

Notes on the jumping spider *Brettus cingulatus* in Karnataka (Araneae: Salticidae: Spartaeini)

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Abstract. A series of male and female *Brettus cingulatus* were observed over a 38 day period on a single plant (*Ficus microcarpa*) in Karnataka. New observations included regeneration of legs by a female at her final molt and a male mating with a female as she tended her eggs. Occupation of a single nest site by a succession of different females and the destruction of two different *B. cingulatus* nests at the same site, one involving oophagy by ants (*Tetraoponera* sp. and possibly *Oecophylla smaragdina*), is also documented.

Keywords. *Brettus albolimbatus*, brood, cohabitation, India, Mysuru, *Oecophylla smaragdina*, *Tetraoponera*, Uloboridae

It was only recently discovered that the widely-distributed spartaeine *Brettus albolimbatus* Simon 1900 represents the female of *B. cingulatus* Thorell 1895 (Ahmed et al. 2017; Patil & Uniyal 2018). This distinctive species is locally common throughout tropical Asia, from southern India to western Indonesia. They are known to feed on both insects and spiders, using at least five different modes of plucking with their pedipalps to entice web spiders to approach them (Jackson & Hallas 1986; Jackson 2000).

There are few published observations of these spiders in the field. Here we present a series of observations recorded by one of the authors (Abhijith) on a single plant (*Ficus microcarpa*) in front of his house at Indraprastha Organic Farm in Mysuru, Karnataka, India. Most of these observations were centered on the activity of a succession of females, three of which occupied the underside of a single leaf, observed over a 38 day period (Figure 1). Field observation of salticids is notoriously difficult as these spiders are difficult to follow and easy to disturb. Although the observations reported here (Figures 2-92) were not continuous, the periodic sampling of activity near a retreat did avoid most interference and thus should be a valid representation of some of the most important activities of these spiders. At the same time this leaves us with many gaps in their life histories and questions related to the ultimate fate of individual spiders. Hopefully the events depicted here will encourage others to engage in their study.

MAY 2019															JUNE 2019																						
5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11
A. Figures 6-7							B. Figures 8-28										C. Figures 29-66					D. Figures 67-92															

Figure 1. Study interval between May and June, 2019. Four sequences (A-D) correspond to the activity of four different females in succession. The first three of these occupied the same nest site.



Figures 2-7. Earlier photographs of *Brettus* nests. **2,** Female guarding her hatchling (instar 1) brood. At this stage the young are dark green-black with light-coloured legs. **3,** Female with her recently molted (instar 2) brood. **4,** Recently molted brood showing resemblance of instar 2 spiders to the adult female. **5,** Detail of (4). **6-7,** Female guarding her eggs.



