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Biosystematics of Australian mygalomorph spiders: description of a new species of *Missulena* from southwestern Australia (Araneae: Mygalomorphae: Actinopodidae)

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Abstract – A new species of *Missulena* from west of Albany, southwestern Australia is described and notes on its biology presented. *Missulena rugosum* Ausserer is tentatively reinstated.

INTRODUCTION

The trapdoor spider genus *Missulena* Walckenaer, the only Australian representative of the Gondwanan family Actinopodidae, is widespread across the continent and occurs on some offshore islands but is absent from Tasmania. Early records of the genus in New Guinea (Rainbow 1920) are now generally discounted. The genus has long been recognised as taxonomically difficult. It was the first indigenous mygalomorph genus named from Australia. However, in spite of a revision of the genus by Womersley (1943) recognition of nominal species is in most cases difficult due to a combination of inadequate early nineteenth century descriptions, loss of many types, absence of locality data for early specimens and the conservative morphology. Perhaps the only named species which are uneqivocally recognisable are *M. pruinosa* Levitt-Gregg from northern Australia, *M. bradleyi* Rainbow from mid-eastern Australia and two recently described species (Faulder 1995). Even the type species, *M. occatoria* Walckenaer as it is currently defined, appears to have several other species confused with it.

Main (1985) recognised seven species. Synonymy there of *M. rugosum* Ausserer with *M. occatoria* Walckenaer was perhaps in error and I now tentatively reinstate *M. rugosum*.

Regardless of the taxonomic confusion of the nominal species it is apparent from my field observations and an abundance of specimens (mainly males) in museums that there are many undescribed species. Richard Faulder is currently reviewing the genus and preparing redescriptions of those species recognised by him.

This paper provides a description of a new species from west of Albany, south western Australia. Female specimens from the Albany coastal region cannot unequivocally be associated with the male specimens on which establishment of the new species is based because another species with distinctive males (having red chelicerae) occurs also in the same area.

Abbreviations: BYM, Barbara York Main collection (housed in the Zoology Department, University of Western Australia); WAM, Western Australian Museum.

SYSTEMATICS

Missulena torbayensis sp. nov.

Figures 1, 2; Table 1

Material examined

Holotype

♂, Rutherwood Road/South Coast Highway (Highway 1), Torbay, Nature Reserve, Western Australia, Australia, 16 June 1983 , B.Y. Main, alive in pitfall trap (BYM 1983/140; WAM 1995/2).

Paratypes

Australia: Western Australia: All collected from pitfall traps. 1♂, data as for holotype, 20 June 1983–3 July 1983, (BYM 1983/143; WAM 1995/4); 1♂, West Cape Howe National Park, near granite dome above Dingo Beach, B.Y. Main, 4–26 August 1984 (BYM 1984/82); 1♂, West Cape Howe National Park, heath at eastern edge Lake William, B.Y. Main, 25 May 1985–13 June 1985 (BYM 1985/83; WAM 1995/3); 1♂, West Cape Howe National Park, karri/peppermint grove southwest of Lake William, B.Y. Main, 16 April 1987–12 May 1987 (BYM 1987/12).

Other Material

Australia: Western Australia: 1♂, Manjimup, 34°155'S, 116°09'E, 19 May 1976, J.D. Majer, pitfall trap (WAM 93/1698) (tentative identification); 1♂, Shannon River at Nelson Road 34°43'S, 116°21'E, M.S. Harvey and M.E. Blosfelds, 16–18 February 1990 (WAM 92/293) (tentative identification).

