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Two new species in the spider genus *Nanometa* (Araneae: Tetragnathidae: Nanometinae) from Tasmania

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Abstract

Two new species in the orb-weaving spider genus *Nanometa* Simon, 1908 are described, *N. ilanejzykowiczi* **sp. nov.** and *N. cerastes* **sp. nov.** (family Tetragnathidae Menge, 1866), elevating the number of described Australian species to eight. Both new species have so far only been recorded from Hartz Mountains National Park, southern Tasmania, at about 1,200 metres a.s.l., where two other species, *N. tasmaniensis* Álvarez-Padilla, Kallal & Hormiga, 2020 and *N. tetracaena* Álvarez-Padilla, Kallal & Hormiga, 2020 also occur.

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Introduction

The orb-weaving spider family Tetragnathidae Menge, 1866 currently comprises 45 genera and 990 species worldwide (World Spider Catalog 2023). It is widespread throughout all continents except Antarctica, with most species typically building horizontal orb webs (Álvarez-Padilla and Hormiga, 2011). The family includes four subfamilies in addition to some unplaced lineages: Tetragnathinae, Leucauginae, Metainae, and Nanometinae, with records of 10 genera and 46 species to Australia (including Lord Howe Is. and Norfolk Is.) (Álvarez-Padilla and Hormiga 2011; Álvarez-Padilla et al. 2020; Framenau 2023; World Spider Catalog 2023).

Nanometinae was formalised as a subfamily by Álvarez-Padilla and Hormiga (2011), after it first appearing as "Nanometa Clade" in Álvarez-Padilla et al. (2009). It is exclusively found in Australia, New Zealand, Papua New Guinea, and New Caledonia, currently including two genera, *Nanometa* Simon, 1908 and *Pinkfloydia* Hormiga & Dimitrov, 2011. While *Pinkfloydia* includes only two described species, *Nanometa* was recently revised to contain 15 species, with three of these occurring in Tasmania (Álvarez-Padilla et al. 2020).

A recent field trip to Tasmania revealed two undescribed species that match the diagnosis of *Nanometa*. The purpose of this study is to describe these two

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species as part of an ongoing long-term project on the documentation of the Australian spider fauna.

Methods

Descriptions and morphological nomenclature follow Álvarez-Padilla et al. (2020). Specimens were collected during a field trip by PSC and RLCB to Tasmania in January 2023. No additional specimens of the new species were found in the collections of HBI, QVM or WAM.

All measurements are in millimetres. Colour descriptions are based on specimens preserved in absolute ethanol. Male left pedipalp of *N. ilanejzykowiczi* **sp. nov.** was expanded, and female epigynes were cleared in KOH for ca. 10 minutes.

Microscopic images were taken in different focal planes (ca. 20–30 images) on a Leica DMC4500 digital camera mounted to a Leica M205C stereomicroscope and combined using the Leica Application Suite X, v. 3.6.0.20104 at Harry Butler Institute, Murdoch University. Photographs were edited and plates were compiled in Adobe Photoshop CC 2023. The map was compiled in the software package QGis v. 3.16.8 Girona (https://qgis.org/en/site/; accessed 29 October 2023). Geographic coordinates were determined by pinpointing collection localities using Google Earth.

Abbreviations

Morphology

C, conductor; CD, copulatory duct; CEBP, cymbial ecto-basal process (can be divided in ventral or dorsal prongs); CEMP, cymbial ecto-median process; CO, copulatory opening; Cy, cymbium; E, embolus; FD, fertilisation duct; P, paracymbium; S, spermatheca; T, tegulum.

Collections

HBI – Harry Butler Institute, Murdoch, Western Australia; QVM – Queen Victoria Museum & Art Gallery, Launceston (Australia); WAM – Western Australian Museum, Perth, Western Australia

Taxonomy

Nanometa ilanejzykowiczi sp. nov.

Figures 1A–N, 2A, B, 4, 5.

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Type material. 1 male, Hartz Mountains National Park, Arve Falls track and Lake Osborne track (43°12'33.59''S, 146°46'14.95''S, Tasmania, AUSTRALIA), 15 January 2023, R. Baptista & P. Castanheira coll., night hand collecting (QVM:2023:130096).

