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Two new peacock spiders in the *linnaei* group from Western Australia (Araneae: Salticidae: Euophryini: Australphryni: *Maratus*)

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Abstract. Two new species, *Maratus lynx* and *M. miles*, both close relatives of *M. felinus* and members of the *M. linnaei* group, are described from southwestern Australia. With three other species not yet described, we can now recognize at least 11 species in the *M. linnaei* group, all endemic to southwestern Australia. The courtship display of *M. felinus*, *M. lynx*, and *M. miles* (comprising the *felinus* subgroup) is also described and compared.

Keywords. courtship, *Maratus felinus*, *Maratus lynx*, *Maratus miles*, new species

Since the description of *Maratus linnaei* by Waldock (2008), five new species have been described and added to a nominate clade called the *linnaei* group of the genus *Maratus* Karsch 1878 (Otto & Hill 2021, 2022). Here we add two more species to that group, and illustrate three more that have yet to be described (Table 1, Figures 1-2). We also describe the courtship of these new species, as well as that of *M. felinus* Schubert 2019, which appears to be closely related.

Table 1. Members of the *Maratus linnaei* group. The type locality given with the published description of *M. laurenae* was incorrect, and the correct type locality is shown here and in Figure 2 (Otto & Hill 2022). Type localities are shown for all described species (1-8), collection localities for the other three species (9-11).

	species	reference for description	collectors	type locality/locality
1	*M. candens*	Otto & Hill 2022	M. Peak, P. Winthrop	S34.04600°, E115.61670°
2	*M. cuspis*	Otto & Hill 2019	J. C. Otto	S34.82433°, E116.96996°
3	*M. electricus*	Otto & Hill 2017	D. Knowles, J. C. Otto	S34.45060°, E116.68377°
4	*M. felinus*	Schubert 2019	M. Duncan	S34.37847°, E115.65775°
5	*M. laurenae*	Schubert 2020	J. Murray, S. Murray	S34.85690°, E117.39632°
6	*M. linnaei*	Waldock 2008	M. L. Moir, J. M. Waldock	S34.97917°, E118.18611°
7	*M. lynx*, new sp.	this paper (Otto & Hill 2024)	J. McMulkin	S34.28539°, E115.26202°
8	*M. miles*, new sp.	this paper (Otto & Hill 2024)	F. Prall, J. McMulkin	S34.25141°, E115.26937°
9	*M.* cf. *candens*	not described	M. Peak	S34.01217°, E115.73192°
10	*M.* cf. *cuspis* A	not described	R. Coakley	S34.81706°, E118.27978°
11	*M.* cf. *cuspis* B	not described	R. Coakley, M. Lun, F. Prall	S34.82890°, E117.42761°

Figure 1. Male representatives of peacock spiders in the *M. linnaei* group, all narrow endemics from the southwestern corner of Australia. **1-3,** Note the similarity of the fan, including a pair of tufts at the apex, in *M. lynx*, *M. felinus* and *M. miles*. These three species comprise a new clade, the *felinus* subgroup. **4-5,** These two species have very similar scale patterns on the fan, but their colours differ and the fan of M cf. *candens* is a different shape, wider at the middle. **8-11,** The fan of M. cf. *cuspis* A (9) resembles that of *M. cuspis* (8), but the truncated rear margin is much wider. The fan of M. cf. *cuspis* B (10) is also wider at the rear, but has a different shape, wider at the middle with angulate (not smooth or tapering) lateral margins, and prominent dorsal fringes on the femur and tibia of each leg III, much like those of *M. linnaei* (11). Photo credits: 7, Joseph Schubert; 10, Michael Lun.

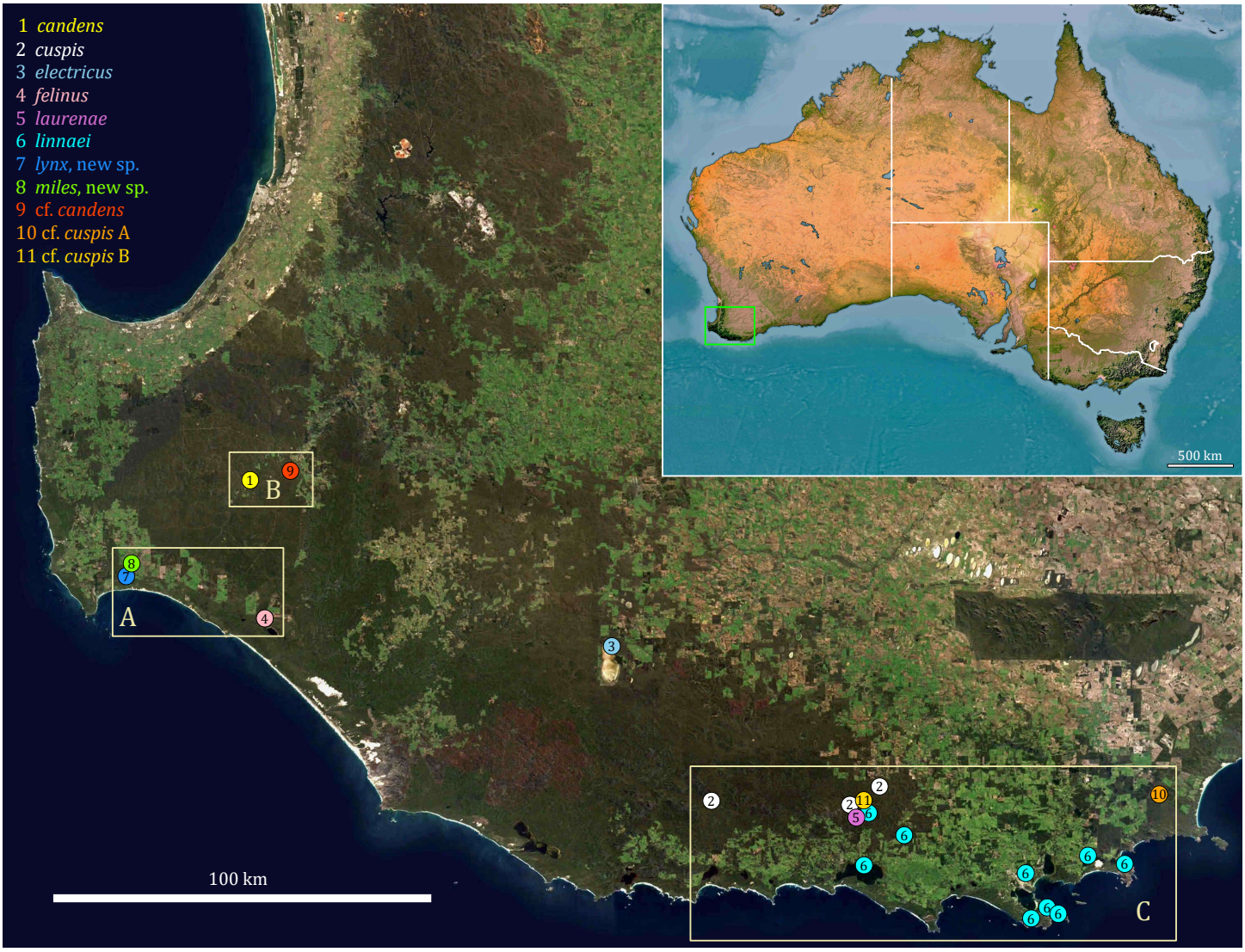

Figure 2. Known distribution of peacock spiders of the *Maratus linnaei* group in Western Australia (see also Table 1). All species in this group are largely parapatric, with a geographic separation that appears to correlate with their relatedness. On this basis we can identify four different subgroups: A, *felinus* subgroup, including *M. felinus* and our two new species; B, *M. candens* and *M.* cf. *candens*; C, eastern group including *M. cuspis*, *M.* cf. *cuspis* A, *M*. cf. *cuspis* B and *M. linnaei*; *M. electricus* (3). This distribution suggests that dispersal of these spiders is low, subject to K-selection.

Taxonomy of the *Maratus felinus* subgroup

Genus *Maratus* Karsch 1878

Type species *Maratus amabilis* Karsch 1878

Maratus felinus Schubert 2019

Joseph Schubert first described this spider, from two males and two females collected by Michael Duncan near Lake Jasper in Western Australia (Schubert 2019). The species name was based on the unusual, cat-like appearance of the elevated fan of the male (Figure 1.2). As part of this description, basic features of the male courtship display were also described: waving of the elevated fan, waving of an extended leg III, lateral separation of the pedipalps, and the peculiar movements of legs I. The latter, which will be described in more detail here, represent a distinctive feature of the courtship of *Maratus felinus*, *M. lynx* n. sp., and *M. miles* n. sp. (Group A, the *felinus* subgroup, in Figure 2).

***Maratus lynx*, new species**

Type specimens. The holotype male (♂ #1), four paratype males (♂ #2-5), and six paratype females (♀ #1-6) were collected about 10 km NE of Augusta, Western Australia (S34.285390°, E115.262016°; 7 OCT 2023; James McMulkin, collector). All types will be deposited in the Western Australia Museum, Perth.

Etymology. The species group name, *lynx* (Latin, noun in apposition, derived from the Greek λύγξ, English translation *wild cat*, *brightness*), was chosen for the resemblance of the two long tufts of setae at the rear of the male fan to the hair tufts rising from the ears of wild cats of the genus *Lynx*.

Diagnosis. *Maratus lynx* is very similar to *M. felinus* but the colouration of adult males of the two species is quite distinct (Figure 1). The legs of *M. lynx* males are light brown to orange, and the cuticle of this species lacks the dark pigment characteristic of *M. felinus*. The fan itself is blue-grey in *M. lynx*, light brown or tan in *M. felinus*. Otherwise the general shape of the body, and the position of setal tufts, is very similar. *M. lynx* is also very similar to *M. miles*, n. sp. (see description below), but that species (Figure 1.3) has more tufts and a distinctive pattern at the rear of the fan. As with most other *Maratus* found in Western Australia, the detailed structure of the pedipalps is of little use for identification to species.

Description of male (Figures 1.2, 3-6). Type males (n=5) range from 4.0-4.3 mm in length. Dorsally the pedipalps are covered with bright white setae, with light yellow-brown setae toward the retrolateral side. The chelicerae are mostly glabrous and, like exposed parts of the carapace (not covered with setae) are deep brown or amber in colour. Longer white to off-white setae with a ventromedial orientation extend from the clypeus and the medial part of each paturon. The eye region is marked by four bold red-orange stripes, each extending to the rear behind one of the four front eyes. Between these are three bands of white to grey setae, each of which extends down between the front eyes. The PME are closer to the PLE than to the ALE. The rear of the carapace (thoracic portion, behind the eye region) is dark brown or black with scattered red-orange setae, and a prominent white middorsal stripe at the top before a steep posterior slope. Below the eyes, the sides of the carapace are mostly glabrous and dark. A marginal band of white setae is present, but less defined than in most *Maratus*.

The fan (Figure 3.23) curves around the lateral sides of the opisthosoma but does not bear flaps. At the front this is ovate, marked by two large, ovoid, blue-gray areas, followed by chevrons of iridescent light blue scales on a field of dull to bright red-orange pigmented scales. At the center, rear, is a distinct "Y" shaped figure comprised of intensely bright, blue-green iridescent scales. At the rear of the fan the white anal tuft stands out above the grey spinnerets, extending beyond the curved rear margin of the fan, and on either side a prominent tuft of long, mostly white, setae is present, entending toward the rear. The ventral opisthosoma has a uniform cover of white to off-white setae.

Legs I and II are shorter, legs III and IV longer, and legs III the longest. Legs I and II are lighter brown in colour, with a cover of light orange-brown pigmented setae; in life the distal tarsi are black. Legs III and IV are slightly darker in colour, amber coloured when viewed from below. Legs III also have orange setae from the distal femur to the tarsus, prominent black spines on the tibia, metatarsus and tarsus, two ventral fringes of longer setae that extend from the metatarsus, and a tuft of white setae that extends from the distal end of the tarsus.

As viewed from below (Figure 4), the coxae, sternum, labium and endites are mostly glabrous and translucent grey in colour, except for scattered long white setae extending in all directions from the sternum. From below, the proximal leg segments (from trochanter to femur) are light brown and translucent, with a cover of scattered white setae on the femur.

Figure 3 (continued on next page). Living male types for *Maratus lynx*.

Figure 3 (continued from previous page). Living male types for *Maratus lynx*.

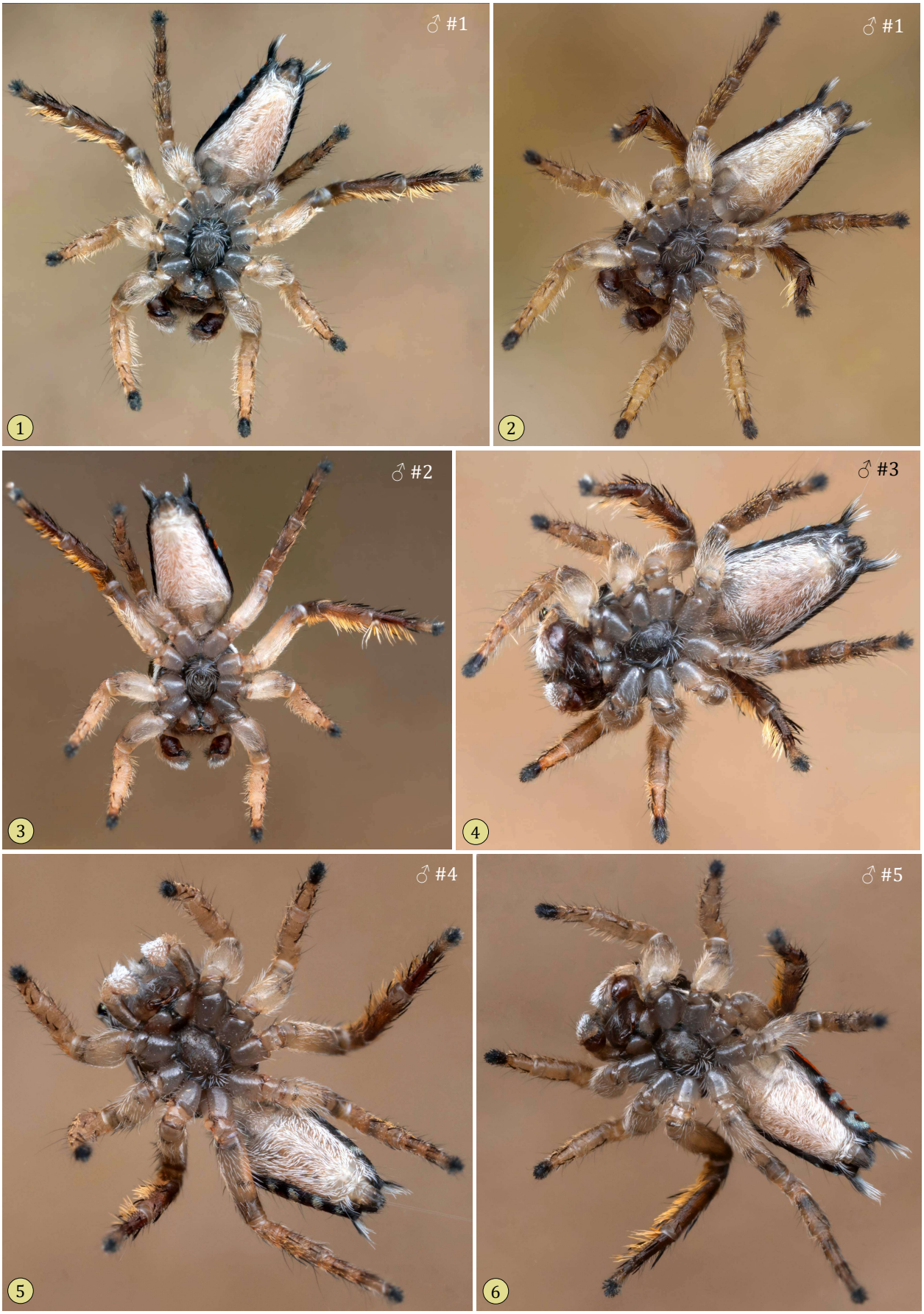

Figure 4. Ventral views of living male types for *Maratus lynx*.

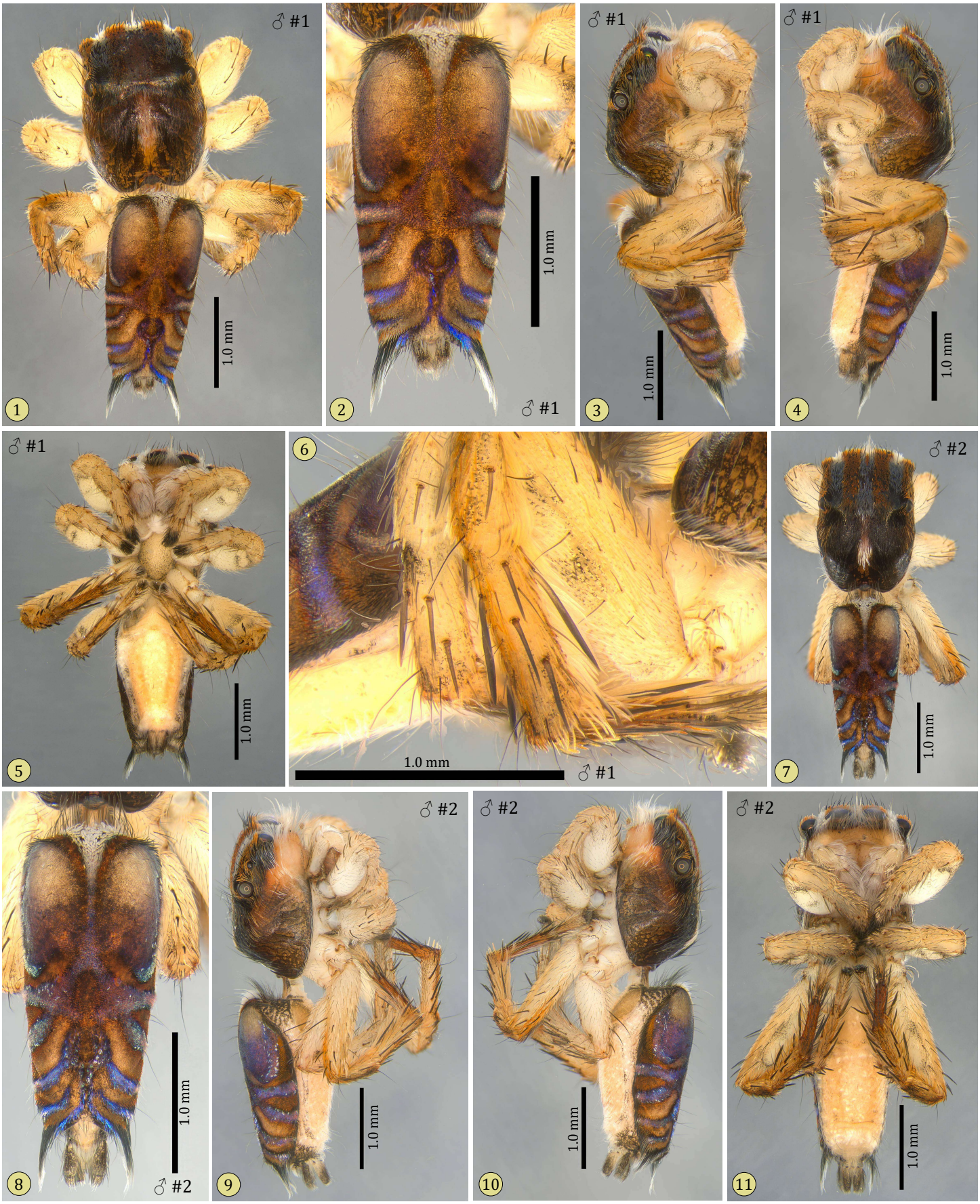

Figure 5 (continued on next page). Male types for *Maratus lynx* in alcohol. **6,** Detail of (3), showing prominent dark setae or spines on legs III.

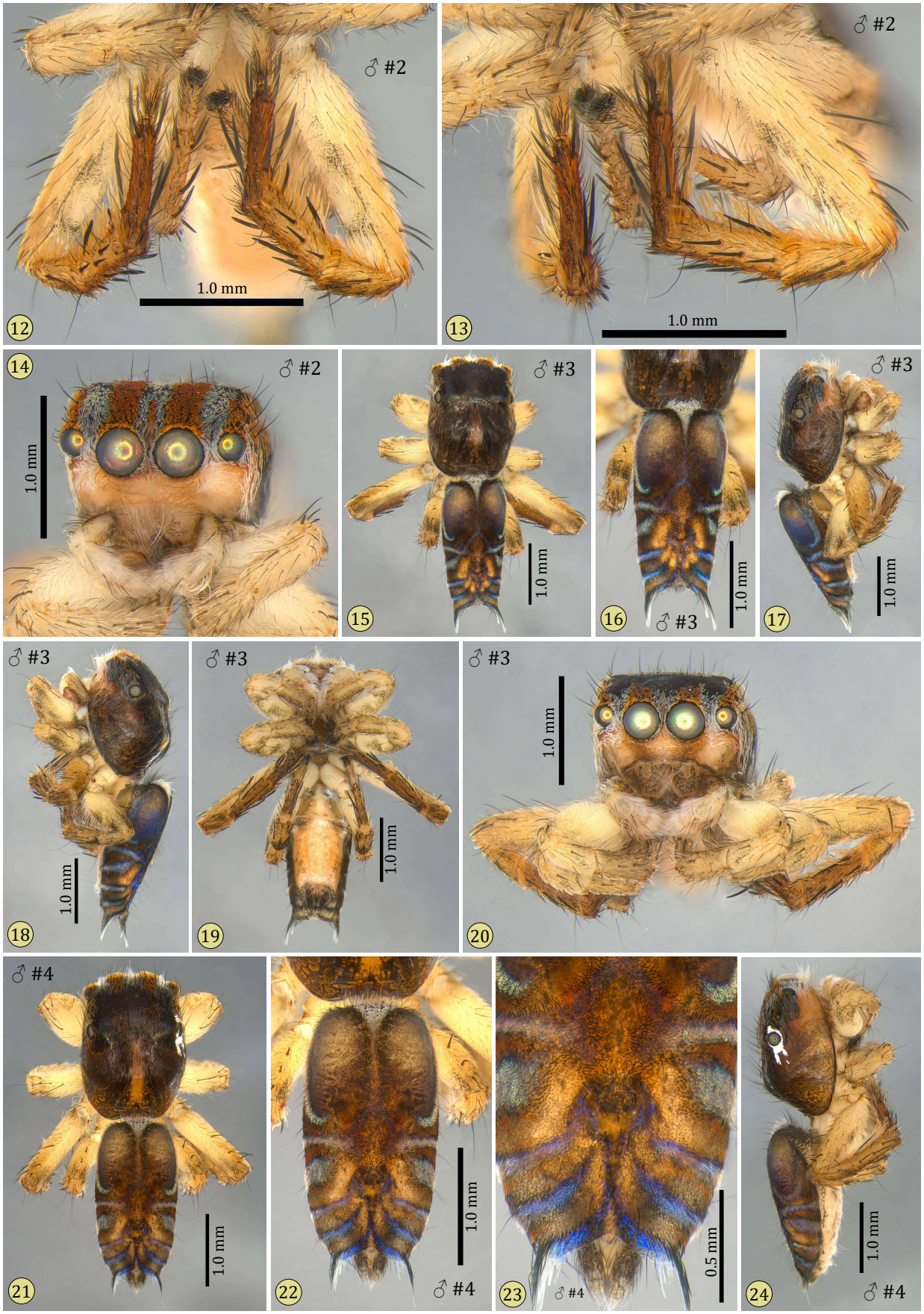

Figure 5 (continued from previous page, continued on next page). Male types for *Maratus lynx* in alcohol. **12-13,** Detail of (11), showing prominent dark setae or spines on legs III and IV.

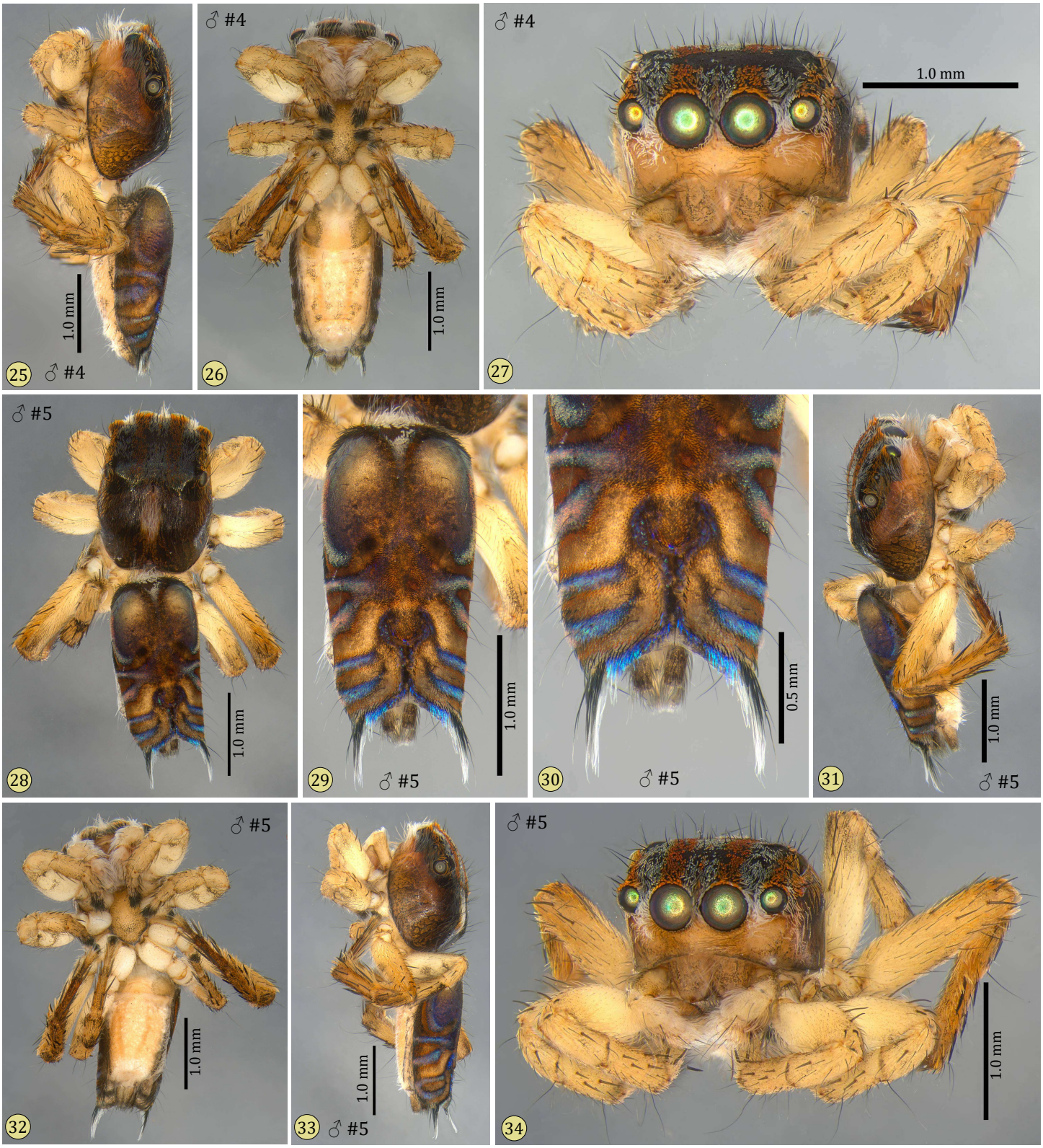

Figure 5 (continued from previous page). Male types for *Maratus lynx* in alcohol.

The male pedipalp (Figure 6), is like that of most *Maratus* from southwestern Australia, with the curved outer loop of the embolus terminating in a stout, pointed apex just above the apex of a shorter inner loop. Just before the apex is a slight projection (arrow, Figure 6.8). One of the five males (#4), looked normal (Figures 3.12-3.21, 4.5), but failed to develop a normal, functional pedipalp (Figures 6.33-6.36).

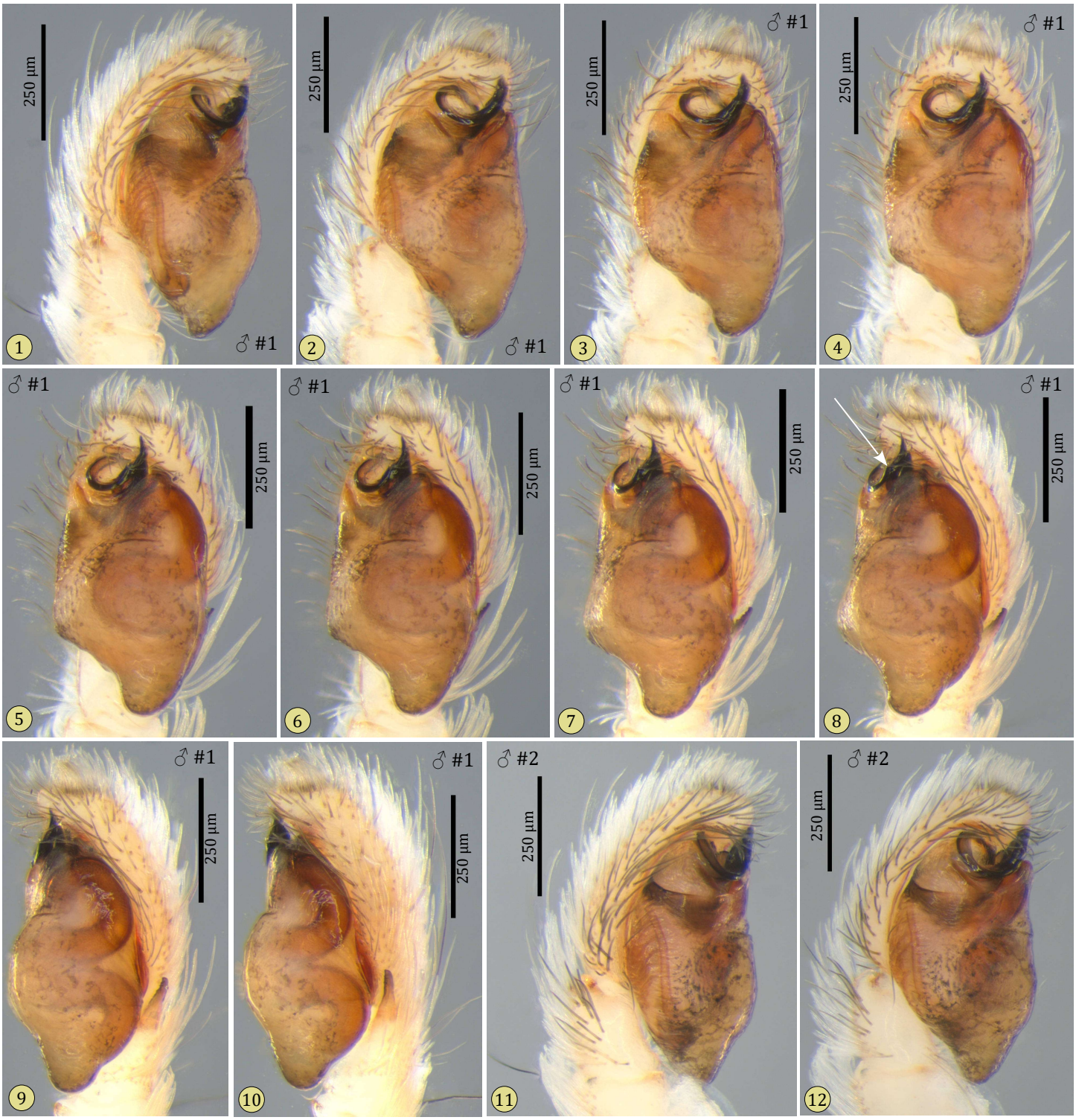

Figure 6 (continued on next page). Medial (prolateral) to lateral (retrolateral) views of the left pedipalp of male types for *Maratus lynx*. **8,** Note projection on rim (arrow), near apex of outer embolus. This is characteristic of many *Maratus* species.

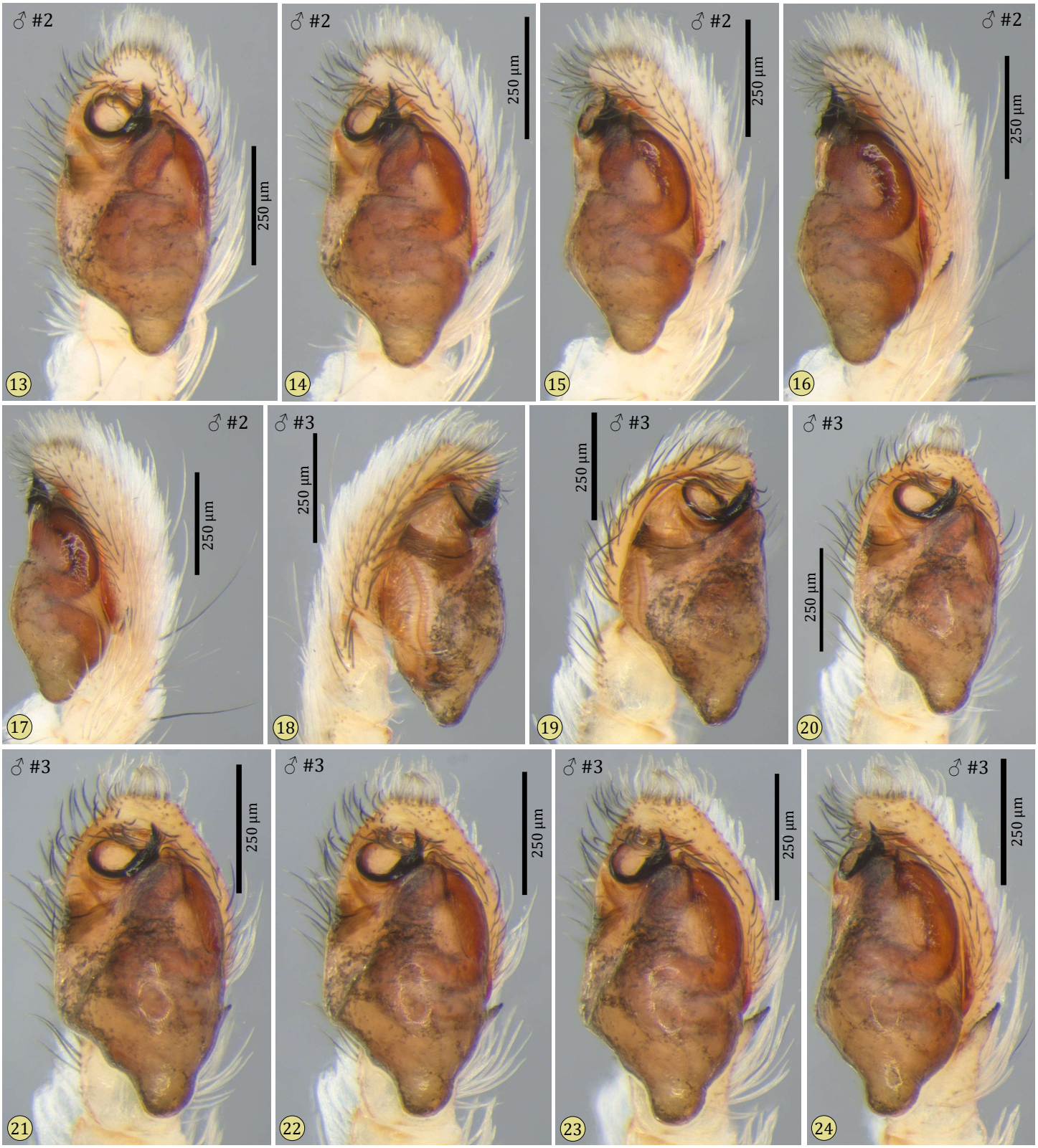

Figure 6 (continued from previous page, continued on next page). Medial (prolateral) to lateral (retrolateral) views of the left pedipalp of male types for *Maratus lynx*.

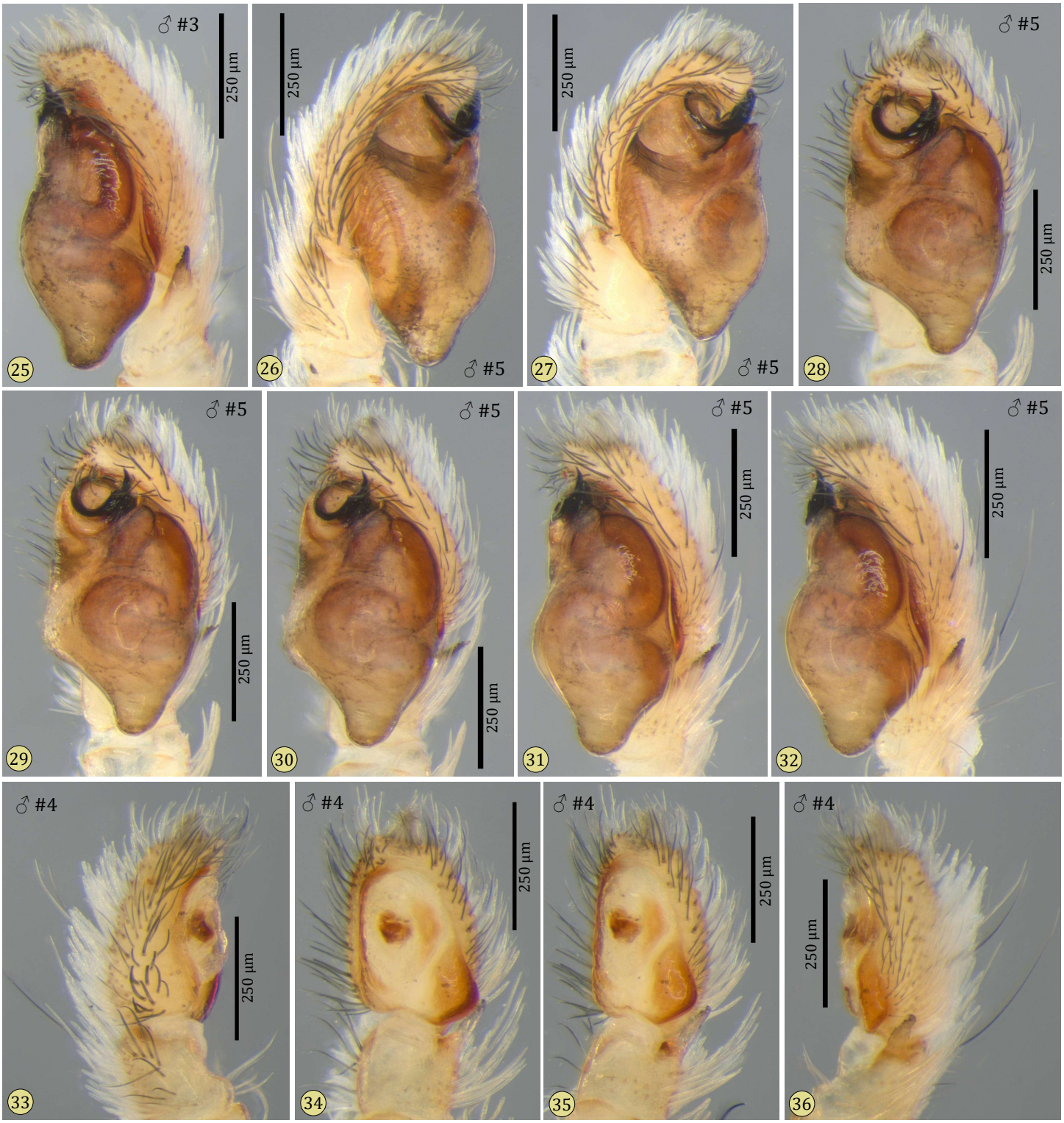

Figure 6 (continued from previous page). Medial (prolateral) to lateral (retrolateral) views of the left pedipalp of male types for *Maratus lynx*. **33-36,** Defective (undeveloped) pedipalp of male #4.

