



A new species of wishbone spider (Mygalomorphae: Anamidae: *Aname*) collected on a Bush Blitz expedition in the eastern Murchison bioregion of Western Australia





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Abstract

There are currently 110 described species of wishbone spiders in the genus *Aname* L. Koch, 1873, although many more are recognised but remain undescribed. In Western Australia, only 26 species of *Aname* have been formally described to date. In this paper, we describe a new species, *Aname hetaera* sp. nov., using both morphological and genetic evidence. This species belongs to the *pulchella* group, and is distinguished by its bold abdominal chevrons, a feature unique among currently described *Aname* species. Several specimens of *A. hetaera* sp. nov. were collected from the Murchison bioregion of Western Australia during the 2023 Tjiwarl Bush Blitz expedition.

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Introduction

The genus *Aname* L. Koch, 1873 is the most widespread member of the endemic Australian family Anamidae, and is likely the most diverse genus of mygalomorph spiders in the world (Harvey et al. 2018; Rix et al. 2021; Wilson et al. 2025). It is found across the entire continent, including on offshore islands of both eastern and western coasts. The genus extends from the Kimberley, Arnhem Land, and the Cape York Peninsula in the north

to south-western Western Australia, the Nullarbor plain, and the Murray-Darling Basin in the south, and is absent only from the coldest and wettest mesic climates of the south-east (Rix et al. 2021).

As their common name, 'open-holed trapdoor spiders' suggests, members of the Anamidae typically build open, silk lined burrows in soil; this behaviour has ancient roots in the ancestor of the Nemesioidina (Opatova et al. 2020; Wilson et al. 2023a). Some genera,

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including *Aname*, are also known as wishbone spiders because their burrows often have a Y-shaped underground structure that includes a concealed secondary exit that branches off the main shaft. This adaptation is believed to aid predator evasion and possibly flood avoidance (Raven 1981; Main 1982; Harvey et al. 2018).

There are 110 currently described species of *Aname* (World Spider Catalog 2025). However, research suggests that over 60% of the diversity in the genus still remains undescribed, and that the total number of *Aname* species in Australia could easily exceed 300 (Wilson et al. 2025). Most currently described *Aname* species are from eastern Australia, largely due to the eastern-focus of early arachnologists (Koch 1873; Rainbow & Pulleine 1918; Raven 1985, 2000), and a recent monograph on the subtropical and tropical eastern fauna, which added 55 new species (Wilson et al. 2025). However, recent analyses of a continental molecular dataset revealed that north-western Australia is the biogeographic origin of the genus and its centre of phylogenetic diversity (Rix et al. 2021). Although some recent research has focused on Western Australian species, integrating traditional morphological taxonomy with molecular phylogenetics (Harvey et al. 2012, 2020; Castanelli et al. 2020; Wilson et al. 2023b), curated material in the Western Australian Museum suggests that the majority of the state's *Aname* diversity remains undescribed (MSH, JDW, pers. obs.).

Western Australia has 26 currently described *Aname* species, and this paper aims to contribute to the effort to further document this fauna by adding one more species to the mix. Several specimens of this new species were collected from the 'Goldfields' region of the eastern Murchison during the 2023 Tjiwarl Country Bush Blitz expedition. Bush Blitz expeditions aim to document Australian biodiversity, and are run by the Australian Government in collaboration with Broken Hill Proprietary Company Limited (BHP) and Earthwatch Australia (see Preece et al. 2015). This new species falls within the *pulchella* group (Clade 5) *sensu* the phylogenetic analysis of Rix et al. (2021) (Fig. 2).

Methods

The species concept employed in this study is the Retrospective Reproductive Community Concept (RRCC) of Maddison and Whitton (2023). RRCC emphasises the past as the source of operational evidence for species hypotheses, encourages the integration of different data types, and acknowledgment that delimitation methods can only approximate current biological partitions. The species hypothesis proposed here is identified as a 'retrospective reproductive community' by the presence of morphological autapomorphies, molecular monophyly, and COI pairwise distances that, in this case, do not confirm or reject membership in the same reproductive community.

Specimens examined in this study are lodged in the Western Australian Museum, Perth (WAM). Specimens are preserved in 75% ethanol, and in some cases one leg has been removed and stored in 100% ethanol at -80°C for genomic DNA extraction.

Digital auto montage images were taken using a Leica DFC500 digital camera attached to a Leica MZ16A stereo microscope using Leica Application Suite X (LASX) software (Leica, Wetzlar, Germany). For both the imaged male and female, the left leg I was removed for imaging, as was the left pedipalp, and right copulatory organ of the male. To obtain the image of the female's spermathecae, the genital plate was first shaved of setae, then dissected from the abdomen, then cleared in lactic acid until the spermathecae became visible.

