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The water mite genus *Neumania* Lebert, 1879 in Australia (Acari: Hydrachnidia)

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Original research

ABSTRACT

A new *Neumania* species is described from Australia, i.e., *N. australica* n. sp. *Neumania queenslandica* K.O. Viets, 1977 is synonymized with *N. gila* K.O. Viets, 1975. Previous records of *N. falcipes* Koenike, 1906 from Australia should be assigned to *N. gila*. New records are given of the genus from all over Australia.

Keywords taxonomy; systematics; new species; new records

Zoobank <http://zoobank.org/B886946B-B7B5-406E-8FE2-CA5E8AEA2EAC>

Introduction

The genus *Neumania* has a worldwide Distribution. Currently, there are 12 subgenera known worldwide (Smit 2020). Within Australia, three subgenera have been reported, the nominate subgenus, *Lemienia* Koenike, 1910 and *Soarella* Koenike, 1907.

Few studies have been conducted on the genus *Neumania* in Australia. K.O. Viets (1975, 1977, 1981, 1984), Cook (1986) and Smit (1992) were the only authors who reported on the occurrence of *Neumania* in Australia, summarized by Harvey (1998). The total number of *Neumania* species in Australia tallies seven, including the new species described in this paper.

This study gives numerous records of the genus from all over Australia. Moreover, the status of *N. queenslandica* K.O. Viets, 1977, described from Australia, is discussed. *Neumania gila* K.O. Viets, 1975 is compared with *N. falcipes* Koenike, 1906, and it is concluded that material from Australia previously assigned to the latter species, belongs to *N. gila*.

Material and methods

All material from this study has been collected by the author, unless stated otherwise. Paratypes and all non-type material will be lodged in the Naturalis Biodiversity Center, Leiden (RMNH). The following abbreviations are used: asl = above sea level; Cx-IV – fourth coxae; P1-5 – palp segments 1-5; IV-leg-2 – second segment of fourth leg; NP – National Park; SAM – South Australian Museum, Adelaide; SMF – Senckenberg Museum, Frankfurt am Main; WAM – Western Australian Museum, Perth. 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 or adult/deutonymph. All coordinates are taken with a GPS. Coordinates given as degrees, minutes and seconds are taken from Google Earth and are by approximation. No water mites are known from the Australian Capital Territory. So, when in the distribution is referred to all states and territories, it is without the Australian Capital Territory. Data on the world distribution are taken from Smit (2020).

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Taxonomy

Family Unionicolidae Oudemans

Subfamily Pionatacinae K. Viets

Genus *Neumania* Lebert, 1879

Neumania (Neumania) ambigua Piersig, 1906

New records — **Western Australia.** 16/8/0, Fitzroy River, at crossing with Great Northern Highway, S of Derby, 8 Sept. 1998; 1/5/1, pool Valentine Springs, W of Kununurra, 18. Sept. 1998; 2/1/0, Arthur Creek at crossing with Great Northern Highway, 23. Sept. 1998; 1/1/0, Geikie Gorge, western side, Geikie Gorge NP, 18°7'23.92" S 125°39'42.47" E, 28. Sept. 1998; 1/5/0, Lake Campion, 17°50'50.37" S 122°44'29.84" E, 14. Oct. 1998. **Northern Territory.** 1/0/1, small billabong, Yellow Waters, Kakadu NP, 22 July 1994; 1/0/0, ponds Ormiston Gorge, Ormiston Gorge NP, 6 Aug. 1994; 1/4/1, Campbell Springs, 38 km E of Victoria Roadhouse, Gregory NP, 15°29.749' S 131°23.328' E, 4. Oct. 2005; 1/3/0, Caranbirini Waterhole, 16°16.279' S 136°04.837' E, 6 Oct. 2005. **Queensland.** 3/5/0, Nankin Creek, Rockhampton, 24 Sept. 1982, leg. A.P. Mackey; 1/0/0, Fitzroy River, Rockhampton, 13 Apr. 1983, leg. A.P. Mackey; 2/1/0, Archer River at Archer River Roadhouse, Cape York Peninsula, 13°26'10.25" S 142°56'39.73" E, 6 Sept. 2000; 4/3/0, Hasties Swamp, Hasties Swamp NP, 17°17'55.35" S 145°28'32.24" E, 16 Sept. 2000; 2/0/0, Pandanus Creek, Cathu State Forest, 20° 47.904' S 148°32.658' E, 24 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.

