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## Spiders of the *mungaich* group from Western Australia (Araneae: Salticidae: Euophryinae: *Maratus*), with one new species from Cape Arid

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**Abstract.** Two of the five previously known species in the *mungaich* group of the genus *Maratus* (*M. mungaich* and *M. sarahae*) are compared with respect to external features and the courtship behaviour of males. A new, sixth species (*M. avibus*) within this group is also described.

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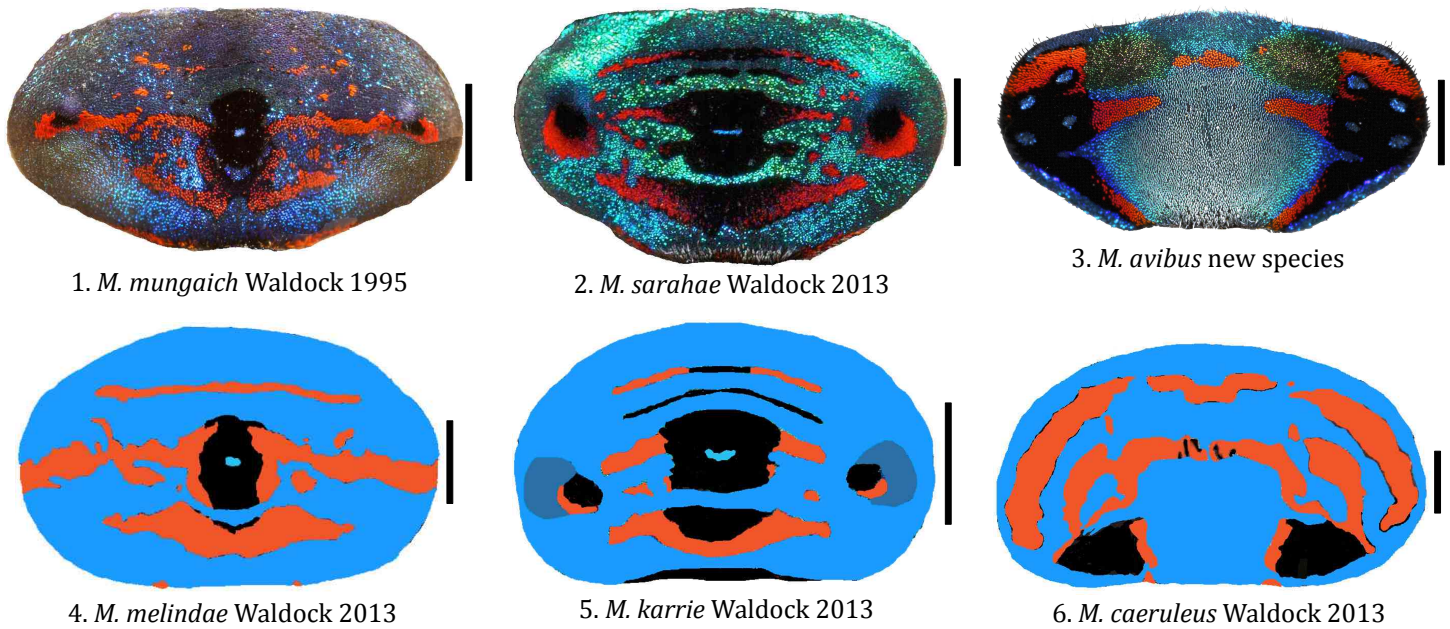
In our previous examination of Australian peacock spiders (*Maratus* Karsch 1878) from the Peckham collection at the Harvard Museum of Comparative Zoology, we recognized an undescribed species ('Darlington's Peacock Spider') collected by P. J. Darlington in 1931 (Hill & Otto 2011). Subsequently, we referred to this spider as '*Maratus* species A', and grouped it with a related spider from Bluff Knoll (Otto & Hill 2011b). Later (Otto & Hill 2012b), we compared the Bluff Knoll spider to the closely related *M. mungaich* Waldock 1995. Waldock (2013) separated Darlington's Peacock Spider (now *M. karrie* Waldock 2013) from the related spider first collected at Bluff Knoll by David Knowles (now *M. sarahae* Waldock 2013), and also named two more species within the '*Maratus mungaich* species-group'. Here we describe a sixth representative of the *mungaich* group from Cape Arid. We also reorganize and update nomenclature presented in our earlier comparison of *M. sarahae* with *M. mungaich* (Otto & Hill 2012b). Žabka (1991, Figure 20, p. 33, not #138, p. 40) published a photograph of a member of this group that cannot now be identified to species, as noted by Waldock (2013). We have included an appendix (Appendix 1) to this paper to provide an updated list of known species of *Maratus*.

### *Maratus avibus* new species

**Type specimens.** The holotype male (♂#1) and two paratype males (♂#2, ♂#3) were collected near the ruins of the old 'Hill Springs' homestead at Cape Arid National Park in Western Australia (33°58'12.3"S, 123°13'15.6"E, 15 OCT 2013, Jürgen Otto and David Knowles coll.). All will be deposited in the Western Australian Museum, Perth.

**Etymology.** The species group name (*avibus*, Latin, noun in apposition to the genus name, English translation *birds*) refers to the appearance of two facing birds on the extended opisthosomal fan of males.

**Diagnosis.** Only one other member of the *mungaich* group lacks a dark central spot or patch on the dorsal opisthosoma or fan of the male, *M. caeruleus* Waldock 2013, a species known from two specimens collected on Middle Island (Recherche Archipelago). The distinctive pattern of scales on this fan, including patches that resemble a pair of birds facing each other, readily distinguishes *M. avibus* from that species (Figure 1). Waldock's (2013) measurement (7.89 mm length excluding spinnerets) would make *M. caeruleus* a much larger species than *M. avibus*, although this difference is not so significant if the scale bars in her drawings are correct.

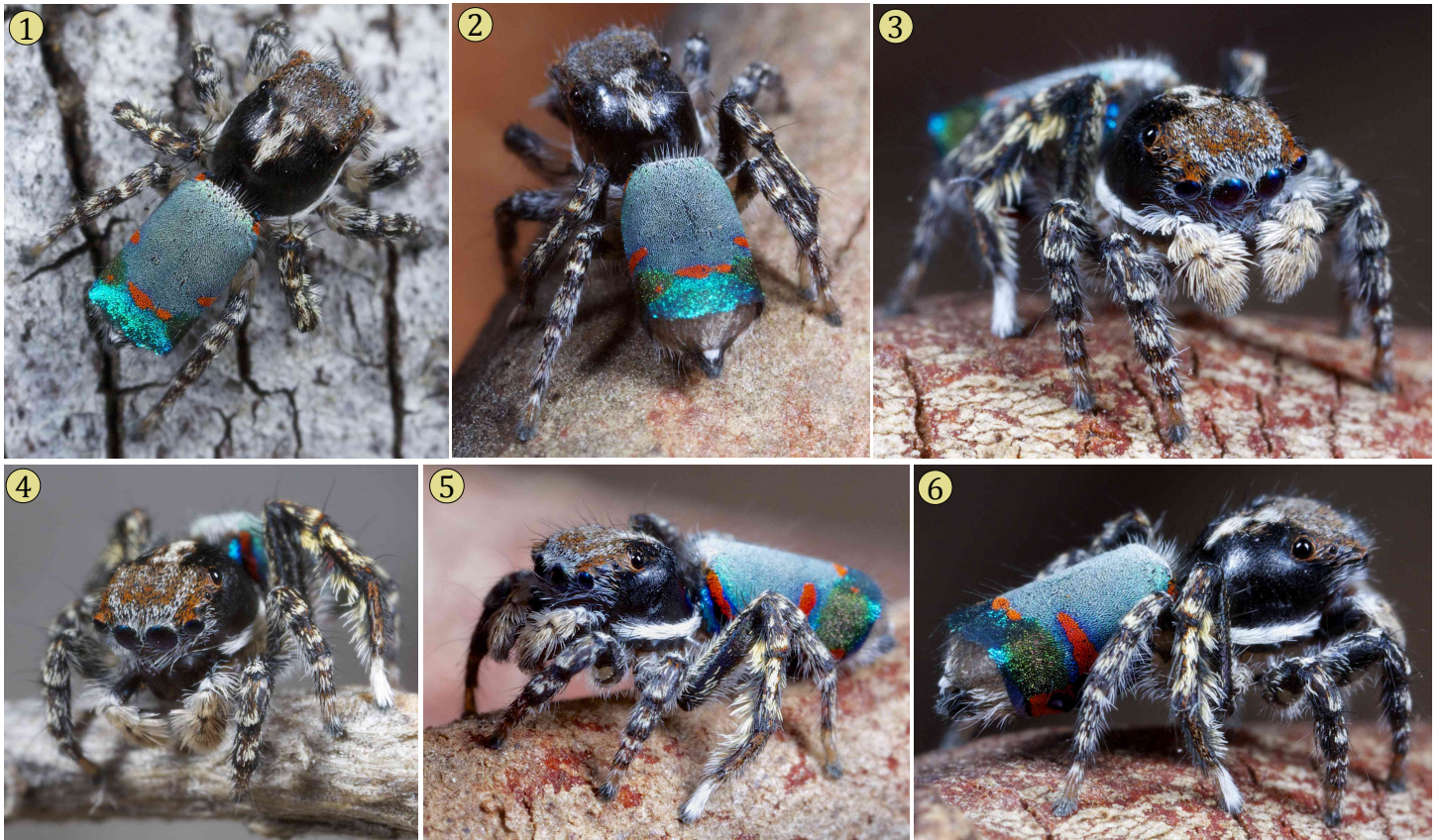


**Figure 1.** Photographs (1-3) and approximate drawings (4-6) of the extended male opisthosomal fan of species in the *mungaich* group of the genus *Maratus*. Photographs show fans of living spiders. Drawings are based on descriptions (Waldock 2013) or, in the case of *M. karrie*, on specimens collected by Darlington that we examined. Waldock described the iridescent scales of these spiders (blue in drawings 4-6) as 'bright blue to rose-gold' under halogen lights, and did not distinguish the appearance of living animals from specimens under alcohol. Our examination of the scales of *M. karrie* (Figure 14; Hill & Otto 2011), as well as photographs of the *M. caeruleus* holotype, suggest that the colour of the iridescent background in these drawings is similar to that shown in the photographs. Each scale bar = 1.0 mm. Scale bars associated with each photograph are based on our records. Scale bars associated with each drawing are based on the length of each respective spider in Waldock's (2013) text description and generally do not agree with the scale bars in her figures.

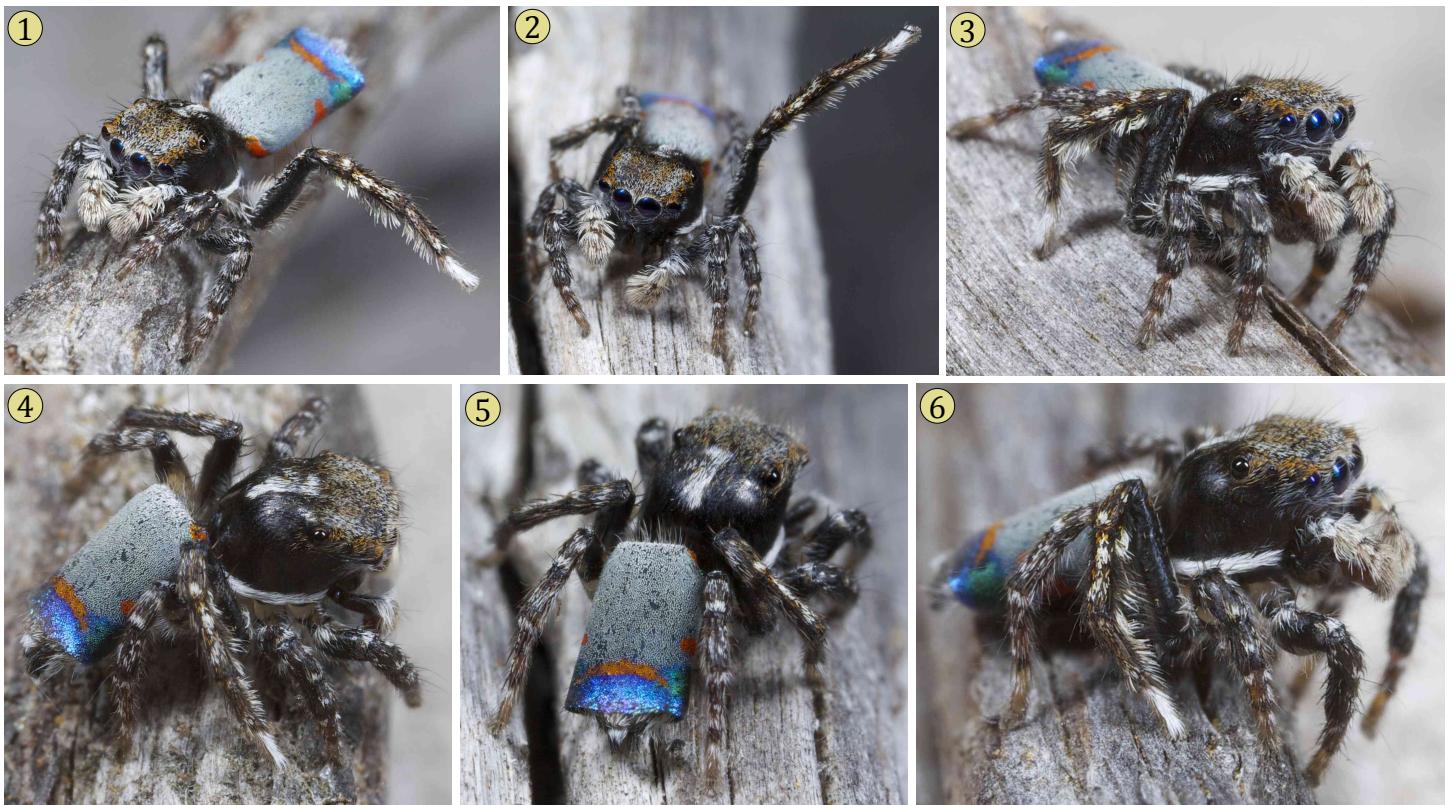
*Description of male* (Figures 2-6). The holotype and two paratype specimens range from 4.44-4.50 mm in body length, not including the spinnerets. With the protruding spinnerets, the holotype specimen is 4.66 mm in length. The carapace, except for scale or setal fields, is glabrous and dark black-brown (more black in life). The chelicerae are also dark black-brown, of average size for the genus. Long white setae cover the clypeus, extending over the median and down, above the top of the chelicerae, from both sides. The eye region is covered with grey scales, except for red-brown scale bands at the lateral margins, and a more-or-less distinct 'm' shape comprised of red-brown scales at the center, with its base at the line between the rear margins of the PLE (Figure 2:3,4). The PME are closer to the PLE than to the ALE. Behind the eye region, an irregular median band of white setae extends about half-way to the rear margin of the carapace, surrounded on either side by scattered red-brown scales. A thick marginal band of white scales is present at each lateral margin of the carapace.

The opisthosoma bears a prominent dorsal plate with extensible flaps that, when not used in display, are wrapped around the lateral sides to meet or to overlap at the venter. At the anterior of this plate long, white, erect setae project toward the carapace. The plate itself (Figure 4), when not expanded, displays a relatively uniform, dense cover of matte to slightly iridescent grey to grey-green scales, with a single more-or-less interrupted transverse bar of orange scales toward the rear. Posterior to the orange band is a band that consists of highly iridescent blue-purple scales that may change colour depending on the direction of incident light. When the flaps of this plate are fully extended in display, more varied markings can be seen. These resemble a pair of birds facing each other, with four bright iridescent blue or purple spots surrounded by black, with a crown of red forming the 'head' of each bird. From each 'head', a black 'neck' bounded medially by red-orange scales extends toward the front, an 'upper beak' comprised of a large, oval patch of iridescent dark green scales extends toward the median, and a 'lower beak' of red-orange scales extends toward the median. The 'neck' of this bird-like figure is surrounded by iridescent blue-purple scales that are more intensely coloured than those in the centre of the fan.



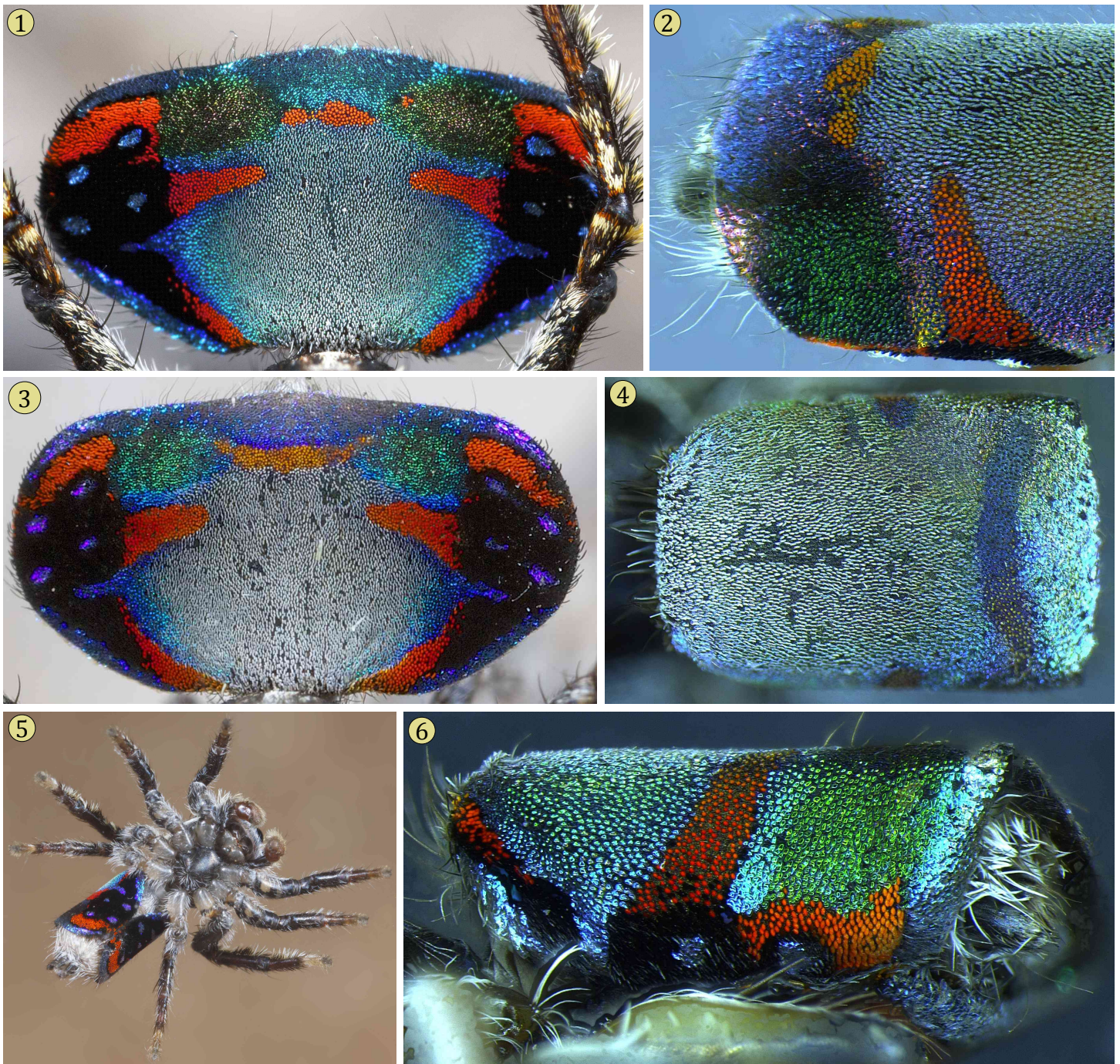


**Figure 2.** Holotype male (♂#1) *M. avibus*. Note the variable extension of the anal tubercle and spinnerets behind the posterior margin of the dorsal opisthosomal plate.