Measurements were taken following methods used by Castanelli et al. 2020 and Wilson et al. 2025.

The following abbreviations are used: D = dorsal; MID = metatarsus I depth (width); MIL = metatarsus I length; MIPEL = metatarsus I proximal excavation length; PDL = pedipalpal depression length; PL = prolateral; PTL = pedipalpal tibia length; RL = retrolateral; TID = tibia I depth (width); TIL = tibia I length; TIS = tibia I length to spur; TISH = tibia I spur height; V = ventral.

Finally, we highlighted the position of the new species using the phylogeny generated in Wilson et al. (2025), which included three mitochondrial and four nuclear loci: cytochrome c oxidase subunit I (COI), 12S ribosomal RNA (12S), 16S ribosomal RNA (16S), histone H3 (H3), 18S ribosomal RNA (18S), 28S ribosomal RNA (28S), and elongation factor 1-gamma (EF-1γ). See Wilson et al. (2025) for further details. The GenBank accession numbers for *A. hetaera* can be found in the remarks section of the species description, all other GenBank accession numbers used in this phylogeny can be found in Wilson et al. (2025).

Taxonomy

Class Arachnida Cuvier, 1812

Order Araneae Clerck, 1757

Family Anamidae Simon, 1889

Subfamily Anaminae Simon, 1889

Genus *Aname* L. Koch, 1873

Aname

Type species: *Aname pallida* L. Koch, 1873, by monotypy.

Diagnosis: Males and females of *Aname* can be diagnosed from all other Australian mygalomorph spiders except other Anamidae by the following combination of characters: the presence of two rows of teeth on the paired tarsal claws, the absence of tarsal claw tufts, and