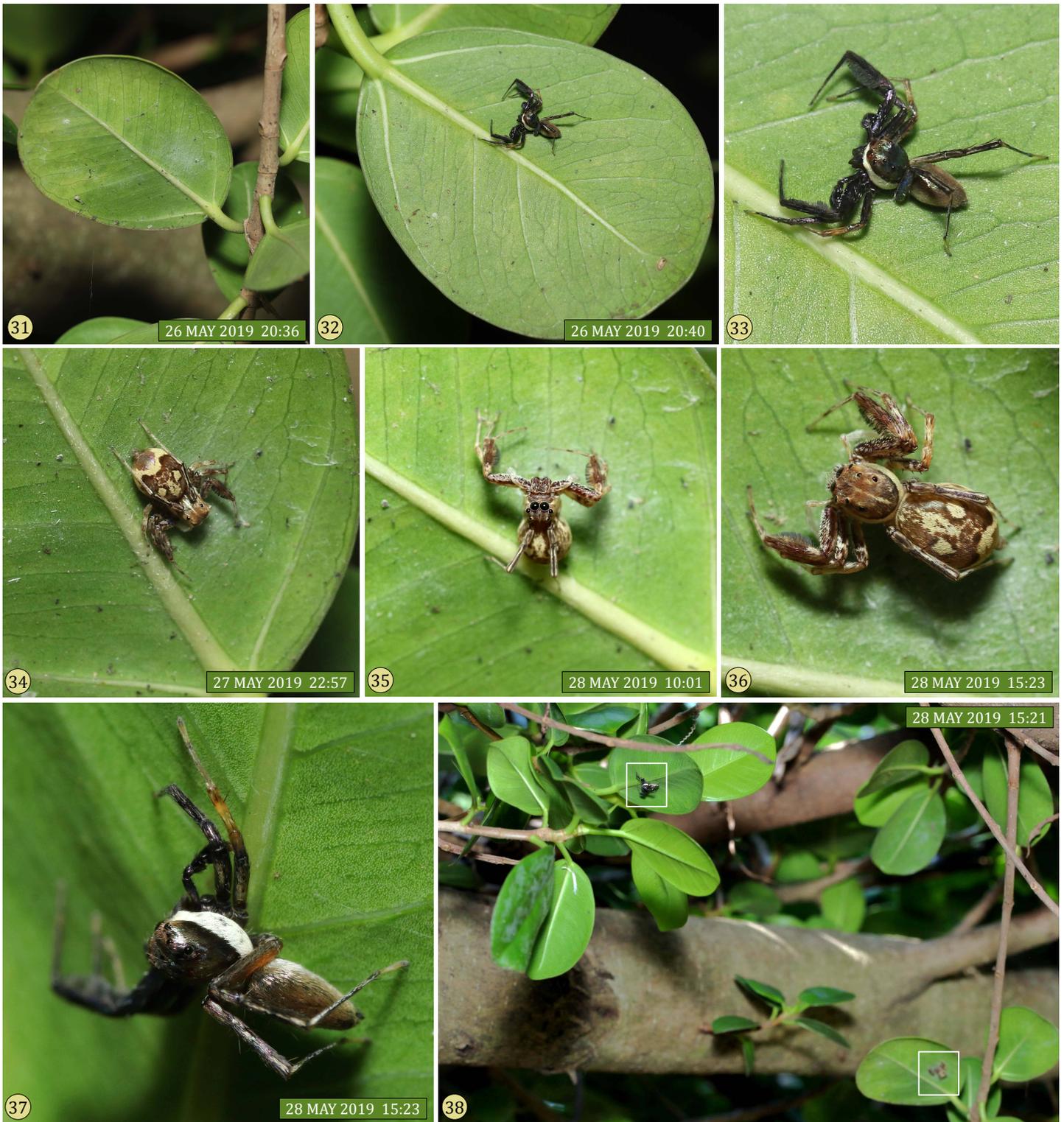
Figures 8-14. Penultimate female under leaf accompanied by adult male. Although the emergent spiderlings (instar 2, Figures 4-5) resemble the darker adult female, older immatures of both sexes are light orange. The area on this leaf occupied by this penultimate female, covered by a thin layer of silk, was occupied five days earlier by a different female guarding her eggs (6-7). The fate of that female and her brood is not known.