Diagnosis. Males of *N. ilanejzykowiczi* **sp. nov**. are most similar to those of *N. dimitrovi* Álvarez-Padilla, Kallal & Hormiga, 2020 and *N. gentilis* Simon, 1908 as all three have long CEBPs with apically curved tip and rounded CEMPs (Figures 1K–N, 2B; Álvarez-Padilla et al. 2020, figures 7B, D, F–H, 8A–C, 31B, D, F, H, 32A–C). It differs from *N. gentilis* by the conductor that has a triangular pointed tip and lacks a transversal lobe below the tip in ectal view, CEBP without additional slender projection and a CEMP that is longer and more protruding (Figures 1K–N, 2A, B; Álvarez-Padilla et al 2020, figures 7B, D, F, G, 8A–C). In relation to *N. dimitrovi*, the new species has a more protruding and thinner conductor with its mesal part wrapping more around the embolus, and the CEBP does not have a spiniform projection at its base (Figures 1K–N, 2A, B; Álvarez-Padilla et al. 2020, figures 31B, D, F, H, 32A–C).

Females of *N. ilanejzykowiczi* **sp. nov**. can be confused with *N. dimitrovi*, *N. dutrorum* Álvarez-Padilla, Kallal & Hormiga, 2020 and *N. tetracaena* Álvarez-Padilla, Kallal & Hormiga, 2020. All these species share copulatory openings at the centre of the epigynal plate (Figure 1G, H; Álvarez-Padilla et al. 2020, figures 19D, 32D, 33D). The epigyne of *N. ilanejzykowiczi* **sp. nov**. is most similar to the one of *N. dimitrovi*, as both have a clearly visible shallow median septum separating the two rounded copulatory openings (vs. median septum and copulatory openings partially covered by thick anterior projections of the margin of the enlarged posterior ridges in *N. dutrorum* and median septum being a thin keel in *N. tetracaena*) (Figure 1G, H; Álvarez-Padilla et al. 2020, figures 18E, 19D, 30A, 32D, 33D). It differs from *N. dimitrovi* due to its wider median septum with copulatory keels overhanging the copulatory openings, a relatively large posterior ridge (vs. thin median septum without keel and small posterior ridge), a wider copulatory sac and oblong smaller spermathecae which are projected ectally (vs. globose, larger and centred) (Figure 1G–J; Álvarez-Padilla et al. 2020, figures 30A, B, 32D, E).

Description. Male (holotype QVM:2023:130096): Total length 2.4. Cephalothorax length 1.1, width 0.8. Clypeus 0.3 (Figure 1E). Cephalothorax background yellowish-brown, medially mottled dark olive-grey and dark brown on carapace edges (Figure 1A). Eyes subequal in size, lateral smaller, all ringed in black (Figure 1A). Femur I length 2.2. Legs yellowish-brown mottled olive-grey (Figure 1A, B). Sternum dark grey, slightly lighter centrally (Figure 1B). Cheliceral promargin and retromargin with three and two teeth respectively, and two denticles on retromargin. Abdomen length 1.3, width 0.9; oblong, dorsum background and folium yellowish-brown, with two parallel irregular areas of red and dark brown patches lateral of cardiac area, guanine crystal patches occupy the borders of the dorsal area, sides yellowish-brown with dark streaks, venter grey (Figure 1A, B). Pedipalp with cymbium bearing CEMP trapezoid, long and protruding; and CEBP strong with enlarged base and sclerotized pointed tip, curved apically and bearing a strong apical ridge; conductor membranous, ending in a thin, triangular and very sclerotized tip, and with its mesal half very curved ventrally over the embolus, almost wrapping it; embolus strong, basally enlarged,

