998; 0/0/1, pool Sawpit Gorge, S of Halls Creek, 25 Sept. 1998; 1/3/0, Fitzroy River, S of Fitzroy Crossing, 18°12'39.07" S 125°34'40.91" E, 28 Sept. 1998; 0/0/1, pool W of Tunnel Creek, Tunnel Creek NP, 30 Sept. 1998; 8/5/1, Geikie Gorge, western side, Geikie Gorge NP, 18°07'23.92" S 125°39'42.47" E, 28 Sept. 1998; 0/2/0, Python Pool. Millstream-Chichester NP, 21°20.031' S 117°14.310' E, 180 m a.s.l., 30 Jan. 2019.

Distribution — Previously known from Queensland, Northern Territory and Western Australia and reported here for the first time from New South Wales.

Limnesia (Limnesia) otruma Cook, 1986

New records — **Victoria.** 0/1/0, Buckland River at crossing with Buckland Valley Road, W of Bright, 11 Oct. 1997; 0/2/0, Jimmy Creek at campground, Grampians NP, 37°22.339' S 142°30.203' E, 379 m a.s.l., 15 Mar. 2008; 0/1/0, Wannon River at crossing with Serra Road, Grampians NP, 37°20.918' S 142°30.386' E, alt. 331 m a.s.l. 15 Mar. 2008; 0/2/0, Mt Williams Creek downstream of Kalymna Falls, Grampians NP, 37°19.034' S 142°36.212' E, 18 Mar. 2008; 1/0/0, Aire River at Aire Crossing, Great Otway Ranges NP, 38°42.190' S 143°28.536' E, 202 m a.s.l., 1 Apr. 2008; 2/1/0, Aire River at crossing with Binns Road, Great Otway Ranges NP, 38°40.103' S 143°34.805' E, 240 m a.s.l., 1 Apr. 2008.

Remarks — According to Cook (1986), Cx-I are medially separated. Several males, however, have Cx-I completely fused (but suture line visible) or partly fused. Therefore, this character is not always reliable.

Distribution — Previously known from Tasmania and New South Wales and reported here for the first time from Victoria.

Limnesia (Limnesia) parasolida K.O. Viets, 1984

New records — **Tasmania.** 0/1/0, Apsley River at crossing with Tasman Highway, 19 Oct. 1997. **Victoria.** 0/2/0, Shipwreck Creek, Mallacoota, Croajingolong NP, 23 Oct. 1997. **South Australia.** 0/1/0, Onkaparinga River at Sundews Trail, Onkaparinga NP, 35°09.478' S 138°34.791' E, 95 m a.s.l., 6 Apr. 2008. **New South Wales.** 1/0/3, Sugarloaf Creek at crossing with Misty Mountain Road, Monga NP, 35°33'44.70" S 150°0'48.61" E, 15 Dec. 2003; 1/1/0, Lake Ainsworth, N of Ballina, 28°47.053' S 153°35.569' E, 8 Nov. 2005. **Queensland.** 1/1/4, Normanby River, W of Cooktown, 3 Sept. 2000; 2/3/0, Hann Crossing (stagnant), Lakefield NP, 14°45'57.30" S 144°04'46.60" E, 4 Sept. 2000; 1/0/0, Hann Crossing (flowing), Lakefield NP, 5 Sept. 2000; 4/0/3, Archer River near Archer River Roadhouse, Cape York Peninsula, 13°26'10.25" S 142°56'39.73" E, 6 Sept. 2000; 0/1/0, billabong W of Wenlock River, near crossing with road to Iron Range NP, 10 Sept. 2000; 1/0/0, Cockatoo Creek, Cape York Peninsula, 11°39'2.31" S 142°27'29.59" E, 11 Sept. 2000; 1/0/0, Fruit Bat Falls, Cape York Peninsula, 11 Sept. 2000; 1/1/2, Coen River, Coen, 13°56'10.46" S 143°11'58.67" E, 12 Sept. 2000; 1/3/0, Twin Falls, Cape York Peninsula, 11 Sept. 2000; 6/6/0, Lake Moondarra, Mt Isa, 20°35.274' S 139°34.357' E, 8 Oct. 2005; 1/2/1, Lawn Hill Creek at campground, Lawn Hill NP, 18°42.011' S 138°29.235' E, 10 Oct. 2005; 0/1/2, Cascades, Lawn Hill Creek, Lawn Hill NP, 18°41.806' S 138°29.138' E, 10 Oct. 2005; 0/2/0, Gregory River at Gregory Downs, 18°38.811' S 139°15.008' E, 68 m a.s.l., 11 Oct. 2005; 1/0/0, Lacey Creek, Mission Beach, 17°51.068' S 146°03.871' E, 81 m a.s.l., 20 Oct. 2005; 10/6/5, Alligator Creek, Bowling Green Bay NP, 19°26.192' S 146°56.862' E, 32 m a.s.l., 22 Oct. 2005; 14/2/2, Fletcher Creek, Dalrymple NP, 19°49.125' S 146°03.771' E, 260 m a.s.l., 22 Oct. 2005; 1/1/0, Porcupine Creek, Porcupine Gorge NP, 20°21.039' S 144°27.852' E, 23 Oct. 2005; 0/2/0, pool Broken River, Eungella NP, 21°10.112' S 148°30.078' E, 710 m a.s.l., 25 Oct. 2005; 0/2/0, Broken River, Eungella NP, 21°10.069' S 148°30.676' E, 25 Oct. 2005; 0/1/0, Carnarvon Creek upstream of confluence with Moss Gorge, Carnarvon NP, 25°03.075' S 148°12.697' E, 430 m a.s.l., 29 Oct. 2005; 1/10/0, Waterfall Creek, Mt Walsh NP, 25°38.422' S 152°05.363' E, 197 m a.s.l., 1 Nov. 2005; 1/0/0, Coen River, Coen, 13°56.175' S 143°11.988' E, 192 m a.s.l., 19 Oct. 2014; 6/2/7, Wenlock River near Moreton Telegraph Station, Cape York Peninsula, 12°27.336' S 142°38.444' E, 34 m a.s.l., 19 Oct. 2014; 2/3/1, Elliot Creek at Fruit Bat Falls, Cape York Peninsula, 11°26.370' S 142°26.086' E, 72 m a.s.l., 19 Oct. 2014; 2/0/0, Canal Creek at Twin Falls, Cape York Peninsula, 11°22.976' S 142°24.788' E, 54 m a.s.l., 20 Oct. 2014; 12/11/5, Jacky Jacky Creek, Jardine River NP, 11°01.381' S 142°23.277' E, 16 m a.s.l., 22 Oct. 2014; 0/2/1, Burster Creek SE of Injinoo, Cape York Peninsula, 10°55.355' S 142°21.174' E, 3 m a.s.l., 22 Oct. 2014; 13/14/2, Jardine River, Cape York Peninsula, 11°09.070' S 142°21.335' E, 7 m a.s.l., 22 Oct. 2014; 2/0/0, Archer River, Cape York Peninsula, 13°26.041' S 142°56.546' E, 93 m a.s.l., 23 Oct. 2014; 5/2/5, unnamed creek 7.6 km N of Archer River, Cape York Peninsula, 13°23.157' S 142°54.316' E, 103 m a.s.l., 23 Oct. 2014; 5/4/3, Mango Lagoon, Oyala Thumotang NP, 13°37.838' S 142°34.627' E, 73 m a.s.l., 24 Oct. 2014; 12/8/4, Pasco River, Cape York Peninsula, 12°52.988' S 143°00.616' E, 63 m a.s.l., 25 Oct. 2014; 0/1/0, Wenlock River at crossing with road to Iron Range NP, 13°05.734' S 142°56.526' E, 108 m a.s.l., 25 Oct. 2014; 1/0/0, Prospect Creek, 33 km SW of Sarina, 21°37.285' S 149°01.595' E, 185 m a.s.l., 17 Nov. 2014. **Northern Territory.** 0/1/0, Manton Dam, 12°51.726' S 131°07.148' E, 24 Sept. 2005; 1/1/3, Florence Creek downstream of Florence Falls, Litchfield NP, 13°05.885' S 130°46.999' E, 25 Sept. 2005; 6/1/4, stream upstream of Wangi falls, Litchfield NP, 13°09.832' S 130°41.166' E, 25 Sept. 2005; 7/3/5, Walker Creek, Litchfield NP, 13°04.694' S 130°41.929' E, 161 m a.s.l., 25 Sept. 2005; 2/2/0, Gubarra Creek upstream of pool, Kakadu National Park, 12°49.605' S 132°52.708' E, 27 Sept. 2005; 0/1/0, Barramundie Creek downstream of plunge pool, Kakadu NP, 13°19.036' S 132°26.279' E, 28 Sept. 2005; 5/11/2, plunge pool Gunlom,

