

Notes on biology of the ant-mimicking jumping spider *Myrmarachne plataleoides* (Araneae: Salticidae: Astioida) in south Asia¹

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The ant-mimicking jumping spider *Myrmarachne plataleoides* (O. Pickard-Cambridge 1869), found in association with the green tree or Asian weaver ant *Oecophylla smaragdina* (Fabricius 1775), has a wide distribution in tropical south and southeast Asia (Ramachandra & Hill 2018; Abhijith, Hill & Pai 2020; Abhijith & Hill 2021, 2022; Hill & Abhijith 2022). Here we document some interesting features of the biology of these spiders, based on recent observations at the Indraprastha Organic Farm of the senior author at Kalawadi Village, Mysuru, Karnataka.

Moulting during suspension from a dragline. We previously documented moulting during suspension from a dragline by the salticids *Valimia* sp., *Telamonia dimidiata* (Simon 1899) and other spiders representing the families Araneidae, Oxyopidae and Sparassidae (Hill et al. 2020; Abhijith & Hill 2020). Although it appears that *Myrmarachne plataleoides* usually moult inside of a nest (Figures 1, 2.1), we now report one observation of a female *M. plataleoides* moulting while suspended from her dragline (Figure 2.2-5).



Figure 1. Nest of *Myrmarachne plataleoides* containing exuvium (arrows), between two leaves occupied by Indian red bug nymphs, *Probergrothius sanguinolens* (Amyot & Serville 1843). **3**, Note the terrestrial planarian (Platyhelminthes: Geoplanidae) resting above this nest. Photographs taken at 20:20 on 11 JUL 2022 at the Indraprastha Organic Farm.