Description of female (Figures 7-10). Type females (n=6) range from 4.8-5.6 mm in length. Females are unremarkable and very much like those of many other *Maratus* species. We find no significant differences from the female *M. felinus* described by Schubert (2019). The pedipalps are covered with uniform light, off-white setae. The chelicerae are mostly brown or amber in colour and translucent, with some white to off-white setae on the medial side of each paturon, oriented in a medioventral direction. Longer white or off-white setae of the clypeus are also oriented in a medioventral direction, above each paturon. The eye region is variable in colour, uniform brown in some females, but with a broad band of darker brown or even brighter but dull red-orange extending to the rear behind each anterior eye (Figures 7.19, 7.23), much like the pattern seen in the male. The PME are closer to the PLE than to the ALE, as in other *Maratus*. Below the lateral eyes on either side is a band of off-white to brown or dull red-orange scales, but the sides and lateral margins of the carapace are glabrous and dark brown to amber, translucent. Behind the eye region the carapace is black, with a middorsal thoracic stripe on top, much like that seen in the male.

The dorsal opisthosoma has a fairly uniform cover, in some cases sparse, off-white to brown or dull red-orange scales, surrounded at front and at the lateral margins by bands of uniform off-white scales. A narrow and indistinct stripe of off-white setae may be present at the anterodorsal midline of the opisthosoma. The marginal bands are broad and continuous with a uniform cover of off-white setae on the venter of the opisthosoma, where the cuticle is light brown in colour. As in other *Maratus*, a distinct , small anal tuft of white setae is present, above the spinnerets that are grey above, and either grey of translucent brown below.

From below, the trochanters, coxae, sternum, labium and endites are mostly glabrous, except for scattered off-white setae projecting from the sternum. Legs I and II are shorter and about the same length, legs III and IV longer and also about the same length. All legs are brown to dark brown in colour, with a cover of scattered off-white setae or scales. Pigment varies, but some females have distinct patterns of dark pigment on the legs, particularly on the retrolateral side of the femora of legs I and II (Figures 7.18, 7.24). The metatarsi and tarsi of the legs bear many strong spines.

The epigynum (Figure 10) closely resembles that of many other *Maratus*, with a large window (*fenestra*) on either side though which sclerotized ducts may be seen on the posterior side, in front of a large posterior spermatheca. The width of the midline septum separating the windows, and the size of the spermathecae relative to the windows, is variable.

Figure 7 (continued on next page). Living female types for *Maratus lynx*.

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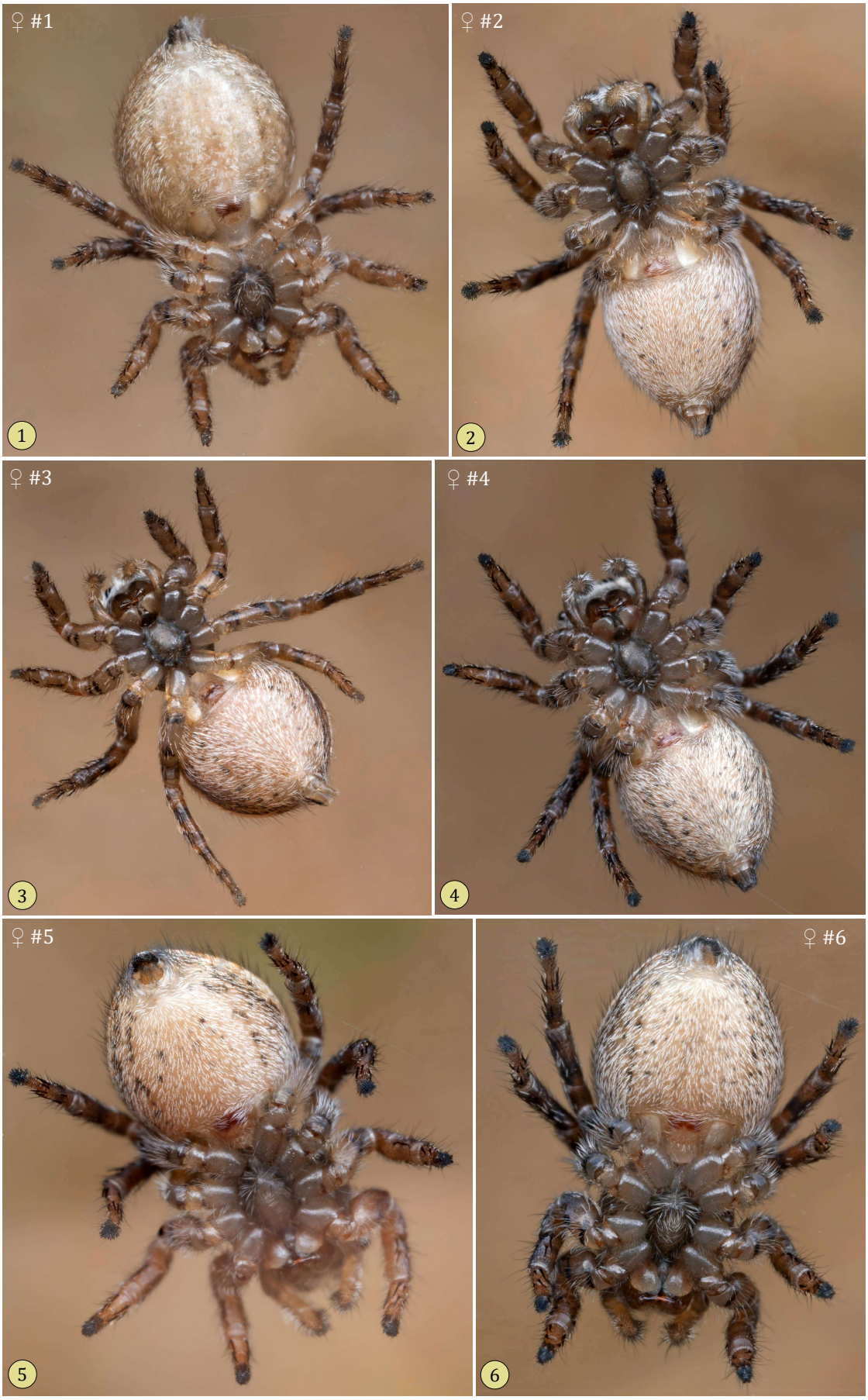

Figure 8. Ventral views of living female types for *Maratus lynx*.

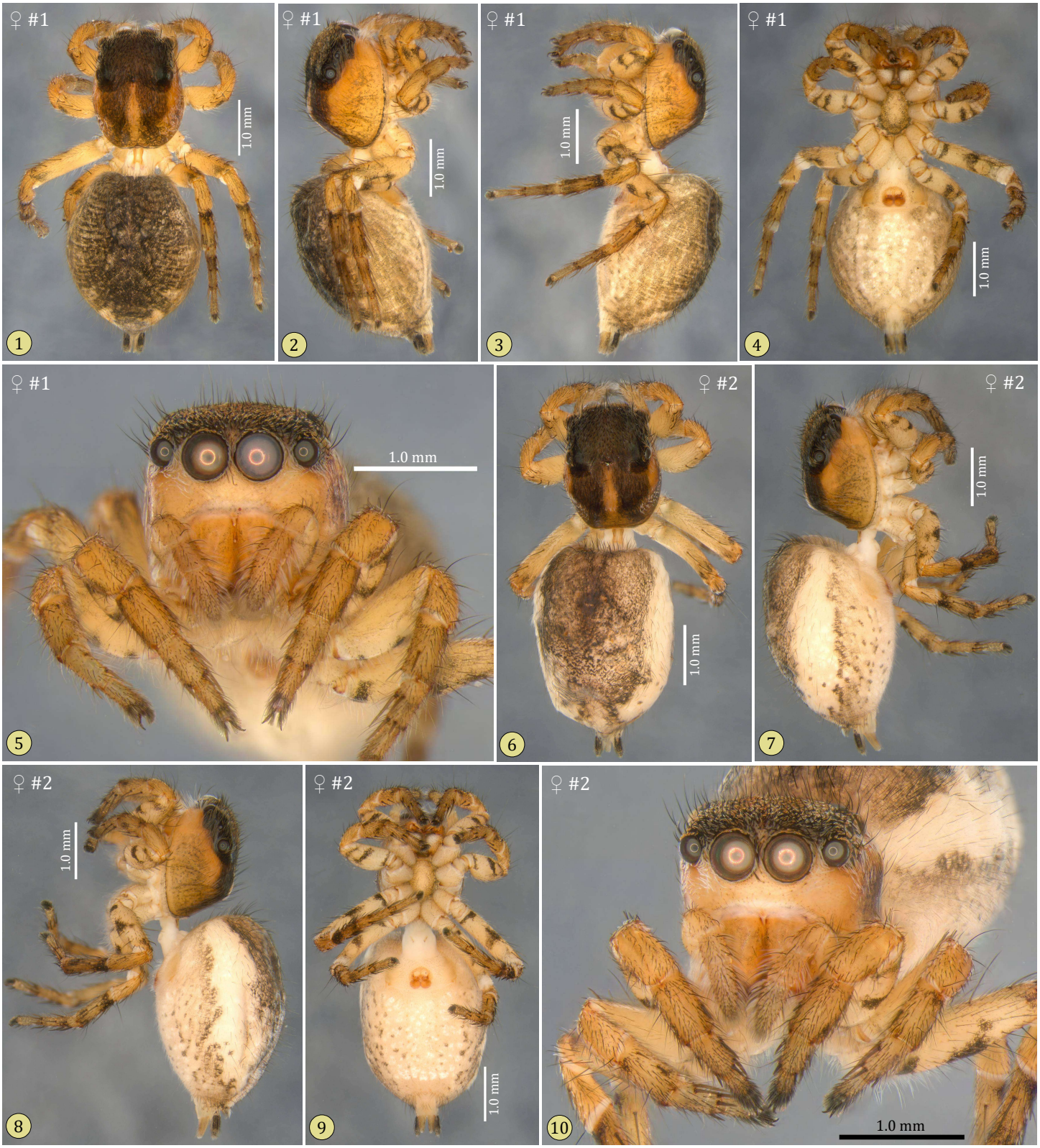

Figure 9 (continued on next page). Female types for *Maratus lynx* in alcohol.

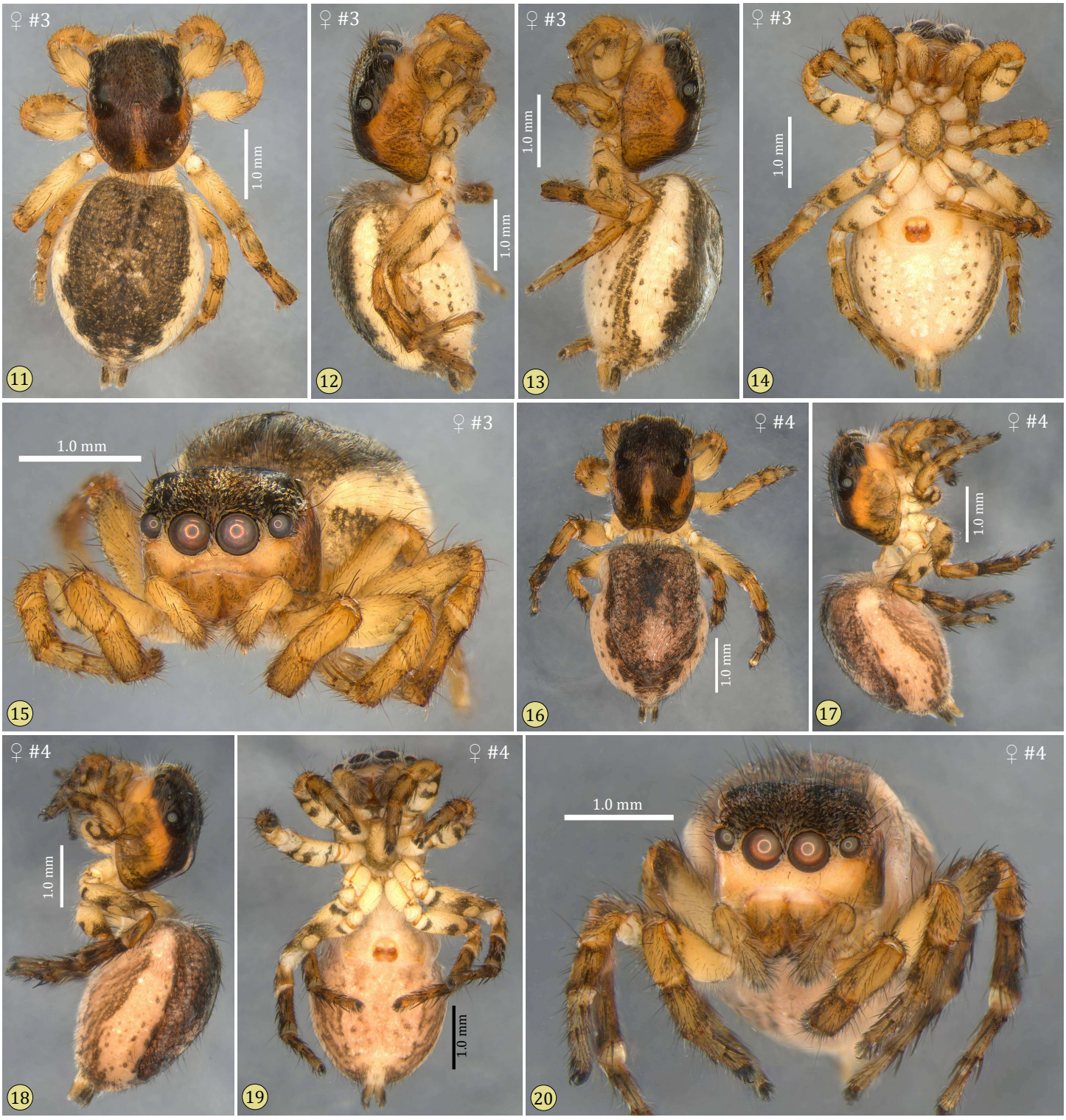

Figure 9 (continued from previous page, continued on next page). Female types for *Maratus lynx* in alcohol.

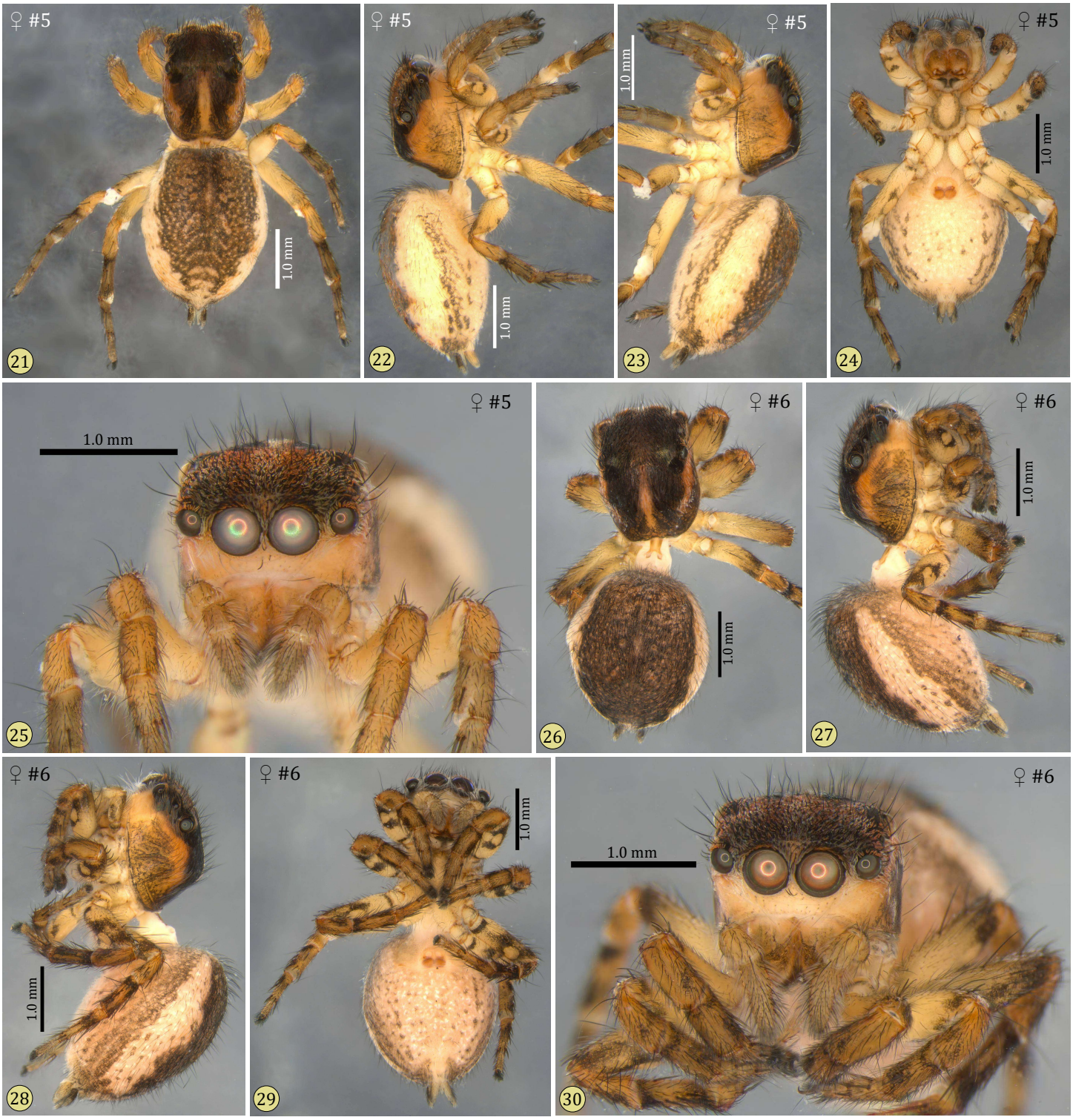

Figure 9 (continued from previous page). Female types for *Maratus lynx* in alcohol.

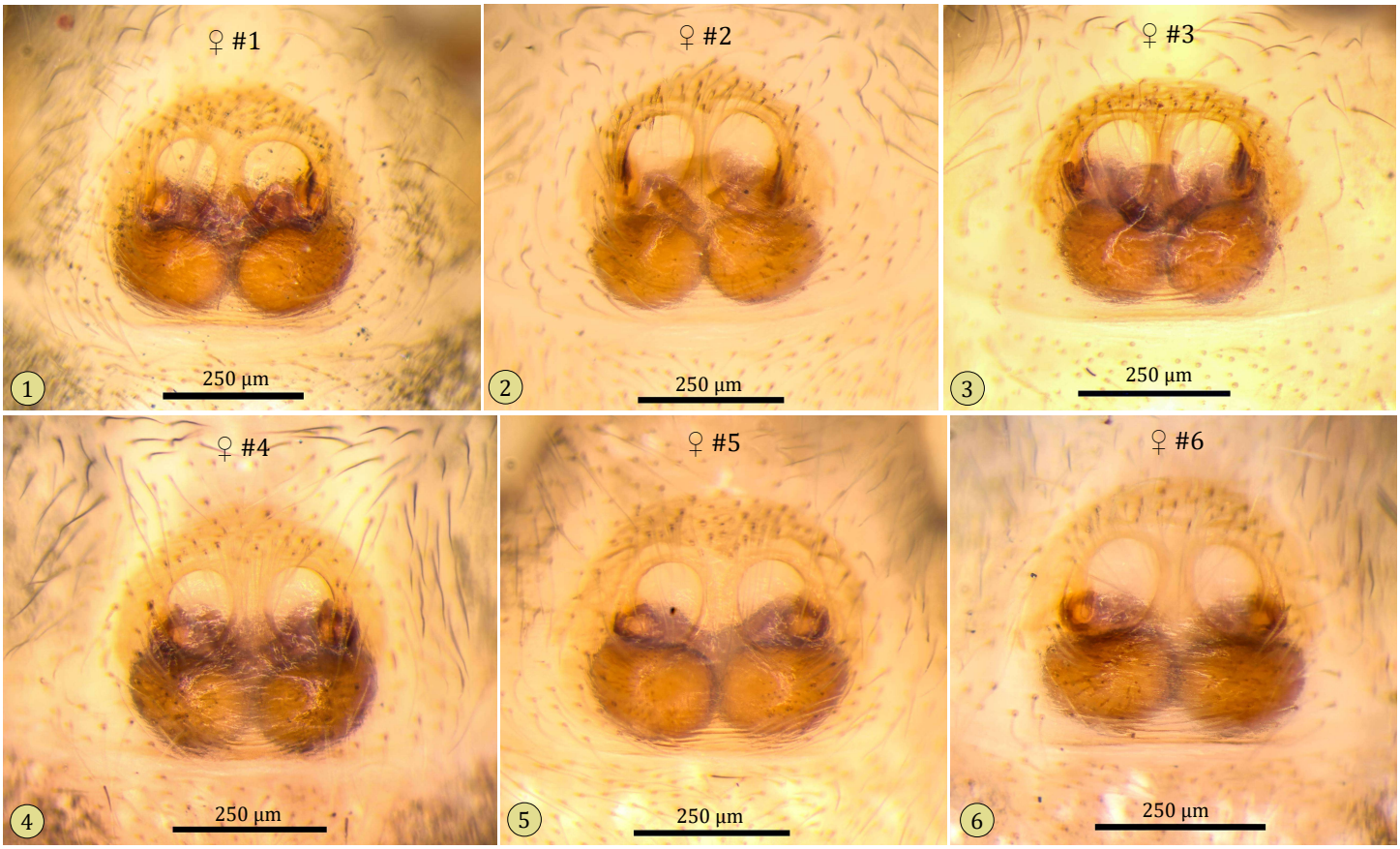

Figure 10. Ventral view of the epigynum of female types for *Maratus lynx*.

Habitat. The type locality for *Maratus lynx* is shown in Figure 11.

Figure 11. Type locality for *Maratus lynx*, 10 km NE of Augusta, Western Australia. Photo credits: James McMulkin.

***Maratus miles*, new species**

Type specimens. The holotype male (♂ #2), four paratype males (♂ #1, 3-5), and two paratype females (♀ #1-2), all collected as adults, and two paratype females (♀ #3-4) collected as immatures and reared to maturity, were collected about 12 km NE of Augusta, Western Australia (S34.251414°, E115.269371°; 24 SEP 2023; Flynn Prall and James McMulkin, collectors). All types will be deposited in the Western Australia Museum, Perth.

Etymology. The species group name, *miles* (Latin, masculine noun in apposition, English translation *soldier*), was chosen because the pattern of iridescent scales at the top of the elevated fan of the male resembles the crest of a kabuto helmet, worn by an ancient Japanese warrior.

Diagnosis. The male *Maratus miles* is similar to *M. felinus* and *M. lynx*. but can be distinguished from the two species by the distinctive pattern of iridescent scales on the fan (Figure 1). The opisthosoma of *M. felinus* and *M. lynx* males is more ovoid, widest at the middle, whereas that of *M. miles* is of more uniform width, wider toward the rear where the bright, light blue "crest" is located. All three species have a pair of tufts at the rear of the fan, but *M. miles* also has smaller tufts anterior to this, on either side. The colouration and setation of the legs of *M. lynx* and *M. miles* is similar, but more than half of each tarsus of *M. miles* is black. Females of the three species are similar and of little use for identification. The detailed structure of the pedipalps is similar to that of many other *Maratus* species from southwestern Australia, and also of little use for identification to species.

Description of male (Figures 1.3, 12-15). Type males (n=5) range from 3.8-4.2 mm in length. Dorsally the pedipalps are covered with off-white or light brown setae. Longer off-white setae project forward over each paturon from the clypeus. Otherwise each paturon is brown to dark brown and mostly glabrous. A band of pigmented red-orange scales extends across the eye region, behind each of the four anterior eyes. Separating these bands are three bands of grey to white setae, and long setae from each band extend to the front in three tufts that separate the anterior eyes. The PME are closer to the PLE than to the AME. On the dorsal carapace, just behind the eye region, is a prominent sagittal band of bright white setae. The carapace is dark black and mostly glabrous on both sides of this sagittal band, and to the sides and rear, except for a prominent marginal band of bright white setae on either side.

The opisthosoma is elongated with nearly parallel sides, tapering evenly toward the rear. The dorsal plate (fan) is darker blue, with distinctive markings comprised of bright, light blue, iridescent scales (Figure 12.14). Toward the rear, long setae extend from the fan on either side, and two longer tufts, each marked by the presence of lighter-coloured setae, are present on each side. At the front of the opisthosoma, long and stout, bright white setae project to the front above the pedicel. At the rear, a small triangular tuft of bright white setae (characteristic of *Maratus*) can be seen above the grey to black spinnerets. Below, the opisthosoma is covered with white to off-white setae.

Legs I and II are shortest, legs IV longer, and legs III by far the longest. Legs I and II have a uniform cover of light brown setae. Legs III are generally orange in colour, with distinctive tufts of longer setae at the proximal tibia and metatarsus (Figure 12.12). Many prominent black-grey setae or spines are also present on the dorsal aspect of legs III. Legs IV also have a cover of light brown setae, but also indistinct banding. Below, coxae, labium and endites are mostly grey and translucent, but many longer off-white setae project from the rear of the darker grey sternum. Below, the pedipalps are glabrous and brown (Figure 13.2). The detailed structure of the pedipalps is similar to that of related species, with a small tooth or projection near the lateral apex of the heavily sclerotized, dark brown or black ring of the embolus (Figure 15).

Figure 12 (continued on next page). Living male types for *Maratus miles*.

Figure 12 (continued from previous page). Living male types for *Maratus miles*.

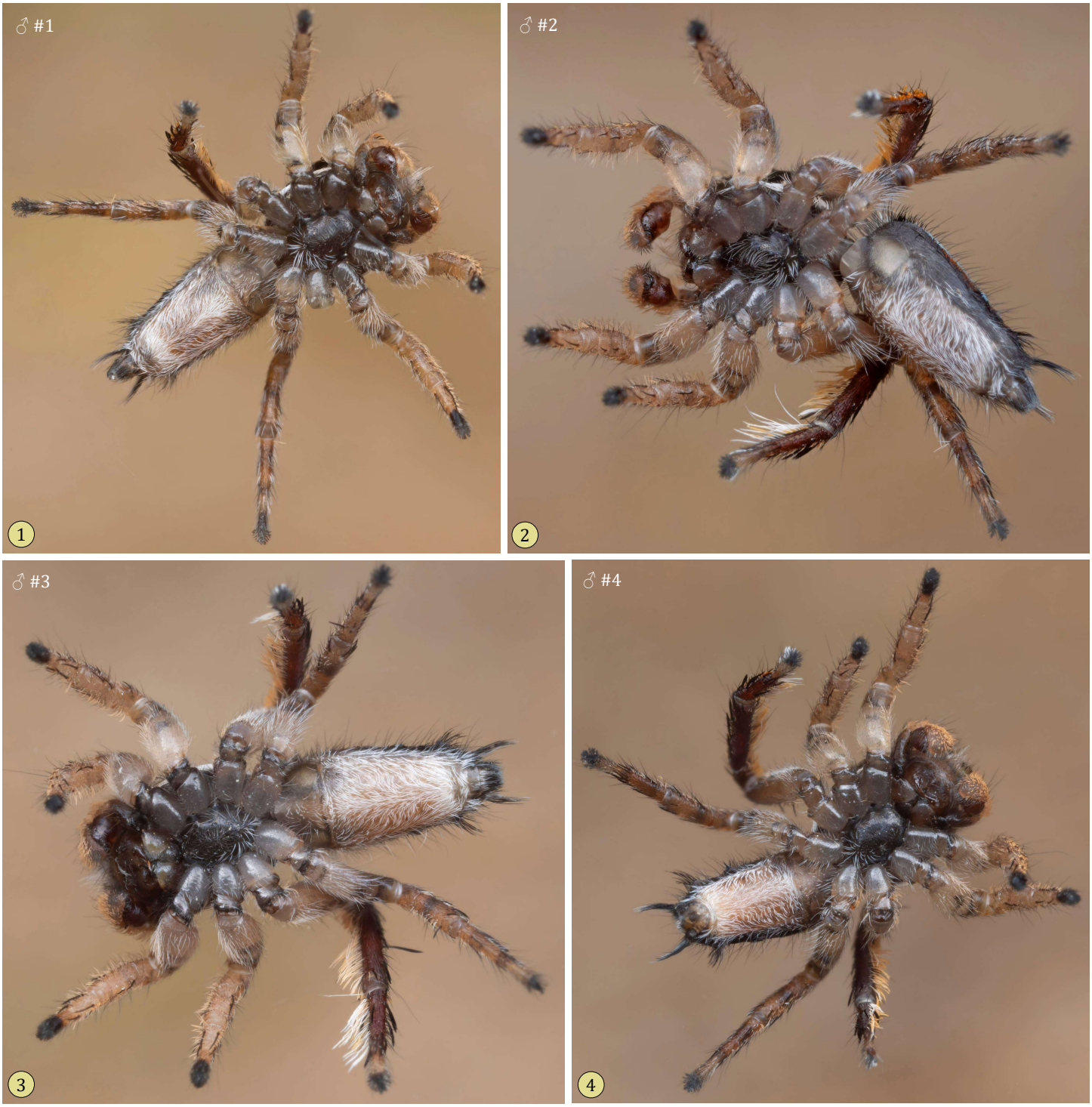

Figure 13. Ventral views of living male types for *Maratus miles*.

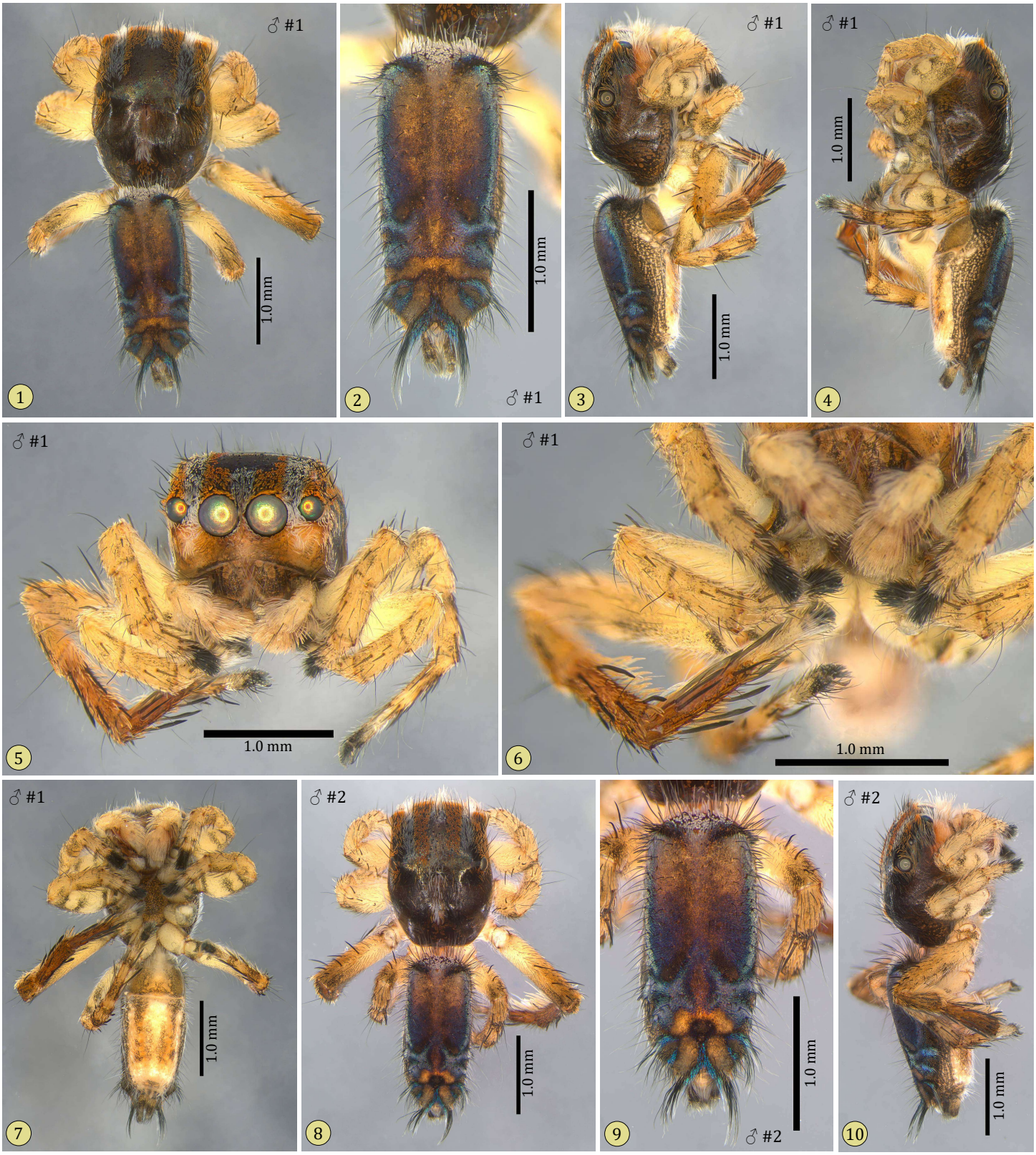

Figure 14 (continued on next page). Male types for *Maratus miles* in alcohol.

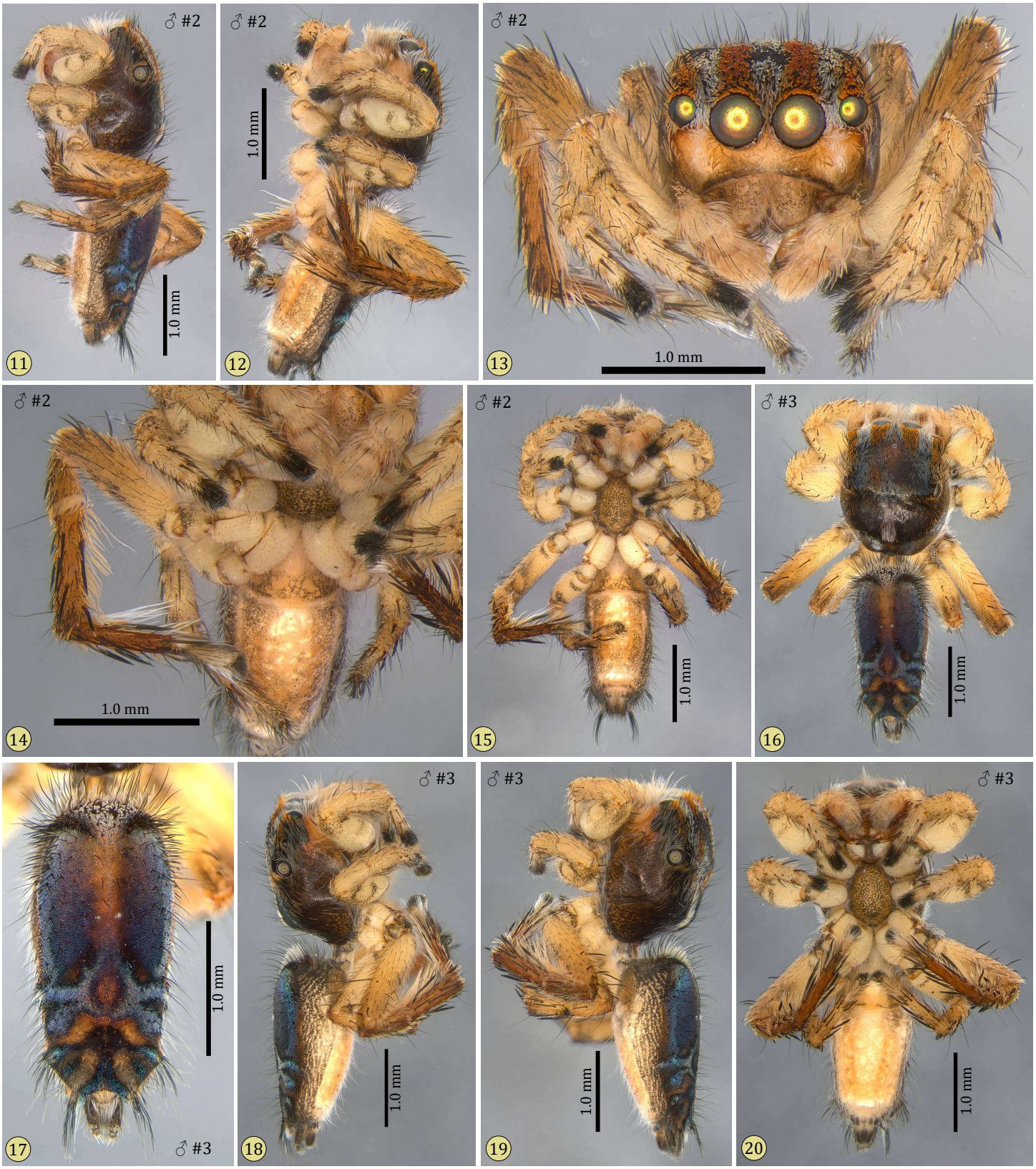

Figure 14 (continued from previous page, continued on next page). Male types for *Maratus miles* in alcohol.

