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NOTES ON THE BIOLOGY OF THE GULF FRITILLARY, *AGRAULIS VANILLAE* (LEPIDOPTERA: NYMPHALIDAE), IN NORTH-CENTRAL FLORIDA

Additional key words: *Lespesia aletiae*, *Hyphantrophaga virilis*, Diptera, Tachinidae, behavior, larvae, parasitism, parasitoid, diapause, migration, host plant, *Passiflora*.

Agraulis vanillae L. is one of the most common butterflies in Gainesville, north-central Florida, where it flies throughout the year (G.T. Austin, pers. com.; Kons & Borth 2006). Its larvae can be found on native *Passiflora incarnata* L. and on other (frequently exotic) passion vines in the area. Larvae can be found through late fall, until the first hard freeze (usually in December) kills the above-ground portion of the passion-vine.

Scott (1979) suggested that *A. vanillae* is not known to diapause, and listed as its winter stages larva, pupa, and adult. However this cannot be true for the species' entire distribution area (North Carolina to Patagonia). *A. vanillae* is migratory, moving southward in the fall and northward in the spring (Walker 2001). The question remains, do any individuals overwinter locally as larvae and pupae, and if so, is either stage capable of diapause? Observations reported here indicate that, in north-central Florida, *A. vanillae* can apparently diapause not only as pupae but as larvae.

In 2007–2008, I observed hundreds of larvae (abundant in October–November) pupating on the vegetation surrounding the host plants. Some pupae remained dormant until spring, while some were observed to emerge in January even after hard freezes. Many larvae (mostly fifth-instar) that were unable to complete development prior to freezing of the host plant were not killed by the freeze, though they remained motionless or were even knocked down to the ground by the cold temperatures and wind. The lowest monthly average temperature in the area is relatively high: 66.2°F in January (according to National Climatic Data Center). When the temperatures rose above 60°F, larvae dispersed away from the host plant, but could be found occasionally on surrounding vegetation months later. In March, when the first shoots of *P. incarnata* sprouted, I found mature *A. vanillae* larvae on them almost immediately, which indicates that they survived without food source for a period of four months in what seems to be a semi-active diapause.

An interesting behavior was exhibited by mature *A. vanillae* larvae coming out of diapause and beginning to feed on fresh shoots of *Passiflora caerulea* L. This passion vine exuded abundant sweet-tasting (pers. obs.) sap, not only from the nectaries, but also from the leaf veins where the latter were cut by larval feeding. Larvae appeared to be deliberately drinking this sap by selecting individual droplets with their mandibles and sucking the droplets in. Perhaps this behavior is induced by dehydration resulting from the four-month-long interruption in feeding during diapause.

From 20 last-instar larvae collected in late November and allowed to pupate in captivity, 90% were found to be parasitized. The tachinid flies that emerged from the pupae belonged to three species: *Lespesia aletiae* (Riley), *Hyphantrophaga virilis* (Aldrich & Webber), and a yet-undetermined *Hyphantrophaga* species (voucher specimens were deposited in the Canadian National Collection of Insects). Arnaud (1969) found a tachinid, *Compsilura concinnata* (Meigen) (introduced from Europe), in 2% (N=50) of field-collected larvae in northern California, and Castellar & Figuero (1969) noted that *A. vanillae* is parasitized by unidentified Tachinidae in Brazil.

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