**Figure 3.** Paratype male (♂#2) *M. avibus*. The scale cover of the dorsal opisthosoma of this individual was more grey, contrasting with the bright band of iridescent blue-purple scales at the rear. **1-2**, This spider displayed at a distance by extending and flexing a leg III at the femuro-patellar joint.

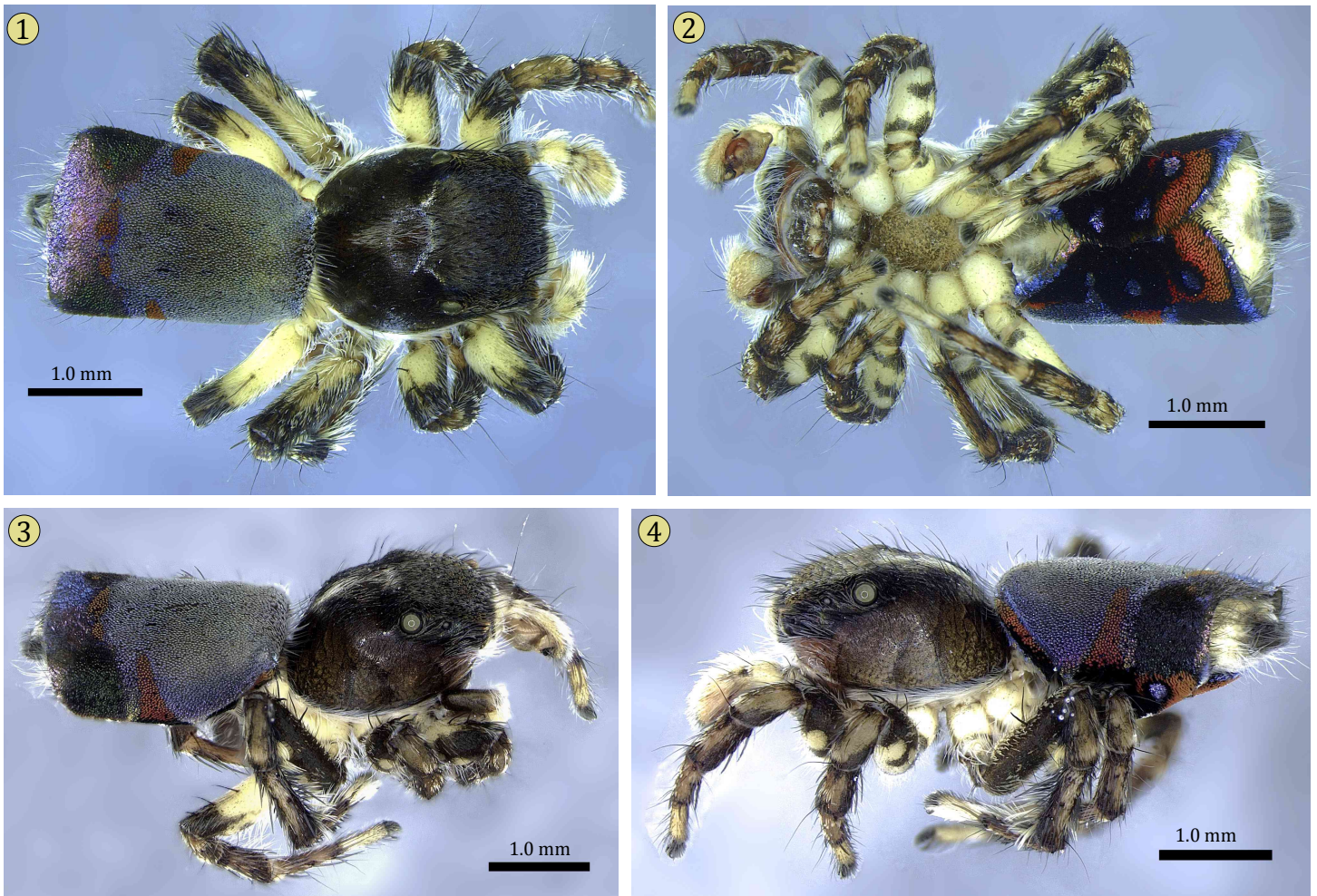




**Figure 4.** Views of the fan or dorsal opisthosomal plate of *M. avibus*. **1**, Extended fan of the holotype (♂#1). Note the hyperextension of femuro-patellar and patello-tibial joints of leg LIII, at right. **2**, Right posterior margin of folded fan of the holotype (♂#1), showing the tightly packed arrays of iridescent and orange or red-orange pigmented scales that give the fan its colour. **3**, Extended fan of paratype (♂#2). **4**, Top of folded fan of a paratype specimen in alcohol (♂#3). The orange scales of the posterior band of this spider are not visible and may have worn off. **5**, Ventral view of living paratype (♂#2). Note how the folded flaps of the fan meet at the venter. **6**, Detail of scales covering the left side of the folded fan of a paratype (♂#3).

The ventral opisthosoma is grey-white, bearing many long white setae. The posterior, including the anal tubercle with its tuft of white setae (typical for *Maratus*), and the grey, normal-sized spinnerets below this, can be inflated or extended well beyond the posterior margin of the fan (Figure 2:2), most likely the result of recent feeding. The sternum is grey (or brown in preserved specimens) with long white setae extending to the rear, the labium and endites, like the coxae, translucent grey (or white in preserved specimens).





**Figure 5.** Four views of the holotype male specimen ( $\sigma$ #1) of *M. avibus*.

Legs I and II are about the same length, much shorter than legs III and IV. Legs III are the longest. Coxae, trochanters, and proximal femura of all legs are translucent or light grey in living spiders, white in preserved specimens, mottled with two or three dark spots. In living spiders, legs I,II,IV are dark brown distally from the proximal femur, ending in light-brown or translucent tarsi, and irregularly ringed with long white setae. The elongated femora of legs III are lighter above, with a fringe of long white setae and covered with white scales, but black in the front and back, and below. Patellae, tibiae, and metatarsi III are fringed below with long white, ivory, or brown setae. On other surfaces patellae, tibiae, and metatarsi III are irregularly covered with ivory and brown scales. Tarsi are densely covered with long white setae, extending dorsally over the foot pads.

Proximal segments of each pedipalp bear long white setae, but mostly the dorsal pedipalp bears a dense cover of long ivory setae. The pedipalp (Figure 6) is typical for the genus. Apart from a 'toothed edge' on the outer ring of the embolus, a feature that could easily be overlooked, there is little to distinguish this species from other members of the *mungaich* group.





**Figure 6.** Left pedipalp of male holotype *M. avibus* (♂#1). As is typical for the genus *Maratus*, the embolus has two apices, visible in a lateral view (6). The RTA narrows to a slightly blunt, darker tip. Note the presence (4, 5) of a distal jagged edge or tooth on the outer apex of the embolus.

*Fan dance of the male.* When placed near a female *Maratus*, a male *M. avibus* would face this female, extend and elevate the opisthosomal fan in a manner typical of the genus, then display in a distinctive manner that has not been recorded for any other species (Figures 7-10). The extended fan was 'bracketed' by the extended legs III, which were held just in front of the fan with tarsi brought together so that the legs almost enclosed the fan as seen from the front. This raised bracket resembled a hexagon, with five sides enclosed, open only at the top (*set position*; Figures 7-8). We recorded two different modes of display with the fan in this position (Otto 2014). In the *slow mode* (Figure 9), the male rotated the fan to one side and then to the other, not moving pedipalps or legs. This began with rotation of the centered fan to one side over  $\sim 0.5$ s, followed by much faster ( $\sim 0.05$ s or less) return to the centered position. Rotation to the opposite side could begin  $\sim 0.5$ s later. Just before the fan was returned to the centered position, it was rotated (or depressed) slightly to the rear, movement resulting in a *flash* or sudden increase in the intensity of light reflected from the iridescent scales of the fan toward the front of the male. The *fast mode* of display (Figure 10) was observed at the onset of an encounter with a female. Here the set position alternated with bouts of rapid vibration of the fan mostly toward the rear, bilateral movement of legs III (pinch), or a combination of the two. Speed of vibration was not measured, but the period of each cycle between set and vibrating positions was  $\sim 0.08$ s. All vibration within each cycle occupied no more than a single 0.04s frame, and these cycles continued in one clip for  $\sim 4$ s ( $\sim 50$  cycles).





**Figure 7.** Positions during fan dance of holotype ( $\sigma\#1$ , 1-6) and paratype ( $\sigma\#2$ , 7-9) male *M. avibus* facing a female. Although this can vary, the elevated legs typically form four sides of a hexagon bracketed the raised and extended fan from the front, just in front of that fan. **1**, Note inflation and extension of the posterior opisthosoma, including display of a patch of bright white setae associated with the anal tubercle above the fan.





Figure 8. Positions during fan dance by a paratype ( $\sigma$ #2 male) *M. avibus* facing a female.

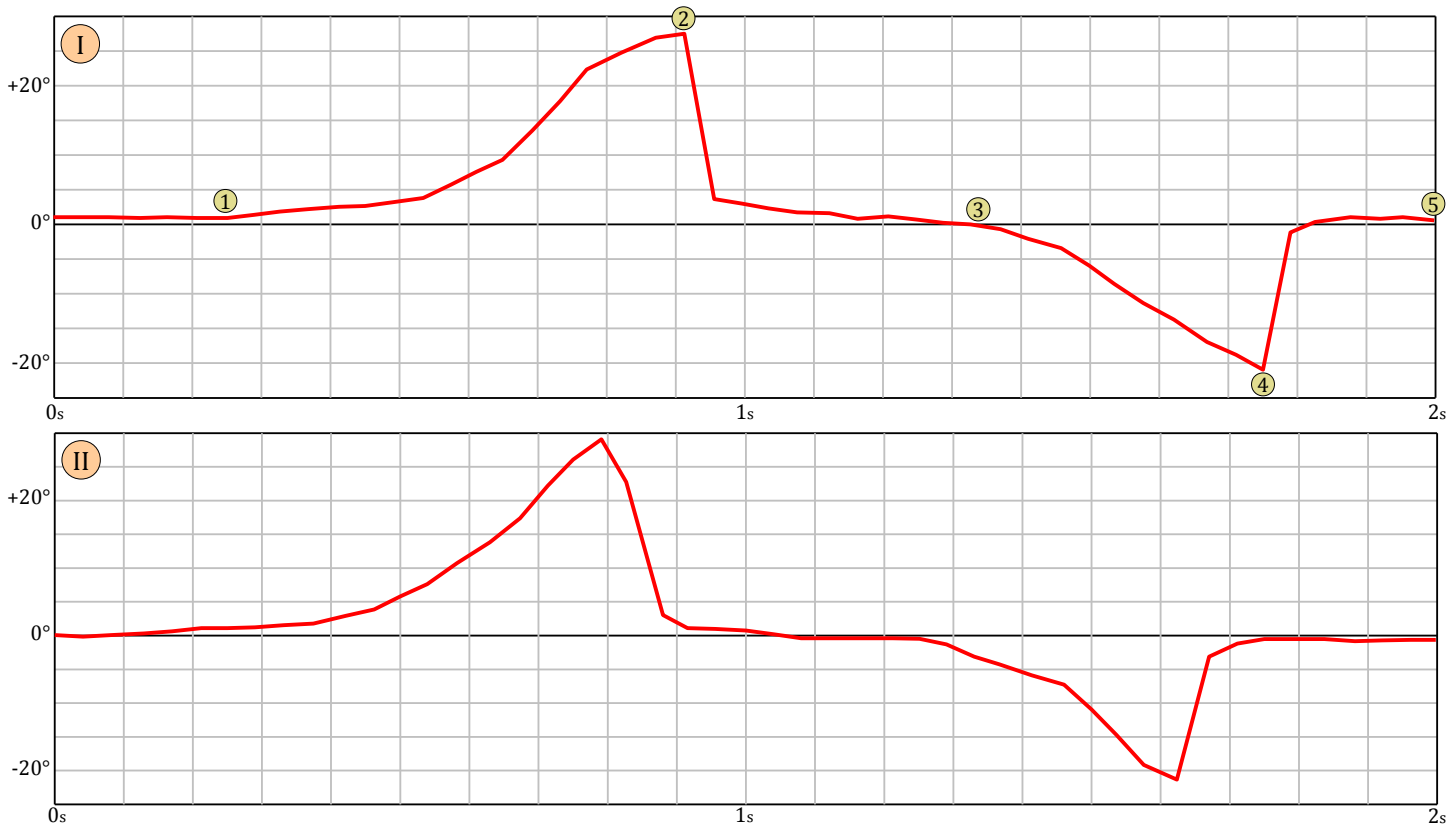
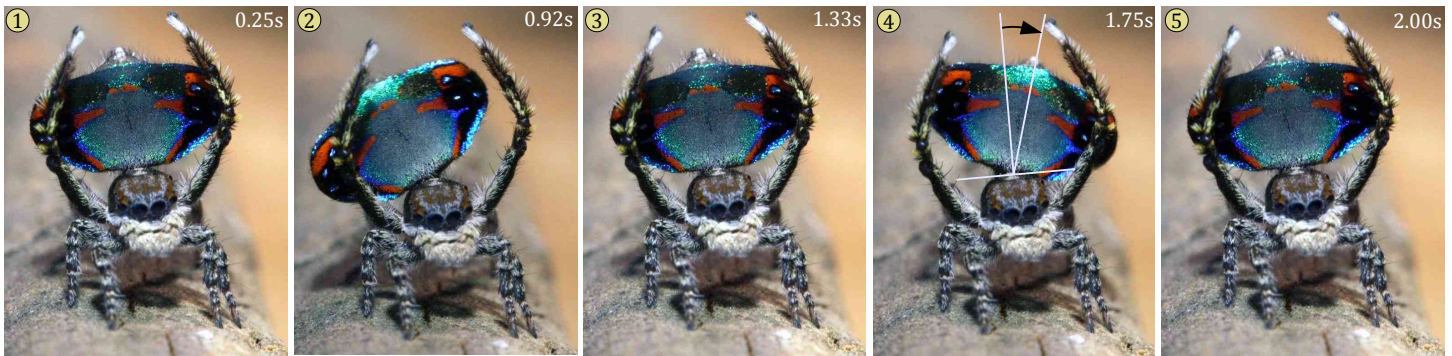
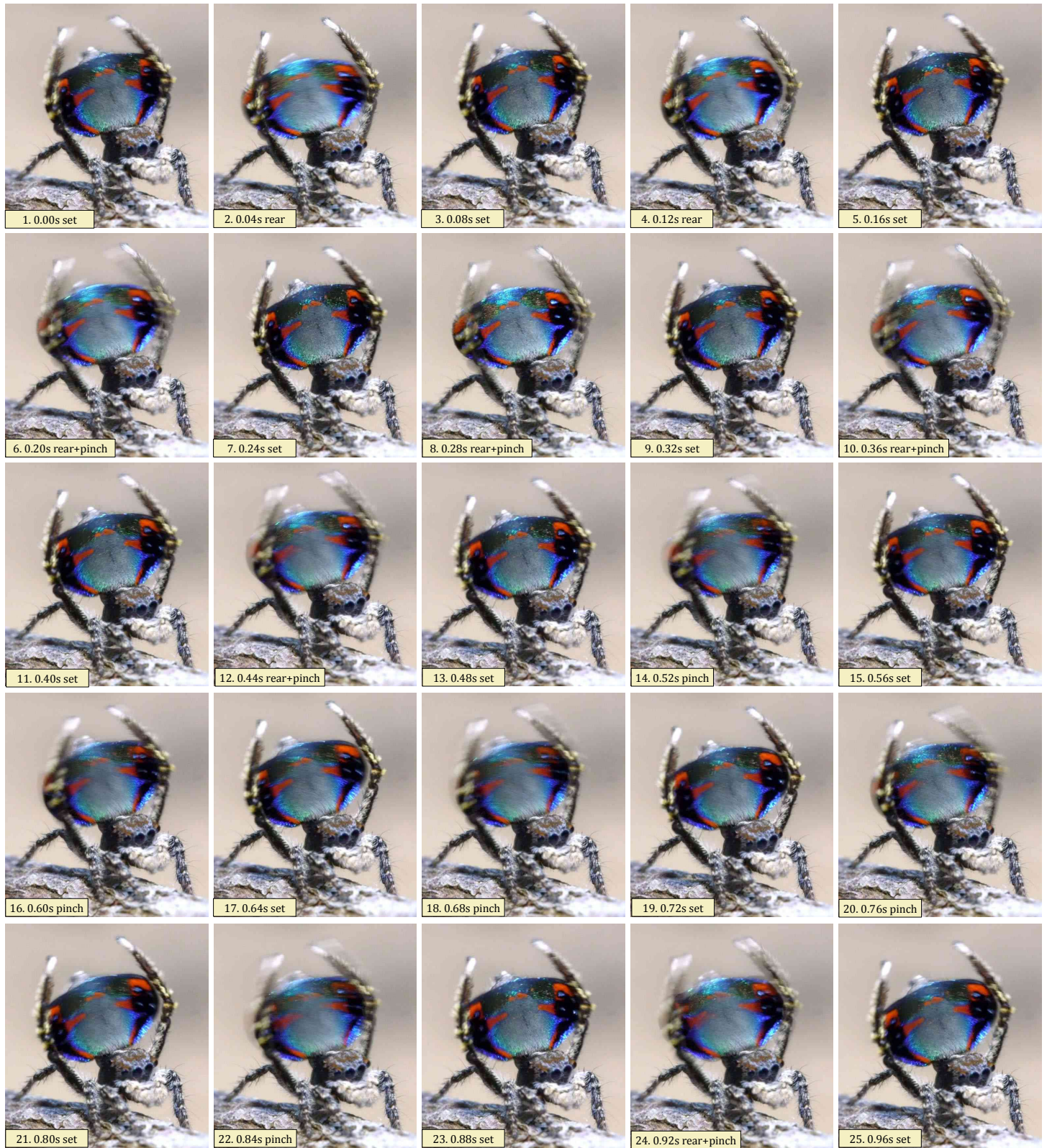


Figure 9. Video study (23.976fps) of slow lateral rotation of fan by the holotype ( $\sigma$ #2) male *M. avibus* facing a female. Two sequences of display (I-II), each of 2s duration, are shown in these charts. Five frames from the first sequence are shown above the charts, and the position of each frame is indicated with a number in the first chart. The convention for measurement of this rotation is shown in frame (4): As viewed from the front, rotation of the fan to the left is positive, and rotation of the fan to the right is negative (indicated on vertical axis). Rotation was about 25° to either side.