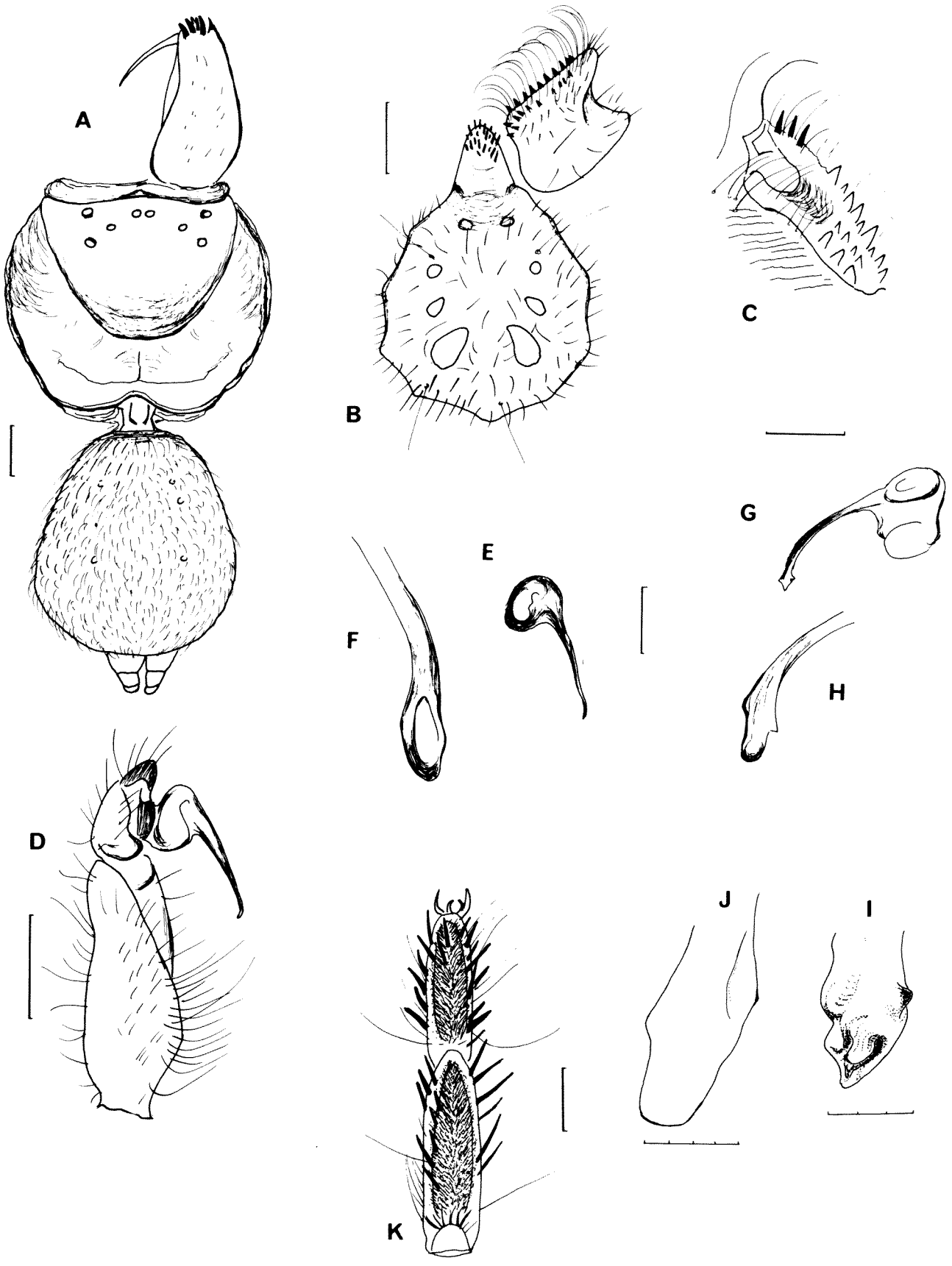

Figure 1 *Missulena torbayensis* sp. nov., male specimens. A–H, K, holotype; I, J, paratypes (BYM 1985/83 and BYM 1983/143). A, dorsal view carapace and abdomen; B, sternum, labium and left maxilla; C, right cheliceral groove; D, left palp, tarsus and tibia, proventral view; E, F, left bulb and embolus tip ventral; G, H, left bulb and embolus tip dorsal; I, J, left embolus tips; I, dorsal (see Fig. 2 B); J, ventral (see Fig. 2D); K, tarsus and metatarsus right leg IV ventral. Scale bars: A, B, D = 1.0 mm; E, G, K = 0.5 mm; I, J = 10 μm; C, F, H not to scale.

Diagnosis

Male spiders small and black with no white "patches" on abdomen; carapace length up to 4.0 mm. Carapace finely rugulose, caput with heavy rugosities. Teeth on inner row of cheliceral groove numerous (7–10) of uneven size, few (3) evenly sized relatively large teeth on outer and 3–4 smaller teeth on inner row. Differs from other small black species (*M. dipsaca* Faulder and *M. rutraspina* Faulder) by having "rasps" on all patellae instead of on patellae III only and by the "extra" pair of faint sigilla in the labial groove; from *M. rutraspina* by the rounded embolus tip and more numerous teeth in cheliceral groove rows and many long, pointed rastellum teeth; from *M. dipsaca* by presence of thin scopula on tarsus I and well developed scopula on tarsi III and IV (see Faulder 1995).

