



A new species plus new live habitus and burrow records of the spiny trapdoor spider genus *Bungulla* (Mygalomorphae: Idiopidae: Aganippini) from south-western Australia

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Abstract

The aganippine spiny trapdoor spider genus *Bungulla* Rix, Main, Raven & Harvey, 2017 is endemic to Western Australia, with 32 species described following revisionary systematic study in 2018. In this paper we describe a new species, *B. pipilata* **sp. nov.**, from the northern Jarrah Forest bioregion of south-western Australia. This species is currently known from only a single locality in Upper Chittering, and appears closely related to *B. biota* Rix, Raven & Harvey, 2018 from the central Murchison bioregion. We further provide two new records of indeterminate female specimens collected on a recent Bush Blitz expedition to the northern Geraldton Sandplains bioregion, and document the live habitus morphology and burrowing biology of these specimens given the paucity of previous such records for the genus.

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<https://zoobank.org/References/7a002dba-173d-4019-b9fa-7ad5d1567afa>

Introduction

The spiny trapdoor spiders of the family Idiopidae have undergone extensive systematic revision in Australia since 2017, with molecular phylogenetic assessment at a continental scale (Rix et al. 2017a) also complemented by a higher-level generic revision of the Australasian fauna (Rix et al. 2017b) plus detailed monographic tax-

onomy of numerous endemic genera (e.g. Rix et al. 2018a–d, 2019; Harrison et al. 2018; Wilson & Rix 2021; Wilson et al. 2021). Of the 11 idiopid genera now recognised from Australia (all in the subfamily Arbanitinae; Rix et al. 2017a, b), five are members of the distinctive and highly diverse tribe Aganippini Simon: *Bungulla* Rix, Main, Raven & Harvey, 2017, *Eucanippe* Rix, Main, Raven & Harvey, 2017, *Eucyrtops* Pocock, 1897, *Gaius* Rainbow,

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1914 and *Idiosoma* Ausserer, 1871. All but *Idiosoma* are endemic to Western Australia, and most (to the exclusion of *Eucyrtops*) have been the subject of complete (*Bungulla*, *Eucanippe*, *Gaius*) or partial (*Idiosoma*) monographic revision since 2018.

The genus *Bungulla* is a morphologically distinctive group that includes 32 previously named species from Western Australia, 31 of which were recently described as part of revisionary systematic studies in 2017 and 2018 (see Rix et al. 2017b, 2018c). Most species are known only from pitfall-trapped male specimens, with very few records of females or burrows in the published literature. The genus is particularly diverse through the coastal and sub-coastal Mid-west region of Western Australia, especially in the northern Geraldton Sandplains and southern Carnarvon bioregions, where the fauna is complex with high levels of species sympatry and/or parapatry (see Rix et al. 2018c). Although little is known of their biology or life history, species of *Bungulla* are undoubtedly an important component of the aganippine fauna of Western Australia, and the second-most diverse genus in the tribe after *Idiosoma*.

In this paper, we describe a new species of *Bungulla* from a single locality in the northern Jarrah Forest bioregion of south-western Western Australia. We further provide two new records of indeterminate female specimens collected on a recent Bush Blitz expedition to the northern Geraldton Sandplains bioregion, and document the live habitus morphology and burrowing biology of these specimens given the paucity of previous such records for the genus.

This research contributes to Taxonomy Australia (2020), a national initiative under the Australian Academy of Science that brings together the taxonomic community to accelerate the discovery, documentation, and naming of new species. The initiative aims to comprehensively document the Australian biota within a generation.

Methods

Morphological taxonomic methods, including the format of the species description, follow Rix et al. (2018c), with measurements in millimetres, and digital automontage images taken using a Leica M165C stereomicroscope with mounted K5C digital camera, and processed using Leica Application Suite Version X Industry Core software. Specimens are lodged at the Western Australian Museum, Perth (WAM), and the following descriptive abbreviations are used: ALE, anterior lateral eye/s; AME, anterior median eye/s; PLE, posterior lateral eye/s; PME, posterior median eye/s; RTA, retrolateral tibial apophysis (of male pedipalp). Bioregional definitions are as per the Interim Biogeographic Regionalisation for Australia (IBRA) Version 7.0 (Thackway & Cresswell 1995).