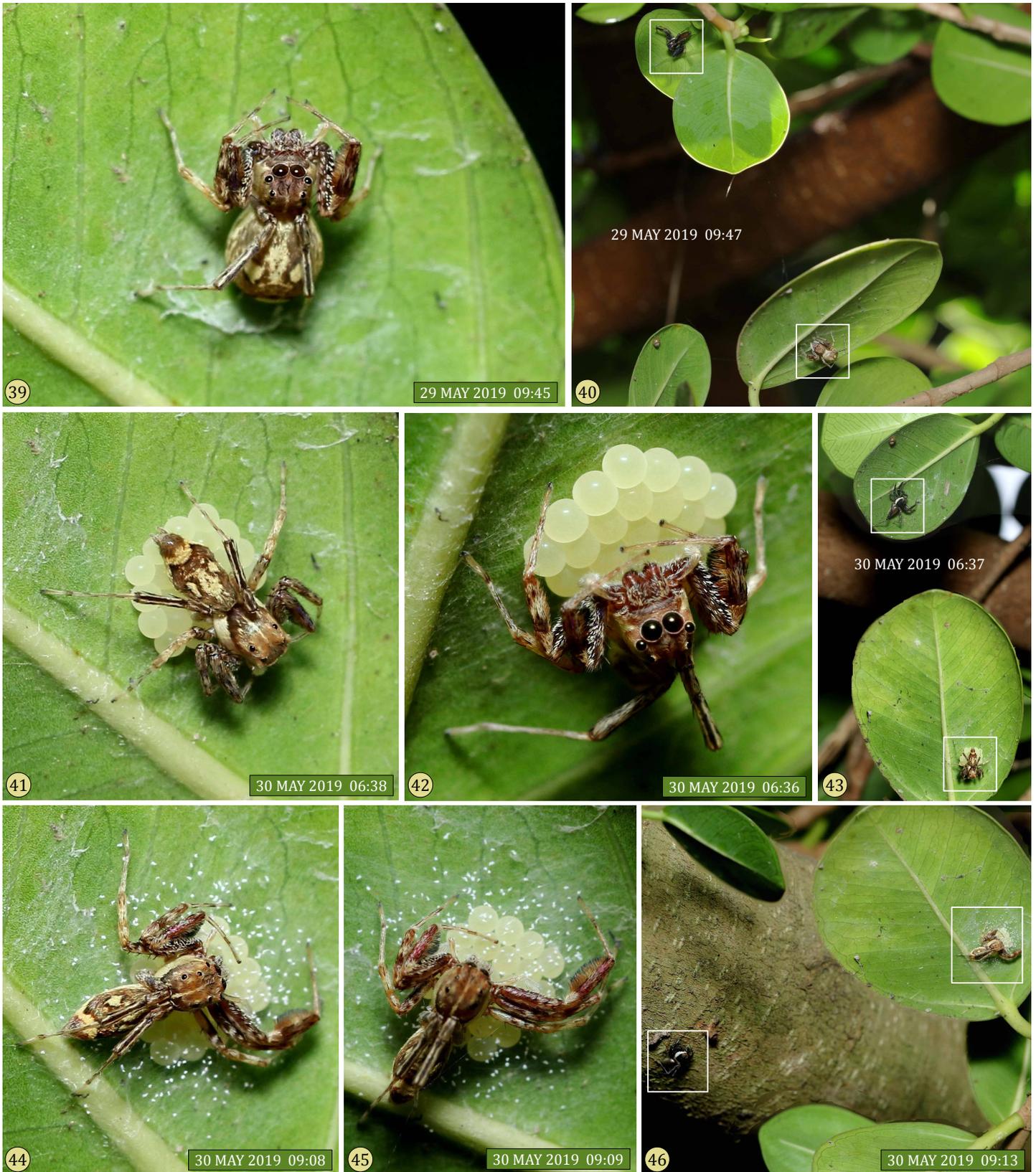
Figures 15-22. Penultimate female under leaf accompanied by adult male (continued from Figures 8-14). **15**, Attending male on a nearby leaf. **16-17**, Detailed views of female and male from (15). **18**, As she matured this female became darker and the adult pattern became more visible. **19**, Detailed view of female from (18). **20**, Wider view of the host plant (*Ficus microcarpa*) showing male and female under leaf (inset). **21**, Detail of inset from (20). **22**, Detail of male in resting position under leaf.



Figures 23-30. 23, Penultimate female under leaf accompanied by adult male on nearby branch (continued from Figures 8-22). 24-25, Detailed views of female and male from (23). 26-27, Adult female occupying the nesting site previously occupied by the penultimate female (23), two days later. This may represent the same individual but molting was not observed. 28, Later in the day the adult female (26-27) left the nest site and this adult female may represent the same individual hunting on a nearby stem. 29-30, On the next day the nest site was occupied by this well-fed adult female which, based on details of the dorsal scale pattern, was not the previous female (26-27) at this site.