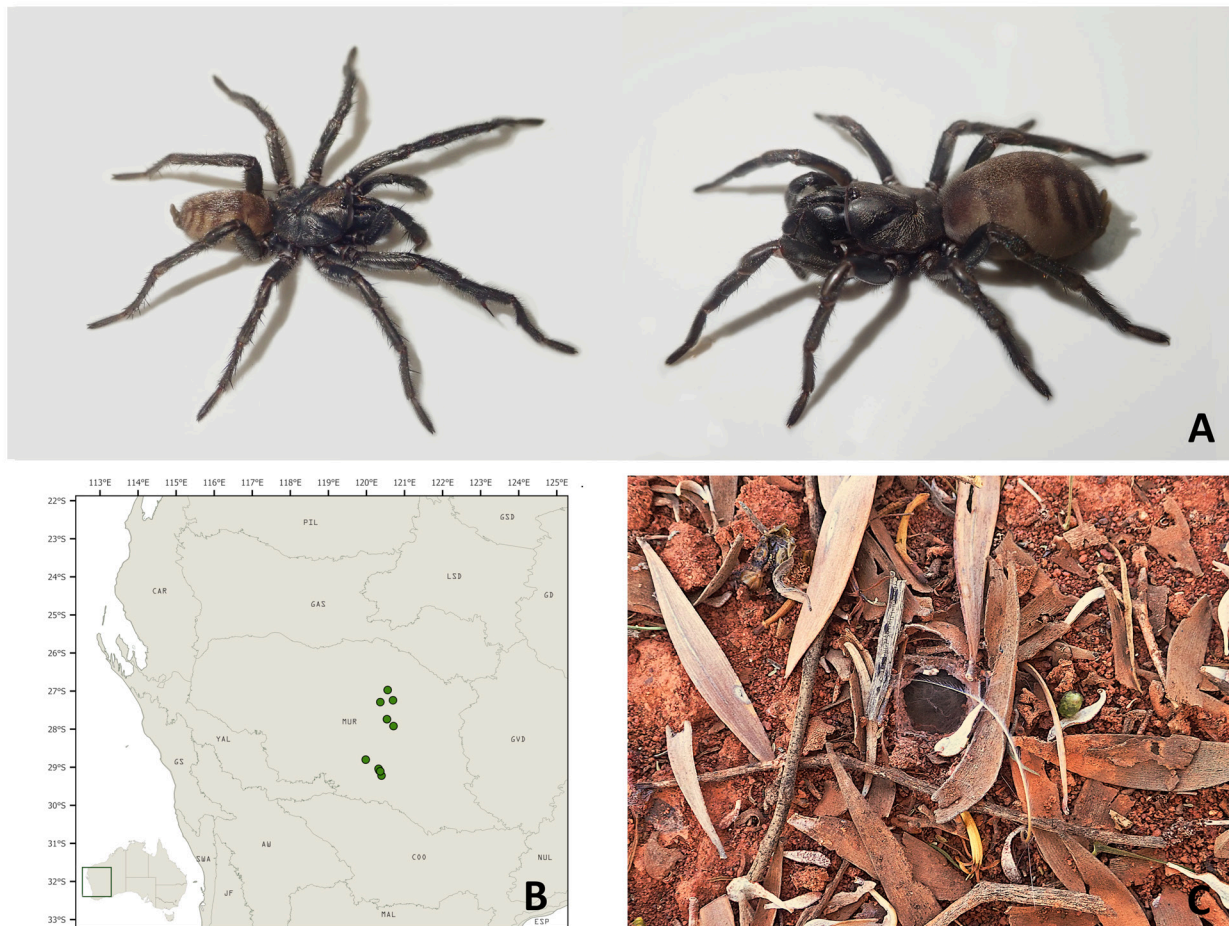


Figure 1. Distribution and natural history information for *Aname hetaera* sp. nov. **A**, live photos: left, male WAM T161641; right, female paratype WAM T161664. **B**, Map showing the collection locality of all known specimens, abbreviations and boundaries represent IBRA 7.1 (Interim Biogeographic Regionalisation for Australia) bioregions, with MUR = Murchison region. **C**, Burrow entrance of female paratype WAM T161664.

the presence of prominent posteromedial heels on the maxillae with cuspule patches that extend posteriorly onto this heel (Fig. 3B,I; Fig. 4B, I).

Male *Aname* can be distinguished from males of other anamid genera by the presence of a ventral asetose depression on the palp tibia (Fig. 3K). Females can generally be distinguished by the combined presence of relatively broad (extending laterally) cuspule patches on the maxillae (Fig. 4B, I), and the absence of spines on the leg tarsi.

Description: See Harvey et al. (2018).

Aname hetaera sp. nov.

Figs 1–4

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Holotype: AUSTRALIA – *Western Australia*: • ♂, Mt Keith mine, 9.6km ESE of Lake Way homestead, site MKO5B, 26°58'22"S, 120°33'29"E, 25 Sep. 2005, pitfall trap, R. Teale (WAM T74670).

Paratypes: AUSTRALIA – *Western Australia*: • 1 ♂, 4 km S. of Lake Miranda, W. side of Goldfields Highway, 27°44'23.32"S, 120°32'21.13"E, 31 Aug. 2023, pitfall trap, P. Doughty, K. Thorn, R. Ellis (WAM T161641); • 1 ♂, same data except 27°44'22.16"S, 120°32'20.29"E, 01 Sep. 2023 (WAM T161651); • 1 ♂, same data except 27°44'21.26"S, 120°32'19.93"E (WAM T161652); • 1 ♂, same data except 27°44'22.63"S, 120°32'21.14"E, 03 Sep. 2023 (WAM T161680); • 1 ♀, same data except 27°44'22.32"S, 120°32'19.11"E, 02 Sep. 2023, excavated, J. Wilson, C. Whisson (WAM T161664); • 1 ♂, Albion Downs, 76.6 km NNW. of Leinster, 27°17'25"S, 120°21'54"E, 28 Aug.–03 Sep. 2008, pitfall trap, Z. Hamilton, R. Teale (WAM T96498); • 1 ♂, Mt Keith mine, 18.9 km ENE. of Mount Keith homestead, site MKO20B, 27°14'31"S, 120°41'52"E, 28 Sep. 2005, pitfall trap, R. Teale (WAM T74669).

Diagnosis: Both males and females of *Aname hetaera* sp.nov. can be distinguished from all other described species by the combined presence of a bold dorsal pattern on their abdomens and a patch of cuspules on at least coxa I (sometimes also coxa II) (Figs 1A, 3F, 4F).

In Western Australia there are only four other described species with distinctive dorsal patterns on their