Taxonomy

Family Idiopidae Simon, 1889

Subfamily Arbanitinae Simon, 1903

Tribe Aganippini Simon, 1903

Genus *Bungulla* Rix, Main, Raven & Harvey, 2017

<https://zoobank.org/NomenclaturalActs/8D97916B-6E04-45C2-918E-9ECC8DB5AE5F>

Bungulla Rix, Main, Raven & Harvey, 2017 in Rix et al. (2017b): 602.

Type species

Bungulla bertmaini Rix, Main, Raven & Harvey, 2017, by original designation.

Diagnosis

Species of *Bungulla* are unique among Australian Idiopidae in lacking a retrolateral tibial apophysis (RTA) on the male pedipalp (Fig. 11) (Rix et al. 2017b, 2018c). Males can further be characterized by the absence of prolateral clasp spurs on the leg I tibia (Fig. 10), by the presence of a field of strong spinules on the dorsal cymbium (Figs 11–13), and by the absence of a complete fringe of porrect setae around the lateral margins of the carapace (Fig. 2) (Rix et al. 2018c: 253).

Females (and juveniles) of *Bungulla* are very similar in general appearance to species of *Eucyrtops*, though can be distinguished molecularly based on at least seven nucleotide autapomorphies identified by Rix et al. (2017b: 602). Females of *Bungulla* are also less uniformly dark-coloured somatically with a stronger dorsal abdominal patterning compared to most species of *Eucyrtops*, and in many parts of Western Australia (especially northern areas of the Mid-west), the two genera do not occur sympatrically (see Rix et al. 2017b, 2018c).

Description

See Rix et al. (2017b).

Distribution

The genus *Bungulla* is endemic to Western Australia, with a distribution extending from the southern Jarrah Forest, Esperance Plains and Hampton bioregions, north to the Pilbara (Rix et al. 2018c).

Composition

Rix et al. (2018c) recognised 32 species of *Bungulla*, with *B. pipilata* sp. nov. newly described in this study. The monophyly of the genus is now well established, with Rix et al. (2017a) recovering *Bungulla* as the sister-group to the rest of the tribe Aganippini.