Kakadu NP, 13°25.917' S 132°24.989' E, 30 Sept. 2005; 0/4/1, South Alligator River at crossing with Gunlom Road, Kakadu NP, 13°29.704' S 132°28.601' E, 30 Sept. 2005; 7/3/6, Umbrawarra Gorge, Umbrawarra Gorge Nature Reserve, 13°57.892' S 131°41.620' E, 1 Oct. 2005; 2/1/2, Moline Bottom Rockhole, Kakadu NP, 13°34.418' S 132°15.290' E, 175 m a.s.l., 1 Oct. 2005; 0/1/0, Ferny Gully, Kakadu NP, 13°33.810' S 132°17.563' E, 1 Oct. 2005; 3/5/0, pools Waterfall Creek, upstream of falls, Kakadu NP, 13°25.762' S 132°25.089' E, 143 m a.s.l., 1 Oct. 2005; 1/0/0, Edith River downstream of plunge pool, Nitmiluk NP, 14°10.885' S 132°11.271' E, 149 m a.s.l., 2 Oct. 2005; 2/0/0, Copperfield Dam, Pine Creek, 13°50.719' S 131°49.095' E, 212 m a.s.l., 2 Oct. 2005; 7/13/0, Plunge pool Edith Falls, Nitmiluk NP, 14°10.899' S 132°11.342' E, 149 m a.s.l., 2 Oct. 2005; 0/1/2, Campbell Springs 38 km E of Victoria River Roadhouse, Gregory NP, 15°29.749' S 131°23.328' E, 4 Oct. 2005; 1/0/0, 17 Mile Creek, Nitmiluk NP, 14°18.318' S 132°25.293' E, 4 Oct. 2005; 3/14/0, Bitter Springs, Elsey NP, 14°54.760' S 133°05.386' E, 5 Oct. 2005. **Western Australia.** 0/1/0, Cockatoo Creek at crossing with Great Northern Highway, 8 Sept. 1998; 4/4/0, pool Lennard River, Windjana Gorge NP, 9 Sept. 1998; 0/2/0, pool Lennard River, east side Windjana Gorge, Windjana Gorge NP, 10 Sept. 1998; 2/0/0, Bell Creek at crossing with Gibb River Road, the Kimberley, 17°09'1.11" S 125°28'9.73" E, 10 Sept. 1998; 7/2/0, pools 3 km from Lennard Gorge, the Kimberley, 10 Sept. 1998; 7/6/1, pool Lennard Gorge, the Kimberley, 10 Sept. 1998; 6/8/1, pool Silent Grove Spring, the Kimberley, 11 Sept. 1998; 20/10/1, pool Silent Grove (behind ranger station), the Kimberley, 11 Sept. 1998; 1/4/0, pool downstream of Manning Gorge, at campground, the Kimberley, 12 Sept. 1998; 8/14/0, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 0/2/0, pool near Adcock Gorge, the Kimberley, 12 Sept. 1998; 6/7/0, pool Galvans Gorge, the Kimberley, 12 Sept. 1998; 5/9/0, pool Manning Gorge Falls, the Kimberley, 13 Sept. 1998; 1/1/0, Russ Creek at crossing with Gibb River Road, the Kimberley, 14 Sept. 1998; 12/4/0, Miner's Pool, Drysdale River Homestead, 14 Sept. 1998; 2/3/0, Zebedee Springs (hot springs), El Questro Station, the Kimberley, 16 Sept. 1998; 129/53/0, plunge pool Emma Gorge, the Kimberley, 16 Sept. 1998; 0/1/0, pool Amalia Gorge, El Questro Station, the Kimberley, 16 Sept. 1998; 9/20/0, pool Valentine Springs, W of Kununurra, 18 Sept. 1998; 32/26/0, plunge pool Black Rock Falls, W of Kununurra, 18 Sept. 1998; 1/0/0, Ord River at Ivanhoe Crossing, Kununurra, 18 Sept. 1998; 13/3/0, Middle Springs W of Kununurra, 15°38'1.38" S 128°40'10.67" E, 18 Sept. 1998; 1/0/0, Lake Kununurra, 10 km SE of Kununurra, 15°52'7.45" S 128°45'46.75" E, 19 Sept. 1998; 12/12/0, plunge pool The Grotto, S of Wyndham, 20 Sept. 1998; 12/7/0/ Spillway Creek near Lake Argyle, 20 Sept. 1998; 2/3/0, plunge pool Frog Hole Gorge, Purnululu NP, 23 Sept. 1998; 27/47/0, Arthur Creek at crossing with Great Northern Highway, 23 Sept. 1998; 51/43/0, plunge pool Cathedral Gorge, Purnululu NP, 17°28'49.60" S 128°22'22.47" E, 24 Sept. 1998; 2/1/0, pool Sawpit Gorge, S of Halls Creek, 25 Sept. 1998; 0/1/0, Palm Springs S of Halls Creek, 25 Sept. 1998; 17/10/0, pools in creek at Old Halls Creek, S of Halls Creek, 26 Sept. 1998; 2/1/0, Geikie Gorge, western side, Geikie Gorge NP, 18°07'23.92" S 125°39'42.47" E, 28 Sept. 1998; 35/8/0, pool W of Tunnel Creek, Tunnel Creek NP, 30 Sept. 1998; 2/1/0, Tunnel Creek (cave), Tunnel Creek NP, 30 Sept. 1998; 1/4/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m a.s.l., 28 Jan. 2019; 3/6/3, stream downstream of Fortescue Falls, Karijini NP, 22°28.656' S 118°33.068' E, 606 m a.s.l., 28 Jan. 2019; 0/1/0, Eastern Channel Flow, Millstream-Chichester NP, 21°35.394' S 117°03.900' E, 29 m a.s.l., 29 Jan. 2019; 8/9/0, Python Pool. Millstream-Chichester NP, 21°20.031' S 117°14.310' E, 180 m a.s.l., 30 Jan. 2019; 0/1/0, streams originating from Jirndawurrnha Pool, Karijini NP, 21°35.424' S 117°04.202' E, 30 Jan. 2019.

Remarks — Smit (1998) reported specimens with aberrant numbers of acetabula, i.e. 2+2, 2+3, 7+7 and 8+8. Many specimens from this study have 4+4 acetabula and one female from Manton Dam has 8+9 acetabula.

Distribution — Widespread in the northern half of Australia (Smit 1998), and reported here for the first time from Tasmania, Victoria, South Australia and New South Wales. From this study it is clear that *L. parasolida* is one of the most common species in northern and eastern Australia.

***Limnesia (Limnesia) passama* Cook, 1986**

New records — **Tasmania.** 2/4/0, Bernacchi's Creek, Maria Island NP, 18 Oct. 1997; 1/0/0, small lake near Lake Shadow, Lake St Clair-Cradle Mountain NP, 42°05'47.87" S 146°07.45.23" E, 25 Mar. 2008. **Queensland.** 2/0/0, Cave Creek, Springbrook NP, 13 Nov. 2003. **Victoria.** 0/1/0, Lower Stony Creek, Brisbane Ranges NP, 27 Sept. 1997. **New South Wales.** 2/3/0, Bugong Creek near Morton NP, 5 Nov. 2001; 1/0/0, Barrengarry Creek upstream of falls, Morton NP, 6 Nov. 2001; 1/0/0, Bola Creek at Bola Creek Picnic Area, Royal NP, 8 Nov. 2001; 0/1/0, Tributary of Wild Cattle Creek, Dorrig NP, 8 Nov. 2003; 2/2/0, Never Never Creek at Tallywood Point, 30°21.624' S 152°54.269' E, 7 Nov. 2005. **Queensland.** 0/1/0, West Gap Creek, behind camping area, Main Range NP, 17 Nov. 2003; 1/1/0, Mickey Creek downstream of confluence with Warrumbah Creek, Carnarvon NP, 25°4'51.49" S 148°15'9.96" E, 18 Oct. 2005; 0/1/0, Neurum Creek, D'Aquilar NP, 27°04.379' S 152°42.127' E, 256 m a.s.l., 30 Nov. 2014.

Distribution — Known from Tasmania, Victoria and Queensland (Cook 1986), and reported here for the first time from New South Wales.

***Limnesia (Limnesia) patens* K. Viets, 1935**

Limnesia szalayi K. Viets, 1955 **syn. nov.**

Material examined — *Limnesia patens*. Syntypes: Two males, three deutonymphs, Kratersee Telaga, Buitenzorg, Java, 21.11.1928, (Type, slide 45621, SMF); two males, one female, Sindanglaja Quelle, Buitenzorg, Java, 21.11.1928 (Types, slide 45622, SMF). *Limnesia szalayi*. Holotype female, Kuranda, N Queensland, Laird coll., 13.6.54 (slide 45696, SMF).

New record — Queensland. 1/1/0, Spear Creek at crossing with Bypass Road, Cape York Peninsula, 12°03.206' S 142°39.138' E, 76 m a.s.l., 23 Oct. 2014.

Remarks — The specimens from this study match the description of *K. Viets* (1935) well. *K. Viets* (1955) described a very similar species from northern Queensland, i.e. *L. szalayi*. The description of the latter species was based on one female only, and *Viets* didn't compare it with other species. Moreover, the holotype of *L. szalayi* was fixed in ethanol, which makes it often difficult to see the morphological structures well. *Cook* (1986) noticed the similarity between the two species. When comparing the original descriptions, the only difference I find between the two species is that *L. patens* has no posteromedial platelet (*K. Viets* 1935), and in *L. szalayi* an indistinct platelet should be present (*K. Viets* 1955). I examined the holotype and only known specimen thus far of *L. szalayi*, but I do not see a posteromedial platelet. In the shape of palp and genital field the two species are identical. Therefore, I propose to synonymize *L. szalayi* with *L. patens*.

Distribution — *Limnesia patens* is widespread, and has been reported from Java, Indonesia (K. Viets 1935), India (Cook 1967) and Burma (Lundblad 1969). Within Australia known only from Queensland.

***Limnesia (Limnesia) pseudomaceripalpis* sp. nov.**

Zoobank: E1653384-8BDD-447D-8239-0A37D8028162

(Figure 5A-E)

Material examined — Holotype male, Babinda River, Wooroonooran NP, Queensland, Australia, 17°20.484' S 145°52.113' E, 16 Oct. 2005 (QM). Paratypes: One male (QM), two males, one female (RMNH), same data as holotype.

Diagnosis — Cxgl-4 located on Cx-III; fused medial margin of Cx-I relatively long. Male: Genital field relatively short, with 10-12 small setae along lateral margin.

Description — Male: Idiosoma dorsally 701 (697-754) long and 761 (567-616) wide, ventrally 761 (757-810) long. Dorsum with a posteromedial platelet (Figure 5A), 112 long and 84 wide. Coxae in three groups, anterior coxae with short apodemes extending onto Cx-III. Fused medial margin of Cx-I relatively long, L = 112 (Figure 5B). Cx-II medially with