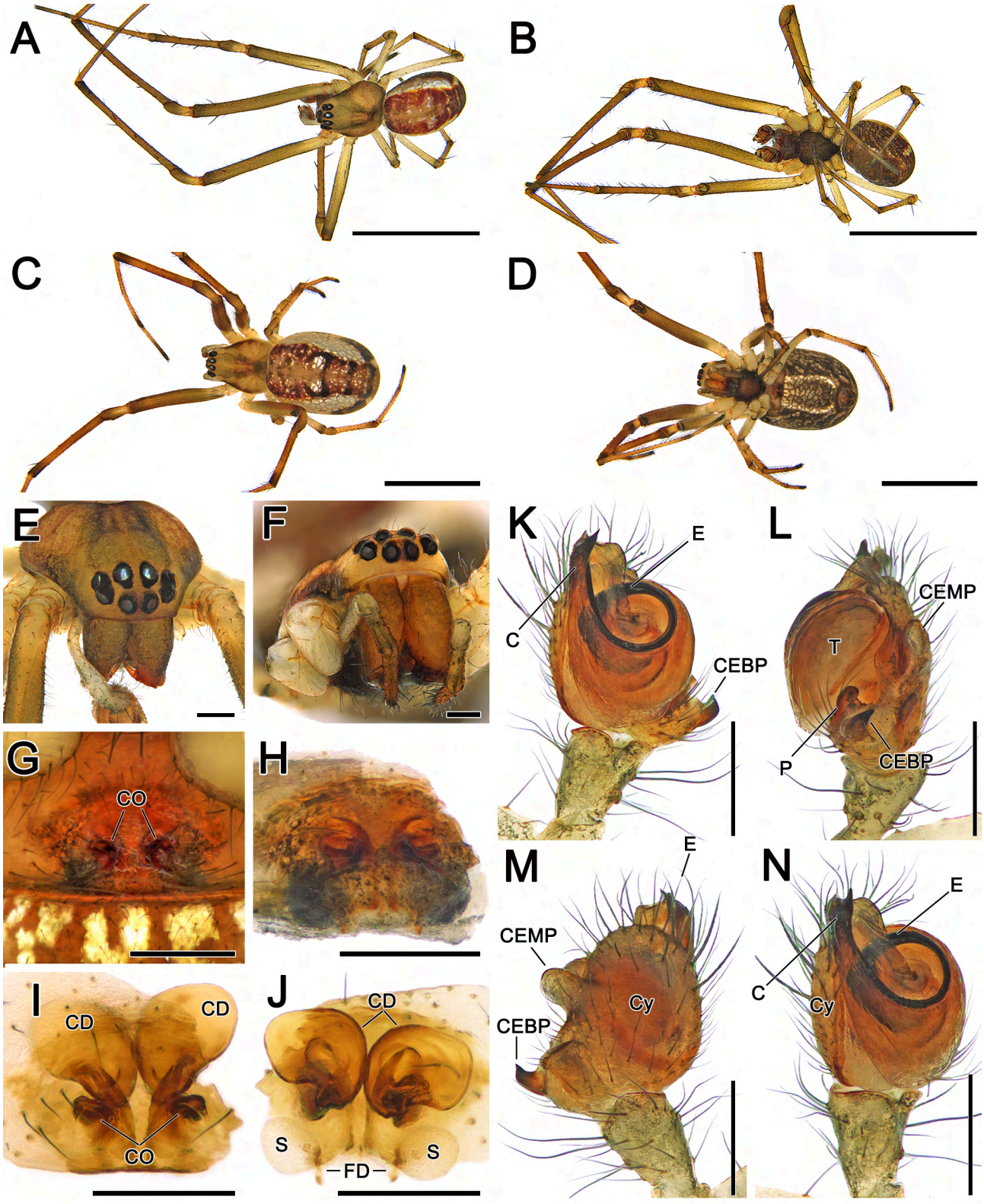

Figure 1. *Nanometa ilanejzykowiczi* **sp. nov.**, holotype male (QVM:2023:130096). A, dorsal habitus; B, ventral habitus; E, frontal habitus; K–N, left pedipalp: K, ventral view; L, ectal view; M, dorsal view; N, mesal view. Ditto, female (QVM:2023:130097). C, dorsal habitus; D, ventral habitus; F, frontal habitus; G–J, epigyne: G, ventral view; H, caudal view; I, ventral view (cleared); J, dorsal view (cleared). Abbreviations: C, conductor; CD, copulatory duct; CEBP, cymbial ectobasal process; CEMP, cymbial ectomedian process; CO, copulatory opening; Cy, cymbium; E, embolus; FD, fertilisation duct; P, paracymbium; S, spermatheca; T, tegulum. Scale bars: A–D, 2 mm; E–N, 0.2 mm.