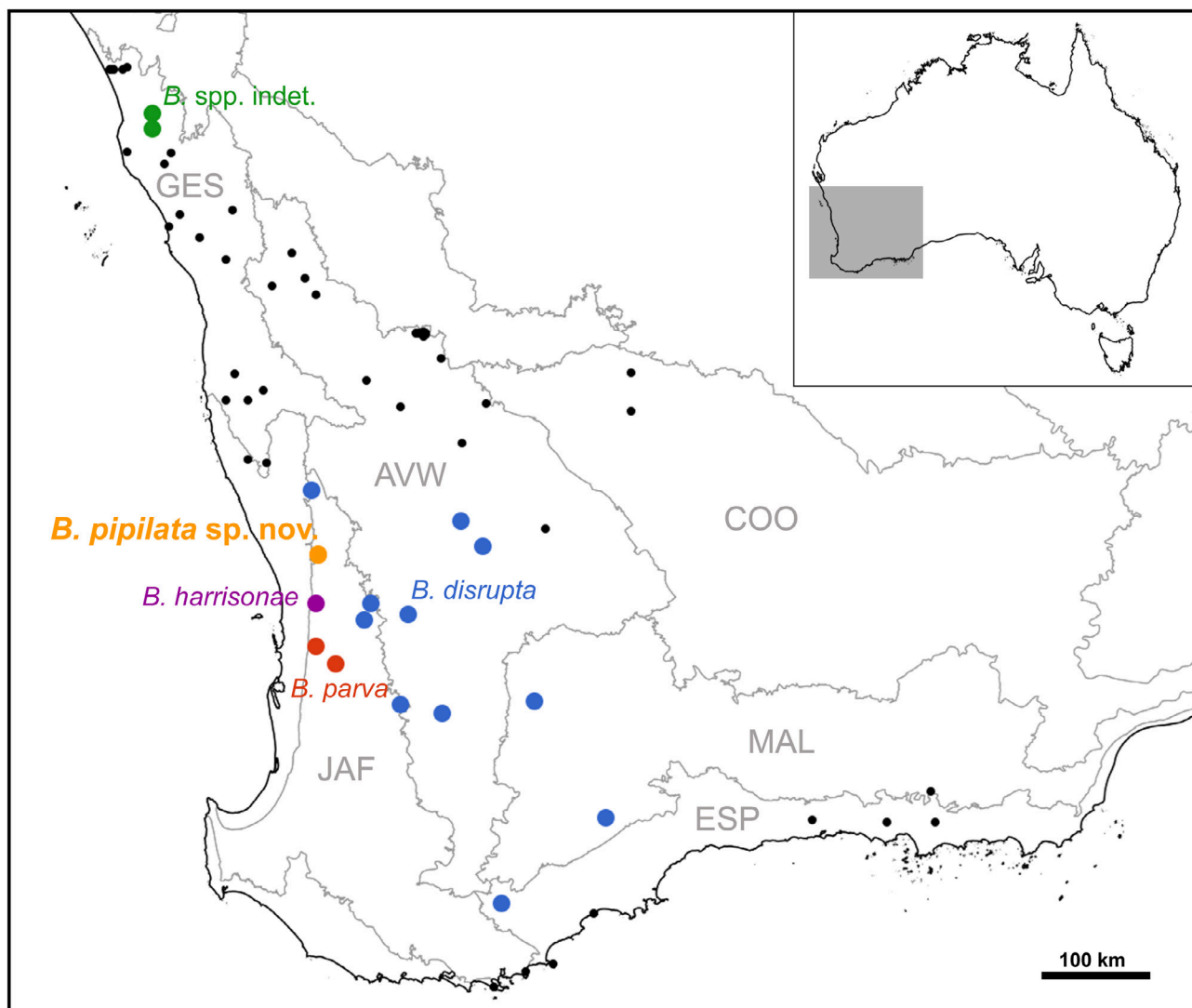


Figure 1. Map showing collection records of *Bungulla* in south-western Western Australia (black dots), overlaid with species known to occur in the northern Jarrah Forest bioregion, including the newly described *B. pipilata* sp. nov. Note also new records of indeterminate female specimens from the northern Geraldton sandplains bioregion. IBRA 7.0 bioregional acronyms are as follows: AVW, Avon Wheatbelt; ESP, Esperance Plains; COO, Coolgardie; GES, Geraldton Sandplains; JAF, Jarrah Forest; MAL, Mallee.

***Bungulla pipilata* sp. nov.**

Figures 1–13

<https://zoobank.org/NomenclaturalActs/5c81ec50-b604-43df-b377-e94a75776498>

Holotype

Australia: *Western Australia*: ♂, Djidi-Djidi Ridge Reserve, Upper Chittering, off Chittering Road, site 4 (IBRA_JAF), 31°29'06"S, 116°06'46"E, 30 June–29 July 2008, pitfall trap on south-facing slope with *Corymbia calophylla*, F. Bokhari (WAM T143099).

Paratypes

Australia: *Western Australia*: 1 ♂, same data as holotype (WAM T148499); 1 ♂, same data except site 6, 31°29'14"S, 116°06'58"E, pitfall trap in open woodland, east-facing slope (WAM T148500).

Diagnosis

Males of *Bungulla pipilata* sp. nov. can be distinguished from all other known congeners with >10 retrolateral spinules on the palpal tibia (Fig. 12) – except *B. biota* Rix, Raven & Harvey, 2018, *B. burbridgei* Rix, Raven & Harvey, 2018, *B. dipsodes* Rix, Raven & Harvey, 2018, *B. keigheryi* Rix, Raven & Harvey, 2018, *B. kendricki* Rix, Raven & Harvey, 2018, *B. sampeyae* Rix, Raven & Harvey, 2018 and *B. westi* Rix, Raven & Harvey, 2018 – by the shape of the proximal half of the palpal tibia, which has a pronounced ventral bulge in retrolateral view, in an RTA-like position (Fig. 11) (palpal tibia is unmodified in other species). It is most similar to *B. biota* from the central Murchison bioregion, with which it shares a small body size (carapace length <4.0) and a distinctly short, squat palpal tibia with a ventral bulge bearing a limited, clustered field of <15 spinules (Figs 11–13). It can be distinguished from *B. biota* by the shape of the embolus,



Figures 2–8. *Bungulla pipilata* sp. nov., male holotype (WAM T143099) from Upper Chittering, Western Australia, body morphology: 2, 3, carapace and abdomen, dorsal view; 4, carapace, lateral view; 5, eyes, dorsal view; 6, mouthparts, ventral view; 7, sternum, ventral view; 8, abdomen, ventral view. Scale bars 2.0.