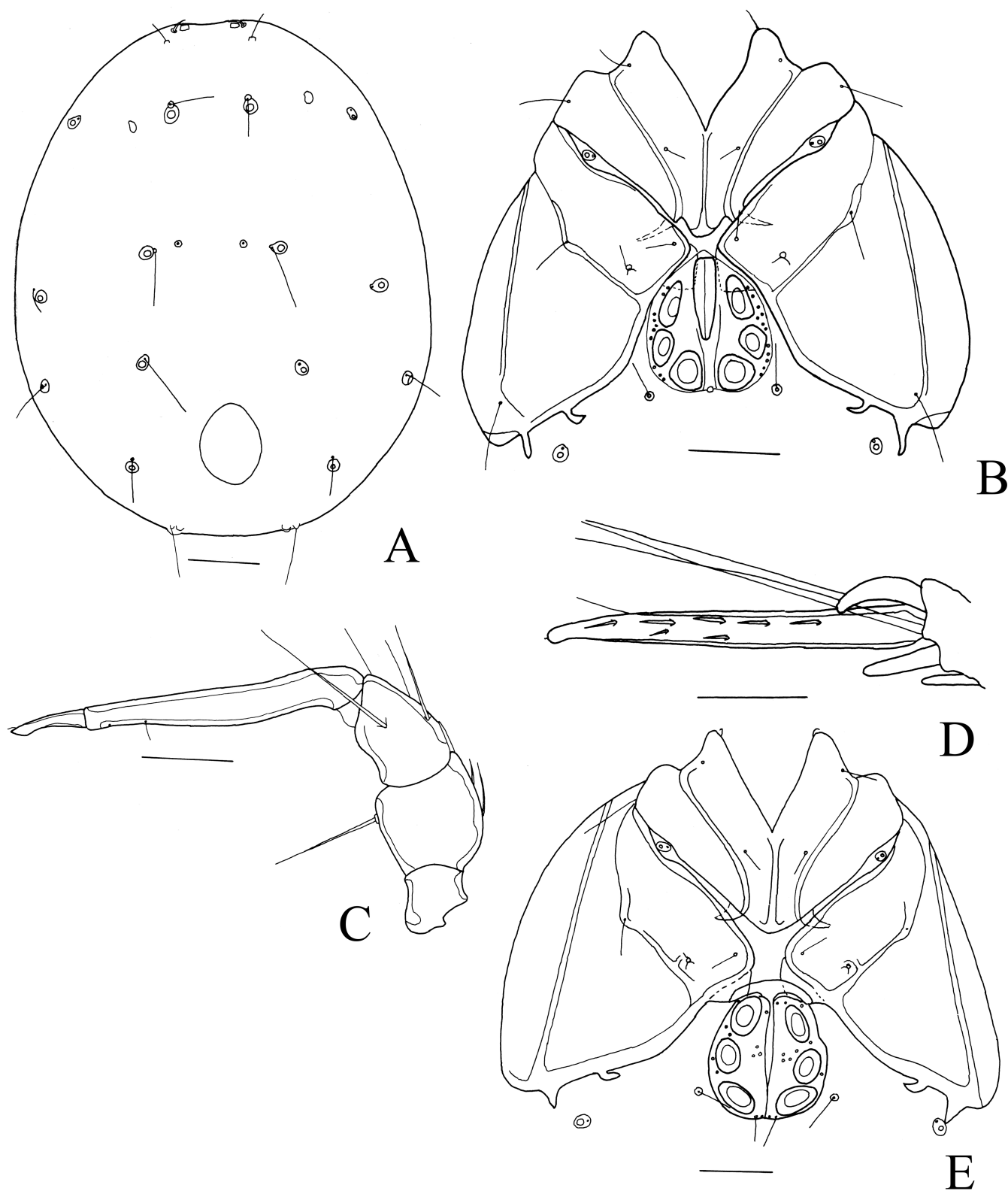


Figure 5 *Limnesia (Limnesia) pseudomaceripalpis* sp. nov., A-D – holotype male, E – paratype female. A – dorsum; B – venter; C – palp; D – IV-leg-6; E – venter. Scale bars: A-B, E = 100 μ m, C-D = 50 μ m.

secondary sclerotization, but not well visible as it is covered by the genital field. Cxgl-4 located on Cx-III, well distanced from associated setae. Medial margin of Cx-IV with a pair of posterior projections. Genital field 152 long and 130 wide, with three pairs of acetabula. Third pair of acetabula larger than anterior two pairs. Gonopore slender, 84 long; along lateral margin 10-12 pairs of small setae. Vgl-1 well distanced from Vgl-3. Length of P1-5: 18, 62, 66, 148, 41. P-2 ventrally with a long, thin seta on a very short setal tubercle, P3 medially with a long seta, P4 and P5 slender (Figure 5C). Length of I-leg-4-6: 108, 130, 128. Length of IV-leg-4-6: 152, 162, 166. Only fourth leg with swimming setae: IV-leg-4 with six, IV-leg-5 with eight swimming setae; swimming setae distributed over nearly the entire length of segments. IV-leg-4 with five large stout setae and three smaller stout setae, IV-leg-5 with three large and three smaller stout setae. IV-leg-6 without a terminal seta (Figure 5D).

Female: Idiosoma dorsally 964 (737) long and 834 (616) wide, ventrally 1021 (834) long. Dorsum with a posteromedial platelet, 126 long and 101 wide. Coxae in three groups, anterior coxae with short apodemes extending onto Cx-III. Fused medial margin of Cx-I relatively long, L = 138. Cx-II medially with secondary sclerotization, but not well visible as it is covered by genital field. Cxgl-4 located on Cx-III, well distanced from associated setae (Figure 5E). Medial margin of Cx-IV with a pair of posterior projections. Vgl-1 well distanced from Vgl-3. Genital field 172 long and 164 wide, with three pairs of acetabula; small setae scattered over genital valves. Pregenital sclerite 118 wide. Length of P1-5: 20, 70, 76, 172, 38; palp as in male. Length of I-leg-4-6: 132, 156, 136. Length of IV-leg-4-6: 184, 212, 214. Fourth leg as in male, IV-leg-4 with seven and IV-leg-5 with 9 swimming setae.

Etymology — Named for its resemblance with *L. maceripalpis*.

Remarks — The new species is most similar to *L. maceripalpis*. The most striking difference with the latter species is the much shorter male genital field. The male genital field of *L. maceripalpis* is 244 long and elongated, the male genital field of the new species is 152 long and hardly elongated. The small setae of the male genital field are not situated along the lateral margin in *L. maceripalpis*. Moreover, Cxgl-4 of the new species are not lying in a bifurcation of Cx-III and Cx-IV, and the fused medial margin of Cx-I is relatively longer. The palps of the two species are very similar, but P2 of the new species stockier compared to *L. maceripalpis* and P4 less slender. A third species with a hair-like seta on P2 is *L. suraensis* Wiles, 1997 from New Guinea, known in the female sex only (Wiles 1997b). The latter species has much larger acetabula, a less slender P4 and Cxgl-4 is close to its associated seta.

***Limnesia (Limnesia) rubra* Smit, 1998**

(Figure 6A-E)

New records — Northern Territory. 1/1/0, plunge pool Edith Falls, Nitmiluk NP, 14°10.899' S, 132°11.342' E, 149 m a.s.l., 2 Oct. 2005.

Description — Male: Idiosoma dorsally 980 long and 802 wide, ventrally 1016 long. Integument with a coarse lineation, chitinized parts brownish. Dorsum with a posteromedial platelet, 122 long and 110 wide. Postocularia on small platelets (Figure 6A). Gnathosomal bay about as long as fused portion of Cx-I. Anterior coxae with short apodemes, Cx-I fused medially. Cxgl-4 well separated from associated seta (Figure 6B). Genital field 243 long and 243 wide; gonopore broad elliptical, 128 long and 80 wide. Vgl-3 well distanced from Vgl-1. Posterior to genital field and Cx-IV a small area of secondary sclerotization. Length of P1-5: 30, 134, 100, 198, 56. P2 ventrally with a peg-like seta, P4 slender, ventrally with a small setal tubercle (Figure 6C). Length of I-leg-4-6: 142, 170, 150. Length of IV-leg-4-6: 215, 227, 210; subterminal seta of IV-leg-6 126 long. Swimming setae: III-leg-4 one, IV-leg-4 three, IV-leg-5 two (Figure 6E). III-leg-5 with eight long setae along entire length of segment, which could act as swimming setae (Figure 6D).

Female: Idiosoma dorsally 1266 long and 1975 wide, ventrally 1286 long. III-leg-5 with four long setae along proximal half of segment which could act as swimming setae, IV-leg-5 with two stiff swimming setae.

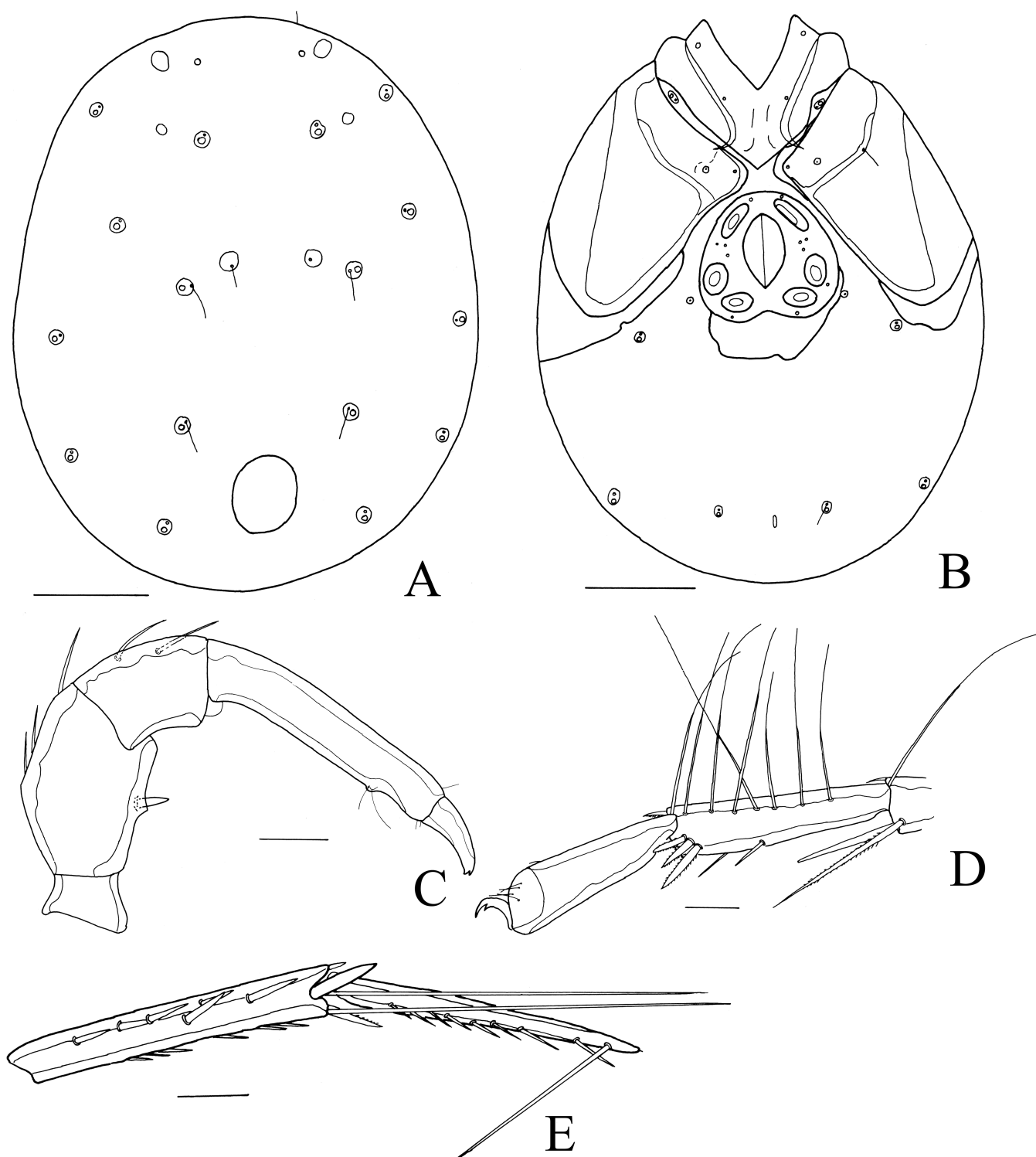


Figure 6 *Limnesia (Limnesia) rubra* Smit, male. A – dorsum; B – venter; C – palp; D – III-leg-5-6; E – IV-leg-5-6. Scale bars: A-B = 100 μm , C-E = 50 μm .