Figures 31-38. Adult female and adult male under separate leaves. **31**, Later in the day the nest site occupied by the previous female was unoccupied. **32**, This adult male was present under a leaf near the nest site. **33**, Detail of (32). **34**, Late on the next day this adult female occupied the nest site. Based on scale pattern this appears to be the female observed previously at this site (29-30). **35-38**, On the next day this female continued to occupy the nest site (38, inset at lower right) as an adult male rested beneath a different leaf at a distance (38, inset at upper left).



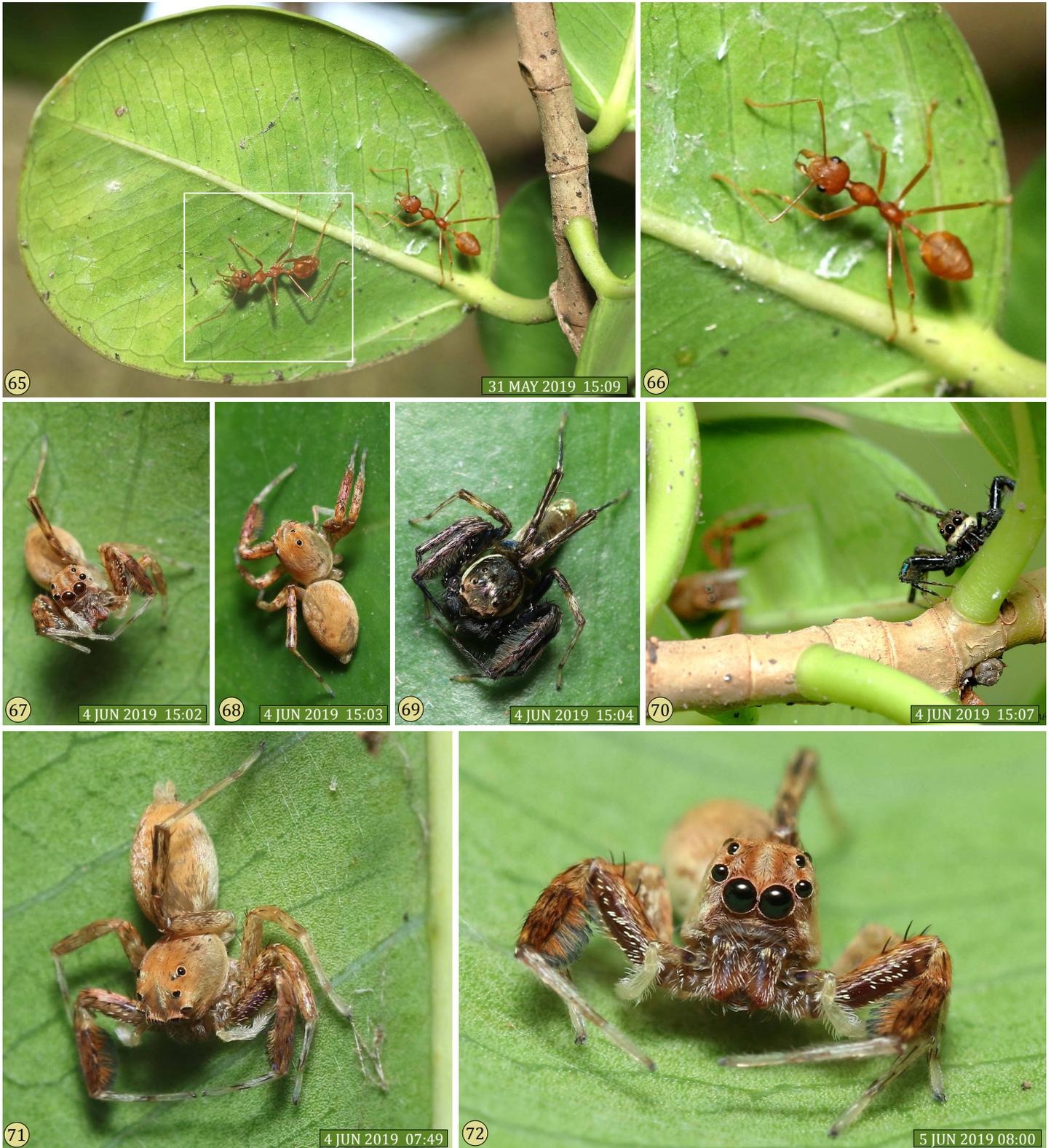
Figures 39-46. 39-40, The previous adult female (34-36) continued to occupy the nest site on the next day, accompanied by an adult male at a distance (40, inset at upper left). This may represent the same male. 41-43, By the morning of the next day this female had deposited her clutch of 23 eggs, not yet covered with silk. At this time she was still accompanied by an adult male (43, inset at upper left). 44-46, In the next 2-3 hours this female covered her eggs with the flecked silk characteristic of *Brettus* and related spartaeines. A male was still present in the vicinity, apparently watching the female (46).