which is much thinner and without a distally flattened, truncate tip (Figs 11–13; cf. Rix et al. 2018c, figs 108–110, supplementary file 1). This species can further be distinguished from *B. burbridgei* by the absence of dagger-like spinules at the apex of the RTA-like bulge (Fig. 11; cf. Rix et al. 2018c, fig. 134); from *B. dipsodes* by the much smaller field of spinules on the palpal tibia (Figs 11, 12; cf. Rix et al. 2018c, figs 147, 148); from *B. keigheryi* by the broadly rounded shape of the ventral bulge on the palpal tibia (Fig. 11; cf. Rix et al. 2018c, fig. 280); from *B. sampeyae* by the uniformly dark coloration of the dorsal abdomen (Fig. 3; cf. Rix et al. 2018c, fig. 398); from *B. kendricki* by the shape of the palpal tibia, which is less strongly arched dorsally, with a more symmetrical, bulbous profile in retrolateral view (Fig. 11; cf. Rix et al. 2018c, fig. 306); and from *B. westi* by the absence of spin-

ules on the disto-dorsal margin of the palpal tibia (Fig. 11; cf. Rix et al. 2018c, fig. 432). Females are unknown.

Description (male holotype)

Total length 7.7. Carapace 3.9 long, 3.4 wide. Abdomen 3.0 long, 2.0 wide. Carapace (Fig. 2) dark tan, with darker brown lyre-like pattern either side of pars cephalica, reticulated brown patterning on pars thoracica, brown lateral rims and mostly black ocular region; postero-lateral corners near abdomen each with marginal cluster of longer black setae; fovea straight. Eye group (Fig. 5) trapezoidal (anterior eye row strongly procurved), 0.7 x as long as wide, PLE–PLE/ALE–ALE ratio 1.7; ALE separated by nearly their own diameter; AME separated by less than their own diameter; PME separated by 3.1x their own diameter; PME and PLE separated by diameter of



Figures 9–13. *Bungulla pipilata* sp. nov., male holotype (WAM T143099) from Upper Chittering, Western Australia, leg I and pedipalp: 9, leg I, prolateral view; 10, leg I tibia, prolateral view; 11, pedipalp, retrolateral view; 12, pedipalp, retroventral view; 13, pedipalp, prolateral view. Scale bars 2.0.

PME, PME positioned in line with level of PLE. Maxillae with field of cuspules confined to inner corner (Fig. 6); labium without cuspules. Abdomen (Fig. 3) oval, mostly dark charcoal-brown in dorsal view, with faint dark tan mottling and four pairs of beige-tan chevrons posteriorly, each divided along midline. Dorsal surface of abdomen (Fig. 3) with sparse arrangement of stiff, porrect black setae, each with slightly raised, dark brown sclerotic base; sclerotized sigilla absent. Legs (Figs 9, 10) variable shades of dark tan, with light scopulae on tarsi I, II; tibia I spinose, without prolateral clasping spurs. Leg I: femur 4.1; patella 1.9; tibia 3.2; metatarsus 2.7; tarsus 2.1; total 13.9. Leg I femur-tarsus/carapace length ratio 3.6. Palpal tibia (Figs 11–13) stout, 1.7x longer than wide, with RTA-like ventral bulge proximally; primary field of retrolateral spinules sub-triangular in shape, positioned

medially (at apex of ventral bulge), consisting of 12 spinules of largely similar length, with additional small, isolated spinule along disto-ventral margin; RTA absent. Cymbium (Figs 11–13) setose, with field of porrect, thorn-like spinules covering most of dorsal surface. Embolus (Figs 11–13) as long as bulb, slightly curved, with unmodified tip; embolic apophysis absent.

Distribution and habitat

Bungulla pipilata is known only from Djidi-Djidi Ridge Reserve, Upper Chittering, in the northern Jarrah Forest bioregion of south-western Western Australia (Fig. 1). Djidi-Djidi Ridge Reserve is a small, 85 ha remnant situated near the western margin of the Jarrah Forest bioregion, 6.5 km east of the Swan Coastal Plain and ca. 50

km north-east of Perth. The habitat is lightly sloping open eucalypt woodland to less than 200 m elevation.