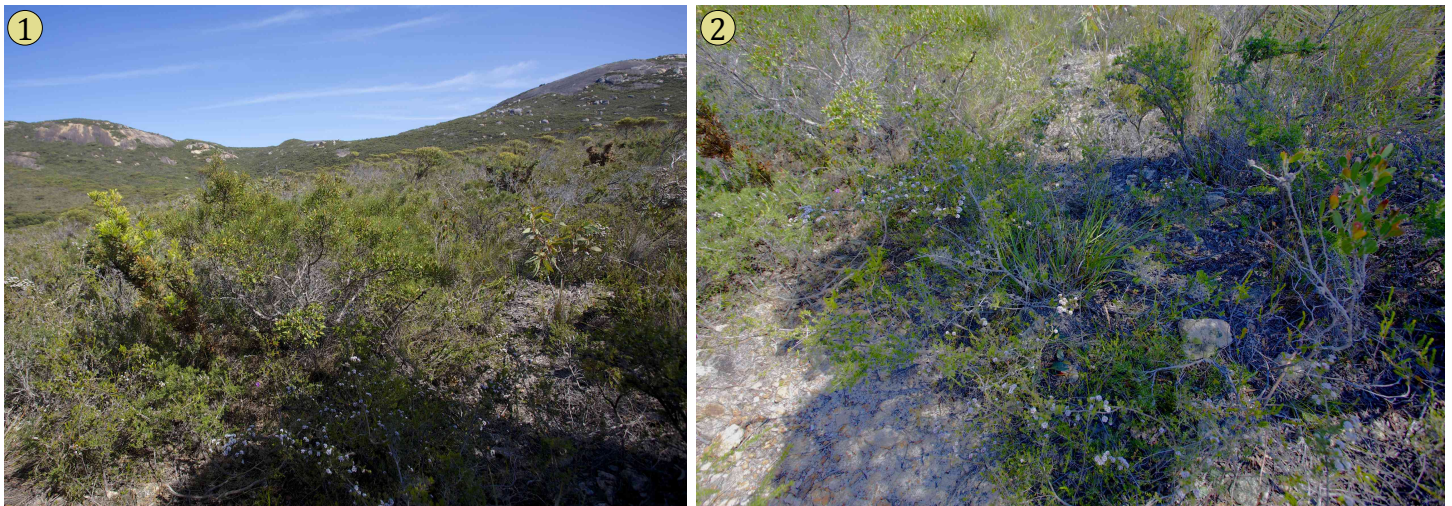




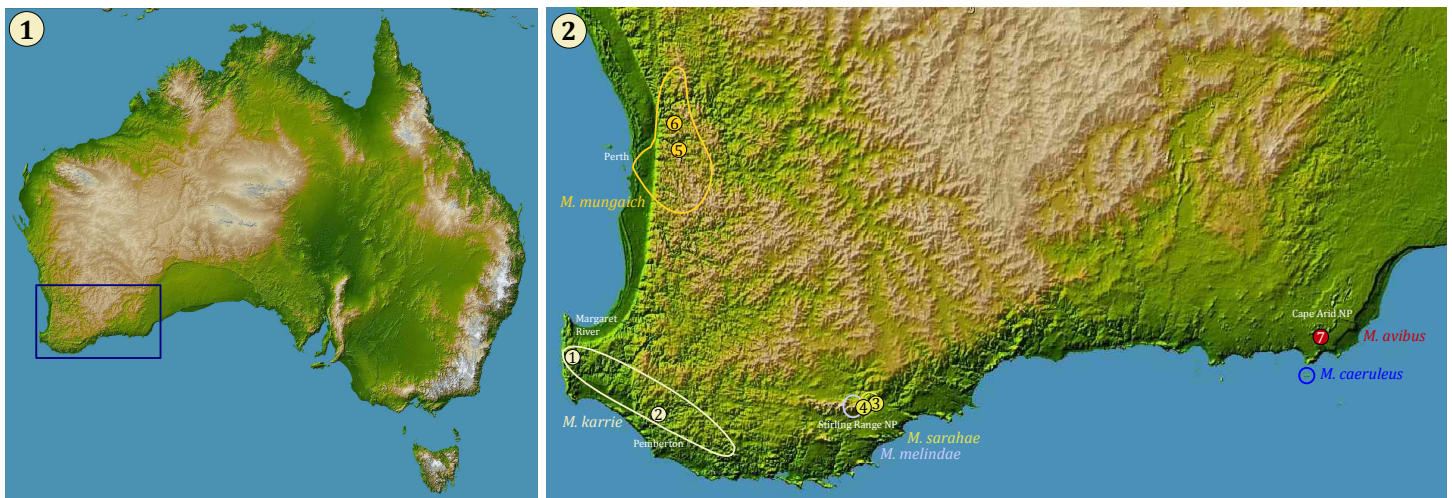
**Figure 10.** Sequential frames from a video study (23.976fps) of the displaying male holotype *Maratus avibus* covering a span of ~1s during a bout of rapid vibration that lasted for ~4s. **1-5**, From a 'set' or starting position the male tilted its extended fan toward the rear then returned it to the set position with a period of ~0.08s. The extent of the rearward movement of the fan can be estimated by the 'flash' of bright blue that appeared at the top of the fan when it was rotated to the rear (frames 2, 4). **5-13**, In this interval the male continued the cycles of rearward rotation of the opisthosoma, but each rearward movement was accompanied by rapid vibration of legs III, alternately closing and opening the gap between the two legs. The speed of this movement could not be measured, but appears as a blur (frames 6, 8, 10, 12). **13-23**, Here cycles alternating the set position with rapid movement of legs III continued, but with little movement of the fan. **23-25**, The male again began to move the fan to the rear during each cycle.



**Habitat and distribution.** These spiders were found on or near the ground at Cape Arid National Park (Figure 11). They are known from only the single, type locality (Figure 12:2, locality 7).



**Figure 11.** Collecting site for *M. avibus* at Cape Arid National Park, located near the Southern Ocean in Western Australia. **1**, Spiders were found in the shaded area in the foreground, beneath the larger shrubs in this area. **2**, Detail of the foreground from (1).



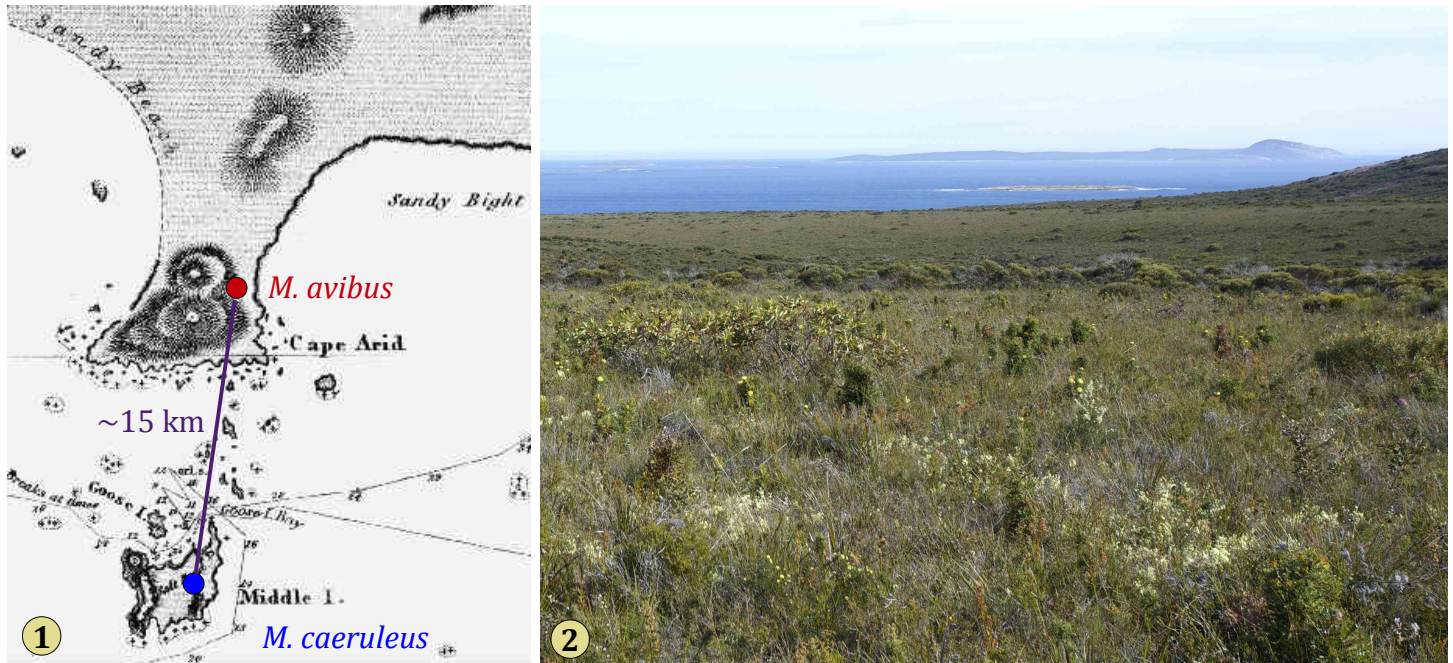
**Figure 12.** Localities where spiders of the *mungaich* group have been reported, all in Western Australia. **1**, Radar topography map of Australia, based on data collected by the *NASA Shuttle Radar Topography Mission*. **2**, Area of interest in the southern part of Western Australia, corresponding to the inset rectangle in (1). Numbers (encircled) correspond to spiders that we have examined, and are described under each of our species accounts. Outlined distributions are based on localities described by Waldock (2013). To date, all species described in this group have an allopatric distribution. Collection from more sites within this area should contribute to our understanding of relationships between the isolated populations represented by these species.

### ***Maratus caeruleus* Waldock 2013**

*Maratus caeruleus* (Figure 1), with a reported male body length of 7.89 mm, is perhaps one of the largest *Maratus* (Waldock 2013, Fig. 25 however depicts a body length ~5 mm). It is known only from type specimens collected on the ground (22 OCT 2008), on Middle Island in the Recherche Archipelago just 15 km from the type locality of the related *M. avibus* (Figure 13). Like the smaller *M. avibus*, this spider lacks a central dark figure on the dorsal opisthosoma. Shallow seas presently separate this Archipelago from the mainland, but these were elevated areas on the mainland during the last glacial maximum (LGM, ~15-20Ka). *M. caeruleus* may represent a case of *island gigantism* (or the *island rule*; Lomolino 2005). Given the small size of Middle Island, a difference in selection based on community composition, as well as the



rapid evolution (*genetic drift*) associated with a small island population (Ellstrand and Elam 1993), may have led to a recent, rapid divergence of *M. caeruleus* from the mainland species *M. avibus*.



**Figure 13.** Cape Arid and Middle Island. **1**, Type localities where *M. avibus* and *M. caeruleus* have been found, superimposed on an old nautical map of the southwestern coast (1802 survey published by Forrest *et al.* 1878). Depths are in fathoms (1 fathom = 1.822 m). Coastlines on this early survey map are only approximate. **2**, View of Middle Island in the Recherche Archipelago (at right rear, in the distance) from Cape Arid. Several smaller islands nearer to the coast can also be seen. Presently Middle Island is separated from the Cape by a shallow strait.

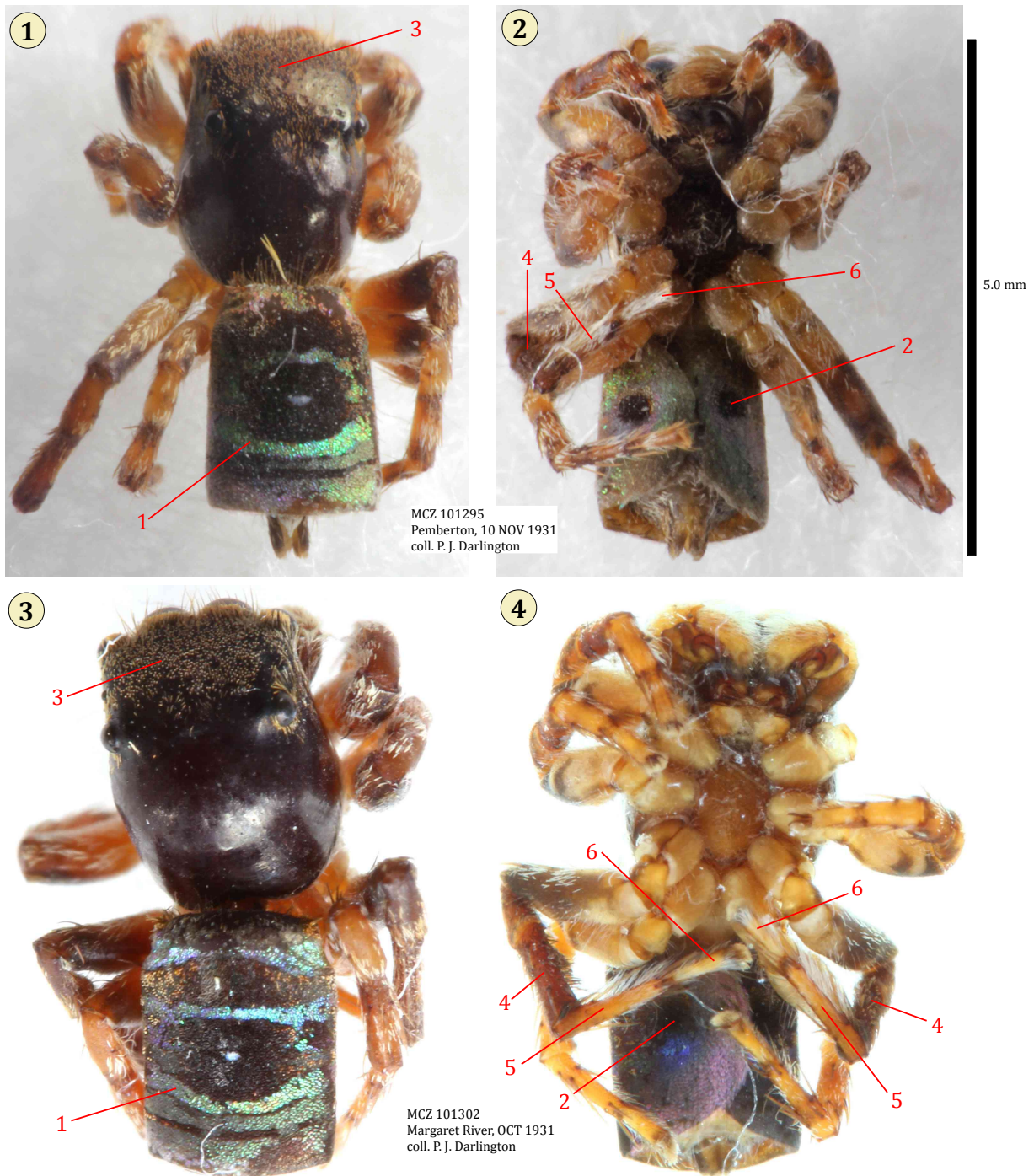
### *Maratus karrie* Waldock 2013

This smaller species (Figure 1) is reported from the southwestern corner of Australia. We have examined specimens collected by Darlington in 1931 from Margaret River (Figure 12:2, locality 1) and Pemberton (locality 2). The pattern of scales on the dorsal opisthosomal plate (fan) is similar to that of *M. sarahae*, but the spider is smaller (Waldock 2013). We have given this spider the common name of Darlington's Peacock Spider (Hill & Otto 2011). Many of its features are intermediate between those of *M. mungaich* and *M. sarahae* (Table 1, Figure 14), but perhaps more like the latter. We have previously considered this variety to be conspecific with *M. sarahae* (Otto & Hill 2011b, 2012b). The distinctive pattern of the fan, including the wide bands of iridescent scales, appears to place these specimens with *M. sarahae*, but some of the characters related to setation are more like those of *M. mungaich*. See Waldock's (2013) description of *M. karrie* for more details.

