

Supplementary Material

Genitalic morphology and phylogenomic placement of the Australian spider *Paraplectanoides crassipes* Keyserling, 1886 (Araneae, Araneidae) with a discussion on the classification of the family Araneidae

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Table S1. Sources and accession information of the sequence data used in this study.

Family	Taxon name for UCE data set	Accession code, data source for UCE, Transcriptome or genome	Data class	Concatenated with six-marker Sanger sequence data set of	Data source for Sanger data
Linyphiidae	<i>Laminacauda gigas</i>	BioProject PRJNA991600	UCEONLY	NA	
Pimoidae	<i>Pimoida breviata</i>	SRR10291842	UCEbycatch	Kulkarni <i>et al.</i> (2023)	Kulkarni <i>et al.</i> (2023)
Synotaxidae	<i>Synotaxus</i> sp. GH1385	SRR10291835	UCEONLY	NA	
Synotaxidae	<i>Synotaxus</i> cf. <i>turbinatus</i>	SRR6998908	UetS	<i>Synotaxus</i> spARACG000260	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Acusilas coccineus</i>	BioProject PRJNA991600	UCEbycatch	Kulkarni <i>et al.</i> (2023)	Kulkarni <i>et al.</i> (2023)
Araneidae	<i>Araneus dimidiatus</i>	SRR6967876	UCEONLY	NA	NA
Araneidae	<i>Araneus marmoreus</i>	SRR10291862	UCEbycatch	Kulkarni <i>et al.</i> (2023)	Kulkarni <i>et al.</i> (2023)
Araneidae	<i>Araneus seminiger</i>	DRR129311	UCEONLY	NA	NA
Araneidae	<i>Araneus ventricosus</i>	DRR129314	UCEONLY	NA	NA
Araneidae	<i>Argiope aemula</i>	DRR129308	UCEONLY	NA	NA
Araneidae	<i>Argiope argentata</i>	SRR3545614	UCEONLY	NA	NA
Araneidae	<i>Argiope</i> sp.	SAMN08668846	UetS	<i>Argiope bruenicchi</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Caerostris darwini</i>	SRR7499250	UCEONLY	NA	NA
Araneidae	<i>Caerostris sexcupidata</i>	SRR10291817	UetS	<i>Caerostris sexcupidata</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Cyclosa octotuberculata</i>	DRR129312	UCEONLY	NA	NA
Araneidae	<i>Cyclosa</i> sp	SRR6967878	UetS	<i>Cyclosa bifurcata</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Cyrtophora</i> sp.	SRR6997738	UetS	<i>Cyrtophora citricola</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Cyrtophora unicolor</i>	DRR129309	UCEONLY	NA	NA
Araneidae	<i>Deliochus humilis</i>	SRR6967879	UCEONLY	NA	NA
Araneidae	<i>Dolophones</i> sp.	SRR6967880	UCEONLY	NA	NA
Araneidae	<i>Eriophora ravilla</i>	SRR12687647	UetS	<i>Eriophora</i> sp.	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Eriophora transmarina</i>	SRR6967881	UCEONLY	NA	NA
Araneidae	<i>Gasteracantha kuhlii</i>	DRR129307	UCEONLY	NA	NA
Araneidae	<i>Gasteracantha hasselti</i>	SRR1048659	UetS	<i>Gasteracantha cancriformis</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Herennia multipuncta</i>	SRR12687643	UetS	<i>Herennia multipuncta</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Hypognatha</i> sp. GH2567	SRR12687642	UCEONLY	NA	NA
Araneidae	<i>Larinioides cornutus</i>	SRR11216245	UetS	<i>Larinioides cornutus</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Macracantha arcuata</i>	SRR1048826	UCEONLY	NA	NA
Araneidae	<i>Mangora</i> sp. MCZ-IZ141271	SRR6967882	UetS	<i>Mangora maculata</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Metepeira labyrinthea</i>	SRR6967883	UetS	<i>Metepeira labyrinthea</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Metepeira</i> sp.	BioProject PRJNA991600	UCEbycatch	<i>Metepeira</i> sp.	Kulkarni <i>et al.</i> (2023)
Araneidae	<i>Micrathena gracilis</i>	SRR1514882	UetS	<i>Micrathena gracilis</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Neoscona arabesca</i>	SRR1145741	UetS	<i>Neoscona arabesca</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Neoscona theisi</i>	DRR129306	UCEONLY	NA	NA
Araneidae	<i>Nephila pilipes</i>	SRR6747912	UetS	<i>Nephila pilipes</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Nephilengys cruentata</i>	SRR3943479	UetS	<i>Nephilengys cruentata</i>	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Paraplectanoides crassipes</i>	SRR10291845	UCEbycatch	Kulkarni <i>et al.</i> (2023)	Kulkarni <i>et al.</i> (2023)
Araneidae	<i>Parawixia dehaani</i>	DRR297832	UCEONLY	NA	NA
Araneidae	<i>Phonognatha graeffei</i>	SRR6967874	UetS	<i>Phonognatha graeffei</i> ARAGH000044	Wheeler <i>et al.</i> (2017)
Araneidae	<i>Plebs eburnus</i>	SRR6967875	UCEONLY	NA	NA
Araneidae	<i>Poltys</i> sp. MCZ-IZ141212	SRR6967873	UCEONLY	NA	NA
Araneidae	<i>Trichonephila antipodiana</i>	SRR12459696	UCEONLY	NA	NA
Araneidae	<i>Trichonephila clavipes</i>	SRR1514901	UetS	<i>Nephila clavipes</i>	Wheeler <i>et al.</i> (2017)

