

Orchard Orbweaver, Orchard Spider *Leucauge argyrobapta* (White), *Leucauge venusta* (Walckenaer) (Arachnida: Araneae: Tetragnathidae)¹

Donald W. Hall²

The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids, and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences.

Introduction

The orchard orbweavers, *Leucauge argyrobapta* (White) (Figure 1) and *Leucauge venusta* (Walckenaer), are attractive small spiders and collectively are some of the most common spiders in the eastern United States. They are sometimes simply known as orchard spiders (Kaston and Kaston 1953, Levi and Levi 2002). Orchard orbweavers belong to the family Tetragnathidae, the longjawed orbweavers (Levi and Hormiga 2017, World Spider Catalog 2018).



Figure 1. Female orchard orbweaver, *Leucauge argyrobapta* (White). (Spider removed from web for photography).

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Synonymy and Nomenclature

Synonyms for *Leucauge venusta* (Walckenaer):

Epeira venusta Walckenaer (1841)

Epeira hortorum Hentz (1847)

Argyropeira hortorum Emerton (1884)

Argyropeira venusta McCook (1893)

Leucauge (Argyropeira) mabelae Archer (1951)

Linyphia (Leucauge) argyrobapta White (1841)

See Levi (1980, p. 25) for additional information on synonymy.

Historically, the distribution of *Leucauge venusta* (Walckenaer) was considered to range from Canada to Brazil. However, based on significant differences in DNA barcoding of populations, Ballesteros and Hormiga (2018) have proposed restricting the name *venusta* to temperate populations (Canada and US north of Florida) and removing *argyrobapta* from junior synonymy to designate Florida populations from those throughout the remaining range of distribution to Brazil, which apparently comprise a cryptic

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species. According to Dimitrov and Hormiga (2010), *Linyphia* (*Leucauge*) *argyroabpta* is the type species of the genus *Leucauge*. Preliminary DNA barcoding data suggest that *Leucauge argyroabpta* may contain at least three additional cryptic species (Ballesteros and Hormiga 2018).

Distribution

Leucauge argyroabpta is found in Florida and southward through the tropics to Brazil (Ballesteros and Hormiga 2018). *Leucauge venusta*, is found from Canada southward throughout the eastern half of the United States to Georgia with a small disjunct population in southern California (Figure 2). The exact dividing line (and possible overlap) of the distributions of the two species is unknown.

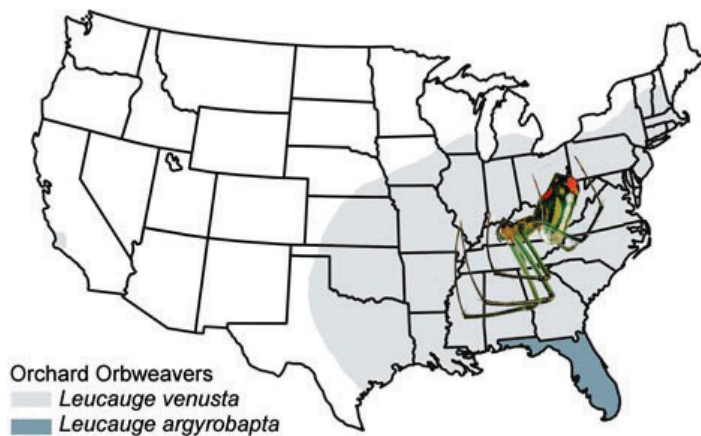


Figure 2. Approximate distribution map for the orchard orbweavers, *Leucauge argyroabpta* (White) and *Leucauge venusta* (Walckenaer). Credits: Map based on Encyclopedia of Life (2018) map, Ballesteros and Hormiga (2018), and Levi (1980)

Description

The genus name *Leucauge* is from Greek roots that literally mean “with a bright gleam” (Cameron 2017). *Leucauge* species can be differentiated from other tetragnathids by their oval bodies and reddish-orange triangular markings (Figure 3) on the ventral aspect (underside) of the abdomen. Because of the reddish-orange spots, some *Leucauge* species are occasionally mistaken for black widow spiders by the general public (Howell and Jenkins 2004, SpiderID 2016-2018). There are also proximal (close to the body) double rows of trichobothria (vibration-sensitive bristles) on the hind legs (Levi and Hormiga 2017) (Figure 4). The ventral reddish-orange area on males is shaped more like a transverse band (Figure 5).