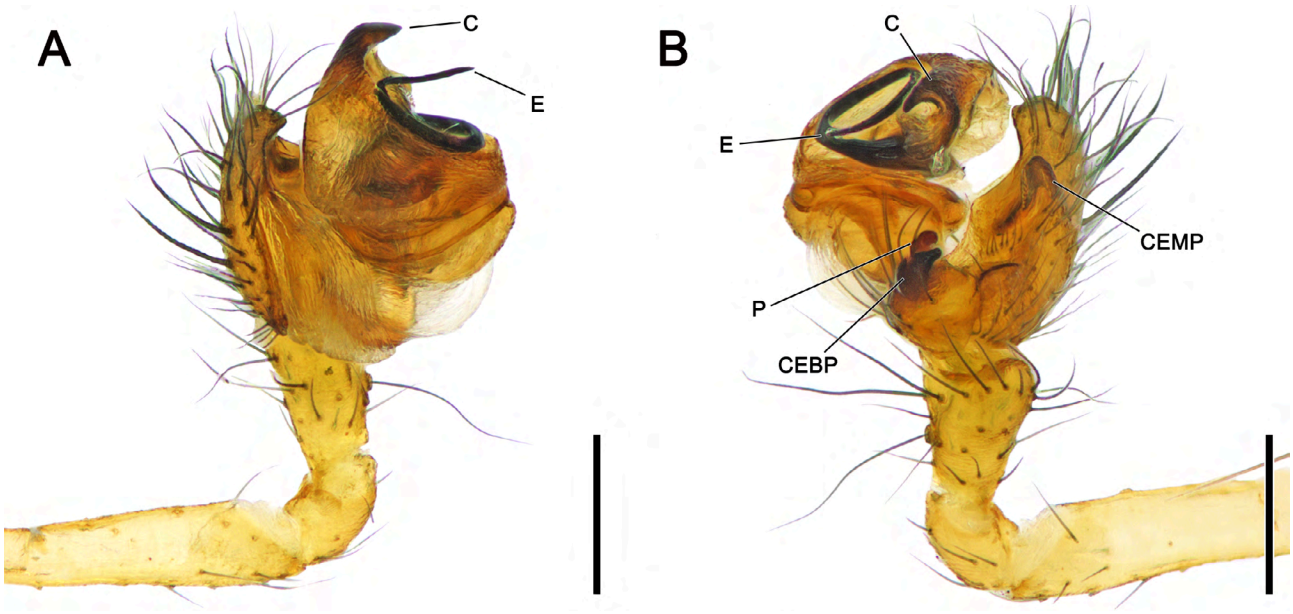

Figure 2. *Nanometa ilanejzykowiczi* **sp. nov.**, male (HBI N30486-22). A–B, left pedipalp expanded: A, mesal view; B, ectal view. Abbreviations: C, conductor; CEBP, cymbial ectobasal process; CEMP, cymbial ecto-median process. Scale bars: 0.2 mm.

very sclerotized, wrapped around the conductor and tapering to a pointed tip; paracymbium thumb-like, projected ectally (Figures 1K–N, 2A, B).

Female (QVM:2023:130097): Similar to male unless noted. Total length 3.9. Cephalothorax length 1.5, width 1.1. Clypeus height 0.3 (Figure 1F). Cephalothorax and abdomen coloration as in male, but with more guanine crystals (Figure 1C, D). Sternum slightly lighter centrally (Figure 1D). Cheliceral promargin and retromargin with three and two teeth respectively, and one denticle on retromargin. Abdomen length 2.4, width 1.8, with more guanine crystals, especially ventrally (Figure 1C, D). Genital area almost as wide as long (Figure 1G); copulatory openings enlarged, located at the middle portion of the epigyne, with relatively large median septum, its ectal margins projected as a thin and long keel (Figure 1G–I); copulatory ducts modified into wide subquadrate membranous sacs (Figures 1I, J); spermathecae relatively small oblong, projected ectally, with accessory duct glands clustered at the internal surfaces (Figure 1J).