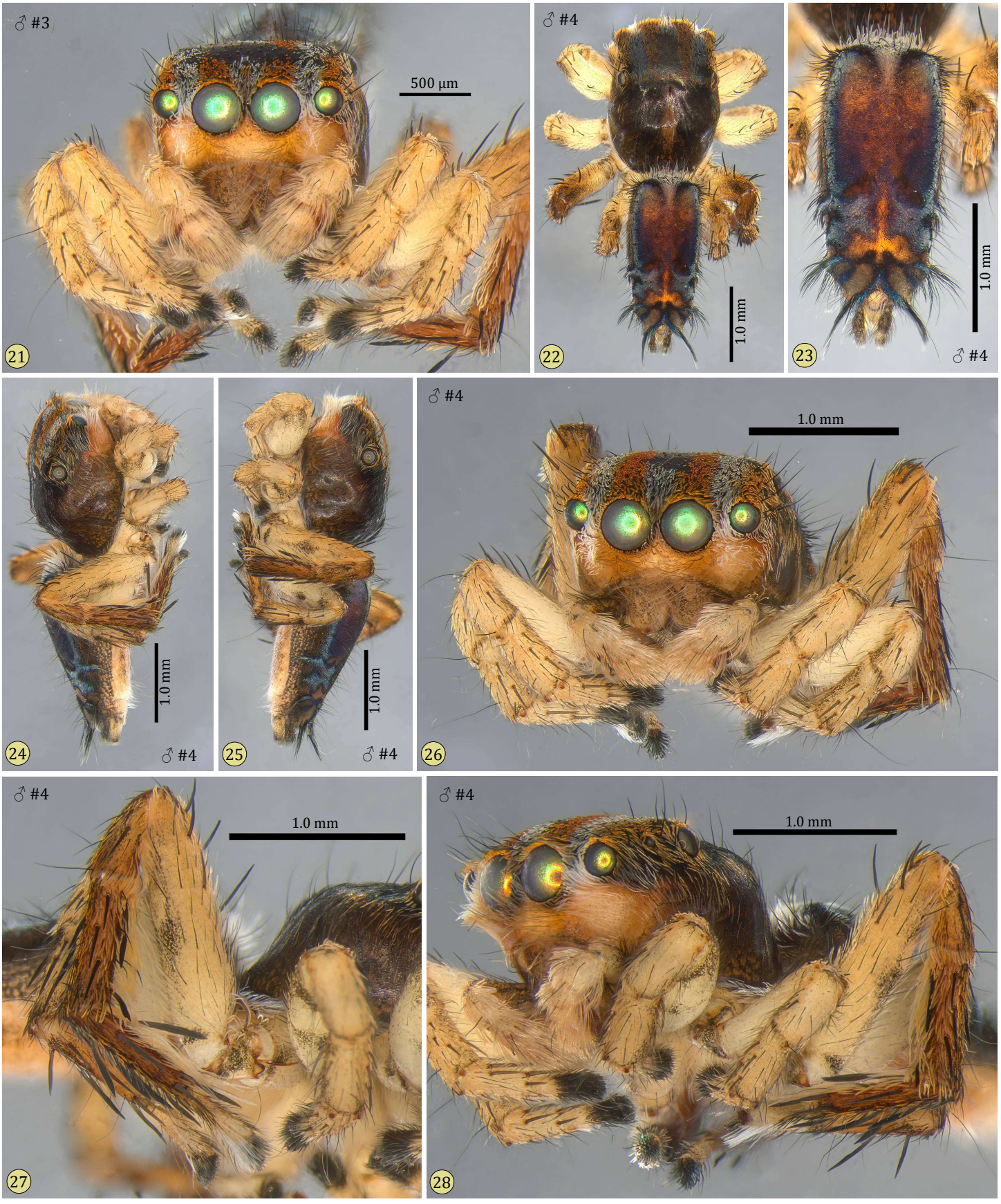

Figure 14 (continued from previous page, continued on next page). Male types for *Maratus miles* in alcohol.

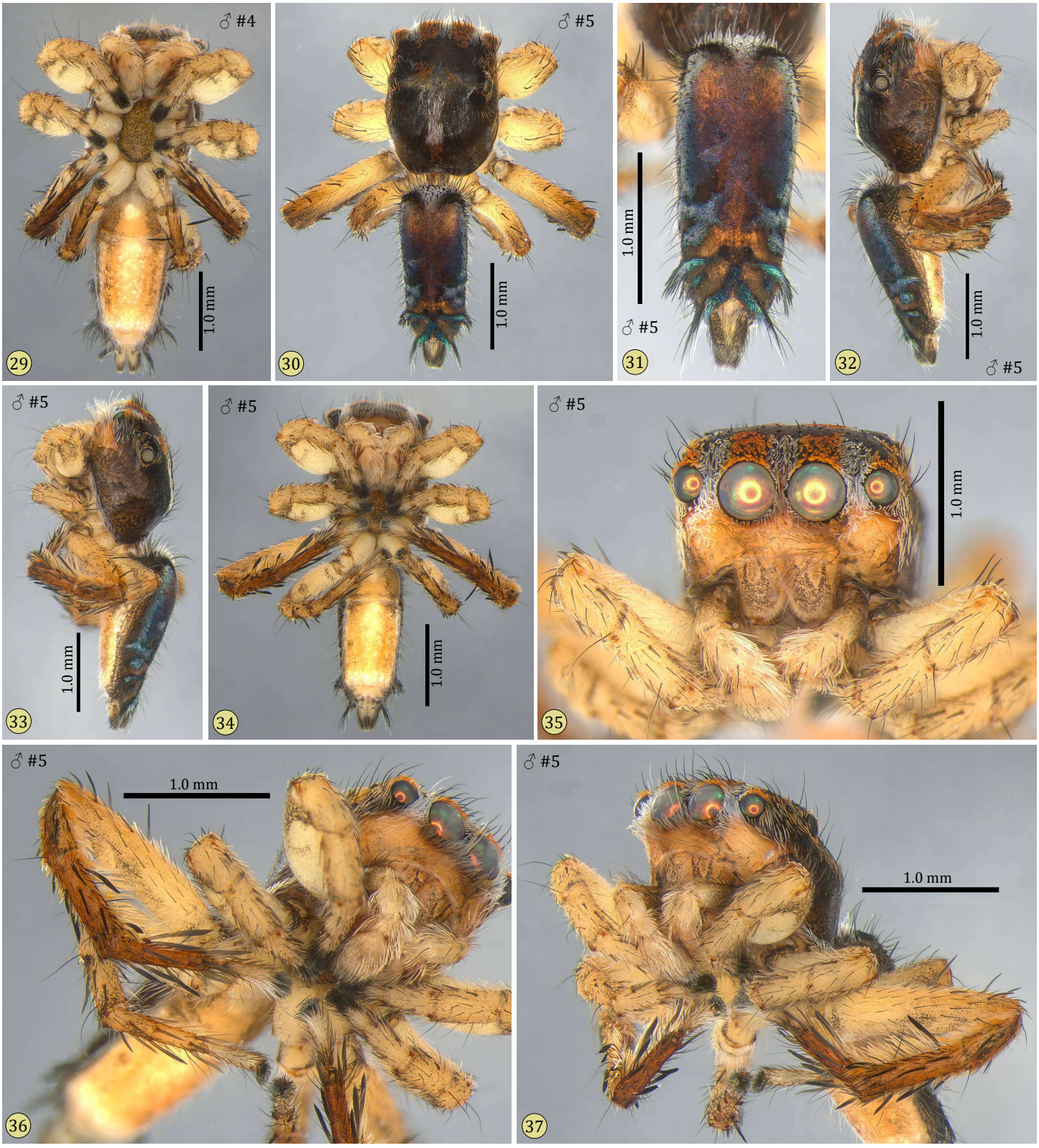

Figure 14 (continued from previous page). Male types for *Maratus miles* in alcohol.

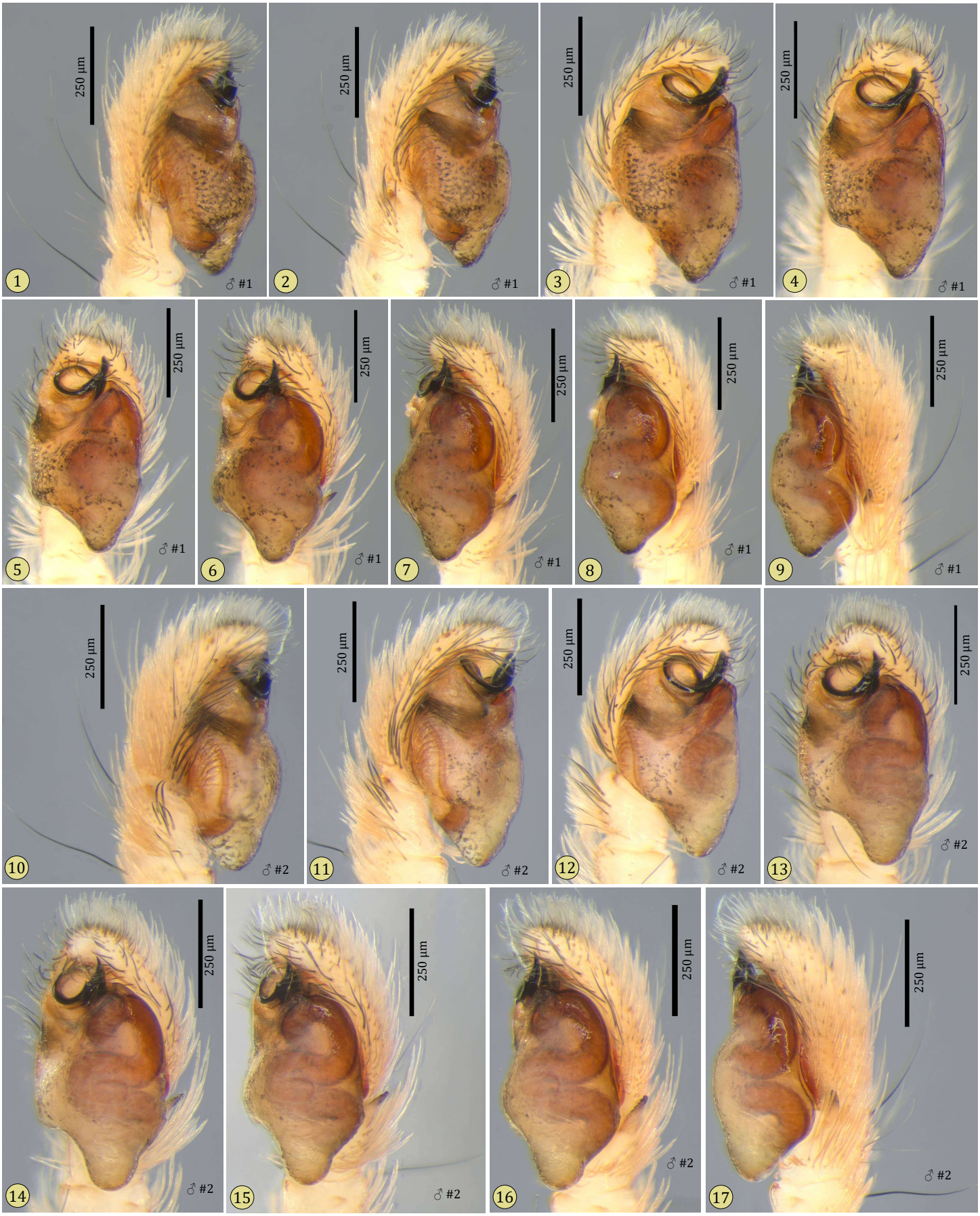

Figure 15 (continued on next page page). Medial to lateral views of left pedipalp, male types for *Maratus miles* in alcohol.

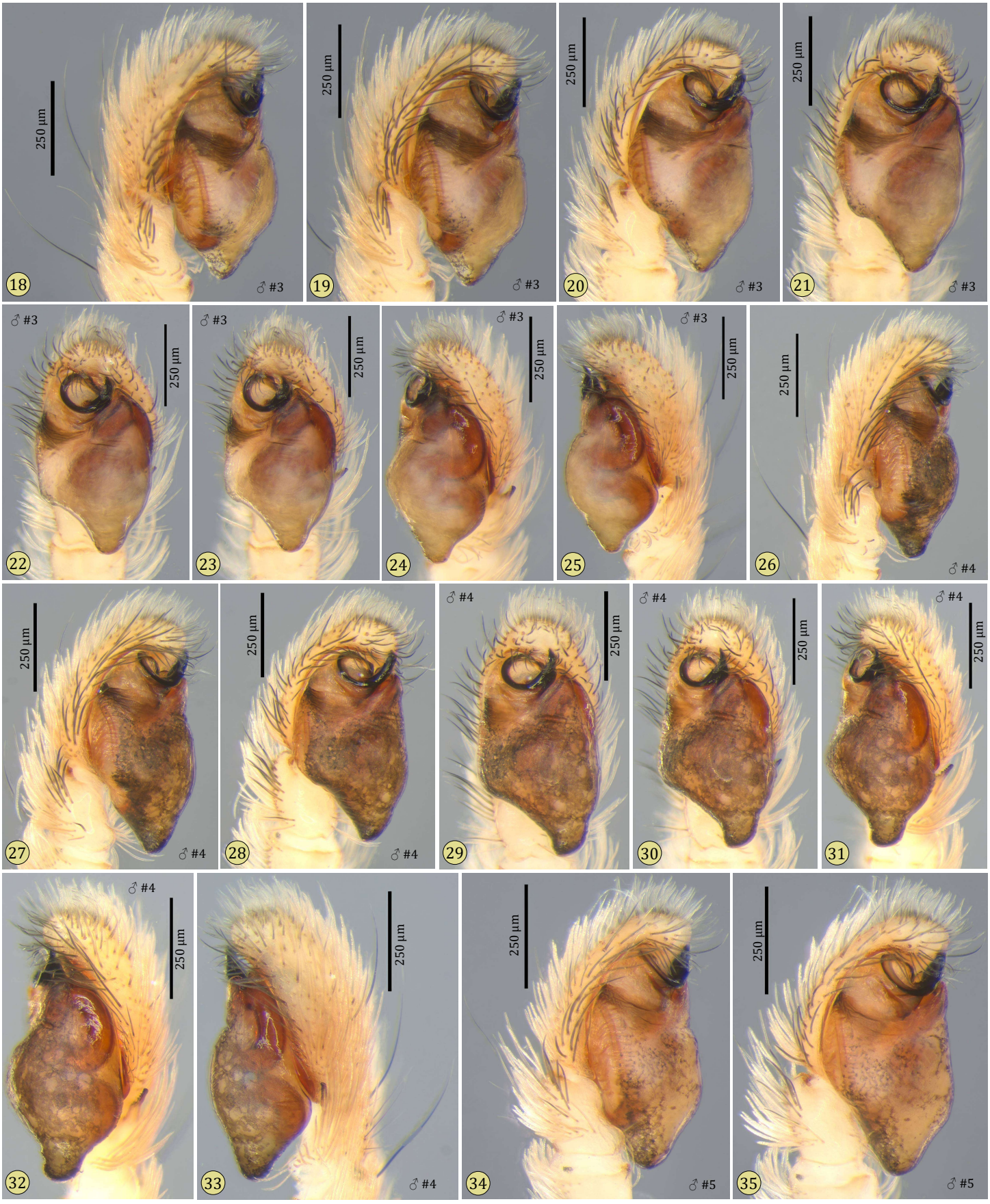

Figure 15 (continued from previous page, continued on next page page). Medial to lateral views of left pedipalp, male types for *Maratus miles* in alcohol.

Figure 15 (continued from previous page). Medial to lateral views of left pedipalp, male types for *Maratus miles* in alcohol.

Description of female (Figures 16-19). Female *Maratus miles* (N=4) ranged from 4.9-5.5 mm in length. In all respects, including size and variable colouration, they are similar to female *M. lynx*. In front the pedipalps are light brown with a cover of off-white setae. White to off-white setae extend in ventromedial direction over the clypeus, below the anterior eye row. Apart from scattered off-white setae, the chelicerae are mostly brown, translucent and glabrous. Above and to the rear the carapace is black, with scale patterns similar to those of the male. There is a band of rust-red scales extending behind each anterior eye across the eye region , and these bands are separated by three bands of mixed off-white and rust-red scales. In some females these bands are less distinct, and more rust-red in colour (Figures 16.7-16.12). The PME are closer to the PLE than to the ALE. To the rear of the eye region, the carapace is black, except for a median band of off-white setae. Below and to the rear of the PLE, on the sides of the carapace, is a prominent patch of mostly off-white setae. The margins are dark brown, glabrous, and translucent, and there is no marginal band.

The dorsal opisthosoma is dark brown, with a variable cover of off-white or rust-red scales. There is a broad, lighter band around the sides of the opisthosoma, with a cover of mostly off-white scales. At the front is a triangular patch of white scales. Less obvious are the numerous, longer black setae that are scattered across the dorsal prosoma and opisthosoma. Below the opisthosoma is light in color, with a cover of off-white setae (Figure 17). Below the coxae, sternum, endites and labium are mostly grey to light brown, glabrous, and translucent, except for scattered off-white setae that may be present on the sternum and the coxae of legs III and IV.

Legs I and II are shorter and of the same length, legs III and IV longer and about the same length. The legs are brown to dark brown or black, with more obvious banding on the rear legs (III and IV). Above they have an incomplete cover of off-white scales and setae, and below they are mostly light brown to grey, glabrous and translucent with bands of black pigment (Figure 17.1).

The epigynum (Figure 19) is like that of many other *Maratus*, with a pair of anterior fossae in front of a pair of large posterior spermatheca of similar size. The septum separating the fossae is of variable width.

Figure 16 (continued on next page). Living female types for *Maratus miles*.

Figure 16 (continued from previous page, continued on next page). Living female types for *Maratus miles*.

Figure 16 (continued from previous page). Living female types for *Maratus miles*.

Figure 17. Ventral views of living female types for *Maratus miles*.

Figure 18 (continued on next page). Female types for *Maratus miles* in alcohol.

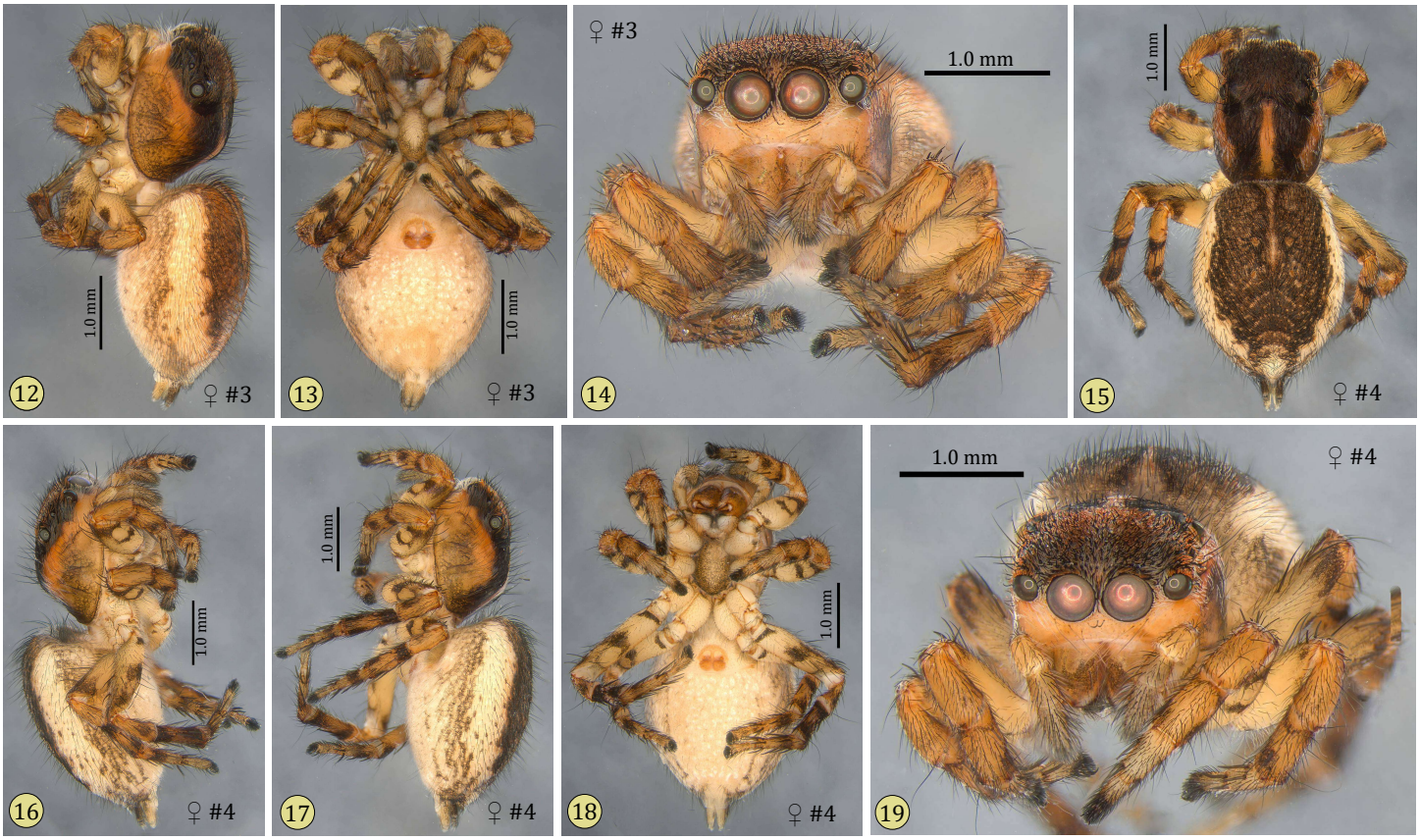

Figure 18 (continued from previous page). Female types for *Maratus miles* in alcohol.

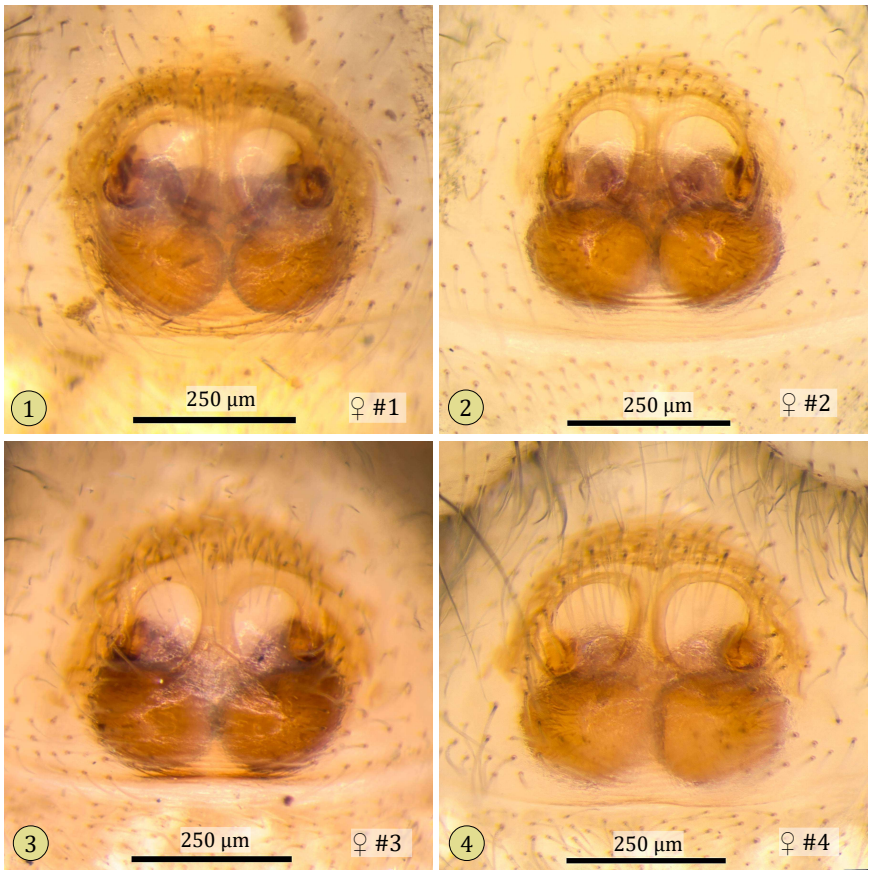

Figure 19. Ventral view of epigynum, female types for *Maratus miles*.

Habitat and population ecology. The type locality for *Maratus miles* is shown in Figure 20. The low shrubs, grasses and herbaceous plants in this area are similar to those found at the nearby type locality for *M. lynx*, and at present we cannot explain the apparent isolation (or *microendemism*) of these species with differences in habitat. Even small-scale variations, such as those related to plant specialization in impoverished soils (Beard et al. 2008) could be relevant.

To the best of our knowledge the three species in the *M. felinus* group are parapatric, subject to local competitive exclusion. Long term environmental stability in the southwestern corner of Australia may favor a low dispersal (measured by map distance traversed during a spider's lifetime) strategy, and this in turn may favor the rapid evolution of female selection on a local scale. However, we still know virtually nothing about either the dispersal or the population genetics of peacock spiders.

Figure 20. Type locality of *Maratus miles*, ~12 km NE of Augusta, Western Australia. Photos by James McMulkin.

Courtship Display by members of the *felinus* subgroup

The choice of a mating partner (*sexual selection*) can be determined by either the behaviour of the male, or the female, or both. For almost all *Maratus*, it appears that only the female makes the final decision to mate (*female selection*). In a few species within the genus, e.g. *M. vespertilio* (Simon 1901), male : male combat (*agonistic behaviour*) may also factor into this decision (Otto & Hill 2012). Apart from the importance of female selection, we have little information about the mating systems at work in this genus. For example, we do not know how many opportunities a female has to mate, how many times she will mate, or whether or not selectivity varies by age or environmental factors. Laboratory observations suggest that females will mate but once. If the adult male population is roughly equivalent to the female population, and females mate but once, then the average male *success* (matings) in a population cannot exceed 1. It follows that some males will never mate, and at least a few others will mate more than once. But at this point we have no idea how variable success is. Further studies are needed for us to better understand the mating systems that drive what appears to be a rapid coevolution of male display and female selection in the various *Maratus* species.

From a strictly functional perspective, it is reasonable to interpret the courtship behavior of the male peacock spider as *intent-driven*. The intent (implicit in behaviour) of the male is to mate with the female, but in this context, the specific display sequence used by a male has some degree of flexibility, presumably a feature that has evolved because it has a positive bearing on success. Based on our observation of the three species in this subgroup, we can recognize a common display repertoire divided into four categories on the basis of hypothetical (or implicit) intent (Table 2).

Table 2. Display repertoire for males of the *Maratus felinus* subgroup.

intent	display	description
advertisement: get a female to reveal her presence	*one leg*	one leg III extended, elevated and waved slightly
	two leg	both legs III extended and held in vertical position, as high as possible, either still or with slight lateral movement
	semaphore	extended legs III are waved up and down, fan may be partly elevated
solicitation: get a female to pay attention	*high fan*	with both legs III extended in a vertical position, and pedipalps held to the side exposing the chelicerae, low amplitude wave of the elevated fan
	high reach	like the *high fan* display, but the elevated legs III are bowed toward each other or in contact above the midline, and may be moved laterally or hyperextended at the tibiometatarsal joint
	pedipalp flicker	the elevated fan and legs III are held in position as the pedipalps are moved up and down in near-unison
seduction: prove value to an attentive female	*tap dance*	with sagittal plane of male out of alignment (skewed by ~45°) relative to the sagittal plane of the courted female, and pedipalps held to the side exposing the chelicerae, movement (tapping) with legs I alternates with elevation and low amplitude waving of the fan between the extended and bowed legs III
presentation: pre-mating activity	*caliper dance*	very active and and rapid full caliper movement of the extended, elevated and bowed legs III as the male steps from side to side facing the female

Advertisement increases the visibility of a male to females in the vicinity. The previous sighting of a female, or the presence of female pheromones (Clark & Jackson 1995; Taylor 1998; Gaskett 2007; Cerveira & Jackson 2013a, 2013b; Tedore & Johnsen 2013; Humbel et al. 2021) may lead to male advertisement, which may in turn lead a female to turn or move in a manner that reveals her location. In the *M. felinus* subgroup, this does not include elevation of the fan, which we have only observed during *solicitation*, after a male has seen a female.

One leg and two leg display (Figures 21-24). These are simple displays, involving extension and elevation of either one or both legs III to a near vertical position, often with slower, low amplitude waves (side-to-side or lateral rotation, ~1-1.5 Hz, ~1-5°) of each leg.

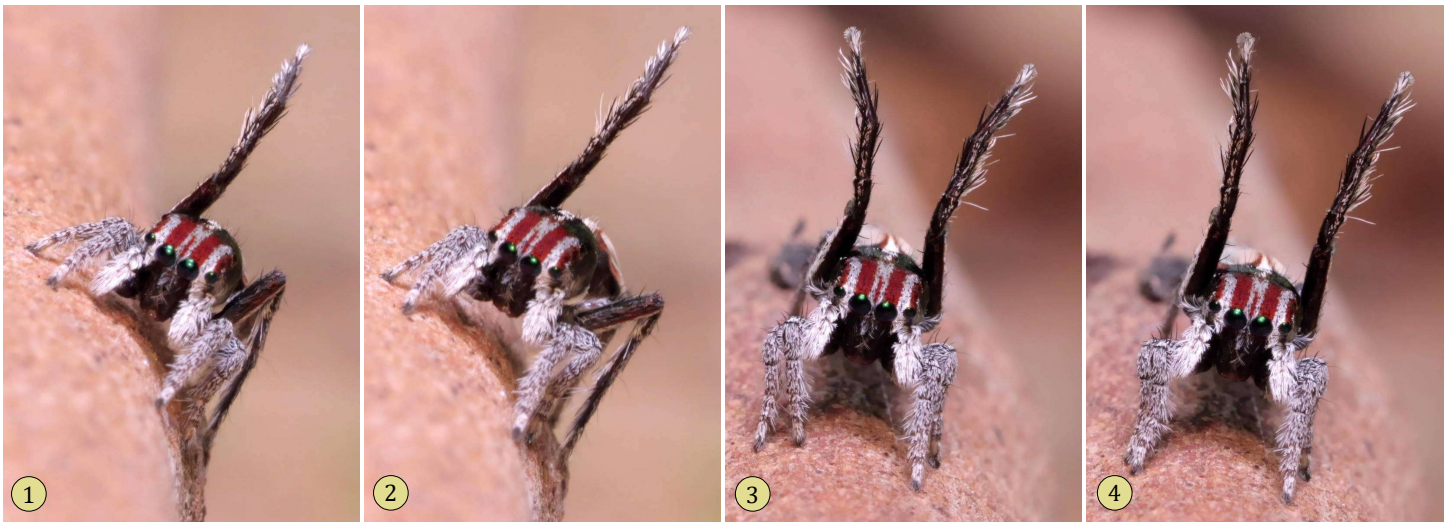

Figure 21. Frames from a 25fps video of an advertising male *Maratus felinus*. **1-2,** Apparently with some degree of caution, this male elevated one leg III to a vertical position as he slowly advanced to look over the top of a branch. **3-4,** With body and extended legs III elevated, the male mostly remained still, with limited movement of legs III in a vertical position.

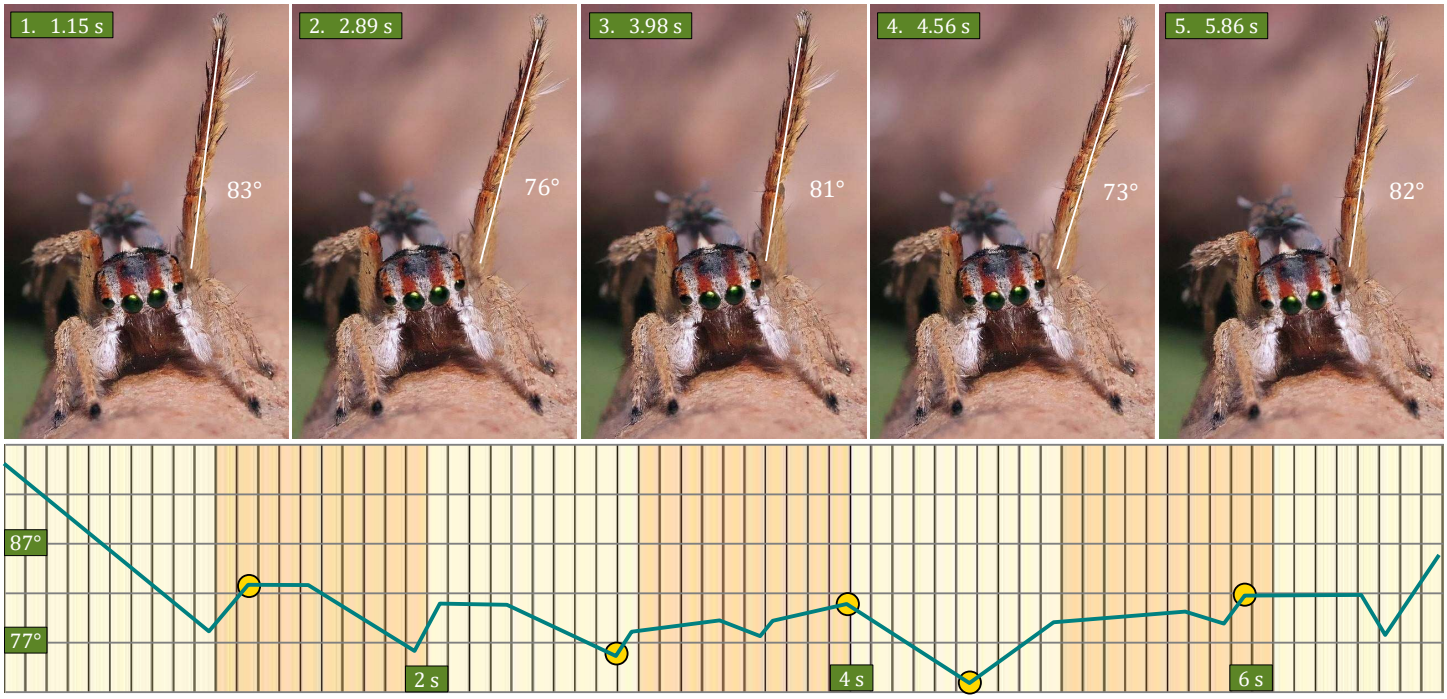

Figure 22. Record of a *one leg* display by a male *Maratus lynx*, based on measurements taken from frames of a 100 fps video. This wave has a relatively low magnitude (~5°), and irregular timing. The chart shows relative positions of the elevated left leg, measured as shown in frames 1-5 (timing indicated by circles on the chart).

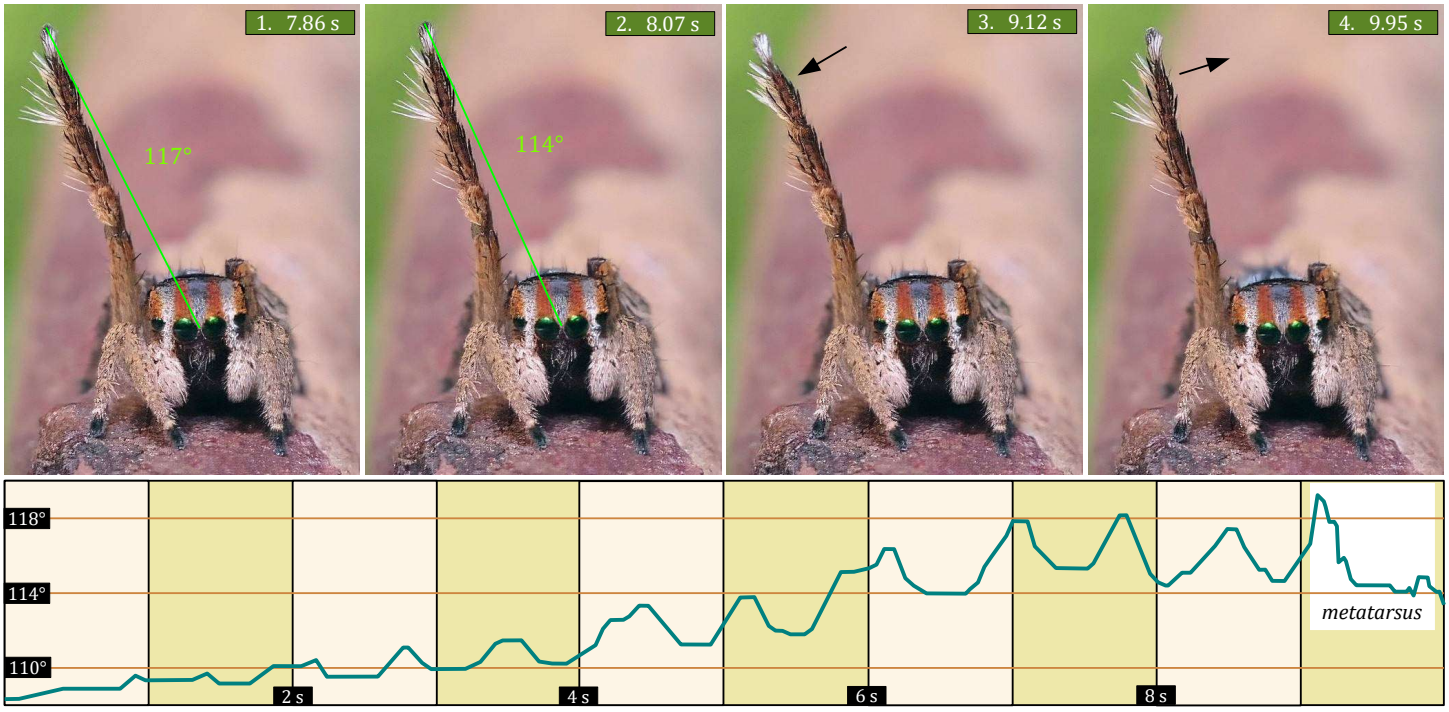

Figure 23. Low amplitude (~1-4°, ~1-1.5 Hz) wave of extended leg RIII during a *one leg* display by a male *Maratus miles*, based on a 100 fps video record. At the end of this sequence (3-4, white rectangle in chart) movement of the leg (RIII) was primarily at the tibiometatarsal joint. This was associated with retraction (3) and extension (4) of long white setae beneath the metatarsus of leg RIII.