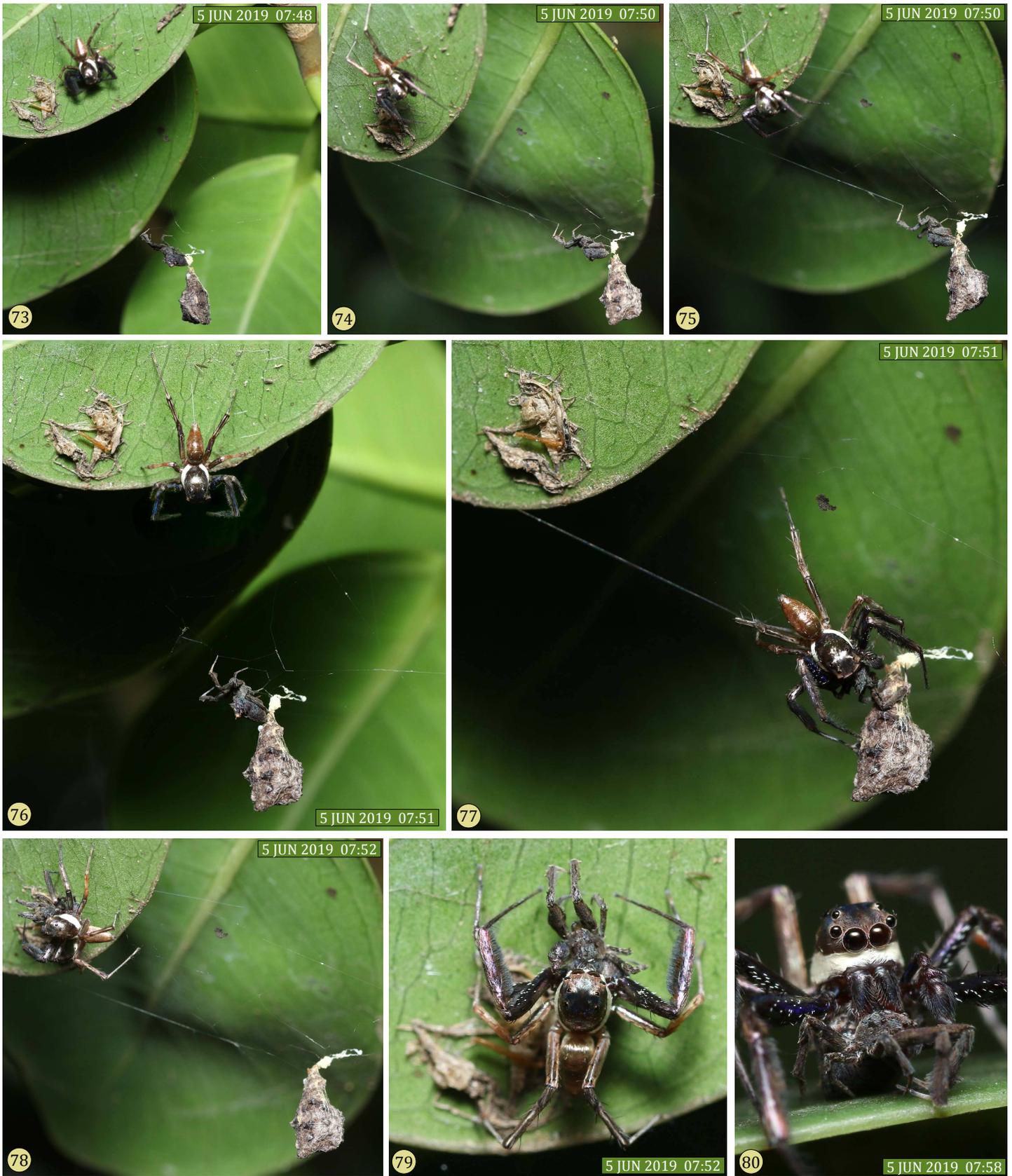
Figures 47-54. 47-50, After her clutch was secured with a silk covering, the same female (39-46) left her nest to capture and feed on a nematoceran fly. 51, After feeding this female returned to guard her clutch. 52-54, About one hour later an adult male mated with this female as she guarded her clutch of eggs. The inflated right tegulum of the male can be seen clearly in (54). Whether or not mating of females in this situation is a common occurrence in *Brettus cingulatus* is not known, but the exposed position of females as they guard their nest certainly makes this possible.