Other material examined. AUSTRALIA: Tasmania: 1 female, same data as holotype (QVM:2023:130097); 1 male, same data as holotype (HBI N30486-22); 1 female, same data as holotype (HBI N30486-4).

Etymology. The specific epithet is a patronym after Ilan Ejzykowicz, whose friendship constantly helped the senior author during his earlier career and whose Jewish family survived World War II.

Variation. Males total length 2.4–3.2 (n = 2); females total length 3.4–4.3 (n = 5). The colour hue can vary, with some brighter tones in some specimens.

Distribution. Currently only known from Hartz Mountains National Park in Tasmania (Fig. 5).

Habitat preferences and life history. All specimens of *N. ilanejzykowiczi* **sp. nov.** were collected during the summer (January). The collecting locations are generally dominated by eucalypts (*Eucalyptus* spp.) and southern beeches (*Nothofagus* spp.), however the area was still recovering from recent bushfires. Some specimens were collected in small horizontal orb webs among the bushes and herbs at the borders of the Arve River near Arve Falls (Fig. 4). Three other *Nanometa* species were also collected at Hartz Mountain: *N. tasmaniensis* Álvarez-Padilla, Kallal & Hormiga, 2020, *N. tetracaena* and *N. cerastes* **sp. nov**.

Nanometa cerastes sp. nov.

Figures 3A–N, 4, 5.

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Type material. 1 male, Hartz Mountains National Park, Arve Falls track and Lake Osborne track (43°12'33.59''S, 146°46'14.95''S, Tasmania, AUSTRALIA), 15 January 2023, R. Baptista & P. Castanheira coll., night hand collecting (QVM:2023:130098).

Diagnosis. Males of *N. cerastes* **sp. nov**. are most similar to those of *N. trivittata* (Keyserling, 1887) due to the shape of the CEBPs, both with two prongs (the dorsal one slender), and the basally curved CEMPs with an arched cuticular ridge (Figure 3K–N; Álvarez-Padilla et al. 2020, figure 13A–C). *Nanometa cerastes* **sp. nov**. is distinguished by its CEBP that has a stouter dorsal prong which is twisted basally at its distal portion and the massive protruding ventral prong, with an acute tip (vs. dorsal prong flattened at its tip with a subapical projection, and ventral prong as a small bulge close to the basis of the dorsal prong in *N. trivittata*); by the larger CEMP, which is more curved basally, and has a wider and clear