Figure 24. *One leg* or *two leg* display or *advertisement* by male *Maratus lynx* (1) and *M. miles* (2-3).

Semaphore display (Figures 25-27). In this display, the laterally extended legs III are slowly (1-2 Hz) waved up and down, in place, with no movement of the fan or pedipalps. Usually the fan is not elevated, but it may be raised if a female is sighted (Figure 25). This display, with legs III extended laterally, has not been observed in *Maratus felinus*.

Figure 25. *Semaphore* display positions of male *Maratus lynx* (1-2) and *M. miles* (3-6). Elevation of the fan suggests that a female has been sighted.

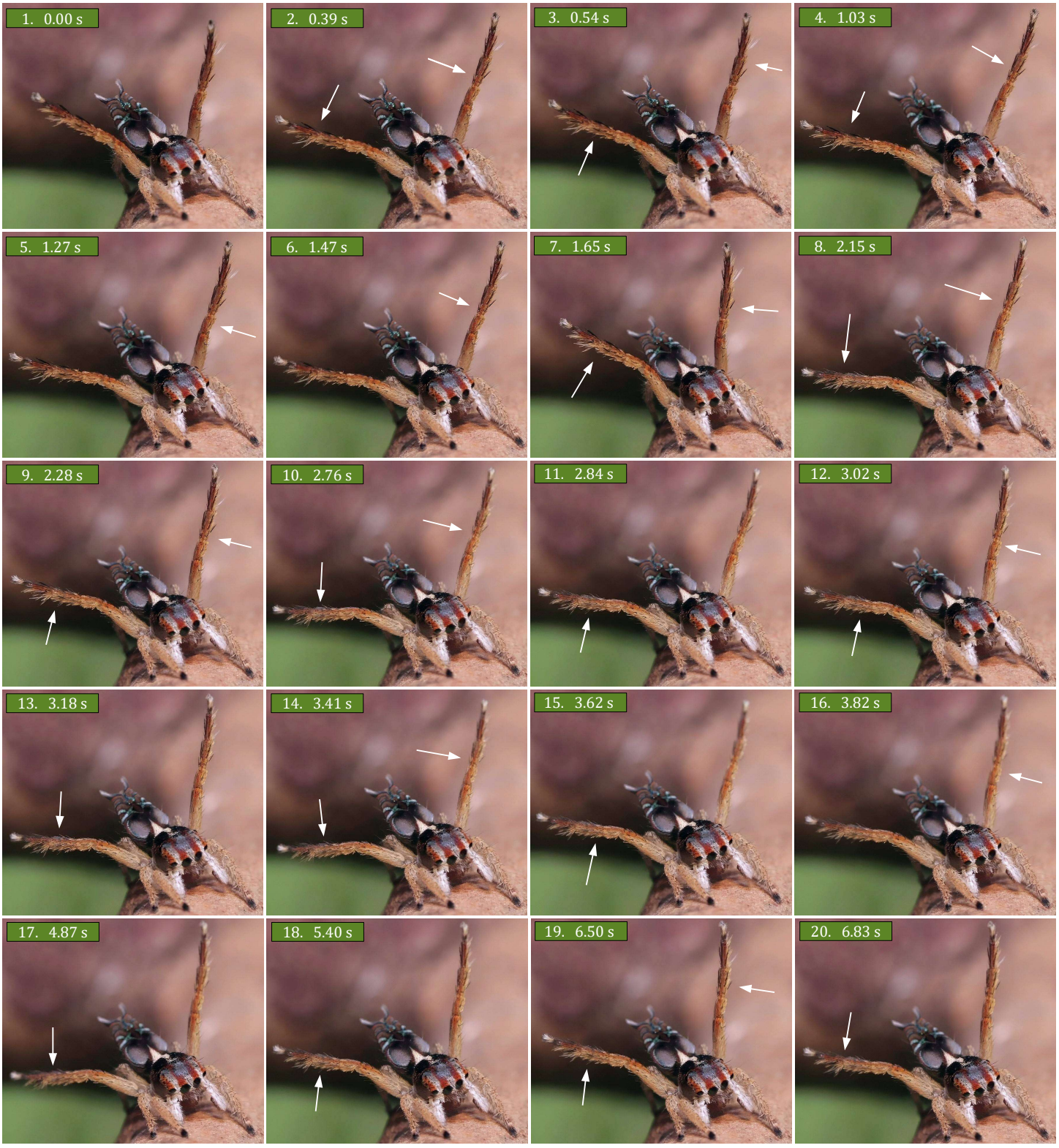

Figure 26. Sequential frames from a 100 fps of a male *Maratus lynx* performing a semaphore (leg III waving) display. Movement of legs relative to the preceding frame is indicated by arrows. During this relatively slow (~1.5 Hz) display, movement of the two legs III is near-synchronous, but not strictly synchronous.

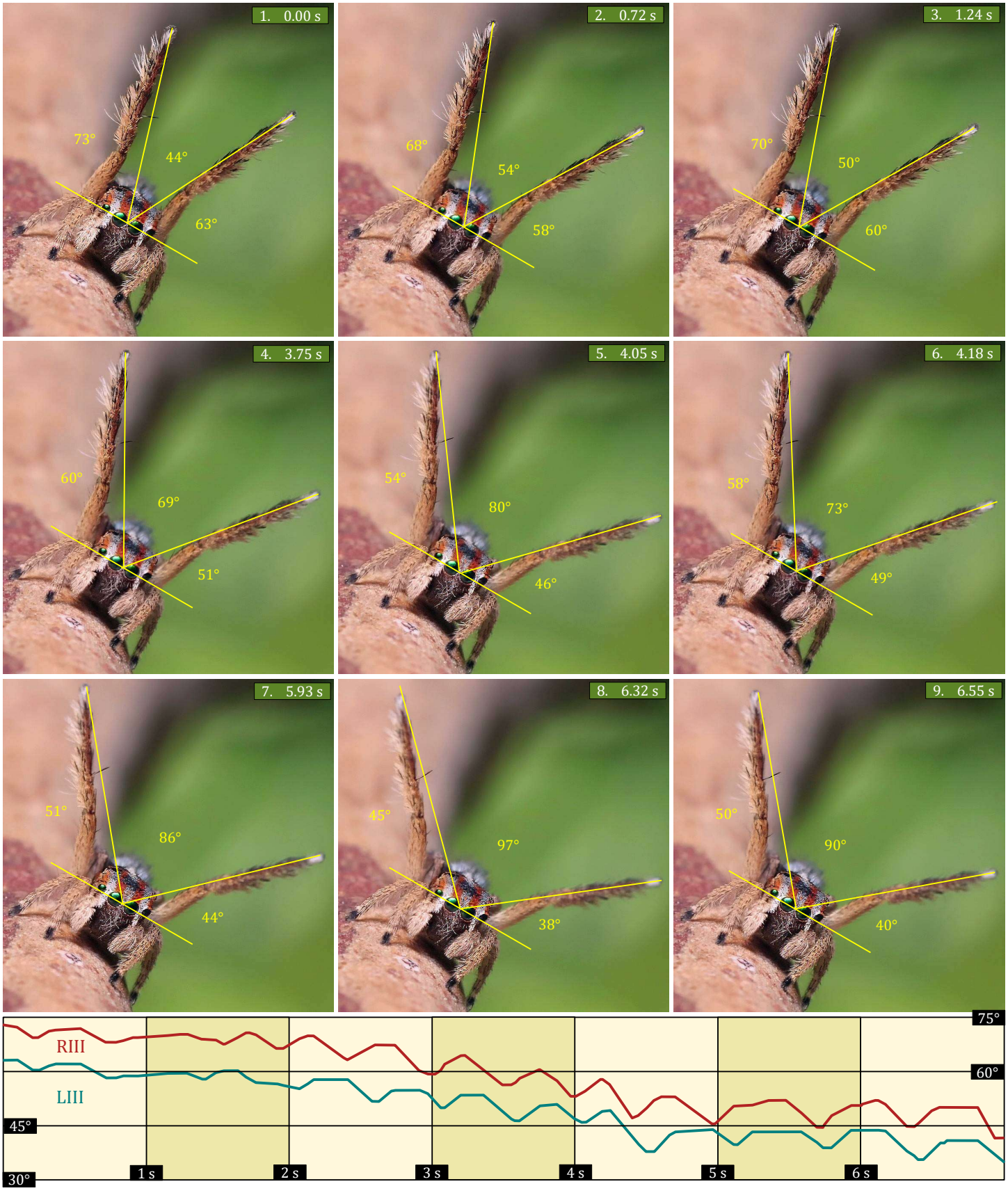

Figure 27. Record of leg III elevation during a *semaphore* display by a male *Maratus miles*, based on 7 s from a 100 fps video record. Movement of the two legs is near-synchronous. Timing of waves (~2 Hz) was consistent, but the position of legs III was progressively lower during this interval.

High fan display (Figures 28-35). During this frequently observed display, the fan is elevated and both legs III are extended and held apart in a near-vertical position. Each pedipalp is held to the side of the ipsilateral paturon, and is not moved. The high fan display is characterized by lateral or side-to-side rotation of the elevated fan in a transverse plane (*waving*) at fairly regular intervals (2-6 Hz cycles, ~8-15° amplitude), which may be interrupted by quiescent intervals or very low amplitude (~1°) waving (Figures 30, 32). Each wave is not completely smooth, but is interrupted by relatively low amplitude *bobbing* (rotation of the fan up and down in a sagittal plane) and lifting or dropping (movement of the fan up and down in a transverse plane) (Figures 29, 33).

Figure 28. *High fan* display by members of the *Maratus felinus* subgroup. During this display, the extended legs III are held in a near-vertical, near-parallel position.

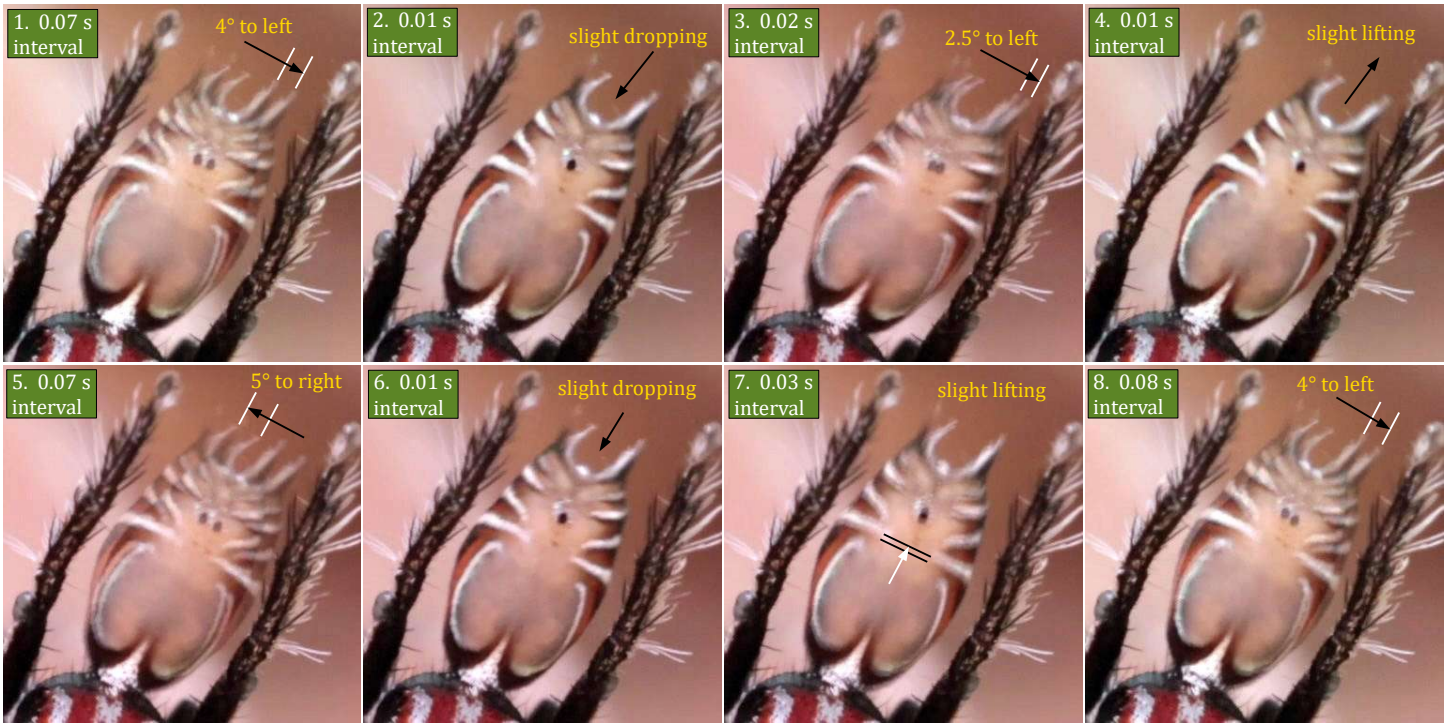

Figure 29. Sequential sets of superimposed frames (or consecutive intervals) from a 100 fps video record of the *high fan* display of a male *Maratus felinus*. *Waving* or lateral rotation of the elevated fan is not smooth or continuous. As shown here, waving motion (1, 3, 5, 8) may alternate with slight *dropping* (2, 6) and *lifting* (4, 7) of the fan in a transverse plane.

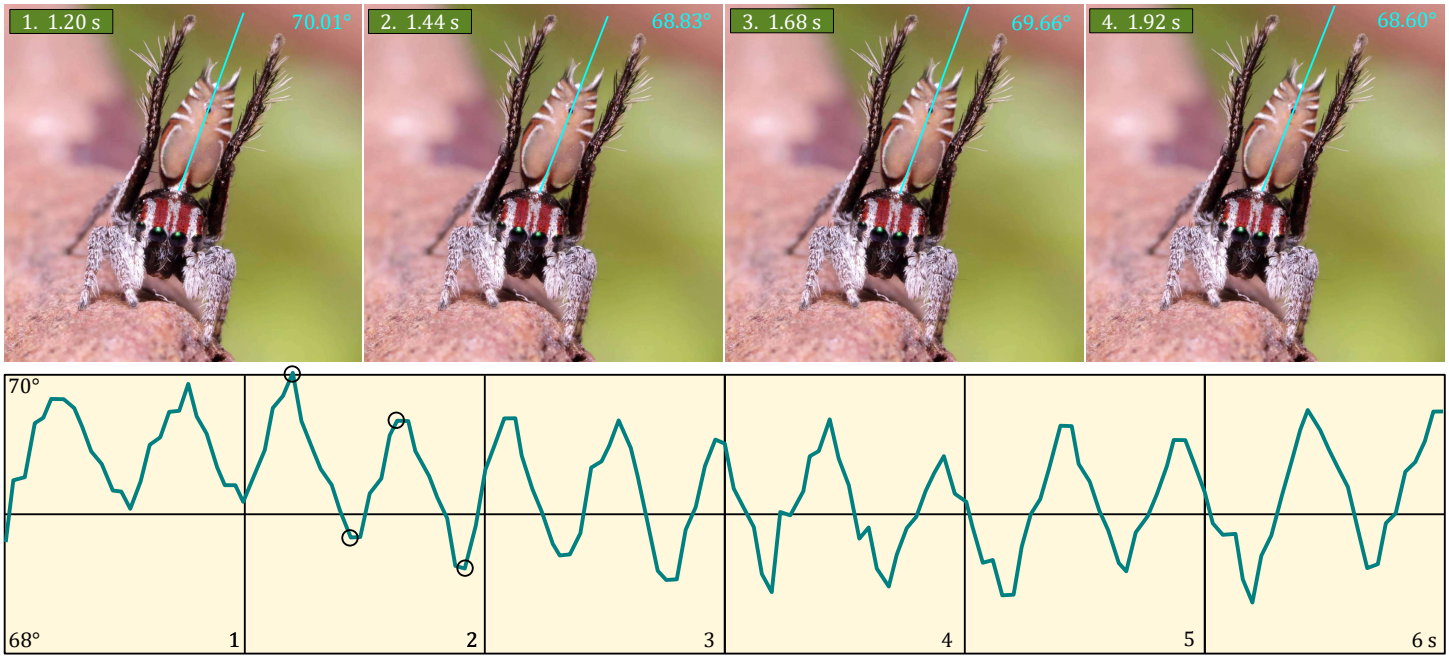

Figure 30. *High fan* display of a male *Maratus felinus*, based on measurement of fan inclination from frames of a 25 fps video over a 6 s interval. The chart shows periodic, but low amplitude (~1°) *waving* (lateral rotation) of the elevated fan at cycles of ~2 Hz during this display. The four sequential frames shown here (1-4) are identified with small circles on the chart. Absolute measurement of the angle of the fan was not very accurate (~0.3° resolution at best), but the timing of these subtle movements shown here is correct.

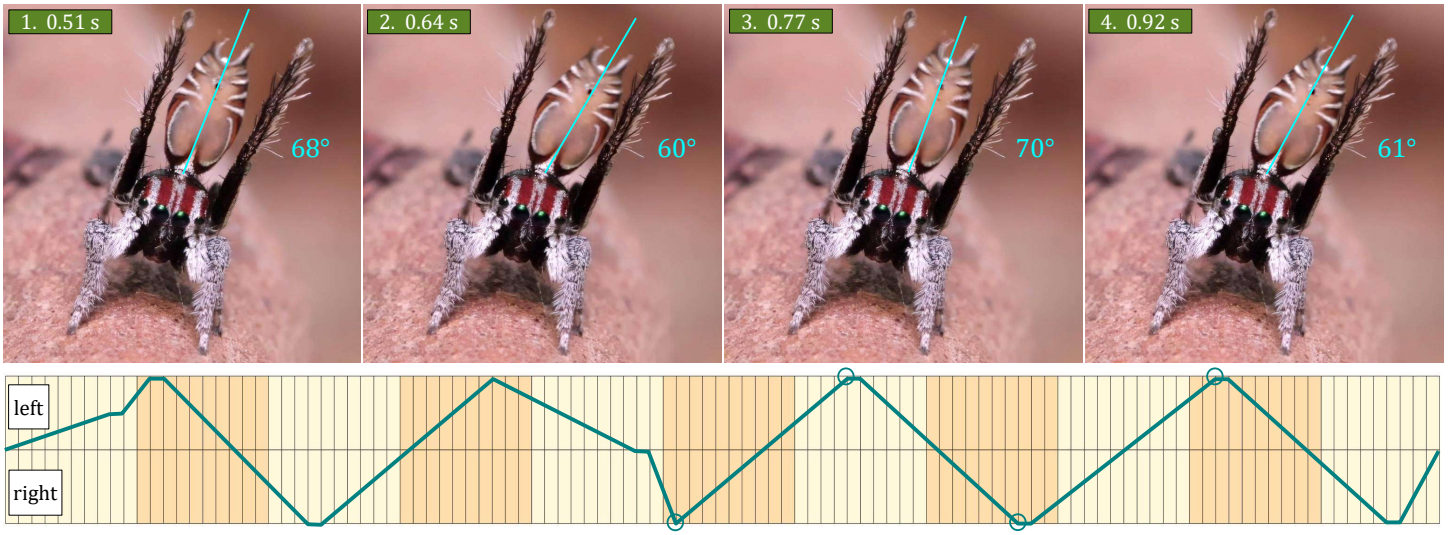

Figure 31. *High fan* display by a male *Maratus felinus*, based on measurement of lateral fan inclination from frames of a 100 fps video over a 1.09 s interval (each increment corresponds to a 0.01 s frame; the vertical scale indicates the timing but not the absolute magnitude of each wave). Here both the frequency (~3.7 Hz) and the amplitude (~10°) of movement of the fan was much greater than that shown in Figure 4.

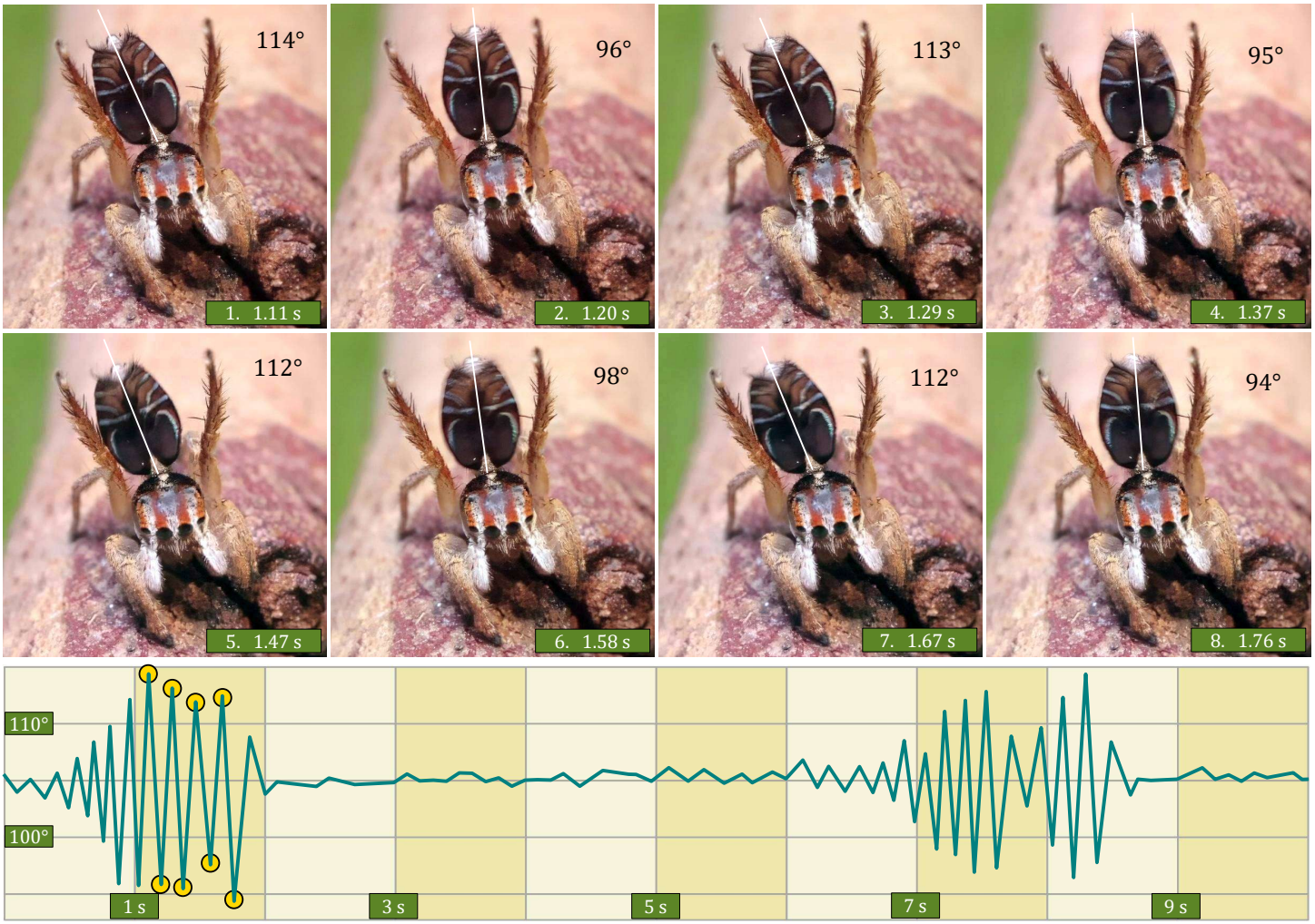

Figure 32. *High fan* display of a male *Maratus lynx* based on 10 s from a 100 fps video. During this interval, the fan was continuously moved, but bouts of higher amplitude waves (~15°, ~6 Hz) alternated with longer periods of irregular, very low amplitude (~1°) waves. Circles in the chart correspond to the sequence of frames (1-8) shown above.

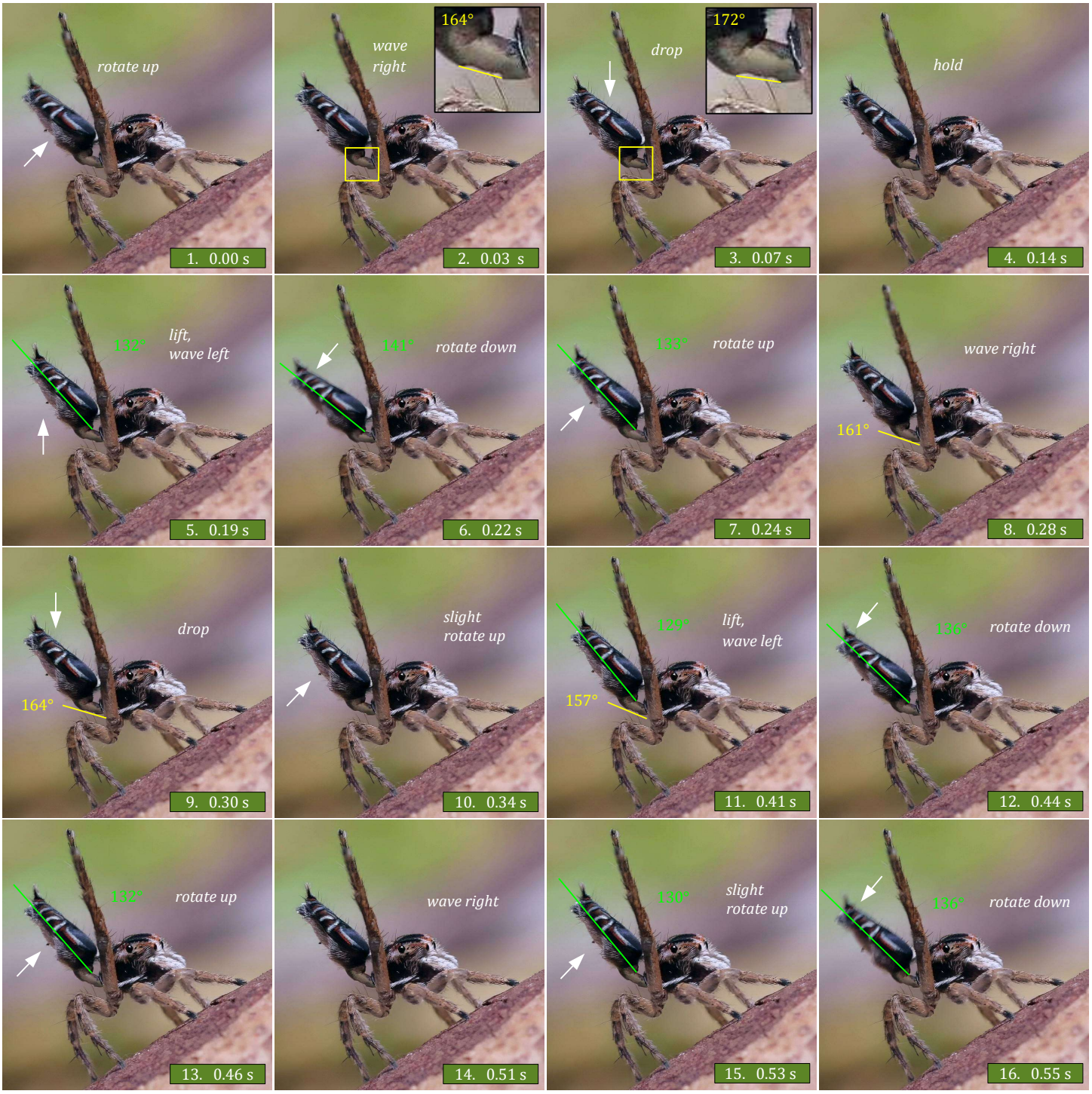

Figure 33. Lateral view of the *high fan* display of a male *Maratus lynx* (selected sequential frames from a 100 fps video). Although waving from side to side (left or right) is less visible in this view, the other two directions of movement of the fan (slight lifting and dropping in a transverse plane, and bobbing or rotation up and down in a sagittal plane) can be seen here. **2-3,** Note the 8° drop in the inclination of the pedicel (insets) between these frames.

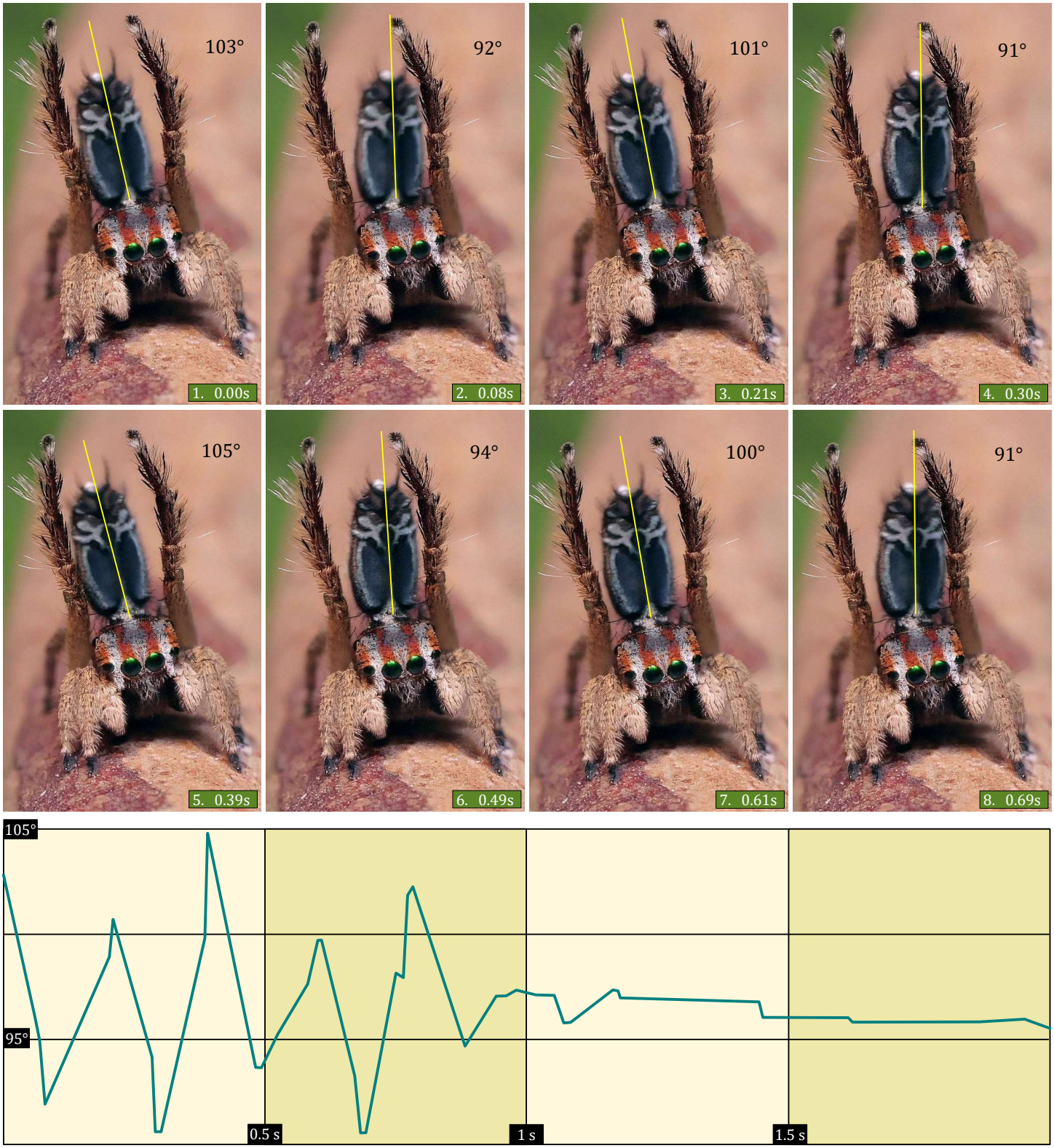

Figure 34. Higher amplitude (~5-15°, ~4 Hz) wave of extended leg RIII during the *high fan* display of a male *Maratus miles*, based on 2 s from a 100 fps video record. Note the relatively stationary position of legs III during the 1-2 s interval.

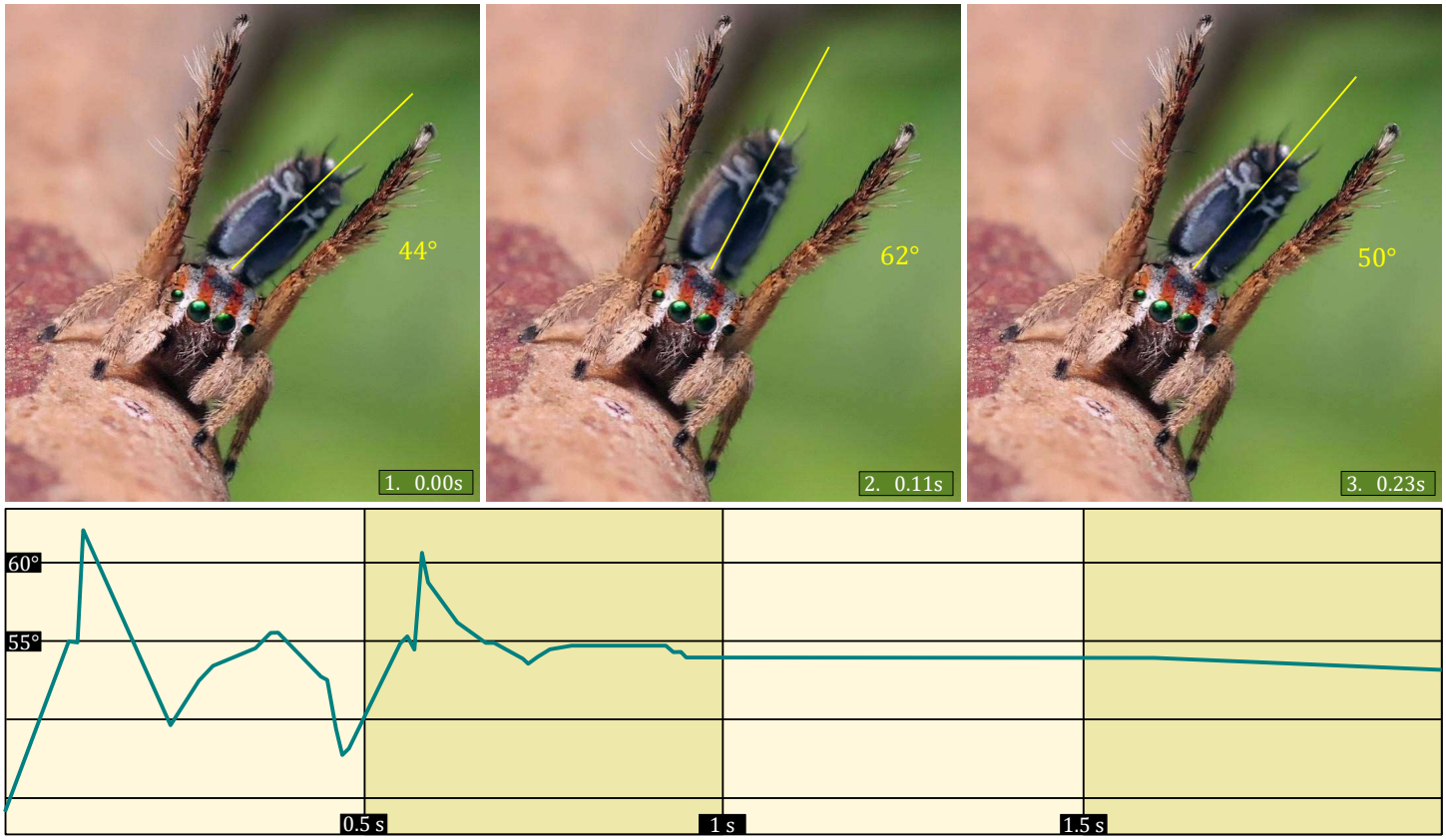

Figure 35. Higher amplitude (~12-18°, ~4 Hz) waves of the fan as measured by fan inclination in a transverse plane during the *high fan* display of a male *Maratus miles*, based on 2 s from a 100 fps video record. As in the related *M. felinus* and *M. lynx*, each wave is not smooth but is interrupted by both bobbing (rotation up and down in a sagittal plane) and lifting or dropping in a transverse plane.

High reach (Figures 36-43). This display resembles the *high fan* display, but legs III are not strictly vertical but are held closer together above the midline, sometimes in contact, and may be alternately separated and then brought together. During a *high reach* display, legs III may be separated and then brought together again above the spider at a rate of 1-4Hz (Figures 37-40). In addition the elevated fan may be waved from side to side at a rage of 4-8 HZ (Figures 39, 42-43).

The *high reach* display for each of the three species was somewhat different. For *Maratus felinus* (Figures 36-39), legs III were brought together but not into contact, and were not straight. For *M. lynx* (Figure 40), legs III were fully extended or straight, and after contact their separation was much less. For *M. miles* (Figures 41-43), legs III were bowed (hyperextended at the tibiometatarsal joint, with more distinct alternation of contact and separation.

