

Nephila clavipes (Golden Orb Weaver)

Order: Araneae (Spiders)

Class: Arachnida (Spiders and Scorpions)

Phylum: Arthropoda (Arthropods)



Fig. 1. Golden orb weaver, *Nephila clavipes*.

[<http://bobarno.com/thiefhunters/golden-orb-weaver-spider/>, downloaded 6 April 2015]

TRAITS. The golden orb weaver is a large species of spider that can vary in colour from grey to greenish-yellow patterns for the females and dark brown for the males. They typically have distinctive white markings on their cephalothorax and abdomen. Female golden orb weavers have striped legs with bands of varying colours from brown to orange (Fig. 1). The females of this species are much larger than the males with the females varying between 20-50mm and the males averaging around 5-8mm with a slender build (Robinson and Robinson, 1973).

DISTRIBUTION. Found in the western hemisphere in North, Central and South America in places such as the West Indies, Florida, Panama and Argentina, to southern Canada. This species prefers warmer climates and humidity.

HABITAT AND ACTIVITY. These are both diurnal and nocturnal spiders (Higgins, 1987). An intricate fine mesh web is built by the female that can be several feet in size with one or two males sitting in it. Semi-permanent web that is repaired every day or when necessary (Peters, 1955). Webs found near water sources, at the ends of forested areas, swamps, near to walking paths etc., in a slightly inclined position as compared to other orb weaver species (Robinson and Mirick, 1971). These locations are used by the spider to capture the most prey by exploiting the flight path of insects, and females are usually found in the hub of the web. The webs are usually 0.5-2.5m off the ground but can be found as high up as 20m. The female hunts for most of the day and usually places her web near to a structure that can be used as a barrier to help protect from predators. Webs are used for defence against predator attack using barrier webs that block predators such as birds, and are used to notify the spider when prey is caught by its vibration.

FOOD AND FEEDING. Feed mostly on flying insects which are small and get caught in their webs (Fig. 2). Prey is incapacitated by a venomous bite and taken to the hub of the web, and wrapped to be ingested or stored. The prey is also placed near to the hub to prevent parasitism by the small spider *Argyrodes nephilae* which steals food from the orb weaver by cutting the prey bundles from its web and claiming it as its own. They hunt most of the day to sustain themselves and to replenish their stores that would have been stolen by the kleptoparasites inhabiting its web. They ingest the liquefied insides of their prey.

POPULATION ECOLOGY. Females build the web and are solitary but one or two males can inhabit it as well on the outskirts of the web if the female is tolerant. The males lose their ability to weave sticky webs when they reach maturity and must then depend on the females for their survival. Without a female's web the males would not survive. Kleptoparasites (*Argyrodes nephilae*) also live on the edges of the web and feed off of the prey that the females capture in their webs. Population is dense in areas closest to their food source and can vary with the changing of seasons (higher in warmer temperatures and lower when the temperature drops). They stay in their webs repairing and rebuilding when necessary. This species is abundant in the areas in which they occur and also be found in other areas once the temperature is adequate for its survival.

REPRODUCTION. Golden orb weavers reproduce by laying fertilized eggs. The mature males wait on the edges of the mature females' webs for the opportunity to mate. The females are willing to mate for only 48 hours after their final moult. While it is a rare occurrence, females sometimes attack the males during mating so the males must wait for the opportune moment. The males must arouse the females by vibrating their abdomen and using a plucking motion to prevent themselves from being eaten. The sperm is transferred from the males to females and stored in the females' spermathecae. Once the eggs are fertilized the females lay their eggs in large sacs (at least two) on a solid structure or on the side of a tree close to its web. The sacs have hundreds of eggs in each of them, with more eggs being produced in tropical areas. The females do not stick to one male but change partners over their lifetime. From the egg comes the spiderling stage (Fig. 3). They emerge from the egg sac when conditions are better e.g. rain or a

rise in temperature and stay together for a week or so before dispersing. They do not feed within this period of time. If conditions are not adequate they stay in their sacs and wait for better conditions. There is no parental care given to the offspring and the only protection they have is the web in which they emerge. Reproduction occurs in warmer season when the conditions are best suited to the survival of the offspring.

