

## THE GOLDEN SILK ORBWEAVER, *NEPHILA CLAVIPES* (ARANEAE: TETRAGNATHIDAE)<sup>1</sup>

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**INTRODUCTION:** In Florida and other southeastern states, this large orange and brown spider with the feathery tufts on its legs is well known to most native southerners. It is particularly despised by hikers and hunters, as during late summer and fall the large golden webs (fig. 1) of this species make a sticky trap for the unwary. However, as is typical with most spiders, there is little real danger from an encounter with the golden silk orbweaver. The spider will bite only if held or pinched, and the bite itself will produce only localized pain with a slight redness, which quickly goes away. On the whole, the bite is much less severe than a bee sting. Typically the webs are made in open woods or edges of dense forest, usually attached to trees and low shrubs, although they may be in the tops of trees or between the wires of utility lines (Krakauer 1972). Prey consists of a wide variety of small to medium-sized flying insects, including flies, bees, wasps, and small moths and butterflies (Robinson & Mirick 1971). We have also seen them feeding on small beetles and dragonflies. These spiders are rarely found in row crops, due to requirements of web support, but they are common in citrus groves (Muma 1975) and have been recorded from pecan (Whitcomb unpublished).

**DISTRIBUTION:** *Nephila clavipes* (L.) is the only species of the genus which is widespread in the Western Hemisphere. It occurs in the West Indies, throughout Florida to North Carolina, across the Gulf States, through Central America, and into South America as far south as Argentina. *Nephila sexpunctata* Giebel occurs from Brazil to Argentina, and the introduced *Nephilengys cruentata* (Fabr.) in Brazil (Levi & von Eickstedt 1989). Related species occur in the South Pacific, southeast Asia, and Africa.

**IDENTIFICATION:** *Nephila clavipes* females (fig. 1 and watermark) are among the largest non-tarantula-like spiders in North America and are perhaps the largest orbweavers in this country, rivalled in size only by *Argiope aurantia* (Fabricius) and the largest *Araneus* species like *A. bicentenarius* (McCook). Females range from 24mm to 40mm in length. The female color pattern, consisting of silvery carapace, yellow spots on a dull orange to tan cylindrical body, brown and orange banded legs, plus the hair brushes (gaiters) on the tibial segment of legs I, II, and IV and femoral segment of legs I and II, make this spider one of the most easily recognized. The males (fig. 1), on the other hand, are rather inconspicuous, dark brown, slender spiders 5-8 mm in length, which would often go unnoticed if not for the fact that they are usually found in the webs of females.

**LIFE HISTORY, HABITS, AND HABITAT:** *Nephila clavipes* in temperate North America has one generation per year. Adult males are present from July to September, with most females maturing in August. Mature females are found late into the fall, when they make at least two large eggsacs 2.5-3cm in diameter consisting of several hundred eggs surrounded by a basket of curly yellow silk. Populations in the tropical parts of the range probably produce more eggsacs, as the related *N. maculata* (Fabricius) averaged nearly 9 eggsacs per female in New Guinea (Robinson & Robinson 1973). The life history of *N. clavipes* is probably quite similar to the larger *N. maculata* (Robinson & Robinson 1976), perhaps with one or two fewer instars.

The finely-meshed, large web of *N. clavipes* (often over one meter in diameter) is placed to best exploit insect flight paths (above the herbaceous stratum). In tropical America, webs are found most frequently at edges of forest clearings, along side forest trails, and across forest watercourses (Robinson & Mirick 1971). The hub of the web where the spider waits is located near the top of the web, making an asymmetrical orb. Kaston (1972, fig. 318) gives an illustration of a portion of a web in detail. The web is a semipermanent structure, i.e., it is not destroyed and created daily as is the case with many araneid orbweavers. Large portions of the web may be repaired, leaving the remainder undisturbed (Peters 1955).

Prey-capture behavior by *Nephila* species is considered primitive compared to species of *Argiope* and *Eriophora*. The large species in these latter genera make webs nearly as large as those of *Nephila*, yet the mesh of these webs are coarse when compared to those of *Nephila*. *Nephila clavipes* capture smaller prey on the average than do, for example, *Argiope argentata* (Fabr.) and *Eriophora fuliginea* (C. L. Koch) webs of similar size. Due to their use of immobilization wrapping as a primary attack weapon (Robinson 1969; Robinson & Olazarri 1971; Robinson, Mirick & Turner, 1969), *Argiope* and *Eriophora* species are able to capture larger prey on the average than do *Nephila* species which directly employ biting to subdue the prey. Possibly this is an evolutionary advancement by these other large orbweavers to reduce competition for prey with *Nephila*.