**Table 1.** Comparison of characters associated with the adult male *Maratus karrie* collected by P. J. Darlington, shown in Figure 14, with *Maratus sarahae* (Bluff Knoll in Stirling Range National Park) and *M. mungaich* (Mt. Dale). Some of the pigments of black setae, like those of red scales or setae, may have been dissolved into the alcohol used to preserve these specimens. The enumerated characters shown here are identified in Figure 14.

character	description	comparison
1	pattern of bands on the dorsal opisthosoma (fan)	clearly like <i>Maratus sarahae</i>
2	large spots on the lateral flaps of the opisthosoma	like <i>Maratus sarahae</i>
3	uniform cover of pigmented setae in optic quadrangle	like <i>Maratus mungaich</i>
4	dark setation of tibiae III	like <i>Maratus mungaich</i>
5	long white setae of metatarsus III	like <i>Maratus sarahae</i>
6	cover of long white setae, no distal dark setae, of tarsus III	like <i>Maratus mungaich</i>
—	body length (~5.0 mm)	intermediate



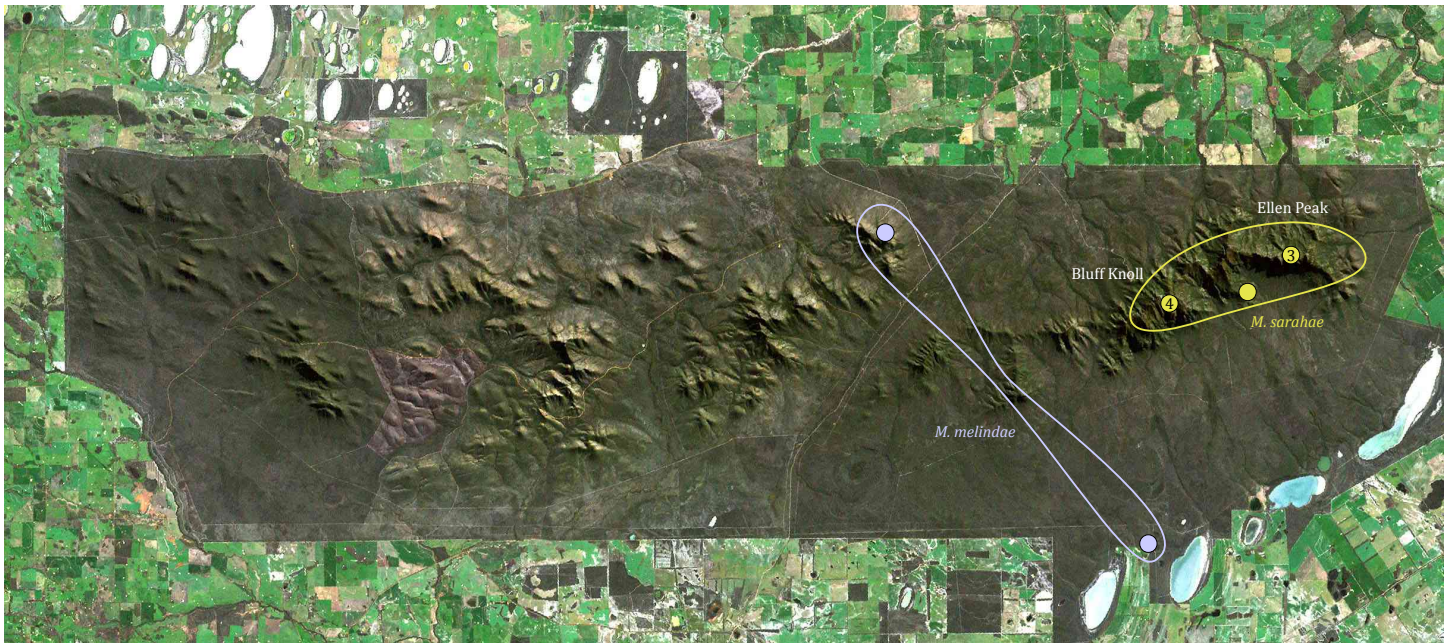


**Figure 14.** Two male *Maratus karrie* (1-2, 3-4) collected by P. J. Darlington in 1931. Enumerated characters are listed in Table 1. To reveal the colours of their setae, both specimens were air-dried for a brief period of time, then quickly returned to an ethanol solution for preservation. Pigments such as those associated with red scales do not survive a long period of immersion in alcohol. Photos by D. E. Hill, released under a [Creative Commons Attribution 3.0 Unported](https://creativecommons.org/licenses/by/3.0/) license.

### *Maratus melindae* Waldock 2013

The pattern of the dorsal opisthosomal plate of *Maratus melindae* (Figure 1) resembles that of *M. mungaich*, and one specimen has previously been associated with that species (Waldock 1995, 2013), but the small black spot on each lateral flap of *M. mungaich* is lacking. This species has been collected at two localities in the eastern part of the Stirling Range National Park, not far from the higher elevations to the east where *M. sarahae* has been found (Waldock 2013; Figure 12:2, Figure 15).





**Figure 15.** Map of Stirling Range National Park in Western Australia, showing known localities where *M. melindae* and *M. sarahae* have been found. Enumerated localities for *M. sarahae* (3, Ellen Peak, Rix, 2007; 4, Bluff Knoll, Otto, 2011) correspond to our earlier records, and are also shown on Figure 11. Other sites are based on Waldock (2013). This park is a unique refuge for many unique plant species. As can be seen, it is surrounded on all sides and thus isolated by cultivated areas at lower elevations. Satellite image courtesy of the NASA Visible Earth Project.

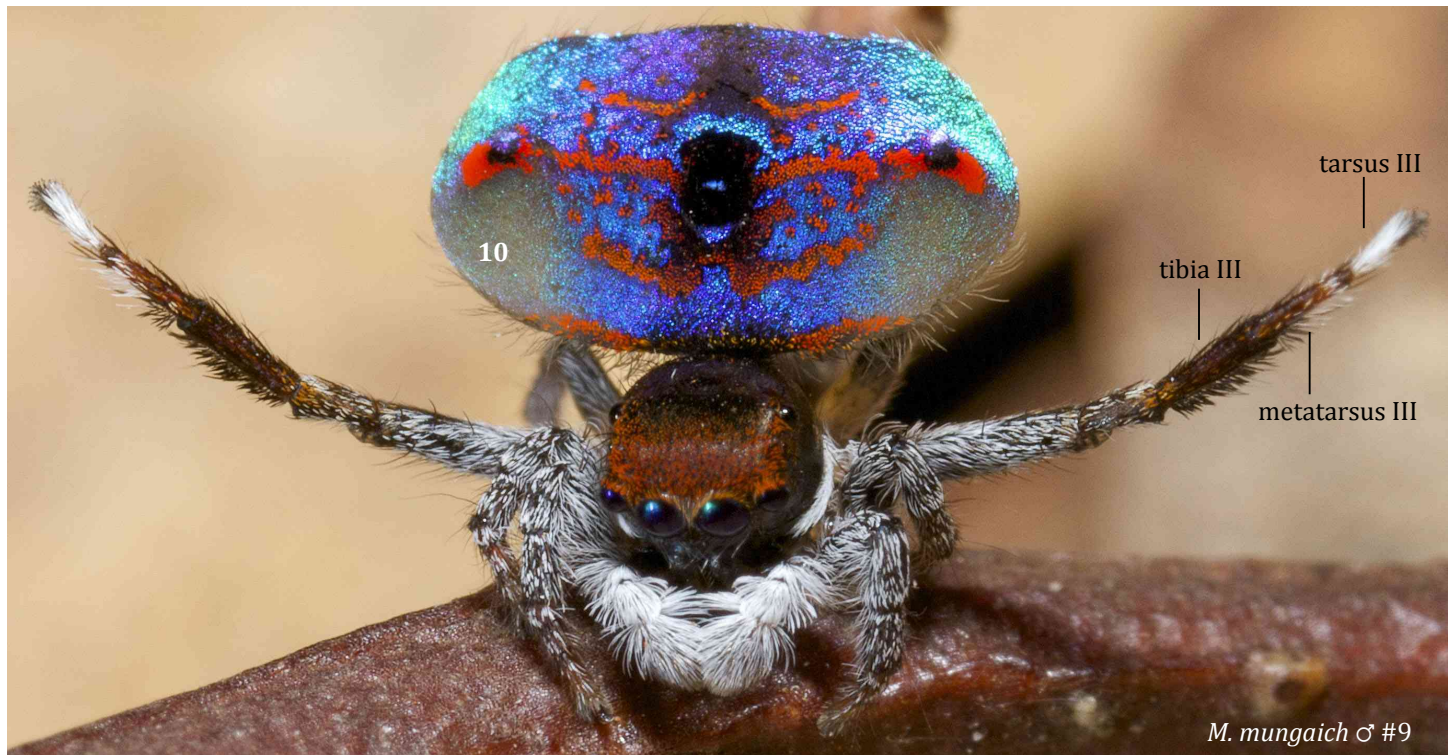
### ***Maratus mungaich* Waldock 1995**

This was the first described species in this group (Waldock 1995), now known only from a relatively small area to the east of Perth (Waldock 2013; Figure 12:2). Jürgen Otto collected most of the *M. mungaich* illustrated here at Mt. Dale east of Perth (S 32° 07' 39.2", E 116° 17' 25.0", elevation ~414 m; Figure 11: locality 5), and additional photographs of this species from the Talbot Road Nature Reserve (Bokhari 2012, Hort 2012; Figure 11: locality 6) have also been examined.

*Field marks for identification of the male* (Figures 16-18). Important features of the male *M. mungaich* are enumerated here and compared with the male *M. sarahae* in the next section. Among the many differences between the two species, the anterior lateral field of iridescent scales that are extensive and usually appear dull green in *M. mungaich* (Figures 16-17: feature 10) are perhaps the most obvious distinction. The carapace of both species has a thick marginal band comprised of white setae. The eye region of *M. mungaich* is covered with relatively bright red-brown setae. Tibia III is dark red-brown, fringed below with uniform black setae. Metatarsus III is dark red-brown to black, and the entire tarsus III is covered with long white, and no black, setae. We have tentatively identified a form that has been consistently found near Mt. Talbot (Figure 17:2) as this species. Since this is not far from Mt. Dale, one suspects that dispersal may be limited in this species, and additional variations associated with local populations may be found in the future.

*Female features* (Figures 19-20). Female *M. mungaich* are, like those of most other *Maratus*, relatively uniform in colouration and difficult to identify when not associated with the males. Waldock's (1995) figure of a paratype female specimen suggests a uniform black eye region in this species, although she describes a covering of setae as we have observed (Figure 19). With respect to the structure of the epigynum, our specimens varied but generally differed from this paratype description with respect to the shape of the spermathecae (oval but circular in outline in the paratype), and the relative separation of the fossae (greater in the paratype). This suggests that, in the absence of a study of individual variation, one must not depend too much on the *details* of epigynal structure for identification.



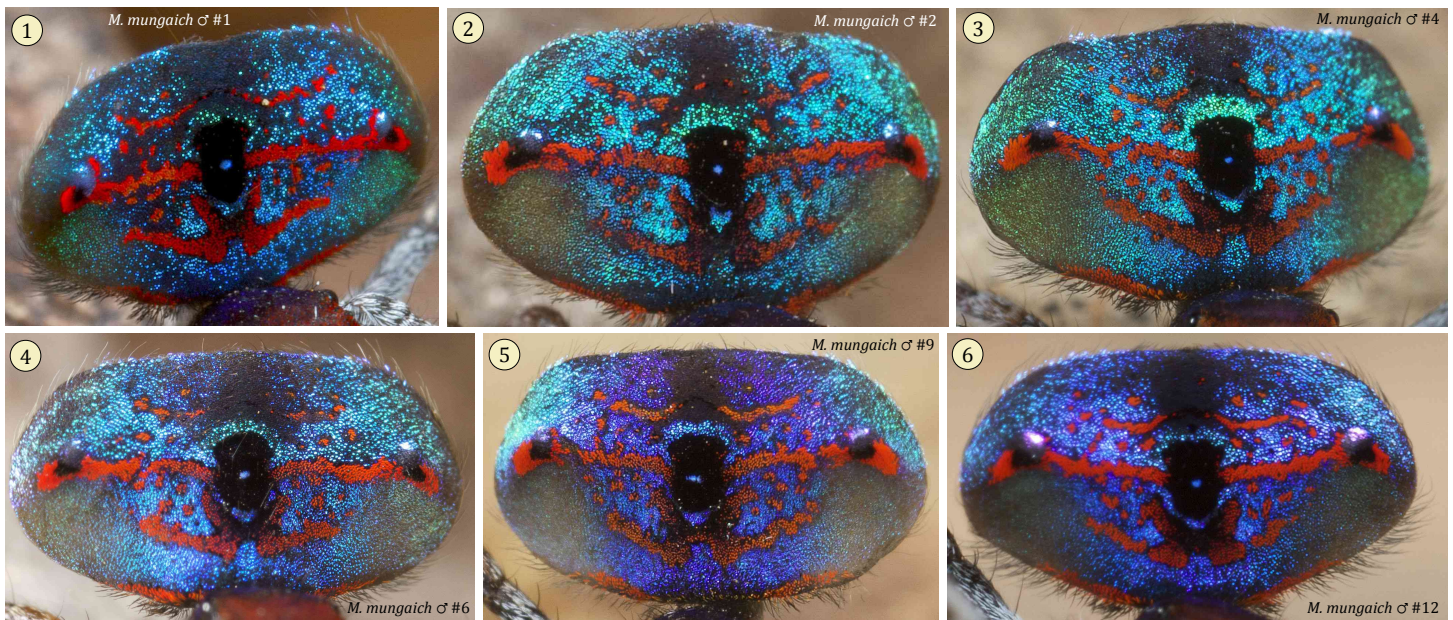


**Figure 16.** Front view of a male *M. mungaich* as it displayed to a female, with legs III extended and elevated fan. A large patch of dull green, iridescent scales on each anterior lateral margin of the fan is a useful feature for identification of this species, at least in our specimens. Other useful features include the abundance of white scales on the legs (except for the distal legs III) and pedipalps, the uniform cover of red-brown scales in the eye region, and the white tarsus III offset by the dark, red-brown to black appearance of the tibia and metatarsus III.

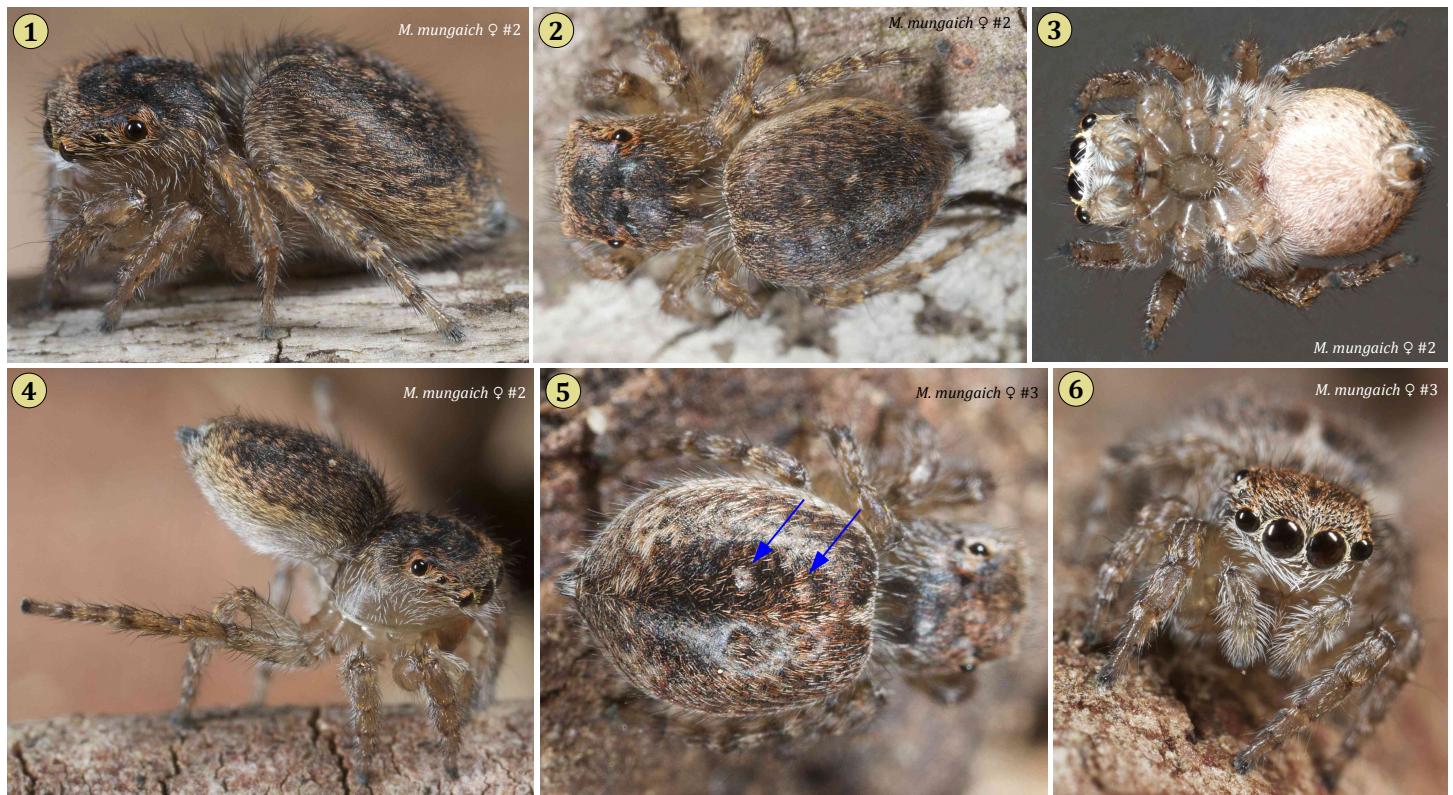


**Figure 17.** Detailed appearance of the very wide fan of male *M. mungaich*. **1**, Expanded fan of a male *M. mungaich* from Mt. Dale. **2**, Retracted or folded fan of a male *M. mungaich* from the Talbot Road Nature Reserve (photograph © Jean and Fred Hort, used with permission). Specimens recently observed by both Bokhari (2012) and Hort & Hort (2012) from this area showed this pattern with two small blue spots at the center of the black central shield, with a more extensive group of red-orange scales bordering that shield toward the rear. Numbered features (1-12) are described and compared with corresponding features of *M. sarahae* in the next section.



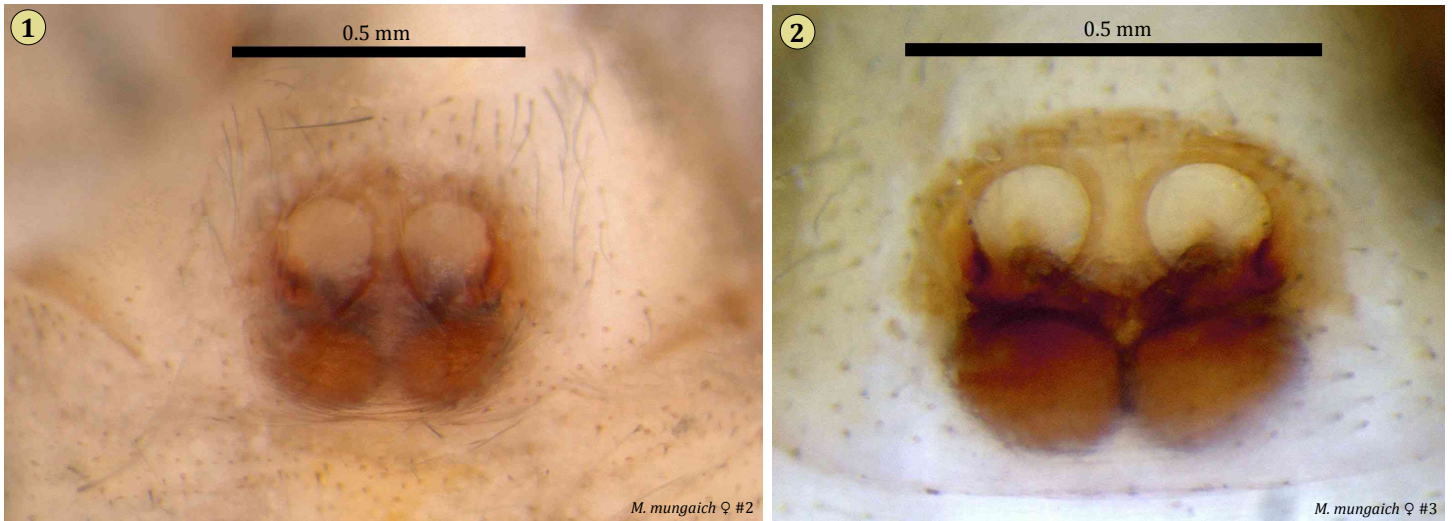


**Figure 18.** Expanded fans of six different *M. mungaich* from Mt. Dale. Much of the difference in observed colour of the iridescent background scales was due to either the relative direction of incident and reflected light, or to differences in moisture and humidity. Apart from the fairly simple and consistent black 'shield' with light blue center in the middle of this pattern, the complexity of the figures comprised of pigmented red scales on a background of iridescent scales allows individual spiders to be identified with ease.