Leucauge argyroabpta and *Leucauge venusta* are nearly identical in appearance. There are very slight differences in the structure of the palpi of males, but the females are virtually indistinguishable (Ballesteros and Hormiga 2018). The specific epithet *argyroabpta* is from Greek roots that

literally mean “baptized with silver” (Borror 1960). The specific epithet *venusta* is Latin for “charming” (Borror 1960).



Figure 3. *Leucauge argyroabpta* (White) female (underside). Note oval abdomen and reddish-orange triangular areas.

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Figure 4. *Leucauge argyroabpta* (White) female. Note trichobothria.

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Figure 5. *Leucauge argyroabpta* (White) male (underside). Note reddish-orange transverse band.

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Adults

Males (body length 3.5 to 4.0 mm) are smaller than females (body length 5.5 to 7.5 mm) (Edwards and Marshall 2002, Kaston and Kaston 1953), have longer legs (Figure 6) and conspicuous bulbous palpi that are much larger than those of females (Figure 7).

The legs are green or greenish-black with black bands at the joints. The cephalothorax is tan. The abdomen is silvery-white with dark mid-dorsal (middle of the back), dorsolateral (area where back and sides of body meet), and

lateral lines that run parallel for nearly the full length of the abdomen (Figure 8). In some specimens the mid-dorsal and dorsolateral lines are connected by transverse lines of varying thickness.



Figure 6. *Leucauge argyrobapta* (White) male and female.
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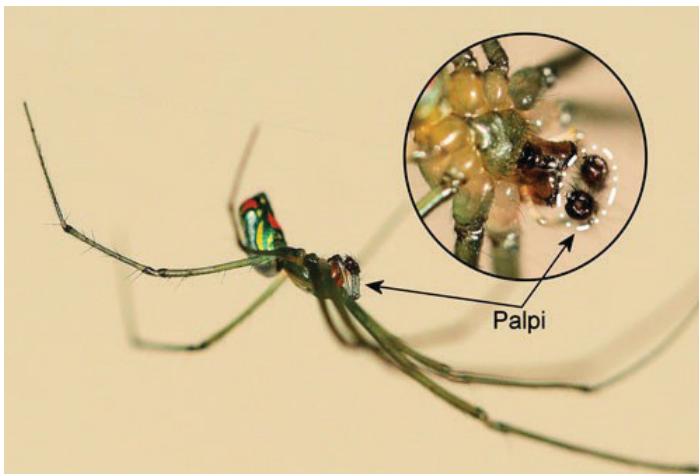


Figure 7. *Leucauge argyrobapta* (White) male, side view. Inset: underside of cephalothorax (fused head and thorax). Note bulbous palpi.
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Figure 8. *Leucauge argyrobapta* (White) female (dorsal aspect).
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There are yellow areas on the sides of the abdomen. In addition to the reddish-orange triangular ventral areas, there are dorsolateral reddish-orange spots near the end of the abdomen (Figure 9).



Figure 9. *Leucauge argyrobapta* (White) female (lateral aspect). (Spider removed from web for photography).
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The silvery-white color is due to thin platelet-like guanine crystals (Oxford and Gillespie 1998, Alvarez-Padilla and Hormiga 2011, Gur et al. 2017) that reflect light. The dark lines and reddish-orange and yellow areas are due to overlaying pigments in the epidermis (Oxford and Gillespie 1998, Gur et al. 2017).

The only other *Leucauge* species in the eastern US is *Leucauge argyra* (Walckenaer). *Leucauge argyra* has dark dorsal lines on the abdomen that turn inward at a 90-degree angle at mid-abdomen. *Leucauge argyra* also lacks the bright reddish-orange spots of the other two species (Bradley 2013) (Figures 10 and 11). *Leucauge argyra* females can also be separated from those of other *Leucauge* species by the cone-shaped epigynum (external genital structure of female spiders) (Levi 1980). *Leucauge argyra* is restricted to central and southern Florida in the US (Levi 1980).