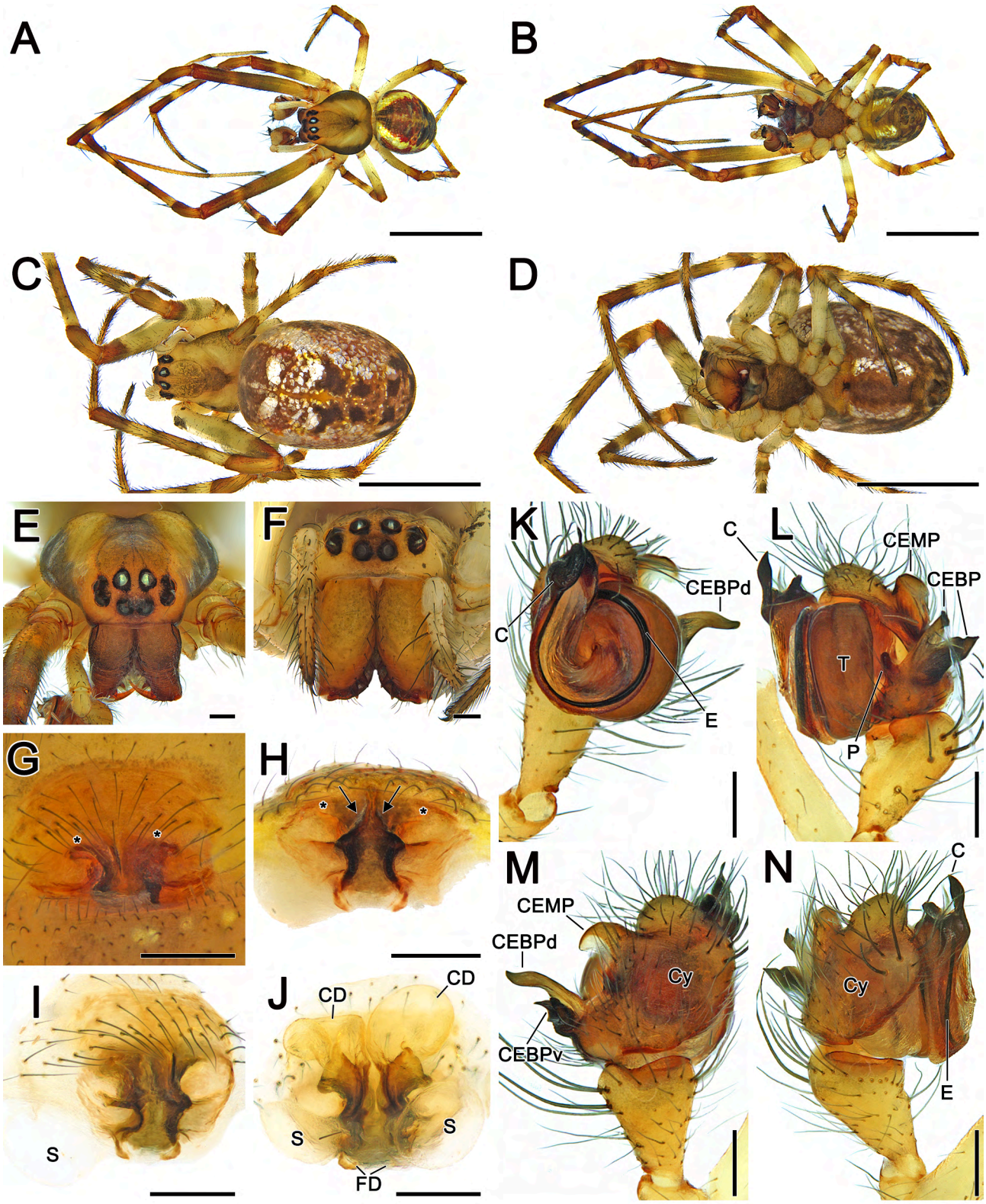

Figure 3. *Nanometa cerastes* **sp. nov.**, holotype male (QVM:2023:130098). A, dorsal habitus; B, ventral habitus; E, frontal habitus; K–N, left pedipalp: K, ventral view; L, ectal view; M, dorsal view; N, mesal view. Ditto, female (QVM:2023:130099). C, dorsal habitus; D, ventral habitus; F, frontal habitus; G–J, epigyne: G, ventral view; H, caudal view; I, ventral view (cleared); J, dorsal view (cleared). Abbreviations: C, conductor; CD, copulatory duct; CEBP, cymbial ecto-basal process (CEBPd = dorsal prong; CEBPv = ventral prong); CEMP, cymbial ecto-median process; CO, copulatory opening; Cy, cymbium; E, embolus; FD, fertilisation duct; P, paracymbium; S, spermatheca; T, tegulum. Asterisks (*) point to copulatory keels; arrows point to median keels. Scale bars: A–D, 2 mm; E–N, 0.2 mm.

Figure 4. Photos at the Arve Falls track in Hartz Mountains National Park, the type locality of both new species.