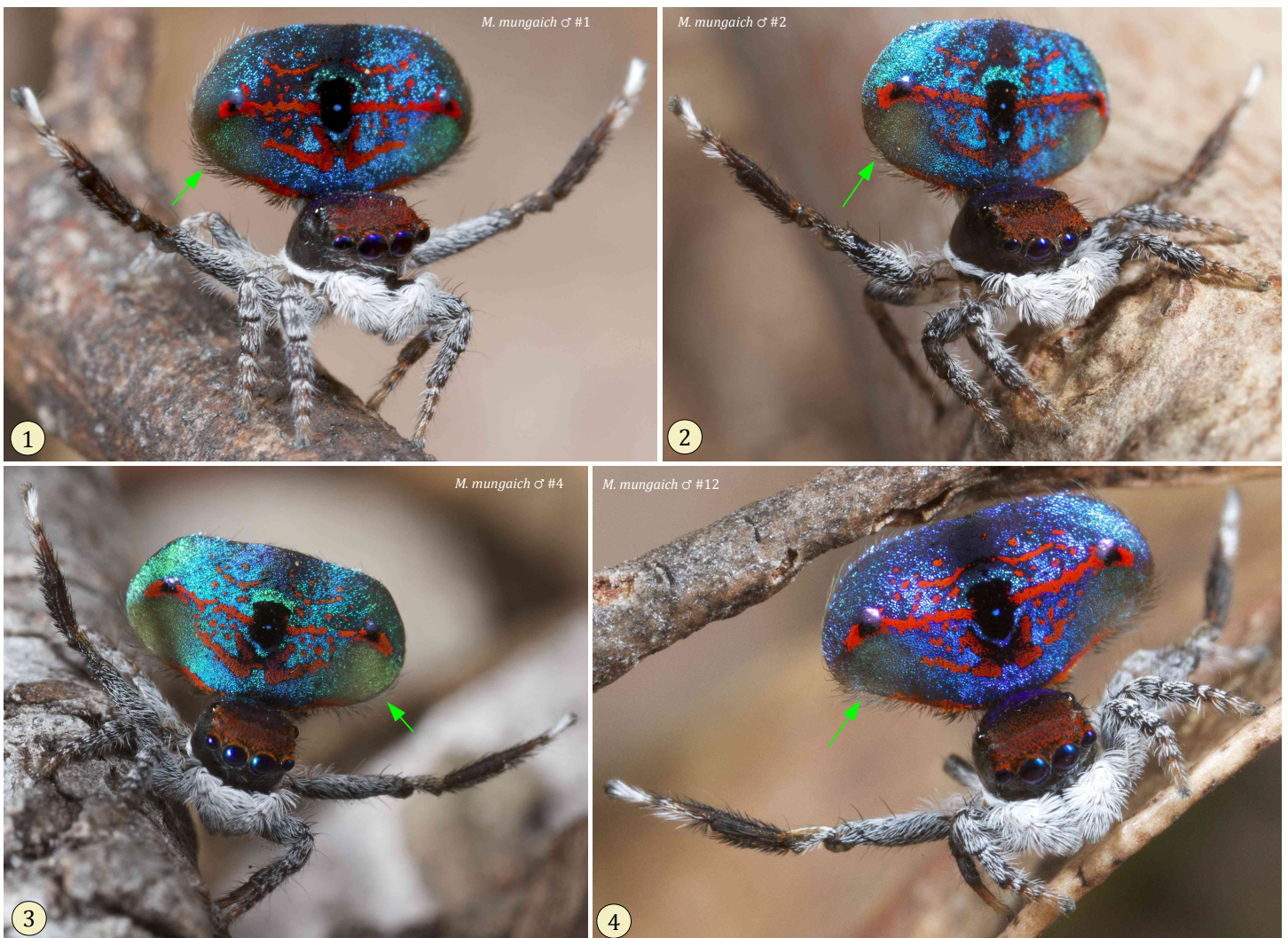
**Figure 19.** Views of two different female *M. mungaich* from Mt. Dale. In (2), the converging brown bands at the rear of the carapace as described by Waldock (1995) can be seen, but these are not distinct. A covering of setae is more complete around the anterior and lateral margins of the eye region, but the lack of setae toward the rear of the eye region in some specimens may be due to wear. Females may have a pair of lighter-coloured anterior spots on the dorsal opisthosoma (5, arrows), but again this feature can be indistinct. Compared to *M. sarahae* females, the legs may be somewhat lighter in colour.





**Figure 20.** Epigyna of two different female *M. mungaich* from Mt. Dale. Note variation in the separation of the fossae, the relative size of the large posterior spermathecae, and even the degree of sclerotization of the associated ducts. Spiders of the genus *Maratus* exhibit little variation in the general features of the epigynum, but differ in details.

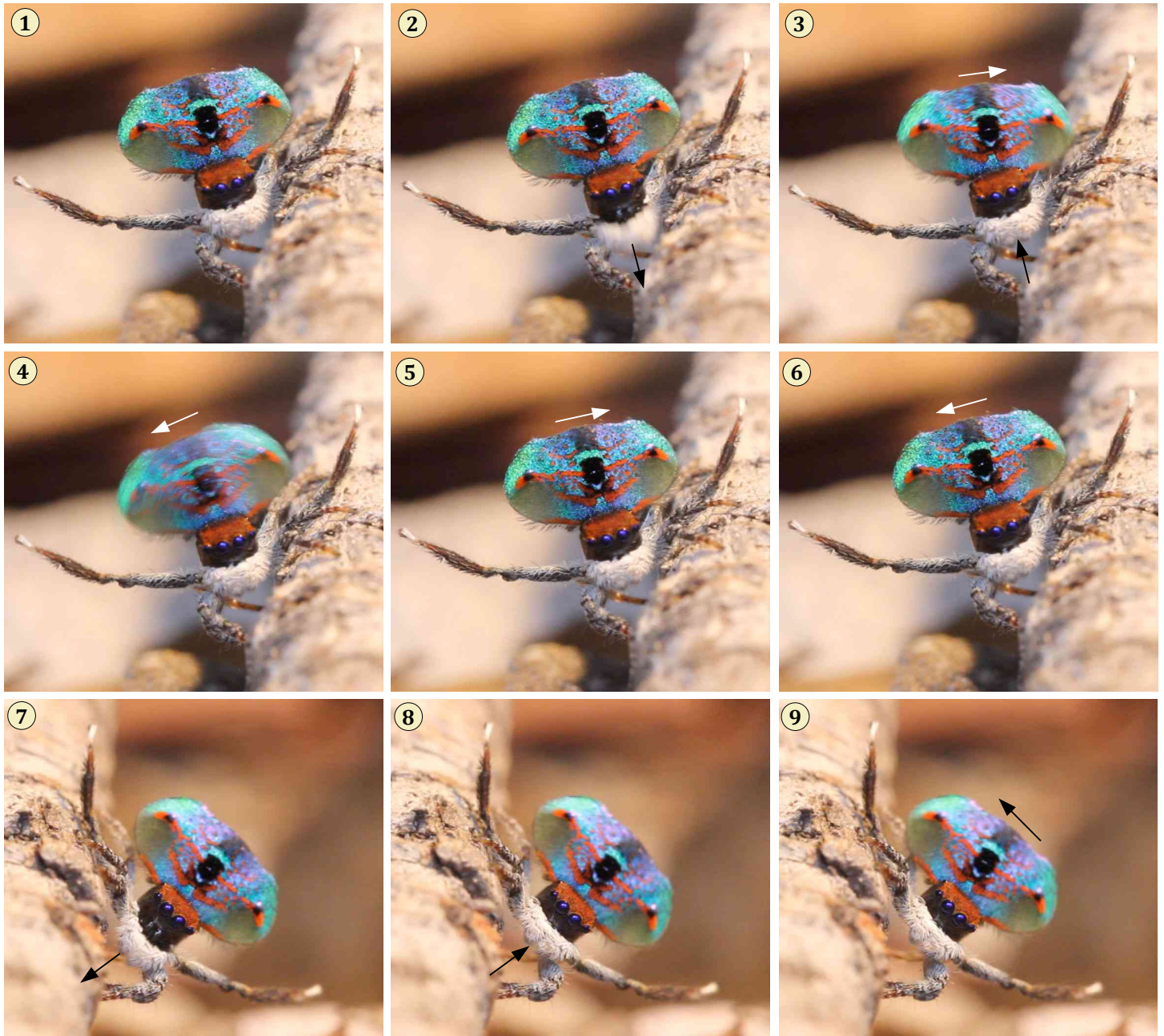
*Male courtship display* (Figures 21-22). Male *M. mungaich* often side-step as they hold legs III in the extended position shown here, and rotate the fan from side to side.



**Figure 21.** Fan dance of four different *M. mungaich* from Mt. Dale. Note the wide separation of legs III, as the fan was rotated from side to side. The darker areas of the anterior lateral margins of the fan are highlighted with arrows.



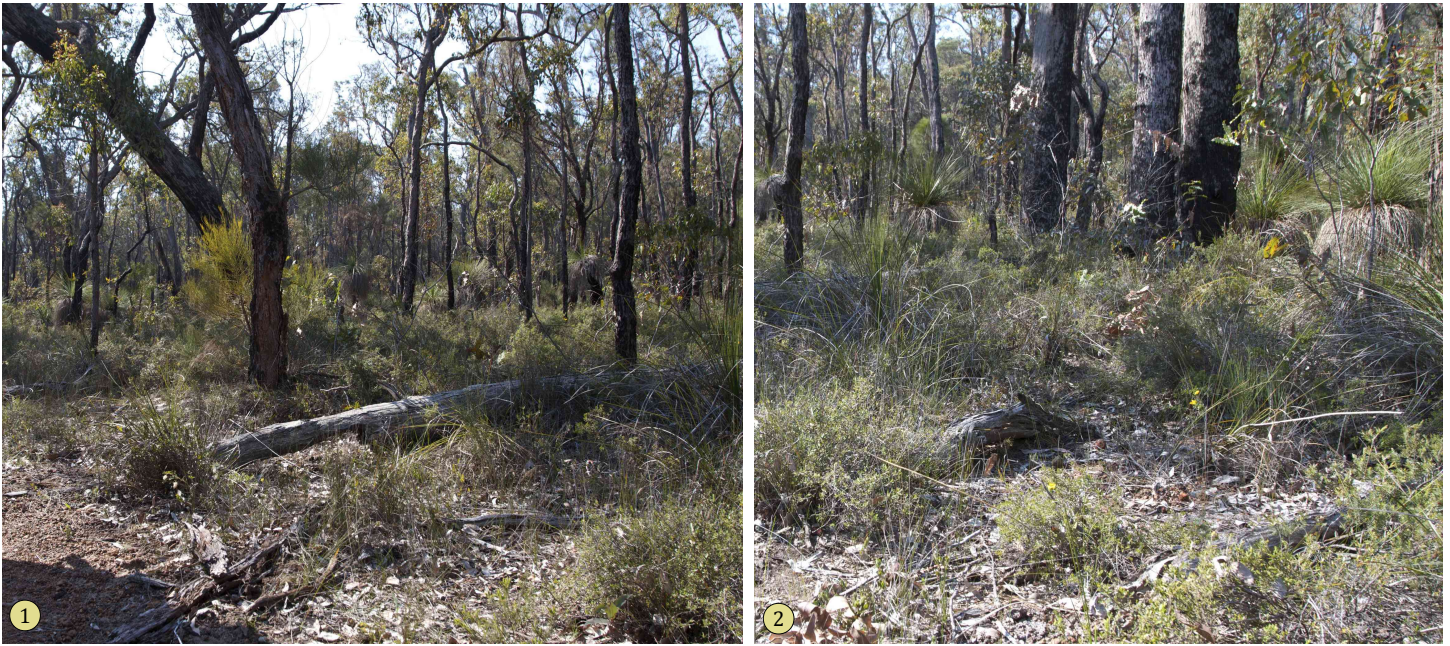
The observed movement of *M. mungaich* was relatively simple and patterned. The male would side step in front of the female, assume this characteristic pose as it moved the pedipalps up and down in that new position, then remained in place as it rotated ('twitched') the fan from side to side several times. It would then side step to a position on the other side of the female, as shown here, and repeat this sequence. Notable differences between this display and that of *M. avibus* include the wide separation of legs III (brought together to frame the fan in *M. avibus*) and the use of the pedipalps by *M. mungaich*.



**Figure 22.** Sequential (1-9), but not consecutive, frames from a video recording of a male ( $\sigma^{\#4}$ ) *Maratus mungaich* as it displayed to a female ('fan dance'). **1**, In position with legs III extended in an arc on one side of a branch. **2**, Pedipalps lowered. **3**, Pedipalps raised and fan rotated to the (spider's) left. **4**, Fan rotated to the right. **5**, Fan rotated to the left. **6**, Fan rotated to the right. **7**, In position after side-stepping to the opposite side of the branch, pedipalps lowered. **8**, Pedipalps raised. **9**, Fan rotated to the right.

*Habitat.* These spiders were found on or near the ground in a wooded area at Mt. Dale (Figure 23). Many specimens have been collected in pitfall traps in old growth jarrah forest areas (Waldock 2013).





**Figure 23.** Wooded area at Mt. Dale, east of Perth, where *M. mungaich* was found.

### ***Maratus sarahae* Waldock 2013**

*Maratus sarahae* was first collected by David Knowles at Bluff Knoll in the Stirling Range National Park in 1988 (Waldock 2013). The *M. sarahae* figured in this paper were found more recently by Jürgen Otto at Bluff Knoll (SEP-OCT 2011, S 34° 22' 35.5", E 118° 15' 14.8", elevation ~1036 m; Figures 12:2, 15: locality 4). Preserved specimens drawn from this group are presently in the collection of Jürgen Otto.

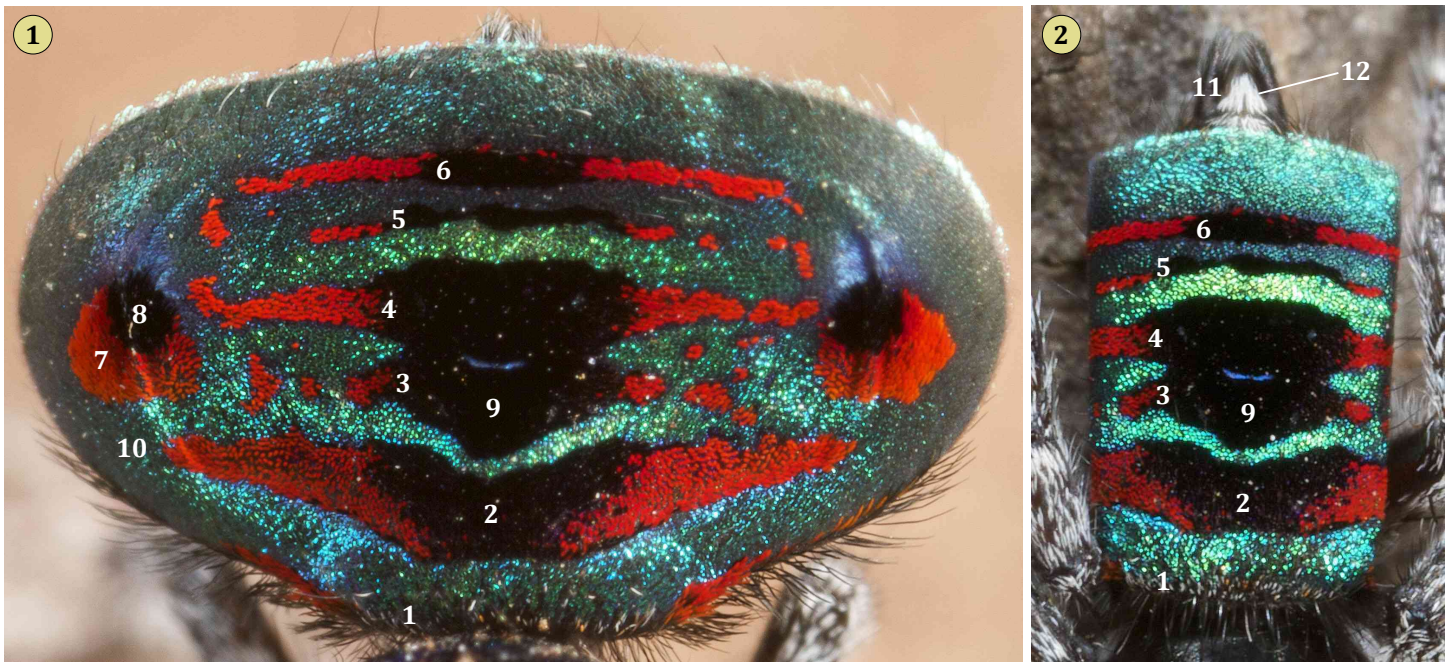
*Male features* (Figures 24-30, Table 2). See Waldock (2013) for a description of the holotype male (WAM T125614). Here we illustrate characters of a male *Maratus sarahae* (♂#5) from Bluff Knoll, and compare these to corresponding characters of a male *M. mungaich* (Table 2). The eye region of *M. sarahae* is dark, with three indistinct longitudinal tracts of dark red-brown scales. Except for scattered white scales, particularly around the front eyes, the carapace is dark, but like *M. mungaich* has a bright white marginal band. The fan (Figure 25, Table 2) has a similar pattern with respect to the presence of a dark central figure and a dark spot on each flap, but differs significantly with respect to details of its pattern of scales. The femur III of *M. sarahae* bears dorsal and ventral fringes of long white setae, much more pronounced than that seen in *M. mungaich*. The tibia III has both white and black setae, with a fringe of long setae beneath. The metatarsus and proximal tarsus III of *M. sarahae* is covered with many white scales, including a prominent fringe of white setae beneath. The distal tarsus III also bears a prominent cover of long black setae, not seen in *M. mungaich*. As in *M. mungaich*, tenent setae of the foot pads are grey.