Family	Taxon name for UCE data set	Accession code, data source for UCE, Transcriptome or genome	Data class	Concatenated with six-marker Sanger sequence data set of	Data source for Sanger data
Araneidae	<i>Trichonephila edulis</i>	SAMN06114581	UCEONLY	NA	NA
Araneidae	<i>Trichonephila plumipes</i>	SRR6747911	UCEONLY	NA	NA
Araneidae	<i>Verrucosa arenata</i>	SRR3144087	UCEbycatch	Kulkarni <i>et al.</i> (2023)	Kulkarni <i>et al.</i> (2023)
Araneidae	<i>Zygiella dispar</i>	DRR129310	UCEONLY	NA	NA
Araneidae	<i>Zygiella</i> sp.	SRR10291827	UCEbycatch	Kulkarni <i>et al.</i> (2023)	Kulkarni <i>et al.</i> (2023)
Araneidae	<i>Zygiella x-notata</i>	SRR12687612	UetS	<i>Zygiella x-notata</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Araneus diadematus</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Chorizopes nipponicus</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Clitaetra episinoides</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Cyclosa conica</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Eustala</i> spTAB-2009	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Gnolus angulifrons</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Gnolus cordiformis</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Herennia etruscilla</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Mecynogea lemniscata</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Nephila clavata</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Nephila fenestrata</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Nephila senegalensis</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Nephilengys dado</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Nephilengys malabarensis</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Nephilengys papuana</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Oarces reticulatus</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Perilla teres</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	NA	SangerONLY	<i>Zygiella atrica</i>	Wheeler <i>et al.</i> (2017)
Araneidae	NA	COI, OR762149; H3, OR751398; 16S, OR769967	Sanger	<i>Venomius tomhardyi</i> (not concatenated with UCEs)	This study