Pedipalp flicker (Figures 44-46). *Pedipalp flicker* involves near-synchronous up and down movement of both pedipalps at a fairly high rate (4-8 Hz). This appears to represent a higher activity "enhancement" to either the high fan or the high reach display (Figure 40).

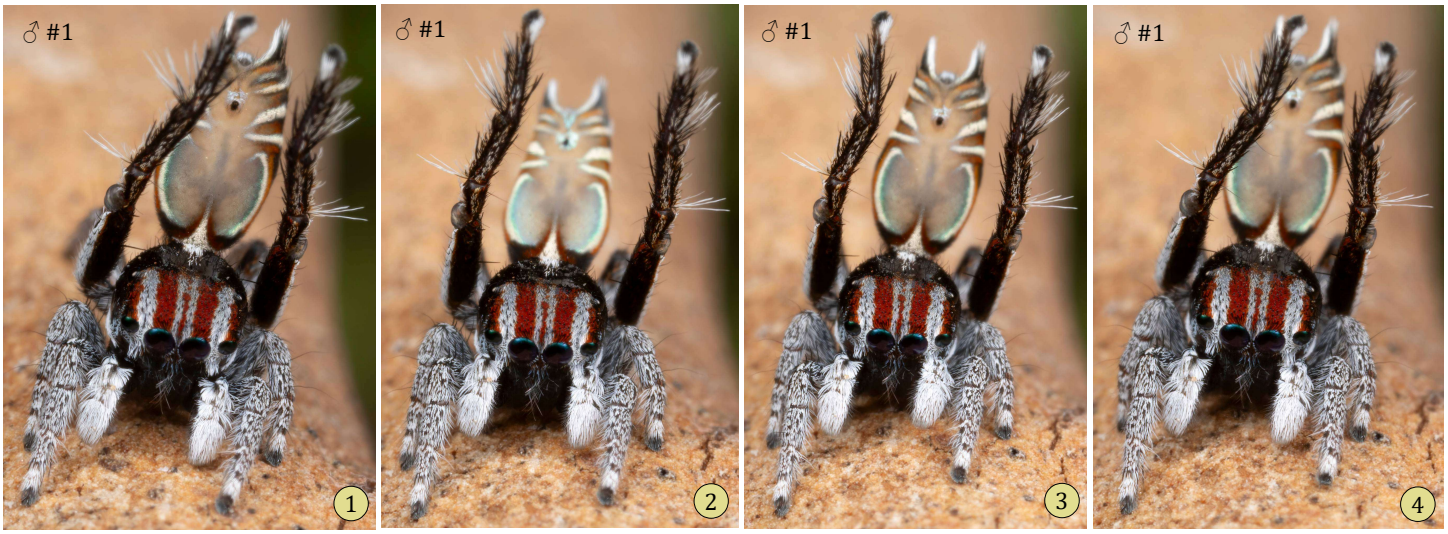

Figure 36. *High reach* display by a male *Maratus felinus*. Note changes in the separation of legs III, and flexion at the tibiometatarsal joint (metatarsal flexion).

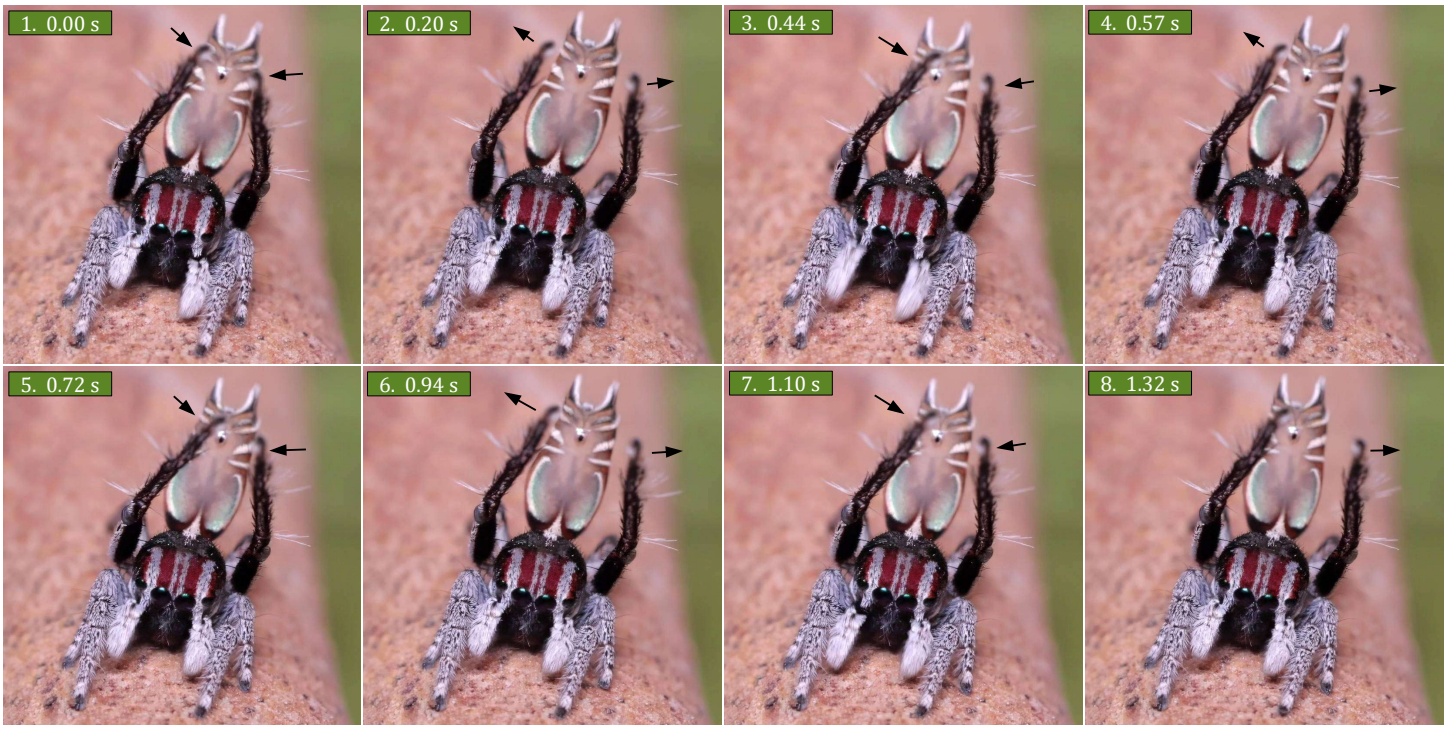

Figure 37. Sequential frames showing the *high reach* display of a male *Maratus felinus*, from a 100 fps video. The partly flexed legs III were alternately brought together and then separated (arrows) at a rate of ~3 Hz, not synchronized with low amplitude waves of the elevated fan.

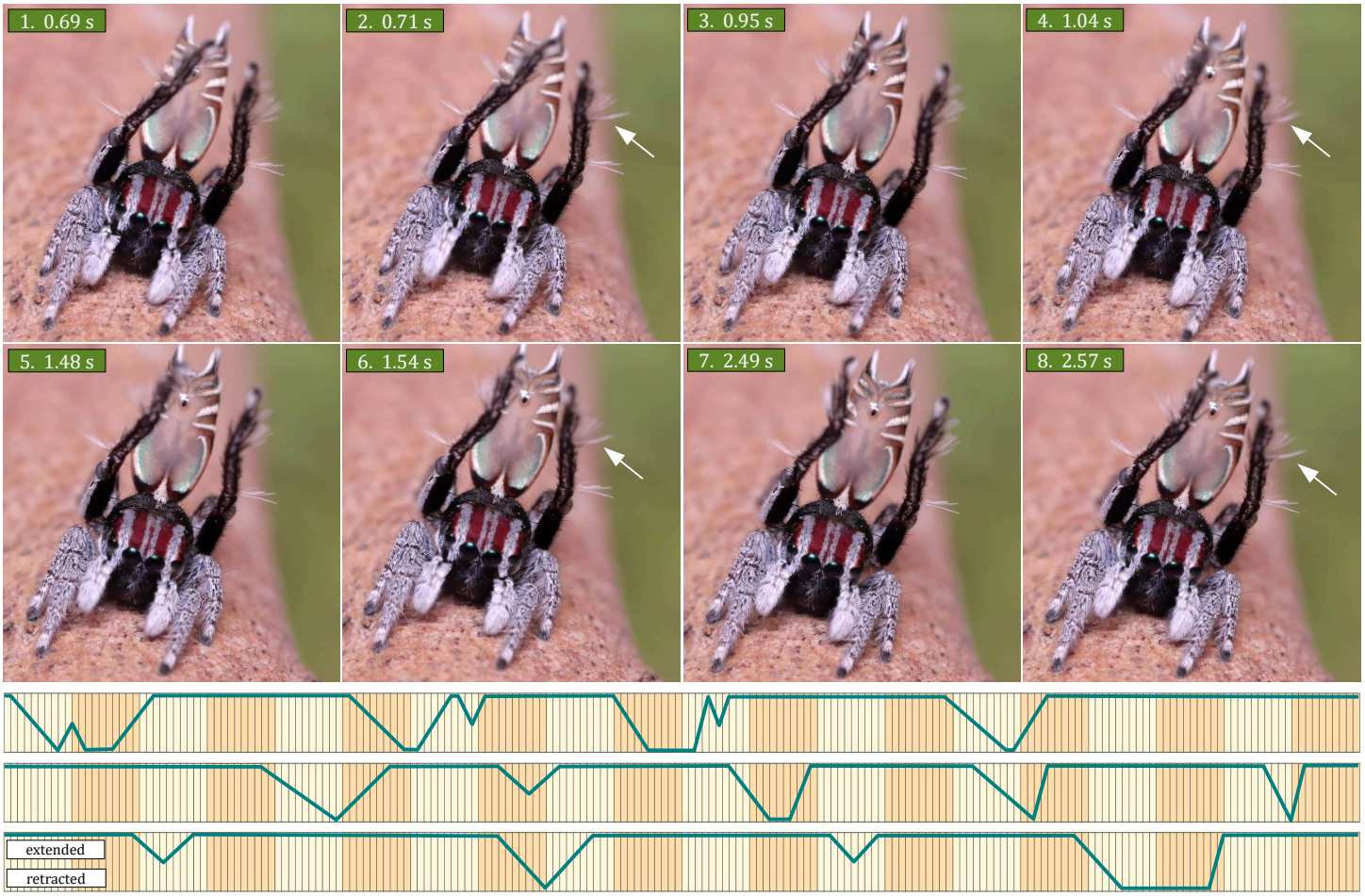

Figure 38. Analysis of a *high reach* display by a male *Maratus felinus*, from a 100 fps video (600 frames or 6 s, shown as three successive charts, each spanning 2 s). Each increment represents 0.01 s. The charts depict extension of the long white setae beneath the metatarsus (arrows) associated with convergence of legs III (top line segments, alternating with shorter intervals of relative divergence or separation of these legs. At a rate of ~1-2 Hz, divergence (separation) of the metatarsi III (odd-numbered frames) alternated with convergence of metatarsi III (even-numbered frames).

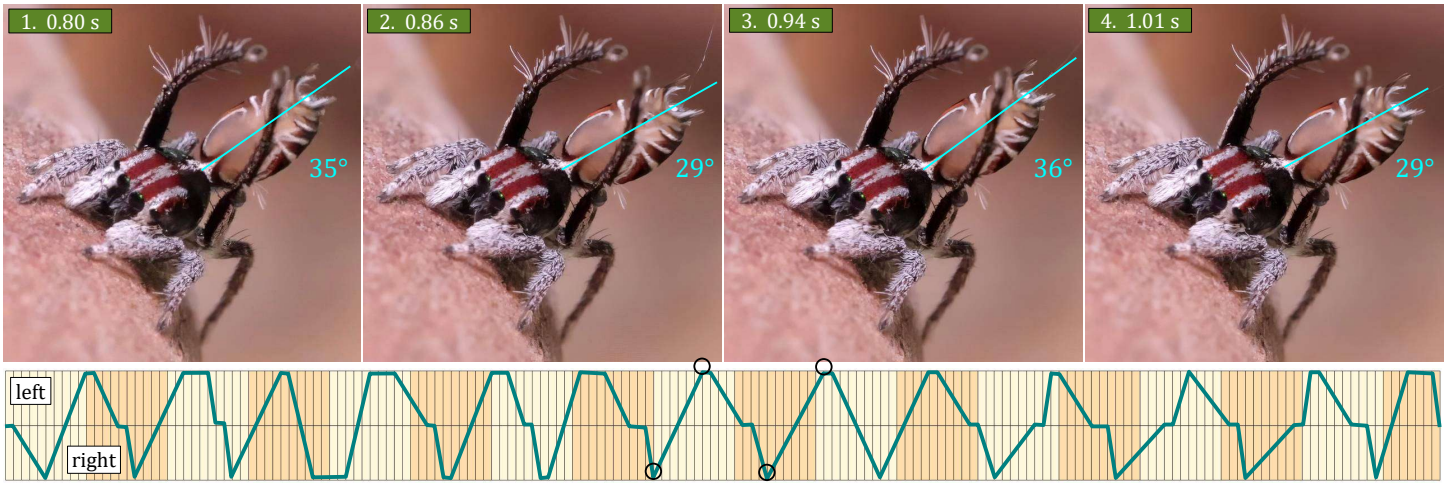

Figure 39. Lateral rotation (waving) of the fan during a *high reach* display by a male *Maratus felinus*. The chart shows the rapid cycles (~7.3 Hz) of lateral fan movement (to the left or right of the male) over a 1.77 s interval. Each increment represents one frame from a 100 fps video. As with the *high fan* display, waves are not completely smooth but were interrupted by slight lifting/dropping of the fan in a transverse plane, and slight bobbing of the fan in a sagittal plane.

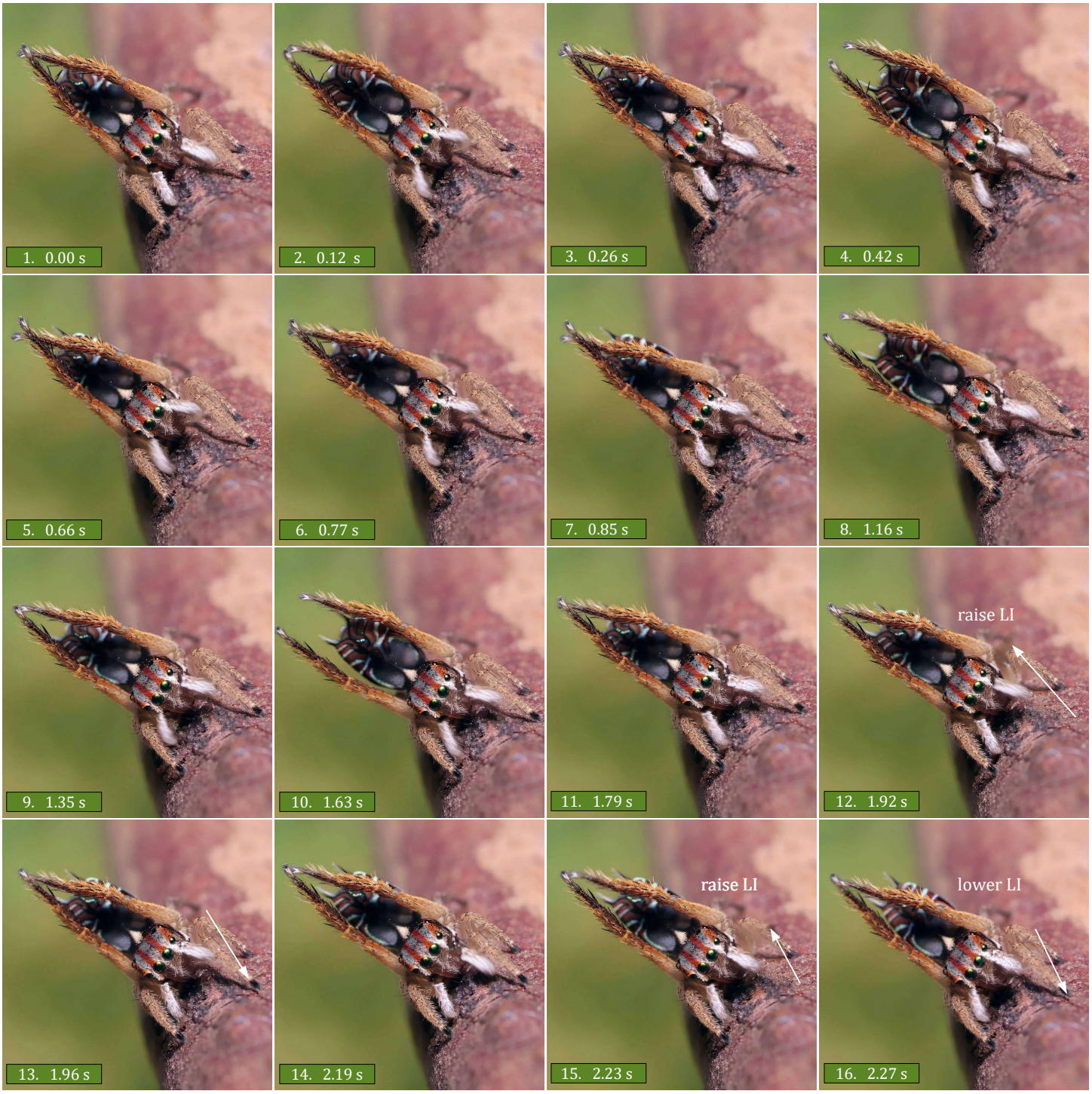

Figure 40. Sequential frames from a 100 fps video showing the *high reach* display of a male *Maratus lynx*. Slight changes in the position of legs III can be seen by comparing adjacent frames. During this display there was limited movement of the extended legs III (mostly in contact above the spider) and the fan, but the general movement included a very slow advance toward the female with pedipalp flicker and some tapping with one leg I (frames 12-13, 15-16). Arrows indicate movement of leg LI relative to the previous frame, similar to the initial movement of legs I during a tap dance. In this *M. lynx*, legs III were straight and not bowed during this display, which incorporated some features (pedipalp flicker, forward motion) of the *pedipalp flicker* display.

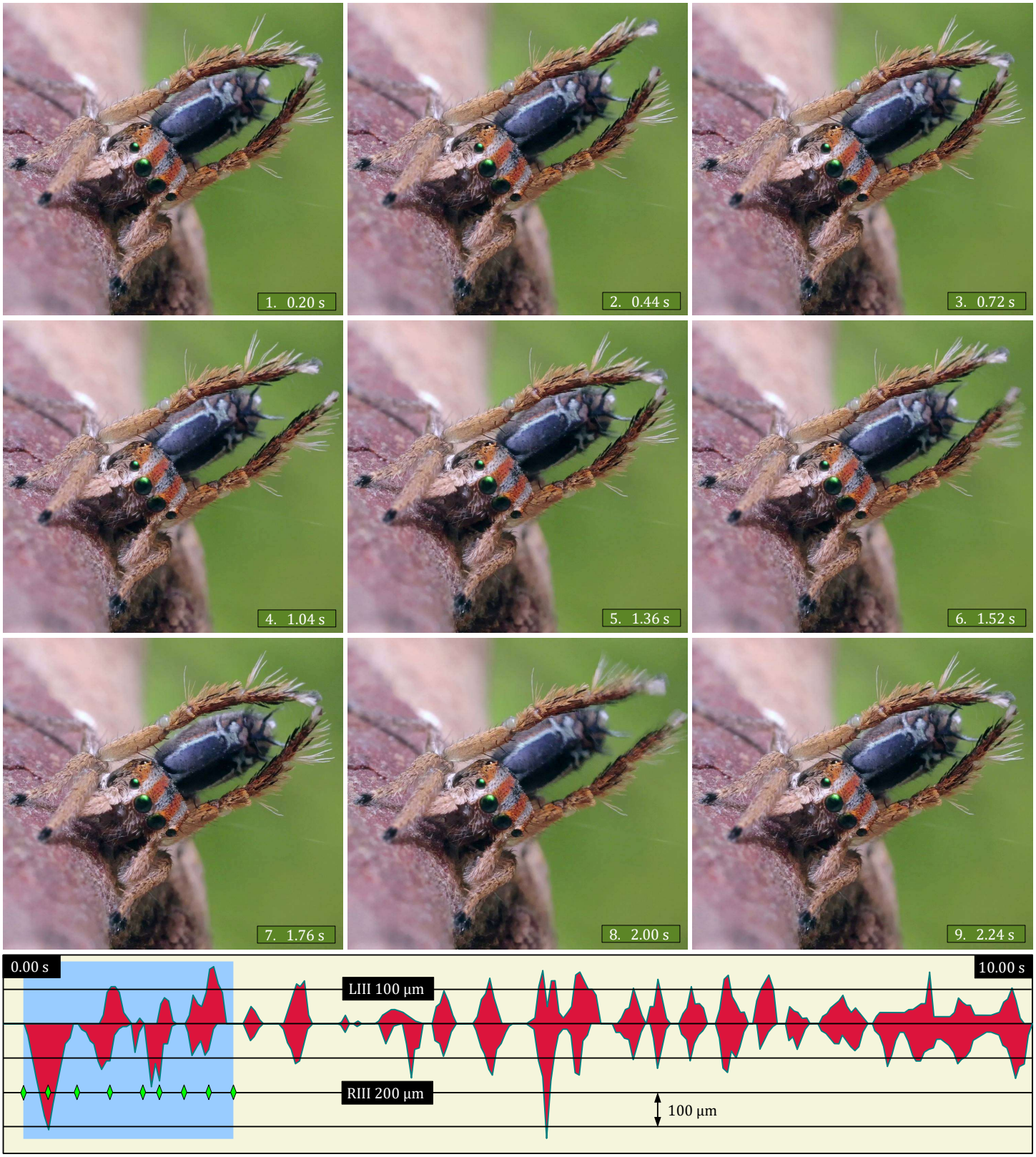

Figure 41. *High reach* by a male *Maratus miles* with movement of metatarsi III (10 s, based on 25 fps video). The chart depicts (in red) the magnitude of separation of the ends of legs III, with movement by LIII at the top, and movement by RIII at the bottom. However the determination of the midline (sagittal plane) during this movement was only estimated. The small green diamonds in the blue rectangle at left mark the temporal position of each frame shown above (1-9). This movement, primarily at the tibiometatarsal joints, was fairly constant at a rate of 2.5 Hz over this interval, with brief pauses when both legs were in contact. Here the long black setae of legs III were not extended (unerect).

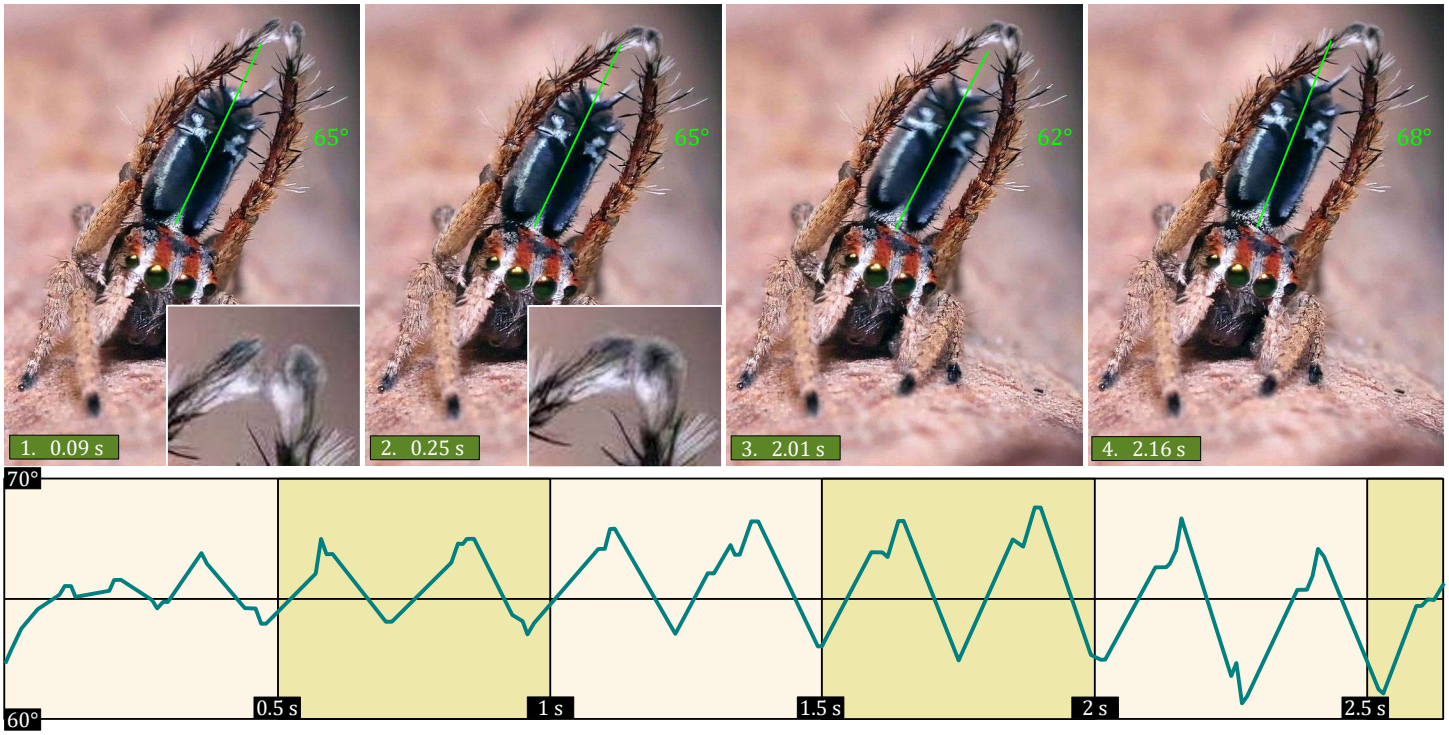

Figure 42. Lateral movement (waves) of the fan during a *high reach* display by a male *Maratus miles* (2.64 s, based on 100 fps video). In this sequence the long black setae of legs III were erect, and after legs III were brought together (1-2, insets), contact between legs III was maintained. With a constant rate of ~4 Hz, the magnitude of each wave increased from ~1° to ~6°, with a shift toward the left side of the spider.

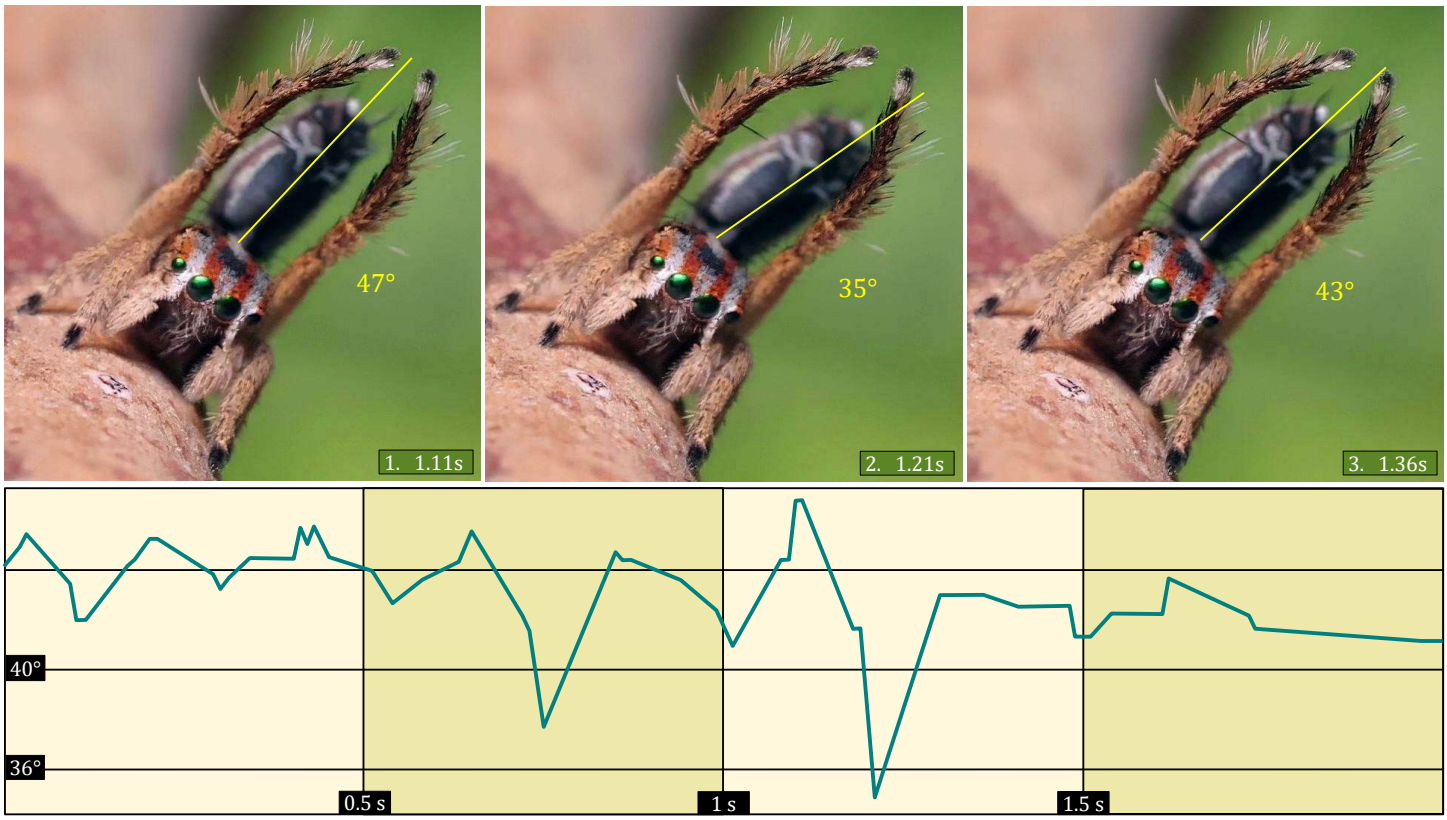

Figure 43. Irregular lateral movement (waves) of the fan during a *high reach* display by a male *Maratus miles* (2 s, based on 100 fps video, ~4 Hz). In this sequence the long black setae of legs III were unerect, and legs III were separated, held in place. This display, which often precedes a tap dance, differs from the high fan display in that legs III are bowed in a caliper shape.

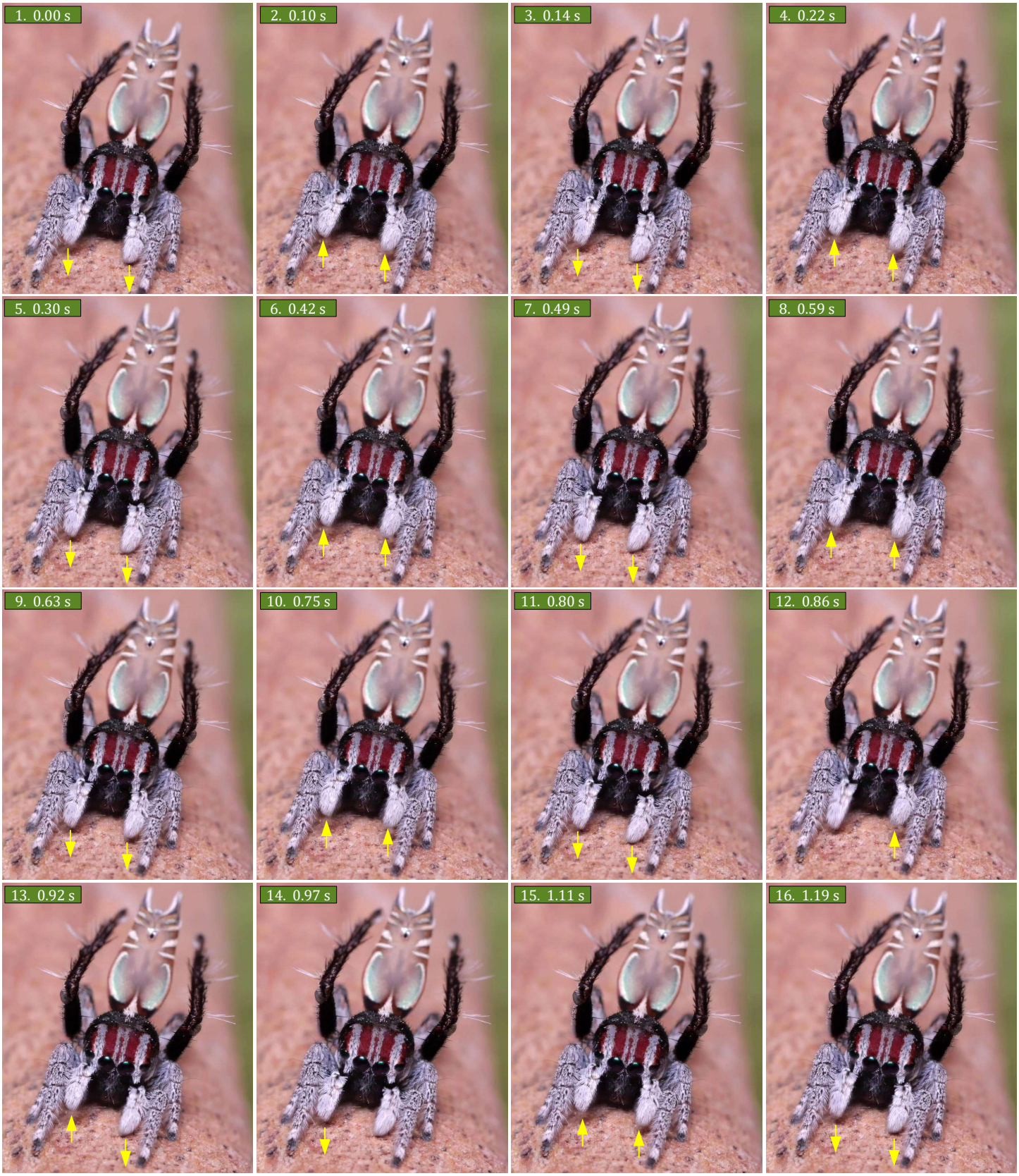

Figure 44 (continued on next page). Sequential frames from a 100 fps video, showing *pedipalp flicker* (near synchrononous up and down movement of the pedipalps) by a male *Maratus felinus*. Arrows depict movement of each pedipalp relative to the previous frame.

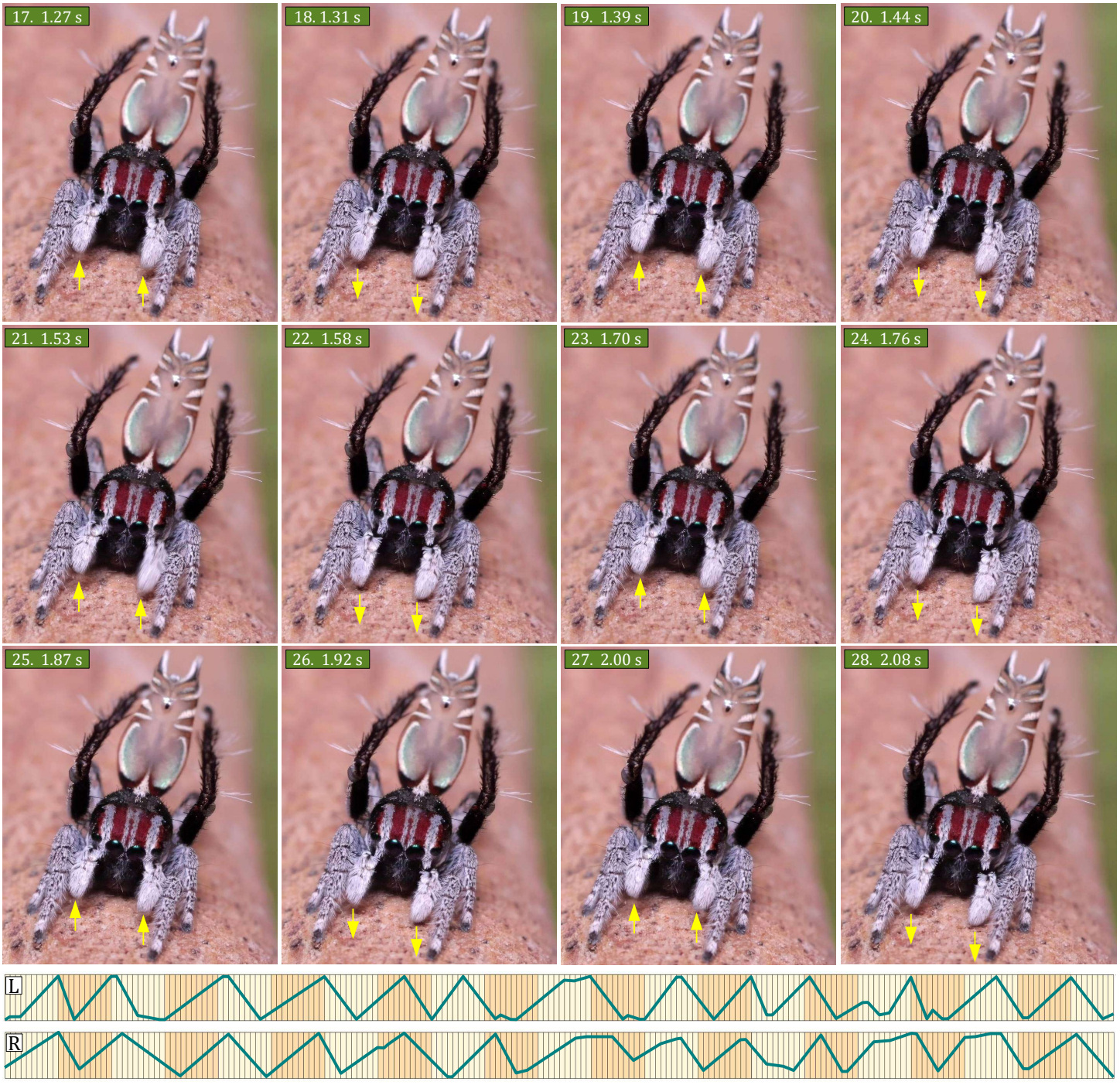

Figure 44 (continued from previous page). Sequential frames from a 100 fps video, showing *pedipalp flicker* (near synchrononous up and down movement of the pedipalps) by a male *Maratus felinus*. The chart shows 2.08 s of this display for each pedipalp, which is nearly synchronous. Each increment in the chart represents 0.01 s, or one frame. Apart from vigorous (~6.25 Hz) movement of the pedipalps, there was little movement of the elevated fan or partly flexed legs during this display. The display itself may simply represent an interruption in a high fan display, as the male attempted to collect more information from chemosensory setae at the distal end of each pedipalp. There is no other display of these spiders that includes pedipalp movement, and even in this display the pedipalps are always held to each side of the chelicerae, exposing the dark and mostly glabrous surface of each paturon.