As shown in Figure 30, the male pedipalp resembles that of other *Maratus*, and is considered to be of limited use for identification. The appearance of the terminal portion of the coiled embolus in published drawings of *Maratus* and related euophryines varies greatly depending on the style of the artist, and the exact angle of the view that is drawn. The terminal part of this coil in *M. sarahae* has a longer, outer projection, and a shorter, inner projection. This is similar to that described for the related *M. mungaich* (Figure 4 in Waldock 1995), but it is also very similar to the embolus of the more distantly related *M. anomalus* (Karsch 1878) from eastern Australia (Prószyński 1984, Żabka 1987, Otto & Hill 2012c, 2012e).





**Figure 24.** Front views of a male *M. sarahae* ( $\sigma$ #5), displaying with elevated fan and extended legs III. **1**, The dark carapace contrasts with the cover of long white setae covering the pedipalps and legs (except for the darker patella-tibia III). **2**, Detail of extended leg LIII, showing fringes of long setae above the femur, and beneath the femur, patella, tibia, and metatarsus. Long black setae are mixed with white setae under the patella and tibia. The distal tarsus also has a thick brush of black setae, not to be confused with the grey tenent setae of the claw tufts that are not visible in this view.

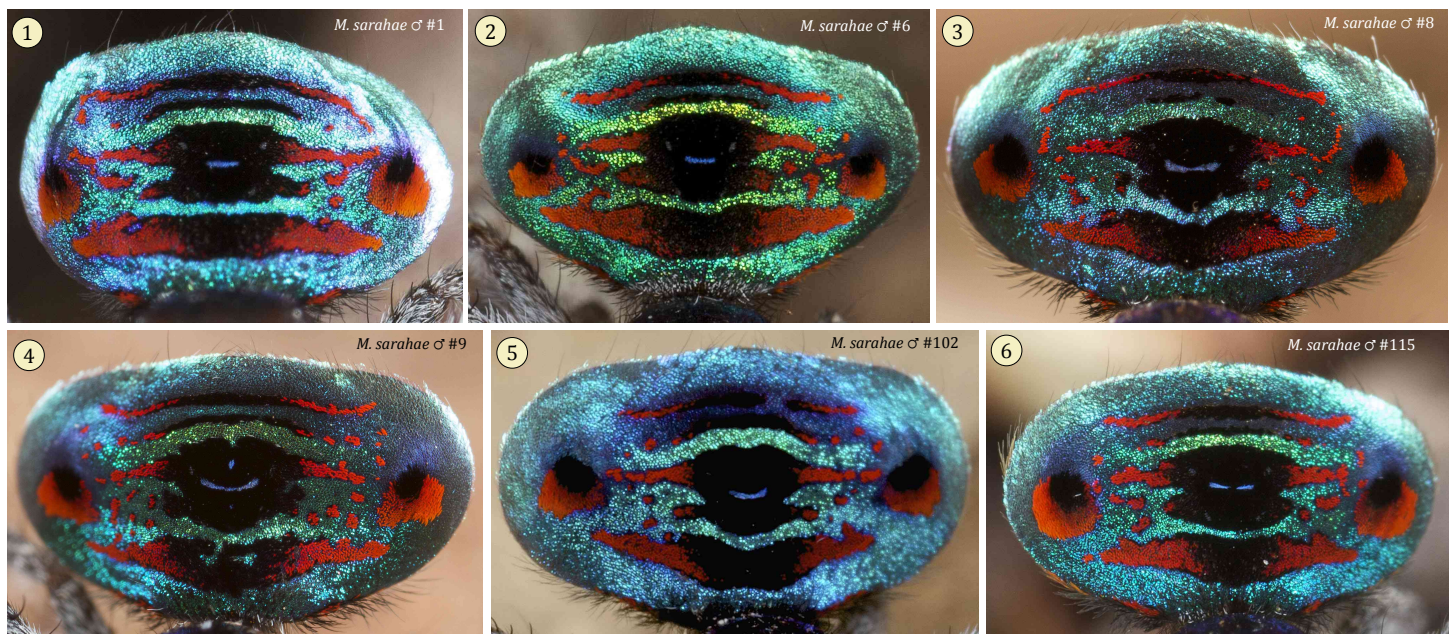


**Figure 25.** Dorsal opisthosoma of a male *M. sarahae* ( $\sigma$ #5), with fan extended (1) and retracted or folded around the lateral margins (2). Numbers 1-12 identify features that are compared with corresponding features of *M. mungaich* in Table 2. As in *M. mungaich*, the fan of *M. sarahae* is very wide.

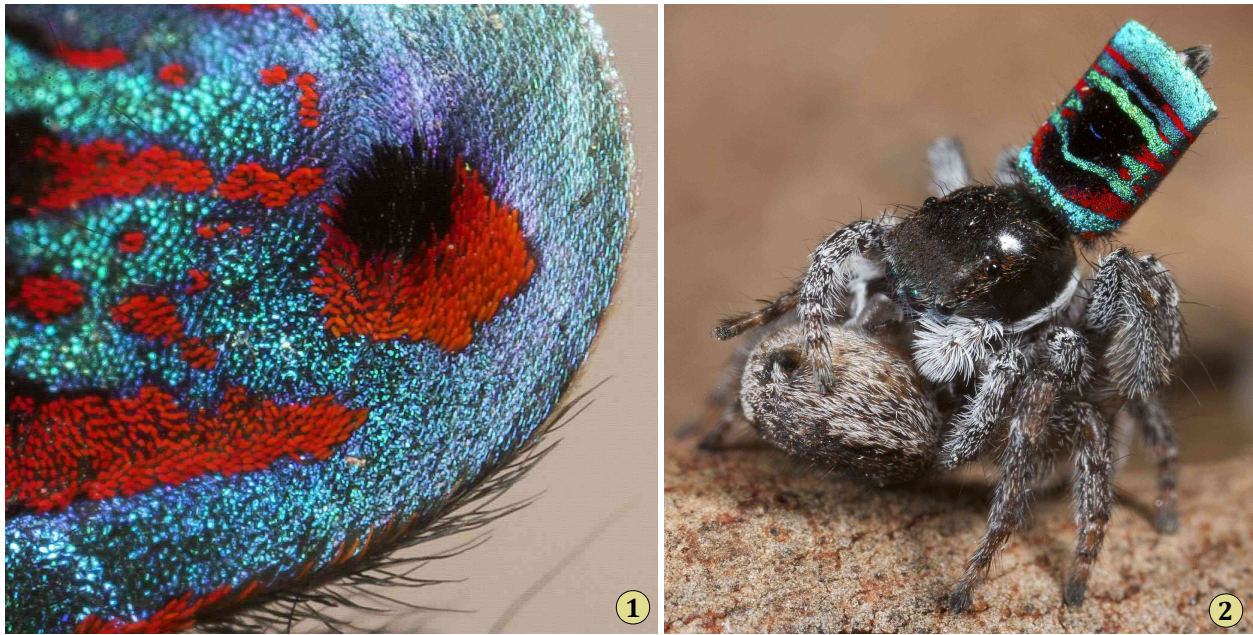


**Table 2.** Comparison of the dorsal opisthosoma of male *Maratus sarahae* with that of male *M. mungaich*, based on features identified and enumerated in Figures 17 and 25.

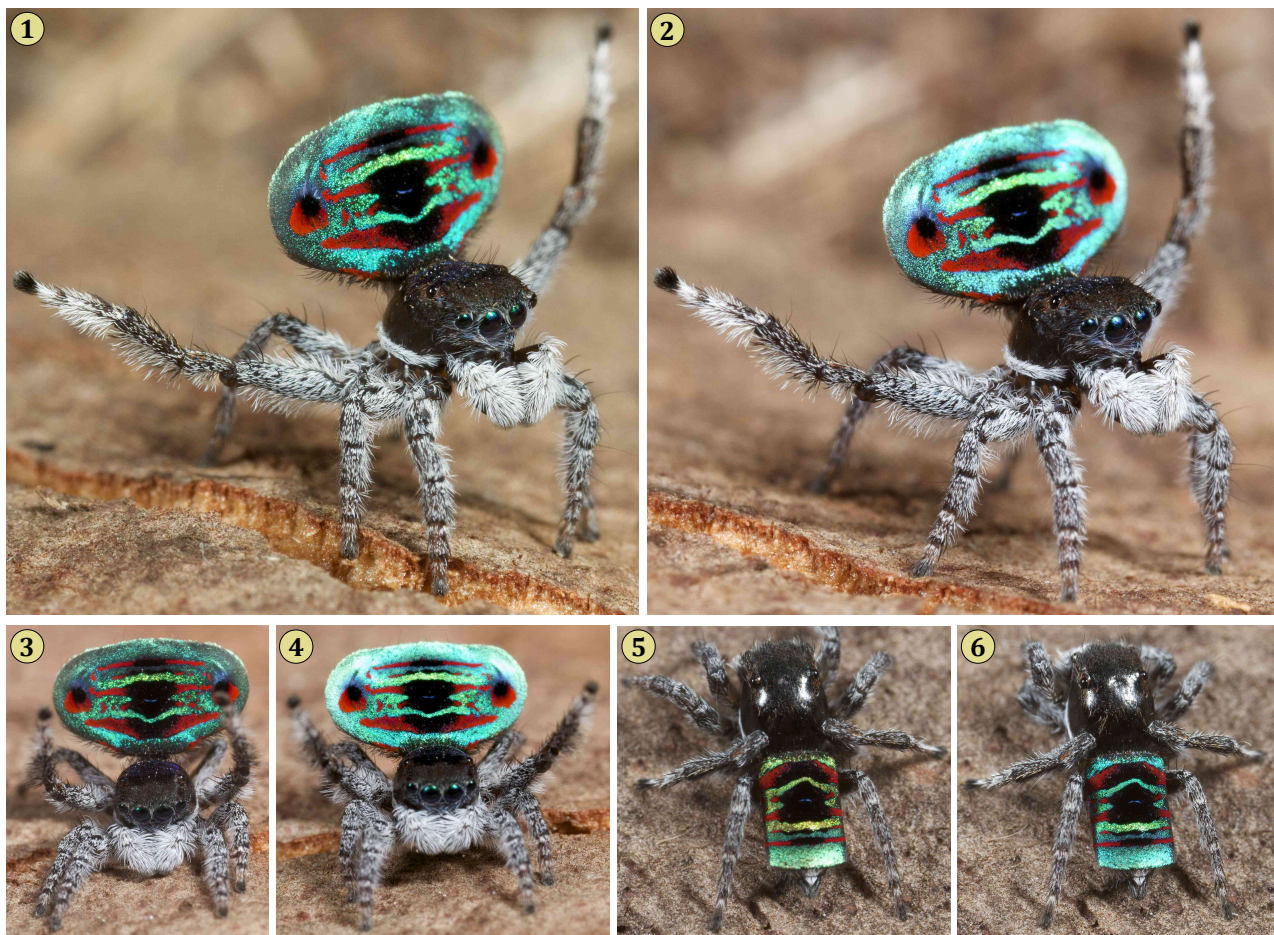
feature	description	♂ <i>M. sarahae</i>	♂ <i>M. mungaich</i>
1	anterior marginal band	lateral orange to red tracts separated medially by white or black scales	
2	transverse band	two broad orange to red tracts extending more than 3/4 of distance from median to lateral margin on each side, separated medially by a large chevron-shaped black area pointed forward	narrower orange to red tracts extending about 1/2 of distance from median to lateral margin on each side, either joined or separated at median by the background field of iridescent scales
3	transverse band	orange to red tracts extending laterally on each side from anterior part of central dark figure (9), broken up into smaller patches laterally	shorter diagonal orange to red tracts each attached to ipsilateral tract of transverse band 2 antero-medially, and separated from the central dark figure (9) by iridescent background scales
4	transverse band	orange to red tracts extending laterally on each side from posterior part of central dark figure (9), more solid than band (3), may be interrupted	orange to red tracts extending laterally on each side from central part of central dark figure (9) toward the lateral dark spot, may be interrupted
5	transverse band	uniform narrow band with red to orange scales laterally, joined across median by tract of black scales with width equal to that of the central dark figure (9)	broken into variable series of small tracts curving to the rear on either side, or indistinct
6	transverse band	uniform narrow band (wider than 5) with red to orange scales laterally, joined across the median by a wider group of black scales	absent or indistinct, may be represented by a line of small red to orange spots
7	lateral red tract	with (8) in a posterior position, comprise a larger, oval patch or red to orange scales on each side, appearing as an extension of both bands (3) and (4)	with (8) in a posterior position, comprise a smaller band or red to orange scales on either side, appearing as an extension of band (4) only
8	lateral dark spot	relatively large, bounded by tract (7) anteriorly for a distance equal to its diameter	relatively small, bounded by only a narrow span of tract (7) scales anteriorly
9	central dark figure	wide field of dark scales separated into anterior and posterior areas by a thin medial, transverse tract of blue scales, the anterior area joining the lateral tracts of band (3), and the posterior area joining the lateral tracts of band (4)	much narrower, shield-shaped area of black scales with one or two small, ovoid blue spots aligned on the midline, joining the lateral tracts of band (4) only, at the center
10	antero-lateral iridescent tract (10)	behind anterior margin (1), anterior band of iridescent (background) scales fairly uniform with no wide antero-lateral area	distinctive wide area (patch) of background iridescent scales at antero-lateral margin of fan, usually appears green to drab or olive-green from the front, extending from anterior margin (1) to the curved anterior limit of tract (7), approaching close to the lateral dark spot (8)
11	setation of spinnerets	grey to black setae	
12	setation of anal tubercle	group or patch of uniform bright white setae, converging distally	

**Figure 26.** Expanded fan of six different male *M. sarahae*, showing variation in the general pattern. Pigmented red to red-orange scales comprise distinct figures on a background of iridescent scales. Although there are individual differences in the colouration of the iridescent scales, this colour also varies greatly as a function of illumination and humidity.



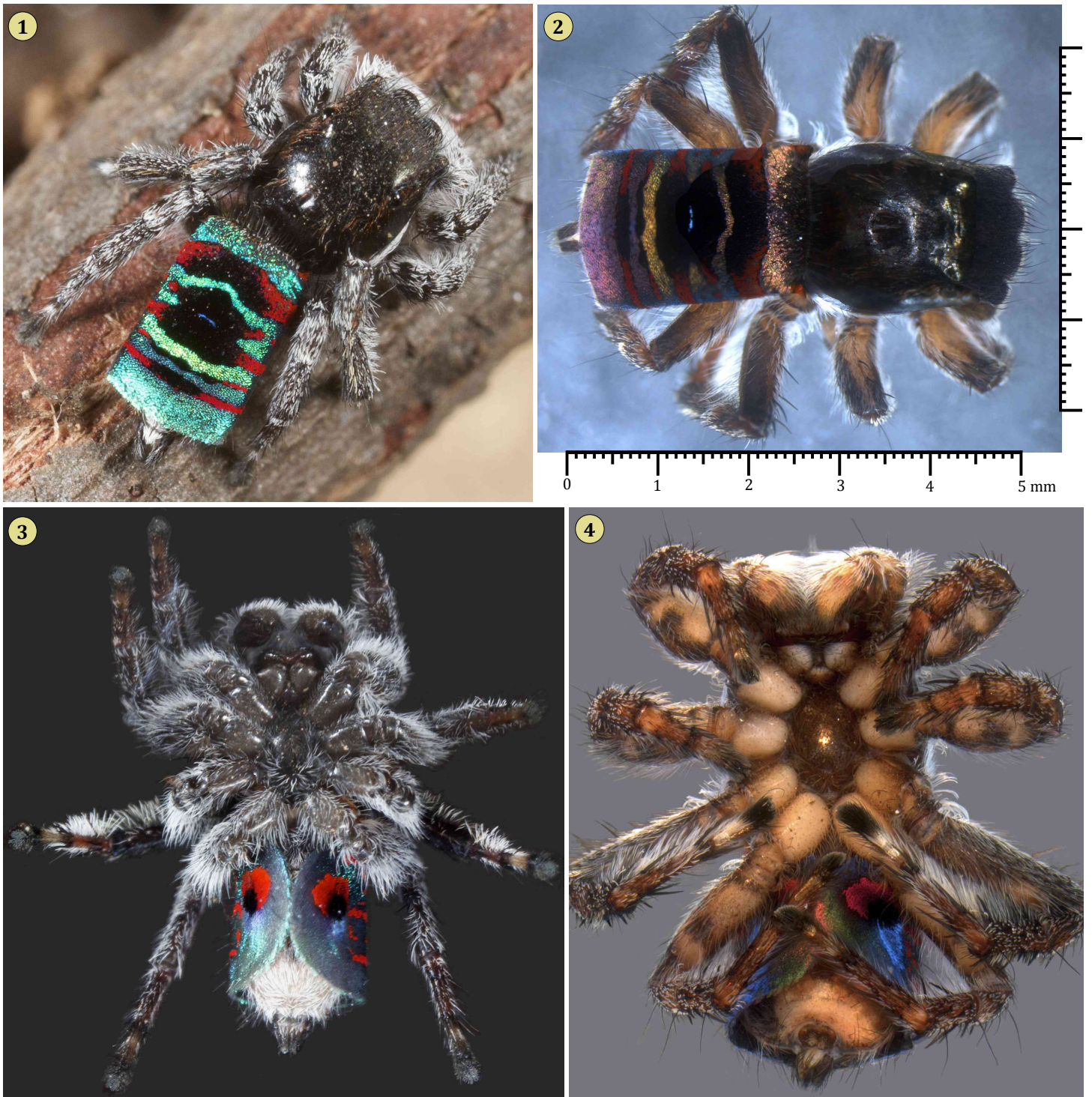


**Figure 27.** Fan of a male ( $\sigma$ #5) *Maratus sarahae*. **1**, Black or bright red-orange scales form figures on a background of blue-green iridescent scales. **2**, Mating pair. The flaps of the male opisthosomal fan are folded unless the spider is displaying to a female.