Remarks — The new material from this study is collected on the type locality. According to the original description (Smit 1998), the gnathosomal bay should be longer than the fused portion of Cx-I. In the new material, the gnathosomal bay is more or less as long as the fused portion of Cx-I. Moreover, the chitinized parts are not as red as in the type material. Apparently, it is not clear whether the gnathosomal bay of this species is longer than the fused portion of Cx-I, more material is needed to clarify this. Above a more detailed description is given of the male, and some additional characters of the female. Only the long setae of III-leg-5 are flexible. Females without the reddish chitinized parts and a deep gnathosomal bay cannot be separated from *L. parasolida*, but the long setae on III-leg-5 are absent in the latter species. In the key at the end of this section I used both options for the gnathosomal bay.

***Limnesia (Limnesia) scutata* sp. nov.**

Zoobank: 675C979E-4D74-4624-AD3C-5771101B94A5

(Figure 7A-E)

Material examined — Holotype male, Lily Pond, Katherine Gorge, Nitmiluk NP, Northern Territory, Australia, 14°18.801' S 132°28.326' E, 3 Oct. 2005 (NTM). Paratypes: one male, two females (NTM), one male, one female (RMNH), same data as holotype.

Diagnosis — Venter of male with extensive secondary sclerotization, incorporating coxae and genital field, extending onto dorsum; Cx-I fused medially; venter of female with a large area of secondary sclerotization posterior to Cx-IV.

Description — Male: Idiosoma dorsally 632 (551-624) long and 470 (429-454) wide, ventrally 624 (583-636) long. Integument with irregular, coarse lineation. Postocularia on small platelets, dorsum with a posteromedial platelet (Figure 7A), 146 long and 104 wide. Cx-I fused medially, this fused part much shorter than length of gnathosomal bay. Anterior coxae with short apodemes. Venter of male with extensive secondary sclerotization, almost completely covering venter, incorporating coxae and genital field (Figure 7B), extending onto dorsum. Young males have less secondary sclerotization, covering less of the venter. Genital field with three pairs of acetabula; gonopore 128 long. Length of P1-5: 18, 94, 68, 120, 36. P2 with a peg-like seta located somewhat distally, P4 with distinct setal tubercles (Figure 7C). Length of I-leg-4-6: 96, 112, 90. Length of IV-leg-4-6: 128, 144, 132. IV-leg-4 with one stiff swimming seta (Figure 7D), IV-leg-6 with a subdistal seta, 80 long (but broken off in illustrated leg).

Female: Idiosoma dorsally 802 (729-834) long and 632 (567-680) wide, ventrally 761 (721-818) long. Integument as in male. Dorsum with a small posteromedial platelet, 108 long and 76 wide. Cx-I fused medially, fused part of Cx-I shorter than length of gnathosomal bay. Anterior coxae with short apodemes. Venter with less secondary sclerotization, in young females completely absent, in older females with a large area posterior to Cx-IV which extends somewhat laterally (Figure 7E). In older females with a fringe of secondary sclerotization medially of Cx-III+ Cx-IV, and posterior to genital field a small platelet. Genital field 156 long and 144 wide, with three pairs of acetabula. Length of P1-5: 20, 82, 62, 128, 36. Palp as in male. Length of I-leg-4-6: 104, 120, 100. Length of IV-leg-4-6: 154, 168, 143. IV-leg-4 with one stiff swimming seta, IV-leg-6 with a subdistal seta, 92 long.

Etymology — Named for the large secondary sclerotization in the male.

Remarks — No other Australian *Limnesia* species has such an extensive secondary sclerotization in the male. The group of Australian *Limnesia* species which do have extensive sclerotization, have the dorsum with large plates and do not have swimming setae.

***Limnesia (Limnesia) solida* Lundblad, 1947**

New records — **Tasmania.** 17/22/0, Swamp 12 km S of Gladstone, along road B82, 20 Oct. 1997. **South Australia.** 12/7/0, pool in Weetootla Creek, Gammon Ranges NP, 24 Oct. 2001; 3/0/0, Stubbs Waterhole, Arkaroola, 30°18'S 139°24' E, 25 Oct. 2001; 12/6/0, waterhole in Barramundie Creek, Arkaroola, 25 Oct. 2001; 17/14/0, Nooldoo Nooldoona

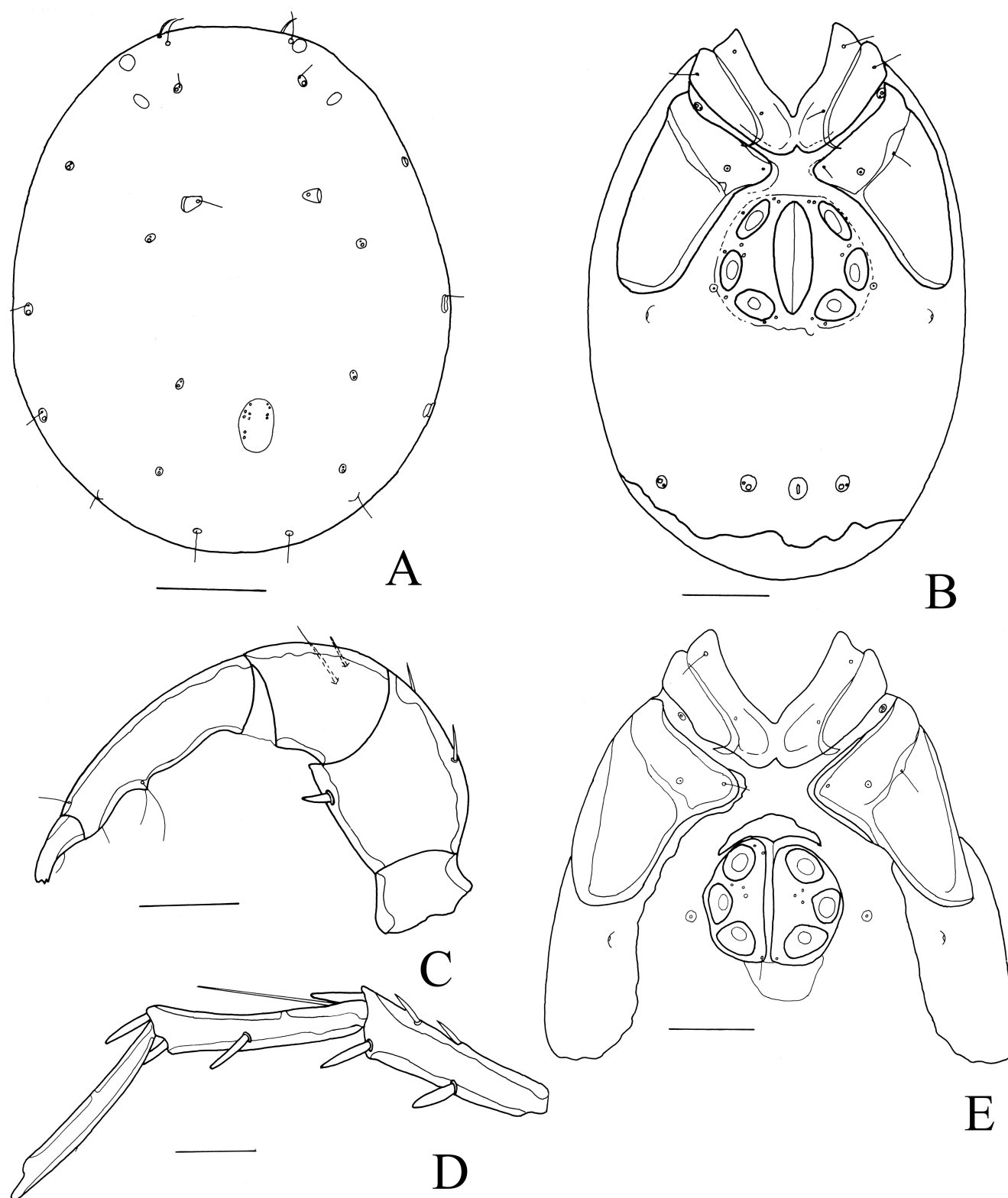


Figure 7 *Limnesia (Limnesia) scutata* sp. nov., A-D holotype male, E paratype female. A – dorsum; B – venter; C – palp; D – IV-leg-4-6; E – venter. Scale bars: A-B, E = 100 µm, C-D = 50 µm.