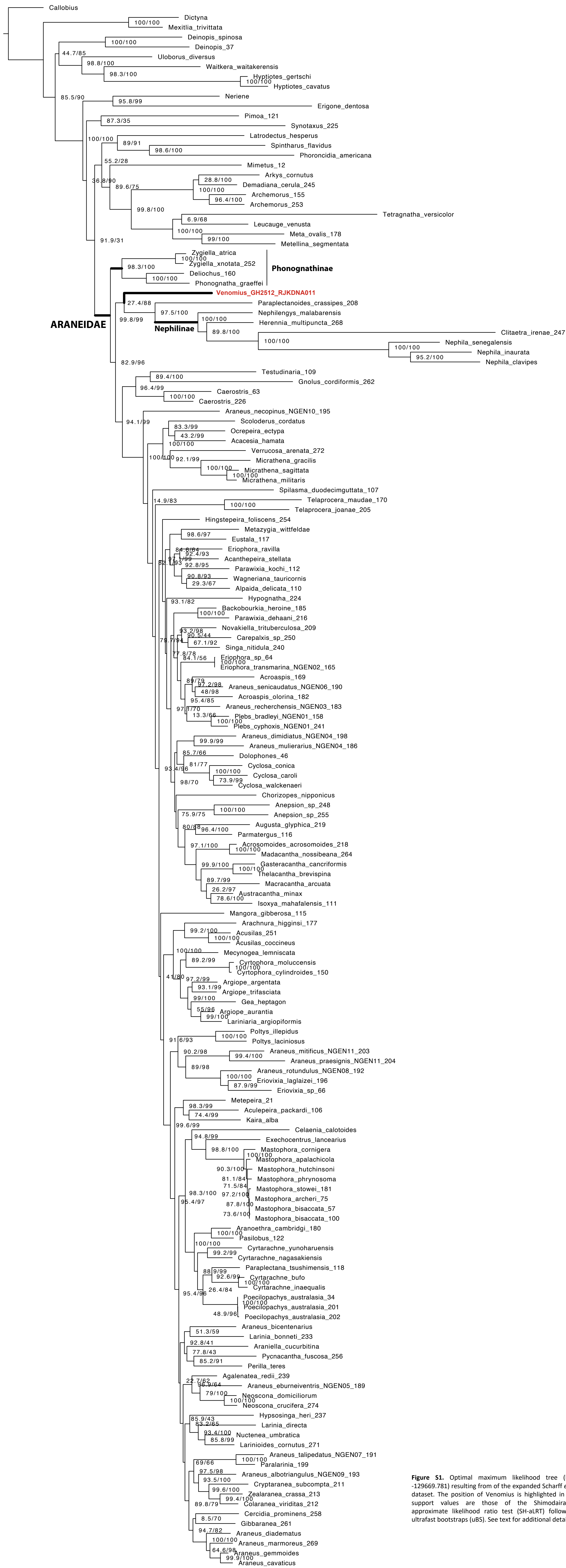


Figure S1. Optimal maximum likelihood tree (best score -129669.781) resulting from of the expanded Scharff *et al.* (2020) dataset. The position of *Venomius* is highlighted in red. Nodal support values are those of the Shimodaira-Hasegawa approximate likelihood ratio test (SH-aLRT) followed by the ultrafast bootstraps (uBS). See text for additional details.