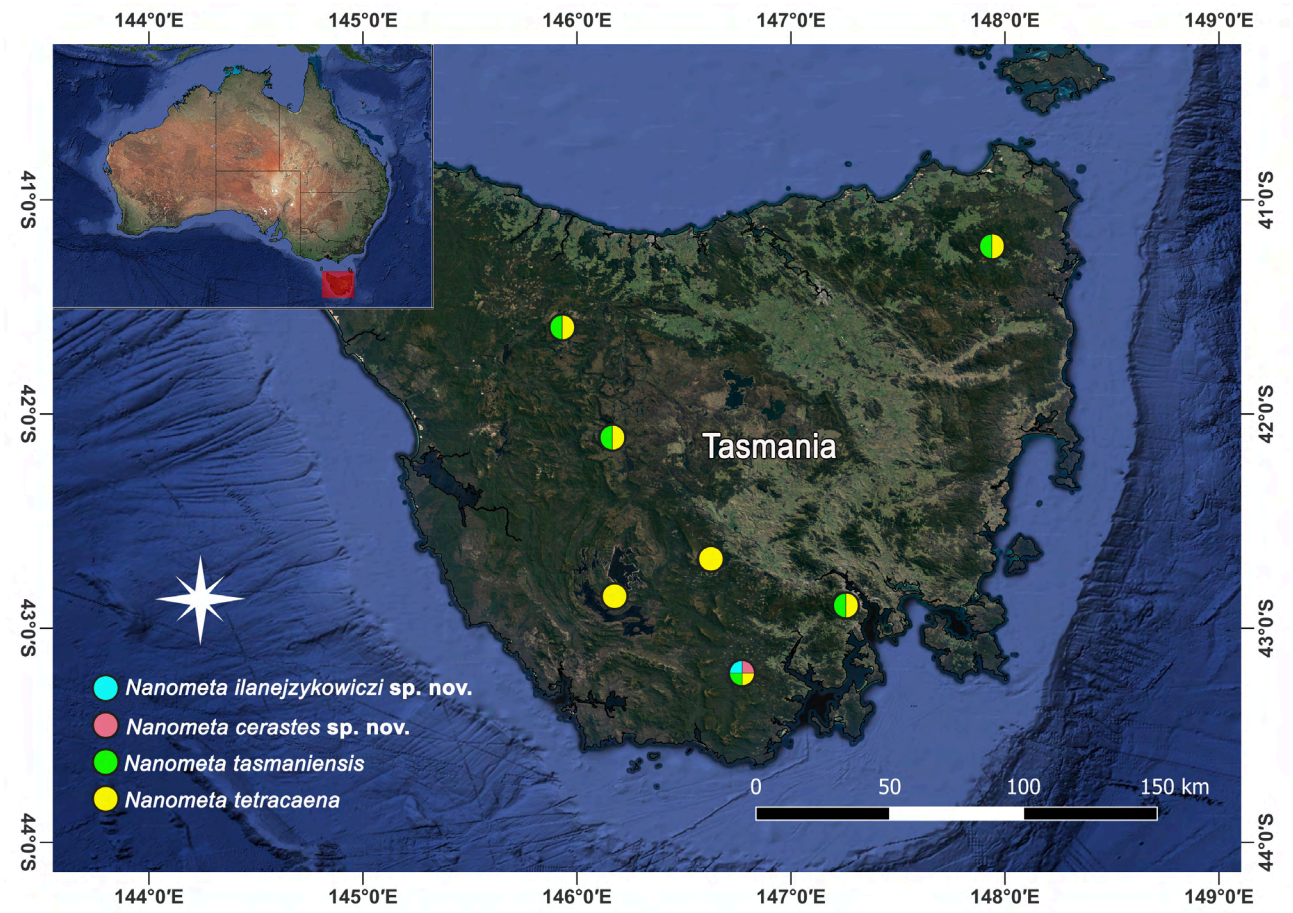

Figure 5. Map with the type-locality of *Nanometa ilanejzykowiczi* **sp. nov.** and *Nanometa cerastes* **sp. nov.**, and the distribution of the specimens of *Nanometa tasmaniensis* and *Nanometa tetracaena* we collected in Tasmania.

cuticular arched ridge (Figure 3L, M; Álvarez-Padilla et al. 2020, figure 13A–C); and by the conductor with its ectal portion projected in a long flattened, twisted and acute tip reaching farther than the smaller rounded, keeled tip of the mesal lobe (vs. tip of ectal portion pointed, straight and projecting at about the same level of the similar, but less sclerotized tip of the mesal lobe) (Figure 3K, L, N; Álvarez-Padilla et al 2020, figure 13A–C).