Waterhole, Arkaroola, 25 Oct. 2001; 38/28/1, Bolla Bollana Spring, Arkaroola, 25 Oct. 2001. **New South Wales.** 6/3/0, small ponds N of Lake Hiawatha, Yuragir NP, 29°47.315' S 153°15.171' E, 60 m a.s.l., 10 Nov. 2003; 0/1/0, Water Gardens, Batemans Bay, 35°42.733' S 150°10.688' E, 16 Dec. 2003. **Victoria.** 5/7/0, pond Boar Gully Camping Area, Brisbane Ranges NP, 28 Sept. 1997; 4/13/0, swamp at junction of Victoria Valley Road and Bundol Road, SW of Grampians NP, 37°35'14.50" S 142°18'58.36" E, 30 Sept. 1997; 1/4/0, pond 3 km N of Chiltern, 9 Oct. 1997; 5/2/0, Pool Green's Creek, Grampians NP, 37°18.321' S 142°23.648' E, 226 m a.s.l., 15 Mar. 2008. **Queensland.** 5/1/1, Nankin Creek, Rockhampton, 21-iii-1983, leg. A.P. Mackay; 3/9/1, Nankin Creek, Rockhampton, 10 Apr. 1983, leg. A.P. Mackay; 0/3/0, Moore's Creek, Rockhampton, 9 Apr. 1983, leg. A.P. Mackay; 0/2/0, shallow pool along road to Hanush Waterhole, Lakefield NP, 4 Sept. 2000; 1/0/0, billabong W of Wenlock River, near crossing with road to Iron Range NP, 10 Sept. 2000; 1/0/0, Twin Falls, Cape York Peninsula, 11 Sept. 2000; 0/1/1, Gregory River at Gregory Downs, 18°38.811' S 139°15.008' E, 68 m a.s.l., 11 Oct. 2005; 2/1/0, small dam Mt Lewis, Mt Lewis Forest Reserve, 14 Oct. 2005; 3/0/0, Mt Carbine Dam, Mt Carbine, 16°32.019' S 145°07.525' E, 358 m a.s.l., 14 Oct. 2005; 1/0/0, Keatings Lagoon, Keatings Lagoon Conservation Park, 15°30.492' S 145°13.342' E, 13 m a.s.l., 17 Oct. 2014; 1/3/0, Marshy Creek crossing Bypass Road, N of Jardine River, 10°58.864' S 142°22.129' E, 22 m a.s.l., 20 Oct. 2014; 1/0/0, Alligator Creek, Bowling Green Bay NP, 19°26.192' S 146°56.862' E, 32 m a.s.l., 22 Oct. 2005; 1/8/0, Fletcher Creek, Dalrymple NP, 19°49.125' S 146°03.771' E, 260 m a.s.l., 22 Oct. 2005; 0/1/0, Porcupine Creek, Porcupine Gorge NP, 20°21.039' S 144°27.852' E, 23 Oct. 2005; 6/9/1, Pandanus Creek, Cathu State Forest, 20°47.904' S 148°32.658' E, 24 Oct. 2005; 17/7/0, South Mimosa Creek, Blackdown Tablelands NP, 23°47.714' S 149°04.270' E, 802 m a.s.l., 27 Oct. 2005; 1/0/0, Fern Tree Pool, Cania Gorge NP, 24°43.685' S 150°58.330' E, 31 Oct. 2005; 1/1/1, Spear Creek at crossing with Bypass Road, Cape York Peninsula, 12°03.206' S 142°39.138' E, 76 m a.s.l., 23 Oct. 2014; 1/0/0, Yabba Creek at Peach Trees Campground, Jimna, 26°38.251' S 152°26.924' E, 465 m a.s.l., 2 Nov. 2005; 0/1/0, Bushy Creek, Mt Lewis, 16°35.677' S 145°16.771' E, 985 m a.s.l., 29 Oct. 2014; 4/3/0, Alligator Creek, pool, upstream, Bowling Green Bay NP, 19°26.740' S 146°58.471' E, 79 m a.s.l., 11 Nov. 2014; 0/1/0, Takilberan Creek at crossing with Bruce Highway, N of Gin Gin, 24°49.680' S 151°42.479' E, 85 m a.s.l., 18 Nov. 2014; 0/1/0, Kolan River crossing Gin Gin-Kalpowar Road, 24°44.348' S 151°28.339' E, 149 m a.s.l., 29 Nov. 2014. **Northern Territory.** 0/5/0, Lake Jabiru, Jabiru, 12°40.264' S 132°50.436' E, 43 m a.s.l., 27 Sept. 2005; 0/1/0, Barramundie Creek downstream of plunge pool, Kakadu NP, 13°19.036' S 132°26.279' E, 28 Sept. 2005; 1/0/0, plunge pool Gunlom, Kakadu NP, 13°25.917' S 132°24.989' E, 30 Sept. 2005. **Western Australia.** 1/1/0, pool Lennard River, Windjana Gorge NP, 9 Sept. 1998; 1/8/0, pool Lennard River, east side Windjana Gorge, Windjana Gorge NP, 10 Sept. 1998; 11/9/0, Bell Creek at crossing with Gibb River Road, the Kimberley, 17°09'1.11" S 125°28'9.73" E, 10 Sept. 1998; 0/0/1, pool Lennard Gorge, the Kimberley, 10 Sept. 1998; 4/5/0, pool Silent Grove Spring, the Kimberley, 11 Sept. 1998; 1/0/0, Bell Creek at campground, the Kimberley, 11 Sept. 1998; 3/0/0, pools upstream of Bell Gorge Falls, the Kimberley, 11 Sept. 1998; 1/0/0, pool downstream of Manning Gorge, at campground, the Kimberley, 12 Sept. 1998; 8/1/0, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 2/1/0, pool near Adcock Gorge, the Kimberley, 12 Sept. 1998; 1/0/0, Russ Creek at crossing with Gibb River Road, the Kimberley, 14 Sept. 1998; 1/3/0, Jackaroo's Waterhole, El Questro Station, the Kimberley, 15 Sept. 1998; 17/33/0, plunge pool Frog Hole Gorge, Purnululu NP, 23 Sept. 1998; 0/3/0, plunge pool Cathedral Gorge, Purnululu NP, 17°28'49.60" S 128°22'22.47" E, 24 Sept. 1998; 1/0/0, Spillway Creek near Lake Argyle, 20 Sept. 1998; 4/6/0, Palm Springs S of Halls Creek, 25 Sept. 1998; 1/1/0, pools in creek at Old Halls Creek, S of Halls Creek, 26 Sept. 1998; 2/8/0, Fitzroy River, S of Fitzroy Crossing, 18°12'39.07" S 125°34'40.91" E, 28 Sept. 1998; 2/0/0, Geikie Gorge, western side, Geikie Gorge NP, 18°07'23.92" S 125°39'42.47" E, 28 Sept. 1998; 3/0/0, pool W of Tunnel Creek, Tunnel Creek NP, 30 Sept. 1998; 0/2/0, unnamed creek at crossing with Windjana Gorge Road, 38 km N of Great Northern Highway, 30 Sept. 1998; 11/8/2, Joffre Creek, Karijini NP, 22°24.682' S 118°15.538' E, 694 m a.s.l., 27

Jan. 2019; 0/1/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m a.s.l., 28 Jan. 2019; 9/19/11, Circular Pool, Karijini NP, 22°28.527' S 118°33.728' E, 711 m a.s.l., 28 Jan. 2019; 3/0/0, Fortescue River at crossing with NW Coastal Highway, 21°17.667' S 116°08.680' E, 40 m a.s.l., 31 Jan. 2019.

Distribution — Previously known from Victoria, Queensland, the Northern Territory and Western Australia, and reported here for the first time from Tasmania, New South Wales and South Australia. From this study it is clear that *L. solida* is one of the most widespread *Limnesia* species in Australia. However, relatively few records have been published thus far.

***Limnesia (Limnesia) surroma* Cook, 1986**

New records — **New South Wales.** 0/1/0, Upper Minnamurra River, W of Robertson, 6 Nov. 2001; 1/3/0, Leather Barrel Creek at crossing with Alpine Way, Mt Kosciuszko NP, 36°31.559' S 148°11.611' E, 999 m a.s.l., 8 Dec. 2003; 1/0/0, Thredbo River at Thredbo Diggers Picnic Area, Mt Kosciuszko NP, 36°26.753' S 148°25.487' E, 1136 m a.s.l., 8 Dec. 2003; 6/9/1, Swampy Plains River at crossing with Alpine Way, Mt Kosciuszko NP, 36°23.121' S 148°10.837' E, 425 m a.s.l., 9 Dec. 2003; 1/1/0, Six Mile Creek, SE Forests NP, 10 Dec. 2003. **Victoria.** 0/1/0, Eurobin Creek downstream of Mt Buffalo NP entrance, 36°41.745' S 146°51.453' E, 293 m a.s.l., 10 Mar. 2008.

Remarks — Cook (1986) stated that “it would not surprise me to have one or no pairs of glandularia incorporated into the anterior dorsal plate and either one, two or three on the posterior plate”. Indeed, the female from the Upper Minnamurra River has the posterior dorsal plate with one pair of glandularia incorporated.

Distribution — Previously known from Victoria only and reported here for the first time for New South Wales.

***Limnesia (Heterolimnesia) tasmanica* (Lundblad, 1941)**

New records — **Tasmania.** 2/19/5, Reservoir of Darlington, Maria Island NP, 42°35'23.28" S 148°5'7.78" E, 18 Oct. 1997; 0/1/0, Apsley River at crossing with Tasman Highway, 19 Oct. 1997; 0/3/0, Swamp 12 km S of Gladstone, along road B82, 20 Oct. 1997; 0/1/0, Little Waterhouse Lake, Waterhouse Protected Area, 21 Oct. 1997; 0/1/0, Blackmans Lagoon, Waterhouse Protected Area, 21 Oct. 1997; 1/0/1, Nive River at crossing with A10, 42°09.456 S 146°28.130 E, 588 m a.s.l., 26 Mar. 2008; 1/1/0, Macquairy River at crossing with road C522, 41°54.472' S 147°23.546' E, 162 m a.s.l., 28 Mar. 2008. **Victoria.** 1/1/1, swamp at junction of Victoria Valley Road and Bundol Road, SW of Grampians NP, 37°35'14.50" S 142°18'58.36" E, 30 Sept. 1997; 7/21/1, pond along Buckland Valley Road, near crossing with Buckland River, W of Bright, 11 Oct. 1997.

Distribution — Known from Tasmania, Victoria, South Australia and New South Wales.

***Limnesia (Limnesia) timmsi* K.O. Viets, 1980**

New records — **New South Wales.** 1/0/1, School Creek near Morton NP, 5 Nov. 2001; 3/1/0, Bugong Creek near Morton NP, 5 Nov. 2001; 1/0/0, Barrengarry Creek upstream of falls, Morton NP, 6 Nov. 2001; 4/11/0, Upper Kangaroo River, N of Kangaroo Valley, 7 Nov. 2001; 1/3/0, Cabbage Tree Gully, tributary of Upper Kangaroo River, N of Kangaroo Valley, 7 Nov. 2001; 2/0/1, Nymboida River at Platypus Flat, Nymboi-Binderay NP, 30°11.146' S 152°41.499' E, 443 m a.s.l., 9 Nov. 2003; 0/1/0, Rosewood River at crossing with Little North Arm Road, near Thora, 30°24.133' S 152°46.380' E, 22 Nov. 2003; 2/0/0, Nulla Nulla Creek near Nulla Nulla Picnic Area, 24 Nov. 2003; 2/0/3, Sugarloaf Creek at crossing with Misty Mountain Road, Monga NP, 35°33'44.70" S 150°0'48.61" E, 15 Dec. 2003; 3/1/3, Carters Creek at crossing with Western Distributor Road, 35°30.914' S 150°03.546' E, 187 m a.s.l., 16 Dec. 2003; 1/1/1, Cabbage Tree Creek at crossing with Kings Highway, 35°34.367' S 150°02.537' E, 260 m a.s.l., 26 Dec. 2003. **Queensland.** 1/1/0, Peter's Creek at crossing with

road Kenilworth-Jimna, 26°40.911' S 152°36.577' E, 3 Nov. 2005; 1/5/0, Booloumba Creek upstream of falls, Conondale NP, 26°40.753' S 152°37.162' E, 465 m a.s.l., 20 Nov. 2014.

Distribution — Known from New South Wales and Tasmania and reported here for the first time from Queensland.

Limnesia (Limnesia) victoria sp. nov.

Zoobank: 054F8954-80D9-4CE9-A5D4-30B4B82AB88E

(Figure 8A-E)

Material examined — Holotype male, small rock pools near Rollasons Falls, Mt Buffalo NP, Victoria, Australia, 11 Oct. 1997 (NMV). Paratypes: One male, two females (NMV), one male, two females (RMNH), same data as holotype.