Webs of *Nephila* species, as well as of other large orbweavers, are liable to kleptoparasitism by small (3-4mm) silvery spiders of the genus *Argyrodes* Simon (family Theridiidae). Robinson and Robinson (1976) recorded as many as 30 of these kleptoparasites in a single web of *N. maculata*, and we have seen over 40 *Argyrodes* in an abandoned *N. clavipes* web. This latter observation was noteworthy, since Robinson & Robinson (1976) demonstrated that *Nephila* species could reduce their kleptoparasitic load by periodically moving their webs even if the web site was productive of prey. One aspect of prey capture

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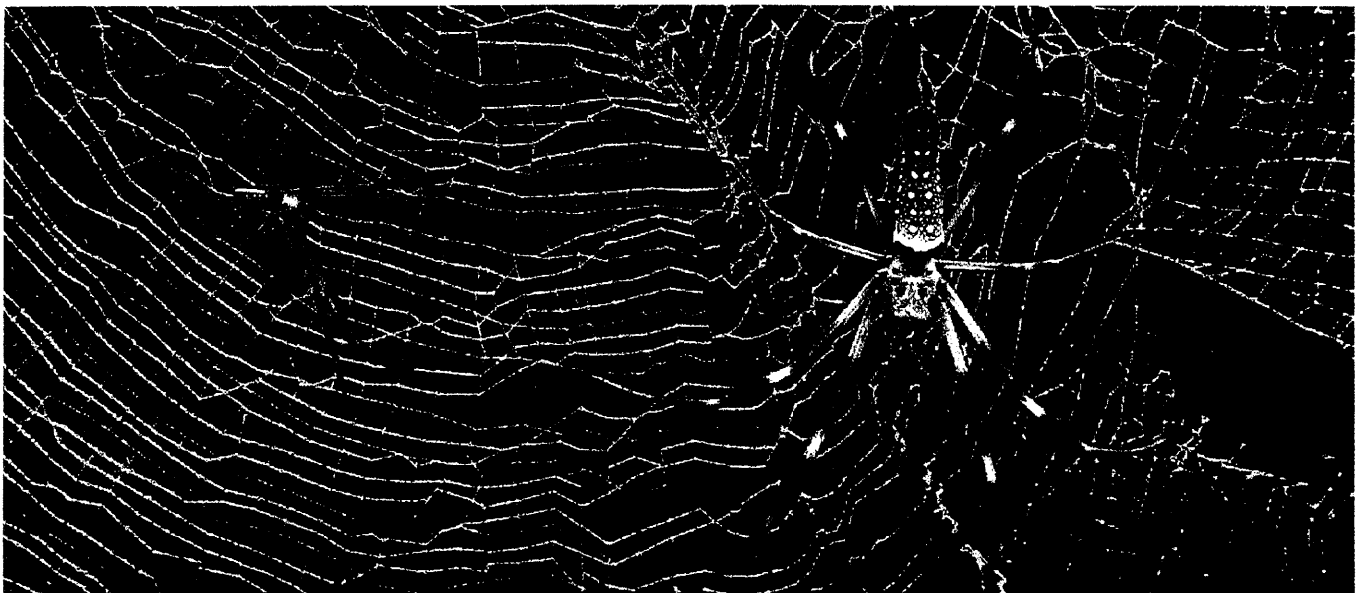
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by *Nephila* species, that of always bringing the prey back to the hub rather than leaving wrapped prey *in situ*, has been hypothesized to be a preventative action to reduce the amount of food stolen by *Argyrodes*, since detection of the theft action of the kleptoparasites would be difficult on such a large web (Robinson & Robinson 1973).

Another problem faced by golden silk spiders in tropical and subtropical climates is overheating. Special behaviors and body features have evolved in *Nephila* to protect against this problem. The silvery carapace reflects sunlight, while the long, cylindrical body may be pointed directly at the sun, thus reducing the area of exposed body surface. Forced evaporative cooling may be employed by manipulating a drop of fluid with the chelicerae. Cooling responses generally occur above 35°C (Krakauer 1972). The web does not have to be perpendicular to the sun in order for the spider to employ orientation; in fact, webs are generally placed so as to capture the most insects regardless of the sun's position, and the spider's orientation movements can be quite complex (Robinson & Robinson 1974).

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**Fig. 1.** Web of *Nephila clavipes* (Linnaeus), showing lifesize female in characteristic waiting position. Female usually waits in hub of web, slightly above and to the left of the female in the figure. Lifesize male in upper left corner.