Figure 10. *Leucauge argyra* (Walckenaer) female (dorsal aspect).
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Figure 11. *Leucauge argyra* (Walckenaer) female (lateral aspect).
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Egg Sacs and Eggs

Levi (1980, p. 28) described an egg sac of *Leucauge venusta* from Virginia constructed of fluffy orange-white silk, measuring approximately 8 to 9 mm in diameter, and containing several hundred eggs. The eggs were reddish-orange and approximately 0.4 mm in diameter. The egg sac is commonly attached to a leaf or twig near the edge of the web (Evans 2008).

Behavior

Habitat

As the name implies, orchard orbweavers are commonly found in orchards. They are one of the most common spiders in Florida citrus groves (Muma 1975). However, both species are most commonly found in shrubby meadows and along woodland edges (Evans 2008). They are also common in wooded suburban areas of cities and often between hedges and houses under overhanging eaves. They are often gregarious and attach their webs together when prey is plentiful (Edwards and Marshall 2002).

Webs and Prey Capture

Silk for the webs is spun by spinnerets at the tip of the abdomen (Figure 12). Webs are usually horizontal (fewer than 45 degrees of slope) (Alvarez-Padilla and Hormiga 2011) but occasionally are nearly vertical (Evans 2008, Gregoric et al. 2013).

Webs have a central hub of loops. The spider rests on the underside of the hub (Figure 13).

In addition to the hub, webs have supporting radii (typically 30 or more) and an outer area of more than 60 sticky spirals (Levi 1980). There is an open area between the hub and the sticky spirals that contains only radii (Figure 14).

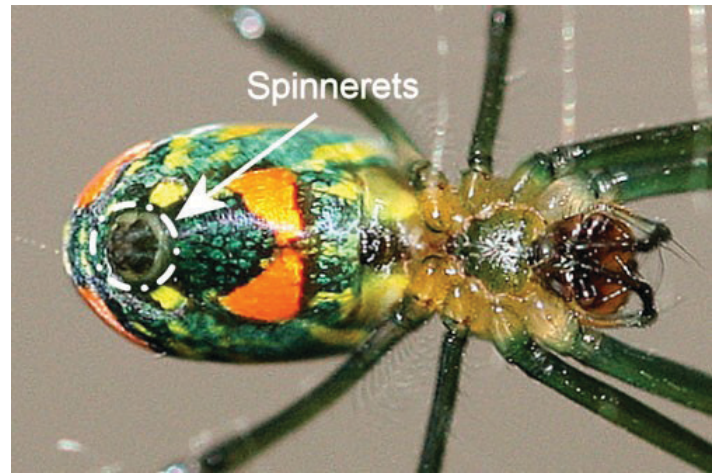


Figure 12. Orchard orbweaver, *Leucauge argyrobapta* (White), spinnerets.
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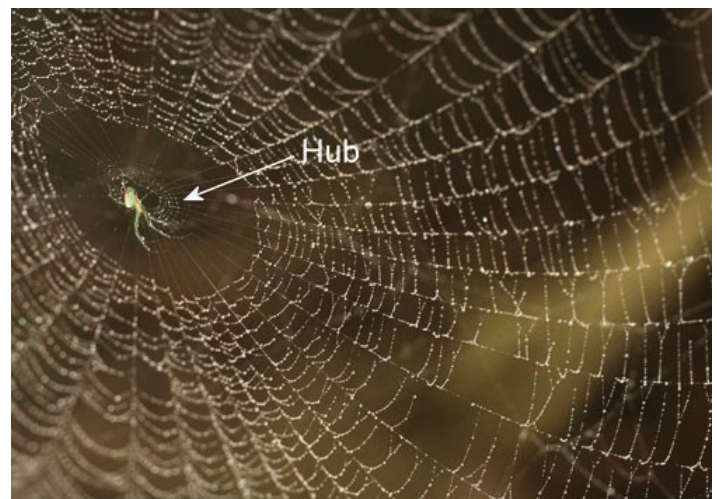