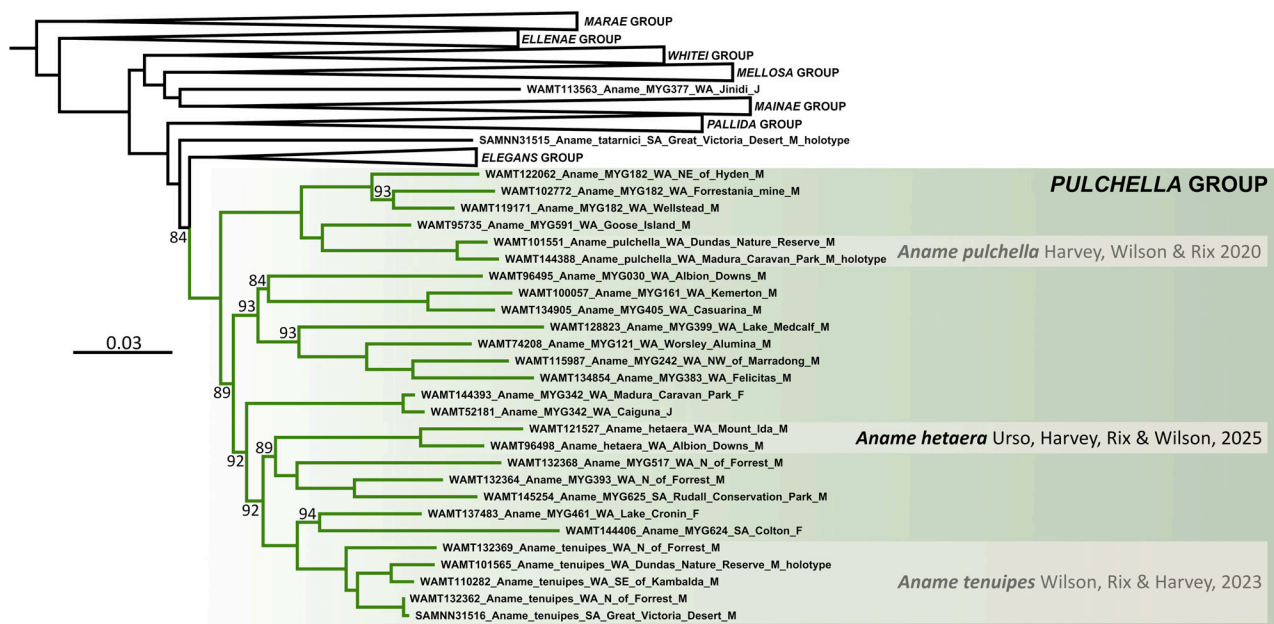


Figure 2. Phylogeny of the genus *Aname* (modified from Wilson et al. 2025), inferred from a W-IQ-TREE maximum likelihood analysis of a seven locus molecular dataset, collapsed to highlight relationships within the *pulchella* group (Clade 5 sensu Rix et al. 2021). Nodes within this group have an ultrafast bootstrap value of ≥ 0.95 unless otherwise stated.

abdomens: *A. exulans* Harvey & Huey, 2020, *A. lorica* Castalanelli, Framenau, Huey, Hillyer & Harvey, 2020, *A. mccleryorum* Harvey & Huey, 2020, and *A. salina* Wilson, Rix & Harvey, 2023 – all members of the *mainae* group (Clade 7) sensu Rix et al. (2021). However, the abdominal pattern in *A. exulans* is more mottled and less defined, with chevrons that do not connect to the medial line (see Harvey et al. 2020, figs 9, 27); and in *A. lorica*, *A. mccleryorum* and *A. salina* the chevrons are only present on the posterior half of the abdomen (see Castalanelli et al. 2020, figs 47, 59; Harvey et al. 2020, figs 67, 85; Wilson et al. 2023, figs 4B, 5B).

Males of *A. hetaera* sp. nov. can further be distinguished by the presence of a copulatory organ with an angular ridge on the distal bulb near the base of the embolus, and a short, reflexed embolus (Fig. 3L). *A. mccleryorum* has a similar copulatory organ, however it is not as reflexed (see Harvey et al. 2020, figs 71–73). Furthermore, the two species are roughly 500 km apart, making it unlikely that they will be mistaken for one another. *Aname exulans*, *A. lorica*, and *A. salina* all have much longer emboli.

Females of *A. hetaera* sp. nov. can be further distinguished by the spermathecae shape, which is distinctly ‘mitten-like’, with relatively thick lateral and medial vesicles, and lateral vesicles with slightly widened crowns (Fig. 4L). In contrast, females of *A. exulans*, *A. lorica* and *A. salina* generally have more elongated and convoluted receptacles (see Castalanelli et al. 2020, fig. 61; Harvey et al. 2020, fig. 30; Wilson et al. 2023, fig. 5L).

Male holotype (WAM T74670)

General (Fig. 3A–Q). Body length 16.5, in good condition, colour presumably faded due to preservation.

Dorsal prosoma (Fig. 3A, C, D). Carapace length 6.41, width 4.99, length/width 1.28, clypeus to fovea length/carapace length 0.69, caput width/carapace width 0.75, carapace pale red-brown, reflective setae present, moderate on caput, light on thorax, fovea procurved, fovea width/carapace length 0.10 (Fig. A, D); chelicerae red-brown, rastellum of bristle-like setae only, chelicerae length/carapace length 0.50 (Fig. A); eye group rectangular, width/length 1.67, eye tubercle present (Fig. C).

Abdomen (Fig. 3F, G). Abdomen length 6.84, pallid sand colour ventrally and laterally, with consistent cover of short setae. A brown, bilaterally symmetrical dorsal pattern is present, consisting of an elongated medial stripe from which lateral bands extend, forming a chevron-like design that tapers distally.