Remarks

Morphologically, *B. pipilata* is very similar to *B. biota*, and the two are likely sister-species, although the latter is known only from the central Murchison bioregion, over 450 km to the north-east of the type locality. In the northern Jarrah Forest bioregion, *B. pipilata* can be found relatively close to populations of *B. disrupta* Rix, Raven & Harvey, 2018, *B. harrisonae* Rix, Raven & Harvey, 2018 and *B. parva* Rix, Raven & Harvey, 2018 (Fig. 1), however, it can easily be distinguished from two of these species based on male morphology, as both *B. disrupta* and *B. parva* are devoid of spinules on the palpal tibia (see Rix et al. 2018c, fig. 12). While males of *B. harrisonae* remain unknown, females of this species are substantially larger than *B. pipilata* (indeed, much larger than would be expected based on proportionate sizing between the sexes), and *B. harrisonae* was also not recovered as phylogenetically sister to *B. biota* in the molecular phylogenetic analysis of Rix et al. (2018c, fig. 14) (as would be expected if the Upper Chittering population was conspecific with *B. harrisonae*).

Little is known of the biology of this species, other than that male specimens were collected in pitfall traps in July, indicating a likely winter mating period. Burrows are unknown.

Etymology

The specific epithet is a verb referring to the type locality of Upper Chittering (from the Latin *pipilatus*: to chirp, peep or twitter).

Bungulla spp. indet. (females)

Figures 1, 14–19

See Rix et al. (2018c) for descriptions of female specimens of named *Bungulla* species.

Specimens listed below are of indeterminate females.

New material examined

Australia: *Western Australia*: 1 ♀, Kalbarri National Park, ca. 0.1 km NE. of Hawks Head Lookout carpark (IBRA_GES), 27°47'17.1"S, 114°28'08.9"E, hand collected from burrow, 28 October 2024, J.D. Wilson, M.S. Harvey & M. Draykos (WAM T166806); 1 ♀, Kalbarri National Park, Z-Bend River Trail (IBRA_GES), 27°39'14.5"S, 114°27'14.8"E, hand collected from burrow, 30 October 2024, J.D. Wilson, M.S. Harvey, K. Hogendoorn, H. Cross & S. Mitchell (WAM T166820).

Remarks

Female specimens of *Bungulla* have rarely been collected, and of the 33 known species in the genus, only six are known from female specimens (Rix et al. 2018c). Of these six species, live habitus images and/or images of burrows are also very poorly documented, with only one

published female habitus image (of *B. gibba* Rix, Raven & Harvey, 2018; see Rix et al. 2018c, fig. 7), and burrow information for only three species: *B. biota*, *B. gibba* and *B. harrisonae* (see Rix et al. 2018c, figs 3, 5, 6, 8, 9). The discovery of two new female specimens of *Bungulla* from Kalbarri National Park, in the northern Geraldton Sandplains bioregion (Fig. 1), are therefore important to our understanding of the biology of the genus, and of the appearance of females in life (see Figs 14–19). While neither specimen can unequivocally be linked to a known described species, they are very likely conspecific or closely related to *B. banksia* Rix, Raven & Harvey, 2018 or *B. ajana* Rix, Raven & Harvey, 2018, based on their abdominal colour pattern and distribution. We are also confident that they are members of the genus *Bungulla* and not undescribed species of *Eucyrtops*, also based on their distribution and colour pattern (see below).

As previously noted in other described *Bungulla* species, burrow doors of both Kalbarri specimens were extremely well camouflaged with sandy soil inclusions externally, and a wafer-like structure. One specimen (WAM T166806) had an unusual sandy soil plug at the entrance to the burrow shaft, physically blocking and sealing the burrow and spider within. While this behaviour has previously been documented in several other aganippine genera (e.g., *Gaius*; see Main 1978), it has not been recorded before in *Bungulla*. In life, the newly collected specimens were very similar in general appearance to females of *Eucyrtops*, though much lighter in colour relative to most *Eucyrtops* species, and with a dorsal abdominal pattern characteristic of other male *Bungulla* species known from the region.

Disclosures

Mark S. Harvey is Editor-in-Chief of this journal, and Michael G. Rix is a subject editor. At no stage did they take part in the handling, peer review or editorial assessment of this manuscript.

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Figures 14–19. Habitus and burrow images of female *Bungulla* spp. indet. from Kalbarri National Park, Western Australia. 14–16, Female (WAM T166806): 14, habitus; 15, burrow closed (15A) and open (15B), showing soil plug at entrance beneath trapdoor; 16, excavated top portion of burrow, showing soil plug at entrance. 17–19, Female (WAM T166820): 17, habitus; 18, habitus, showing detail of cephalothorax; 19, burrow closed (19A) and open (19B). Images by J. Wilson.

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