Figure 13. Orchard orbweaver, *Leucauge argyrobapta* (White), resting on underside of hub. (web misted with water for photography).
Credits: Donald W. Hall, UF/IFAS

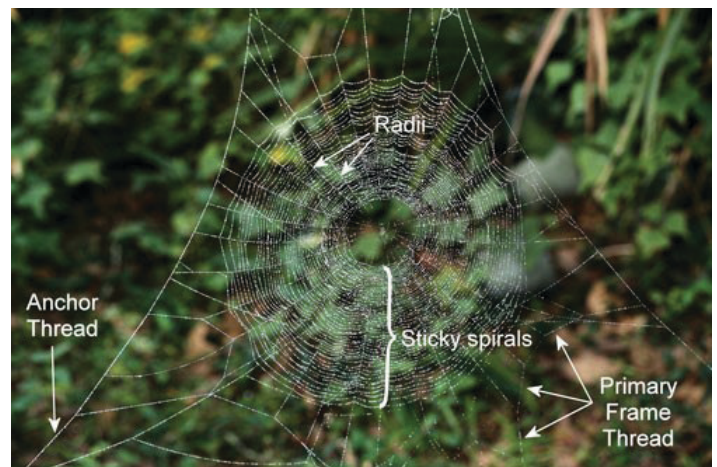


Figure 14. Orchard orbweaver, *Leucauge argyrobapta* (White) web, showing radii and sticky spirals. (web dusted with corn starch for photography).
Credits: Donald W. Hall, UF/IFAS

A barrier web beneath the orb is constructed of randomly-oriented threads (Levi 1980) (Figure 15).



Figure 15. Orchard orbweaver, *Leucauge argyrobapta* (White), barrier web.

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Leucauge webs are often associated with the webs of the golden silk orbweaver, *Nephila clavipes* (Linnaeus) (Figure 16). When associated with *Nephila* webs, the *Leucauge* webs tend to be higher, more vertical, and also lack barrier webs (Hénaut and Machkour-M'Rabet 2010). Hénaut and Machkour-M'Rabet (2010) concluded that the major advantage of the association with *Nephila* webs was lower web construction costs (presumably because they conserve silk by not making barrier webs and by using *Nephila*'s anchor threads instead of making their own). Also, the more vertical orientation of the *Leucauge* webs, likely makes them more efficient at catching flying insects, but less efficient at catching the jumping insects that would be caught if the webs were closer to the ground.



Figure 16. Orchard orbweaver, *Leucauge argyrobapta* (White), web associated with web of *Trichonephila clavipes* (Linnaeus).

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Orchard orbweavers catch small insects belonging to a number of orders, but the most common prey species are small Diptera (Hénaut et al. 2006, Muma 1975) including mosquitoes (Figure 17).



Figure 17. Orchard orbweaver, *Leucauge argyrobapta* (White), with *Aedes albopictus* (Skuse) mosquito prey.

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The prey of orbweavers is crushed and chewed up outside the mouth by the endites, chelicerae, and fangs (Edwards and Marshall 2002) (Figures 18, 19 and 20). To predigest the prey tissues, the spider pumps digestive enzymes onto the prey body. After the tissues are completely liquefied, the resulting liquid is pumped into the stomach by alternate contracting and relaxing of the stomach muscles. Particulates are strained out by hairs on the endites and chelicerae. The contractions of the stomach are also responsible for distributing the nutrients throughout the spider's body (Cushing 2017).

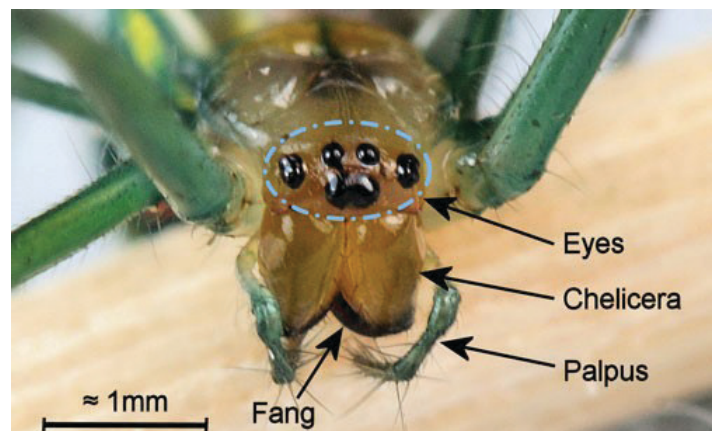


Figure 18. Orchard orbweaver, *Leucauge argyrobapta* (White). (Anterior view of cephalothorax showing palpi, chelicerae, and fangs).