BEHAVIOUR. After the spiderlings leave the web they live on individual webs where they growing via the shedding of their skin (moulting) and capture their prey. The males mature faster than the females and once they reach maturity cannot produce webs capable of capturing prey. The males must then depend on females for survival by living in their webs and feeding off their prey. This allows the males to be present when the female achieves maturity to mate. They create webs that aid in their defence against predators one characteristic being their barrier web. This barrier helps to block predators such as birds that may try to attack the spider. Predators sometimes get trapped in the webs as seen in Fig. 4. They also have a venomous bite that they use in defence but the sting is not very severe and would not kill a larger sized predator e.g. humans who only show mild symptoms from a bite such as swelling and mild pain. Another way this spider protects itself is by strategically placing its webs near to or in between structures, minimizing the access to it by certain predators. They communicate by the vibrations on their webs and hormones which signal to the males that the females have reached maturity.

APPLIED ECOLOGY. The silk webs are used by fishermen to catch bait fish due to their stickiness. While not commercially used in clothing production there have been garments that were made using the webs of the golden orb weaver such as a shawl. They are also being tested to be used to aid in medical procedure such as *in vitro* fertilisation as the body shows no immune response to them making the process more successful. The dragline thread of this spider is stronger than steel ($4 \times 10^9 \text{ N/m}^2$) and is biodegradable.

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Author: Nekila Noel

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Fig. 2. Golden orb weaver (female) feeding on praying mantis.

[<http://bobarno.com/thiefhunters/golden-orb-weaver-spider/>, downloaded 9 April 2015]

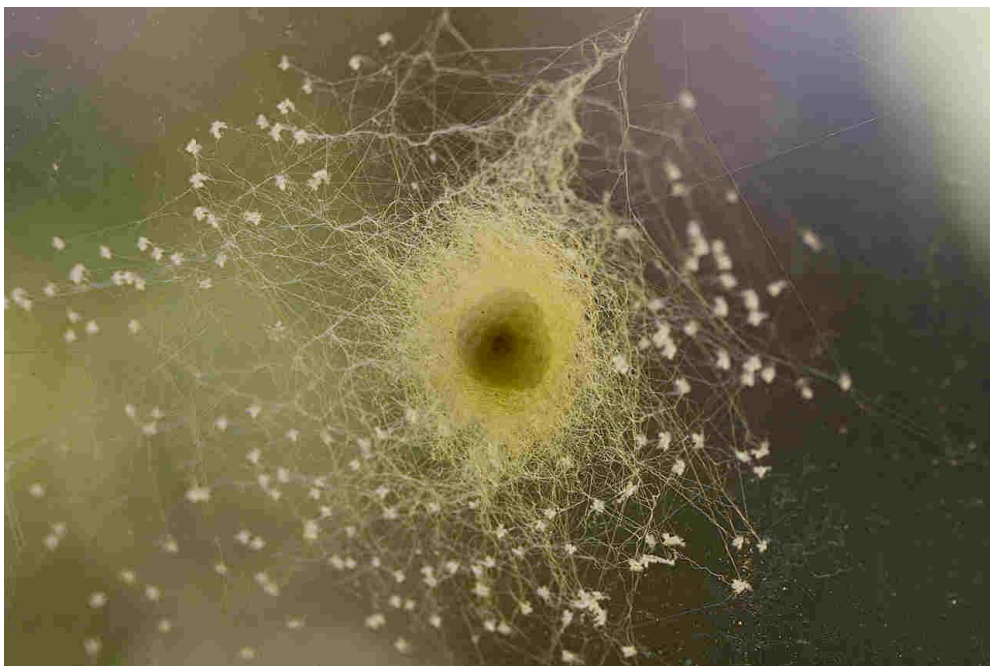


Fig. 3. Newly hatched spiderlings and egg sac.

[<http://okeechobee.ifas.ufl.edu/News%20columns/Orbweaver.spiders.htm>, downloaded 9 April 2015]



Fig. 4. Bird caught in golden orb weaver web.

[<http://bobarno.com/thiefhunters/golden-orb-weaver-spider/>, downloaded 9 April 2015]

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