

## SOME OBSERVATIONS ON THE WEBS OF *GASTERACANTHA GEMINATA* (FABRICIUS, 1798) AND *MACRACANTHA ARCUATA* (FABRICIUS, 1793) (ARANEAE: ARANEIDAE)

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Spiders of genus *Gasteracantha* are known for decorating their orb-webs with small silk balls along the viscid spirals (Tikader, 1982, 1987). These decorations are species specific (Siliwal *et al.*, 2002). These silken decorations in their web are supposedly to scare enemies or are camouflage devices against predators (Tikader, 1987). *Gasteracantha unguifera* Simon, 1889 prepares milky-white beads on the orb-web as well as the supporting silk threads, whereas, *Gasteracantha hasselti* C.L. Koch, 1837 prepares faint silken beads or fussy silk on radial as well as on the spiral threads of the orb-web (Siliwal *et al.*, 2002). This note provides information on web characteristics of *Gasteracantha geminata* (Fabricius, 1798) and *Macracantha arcuata* (Fabricius, 1793).

### *Gasteracantha geminata* (Fabricius, 1798)

*Gasteracantha geminata* is reported to occur in southern India - Karnataka, Tamil Nadu and Kerala (Pocock, 1900; Tikader, 1982; Sivaperuman & Thiyakesan, 1999; Patel, 2003). We observed this species at various localities: Coimbatore (in our office garden and nearby areas), Indira Gandhi Wildlife Sanctuary, Tamil Nadu; Mangalore University Campus, Mangalore, Karnataka; Kerala Agricultural University, Thrissur and Parambikulam Wildlife Sanctuary, Kerala. More than 15 webs of *Gasteracantha geminata* were closely observed during the period July 2002 to December 2003. It was noticed that these spiders prefer relatively undisturbed areas to prepare their web and were common during October to April. The diameter of the orb-web varied from 20-55cm depending on the age of the spider. Webs were observed at 3-6ft height from the ground.

The *G. geminata* web consists of typical orb-web and a few irregular supporting strands (like cob-web) for attaching to the substratum. The orb-web has a hub area (where the spider usually rests) and prey capture area (consisting of sticky / viscid spiral threads, where prey is trapped). Web of *G. geminata* varies from the rest of the species of genus *Gasteracantha*, firstly, by having a small prey capture area with noticeable inner free zone (gap between hub and prey capture area) and outer free zone (gap between prey capture area and outer foundation line). Secondly, it consists of two to three discontinuous milky-white silk thickening at a distance of about 5.0-10.0mm on a single radial line, which runs perpendicular to the lower outer foundation line (Fig. 1). In spiderlings or subadults, these discontinuous milky-white silk thickenings

are also seen on the lower outer foundation line. Number of silk thickenings on the outer foundation line reduces with maturity of the spiderling (Fig. 1). Distance between two thickened parts of silk varies from 10-15mm. But such thickenings are missing in rest of the radial threads and irregular strands supporting the main orb-web.

Members of genus *Gasteracantha* construct their web in various stages. We observed three females of *G. geminata* constructing web from the juvenile stage until maturity in our office garden. The web was prepared in the following stages. **First Stage:** A small orb-web of about 200mm in diameter was constructed near an ornamental shrub with an inner free zone of 15-20mm and outer free zone of 50-60mm.

**Second Stage:** The orb-web was supported by irregular strands of silk but not as many as seen in the web of *G. hasselti*. These irregular strands were attached to various substrata like twigs or leaves of plants, wall, earthen pots, etc. The inner free zone (10-15mm) and outer free zone (40-50mm) space was reduced by the addition of a few radial threads in the web.

**Third Stage:** A discontinuous milky-white silk thickening was there on the lower outer foundation line. This thickening of lower foundation line is not seen in the webs of mature individuals and subadults.

**Fourth Stage:** A discontinuous silken thickening on a single radial line, which is perpendicular to the lower outer foundation line, was constructed. Thickening on radial line of the orb-web was thicker than lower outer foundation line.

In our observations, *G. geminata* took about three to four days to complete web construction (all the four stages). The thickening of silk depended upon the stage of construction. These thickenings appeared to be outstanding white bands on the web. Probably the thickenings and bands help in camouflaging.