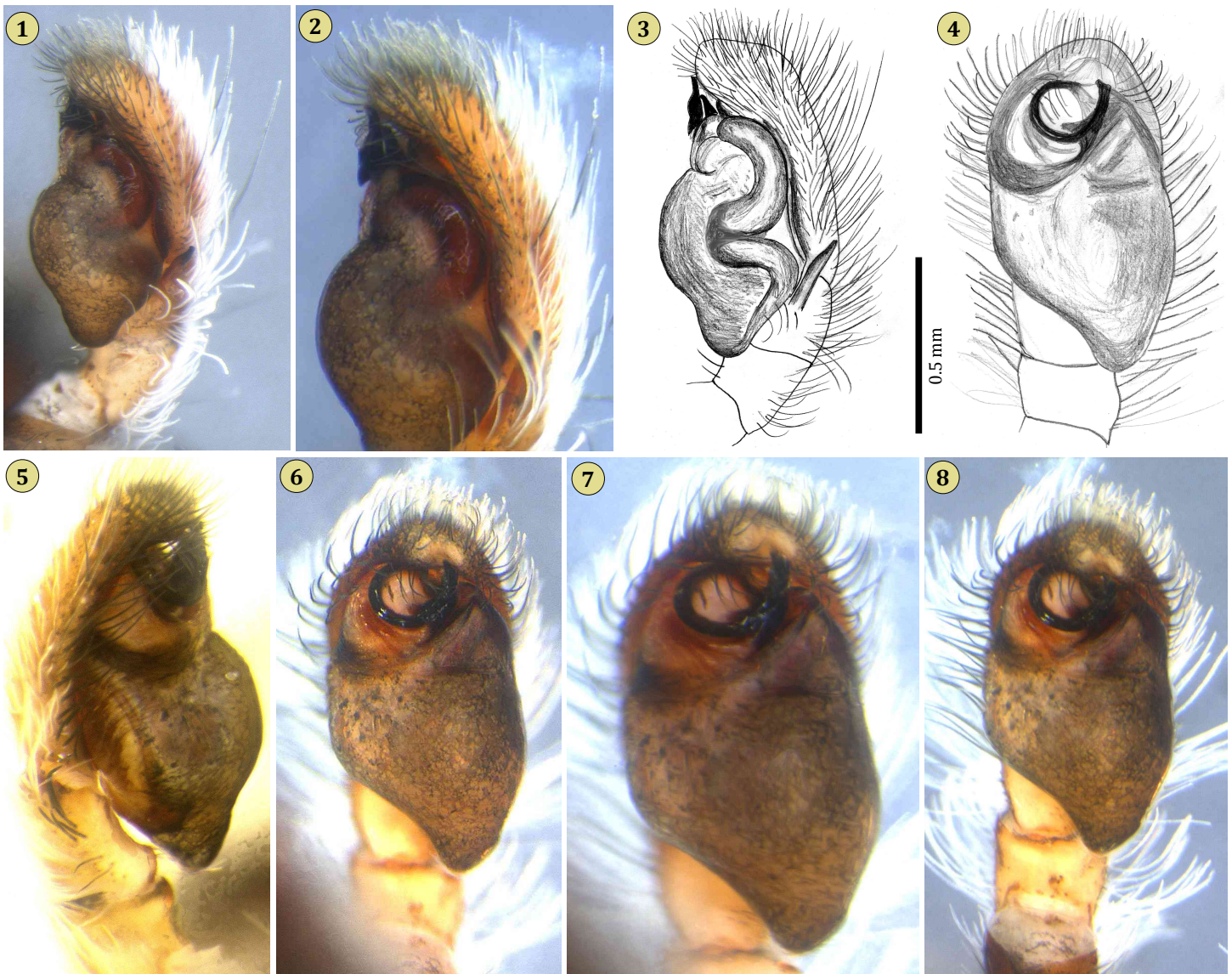
**Figure 28.** Changes in appearance of the opisthosomal fan of a male ( $\sigma$ #5) *Maratus sarahae*. **1-2**, As the male displayed to a female, the orientation of the fan relative to incident and reflected light changed its brightness considerably. **3-4**, Another example of a change in brightness related to the orientation of the fan. **5-6**, Spider showing colour change related to humidity, ~40 s after removal from a vial containing moist cotton (~100% humidity, 5), and three minutes later after drying (6).





**Figure 29.** Dorsal and ventral views of a male ( $\sigma^{\#}5$ ) *Maratus sarahae*. **1**, Dorsal view of living spider. **2**, Dorsal view of specimen, in preservative. **3**, Ventral view of living spider. **4**, Ventral view of specimen in preservative. Note the change of colouration of the normally blue-green iridescent fan scales when submerged in an aqueous solution. The many long white setae that cover the legs of this spider are also much less apparent when preserved. The carapace, with a marginal white band, is mostly dark and glabrous, with some dark brown to red brown scales. The generally grey colour of the cuticle of the living spider also differs from the yellowish colouration of the preserved specimen.





**Figure 30.** Left pedipalp of a male ( $\sigma$ #5) *Maratus sarahae*. 1-2, Lateral views. 3, Drawing of lateral view. 4, Drawing of ventral view. 5, Medial view. 6-8, Ventral views.

*Female features* (Figures 31-33). The females of *M. sarahae*, like those of other *Maratus*, are relatively nondescript with cryptic colouration and subtle features.

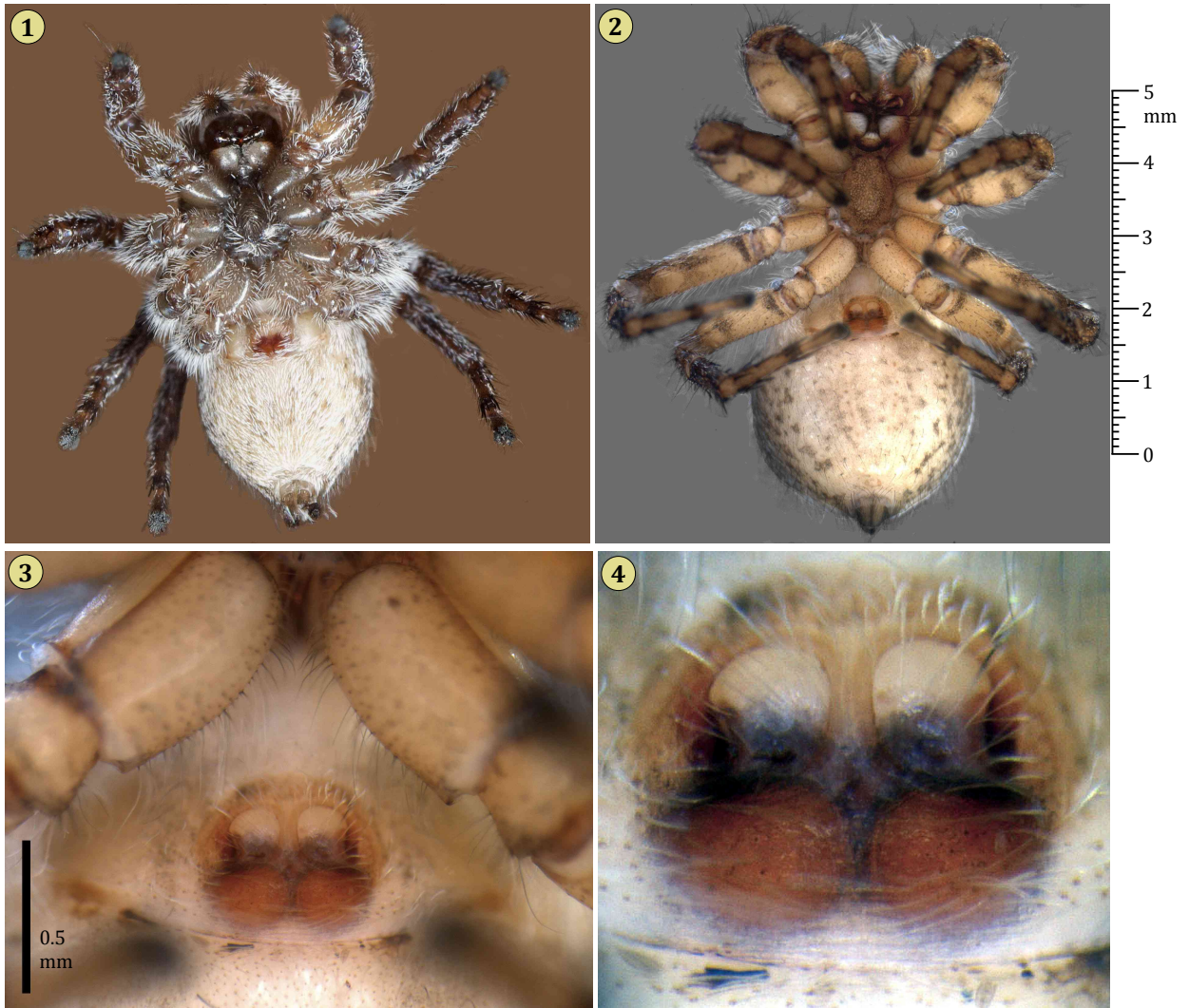
Relative to the spermatheca, the windows (or *fossae*) of *M. sarahae* are relatively smaller than are those of *M. mungaich*. This is expressed in the ratio [b/c] (Figure 33:1) which is about 0.5 in *M. sarahae*, and 0.8-0.9 in *M. mungaich*. The width of both windows relative to the epigynum [d/e] is about 0.6-0.7 in *M. sarahae*, and 0.8-0.9 in *M. mungaich*. The relative width of the septum [a/b] varies greatly, from about 0.4-0.7 in our examples of *M. sarahae*, to about 0.3-0.4 in *M. mungaich*. These differences in proportion may relate to differences in overall body size of the two species, or of the respective specimens.



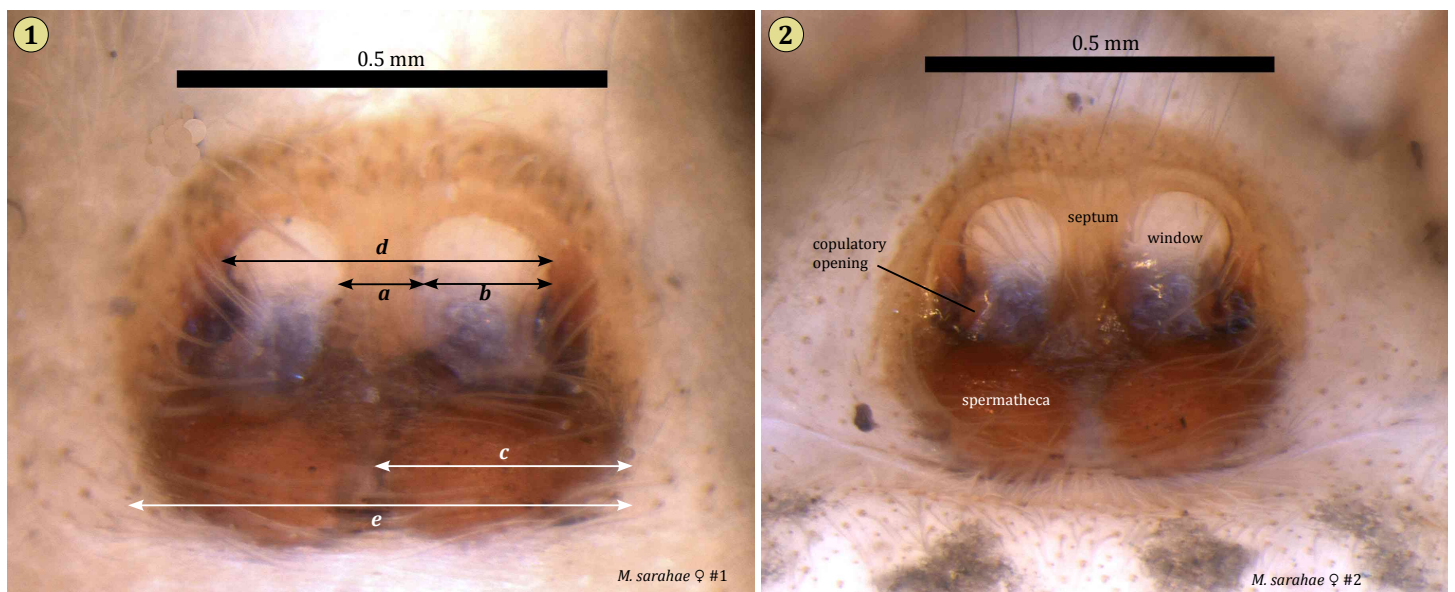


**Figure 31.** Six different female *Maratus sarahae*. **1-2**, Detailed view of one female (♀#5), showing mixture of white and darker red-brown scales on both carapace and dorsal opisthosoma. This contrasts (1, arrow) with a lateral opisthosomal band of white scales, a feature that is more prominent in the other females spiders shown here (3-8). Some of these females have a more or less indistinct median figure on the dorsal opisthosoma (4, arrow), and most have a dark band (7, arrow) separating the dorsal area of the opisthosoma from a lateral marginal band comprised of lighter-coloured scales.





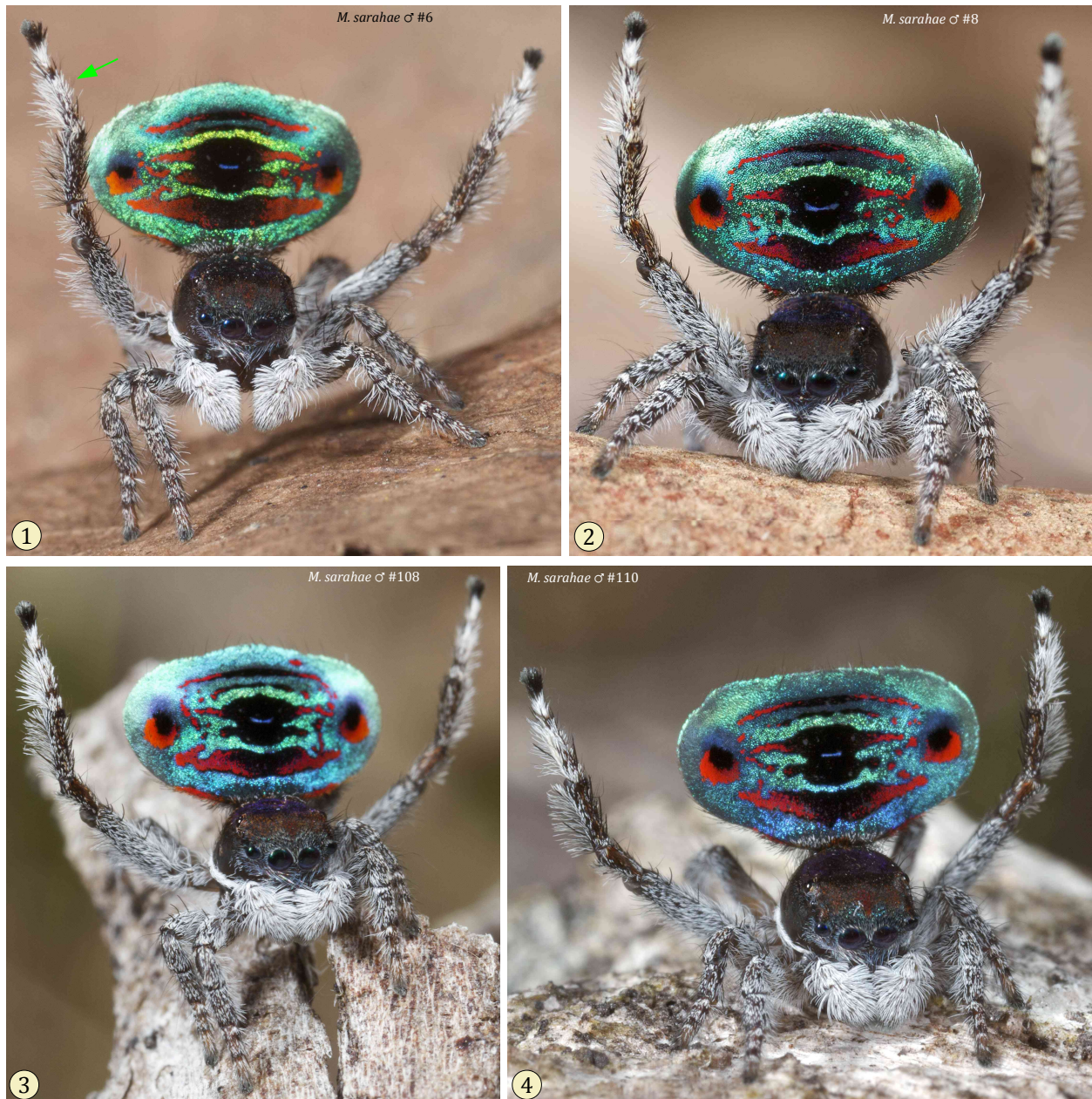
**Figure 32.** Ventral views of a female *M. sarahae* (♀#5). **1**, Underside of living spider. **2**, Underside of preserved specimen. **3**, Ventral view of anterior opisthosoma, showing epigynum. **4**, Detail of epigynum, at high contrast.



**Figure 33.** External view of epigynum of two other *M. sarahae* females. The septum of each was somewhat wider than that of the female shown in Figure 31. **1**, Measurements corresponding to letters (a-e) were used in the evaluation of proportions of respective structures.