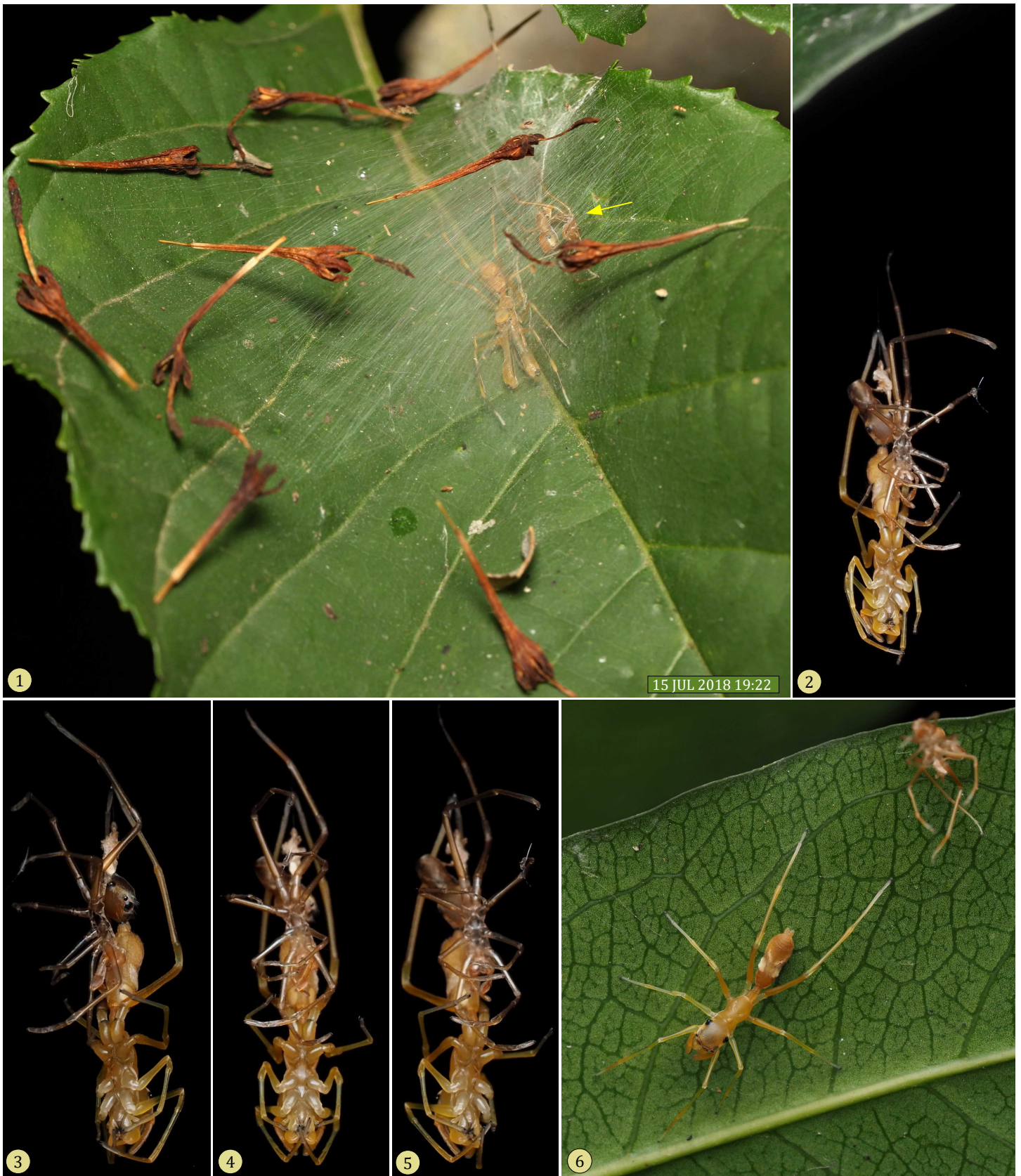


Figure 2. Final moult by *Myrmarachne plataleoides*. **1**, Adult male resting near exuvium (arrow) after moulting in his nest. **2-5**, Penultimate female moulting to adult stage while hanging from a dragline at the Indraprastha Organic Farm. **6**, The same female resting on the underside of a leaf after moulting. Photographs taken at 20:32 (2-5) and 20:33 (6) on 13 DEC 2022 at the Indraprastha Organic Farm.

Colonial nesting. Colonial nesting, suggesting the practice of *collective mimicry*, has been previously reported for *Myrmarachne melanotarsa* Wesołowska & Salm 2002 in East Africa (Wesołowska & Salm 2002; Jackson, Nelson & Salm 2008). Colonial nesting by female *M. plataleoides* was observed at two localities, one in Karnataka and one in Sri Lanka (Figure 3). It is possible that only adult females do this.



Figure 3. Colonial nesting by female *Myrmarachne plataleoides* at two different localities. These appear to be adult females. 2, Note the two egg clusters and the exuvium in one of these nests (arrow). Attribution and ©: 2, Chathuri Jayatissa.

Agonistic behavior of males. Agonistic behavior of *Myrmarachne assimilis* Banks 1930, *M. bakeri* Banks 1930 and *M. lupata* (L. Koch 1879) has been described previously (Jackson 1982; Nelson & Jackson 2007). Agonistic behavior of both a normal male and a gynandromorph for *M. formicaria* has also been described (Suzuki, Kuramitsu & Yokoi 2019), all showing the same positioning by the male, with legs I, chelicerae, and pedipalps extended laterally during the primary threat display. Earlier stages of this display have also been documented for *M. exasperans* (Peckham & Peckham 1892) by Hurni-Cranston & Hill (2019). Here we document a similar agonistic encounters between male *M. plataleoides* (Figures 4-5). There are three possible stages of escalation in these encounters: 1, facing with legs I extended toward the opponent; 2, threat, with legs I, chelicerae, and pedipalps extended laterally; 3, grappling, with chelicerae engaged. This behaviour represents what we think is the primary role of the enlarged chelicerae of *Myrmarachne* spiders, as a critical feature of male:male combat, rather than for display to, and selection by, females. As females can only mate with males that can present themselves, male:male combat represents an important form of sexual selection.



Figure 4 (continued on next page). Selected frames from a video documenting the encounter of two male *Myrmarachne plataleoides* at the Indraprastha Organic Farm. Each frame in this sequence is identified by frame number, followed by the elapsed time in seconds. **1-72**, The alpha (A) male faced off with the beta (B) male, which then turned to flee. **393-517**, Pursued by the alpha male with legs I extended laterally, the cornered beta male initiated the next stage of threat display with pedipalps and chelicerae extended laterally, and fangs extended (429), immediately followed by a similar display by the pursuing alpha male (445-517).



Figure 4 (continued from previous page). Selected frames from a video documenting the encounter of two male *Myrmarachne plataleoides* at the Indraprastha Organic Farm. **522-539**, The alpha male (at right) advanced to grasp and shake the beta male, as it was carried backward and then released (539). **550-609**, As the alpha male maintained his threat posture, the beta male (at top) turned away and fled from its pursuer.