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Orchard orbweavers molt while hanging from the hub of the web, and the shed exuviae often remain in the web for a period of time (Figure 21).

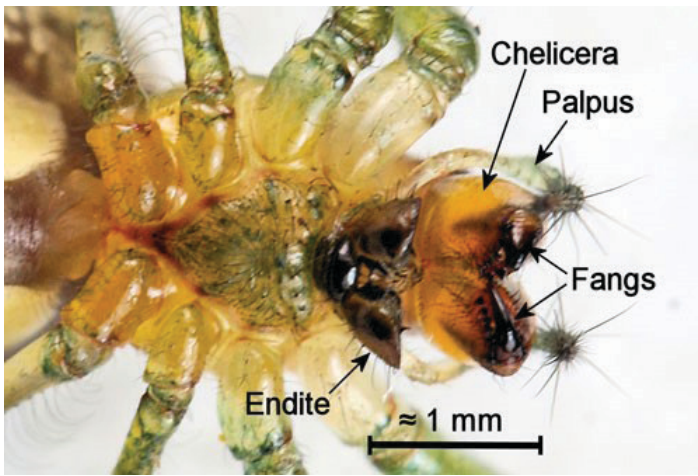


Figure 19. Orchard orbweaver, *Leucauge argyrobapta* (White). (Ventral view of cephalothorax showing endites, palpi, chelicerae, and fangs). Credits: Donald W. Hall, UF/IFAS



Figure 20. Orchard orbweaver, *Leucauge argyrobapta* (White), showing chewed prey. Credits: Donald W. Hall, UF/IFAS



Figure 21. Orchard orbweaver, *Leucauge argyrobapta* (White), with recently shed exuvia. Credits: Donald W. Hall, UF/IFAS

Enemies

The sphecid (mud dauber) wasps, *Trypoxylon lactitarse* Saussure, which most commonly preys on orbweavers in the family Araneidae and *Sceliphron caementarium* (Drury), which is a generalist predator on spiders belonging to

several families have been reported to occasionally provision their nests with *Leucauge* species including *Leucauge venusta* (Culin and Robertson 2003, Buschini et al. 2006, Camillo and Brescovit 1999, Powell and Taylor 2017).

Spiders in the genus *Rhomphaea* (Theridiidae) (formerly included in the genus *Argyrodes* [Exline and Levi 1962]) are predatory on other spiders and sometimes wander onto the webs of other spiders and eat the resident spider (Agnarsson and Levi 2017, Whitehouse 1987). Theridiid spiders have tiny mouths and few or no cheliceral teeth. They bite a small hole in the prey and pump digestive enzymes into the hole. The digested tissue fluids are then sucked out through the hole leaving the empty exoskeleton of the prey (Foelix 2011) which may appear shriveled (Figure 22). The *Rhomphaea* predators fold their legs, remain motionless and resemble pieces of debris in the webs - probably as a defense against their own predators.



Figure 22. Predatory *Rhomphaea* (Theridiidae) (left) and its partially-digested *Leucauge argyrobapta* (White) prey. (Both spiders removed from the *Leucauge argyrobapta* web for photography). Credits: Donald W. Hall, UF/IFAS

The spider's normal defense against predators is to escape. When alarmed, it either runs to the edge of the web or, more commonly, drops from the web while simultaneously releasing a strand of silk which it then uses to climb back to the web. *Rhomphaea* spiders are apparently able to enter the webs of their prey without detection.

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Howard Frank, Lisa Taylor and Eleanor Phillips reviewed this article and offered helpful suggestions. Ingi Agnarsson verified the identification of the spider in Figure 22 as a *Rhomphaea* species.

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