Distribution — A widespread species, known from SE Asia, Philippines, Japan and eastern Siberia. Within Australia known from the Northern Territory and Queensland, and here reported for the first time from Western Australia.

Neumania (Lemienia) australica n. sp.

Zoobank: 9827A63C-A485-4D1B-A8BE-D69931A285FF

(Fig. 1A – E, 2)

Material examined — Holotype male, Maitland River, pools, at crossing with NW Coastal Highway, Western Australia, Australia, 20°51.005' S 116°36.608' E, alt. 8 m asl, 31 Jan. 2019 (WAM). Paratypes: ten females (WAM), 11 females (RMNH), same data as holotype; one male, two females, pool in Weetootla Creek, Gammon Ranges NP, South Australia, 24 Oct. 2001 (SAM); two males, Onkaparinga River at Sundews Trail, South Australia, Australia, 35°09.478' S 138°34.791' E, alt. 95 m asl, 6 Apr. 2008 (RMNH).

Other material. **Northern Territory.** 2/7/0, pools upstream of Waterfall Creek, Kakadu NP, 13°25.762' S 132°25.089' E, 25 July 1994. **Western Australia.** 2/5/0, pool Lennard River, Windjana Gorge NP, Kimberley, 9 Sept. 1998; 1/0/0, pool Lennard Gorge, Kimberley, 10 Sept. 1998; 1/1/0, pool Manning Gorge Falls, Kimberley, 13 Sept. 1998; 2/29/1, pool Amalia Gorge, El Questro Station, Kimberley, 16 Sept. 1998; 7/11/0, pools in creek at Old Halls Creek, S of Halls Creek, 26 Sept. 1998; 1/1/0, Geikie Gorge, western side, Geikie Gorge NP, 18°7'23.92" S 125°39'42.47" E, 28 Sept. 1998. **Queensland.** 12/13/0, Mt Carbine Dam, Mt Carbine, 16°32.019' S 145°07.525' E, alt. 358 m asl, 14 Oct. 2005; 3/5/0, Porcupine Creek, Porcupine NP, 20°21.039' S 144°27.852' E, 23 Oct. 2005; 1/3/0, rockpool Porcupine Creek, Porcupine Gorge NP, 20°21.039' S 144°27.852' E, 23 Oct. 2005; 1/0/0, Yabba Creek at Peach Trees Campground, Jimna, 26°38.251' S 152°26.924' E, alt. 465 m asl, 2 Nov. 2005.

Diagnosis — Male: IV-leg-6 bowed, IV-leg-5 with a distinct ventral indentation, anterior to this indentation a bowed stout seta, IV-leg-6 relatively short.

Description — Male: Idiosoma with very fine papillae, yellowish, 446 (470 – 518) long and 340 (381 – 405) wide, ventrally 454 (486 – 502) long. Apodemes of anterior coxae extending onto Cx-IV. Suture line Cx-III/IV incomplete. Area between the coxae lightly sclerotized. Gonopore ellipsoid, 61 long. Genital field with 7 – 8 pairs of acetabula, one of these distinctly

Figure 1 *Neumania australica* n. sp., A – D holotype male, E paratype female. A = venter male; B = palp, C = III-leg-4 – 6; D = IV-leg-5 – 6; E = genital field female. Scale bars: A, E = 100 μ m, B – D = 50 μ m.

larger than the others. Genital plates fused with venter without suture line. Length of P1-5: 16, 68, 40, 74, 25. P4 distally with a setal tubercle. Length of I-leg-4 – 6: 160, 172, 140. Length of IV-leg-4 – 6: 154, 178, 147. IV-leg-5 with a ventral indentation, anterior to this indentation a stout, bowed seta, ventral margin of this segment with seven pectinate setae, the five anterior setae more stout; IV-leg-6 bowed, ventral margin with 5 – 6 stout setae. True swimming setae absent, but instead legs with relatively short stiff setae.