Ventral prosoma (Fig. 3B, E, H, I). Labial cuspules absent (Fig. 3E); maxillary heel distinct, cuspules present, count: about 115, extending posteriorly onto heel, extending laterally about 40% of maxillae length (Fig. 3B, I); coxae cuspules present, count: 28 on coxa I and 4 on coxa II. Thorn-like setae on prolateral face present (Fig. 3B, I); sternum length/width 1.25, central sternum with consistent covering of short setae, row of longer setae around posterior edges which extends anteriorly until just below the sternum midline (Fig. 3E, H); posterior sigilla elongate, central sternum to posterior sigilla length/sternum length 0.25, posterior sigilla length/sternum length 0.12 (Fig. 3B, H); other sigilla small, round and lateral (Fig. 3B, H).

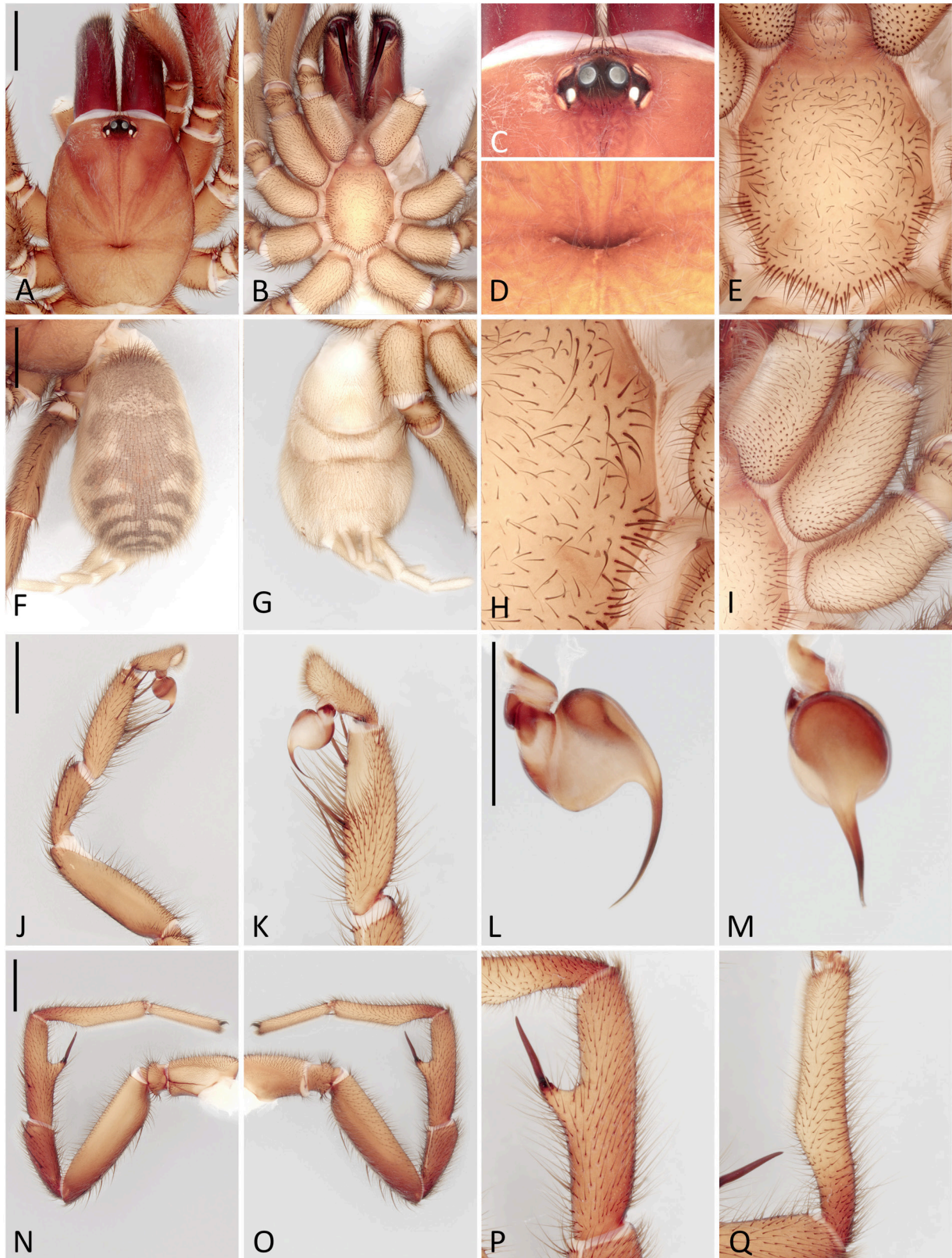


Figure 3. *Aname hetaera* sp. nov., holotype male (WAM T74670): **A**, cephalothorax, dorsal view; **B**, cephalothorax, ventral view; **C**, ocular region, dorsal view; **D**, fovea, dorsal view; **E**, sternum, ventral