Females of *N. cerastes* **sp. nov**. differ from all other species of the genus by the median septum of the epigyne composed of two long arched copulatory keels sideways and two elongate and concave median keels, describing a triangular shape, with its base base at the posterior margin fusing with an ampulate-shaped posterior plate (Figure 3G, H).

Description. Male (holotype, QVM:2023:130098): Total length 2.9. Cephalothorax length 1.5, width 1.4. Clypeus height 0.4 (Figure 3E). Cephalothorax background olive, cephalic area, median portion around fovea and contour of carapace olive-grey (Figure 2A). Eyes subequal in size, lateral smaller, all ringed in black (Figure 3A). Femur I length 2.8. Legs olive, annulated in pink, base of femora lighter (Figure 3A, B). Sternum brown (Figure 3B). Cheliceral promargin and retromargin with three teeth on each side. Abdomen length 2.0, width 1.3, oblong and elevated, dorsum background olive (only visible on folium), mottled in pink anteriorly and black posteriorly with guanine crystal patches occupying the borders of the dorsal area, sides olive with black streaks, venter olive with two parallel guanine crystal patches (Figure3A, B). Pedipalp (Figures 3K–N) with cymbium bearing CEBP divided with two strong prongs pointing ectally, the dorsal one (CEBPd) slender, elongated and bearing a blunt rounded tip, and the ventral one (CEBPv) more sclerotized, with base enlarged and triangular pointed tip; CEMP enlarged curved basally, with a wide and clear cuticular ridge arch at its basal margin; conductor membranous, twisted midway, with its ectal portion projected in a long flattened, twisted and acute tip reaching much farther than the smaller rounded and keeled tip of the mesal lobe; embolus strong, base enlarged, very sclerotized, wrapped around the conductor and tapering to a filiform pointed tip; paracymbium thumb-like, very conspicuous.

Female (QVM:2023:13009): Similar to male unless noted. Total length 4.6. Cephalothorax length 1.9, width 1.5. Clypeus 0.4 (Figure 3F). Cephalothorax and abdomen coloration as in male, but with lighter tone and presence of much more guanine crystals on abdomen (Figure 3C, D). Cheliceral promargin and retromargin with three teeth on each side. Femur I length 1.4. Abdomen length 2.9, width 2.3. Genital area subquadrate, almost as wide as long, bearing an ampulate-shaped septum with four keels, two elongated lateral copulatory keels, placed transversely to the epigyne, and two higher median keels, which are elongated and concave and form a triangular shaped figure, with its vertex anterior and base near the posterior margin, where they fuse with the relatively thin and concave posterior plate, somewhat ampulate (Figure 3G, H); copulatory openings located posteriorly on the epigyne (Figure 3G–I); copulatory ducts elongated, rounded and enlarged as globose membranous sacs (Figures 3I, J); spermathecae massive and translucent; right spermatheca and copulatory ducts much more developed than the left ones (Figure 3J).

Other material examined. AUSTRALIA: Tasmania: 1 female, same data as holotype (QVM:2023:13009); 1 female; same data as holotype (HBI N30486-26); 2 males, 3 females, same data as holotype (HBI N30486-3).

Etymology. The specific epithet "*cerastes*" is named after the Greek "keras" (= horn). It is a reference to the elongated CEBPd of the male pedipalp.

Variation. Males total length 2.9–3.3 (n = 3); females total length 3.3–5.0 (n = 6). We did not observe any conspicuous colour variations amongst the specimens of this new species.

Distribution. Currently only known from Hartz Mountains National Park in Tasmania (Figure 5).

Habitat preferences and life history. Same as for *N. ilanejzykowiczi* **sp. nov.**

Disclosures

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The authors have no conflicts of interest.

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