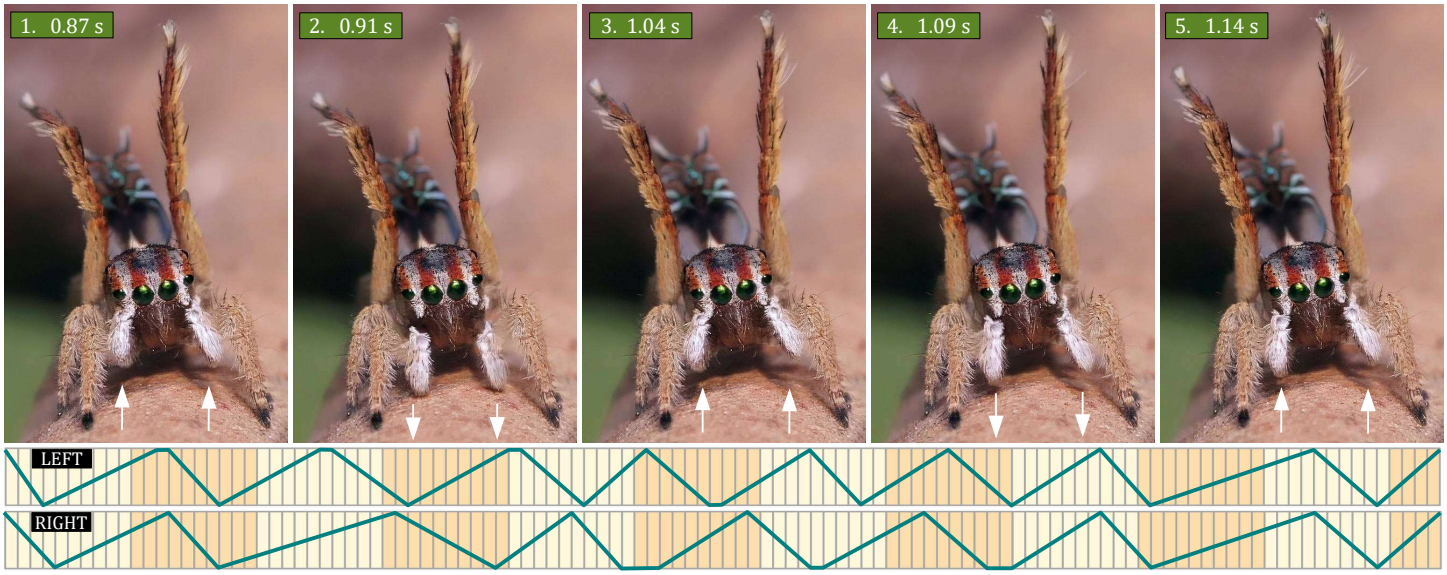

Figure 45. *Pedipalp flicker* by a male *Maratus lynx* (1.14 s from a 100 fps video record; 0.01 s increments in the scale). The graph show timing, but not the absolute magnitude, of up and down movement for each of the two pedipalps. Note that the spider's left pedipalp appears on the *right* side of each of the selected frames (1-5). 1-5, Movement for each pedipalp relative to the previous frame in the sequence is indicated with an arrow. The flicker of the widely separated pedipalps was loosely synchronous, and relatively fast (~8 Hz for each pedipalp). Some movement, and flexion at the tibiometatarsal joints, of legs III is also part of this display.

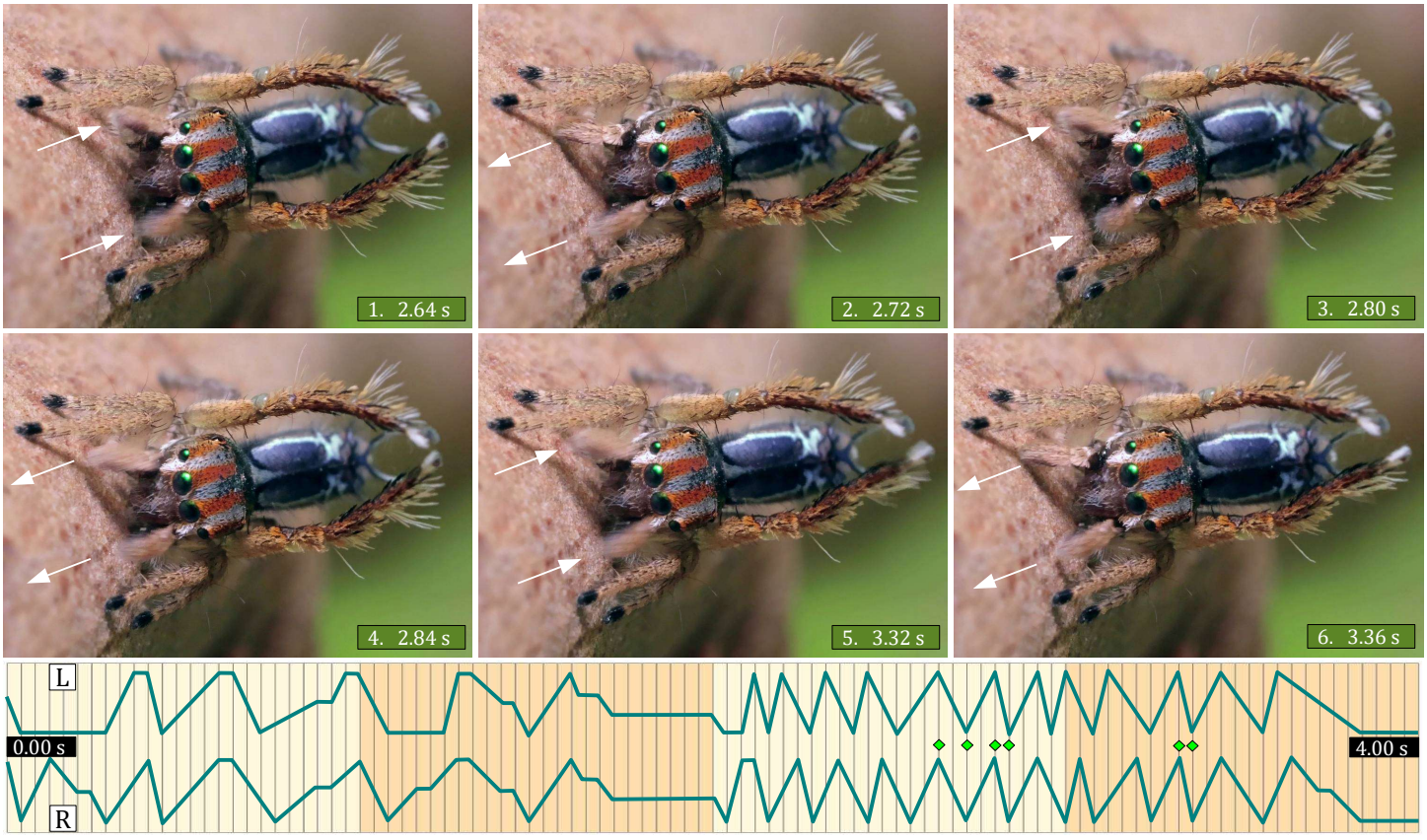

Figure 46. *Pedipalp flicker* by a male *Maratus miles* (4 s, based on 25 fps video). The chart depicts timing of near-synchronous up and down movement of each pedipalp (L and R) for each frame, but not the absolute magnitude of that movement. Small green diamonds mark the position of each frame shown here (1-6) on the chart. For the first 2 s, the flicker was slower (~4 Hz), for the last 2 s, faster (~8 Hz).

Tap dance (Figures 47-66). Males of all three species in the *felinus* subgroup perform the distinctive *tap dance* when an attentive female approaches and examines them at a distance of several millimeters. This display alternates between waving (lateral rotation) of the elevated fan, and the raising and lowering (*tapping*) of legs I as the fan is both waved and bobbed (rotated in a sagittal plane) by the male. The tapping stage may occur once every 3-10 s (Figures 53, 57, 64). As in other displays that include movement of the elevated fan, waving is not smooth, but is interrupted by low amplitude *lifting* and *dropping* of the fan in a transverse plane. Through both stages of display legs III are hyperextended and bowed to meet, or nearly meet, directly above the male, and each pedipalp is held to the side of the respective paturon, so that the chelicerae are fully exposed; both legs III and the pedipalps are moved little or not at all. One unusual feature of this display is that the sagittal plane of the male is tilted to one side, or out of alignment with the sagittal plane of the female, by ~45°. The fan is waved (variable 2-38° amplitude, 4-20 Hz) during both of the two stages (*tapping* and *elevated fan*; Figure 48) of this display. After a slower initiation phase in which each leg I is slowly lifted and then brought back down to the substrate, very low amplitude tapping of each leg I may proceed at a high speed (30-40 Hz). In *Maratus felinus* and *M. lynx* we observed rapid, simultaneous (but asynchronous) tapping of both legs I (Figures 54-56, 61). Sudden erection of the long black setae of legs III as the fan is elevated may be observed in all three species, but most clearly in *M. miles* (Figures 51.1-51.4, 52, 64).

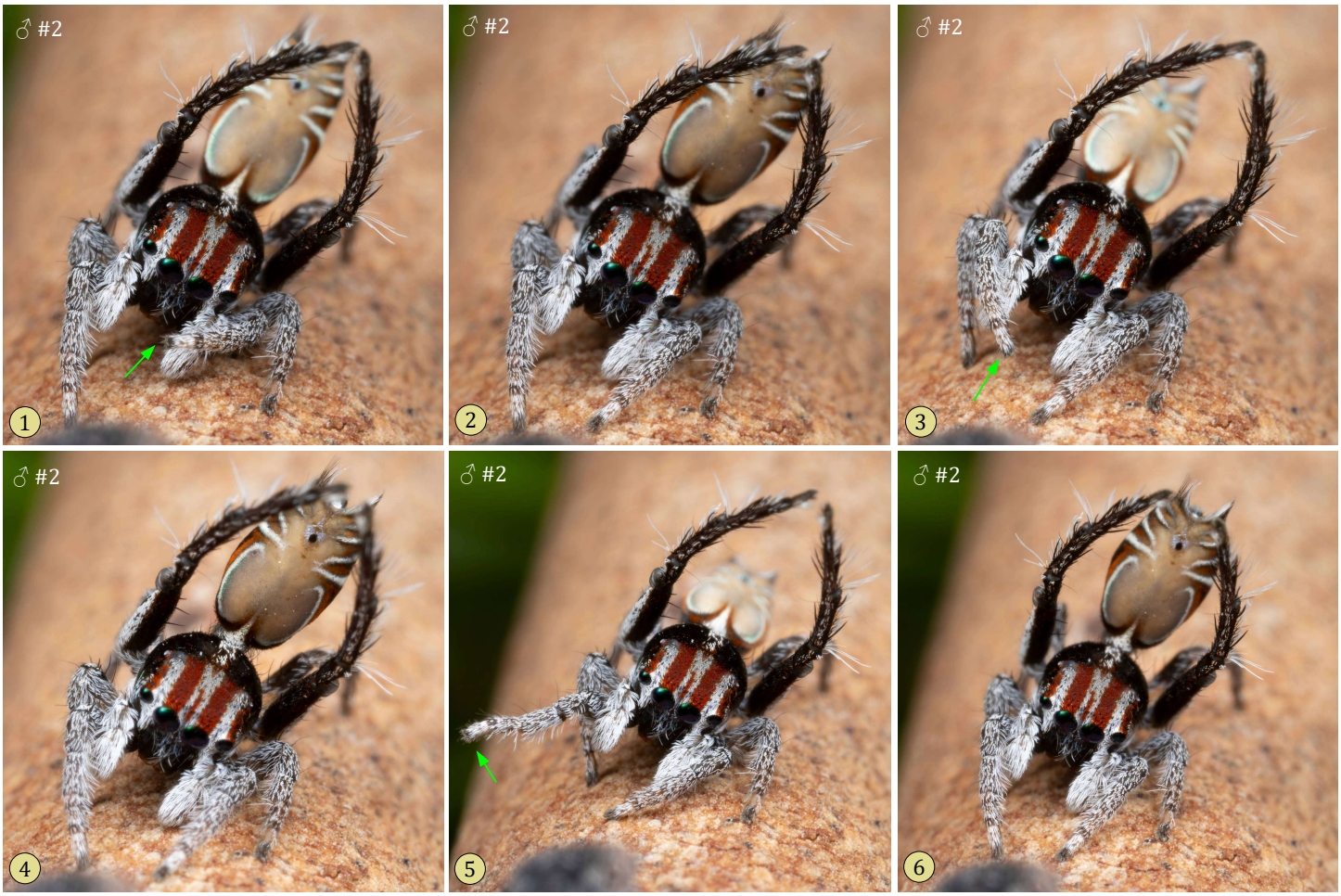

Figure 47 (continued on next page). Sequential photographs of a tap dance performed by a male *Maratus felinus*. Note that the sagittal plane of this male was skewed by ~45° with respect to the sagittal plane of the female (facing male at lower left). Green arrows point to each elevated leg I. Legs I were only raised to the height shown here during the initiation of each tapping interval. Afterwards, more rapid, but low amplitude tapping was observed, with the respective foot only slightly lifted above the substrate. Note also the *bobbing* (rotation in a sagittal plane) of the fan during this display.

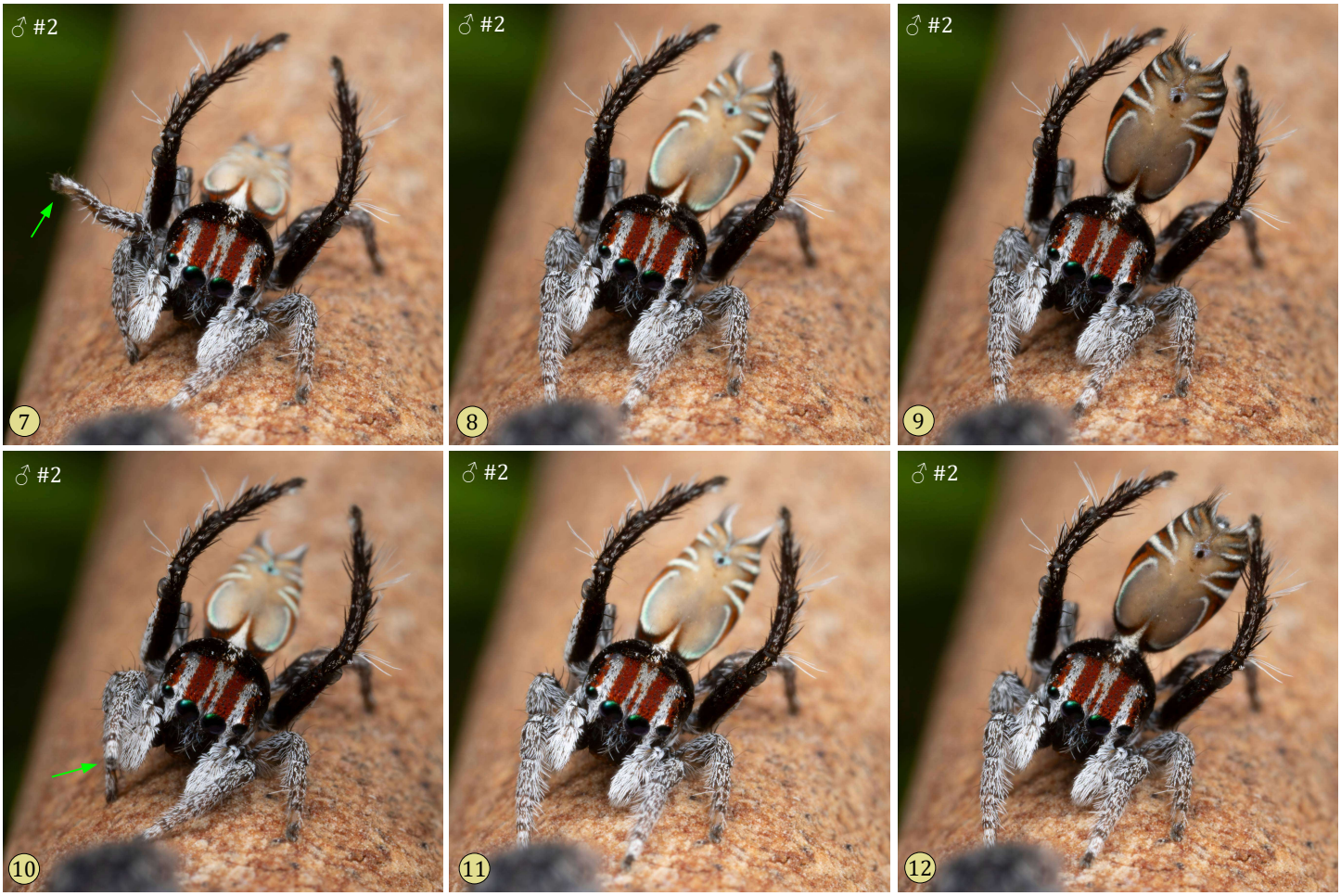

Figure 47 (continued from previous page). Sequential photographs of a tap dance performed by a male *Maratus felinus*.

Figure 48. Sequential photographs showing alternation between the two phases of a *tap dance* by a male *Maratus lynx*. **1, 3,** Display of the elevated fan. **2, 4,** with the fan lowered, elevation of leg LI.

Figure 49 (continued on next page). Sequential photographs showing female attention to a male *Maratus lynx* during the phases of a tap dance. **1-6,** Initially the male held his ground as the female turned to face him and then moved forward. Note the difference (~45°) in alignment of the sagittal plane of the male and female during this display.

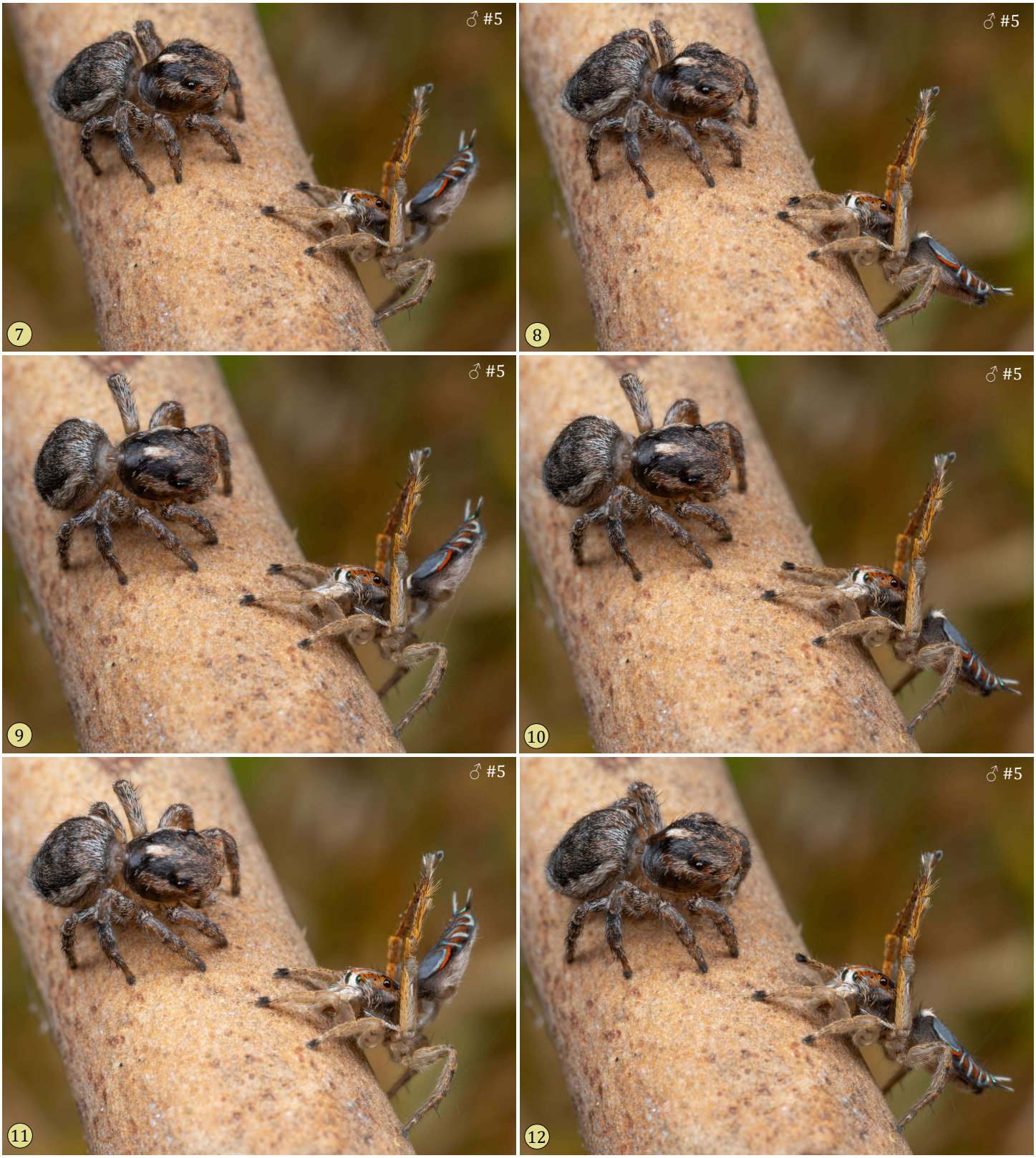

Figure 49 (continued from previous page). Sequential photographs showing female attention to a male *Maratus lynx* during the phases of a tap dance. **7-12,** The female turned to follow the movements of the male, and then moved even closer (12).

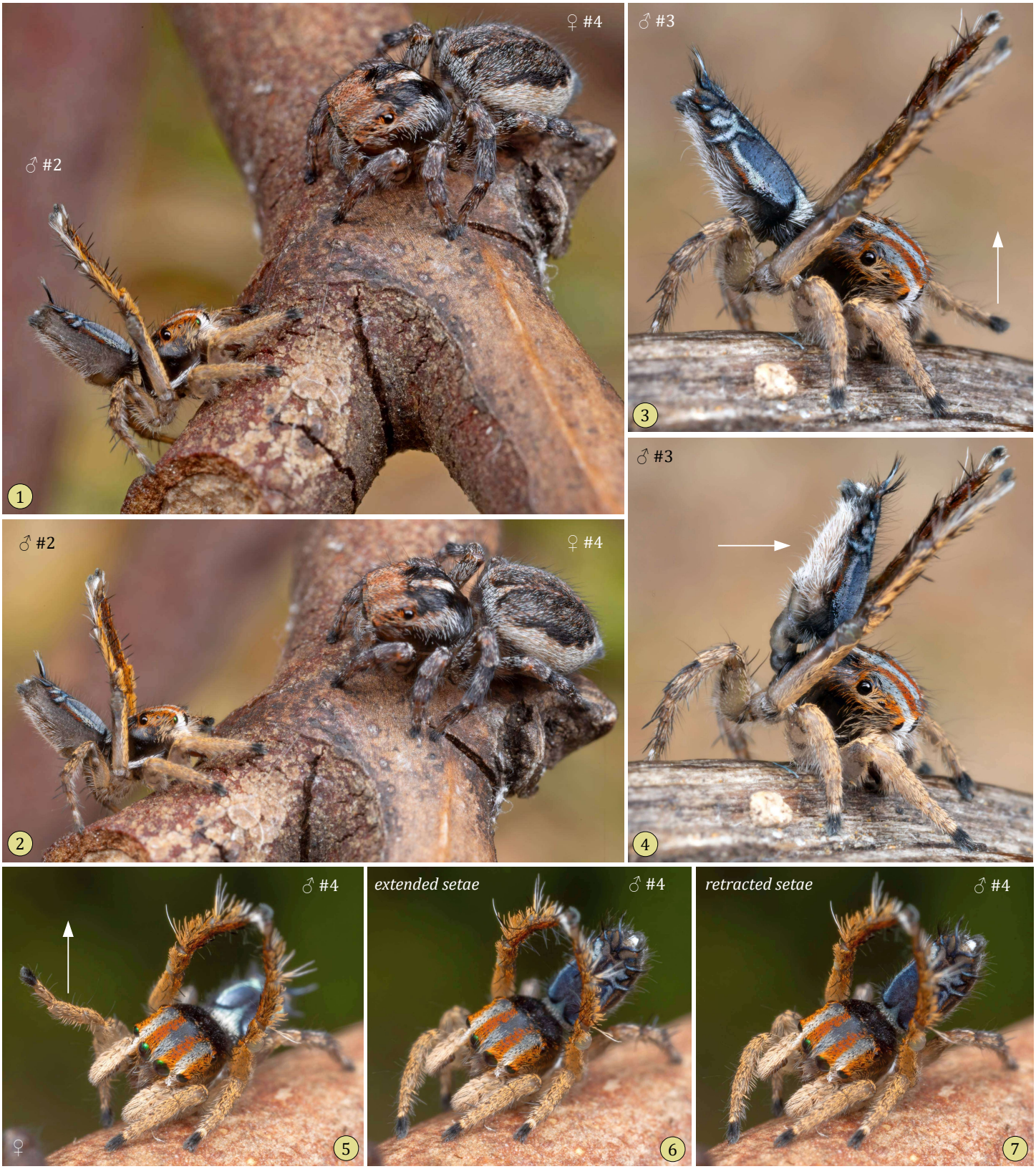

Figure 50. *Tap dance* by male *Maratus miles*. This display is much like a high reach display with legs III held together as a closed caliper, except for the intermittent use of tapping with legs III by the male. **1-2,** Sequential pictures of female watching a male. As in the related *M. felinus* and *M. lynx*, the sagittal plane of the male is skewed by about 45° with respect to the sagittal plane of the female, resulting in the fact that one leg III is higher, the other lower. **3-4,** This lateral view shows the general pattern of alternation between leg I tapping (arrow) with depressed fan (3), and elevation of the fan (4). 5-7, This sequence shows the three main steps in a fan dance, beginning with movement of legs I (arrow) as the fan is depressed (5), followed by elevation of the fan and extension of the long black setae of legs III (6), and finally the retraction of those setae (7).

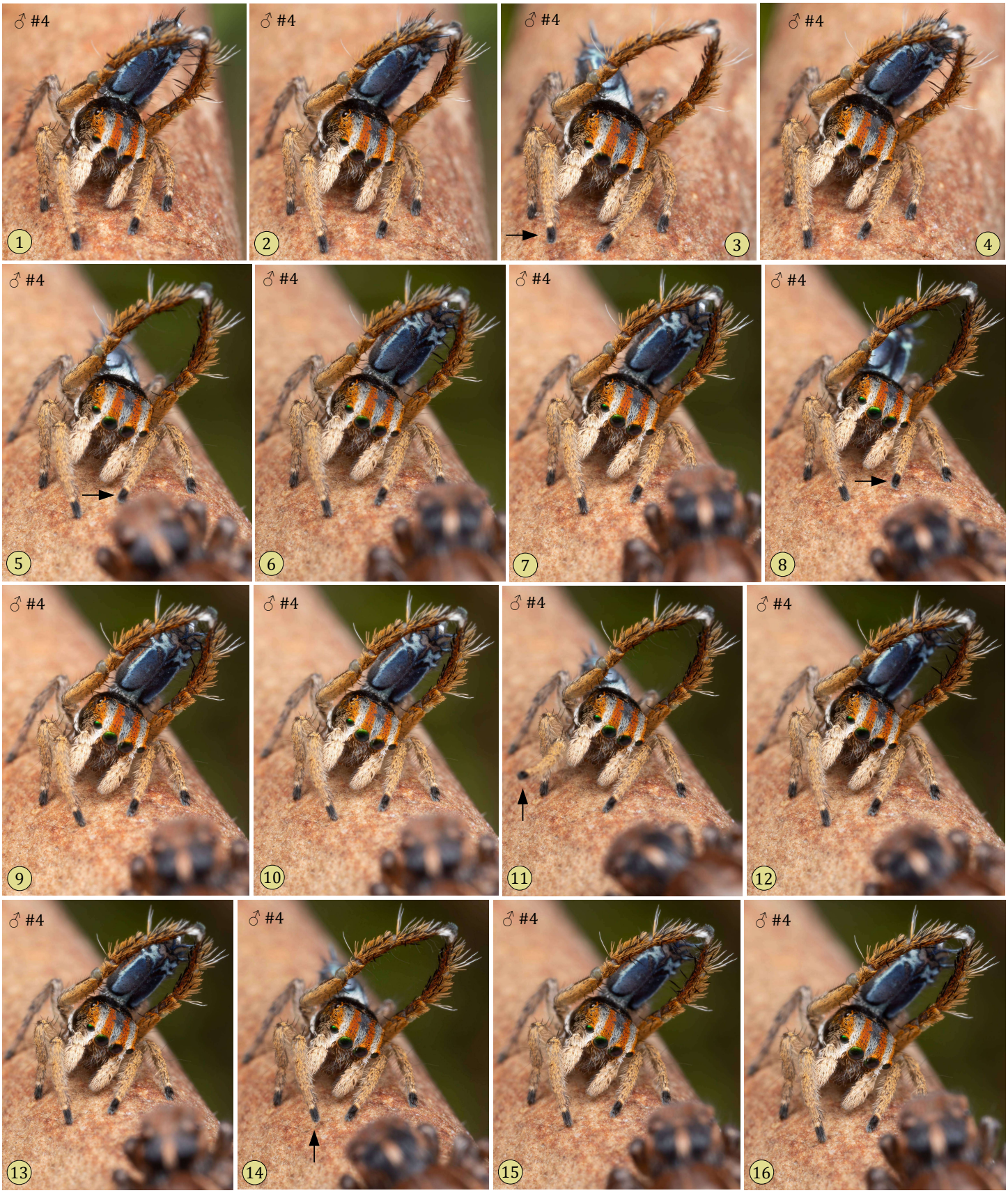

Figure 51. Sequential photographs of a *tap dance* by a male *Maratus miles*. **1-4,** Cycle of dance positions, from elevation of fan and extension of leg III setae (1), to retraction of those setae (2), to tapping with an elevated leg III (3; arrow), and finally to elevation of the fan and extension of leg III setae (4). **5-16,** The attentive female (lower right) turned to follow each leg I movement (5, 8, 11, 14; arrow) and each elevation of the fan with erect leg III setae (6, 9, 13, 15).

Figure 52. Three series (1-3, 4-6, 7-9) of sequential photographs of the *tap dance* performed by male *Maratus miles*. Movement of a leg I is indicated by arrows (1, 5, 7).

Figure 53. Selected sequential frames of a *tap dance* by a male *Maratus felinus* from a 25 fps video, identified by circles on the chart. The chart (in 1 s increments) depicts the up and down movement of the fan (line), alternating with leg I tapping (bars) over a 60 s interval (~0.3 Hz cycles). Note turns by the attentive female at lower left (in focus in frame 9).

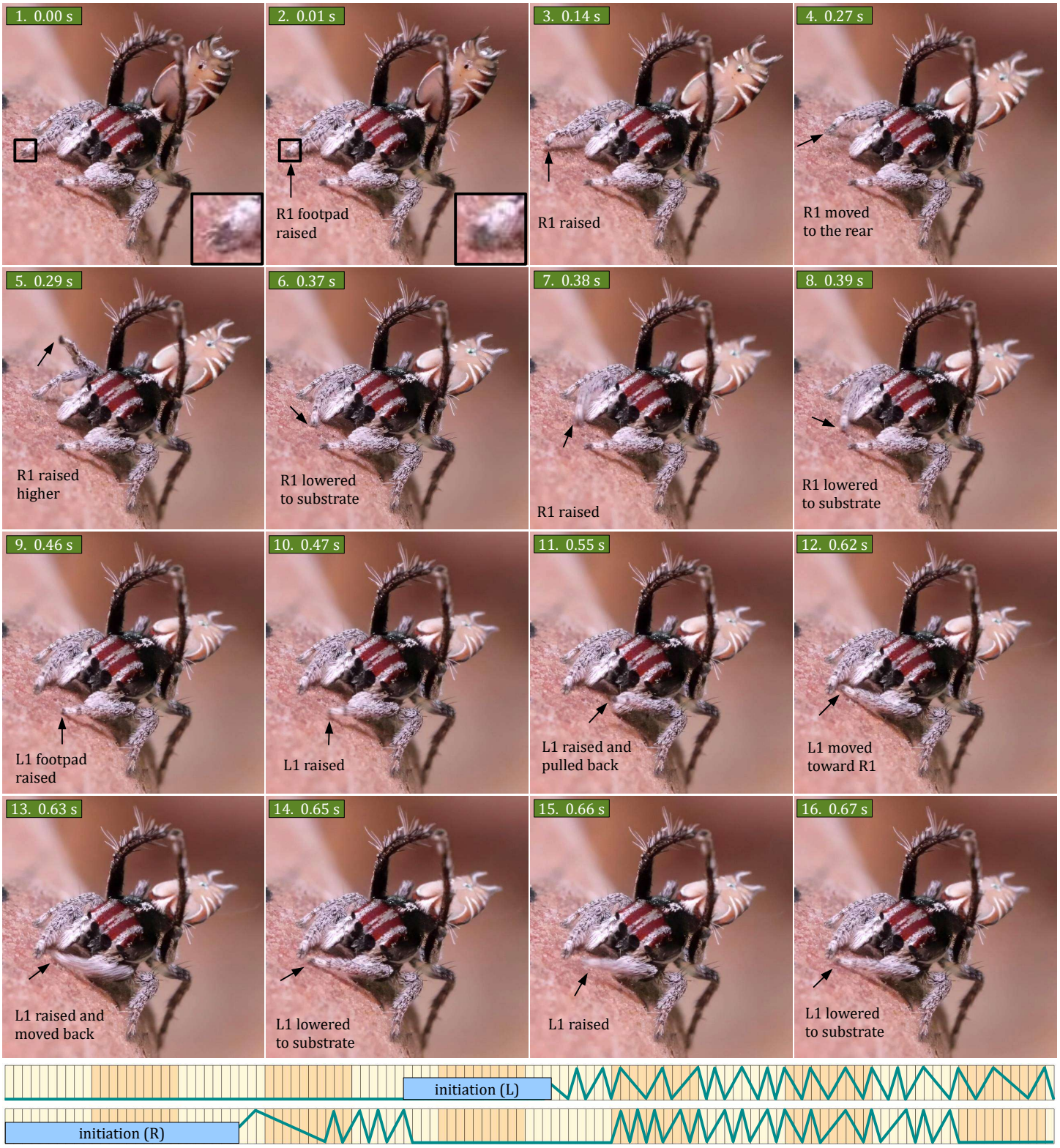

Figure 54. Movement of legs I of a male *Maratus felinus* during a tap dance in front of a female, based on a 100 fps video record. The chart shows the timing of elevation and depression of each leg I during a 1.21 s interval. In this example the upper, right (R) leg I was first raised, followed by elevation and lateral movement of the left leg. Details of initiatory movements of legs I are shown in the sequential frames (1-16). **1-2,** Note that elevation of the foot pad of leg I was the first movement in this sequence (inset), prior to elevation of that leg.

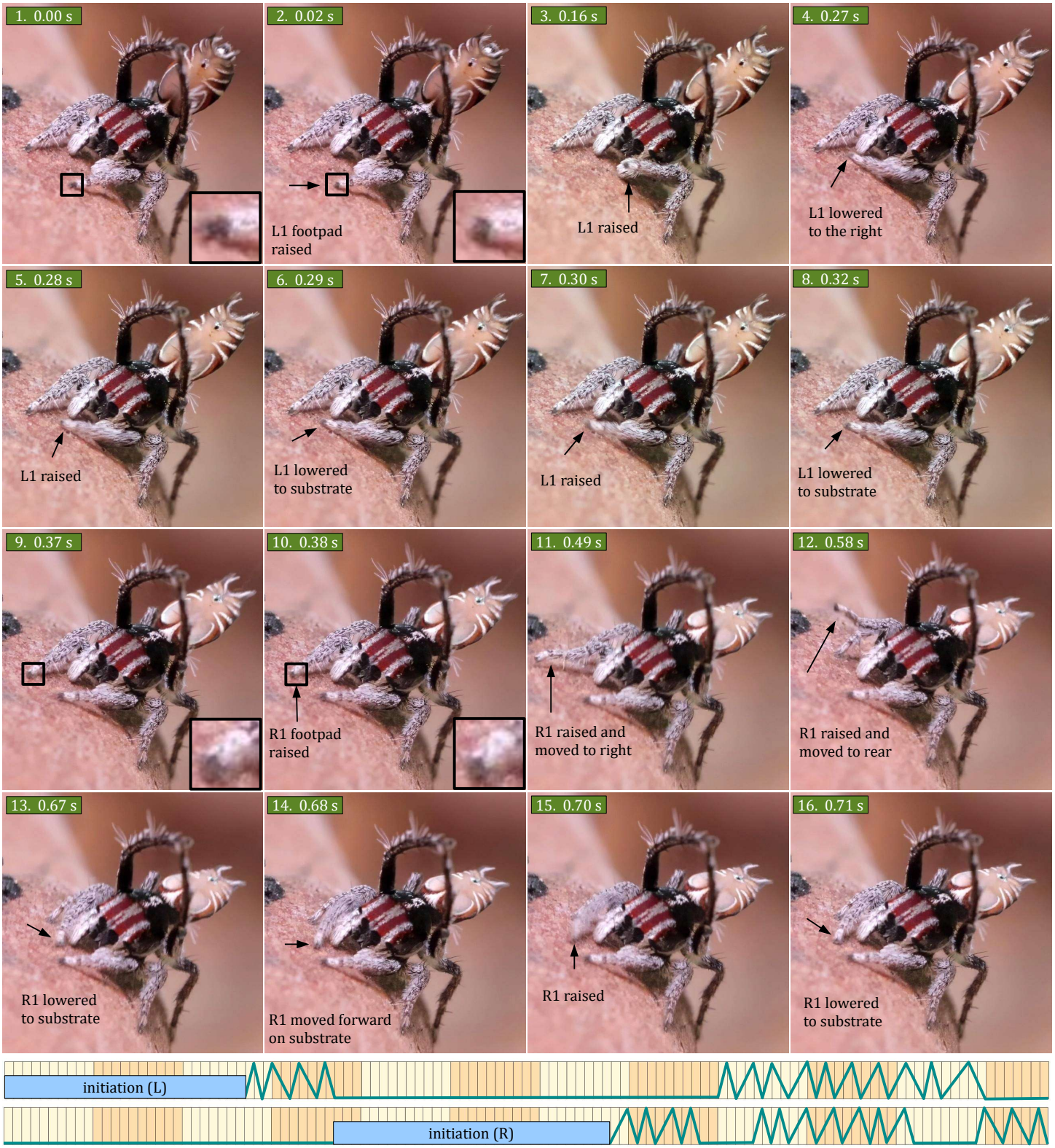

Figure 55. Movement of legs I of a male *Maratus felinus* during a tap dance in front of a female, based on a 100 fps video record. The chart shows the timing of elevation and depression of each leg I during a 1.07 s interval. In this example the lower, left (L) leg I was first raised, followed by elevation of the right (R) leg I. Details of initiatory movements of legs I are shown in the sequential frames (1-16). **1-2,** Note that elevation of the foot pad of leg I was the first movement in this sequence (inset), prior to elevation of that leg.