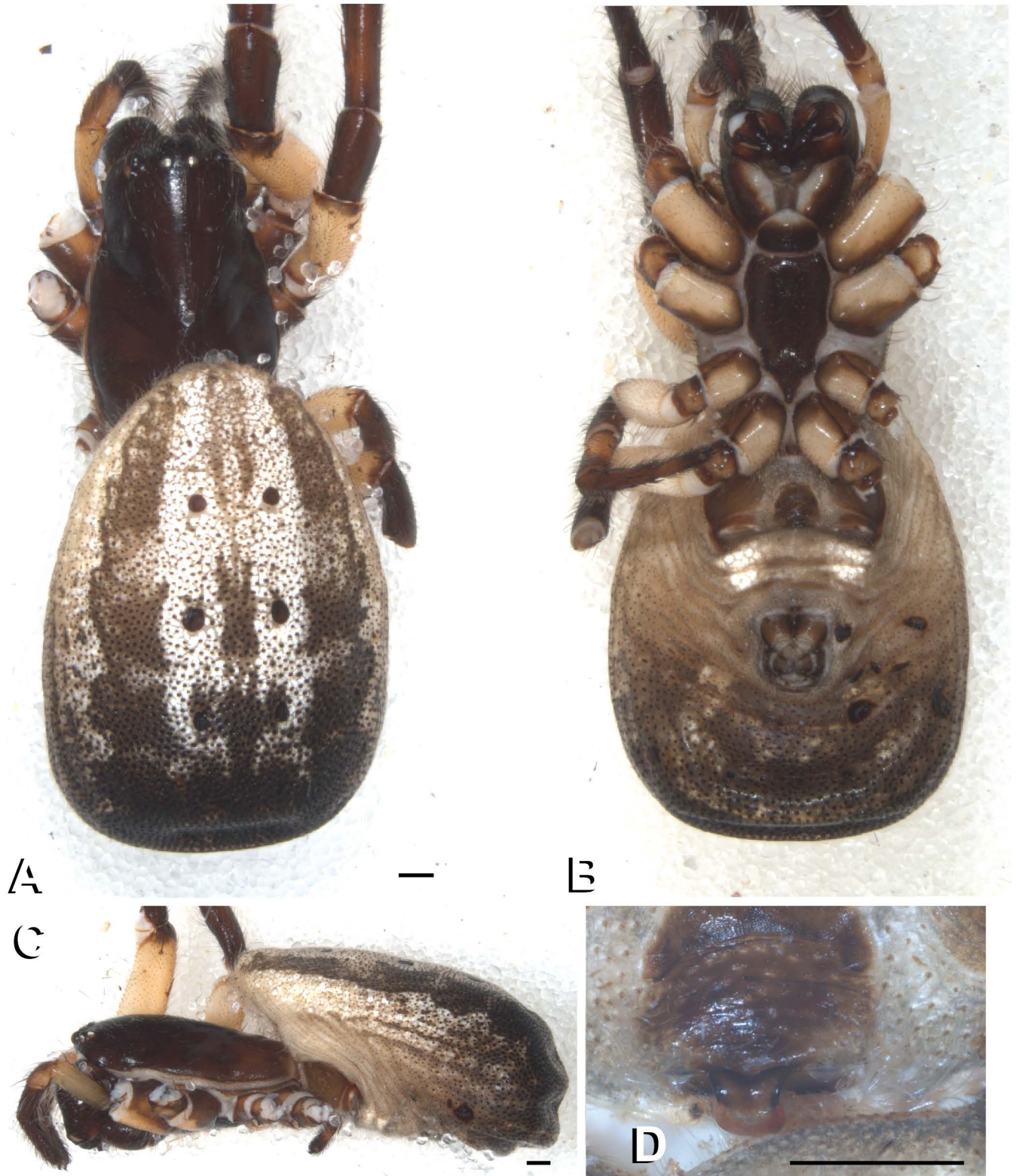


Figure S2. Female voucher specimen of *Venomius tomhardyi* (RJKDNA011, GH 2512) from Flinders Island (Tasmania). A, dorsal; B, ventral; C, lateral; D, epigynum, ventral. Scale bars: 0.5 mm.

References

- Kulkarni S, Wood HM, Hormiga G (2023) Advances in the reconstruction of the Spider Tree of Life: a roadmap for spider systematics and comparative studies. *Cladistics* **39**, 479–532. <https://doi.org/10.1111/cla.12557>
- Scharff N, Coddington JA, Blackledge TA, Agnarsson I, Framenau VW, Szűts T, Hayashi CY, Dimitrov D (2020) Phylogeny of the orb-weaving spider family Araneidae (Araneae: Araneoidea). *Cladistics* **36**, 1-21. <https://doi.org/10.1111/cla.12382>
- Wheeler WC, Coddington JA, Crowley LM, Dimitrov D, Goloboff PA, Griswold CE, Hormiga G, Prendini L, Ramírez MJ, Sierwald P, Almeida-Silva L, Alvarez-Padilla F, Arnedo MA, Benavides Silva LR, Benjamin SP, Bond JE, Grismado CJ, Hasan E, Hedin M, Izquierdo MA, Labarque FM, Ledford J, Lopardo L, Maddison WP, Miller JA, Piacentini LN, Platnick NI, Polotow D, Silva-Dávila D, Scharff N, Szűts T, Ubick D, Vink CJ, Wood HM, Zhang J (2017) The spider tree of life: phylogeny of Araneae based on target-gene analyses from an extensive taxon sampling. *Cladistics* **33**, 574–616. <https://doi.org/10.1111/cla.12182>