view; **F**, abdomen, dorsal view; **G**, abdomen, ventral view; **H**, sigilla; **I**, maxilla and coxae I, II, ventral view; **J**, left pedipalp, prolateral view; **K**, left pedipalp partial retrolateral view; **L**, right bulb, prolateral view; **M**, right bulb, dorsal view; **N**, left leg I, prolateral view; **O**, left leg I, retrolateral view; **P**, left tibia, retrolateral view; **Q**, left metatarsus, retrolateral view. Scale bars = 2 mm (A, F, J, N), 1 mm (L).

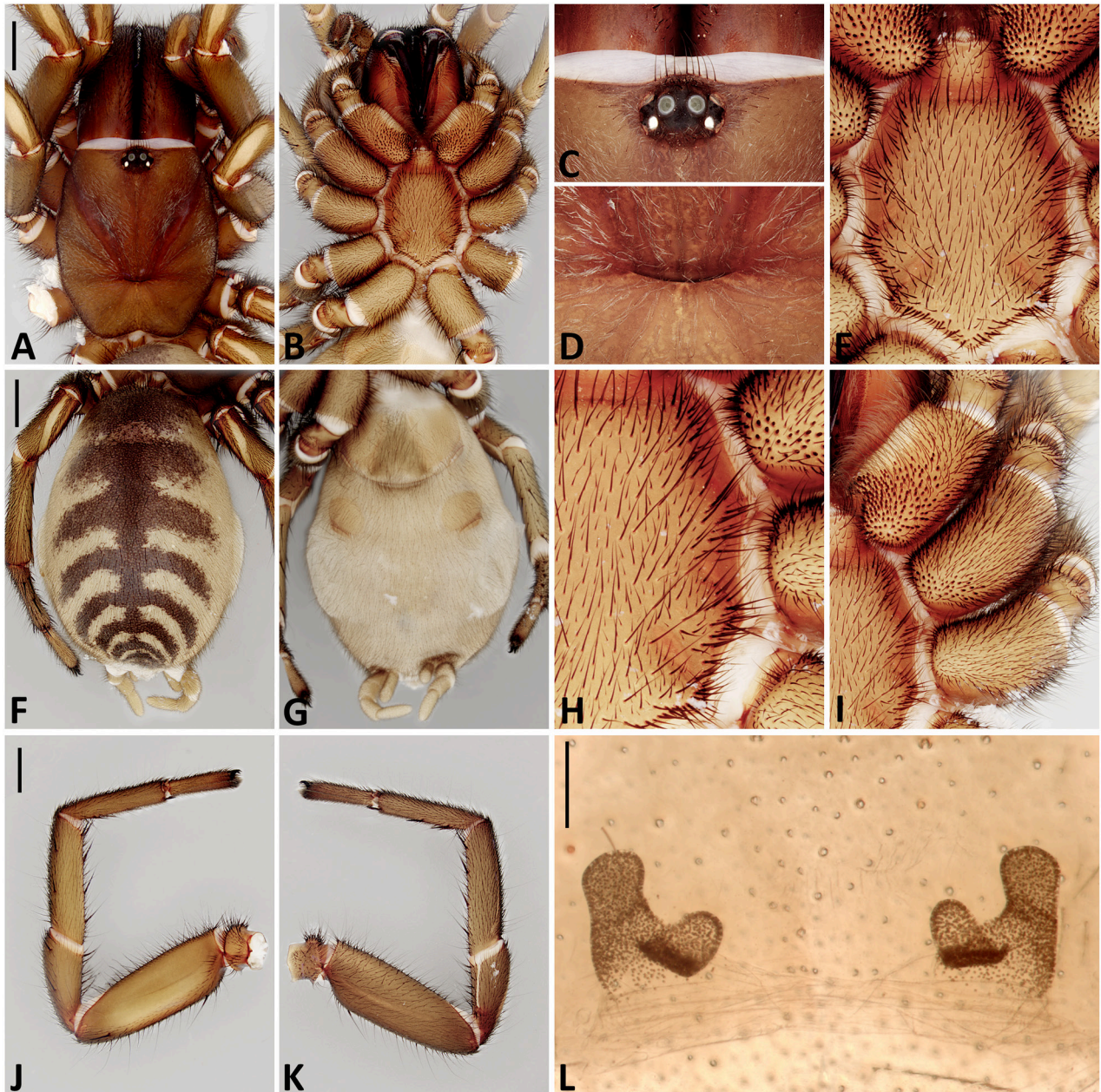


Figure 4. *Aname hetaera* sp. nov., paratype female (WAM T161664): **A**, cephalothorax, dorsal view; **B**, cephalothorax, ventral view; **C**, ocular region, dorsal view; **D**, fovea, dorsal view; **E**, sternum, ventral view; **F**, abdomen, dorsal view; **G**, abdomen, ventral view; **H**, sigilla; **I**, maxillae and coxae I, II, ventral view; **J**, left leg I, prolateral view; **K**, left leg I, retrolateral view; **L**, spermathecae, dorsal view. Scale bars = 2 mm (A, F, J), 0.5 mm (L).