Description

Male (holotype)

Colour, body and legs uniformly black. *Carapace* finely rugulose, caput with heavy rugosities. Carapace length 4.0, width 5.1; caput width 3.9. *Eyes*, anterior width of group 2.8, posterior width 2.6; AME apart 0.1, ALE from AME 1.0, PLE from PME 0.5, ALE from PLE 0.3. *Sternum and labium* length 3.9, labium 1.3, sternum width 2.8. A pair of faint sigilla in labial groove and three discrete pairs with posterior pair the largest and pear shaped. Labium with about 20 pin-like cuspules in apical third. *Maxillae* with dense line of pin-like cuspules on anterior margin extending onto rest of maxillary lobe. *Chelicerae* heavily rugulose, with transverse ridges on outer faces. Rastellum, about eight long pointed teeth on low mound. Groove with large teeth on both margins; (right) 9 unevenly sized prolateral (inner), 3 evenly sized retrolateral (outer) and 4 smaller teeth in intermediate row; (left) 10, 3, 4 respectively. *Legs*. Spination of legs I and IV. I, tarsus rv 4, v 3, pv 3; metatarsus rv 3, v 5, pv 7, tibia rv 4, v 6, pv 1 large apical spine. Prolateral rasp (or "rastellum") on all patellae, very dense (at least 30 spines) on patella I, less dense (about 8) on II, very dense (at least 30) on III, less dense (about 25 short spines) on IV. *Scopulae.* I, a few sparse hairs on tarsus, II, absent, III and IV well developed scopula on tarsus and metatarsus. *Tarsal claws.* Teeth on paired and median claws. Right side. I, P 5, R 3 (distal tooth bicuspid), median 2. II, P 5, R 5, median 3. III, P 4, R 4?, median 2. IV, P 5, R 3, median 1. *Genital area* with about 40 pronounced fusules. *Palp bulb* typical of the genus, that is with a long tapering embolus. Embolus tip viewed ventrally, spoon shaped and rounded in outline; dorsally with small lateral processes (Figures 1 G–J and 2 A–D).