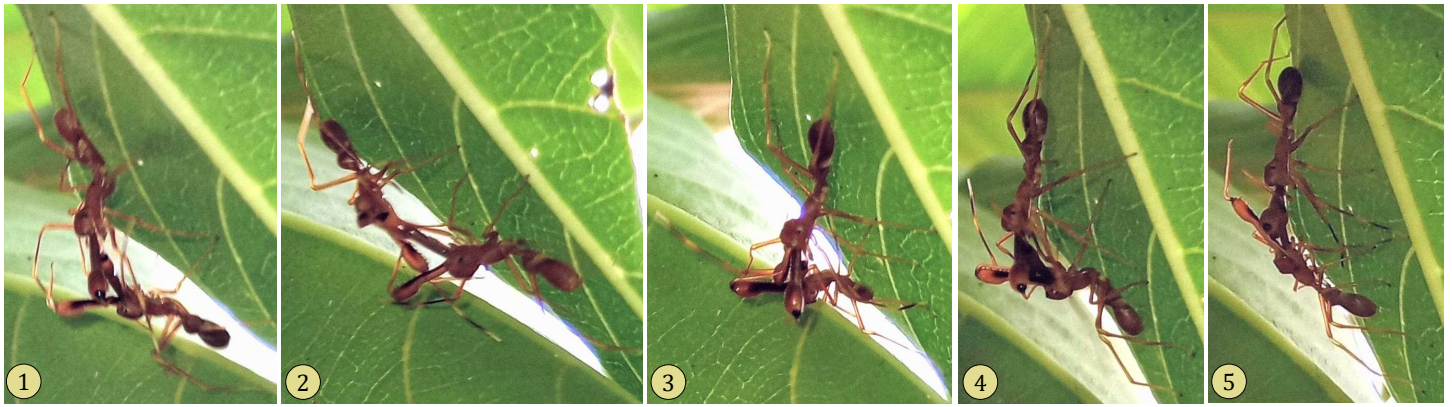


Figure 5. Grappling (stage 3) during an agonistic encounter between two male *Myrmarachne plataleoides* at Kaikondrahalli, Bengaluru, Karnataka (21 DEC 2022). Attribution and ©: 1-5, Chandu Bandi.

For comparison, the last two stages of an agonistic encounter between two male *Myrmarachne maxillosa* (C. L. Koch 1846) are shown in Figure 6.



Figure 6. Agonistic encounter between two male *Myrmarachne maxillosa* at Ang Mo Kio, Singapore (3 DEC 2022). 1-2, Stage II positions, with pedipalps and chelicerae extended laterally, and fangs extended. Note the long spines on legs I (1). 3-4, Stage III (grappling) positions, with chelicerae interlocked. Attribution and ©: 1-4, klearad.

Cohabitation of males and females. Male *Myrmarachne* species are known to enter the nests of females, and to make their own nests alongside the nest of a penultimate female (Jackson 1982; Nelson & Jackson 2007). Here we document this behaviour for *M. plataleoides*; cohabitation may however increase the likelihood that a male and female will be attacked by a fungus at the same time (Figures 7-8). For comparison, we also present a similar record of cohabitation by *Myrmarachne cornuta* Badcock 1918 (Figure 9).



Figure 7. Two examples of cohabiting male and female *Myrmarachne plataleoides* at the Indraprastha Organic Farm. **1-4**, Male nesting alongside a female nest containing at least one exuvium. Nearby green tree ants tended a colony of scale insects (4-5). A male that may have arrived previously at the site (arrows) appears to have been killed inside of its nest by a fungus (21 MAR 2020). **6-7**, In this case both the female and the nearby male (7, lower right) have been killed by a fungus (25 MAR 2020).



Figure 8. Three examples (1-2, 3, 4-5) of cohabitation, or the guarding of a penultimate female by an adult male *Myrmarachne platealeoides* at the Indraprastha Organic Farm. 4-5, This male is black in color and we cannot be certain that it represents the same species as the female. See Hill & Abhijith (2022) for a related discussion.



Figure 9. Cohabiting female (top, left, and 2) and male (bottom, left, and 3) *Myrmarachne cornuta*, at Tanjung Bungah, Penang, Malaysia, 23 DEC 2020. Attribution and ©: 1-3, Albert Kang.

Female defence of her nest. Here (Figures 10-11) we document the successful defence of a nest by a female *Myrmarachne plataleoides*, in response to the attack of a much larger *Cheiracanthium* (Araneae: Cheiracanthiidae). Although it is generally assumed that a female salticid will guard and defend its nest, this behaviour is seldom if ever documented. It is noteworthy that the defending *M. plataleoides* in this case, although much smaller, does have the advantage of acute vision, and the ability to carefully gauge and target its approach to the transgressor.



Figure 10. Selected frames from a 29.97 fps video clip showing the defence of a nesting site by a female *Myrmarachne plataleoides* at Indraprastha Organic Farm (25 MAR 2018). For each frame, the sequential frame number and elapsed time in seconds is shown. **1**, Composite of three frames, showing the advance of the defending female, facing and raising legs I, equipped with sharp spines, toward the intruding *Cheiracanthium*. **2-3**, Subsequent pursuit drove the intruder off of the top of the leaf.



Figure 11. Sequential photographs showing the defence by this female *Myrmarachne plataleoides*. **1-2**, As the defending female approached, the attacking *Cheiracanthium* was biting through the silk layers of one of the nests. **4-5**, After the attacker was driven away, the defending female looked for it, and followed it with legs I raised.

Female cannibalism. Colonial nesting by adult females suggests that, apart from adult males, *Myrmarachne plataleoides* can live safely with conspecifics. However, as shown in Figure 12, in some circumstances females may also prey on conspecific females, which may or may not be mature.



Figure 12. Sequential photographs showing predation by a female *Myrmarachne plataleoides* on a conspecific female in Mysuru, Karnataka. Initially these spiders were observed as they engaged in what appeared to be a territorial contest near a nest built at the base of a motorcycle mirror. Feeding was interrupted several times as the winning female left its prey to examine the area, most likely a response to the presence of the photographer.

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