Diagnosis — Cx-I separated, male genital field forming a complete ring, legs with swimming setae.

Description — Male: Idiosoma dorsally 956 (923-948) long and 790 (770-786) wide, ventrally 940 (842-940) long. Integument coarsely lineated. Postocularia on small, triangular platelets (Figure 8A), dorsal posteromedial platelet 92 long and 66 wide. Cx-I separated (Figure 8B), Cxgl-4 lying on Cx-III, well separated from associated seta. Cx-III medially with some small secondary sclerotization. Cxgl-3 distanced from Vgl-1. Genital field forming a complete ring, 211 long and 227 wide, with three pairs of acetabula; gonopore relatively large, about $\frac{3}{4}$ length of genital field. Length of P1-5: 24, 120, 80, 170, 50. P2 ventrally with a pointed peg-like seta, not inserted on a tubercle; P4 slender, with small setal tubercles (Figure 8C). Length of I-leg-4-6: 170, 214, 168. Length of IV-leg-4-6: 227, 251, 235. IV-leg-6 with two subterminal setae (Figure 8D), the most anterior one 146 long. Swimming setae: IV-leg-5 one, IV-leg-4 four (these setae longer than IV-leg-5), III-leg-4 with five, III-leg-5 with one and II-leg-4 with one; swimming-like setae of III-leg-5 distributed over entire length of segment.

Female: Apart from genital field, in most aspects similar to male. Idiosoma dorsally 1158 (1025-1186) long and 964 (844-925) wide, ventrally 1118 (1025-1206) long. Integument as in male. Posteromedial platelet 116 long and 104 wide. Cx-I medially separated (Figure 8E). Genital field with three pairs of acetabula, 235 long and 227 wide. Length of P1-5: 25, 132, 102, 182, 52; palp as in male. Length of I-leg-4-6: 172, 202, 160. Length of IV-leg-4-6: 279, 275, 251; anterior of the two subterminal seta of IV-leg-6 166 long. Legs as in male.

Etymology — Named for its occurrence in the state of Victoria, the name is a noun in apposition.

Remarks — Two species known from Australia with swimming setae have Cx-I separated, i.e. *L. patens* and *L. otruma*. In these species the male genital field doesn't form a complete ring.

Key to the Australian *Limnesia* species (adapted from Cook 1986)

1. Swimming setae always absent 2
— Swimming setae present, at least one on the fourth leg 11
2. Dorsal sclerotization not extensive; with a pair of small platelets (these occasionally fused medially) immediately anterior to the postocularia platelets (if present) 3
— Dorsal sclerotization extensive; if there are paired platelets anterior to the posteromedial plate, they bear the postocularia 5
3. Anterior coxae fused medially; palp segments relatively long and narrow, P5 sharply pointed and P2 without ventral seta *L. ugava*
— Anterior coxae separated medially; palp segments relatively stocky and P2 with a ventral seta 4

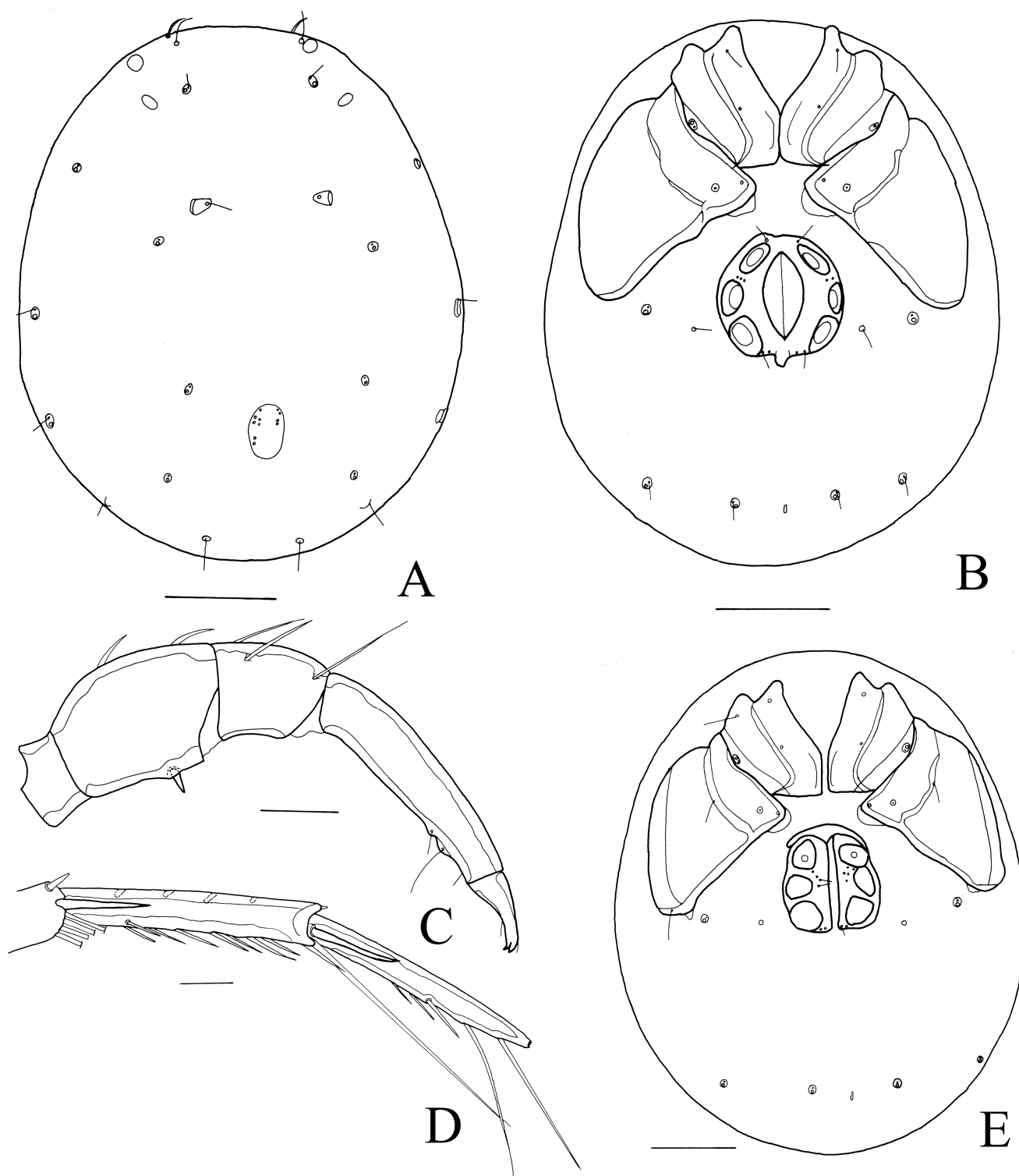


Figure 8 *Limnesia (Limnesia) victoria* sp. nov., A-D holotype male, E paratype female. A – dorsum; B – venter; C – palp; D – IV-leg-5-6; E – venter. Scale bars: A-B, E = 200 µm, C-D = 50 µm.

4. Dorsum with a posteromedial platelet, and anterior to this platelet a pair of small, rounded platelets (the latter platelets occasionally fused) *L. brinvoza*
 — Dorsum without a posteromedial platelet and a pair of smaller platelets
 *L. elongata* **sp. nov.**
5. Dorsum with a large anterior plate and a large posterior plate 6
 — Dorsum with a large posterior plate but anterior plates are paired 10
6. Mouthparts protrusable; tips of Cx-I sharp-pointed 7
 — Mouthparts not protrusable; tips of Cx-I more rounded 8
7. Coxae fused into a single sclerite *L. hopa*
 — Coxae not fused into a single sclerite *L. reela* Cook, 1986
8. Acetabula large, occupying much of the area of the genital field *L. surroma*
 — Acetabula small, occupying only a small part of the genital field 9
9. One pair of glandularia incorporated into the anterior dorsal plate, four pairs incorporated into the posterior plate *L. omneela* Cook, 1986
 — Two pairs of glandularia incorporated into both the anterior and posterior dorsal plates
 *L. unreela* Cook, 1986
10. Two pairs of glandularia and the postocularia incorporated into the paired anterior platelets *L. harveyi* Cook, 1986
 — Only the postocularia incorporated into the paired anterior platelets *L. babinda*
11. Genital field with numerous acetabula; Cxgl-4 lying in a bifurcation of the suture line Cx-III/IV *L. tasmanica*
 — Genital field with three pairs of acetabula; if more than three pairs of acetabula present, then Cxgl-4 not lying in a bifurcation of the suture line Cx-III/Cx-IV 12
12. Cxgl-4 shifted to anterior margin of Cx-III 13
 — Cxgl-4 more posterior in position 15
13. Genital field not greatly elongated but with numerous small peripheral setae; ventral seta of P2 on a well-developed tubercle; integument of deutonymphs and young adults with numerous long setae *L. corpulenta*
 — Genital field elongated with few peripheral setae; ventral seta of P2 on only slightly raised tubercle 14
14. Palp segments relatively long, longest of two ventral setae of P4 well removed from each other; male genital field consisting of two separated flaps *L. dentifera*
 — Palp segments comparatively shorter, longest two ventral setae of P4 relatively close together; flaps of male genital field fused into a single sclerite *L. longigenitalis*
15. Peg-like seta on ventral side of P2 on a well-developed tubercle *L. leembangensis*
 — Peg-like seta on ventral side of P2 not on a well-developed tubercle 16
16. Seta on ventral side of P2 long, hair-like 17
 — Seta on ventral side of P2 peg-like 18
17. Genital field relatively short, genital setae arranged along lateral margin; Cxgl-4 are not lying in a bifurcation of Cx-III and Cx-IV *L. pseudomaceripalpis* **sp. nov.**