Female: Idiosoma yellowish, dorsally 697 (624 – 826) long and 526 (486 – 640) wide, ventrally 648 (616 – 697) long. Integument with very fine papillae. Coxae as in male. Medial margin of Cx-IV with a strip of secondary sclerotization. Genital field with 11 – 13 pairs of

Figure 2 *Neumania australica* n. sp., paratype male from Onkaparinga River. Scale bar = 50 μ m.

acetabula, genital plate 80 long; pre-genital sclerite 66 wide. Length of P1-5: 30, 97, 52, 96, 36. Palp as in male. Length of I-leg-4 – 6: 219, 200, 140. Length of IV-leg-4 – 6: 194, 235, 194. Legs with stiff swimming setae, IV-leg-3 with two, III-leg-5, IV-leg-4 and -5 with three and III-leg-4 with four swimming setae.

Etymology — Named after the Australian continent.

Remarks — The male of the new species is close to *N. gila*. The new species has IV-leg-5 distinctly bowed over its whole length (bowed anteriorly, but straight over most of its posterior part in *N. gila*), and IV-leg-6 is shorter (147 – 160 versus 225 – 258 in *N. gila*). Females are not separable.

The new species is similar also to *N. lacustris* Smit, 2002 from New Caledonia. The third leg of the male of *N. lacustris* is slightly modified, especially III-leg-4. The third leg of the male of the new species is hardly modified, III-leg-4 is not much broader than other segments of this leg.

Smit (1992) reported *N. falcipes* from Queensland. I re-examined this material, lodged in RMNH, and concluded that the two males belong to *N. australica* n. sp. Therefore, *N. falcipes* must be omitted from the Australian list.

***Neumania (Soarella) flagellata* Walter, 1930**

New records — **Northern Territory**. 0/3/0, stream upstream of Wangi Falls, Litchfield NP, 13°09.832' S 130°41.166' E, 25 Sept. 2005; 0/1/2, Moline Bottom Rockhole, Kakadu NP, 13°34.418' S 132°15.290' E, alt. 175 m asl, 1 Oct. 2005. **Western Australia**. 1/4/0, plunge pool Frog Hole Gorge, Purnululu NP, 23 Sept. 1998.

Distribution — Philippines, Indonesia (Java), Thailand, India. Within Australia, known from the Northern Territory, and here reported for the first time from Western Australia.

***Neumania (Lemienia) gila* K.O. Viets, 1975**

Neumania queenslandica K.O. Viets, 1977 – new syn.

Type material — Holotype male, Dry lagoon via Charters Towers, Queensland, Australia,

20 June 1978, leg. B.V. Timms (slide 53259, SMF); Paratypes: two males, same data as holotype (slides 53260, 53261, SMF).

Material for comparison: *Neumania falcipes*, two males, Tjibodas, Teich i. Bot. Garten ([ditch in botanical garden], Java, Indonesia, alt. 1400 m asl, 8 July 1929 (slide 45344, SMF). *Neumania falcipes directa* (K. Viets, 1935), syntypes, three males, one female, two nymphs, Zufluss des Ran. Klakah[-Sees], Java, Indonesia, 28 Oct. 1928 (slide 45346, SMF) [slide labelled type, but more specimens present].

