UF UNIVERSITY of FLORIDA
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EENY-008

Giant Swallowtail, Orangedog, *Papilio cresphontes* Cramer (Insecta: Lepidoptera: Papilionidae)[1]

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Introduction

The giant swallowtail, *Papilio cresphontes* Cramer, is a striking , wonderfully "exotic"-looking butterfly that is very abundant in Florida. The adult butterfly is a welcome visitor to butterfly gardens and to general landscape plantings. The larval or caterpillar stage can be considered a pest due to its habit of feeding on the foliage of mos *Citrus* tspecies. A few "orangedogs", as the larvae are commonly called, can quickly defoliate small or young plants. However, larvae can be tolerated on large dooryard citrus trees in order to enjoy the soon-to-develop magnificent adult butterfly stage.

Figure 1. Adult giant swallowtail, *Papilio cresphontes* Cramer, dorsal view.
Credits: Donald Hall, University of Florida

Distribution

The giant swallowtail is widely distributed throughout the American continent. Its range extends from southern New England across the northern Great Lakes states, into Ontario, through the southern portions of the Central Plains to the Rocky Mountains. The species ranges southward to Florida and the Caribbean, into the southwestern United States, and on through Mexico to Central and South America. The giant swallowtail is very common throughout the entire state of Florida. It is active throughout the year in southern Florida, and is common in northern Florida, except in January and February.

Description

Adult

Adult giant swallowtails are large butterflies with a forewing span of 4.6 to 6.9 inches (avg. 5.5 inches) for males and a span of 5.3 to 7.4 inches (avg. 5.8 inches) for females. The dorsal wing surfaces of the butterfly are black with a striking diagonal yellow bar across the forewings. The ventral wing surfaces are primarily yellow. The giant swallowtail is very distinct from all other swallowtails found in Florida except for the endangered Schaus' swallowtail, *Papilio aristodemus ponceanus*, which is confined to the Florida Keys. The giant swallowtail can be distinguished from the Schaus' swallowtail by the yellow-filled "tails" (Schaus' swallowtail tails are all black), and the small, brick-red

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patch just interior to the blue median band on the ventral hind wing.

Figure 2. Adult giant swallowtail, *Papilio cresphontes* Cramer, with wings closed.
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Larva

The five larval instars differ in appearance but they all share a resemblance to bird droppings. Younger instars are more realistic bird-dropping mimics because of their smaller size. Mature larvae usually rest on stems or leaf petioles (Hagen 1999), but younger larvae often rest in plain view on the upper surfaces of leaves where bird droppings would be expected.

Figure 3. Young larva of the giant swallowtail, *Papilio cresphontes* Cramer, (illustrating bird dropping mimicry) on Ptelea trifoliata leaf. Head is to the top.
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Figure 4. Full-grown larva of the giant swallowtail, *Papilio cresphontes* Cramer. Head is to the right.
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The younger instars are predominantly black or brown with a white saddle, while the older instars are mottled dark brown with a posterior that is white or cream-colored. Younger instars also have setae (hairs) on prominent knobs. Setae are lacking and knobs are reduced in older instars.

Figure 5. Newly hatched larva of the giant swallowtail, *Papilio cresphontes* Cramer, with partially eaten egg shell. Head is to the right.
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Figure 6. Three-day-old larva of the giant swallowtail, *Papilio cresphontes* Cramer. Head is to the left.
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Figure 7. Five-day-old larva of the giant swallowtail, *Papilio cresphontes* Cramer. Head is to the right.
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It has been suggested that the older instars resemble small snakes.

Figure 8. Mature larva of the giant swallowtail, *Papilio cresphontes* Cramer, showing the greatly swollen thorax that resembles a snake head. The larva's head is to the right.
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Figure 9. Larva of the giant swallowtail, *Papilio cresphontes* Cramer, in snake-like "striking" pose. Head is to the right.
Credits: Donald Hall, University of Florida

Figure 10. Front view of larva of the giant swallowtail, *Papilio cresphontes* Cramer, in snake-like "striking" pose.
Credits: Donald Hall, University of Florida

Figure 11. Frontal view of larva of the giant swallowtail, *Papilio cresphontes* Cramer, showing the osmeterium everted and possibly resembling the forked tongue of a snake.
Credits: Donald Hall, University of Florida

Life Cycle

Adult butterflies sip nectar from many flowers and are common but spectacular visitors to butterfly gardens. Identified nectar sources include azalea, bougainvillea, Japanese honeysuckle, goldenrod, dame's rocket, bouncing Bet, and swamp milkweed. They may also sip liquid from manure. Adult males patrol flyways through pine woods or citrus groves searching for females. Flight is very strong and leisurely, and the butterflies may glide long distances between wing beats. Courtship and copulation occur in the afternoon.

Figure 12. A mating pair of the giant swallowtail, *Papilio cresphontes* Cramer, with the female above.
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Mated females usually lay their eggs singly on the upper surface of leaves of host plants. The 1 to 1.5 mm spherical eggs are cream to brown and typically have an irregular coating of an orange secretion that is reminiscent in appearance of orange peel. Larvae progress through five instars. Larval feeding usually takes place during the night.