- Genital field relatively long, genital seta not arranged along lateral margin; Cxgl-4 are lying in a bifurcation of Cx-III and Cx-IV *L. maceripalpis*
- 18. Cx-I separated medially 19
- Cx-I fused medially 21
- 19. Palp stocky, dorsum without a posteromedial platelet *L. patens*
- Palp slender, dorsum with a posteromedial platelet 20
- 20. Male genital plates fused into a complete ring surrounding the gonopore; acetabula of female occupying almost completely the area of genital flap, first pair of acetabula not distanced from posterior two pairs *L. victoria* **sp. nov.**
- Male genital plates not fused into a complete ring surrounding the gonopore; acetabula of female occupying a small area of genital flap, first pair of acetabula distanced from posterior two pairs *L. otruma*
- 21. Ventral side of P4 with well-developed setal tubercles; IV-leg-4 with eight, IV-leg-5 with four swimming setae *L. australica*
- Ventral side of P4 with slight development of setal tubercles; swimming setae various ... 22
- 22. Gnathosomal bay deep (much longer than the length of fused portion of Cx-I) 23
- Gnathosomal bay less deep (approximately same length of the fused portion of Cx-I or shorter) 26
- 23. Posteromedial platelet of dorsum small (< 100) *L. solida*
- Posteromedial platelet of dorsum large (> 100) 24
- 24. Males with extensive secondary sclerotization, in older males covering nearly complete venter and incorporating genital field; older females with a large area of secondary sclerotization posterior to Cx-IV, as long as Cx-III + Cx-IV *L. scutata* **sp. nov.**
- Males with less secondary sclerotization, not covering complete venter and not incorporating genital field; females with less secondary sclerotization posterior to Cx-IV, much shorter than Cx-III + Cx-IV 25
- 25. Gonopore of male as long as genital field; III-leg-5 without long setae along entire segment *L. parasolida*
- Gonopore of male distinctly shorter than genital field, III-leg-5 with eight long setae along entire segment in male, four such setae in female *L. rubra*
- 26. IV-leg-5 with one or two terminal swimming seta 27
- IV-leg-5 with three to six terminal swimming setae 30
- 27. Vgl-3 well distanced from Vgl-1 28
- Vgl-3 close to Vgl-1 29
- 28. Gonopore nearly as long as genital field, IV-leg-5 with one swimming seta *L. gledhilli* **sp. nov.**
- Gonopore much shorter than genital field, IV-leg-5 with two swimming setae *L. rubra*
- 29. Vgl-4 well separated from associated seta; Vgl-1 placed more or less anterior to Vgl-3; acetabula large, with little gap between first and second pairs *L. ekama*
- Vgl-4 close to associated seta; Vgl-1 nearly medial to Vgl-3; acetabula small, with a distinct

gap between first and second pairs *L. passama* (From here on key based on males only)

30. Males without secondary sclerotization associated with the genital field and Cx-IV *L. swanensis* Cook, 1986

— Males with secondary sclerotization associated with the genital field and Cx-IV 31

31. Ventral peg-like seta of P2 placed relatively near distal end; IV-leg-5 with 3-4 swimming setae *L. timmsi*

— Ventral peg-like seta of P2 placed closer to middle of segment; IV-leg-5 with six swimming setae *L. jolova*

Genus *Physolimnesia* Halík, 1940

A genus endemic to Australia, with two species known.

Physolimnesia australis (Halík, 1940)

New records — New South Wales. 1/1/0, Lake Hiawatha, Yuragir NP, 29°49.070' S 153°15.558' E, 25 m a.s.l., 10 Nov. 2003; 2/1/0, small ponds N of Lake Hiawatha, Yuragir NP, 29°47.315' S 153°15.171' E, 60 m a.s.l., 10 Nov. 2003; 4/6/1, MacDonald River upstream of Upper MacDonald Road, 33°12.312' S 150°53.613' E, 2 Dec. 2003; 28/66/1, Lake Ainsworth, N of Ballina, 28°47.053' S 153°35.569' E, 8 Nov. 2005. **Queensland.** 41/37/0, Tinaroo Falls Dam at Yungaburra, 16 Sept. 2000; 1/0/0, Crediton Creek, Eungella NP, 18 Sept. 2000; 0/1/0, small lake Hawkwood Road, 13 km S of Mundaburra, 25°39.910' S 151°13.941' E, 31 Oct. 2005; 1/0/0, small lake S of Biggenden, along road Biggenden-Maryborough, 25°33.583' S 152°07.345' E, 1 Nov. 2005; 0/2/0, Emu Creek at Clancy's Camping Area, Benarkin State Forest, 26°58.334' S 152°09.916' E, 162 m a.s.l., 3 Nov. 2005; 23/50/0, Double Creek West, S of Mt Elliot, 19°34.610' S 147°01.977' E, 41 m a.s.l., 10 Nov. 2014; 0/1/0, Spring Creek, N of Woolooga, 25°44.497' S 152°14.442' E, 111 m a.s.l., 18 Nov. 2014; 1/3/0, Ewen Maddock Dam, NE of Landsborough, 26°47.795' S 152°59.416' E, 29 m a.s.l., 1 Dec. 2014.

Distribution — Previously known from Queensland and New South Wales.

Physolimnesia katherine Smit, 1998

New record — Northern Territory. 0/1/1, stream upstream of Wangi falls, Litchfield NP, 13°09.832' S 130°41.166' E, 25 Sept. 2005.

Distribution — Known only from the Northern Territory.

Genus *Timmsilimnesia* K.O. Viets, 1984

A genus endemic to Australia with one species known.

Timmsilimnesia inga (K.O. Viets, 1975)

New record — Northern Territory. 1/0/0, Lake Jabiru, 12°40.264' S 132°50.436' E, 43 m a.s.l., 27 Sept. 2005.

Distribution — Previously known from Queensland and the Northern Territory (Smit 1998).

Genus *Tubophorella* K.O. Viets, 1978

A genus with a disjunct distribution, with several species known from Central and South America and two species from Australia (Smit 2020). Below two more species are described.

***Tubophorella amoena* K.O. Viets, 1978**

New record — **New South Wales.** 1/0/0, Shoalhaven River at Berlang Camping Area, Deua NP, 35°43.487' S 149°38.911' E, 706 m a.s.l., 15 Dec. 2003.

Distribution — Previously known from Victoria and New South Wales.

***Tubophorella australis* Imamura, 1984**

New records — **New South Wales.** 0/1/0, School Creek, near Morton NP, 5 Nov. 2001; 0/1/0, Upper Kangaroo River, N of Kangaroo Valley, 7 Nov. 2001.

Distribution — Previously, only known from the holotype female collected in New South Wales.

***Tubophorella paluma* sp. nov.**

Zoobank: 29EF3E83-6BF3-463F-A508-B50FC70727A4

(Figure 9A-F)

Material examined — Holotype male, Waterview Creek at entrance of Paluma Range National Park, Queensland, Australia, 18°51.128' S 146°07.506' E, 56 m a.s.l., 12 Nov. 2014 (QM). Paratype: One female, Big Crystal Creek at Paradise Pool, Paluma Range NP, Queensland, Australia, 18°58.754' S 146°15.231' E, 48 m a.s.l., 21 Oct. 2005 (QM).

Diagnosis — Posterior dorsal plate with one pair of glandularia. Gonopore of male large, almost as long as genital field.

Description — Male: Idiosoma dorsally 786 long and 437 wide, ventrally 786 long. Camerostome long and anterodorsally indented. Dorsum with two large plates. Anterior dorsal plate 251 long and 284 wide, with four pairs of glandularia. Posterior dorsal plate with one pair of glandularia and the postocularia (Figure 9A). Dorsal furrow with four pairs of glandularia. Cxgl-4 close to associated setae, located near suture line Cx-III/IV. Genital field 138 long and 118 wide, with three pairs of elongated acetabula. Genital field lying more or less posterior to Cx-IV (Figure 9B). Gonopore 130 long and 60 wide. Length of P1-5: -, 74, 30, 62, 27 (Figure 9C). Length of I-leg-4-6: 106, 118, 120. Length of IV-leg-4-6: 144, 154, 148 (till tip of segment). IV-leg-6 as described for female. Legs without swimming setae.

Female: Idiosoma dorsally 761 long and 429 wide, ventrally 761 long. Camerostome long and anterodorsally indented. Anterior dorsal plate 267 long and 296 wide, posterior dorsal plate 316 long and 324 wide. Configuration of dorsal glandularia as in male. Cxgl-4 close to associated setae, located near suture line Cx-III/IV. Genital field lying more or less posterior to Cx-IV (Figure 9E), 144 long and 130 wide. Length of P1-5: 12, 70, 46, 62, 26. Length of I-leg-4-6: 94, 114, 140 (till tip of segment). Length of IV-leg-4-6: 112, 134, 140 (till tip of segment). IV-leg-6 with a small subterminal seta and six stout setae (Fig. 9F). Legs without swimming setae.

Etymology — Named for its occurrence in the Paluma Range. The name is a noun in apposition.

Remarks — The new species differs from all Australian *Tubophorella* species in the presence of only one pair of glandularia on the posterior dorsal plate. Australian *Tubophorella* species differs from those of the New World in the absence of a ventral seta of P2.

***Tubophorella queenslandica* sp. nov.**

Zoobank: 02B8C107-BD90-4795-9823-DD45478E2930

(Figure 10A-F)

Material examined — Holotype male, Big Crystal Creek, downstream of rock pools, Paluma Range NP, Queensland, Australia, 18°59.013' S 146°14.188' E, 88 m a.s.l., 9 Nov. 2014 (QM). Paratypes: One male, same data as holotype (RMNH); three females, Whyanbeel Creek, N of Mossman, Queensland, Australia, 16°22.205' S 145°19.633' E, 143 m a.s.l., 15 Oct. 2005 (RMNH); one female, Henrietta Creek, Wooroonooran NP, Queensland, Australia,