New records — Queensland. 4/15/2, Lake Emma, Lakefield NP, 15°17'47.43" S 144°38'48.05" E, 3 Sept. 2000; 3/18/0, swamp 9 km E of Musgrave, 5 Sept. 2000; 2/3/0, Low Lake, Lakefield NP, 14°40'57.19" S 144°12'7.96" E, 5 Sept. 2000; 3/13/0, Pandanus Creek, Cathu State Forest, 20°47.904' S 148°32.658' E, 24 Oct. 2005; 1/1/0, Broken River, Eungella NP, 21°10.069' S 148°30.676' E, 25 Oct. 2005; 1/0/0, small lake Hawkwood Road, 13 km S of Mundaburra, 25°39.910' S 151°13.941' E, alt. 130 m asl, 31 Oct. 2005; 3/0/0, small lake S of Biggenden, along road Biggenden-Maryborough, 25°33.583' S 152°07.345' E, 1 Nov. 2005; 2/1/0, Emu Creek at Clancy's Camping Area, Benarkin State Forest, 26°58.334' S 152°09.916' E, alt. 162 m asl, 3 Nov. 2005; 1/0/0, cattle pond along Mulligan Highway, 15°45.519' S 144°59.942' E, alt. 156 m asl, 18 Oct. 2014; 1/0/0, Coen River, Coen, 13°56.175' S 143°11.988' E, alt. 192 m asl, 19 Oct. 2014; 1/3/4, Marshy Creek crossing Bypass Road, N of Jardine River, 10°58.864' S 142°22.129' E, alt. 22 m asl, 20 Oct. 2016; 3/7/0, Mango Lagoon, Oyala Thumotang NP, 13°37.838' S 142°34.627' E, alt. 73 m asl, 24 Oct. 2014. **Northern Territory.** 8/36/10, Billabong Nourlangie Creek, Kakadu NP, 20 July 1994; 2/2/2, Lake Jabiru, Jabiru, 12°40.264' S 132°50.436' E, 20 July 1994; 6/11/6, pond in Jim Jim Creek, at Jim Jim Crossing, Kakadu NP, 22 July 1994; 4/5/0, Jim Jim Billabong at crossing with Kakadu Highway, Kakadu NP, 22 July 1994; 2/10/0, pond Jim Jim Creek, near Jim Jim Campground, Kakadu NP, 23 July 1994; 10/21/0, Southern Rockhole, Katherine Gorge NP, 27 July 1994; 1/0/0, Manton Dam, 12°51.726' S 131°07.148' E, 1-viii-1994; 1/3/0, Lake Jabiru, 12°40.264' S 132°50.436' E, alt. 43 m asl, 27 Sept. 2005. **Western Australia.** 1/2/0, Python Pool, Millstream-Chichester NP, 21°20'0.88" S 117°14'18.89" E, 17 Aug. 1994; 3/5/1, pond Kalamina Gorge, near falls, Hamersley Range, 22°24'48.08" S 118°24'34.50" E, 13 Aug. 1994; 1/18/0, pool Lennard River, east side Windjana Gorge, the Kimberley, 17°21' S 125°20' E, 10 Sept. 1998; 1/2/1, pools 3 km from Lennard Gorge, the Kimberley, 10 Sept. 1998; 2/8/0, pool Silent Grove (behind ranger station), the Kimberley, 11 Sept. 1998; 6/4/0, Pool Silent Grove Spring, the Kimberley, 11 Sept. 1998; 13/17/1, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 2/23/0, Jack's Waterhole, Gibb River Road, the Kimberley, 14 Sept. 1998; 6/11/0, Middle Springs, W of Kununurra, 15°38'1.38" S 128°40'10.67" E, 18 Sept. 1998; 7/0/0, pool Valentine Springs, W of Kununurra, 18 Sept. 1998; 1/3/0, Arthur Creek at crossing with Great Northern Highway, 23 Sept. 1998; 1/0/0, plunge pool Cathedral Gorge, Purnululu NP, 17°28'49.60" S 128°22'22.47" E, 24 Sept. 1998; 11/19/0, pool W of Tunnel Creek, Tunnel Creek NP, 30 Sept. 1998; 1/21/0, Maitland River, pools, at crossing with NW Coastal Highway, 20°51.005' S 116°36.608' E, alt. 8 m asl, 31 Jan. 2019.