Leg I (Fig. 3N–Q). Leg I pale red, darker on distal and retrolateral femur, patella, tibia and proximal metatarsus, reflective setae on dorsal femur. Femur length 5.56, patella length 3.34, tibia length 4.00, metatarsus length 4.35, tarsus length 2.79, total length 20.06, leg I length/carapace length 3.12 (Fig. 3N, O); scopulae on distal metatarsus and tarsus (Fig. 3N, O); spine count Fe D 5, Fe PL 1, Pa PL 2, Ti PL 1, Ti RL 0, Me PL 0, Me RL 1, Ta 0 (Fig. 3N, O); tibia length/width [TIL/TID] 4.42, slight widening from proximal end to spur before narrowing again towards distal end, spur present, triangular, knuckle absent, megaspine angled at 24 degrees, length to distal face of spur/tibia length [TIS/TIL] 0.56,

spur height/tibia width [TISH/TID] 0.58, megaspine length/tibia length 0.31 (Fig. 3N–P); metatarsus slightly sinuous, proximal excavation present, excavation concave with slight heel, semi-sharp, excavation length/metatarsus length [MIPEL/MIL] 0.41, metatarsus length/width [MIL/MID] 5.41 (Fig. 3N, O, Q).

Pedipalp (Fig. 3J–M). Tibia length 3.06, width 0.90, length/width [PTL/PTD] 3.38, asetose depression present, depression length/palp tibia length [PDL/PTL] 0.45, retrolateral face with long light setae, ventral face with two elongate bristle-like setae below depression, prolateral face with two disto-ventral spines, one smaller disto-medial spine, and a small medial spine (Fig. 3J, K);

patella prolateral face with 3 spines (Fig. 3J, K); cymbium with scopulae present distally (Fig. 378J, K); copulatory organ total length 1.35, length/palp tibia length 0.44 (Fig. 3L, M); bulb length/width 0.91, with a slight angular ridge distally (Fig. 3L, M); embolus reflexed, attenuate, forming an angle of roughly 63 degrees with bulb, width at base/bulb width 0.25, embolus length/bulb length 1.25 (Fig. 3L, M).

Female paratype (WAM T161664)

General (Fig. 4A–L). Body length 24.88, in great condition, colour well preserved (recently collected).

Dorsal prosoma (Fig. 4A, C, D). Carapace length 8.18, width 6.70, length/width 1.22, clypeus to fovea length/carapace length 0.67, caput width/carapace width 0.82, carapace deep brown, reflective setae present, moderate on caput, moderate on thorax, fovea procurved, fovea width/carapace length 0.13 (Fig. 4A, D); chelicerae dark red-brown, rastellum absent or inconspicuous, chelicerae length/carapace length 0.62 (Fig. 4A); eye group rectangular, width/length 1.3, eye tubercle present (Fig. 4C).

Abdomen (Fig. 4F, G). Abdomen length 12.02, pallid sand colour, with consistent cover of short setae. A dark brown, bilaterally symmetrical dorsal pattern is present, consisting of an elongated medial stripe from which lateral bands extend, forming a chevron-like design that tapers distally.

Ventral prosoma (Fig. 4B, E, H, I). Labial cuspules absent (Fig. 4E); maxillary heel distinct, cuspules present, count: about 163, extending posteriorly onto heel, extending laterally about 55% of maxillae length (Fig. 4B, I); coxae cuspules present, count: 36 on heel of coxa I, thorn-like setae on prolateral face present (Fig. 4B, I); sternum length/width 1.16, central sternum with consistent covering of short setae, row of longer setae around posterior edges which extends anteriorly until just below the midline (Fig. 4E, H); posterior sigilla elongate, central sternum to posterior sigilla length/sternum length 0.21, posterior sigilla length/sternum length 0.15 (Fig. 4E, H); other sigilla small and lateral (Fig. 4E, H).