### *Macracantha arcuata* (Fabricius, 1793)

*Macracantha arcuata* is a rare spider reported in India from Shillong in Meghalaya and Sikkim (Tikader, 1982). Recently, two females of *Macracantha arcuata* were sighted in Gibbon Wildlife Sanctuary, Assam (Molur *et al.*, 2004). This spider prepares huge web about three to four feet in diameter like *Nephila pilipes* but the silken threads are thicker or more conspicuous than *Nephila pilipes*. The web structure described here is based on photographs and personal observation. Like other *Gasteracantha* species, *Macracantha arcuata* exhibits a unique web structure. It constructs an orb-web, three to four feet in diameter with at least 150mm of inner free zone (gap between hub area and prey capture area). This web differs from the *Gasteracantha* species by following characters.

The hub area of *Macracantha arcuata* is hollow (unlike thick net like structure in many *Gasteracantha* species). It could be because these spiders do not usually rest in the hub area, instead wait outside the web, below the leaf / twig to which is attached an anchoring radiating strand of the main orb-web (Molur *et al.*, 2004). Prey capture area is very large in this species (Fig. 2) unlike in *G. geminata* and occupies a large area making the

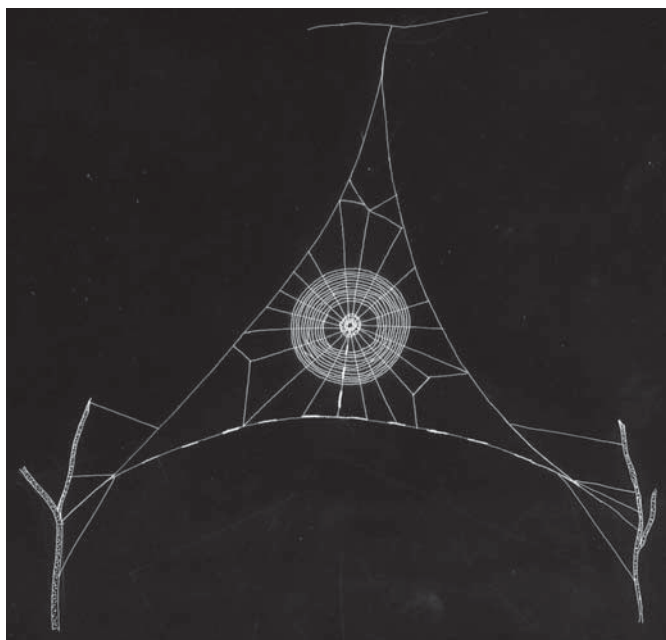


Figure 1. Web of *Gasteracantha geminata* (Fabricius, 1798)

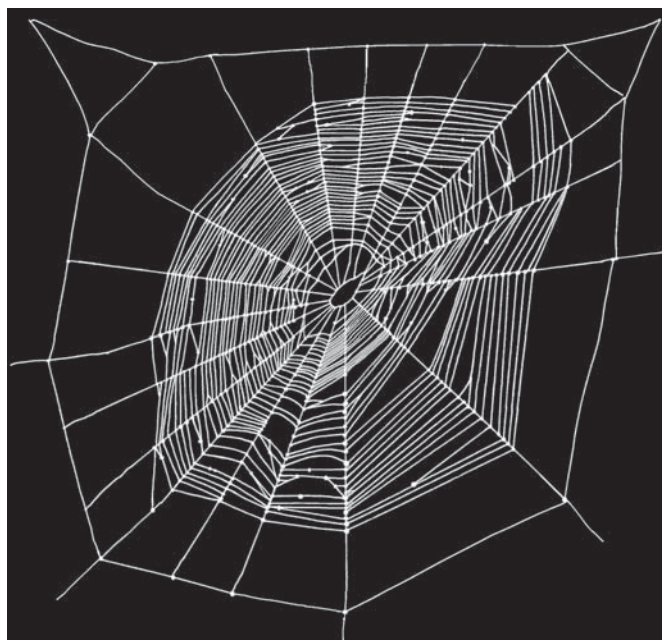


Figure 2. Web of *Macracantha arcuata* (Fabricius, 1793)

outer free zone very negligible. Conspicuous white beads on the radial threads are present especially at the junction between the spiral and radial threads (Molur *et al.*, 2004). Sparse/random, white beads are also found on the spiral threads. The web lacks supporting thread as observed in case of many *Gasteracantha* species. A comparative web structure of this species at various stages is required.

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