Remarks — According to Cook (1986) *Neumania* is a difficult genus to work with in the Australian region. This applies especially to species of the subgenus *Lemienia* Koenike, 1910. K.O. Viets (1975) described *N. gila* from Australia, and he compared the new species only with *N. maharashtritis* Cook, 1967 from India. However, in my opinion the closest species is *N. falcipes* described from Indonesia. K. Viets (1935) described two subspecies, differing in the shape of Cx-IV and IV-leg-6, the latter segment varying from strongly bowed in the nominate taxon to straight in *N. falcipes directa* K. Viets, 1935 and *N. falcipes concava* K. Viets, 1935. *Neumania gila* has an almost straight IV-leg-6, the posteroventral margin of IV-leg-5 is (slightly) concave and the genital field is fused with the venter. I examined *N. falcipes* from the Viets collection, including a subspecies. The only reliable differences between the two species are the structure of the integument, with fine denticles in *N. gila* and a smooth integument in *N. falcipes* and its subspecies, and the genital field lying either free (*N. falcipes*) or fused with the

venter (*N. gila*). A problem is that secondary sclerotization is age dependant, in young males it is difficult to see, although usually some patches with denticles are present.

K.O. Viets (1977) described *N. queenslandica*, based on the female only. He compared this species only with *N. pilosa* Koenike, 1906 from SE Asia. The most important character was the chitinized margins between the coxae and posterior to Cx-IV. According to Viets (1977) young females also have this secondary sclerotization. Within the genus *Neumania* these chitinizations are usually age dependent, and indistinct or absent in young females. Only in older females they are well visible. In my collection there are males of *N. gila* accompanied by females which match the description of *N. queenslandica*, including chitinized margins of the coxae. Therefore, I propose to synonymize *N. queenslandica* with *N. gila*.

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

***Neumania (Lemienia) multipora* (Daday, 1900)**

New record — **Queensland.** 1/1/3, Catfish Waterhole, Lakefield NP, 15°3'57.50" S 144°17'8.43" E, 4 Sept. 2000; 3/10/9, Low Lake, Lakefield NP, 14°40'57.19" S 144°12'7.96" E, 5 Sept. 2000; 2/10/1, cattle pond along Mulligan Highway, 15°45.519' S 144°59.942' E, alt. 156 m asl, 18 Oct. 2014.

Distribution — New Guinea and Australia. Within Australia known from the Northern Territory, and reported here for the first time from Queensland.

***Neumania (Neumania) nodosa* (Daday, 1898)**

New records — **Queensland.** 3/5/0, shallow pool along road to Hanush Waterhole, Lakefield NP, 4 Sept. 2000; 0/1/0, Archer River at Archer River Roadhouse, Cape York Peninsula, 13°26'10.25" S 142°56'39.73" E, 6 Sept. 2000; 2/3/0, Swamp Chili Beach, Iron Range NP, 7 Sept. 2000; 0/1/0, Freshwater Lake, Centenary Lakes, Cairns, 16°54.177' S 145°44.965' E, 17 Oct. 2005; 5/4/0, Pandanus Creek, Cathu State Forest, 20°47.904' S 148°32.658' E, 24 Oct. 2005; 0/1/0, Coen River, Coen, 13°56.175' S 143°11.988' E, alt. 192 m asl, 19 Oct. 2014; 1/3/0, Double Creek West, S of Mt Elliot, 19°34.610' S 147°01.977' E, alt. 41 m asl, 10 Nov. 2014; 2/1/0, Spring Creek, N of Woolooga, 25°44.497' S 152°14.442' E, alt. 111 m asl, 18 Nov. 2014. **Northern Territory.** 0/1/0, Caranbirini Waterhole, 16°16.279' S 136°04.837' E, 6 Oct. 2005. **Western Australia.** 1/0/0, pond Snake Creek, Millstream-Chichester NP, 21°20'39.86" S 117°14'30.34" E, 17 Aug. 1994.

Distribution — A widespread species, reported from SE-Asia, New Caledonia and New Guinea. Within Australia previously known from Queensland, the Northern Territory, New South Wales and reported here for the first time from Western Australia.

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