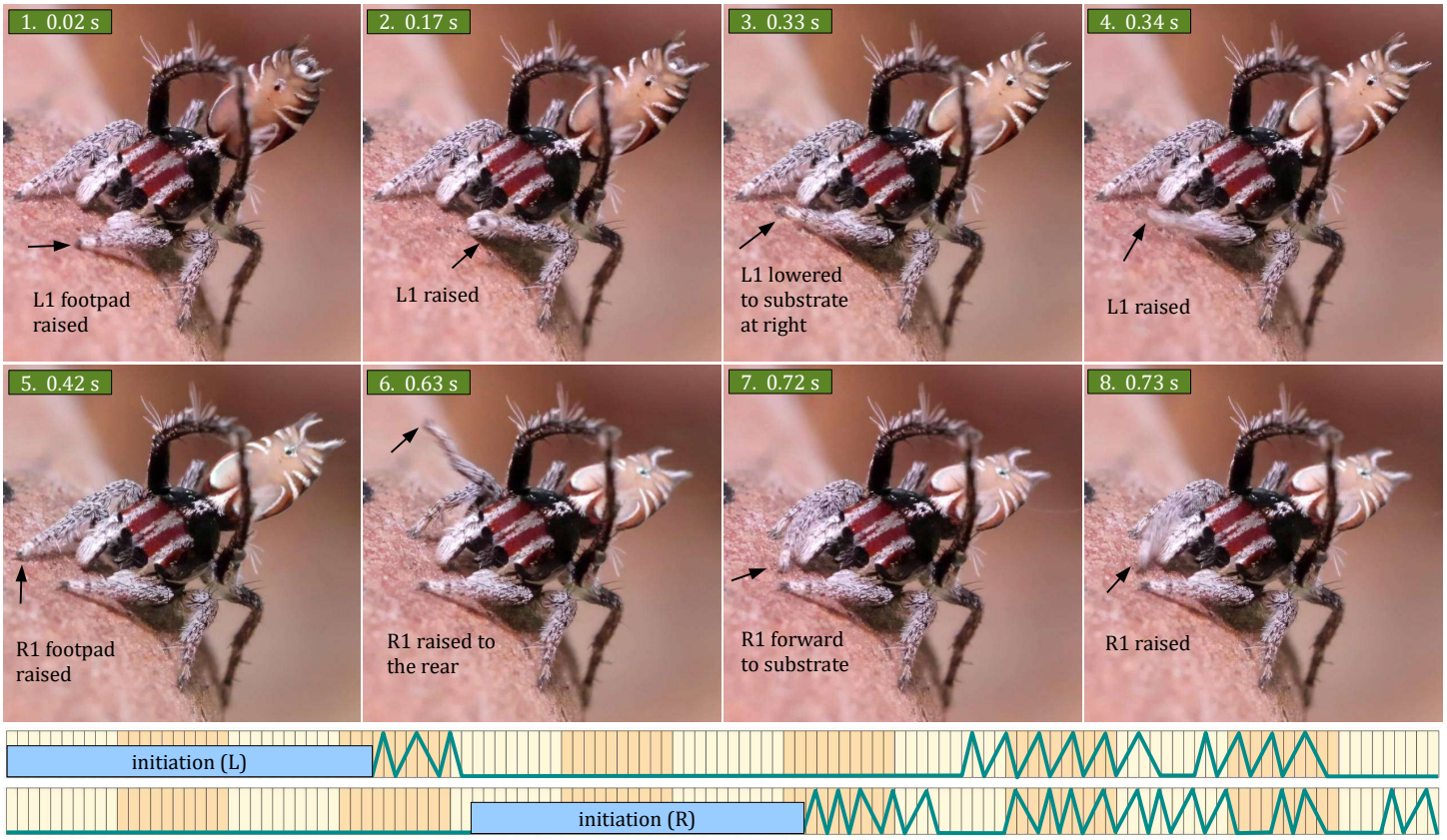

Figure 56. Movement of legs I of a male *Maratus felinus* during a tap dance in front of a female, based on a 100 fps video record. The chart shows elevation and depression of each leg I during a 1.29 s interval; only the timing and not the amplitude is depicted. The 30-40 Hz (per leg) speed of this tapping movement is remarkable. In this example the lower, left (L) leg I was first raised and then moved over to the right leg, followed by elevation of the right leg. Details of initiatory movements are shown in the sequential frames (1-8).

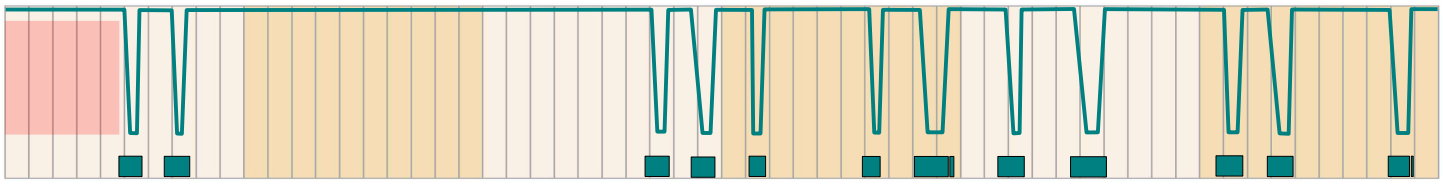

Figure 57. Timeline (60 s, increments in 1.00 s based on a 100 fps video) for the tap dance of a male *Maratus lynx*, described in more detail in Figures 58-60. The upper line shows the height of the fan during this sequence, most often in the elevate, vertical position (top of chart), but moving down to a lower, horizontal position during each of 12 successive tapping sequences. The pink area at left corresponds to the time chart shown in Figure 58.

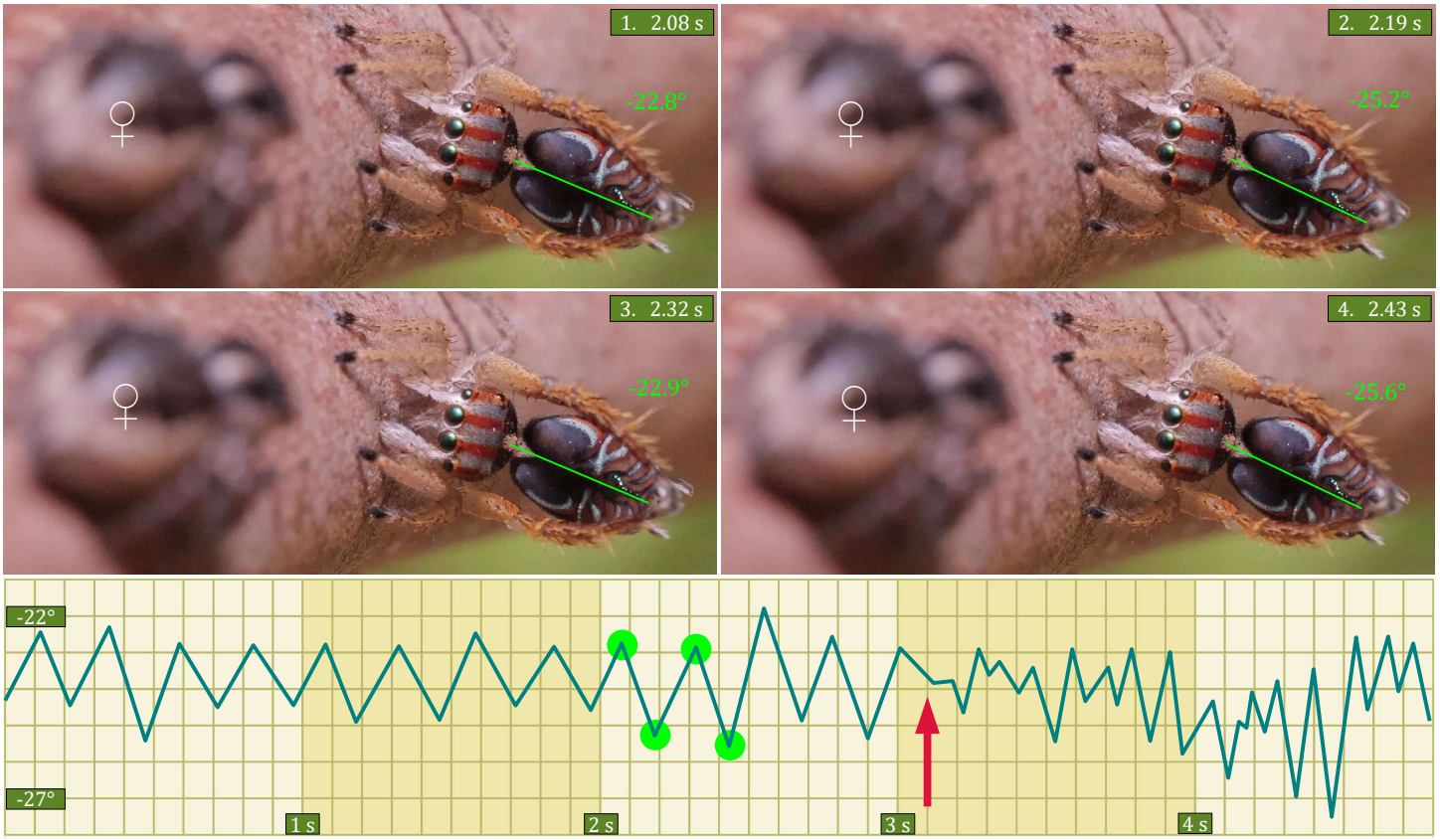

Figure 58. Sequence of frames (1-4) showing moderate amplitude waving of the elevated fan by a male *Maratus lynx* prior to the onset of tapping, and a chart showing transition from regular, ~4 Hz wave cycles to irregular ~10 Hz wave cycles in response to movement by the female (red arrow). Frames 1-4 are identified in the chart with green circles.

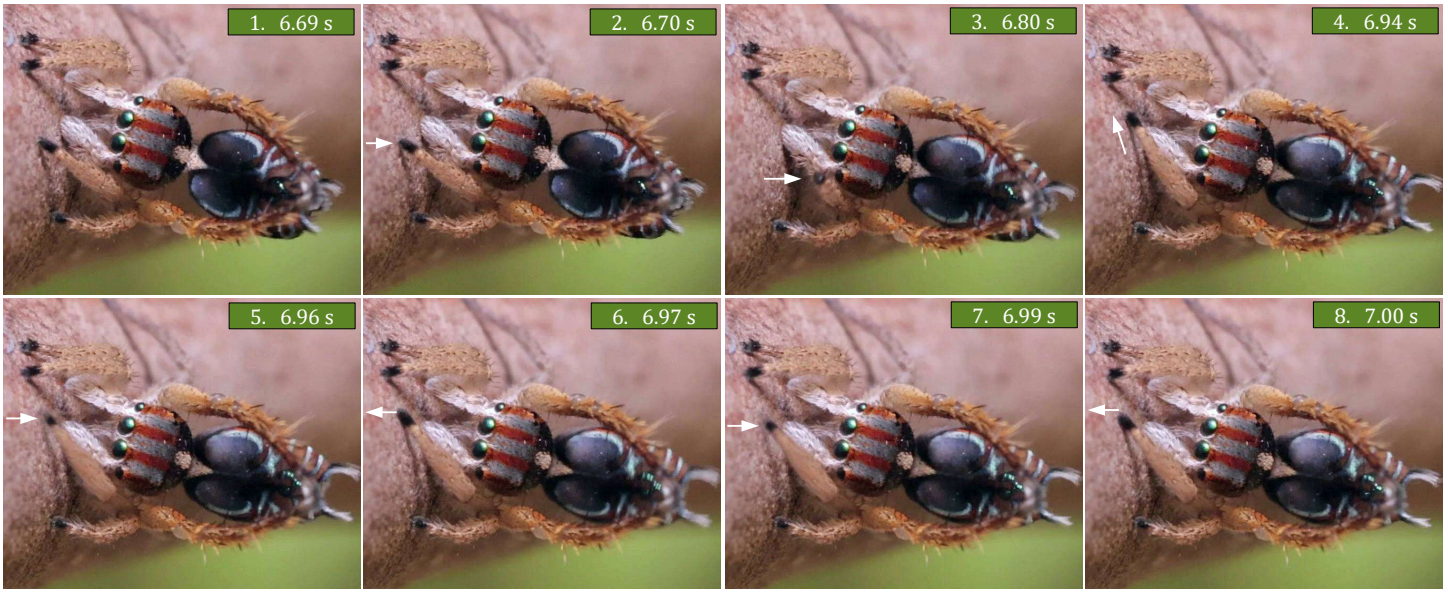

Figure 59 (continued on next page). Sequence of frames (1-32) showing movement of legs I during the tap dance of a male *Maratus lynx*. A small white arrow indicates movement of each leg I relative to the previous frame. Here leg LI was initially raised and lowered (2-4) as shown in Figure 60, but was then tapped twice (5-8) before leg RI was elevated and then returned to contact the substrate (9-10). This was followed by three taps with leg RI (11-16), and then eight taps with leg LI (17-32).

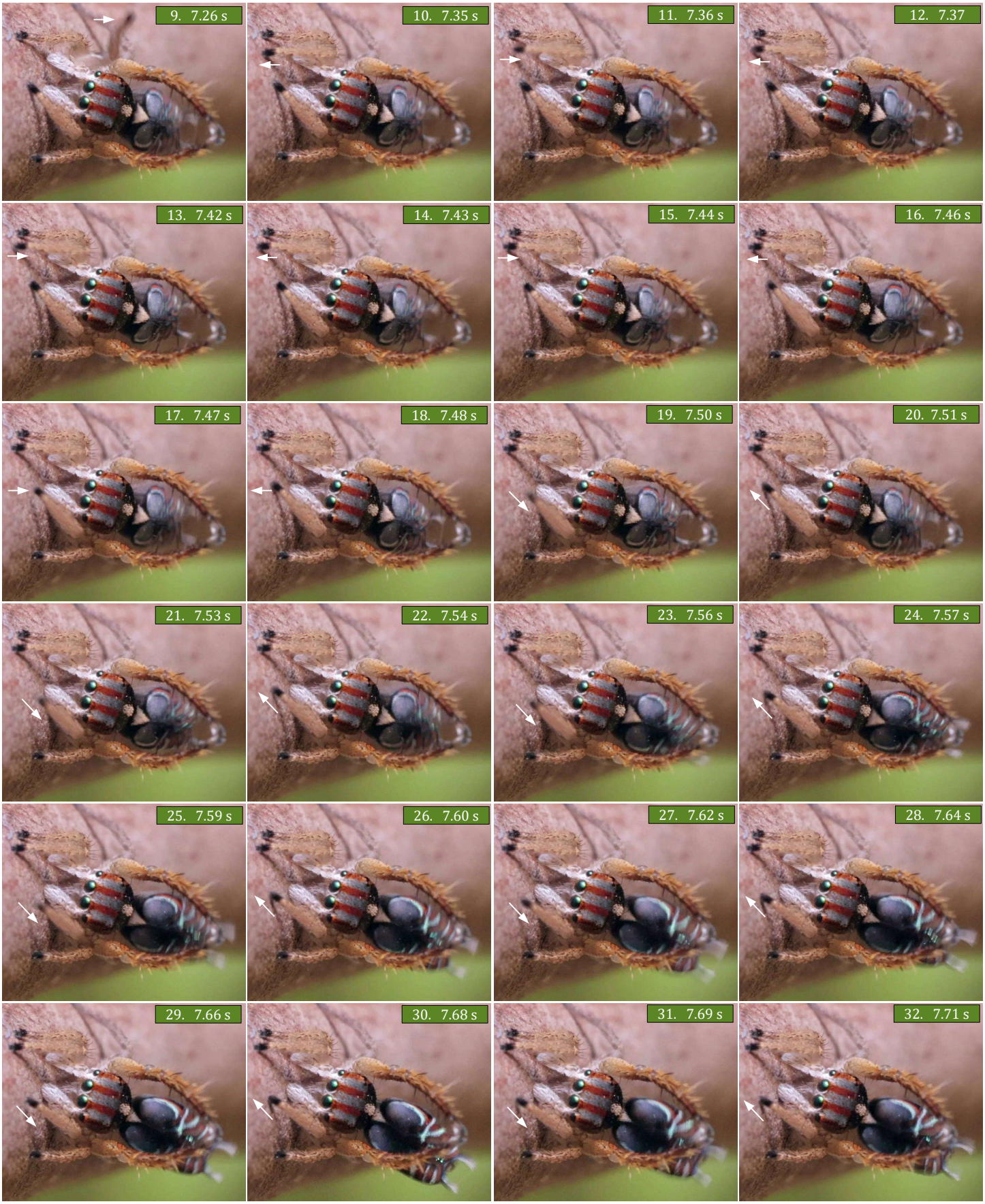

Figure 59 (continued from previous page). Sequence of frames (1-32) showing movement of legs I during the tap dance of a male *Maratus lynx*.

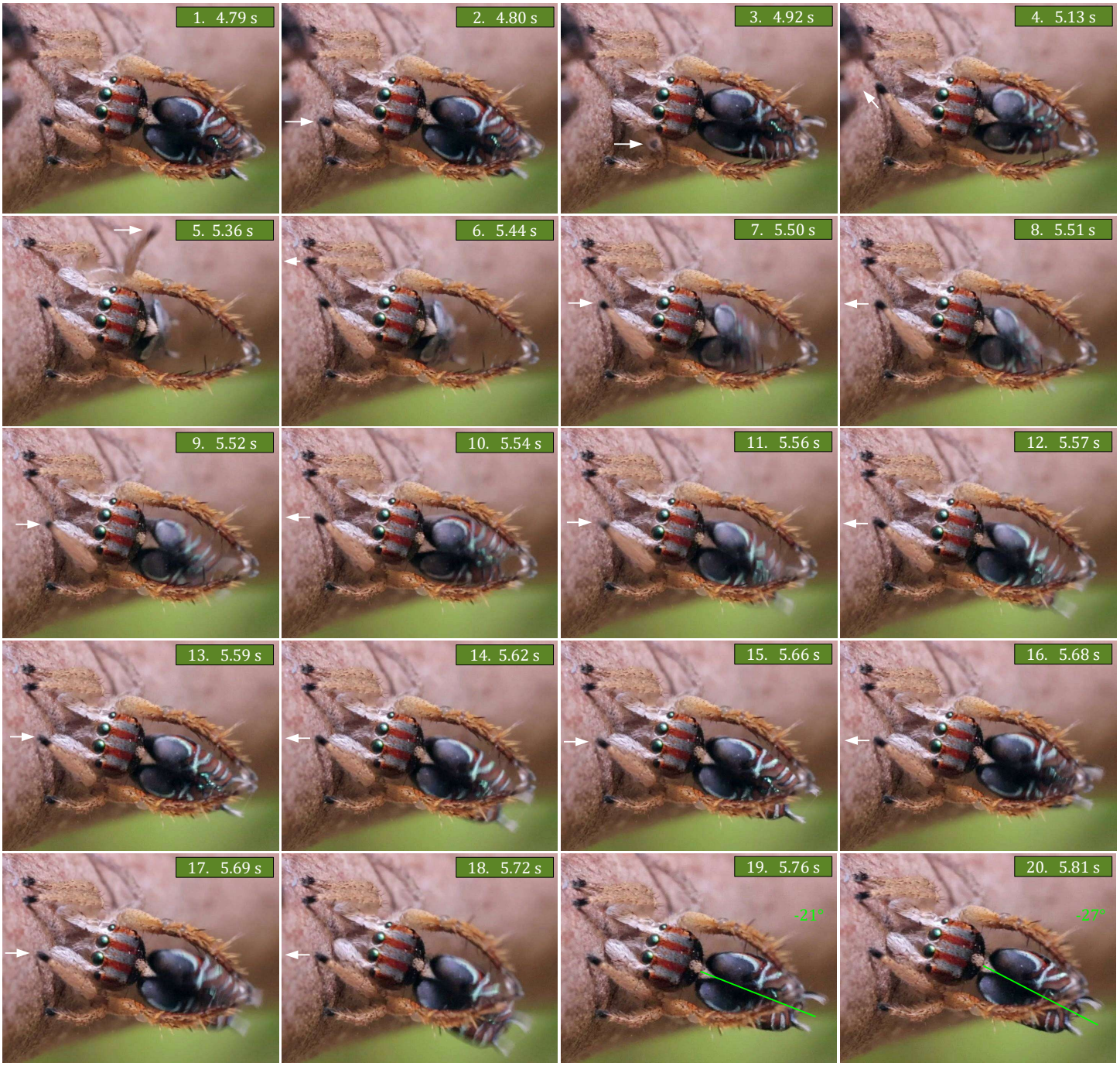

Figure 60. Sequence of frames (1-20) showing movement of legs I during the tap dance of a male *Maratus lynx*. A small white arrow indicates movement of each leg I relative to the previous frame. Initially, the lower leg LI was raised high above the substrate (2-3), then brought down to the substrate in a position closer to leg RI (4). This was followed by even greater elevation of the upper leg RI (5), followed by its return to contact with the substrate (6). The rhythmic tapping movements that followed this intiation were much more rapid, but of very low amplitude.

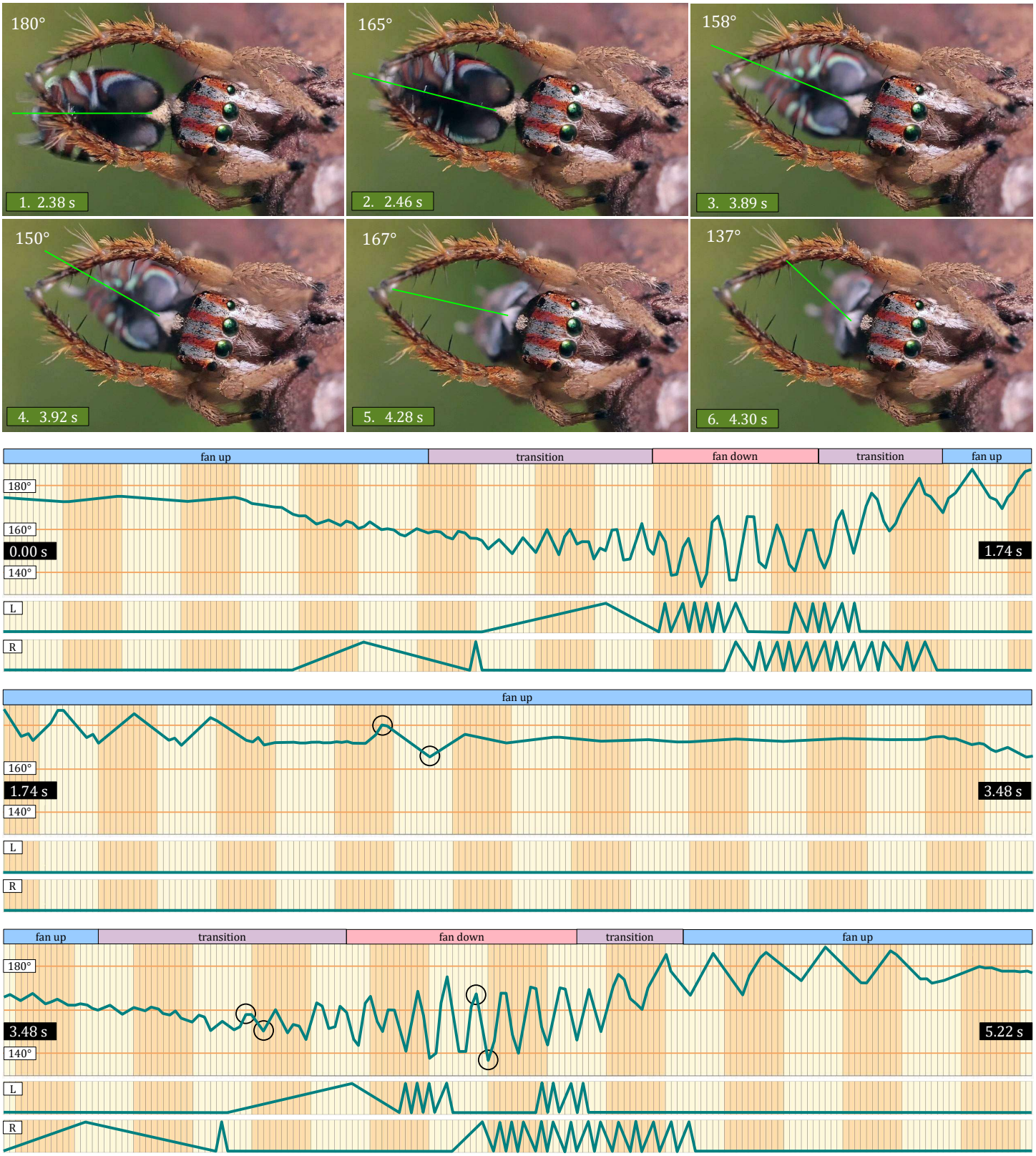

Figure 61. Detailed chart of two tap dance sequences over a 5.22 s interval by a male *Maratus lynx*. Temporal increments are 0.01 s, corresponding to frames of the 100 fps video record of this dance. The top line shows the inclination of the fan during this dance, measured as shown in frames 1-6, above (identified by circles in the chart). Below this are two lines depicting the up and down movement (but not the magnitude of that movement) of legs LI (L) and RI (R). This shows more rapid movement (~20-25 Hz wave cycles) of the lower (*fan down*) fan as this spider tapped the substrate with legs I, and slower (~10 Hz) movement of the elevated fan after tapping. Movement of legs I during the two sequences was remarkably consistent.

Figure 62. Four sequential frames from a 100 fps video showing extension (2-3) and retraction (4) of leg III spines as the elevated fan was displayed during the tap dance of a male *Maratus lynx*. This was not often observed and may have been driven by increased internal hemolymph pressure as part of a response to movement by the female.

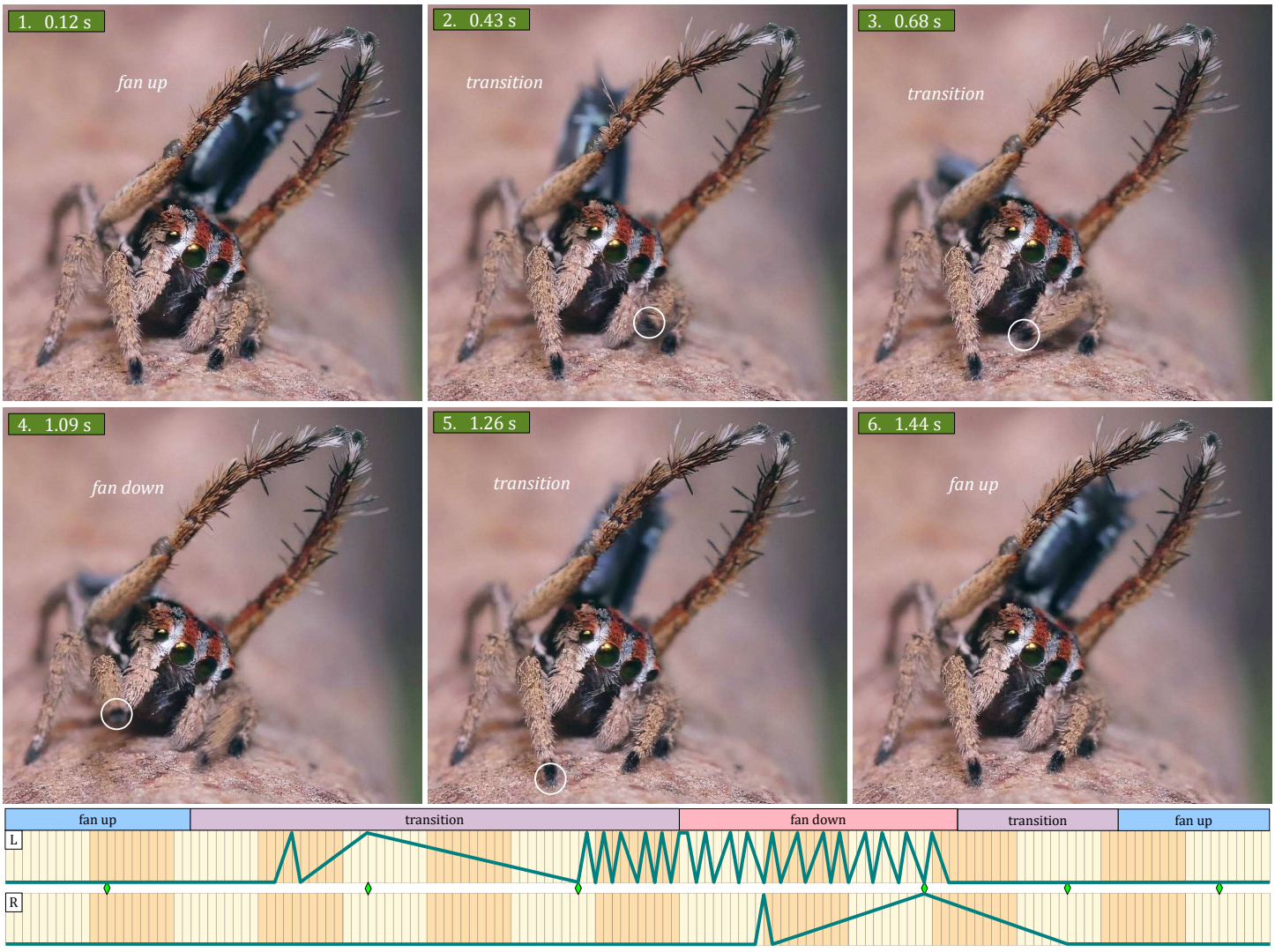

Figure 63. One cycle of a *tap dance* performed by a male *Maratus miles* (1.40 s, from 100 fps video; moving legs identified with circles in selected frames 1-6). The chart shows the timing of up and down movement by legs LI (L) and RI (R) during this display. During each longer (slower) cycle of leg movement the respective leg was raised relatively high above the substrate during an *initiation phase* for movement of that leg. Subsequent movements of the same leg were much faster (~40 Hz as for leg LI during the 0.68-1.12 s interval), but very slight. However the extensive simultaneous movement of both legs I observed in *M. felinus* and *M. lynx* was not observed. Green diamonds in the chart identify the timing of frames (1-6).

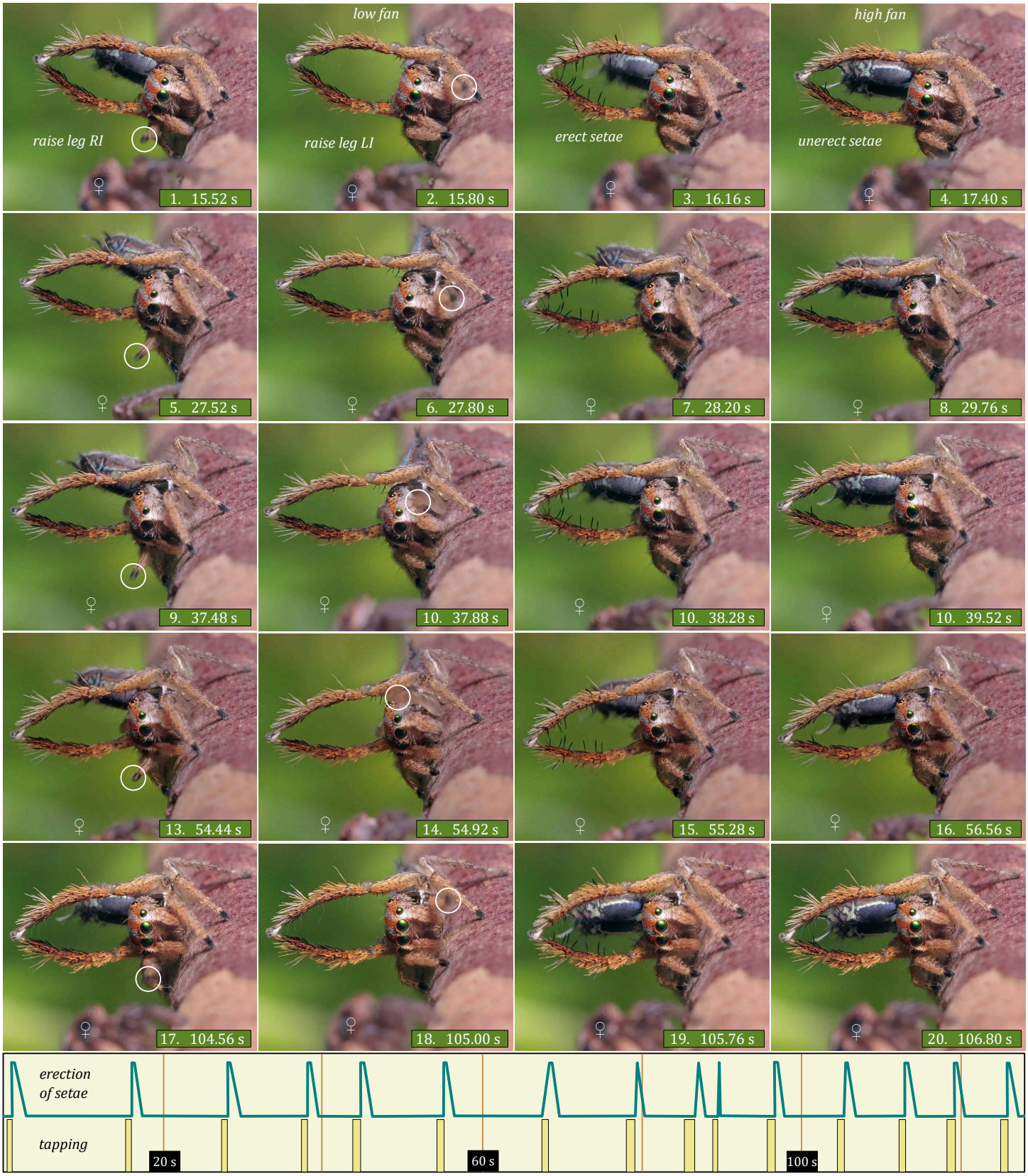

Figure 64. Timing of fifteen successive cycles of a *tap dance* performed by a male *Maratus miles*, based on a 127.16 s record from a 25 fps video. The chart shows the tapping intervals (bars) that preceded the sudden erection of the long black setae of legs III (green line at top) when the fan was elevated to a vertical position. Selected frames show how elevation of the lower leg I (RI in this case; left column) preceded the elevation of the upper leg (LI; second column). After movement of legs I ended, the fan was raised with extension of leg III setae (third column), follow by retraction of those setae (fourth column). Circles identify the moving leg in each case.