Figures 55-64. 55-57, Continuation of mating sequence shown in (52-54). 58-60, After mating this female continue to guard her brood. 61-64, On the next day the female was gone and her fate is not known. This sequence shows an ant (*Tetraoponera* sp.) removing an egg (identified by arrow) from her clutch through an opening in the silk cover, leaving 14 eggs behind. Eight other eggs had been removed previously.



Figures 65-72. 65, Composite of two photographs showing a weaver or green tree ant (*Oecophylla smaragdina*) at the nest site previously invaded by *Tetraoponera* (61-64). By this time all of the eggs had been removed. Removal of eggs by *O. smaragdina* was not observed but may have taken place. 66, Detail from (65). 67-72, Four days later this penultimate female, missing two legs (RIII and RIV) was observed near the previous nest site, at times attended by an adult male (69-70).



Figures 73-80. Sequence showing attack and predation on an adult female uloborid guarding her egg sac by an adult male, near the site occupied by a penultimate female (72). **75-76,** From the edge of a leaf this male plucked silk lines laid down by his prey. In response the uloborid did not approach the male, but began to vibrate its web. **77-80,** The male then jumped to capture the uloborid and returning to the leaf edge to feed. Similar behaviour was described by Jackson & Hallas (1986). The egg sac of this uloborid was not attacked.



Figures 81-86. 81-82, More views of the same adult male (73-80) feeding on its uloborid prey. 83, Adult male at the now-unoccupied nest site that had previously been cleared by ants (65-66). 84, Detail from (83). 85, One day after the tending female had been attacked young uloborids emerged from their intact egg-sac. 86, Nearby the injured penultimate female (72) continued to rest under her leaf.



Figures 87-92. 87-89, Three days later the injured penultimate female (86) molted on a thin silk platform laid down beneath the leaf that she occupied. The two legs that had been lost (RII and RIV) were regenerated and functional, although they were translucent and lacked the usual setation. 90-91, The same female remained at this site on the next day. 92, Adult male resting under a nearby leaf.

The occupation of a single nest site by a succession of different females might be the result of the presence of many draglines leading to this site and value associated with reuse of an established silk platform. Based on the lack of breeding success at this site it was also subject to a relatively high level of risk. This may be associated with a high local population density of *Brettus cingulatus*, correlated with either an increase in interference by conspecifics or an increase in activity by animals that prey on these spiders and their eggs. The nearly constant presence of a male in the vicinity of each female, and mating by a female tending her brood sac, also suggest the possibility that mating systems in this species are more complicated than those that have been documented in other salticid species, particularly the better-studied seasonal species that appear to mate only once (Hill 2018).

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