Figure 13. Dorsal view on an egg of the giant swallowtail, *Papilio cresphontes* Cramer, on Hercules club, *Zanthoxylum clava-herculis* L.
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Larvae may pupate on small twigs on the host plant on which they were feeding or they may travel a short distance to a vertically-oriented structure, such as a fence or other plant. The brownish chrysalis is typically oriented at 45° to the pupation substrate, its posterior end attached directly to a silken pad on the substrate by its Velcro-like cremaster, and its anterior end attached via a thin silken thread to the substrate. At least two, and probably three, generations occur each year in Florida.

Figure 14. Lateral view on an egg of the giant swallowtail, *Papilio cresphontes* Cramer, on Hercules-club, *Zanthoxylum clava-herculis* L.
Credits: Donald Hall, University of Florida

Figure 15. Prepupa of the giant swallowtail, *Papilio cresphontes* Cramer.
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Figure 16. Laterial view of a chrysalis of the giant swallowtail, Papilio cresphontes Cramer.
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Figure 17. Dorsal view of a chrysalis of the giant swallowtail, *Papilio cresphontes* Cramer.
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Host Plants

The larva is the well-known "orangedog" and is considered a minor pest of sweet orange, (*Citrus* × *sinensis* (L.) Osbeck (pro sp.). Host plants of the larvae, besides sweet orange, include native members of the citrus family (Rutaceae), including northern pricklyash (*Zanthoxylum americanum* Mill.), Hercules-club (*Zanthoxylum clava-herculis* L.), lime pricklyash (*Zanthoxylum fagara* [L.] Sarg.), hoptree (*Ptelea trifoliata* L.), sea torchwood (*Amyris elemifera* L.), Mexican orange (*Choisya dumosa* [Torr.] A. Gray), and a variety of exotic Rutaceae, including gasplant (*Dictamnus albus* L.) and white sapote (*Casimiroa edulis* Llave & Lex.). Plant names are from the USDA Plant Database (2009), Wunderlin and Hansen (2003), or Wunderlin and Hansen (2008).

Figure 18. Hercules-club, *Zanthoxylum clava-herculis* L., a host of the giant swallowtail, *Papilio cresphontes* Cramer.
Credits: Donald Hall, University of Florida

Figure 19. Lime pricklyash, *Zanthoxylum fagara* [L.] Sarg., a host of the giant swallowtail, *Papilio cresphontes* Cramer.
Credits: Donald Hall, University of Florida

Figure 20. Sea torchwood, *Amyris elemifera* L., a host of the giant swallowtail, *Papilio cresphontes* Cramer.
Credits: Donald Hall, University of Florida

Figure 21. Hoptree, *Ptelea trifoliata* L., in bloom; a host of the giant swallowtail, *Papilio cresphontes* Cramer.
Credits: Donald Hall, University of Florida

Figure 22. Hoptree, *Ptelea trifoliata* L., with fruit; a host of the giant swallowtail, *Papilio cresphontes* Cramer. Note the typical wafer-shaped fruit from which hoptree derives one of its common names, "wafer ash."
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Management

Biological control

Giant swallowtail pupae are immobile and defenseless against parasitic insects. Pupae may be parasitized by *Lespesia rileyi* (Williston), a tachinid fly; *Brachymeria robusta* (Cresson), a chalcidid wasp; and *Pteromalus cassotis* Walker and *Pteromalus vanessae* Howard, two pteromalid wasps. However, the larval stages appear to be more protected against natural enemies than the pupal stage. Larvae defend themselves against predators (both insects and vertebrates) and parasitic insects by being less visible through cryptic coloration and pattern (i.e., by resembling bird droppings). In addition, larvae possess an osmeterium, an orange or reddish Y-shaped eversible gland that is located mid-dorsally behind the head. When attacked by small predators, the larva extrudes the gland and attempts to wipe it against the attacker. The osmeterium of fourth and fifth instars contains a highly noxious, pungent mixture of chemicals (40:60 mixture of isobutyric acid and 2-methyl butyric acid) that smells like rancid butter. This glandular secretion is repellent and toxic to small predators, such as ants and spiders. Studies have shown that birds are not repelled by these secretions but still rarely eat giant swallowtail larvae. It is thought that larvae may also contain internal toxins (obtained from their food plants).

Figure 23. Mature larva of the giant swallowtail, *Papilio cresphontes* Cramer, with everted osmeterium. Head is to the left.
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Mechanical control

Homeowners may find that just a few larvae of the giant swallowtail can defoliate small, potted or planted citrus plants. Larvae should be hand picked from these small plants so that blossom and fruit yield are not drastically reduced. Mature dooryard trees are large enough to withstand some defoliation.

Chemical control

Mature commercial citrus trees can withstand infestation by many larvae. However, nursery stock and young grove trees can be protected with *Bacillus thuringiensis* and synthetic insecticides when necessary, as described in the Florida Citrus Pest Management Guide for chewing insects (see "orangedog").

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