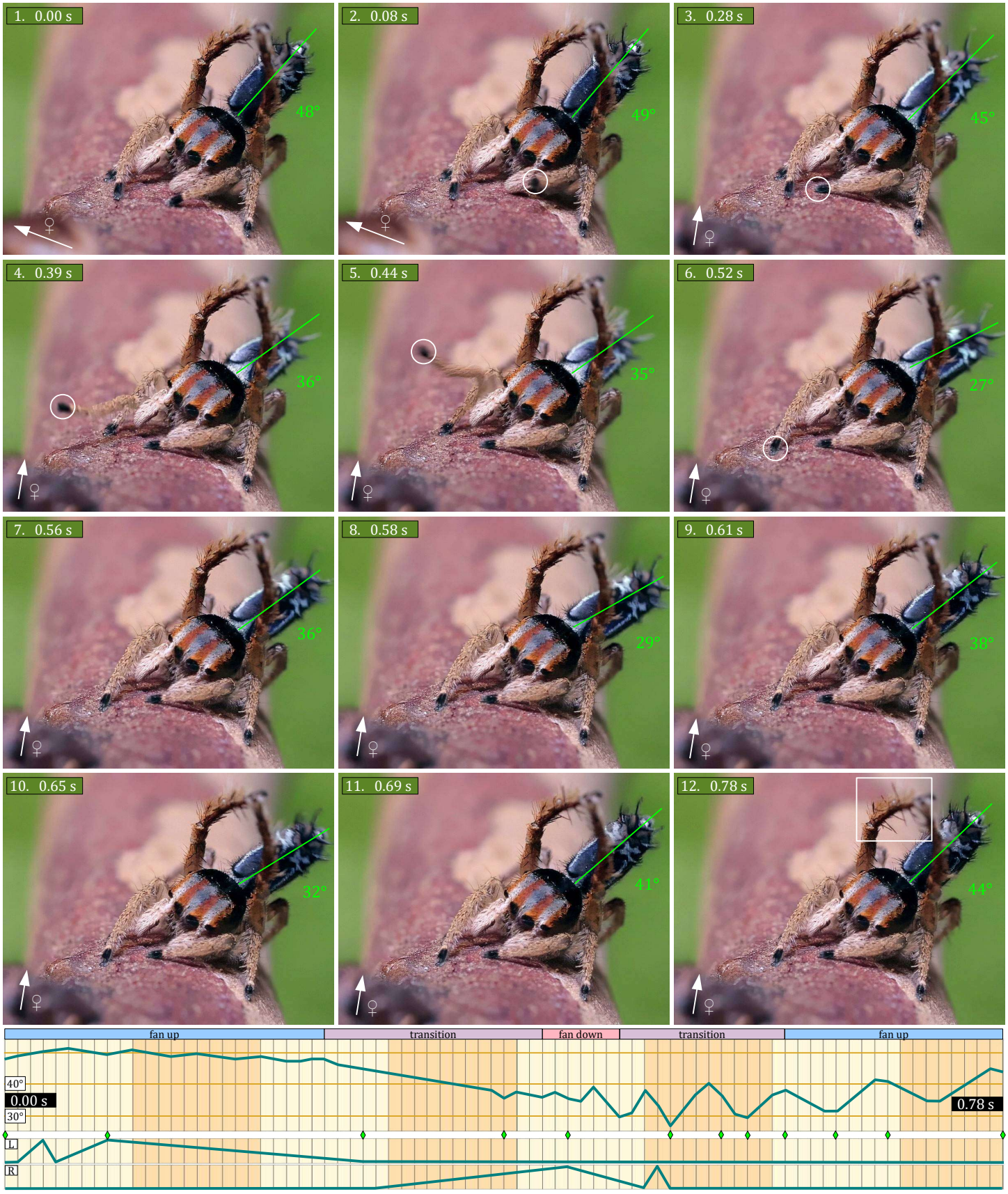

Figure 65. One cycle of a *tap dance* performed by a male *Maratus miles* (0.78 s, from 100 fps video), with limited movement of legs I. The top chart shows waving of the fan (~20 Hz, ~10°) during part of this cycle. The lower charts show the timing of elevation of legs LI (L) and RI (R). The direction faced by the nearby female can be seen at lower left (arrows). **12,** Note the extended black setae of the LIII metatarsus (rectangle).

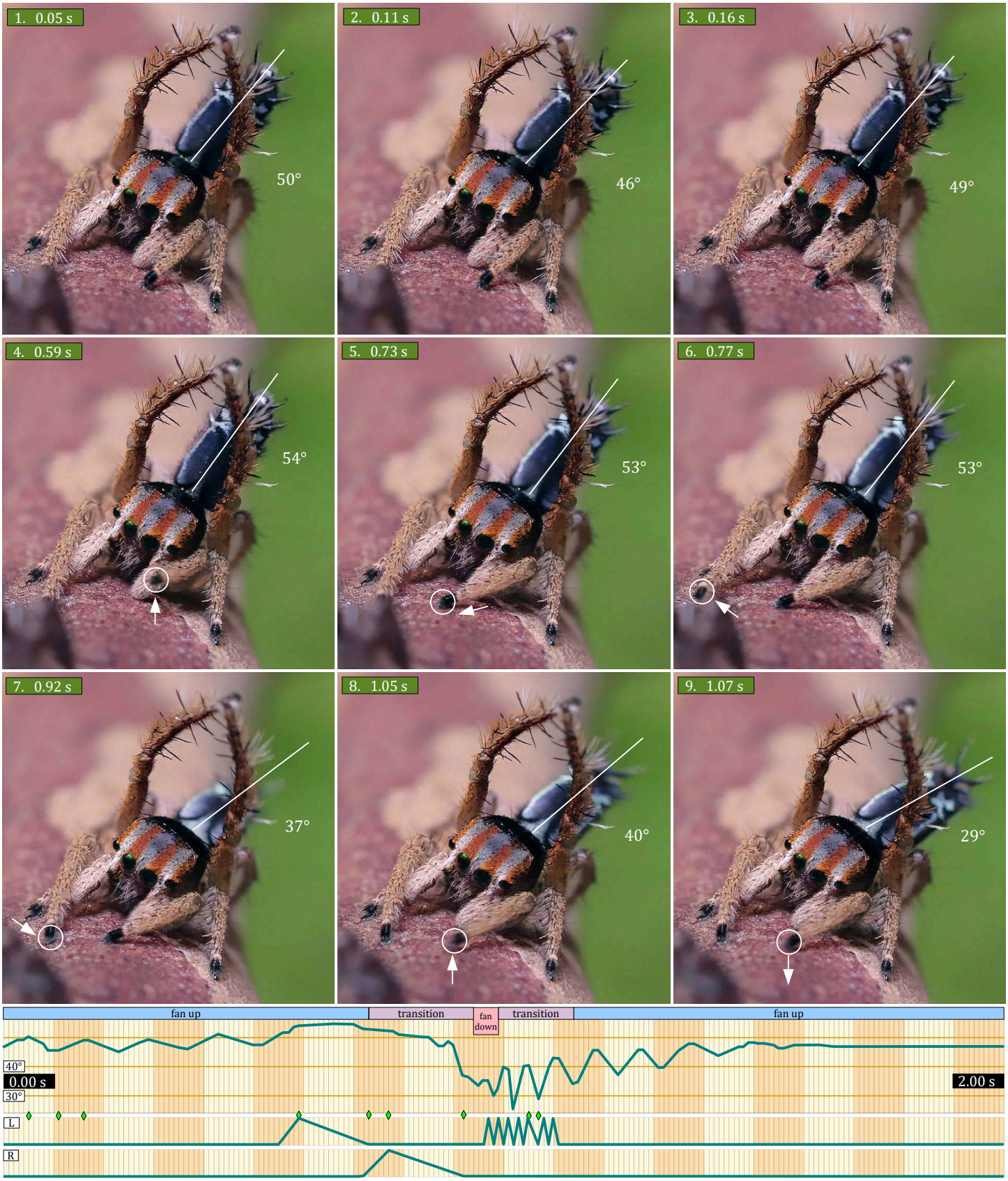

Figure 66. One cycle of a *tap dance* performed by a male *Maratus miles* (2.00 s, from 100 fps video; moving legs identified with circles) **1-9,** Leg LI was first moved up (4), then to the right and down (5). Then leg RI was moved up (6) and down (7), followed by a series of low magnitude up and down movements of leg LI (8-9). The top chart shows 8-20 Hz waving of the fan. The lower two charts show the timing of up and down movement of legs LI (L) and RI (R) during the same interval. Green diamonds in the chart identify the timing of frames (1-9) shown above.

Caliper dance (Figures 67-72). The *caliper dance* represents the final and most active display of a male in the *felinus* supgroup, and it includes caliper movement of varying amplitude with the bowed legs III, bobbing of the fan, and some very fast side-stepping. This appears to represent a final test of the female's readiness to mate, indicated by her lack of movement in response to the active side-to-side movement of the male. Each cycle can be broken into four steps: 1) The male quickly steps to one side or the other as the fan is lowered (rotated down in a sagittal plane) and the two legs III are brought together (closing caliper), 2) The two legs III are brought closely together, or to a position where the feet touch (closed caliper), 3) The two legs III are separated slightly and this position is held for a brief interval, and 4) The two legs III are more slowly separated (opening caliper) as the fan is raised (rotated up in a vertical plane).

The sequence shown in Figure 67 appears to represent an intermediate display, incorporating the extension of the long black setae of legs III seen in the *tap dance* display, and also including less lateral movement than is typical for a caliper dance. As shown in Figures 68, 70-72, caliper separation of legs III during this display is usually much greater. Detailed timing of the stages of this display, which are repeated in a series of cycles at a frequency of ~1.5-2.5 Hz, can be seen in Figures 70 and 72. Most of the time required for each cycle is used to slowly open the caliper formed by legs III, and both side-stepping and closing of the caliper take place immediately after the caliper has been fully opened.

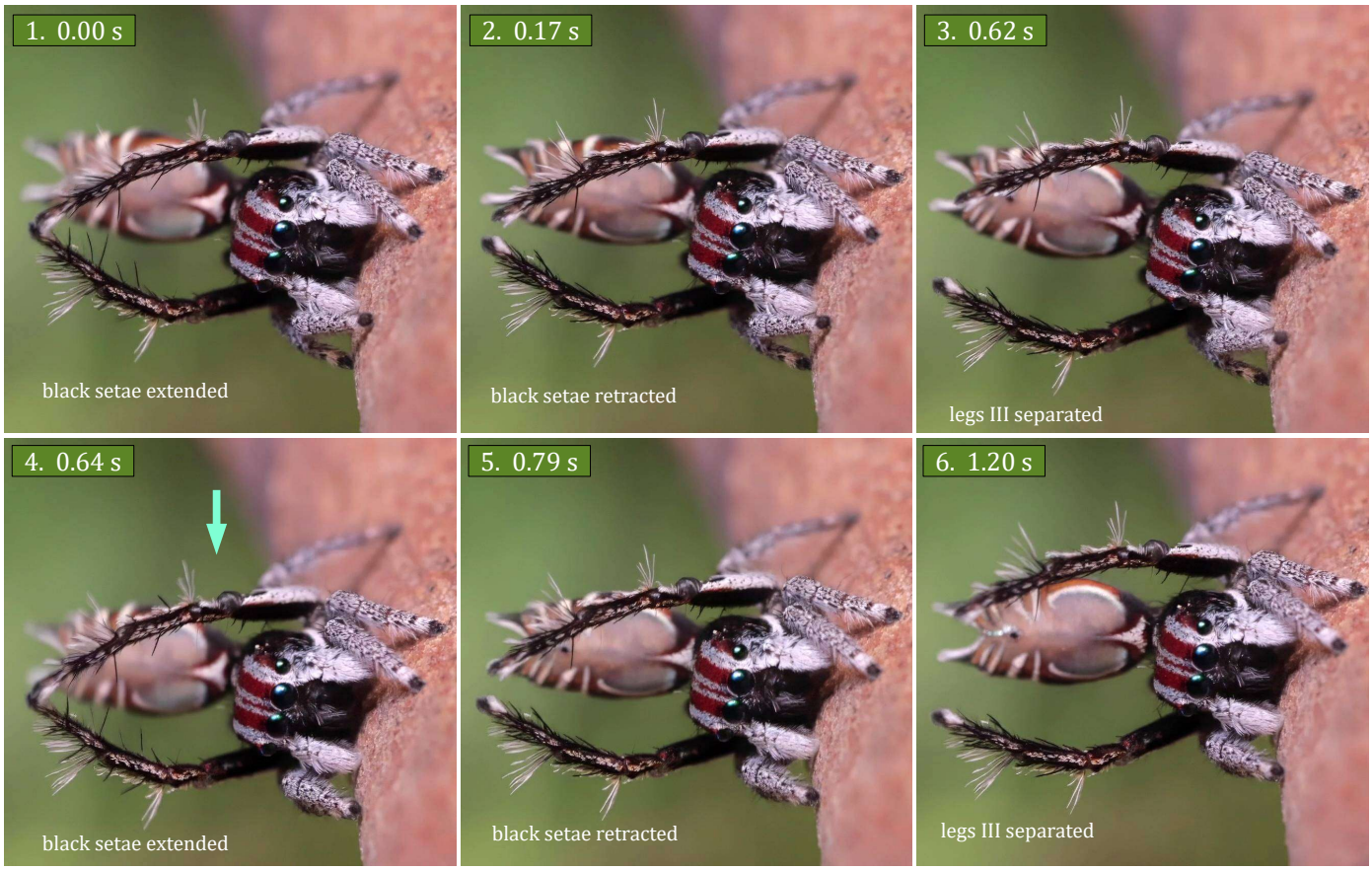

Figure 67 (continued on next page). Sequential frames from a 100 fps video showing a (~2.53 Hz cycles) *caliper dance* by a male *Maratus felinus* (~2.5 Hz cycles). Each time legs III converged at the end of a step (e.g., frame 1) the long black dorsal setae of legs III were extended. Arrows mark sudden sideways movement of the spider relative to the previous frame during this display. The relatively small steps and the extension of the long black setae in this sequence suggest that this particular display was intermediate between a *tap dance* display and a more typical *caliper* display (Figure 68).

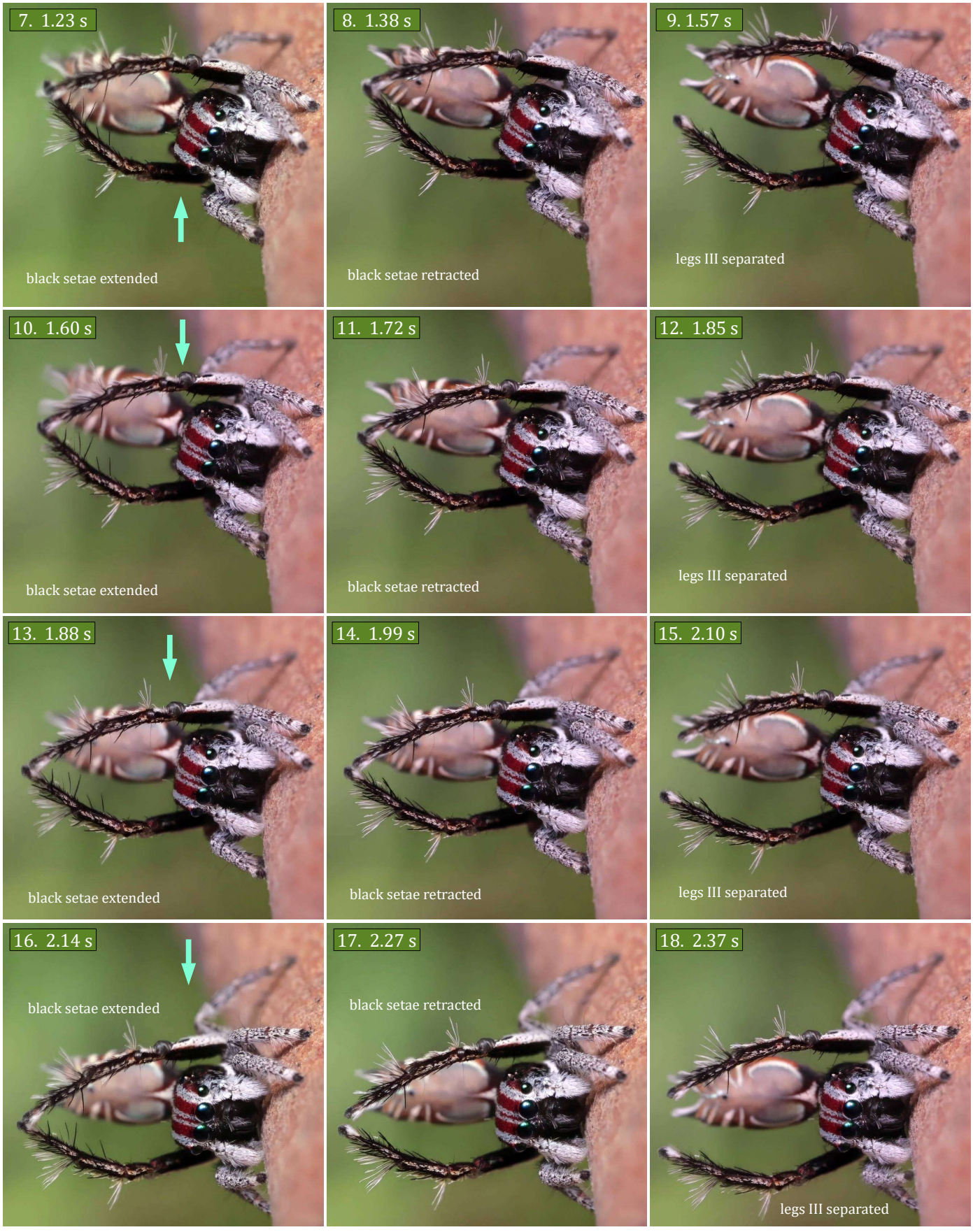

Figure 67 (continued from previous page). Sequential frames from a 100 fps video showing a *caliper dance* by a male *Maratus felinus* (~2.5 Hz cycles).

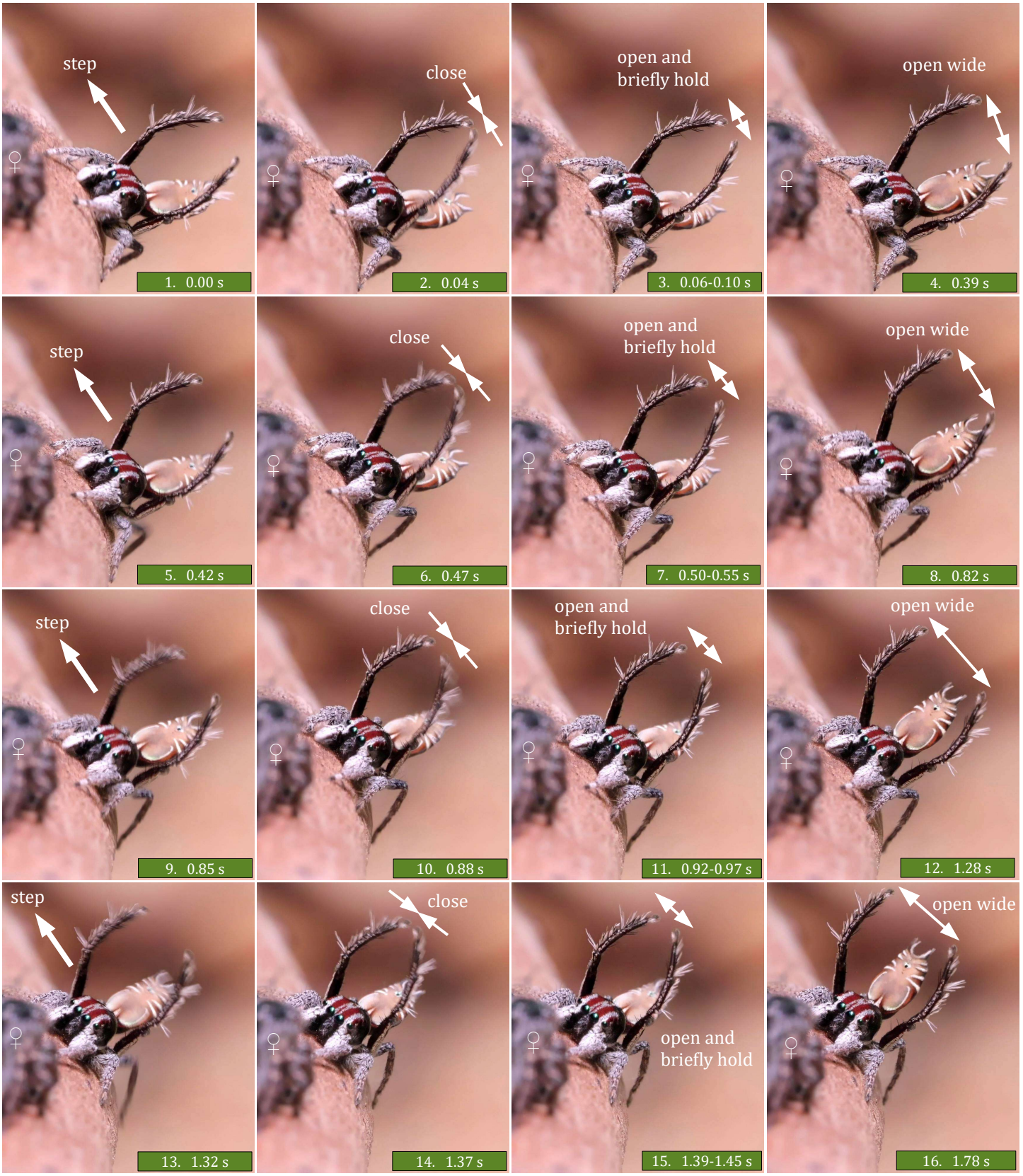

Figure 68. Sequential frames from a 100 fps video showing a larger-amplitude (~2.5 Hz cycles) *caliper dance* by a male *Maratus felinus*. Arrows indicate movement of the spider and legs III during this display, which is marked by regular cycles of four distinctly different positions (e.g., frames 1-4) as shown here. Note the position of the female at left.

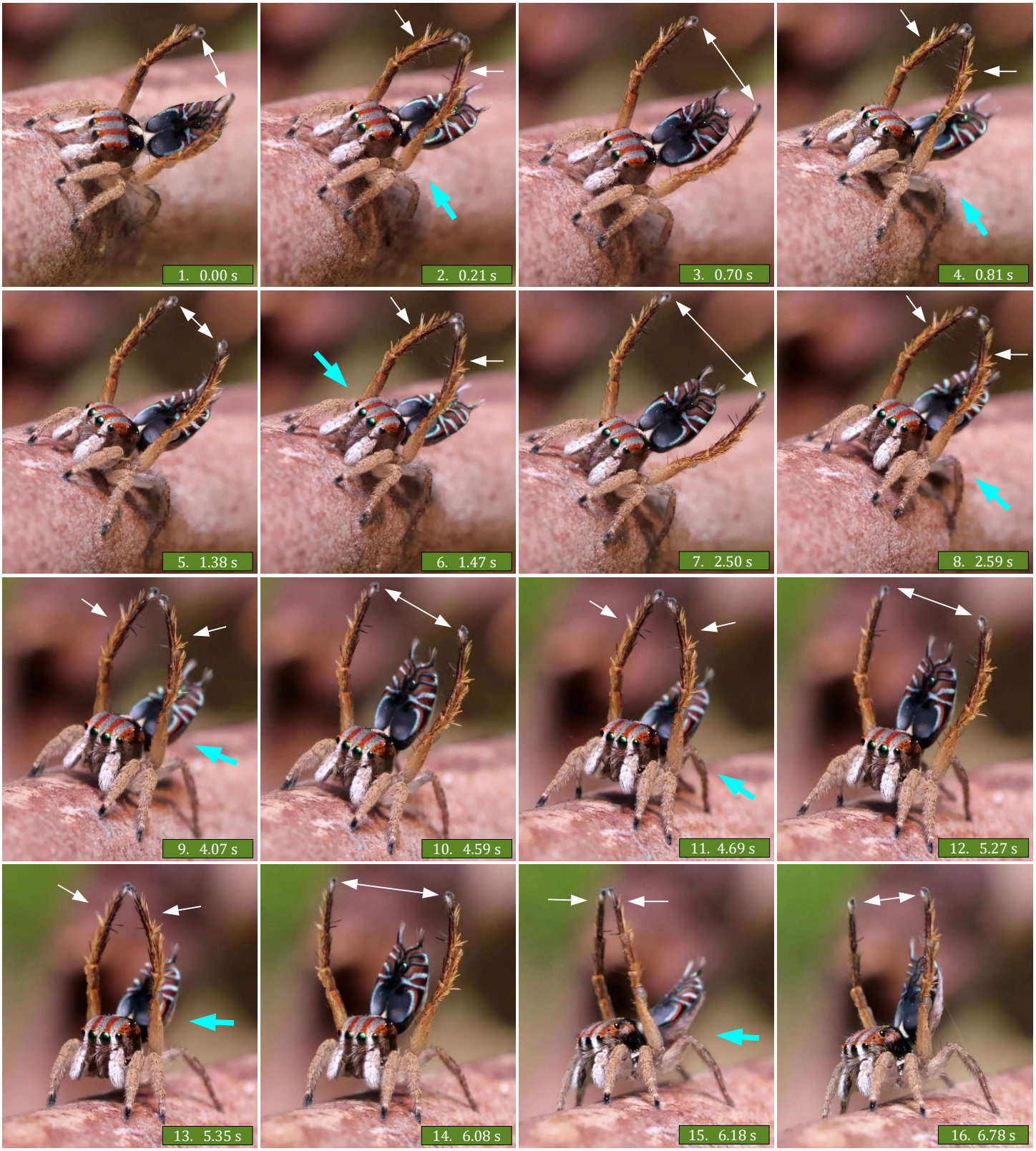

Figure 69. Sequential frames showing two caliper dance sequences (1-8, 9-16) by a male *Maratus lynx* (100 fps video, ~1.5 Hz cycles). White arrows indicate movement of legs III relative to the previous frame, and blue arrows indicate movement of the entire spider by stepping to one side. As legs III separate, the fan is raised. Then, with a sudden movement, the male moves to a new position and brings legs III together.

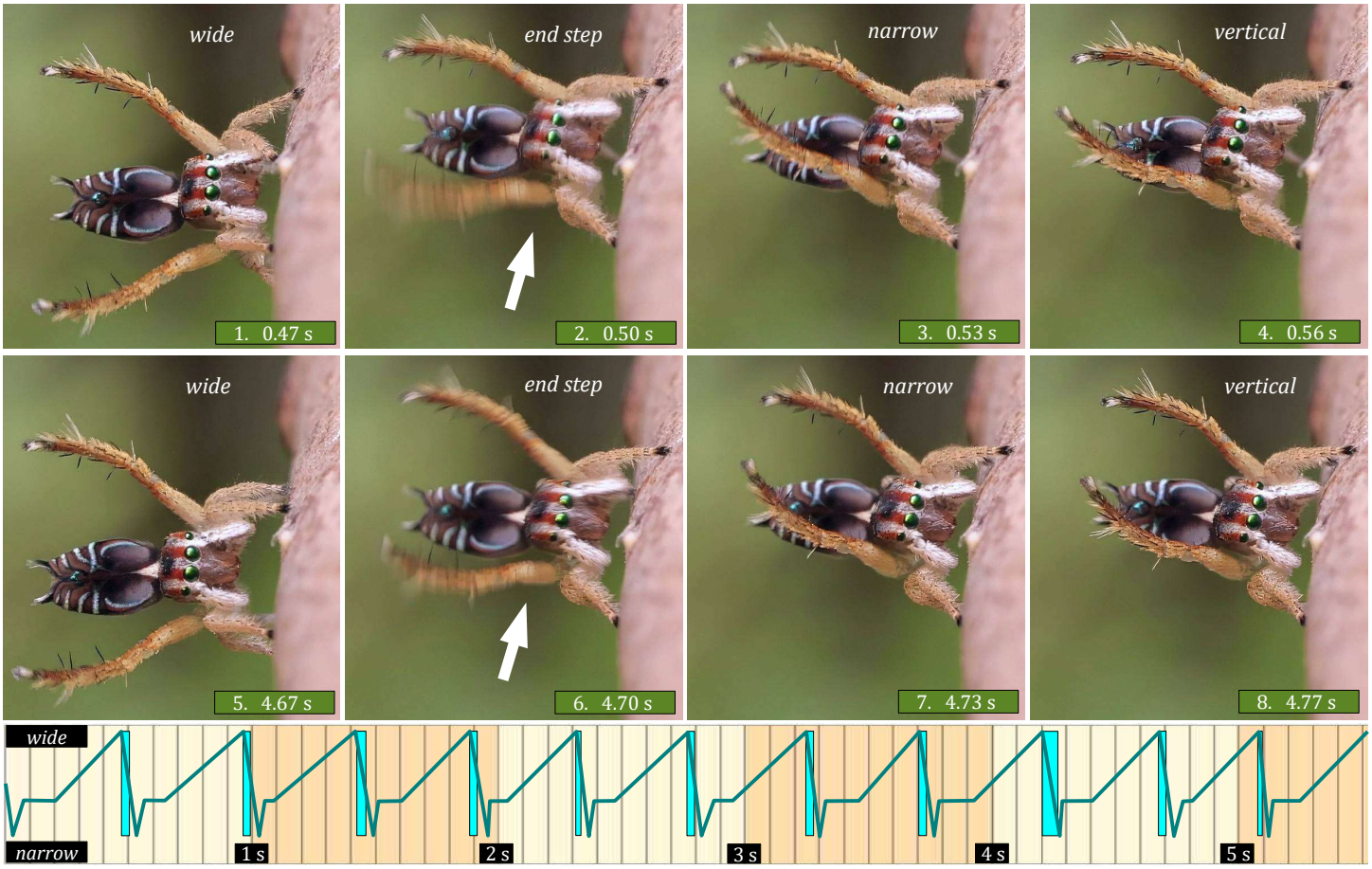

Figure 70. Detailed analysis of leg separation during a 5.51 s caliper dance by a male *Maratus lynx*, recorded with 100 fps video (~2 Hz cycles). The graph depicts the timing of relative separation of legs III during this display, but not the absolute magnitude of that display. Tall blue rectangles mark the very short intervals during which the spider stepped to the side. From a wide position (1) the spider made a quick side-step to a new position (2), closing the gap between legs III (3), then slightly increasing this gap so that legs III were in a near-vertical position (4). After this legs III were separated over the next ~3 s interval, followed immediately by a rapid side-step to a new position. The same sequence of positions is shown in frames 5-8.

Figure 71. Two successive positions occupied by a male *Maratus miles* during a *caliper dance*. Note the bowed *caliper* formed by the two extended legs III.

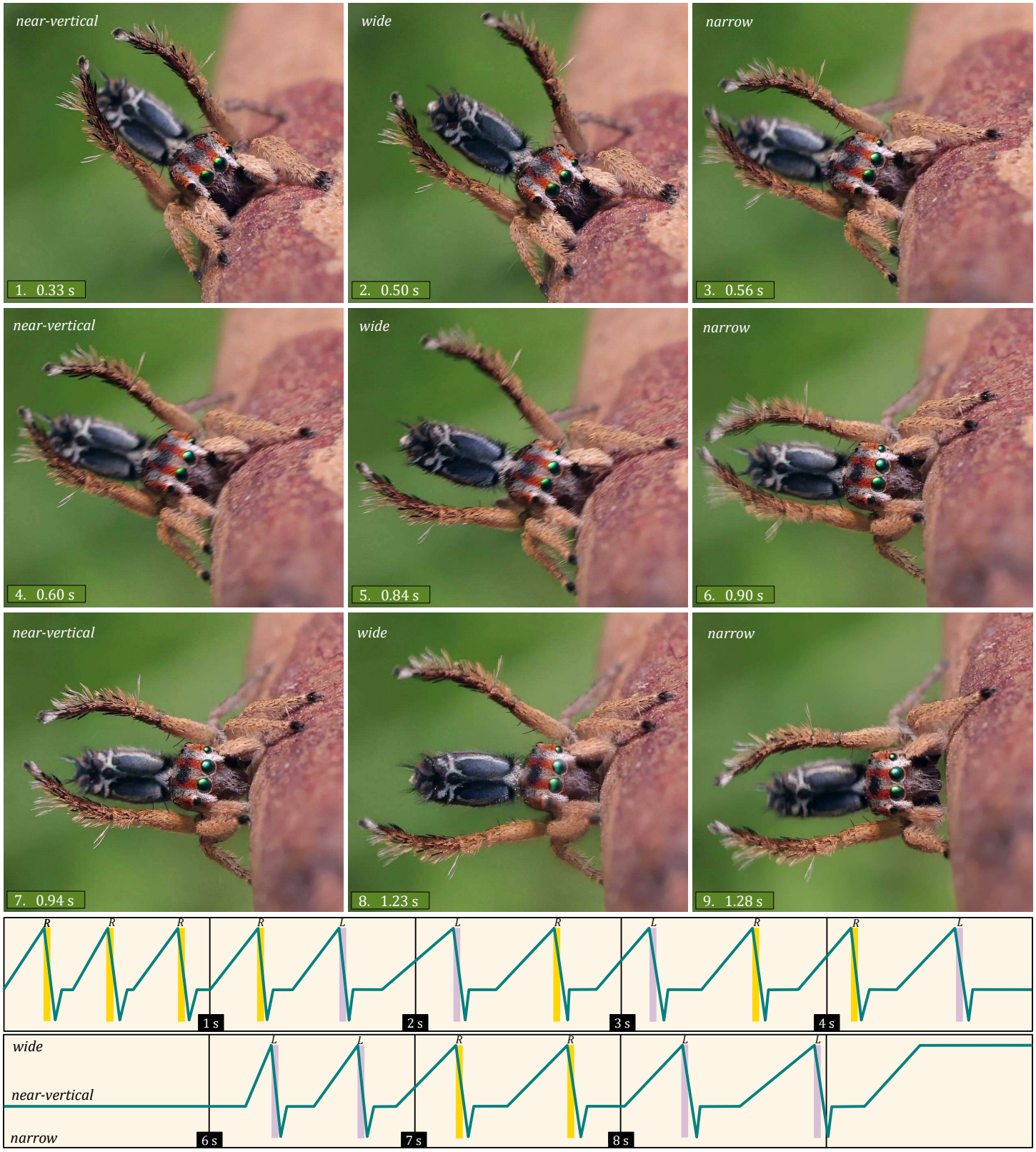

Figure 72. *Caliper dance* by a male *Maratus miles* (10 s, based on 100 fps video, ~2-3 Hz caliper cycles). The chart depicts timing of relative separation (but not absolute magnitude) of legs III (green line), revealing a consistent pattern of cycling between a closed caliper in a near-vertical position (1, 4, 7) and slow separation of legs III (2, 5, 8; accompanied by some elevation of the fan), followed by caliper closing movement as the spider very quickly side-steps to one side or the other (3, 6, 9; R or L, vertical bars in chart). Immediately after this movement, the caliper was opened slightly to a near-vertical position, ready to begin the cycle once more.

Final approach and mating. When a male, based on his assessment of the female's behavior, is ready to mate, he aligns his sagittal plane with that of the female in front of him, and advances to touch her carapace with outstretched legs I, as legs III are extended laterally (Figure 73). The same behaviour has been observed in other *Maratus*. Also, as in other *Maratus* species, the ability of the female to rotate her opisthosoma by ~180° while mating is remarkable (Figure 74).

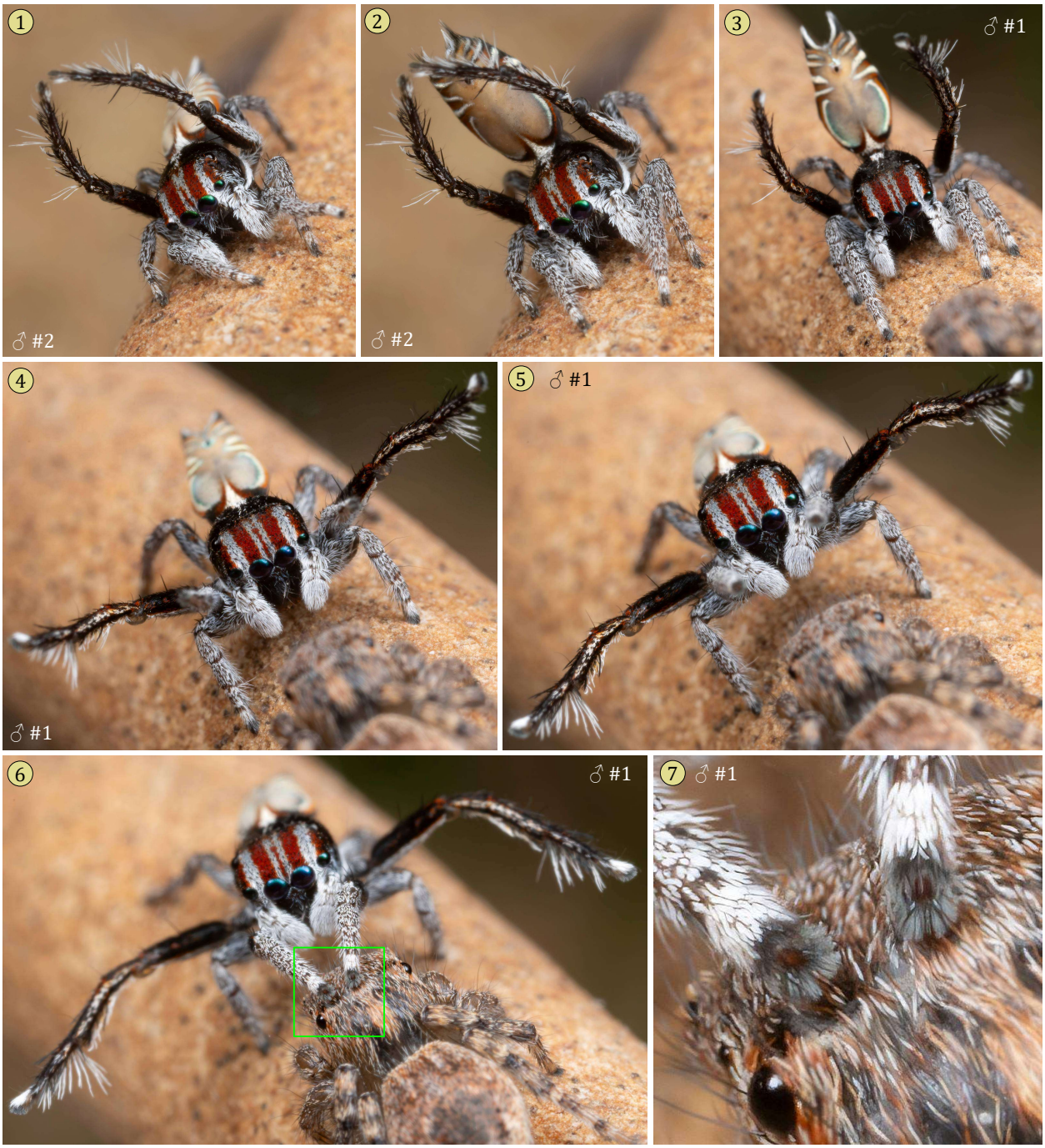

Figure 73. Photographs depicting the final stages of courtship and mounting by *Maratus felinus*. **1-2,** Note the tilt of this male during the alternating stages of a *tap dance*. **3,** At the end of a *caliper dance*, this male centered on the female and advanced. **4-5,** As the male advanced, legs I were raised and extended toward the female, and legs III were extended laterally, flexed forward on either side of the female. **6-7 (detail),** Contact of the extended footpads of legs I of the male with the dorsal carapace of the female.

Figure 74. Mating beneath a branch by a pair of *Maratus lynx*. A female may move to safer or more concealed positions like this, followed by a pursuing male.

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