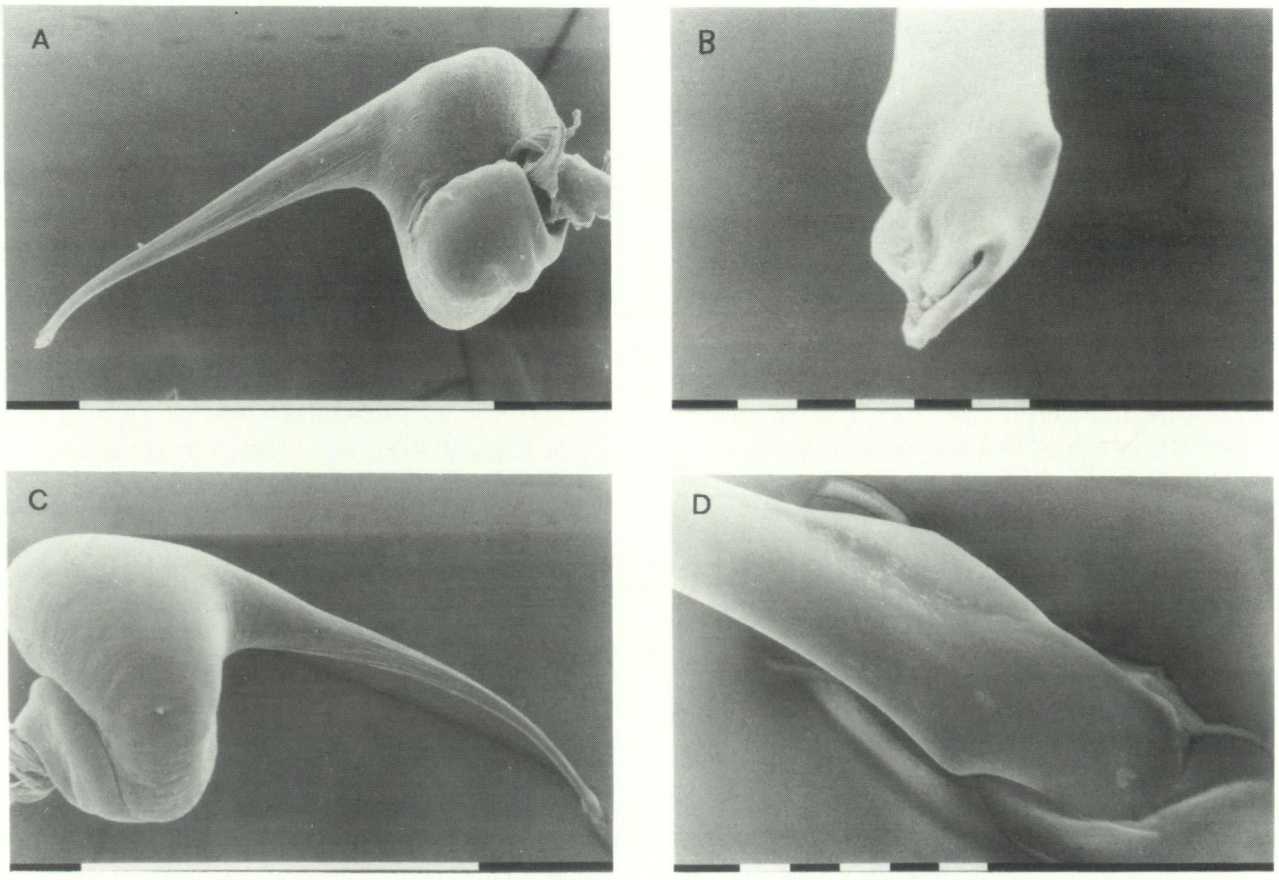

Figure 2 *Missulena torbayensis* sp. nov. bulb and embolus of paratypes. A, B, dorsal (BYM 1985/83) see Fig. 1 I; C, D, ventral (BYM 1983/143) see Fig. 1 J. Scale bars: A, C = 1.0 mm; B, D = 10 µm.

Table 1 *Missulena torbayensis* sp. nov., leg dimensions, holotype male. Tibial index = 100 X width of patella/length of tibia +patella (Petrunkevitch 1942).
Leg formula (length of leg divided by length of carapace):
1/2.7, 4/2.62, 2/2.25, 3/2.15

	F	P	Ti	Mt	T	Total
I	3.3	1.8	2.3	2.2	1.2	10.8
II	2.8	1.4	1.8	1.8	1.2	9.0
III	2.6	1.8	1.2	1.8	1.2	8.6
IV	3.2	1.9	2.0	2.1	1.3	10.5
Palp	2.8	1.6	2.4	–	1.0	7.8

Width of patella I at knee = 0.4; tibial index = 19.51
Width of patella IV at knee = 0.8; tibial index = 20.51

Variation

There is some variation in body size and all meristic characters such as leg spination, maxillary and labial spinules and teeth on groove of cheliceral fang. Variation of carapace length/width and numbers of teeth on inner, median and outer rows of right/left cheliceral groove of specimens additional to holotype from Torbay/West Cape Howe: 3.4/4.1; 8, 3+1minute, 3/7+several minute, 3, 3 (BYM 85/83); 3.5/4.4; __ (BYM 83/143); 3.5/4.6; 8, 4, 3/9,3,3 (BYM 84/82); 3.8/4.8; 9, 3, 3/7, 3, 4 (BYM 87/12).

BIOLOGY

Habitat

All the Torbay and West Cape Howe sites from where the spiders were collected are damp, shaded situations, although the ground may be dry on the surface during summer. The Rutherwood Road reserve is a mixed jarrah/redgum woodland with shrubby, close undergrowth. The pitfall traps were sited along a permanently shaded drainage course which although lacking defined banks is wet in the winter with some surface water. The granite knob above Dingo Beach provides runoff into a scrubby paperbark swamp. The Lake William heath site is along a gentle slope down to a creek which runs vigorously in the winter and its broad, flat bed is wet enough to provide habitat mounds for pitcher plants (*Cephalotus follicularis*). The other West Cape Howe site is a small karri forest grove in a gully which drains into the southwest side of Lake William. It is likewise permanently damp and the heavily littered ground is deeply shaded with a thicket of acacias, reeds and other shrubs.

Phenology

All the Torbay/West Cape Howe specimens were collected during late autumn/winter from pit traps which were permanently open for at least 18 months. Similarly the Manjimup specimen was collected in a pitfall trap during winter. Hence it is deduced that like most other species of *Missulena* the species mates during the autumn/winter. The Shannon River specimen, although collected in February was described as entangled in an amaurobiid web. As the specimen was dead and dry it may have been in the web for several months (M.S. Harvey, pers. comm.)

The lack of red or blue colouring of males of this species is of interest in relation to the habitat, that is, dark "closed canopy" situations. It is presumed that males, like most other species, wander during the daytime. It is probable that the bright colours of open habitat species are a defence against vertebrate predators and I postulate that such colouration mimics offensive insects such as mutillid wasps, although no specific models have been identified. Coyle and Shear (1981) suggested that the diurnally wandering males of *Sphodros* species, which are similarly brightly coloured may "have evolved a defensive mechanism of generalized wasp-ant mimicry in response to selection pressure from visual vertebrate predators". Possibly the species of *Missulena* with entirely black males such as that of the species described here, are confined to habitats with low, dense vegetation where disruptive or warning colours would have no significance.

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