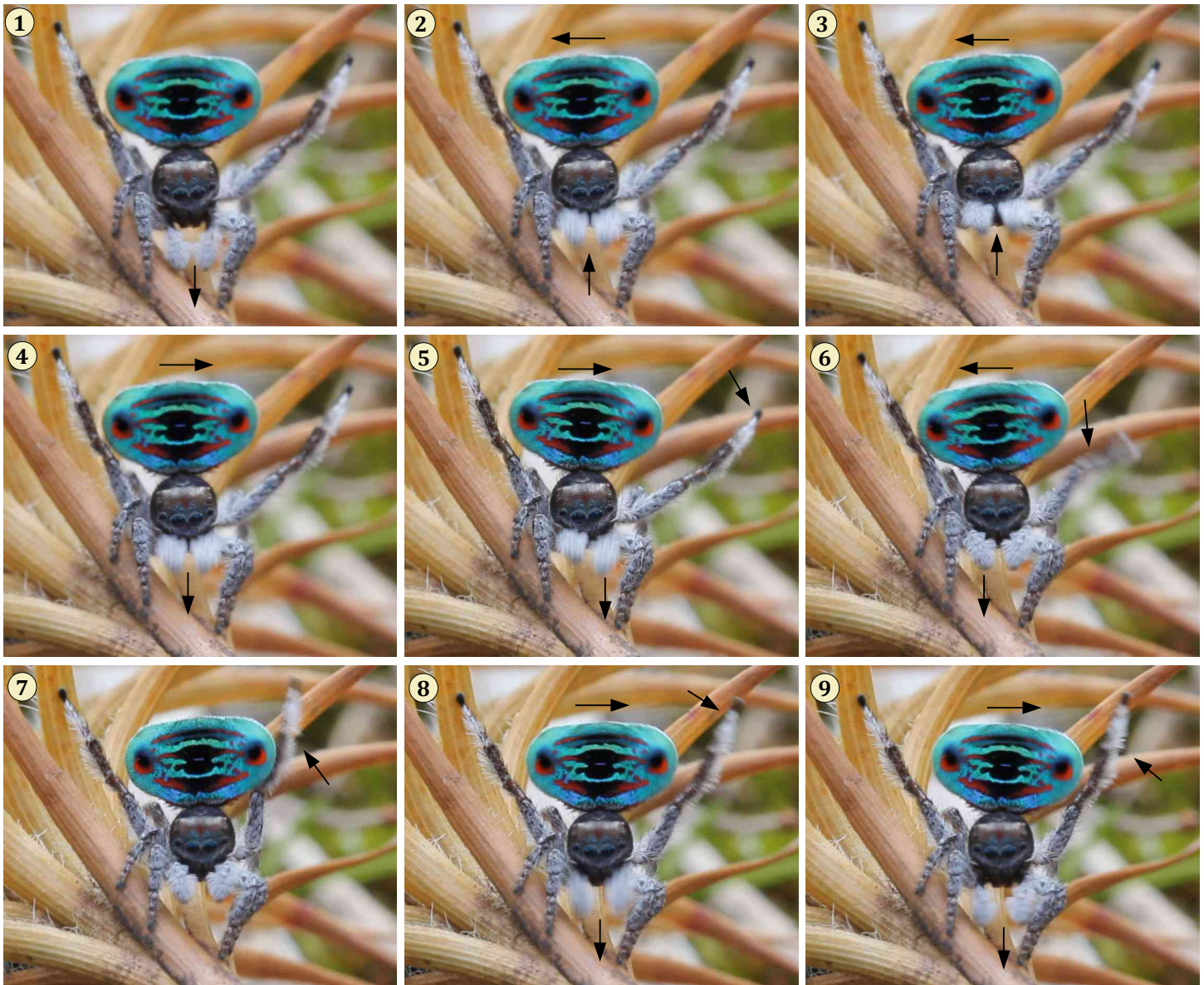


**Male courtship display** (Figures 34-35). In general, *Maratus sarahae* appeared to move its legs III, and flex these legs at the tibio-metatarsal joint, frequently during display, whereas *M. mungaich* appeared to rely more on side-stepping with legs III extended and held in a relatively static position. Male *M. sarahae* may also side-step in front of a female, but appeared to do this much less than did male *M. mungaich*. Videos depicting the display of *M. sarahae* (Otto 2012) and *M. mungaich* (Otto 2013) have been posted recently and provide a good introduction to the temporal sequence of these movements. Only the 'fan dance' of the male is depicted here. Like *M. mungaich*, males have many other signals in their courtship repertoire, including single leg waving at a distance, and semaphore movements of legs III with the fan lowered as the female is approached.



**Figure 34.** Front view of four different *Maratus sarahae* males as they displayed ('fan dance') to females. Each spider had three irregular longitudinal bands of dark red scales on the optic quadrangle; the carapace was otherwise quite dark. Note the black setae covering the distal tarsus III of each spider, and the prominent fringe of long setae on the underside of tibia III (white and black setae) and metatarsus III (white setae only). Flexion of legs III at the tibio-metatarsal joint (1, arrow) was observed frequently in this species. As with *M. mungaich*, a series of intermittent and sudden lateral rotations of the extended and elevated fan, to either side, was an important part of this display.





**Figure 35.** Sequential (1-9), but not consecutive, frames from a video recording of a male ( $\sigma$ #110) *Maratus sarahae* as it displayed to a female ('fan dance'). In each frame, arrows indicate prior movement that led to each observed position. **1**, Pedipalps lowered. **2-3**, Pedipalps raised and fan rotated to the (spider's) right. **4**, Pedipalps lowered and fan rotated to the left. **5**, Left pedipalp lowered, fan rotated to the left, and left leg III rotated to the left. **6**, Right pedipalp lowered, fan rotated to the right, and left leg III flexed. **7**, Left leg III extended. **8**, Pedipalps lowered, fan rotated to the left, and left leg III rotated to the left. **9**, Pedipalps lowered, fan rotated to the left, and left leg III rotated to the right. This species typically combined rapid pedipalp, fan, and leg movements while displaying in place as shown here.

*Habitat.* *Maratus sarahae* has only been found on or near the ground in the eastern part of Stirling Range National Park in southwestern Western Australia (Figures 12:2, 15, 36).





**Figure 36.** Views of the eastern part of the Stirling Range National Park where *Maratus sarahae* has been found at higher elevations.

*Size of Maratus sarahae.* Relative size is only useful within limits. In addition to intraspecific genetic variation, this may vary from year to year, or from place to place, solely as the result of environmental conditions including relative abundance of prey. Overall measurements of body length may not be reliable, due to changes in the relative position of prosoma and opisthosoma, as well as shrinkage, of preserved specimens. For spiders like *Maratus*, with a large and flexible pedicel related to the great extent to which these spiders can rotate the opisthosoma, 'body length' is thus an even less precise measurement. Nonetheless, the *Maratus sarahae* adults that have been measured are among the largest known *Maratus* (Otto & Hill 2011b, Waldock 2013), considerably larger than the related *M. mungaich* (Table 3, Figure 37). Waldock's *M. sarahae* types were much larger than any that we have observed (male



length of 7.4 mm compared with our average of only 5.6 mm), but her drawing of the male (Waldock 2013, Fig. 3) depicts a length of only ~4.5mm.

**Table 3.** Comparative size of adult *Maratus sarahae* and *M. mungaich*. Measurements (in mm) are given as averages, with the range in parentheses. The width of the carapace was measured at its widest point, behind the optic quadrangle. Waldock (1995, 2013; text) only supplied measurements for a single male (holotype), and a single female (paratype), for each of the two species.

species	N	body length	carapace length	carapace width	opisthosoma length	source
♂ <i>Maratus sarahae</i>	9	5.6 (5.2-6.2)	2.8 (2.6-3.2)	2.1 (2.0-2.4)	2.9 (2.6-3.5)	new specimens from Bluff Knoll
♂ <i>Maratus sarahae</i>	1	7.4	3.62	—	3.58	Waldock 2013
♂ <i>Maratus mungaich</i>	11	4.6 (4.0-4.9)	2.2 (1.9-2.4)	1.6 (1.5-1.8)	2.4 (2.3-2.5)	new specimens from Mt. Dale
♂ <i>Maratus mungaich</i>	1	4.8	2.4	—	2.4	Waldock 1995
♀ <i>Maratus sarahae</i>	5	5.8 (5.3-6.2)	2.8 (2.6-3.1)	2.1 (2.1-2.2)	3.1 (2.7-3.5)	new specimens from Bluff Knoll
♀ <i>Maratus sarahae</i>	1	7.54	3.26	—	4.12	Waldock 2013
♀ <i>Maratus mungaich</i>	3	4.8 (4.4-5.5)	2.1 (2.0-2.3)	1.8 (1.7-1.8)	2.4 (2.2-2.8)	new specimens from Mt. Dale
♀ <i>Maratus mungaich</i>	1	5.2	2.4	—	2.8	Waldock 1995



**Figure 37.** Comparison of an adult male *Maratus sarahae* from Bluff Knoll with an adult male *M. mungaich* from Mt. Dale. The larger *M. sarahae* is much heavier bodied, with prominent fringes of long white setae under legs III.

### Group of species or a species complex?

The only reproductive isolation that has been conclusively demonstrated thus far between members of the *mungaich* group is based on their allopatric distribution, and this may not be complete as hybrid populations may yet be found. Although morphological and behavioural differences are sufficient for the identification of the six species in this group, this alone does not establish these as distinct biological species according to the modern synthesis of the *biological species concept* (BSC; Dobzhansky 1937, Mayr 1942). However, it is a fact that *reproductive isolation in the absence of geographic isolation*, a key criterion for the separation of biological species, is almost never demonstrated with respect to closely related arthropod species with an allopatric distribution. It is certainly true that since the formulation of the BSC, there has been little agreement with respect to either its relevance or its applicability (*e.g.*, Mallet 2001, Wilkins 2003). In many cases, however, the BSC has been applied to relegate named species to subspecies or varietal status, within a *species complex* (*e.g.*, Mullen *et al.* 2008, Savage & Mullen 2009, Ferree 2013). Future studies that reveal the characteristics of more geographically isolated populations within the *mungaich* group should help us to better understand relationships within this group. We may then have to decide if graded differences in morphology and behaviour warrant treatment of this group as one or more species complexes rather than as a group of species.



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## Appendix 1: Reference list of described *Maratus* species

### *Maratus* Karsch 1878

#### *calcitrans* group

***Maratus calcitrans* Otto & Hill 2012**

*Maratus calcitrans* Otto & Hill 2012d; Waldock 2013; Metzner 2013; Platnick 2013

***Maratus digitatus* Otto & Hill 2012**

*Maratus digitatus* Otto & Hill 2012d; Waldock 2013; Metzner 2013; Platnick 2013

***Maratus plumosus* Otto & Hill 2013**

*Maratus*-like salticid Hill 2009 (Figures 26-27)

*Maratus* sp. B Otto & Hill 2011b, 2012d; Prószyński 2013

*Maratus plumosus* Otto & Hill 2013b

#### *mungaich* group

***Maratus avibus* Otto & Hill 2014**

*Maratus avibus* Otto & Hill 2014

***Maratus caeruleus* Waldock 2013**

*Maratus caeruleus* Waldock 2013

***Maratus karrie* Waldock 2013**

*Maratus* sp. 'Darlington's Peacock Spider' Hill & Otto 2011 (MCZ specimens collected by Darlington only)

*Maratus* sp. A Otto & Hill 2011b, 2012b (MCZ specimens collected by Darlington only)

*Maratus karrie* Waldock 2013

***Maratus melindae* Waldock 2013**

*Maratus melindae* Waldock 2013

***Maratus mungaich* Waldock 1995**

*Maratus mungaich* Waldock 1995, 2013; Hill 2009, 2010a; Otto & Hill 2011b, 2012b; Metzner 2013; Platnick 2013; Prószyński 2013

***Maratus sarahae* Waldock 2013**

'Darlington's Peacock Spider' Hill & Otto 2011 (photograph by Framenau 2007 only)

*Maratus* sp. A Otto & Hill 2011b, 2012b; Prószyński 2013 (all but MCZ specimens collected by Darlington)

*Maratus sarahae* Waldock 2013

#### *pavonis* group

***Maratus pavonis* (Dunn 1947)**

*Saitis pavonis* Dunn 1947, 1957

*Maratus pavonis* : Żabka 1991; Waldock 1993, 2007, 2008, 2013; Hill 2009, 2010; Otto & Hill 2010, 2011b, 2012c, 2012e, 2013b; Hill & Otto 2011; Girard *et al.* 2011; Metzner 2013; Platnick 2013; Prószyński 2013

***Maratus splendens* (Rainbow 1896)**

*Attus splendens* Rainbow 1896

*Saitis splendens* : Simon 1901a; Dunn 1947

*Saitis rainbowi* Roewer 1951

*Maratus splendens* : Żabka 1991; Hill & Otto 2011; Otto & Hill 2011b, 2012c, 2012e, 2013b; Girard *et al.* 2011; Metzner 2013; Zhang & Maddison 2013; De Angelis *et al.* 2013

*Maratus rainbowi* : Waldock 2008, 2013; Hill 2009, 2010; Platnick 2013; Prószyński 2013

***Maratus watagansi* Otto & Hill 2013**

*Maratus watagansi* Otto & Hill 2013b



## not assigned to group

**Maratus amabilis Karsch 1878** (type species for *Maratus*)

*Maratus amabilis* Karsch 1878; Żabka 1987, 1991; Waldock 1995, 2007, 2008, 2013; Hill 2009, 2010a; Otto & Hill 2010, 2011b; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus anomalus (Karsch 1878)** (type species for *Lycidas*)

*Lycidas anomalus* Karsch 1878; Prószyński 1984; Żabka 1987, 1991; Hill 2010

*Maratus*-like salticid Hill 2009 (Figures 28-29)

*Maratus anomalus* : Otto & Hill 2012c, 2012e; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus chrysomelas (Simon 1909)**

*Habrocestum chrysomelas* Simon 1909

*Lycidas chrysomelas* : Żabka 1987, 1991; Waldock 2002; Hill 2010

*Maratus chrysomelas* : Otto & Hill 2012c, 2012e ; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus harrisi Otto & Hill 2011**

*Maratus harrisi* Otto & Hill 2011b; Waldock 2013; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus linnaei Waldock 2008**

*Maratus linnaei* Waldock 2008; Hill 2009, 2010; Otto & Hill 2011b; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus nigromaculatus (Keyserling 1883)**

*Ergane nigromaculata* Keyserling 1883

*Thorellia nigromaculata* : Rainbow 1911

*Spilargis nigromaculata* : Simon 1903

*Lycidas nigromaculatus* : Żabka 1987, 1991; Hill 2010

*Maratus nigromaculatus* : Otto & Hill 2012c, 2012e; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus purcellae Otto & Hill 2013**

*Maratus purcellae* Otto & Hill 2013a; Metzner 2013; Platnick 2013

**Maratus robinsoni Otto & Hill 2012**

*Maratus robinsoni* Otto & Hill 2012c, 2012e; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus speciosus (O. Pickard-Cambridge 1874)**

*Salticus (Attus) speciosus* O. Pickard-Cambridge 1874

*Saitis speciosus* : Simon 1901a; Dunn 1947; Hill 2009, 2010; Hill & Otto 2011

*Maratus speciosus* : Otto & Hill 2012c, 2012e; Waldock 2013; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus speculiferus (Simon 1909)**

*Habrocestum speculiferum* Simon 1909

*Lycidas speculifer* : Żabka 1987, 1991; Hill 2010

*Maratus speculiferus* : Otto & Hill 2012c, 2012e; Metzner 2013; Prószyński 2013

*Maratus speculifer* : Platnick 2013

**Maratus spicatus Otto & Hill 2012**

*Maratus spicatus* Otto & Hill 2012c, 2012e; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus tasmanicus Otto & Hill 2013**

*Maratus* sp. C Otto & Hill 2011b; Prószyński 2013

*Maratus tasmanicus* Otto & Hill 2013b

**Maratus velutinus Otto & Hill 2012**

*Maratus velutinus* Otto & Hill 2012c, 2012e; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus vespertilio (Simon 1901)**

*Saitis vespertilio* Simon 1901b

*Saitis vespertilis* : Dunn 1947 (misspelled)

*Maratus vespertilio* : Żabka 1991; Waldock 2008, 2013; Hill 2009, 2010; Otto & Hill 2011a, 2011b, 2012a; Metzner 2013; Platnick 2013; Prószyński 2013

**Maratus volans (O. Pickard-Cambridge 1874)**

*Salticus volans* O. Pickard-Cambridge 1874

*Maratus amoenus* Karsch 1878; Żabka 1987

*Saitis volans* : Simon 1901a; Ridewood 1913; Butler 1933; Dunn 1947; Mascord 1970; Prószyński 1984

*Maratus volans* : Żabka 1991; Waldock 1995, 2007, 2008, 2013; Nieuwenhuys 2008; Hill 2009, 2010; Otto & Hill 2010, 2011a, 2011b; Girard *et al.* 2011; Metzner 2013; Platnick 2013; Prószyński 2013



**genus incertus**

Interim placement in *Maratus* is based on synonymy of *Lycidas* per Otto & Hill (2012c).

***Maratus anomaliformis* (Žabka 1987)**

*Habrocestum nigriceps* Keyserling 1882

*Lycidas anomaliformis* Žabka 1987; Hill 2010; Prószyński 2013

*Maratus anomaliformis* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus bitaeniatus* (Keyserling 1882)**

*Thorellia bitaeniata* Keyserling 1882

*Lycidas bitaeniatus* : Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus bitaeniatus* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus chlorophthalmus* (Simon 1909)**

*Eugasmia chlorophthalmus* Simon 1909

*Lycidas chlorophthalmus* : Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus chlorophthalmus* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus dialeucus* (L. Koch 1881)**

*Ergane dialeuca* L. Koch 1881; Keyserling 1883

*Hasarius lineatus* Keyserling 1881

*Sigytes dialeuca* : Simon 1903

*Lycidas dialeucus* : Žabka 1991; Hill 2010; Prószyński 2013

*Maratus dialeucus* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus furvus* (Song & Chai 1992)**

*Lycidas furvus* Song & Chai 1992; Song & Li 1997; Song, Zhu & Chen 1999; Prószyński 2013

*Maratus furvus* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus griseus* (Keyserling 1882)**

*Cytaea grisea* Keyserling 1882

*Lycidas griseus* : Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus griseus* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus heteropogon* (Simon 1909)**

*Saitis heteropogon* Simon 1909

*Lycidas heteropogon* : Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus heteropogon* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus karschi* (Žabka 1987)**

*Lycidas karschi* Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus karschi* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus kochi* (Žabka 1987)**

*Lycidas kochi* Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus kochi* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus michaelsoni* (Simon 1909)**

*Saitis Michaelsoni* Simon 1909

*Lycidas michaelsoni* : Žabka 1987, 1991; Davies & Žabka 1989; Hill 2010; Prószyński 2013

*Maratus michaelsoni* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus nigriceps* (Keyserling 1882)**

*Thorellia nigriceps* Keyserling 1882

*Saitis nigriceps* : Rainbow 1911; Dunn 1947

*Lycidas nigriceps* : Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus nigriceps* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus obscurior* (Simon 1909)**

*Saitis Michaelsoni obscurior* Simon 1909

*Lycidas obscurior* : Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus obscurior* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus piliger* (Keyserling 1882)**

*Cytaea piligera* Keyserling 1882

*Lycidas piliger* : Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus piliger* : Otto & Hill 2012c, 2012e; Platnick 2013

***Maratus pilosus* (Keyserling 1882)**

*Habrocestum pilosum* Keyserling 1882

*Lycidas pilosum* : Žabka 1987, 1991; Hill 2010; Prószyński 2013

*Maratus pilosus* : Otto & Hill 2012c, 2012e; Platnick 2013



**Maratus scutulatus (L. Koch 1881)***Ergane scutulata* L. Koch 1881*Sigytes scutulata* : Simon 1903*Lycidas scutulatus* : Żabka 1987, 1991; Hill 2010; Prószyński 2013*Maratus scutulatus* : Otto & Hill 2012c, 2012e; Platnick 2013**Maratus vittatus (Keyserling 1881)***Hasarius vittatus* Keyserling 1881; Prószyński 1984*Lycidas vittatus* : Żabka 1991; Hill 2010; Prószyński 2013*Maratus vittatus* : Otto & Hill 2012c, 2012e; Platnick 2013**References for Appendix 1**

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