Leg I (Fig. 4J, K). Leg I pale brown, femur length 7.73, patella length 4.55, tibia length 5.05, metatarsus length 4.83, tarsus length 2.85, total length 25.04, leg I length/carapace length 3.06; scopulae on distal metatarsus and tarsus; spine count Fe D 1, Fe PL 1, Pa PL 2, Ti PL 3, Ti RL 4, Me PL 2, Me RL 3, Ta 0; tibia length/width [TIL/TID] 3.13.

Genitalia (Fig. 4G, L). Epigastric furrow unmodified (Fig. 4G); spermathecae with two vesicles each, with overall 'mitten-like' shape (Fig. 4L); lateral vesicle lobed, length 0.66, lateral vesicle length/genitalia width 0.26, length/width at base 1.35, crown slightly wider than stem (Fig. 4L); medial vesicle short, protruding medially, medial vesicle length/genitalia width 0.15, length/width 1.33, medial vesicle length/lateral vesicle length 0.58 (Fig. 4L).

Other material examined

AUSTRALIA – *Western Australia*: • 1 juvenile, 4 km S. of Lake Miranda, W. side of Goldfields Highway, 27°44'22.63"S, 120°32'21.14"E, 03 Sep. 2023, excavated, J. Wilson, C. Whisson (WAM T161687); • 1 juvenile, ca. 1 km SE. of Leinster, 27°55'13.54"S, 120°42'40.75"E, 05 Sep. 2023, excavated, J. Wilson, R. Ellis, M. Terry (WAM T161695); • 1 ♀, Mount Richardson, ca. 40.9 km SSE. of Bulga Downs Station, 28°48'07.75"S, 119°58'52.68"E, 07 Aug. 2020, excavated, E. Volschenk (WAM T153294); • 1 ♀, same data (WAM T153295); • 1 ♂, Mt Bevan [mine lease], c. 0.8 km NE. of Mt Bevan, ca. 100 km W. of Leonora, 29°02'30.37"S, 120°19'09.66"E, 22 Oct. 2022, pitfall trap, loam, M. Greenham (WAM T161831); • 1 ♂, Mt Bevan [mine lease], c. 4 km SE. of Mt Bevan, ca. 100 km W. of Leonora, 29°04'19.61"S, 120°19'48.75"E, 21 Oct. 2022, pitfall trap, flood plain, clay loam, M. Greenham (WAM T161828); • 1 ♂, Mt Bevan [mine lease], c. 6 km SE. of Mt Bevan, ca. 99 km WSW. of Leonora, 29°05'23.97"S, 120°20'20.03"E, 18 Oct. 2022, pitfall trap, flood plain, clay loam, R. De Vos (WAM T161829); • 1 ♂, Mt Bevan [mine lease], c. 9 km SE. of Mt Bevan, ca. 97 km WSW. of Leonora, 29°06'25.56"S, 120°21'49.06"E, 21 Oct. 2022, pitfall trap, flood plain, clay loam, R. De Vos (WAM T161830); • 1 ♂, same data except 29°06'25.24"S, 120°21'50.16"E, 22 Oct. 2022 (WAM T161832); • 1 ♂, Mt Ida, 80 km NW. of Menzies, 29°13'16"S, 120°23'47"E, 30 Sep. 2011, pitfall trap, Aca-cia shrubland, V. Saffer (WAM T121527).

Etymology: The specific epithet *hetaera* is a Latinised form of the Ancient Greek noun *hetaira* (ἑταῖρα), denoting a highly educated female companion or courtesan in ancient Greece. The name alludes to the reproductive status of the female paratype, which had recently mated prior to vouchering.

Distribution and natural history

A. hetaera sp. nov. is known only from the eastern Murchison bioregion of Western Australia, between the towns of Leonora in the south and Wiluna in the north (Fig. 1C). The type locality is in the northern part of this range, with type specimens collected from the area between Leinster and Wiluna. The habitat in the area is semi-arid to arid, dominated by open mallee, mulga woodlands, and spinifex grasslands on sandy, stony, and loamy soils.

Remarks

Aname hetaera sp. nov. was previously known by the WAM species codes *Aname* 'MYG031', and *Aname* 'MYG251'. It is the third species described from the *pulchella* group (Clade 5) *sensu* the phylogenetic analysis of Rix et al. (2021), along with *A. pulchella* Harvey, Wilson & Rix, 2022 and *A. tenuipes* Wilson, Rix & Harvey, 2023.

GenBank accession numbers for this species' sequences used in Wilson et al. (2025) are as follows: for WAMT96498 – 12S: MW518291; 16S: MW518391; 18S:

MW518480; 28S: MW518561; H3: MW518756; EF-1y: MW518695; for WAMT121527 – COI: KJ744974; 12S: MW518325; 16S: MW518423; 18S: MW518509; 28S: MW518591; H3: MW518782.

Disclosures

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