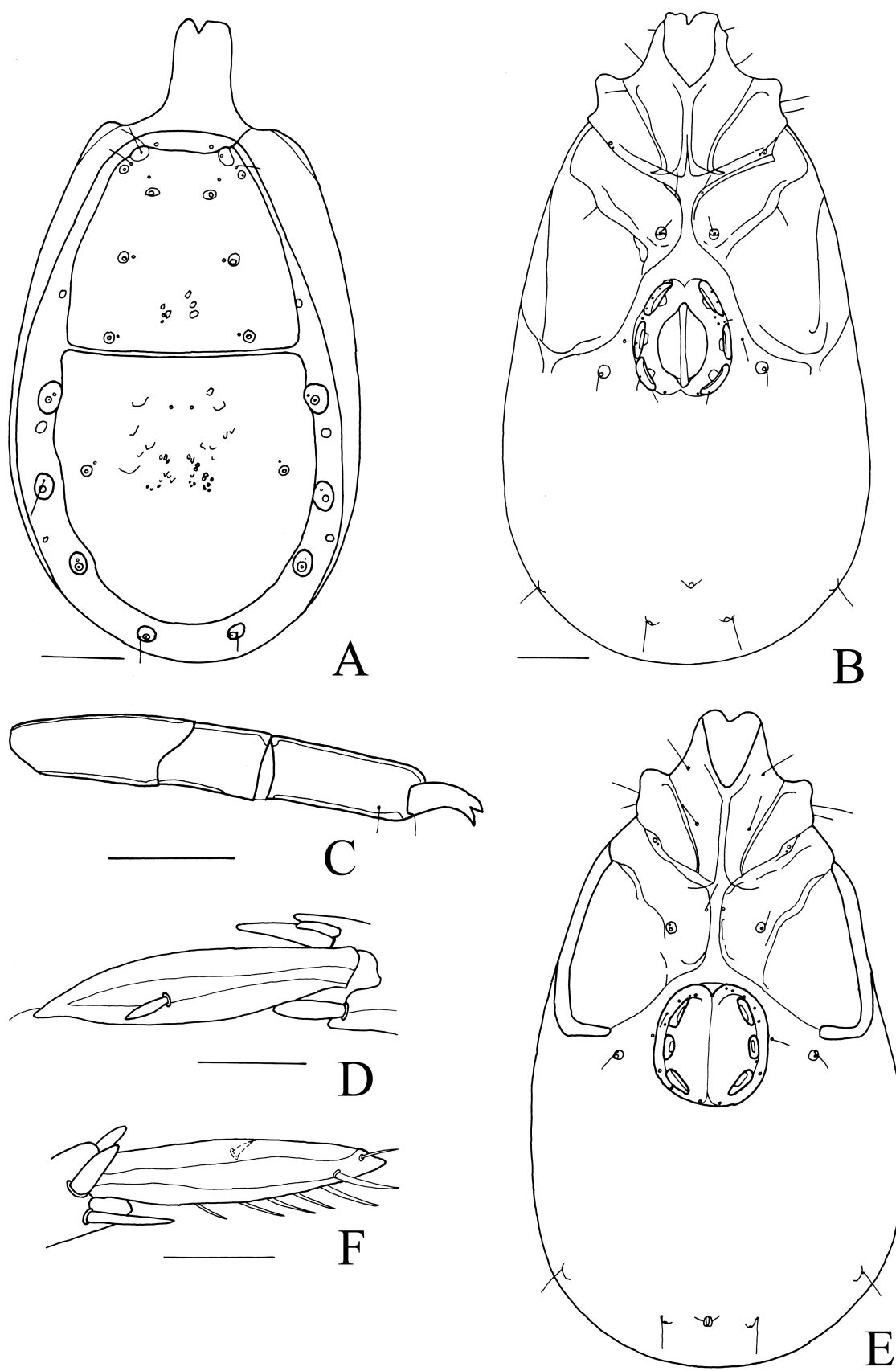


Figure 9 *Tubophorella paluma* sp. nov., A-D – holotype male, E-F – paratype female. A – dorsum; B – venter; C = P2-P5; D – IV-leg-6; E – venter; F – IV-leg-6. Scale bars: A-B, E = 100 μ m, C-D, F = 50 μ m.

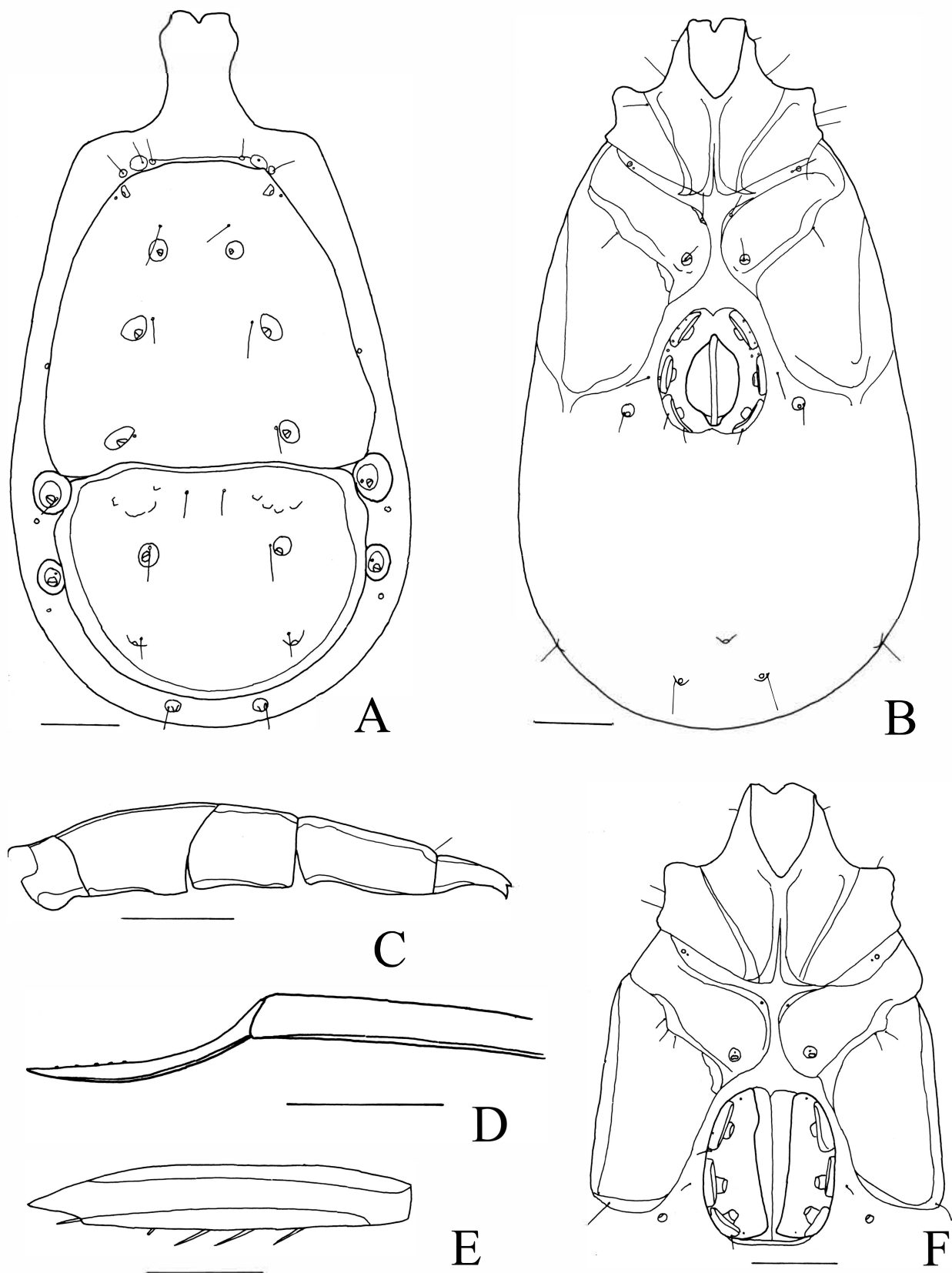


Figure 10 *Tubophorella queenslandica* sp. nov., A-E – holotype male, F – paratype female. A – dorsum; B – venter; C – palp; D – cheliceral claw; E – IV-leg-6; F – venter. Scale bars: A-B, F = 100 μ m; C-E = 50 μ m.

17°35.884' S 145°45.548' E, 390 m a.s.l., 19 Oct. 2005 (RMNH); one male, two females, same location, 3 Nov. 2014 (QM). Other material. **Queensland.** 0/1/0, Lacey Creek, Mission Beach, 17°51.068' S 146°03.871' E, 81 m a.s.l., 20 Oct. 2005; 1/1/0, Mulgrave River near outflow of Kearneys Creek, Wooroonooran NP, 17°14.430' S 145°46.456' E, 69 m a.s.l., 1 Nov. 2014; 0/1/0, unnamed creek N of Tully River, Tully Gorge NP, 17°46.590' S 145°39.871' E, 80 m a.s.l., 4 Nov. 2014; 1/0/0, unnamed creek N of Tully River, Tully Gorge NP, 17°46.159' S 145°39.461' E, 134 m a.s.l., 4 Nov. 2014; 0/1/0, Tully River at campground, Tully Gorge NP, 17°46.280' S 145°39.073' E, 86 m a.s.l., 4 Nov. 2014; 0/1/0, Gooligan Creek at crossing with Palmerston Highway, Wooroonooran NP, 17°36.267' S 145°45.726' E, 370 m a.s.l., 7 Nov. 2014.

Diagnosis — Anterior dorsal plate larger than posterior dorsal plate. Genital field located between Cx-IV. Male gonopore large.

Description — Male: Idiosoma dorsally 907 (850-899) long (including camerostome) and 502 (462-486) wide, ventrally 907 (850-899) long. Camerostome long and anterodorsally indented. Dorsum with two large plates, anterior dorsal plate larger than posterior dorsal plate (Figure 10A). Anterior dorsal plate 389 (364-373) long and 421 (389-409) wide, with four pairs of glandularia. Posterior dorsal plate 292 (292) long and 397 (356) wide, with two pairs of glandularia and the postocularia. Dorsal furrow with three pairs of glandularia. Gnathosoma and chelicera long, but gnathosoma unfortunately broken during mounting; cheliceral claw 74 long, slender with small teeth (Figure 10D). Cxgl-4 close to associated setae, located near suture line Cx-III/IV. Genital field 160 long and 136 wide with three pairs of elongated acetabula. Genital field lying between Cx-IV, with indented anterior and posterior margins (Figure 10B). Gonopore 112 long and 64 wide. Length of P1-5: 14, 72, 58, 64, 34. Ventral margin of P-2 without a seta (Figure 10C). Length of I-leg-4-6: 116, 126, 110. Length of IV-leg-4-6: 144, 160, 162. IV-leg-6 without a terminal seta (Figure 10E). Swimming setae absent.

Female: Idiosoma dorsally 932 (850-915) long (including camerostome), 518 (486-543) wide, ventrally 932 (850-915) long. Dorsum as in male, anterior plate 397 (381-385) long and 437 (429-478) wide, posterior plate 312 (287-308) long and 405 (373-429) wide. Genital field 178 long, lying between Cx-IV (Figure 10F). Length of P1-5: 14, 74, 38, 68, 30. Length of I-leg-4-6: 134, 132, 114. Length of IV-leg-4-6: 169, 150, 152. Legs as in male.

Etymology — Named for its occurrence in Queensland.

Remarks — The new species shares the same number of glandularia on the dorsal plates as in *T. amoena*, but in the latter species the posterior dorsal plate is longer than the anterior dorsal plate. In the new species the anterior dorsal plate is distinctly longer than the posterior dorsal plate. Moreover, the genital field of the male of the new species is located between Cx-IV, while in *T. amoena* the genital field is located more or less posterior to Cx-IV. Furthermore, the male gonopore of the new species is larger than the male gonopore of *T. amoena*.

Key to the Australian species of *Tubophorella*

1. Posterior dorsal plate with one pair of glandularia *T. paluma* **sp. nov.**
— Posterior dorsal plate with more than one pair of glandularia 2
2. Posterior dorsal plate with three pairs of glandularia *T. australis* Imamura
— Posterior dorsal plate with two pairs of glandularia 3
3. Anterior dorsal plate longer than posterior dorsal plate *T. queenslandica* **sp. nov.**
— Posterior dorsal plate longer than anterior dorsal plate *T. amoena* K.O. Viets

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