Mexican Bromeliad Weevil Report
January 2009

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The production of *Lixadmontia franki* pupae stabilized after the erratic period of the previous three months. Average weekly production of pupae was 71, with a maximum of 96. In October, 217 pupae were produced, in November 297 pupae, and in December 397 pupae. The trimestral total was 911, down 25% from the previous trimester.

During a 3-month period, half of the weevil-infested pineapple tops in the fly breeding cage were oriented horizontally and the other half oriented vertically. Larvae exposed in these tops were kept separately in order to determine if parasitism rates differ significantly between the two orientations. Parasitism was 29.2% in the horizontal tops versus 14.4% in the vertical tops. We are not sure why the rate is lower in vertical tops, but it possibly explains why pupa production was lower during the period of the experiment. These results also imply consequences on the fly field establishment evaluation technique in which sentinel pineapple tops were oriented vertically in the trays. The difference in parasitism rates may also influence the fly's ability to control the weevil population in bromeliads on host trees.

Larvae of *Metamasius quadrilineatus* were collected in Honduras during October and November. From these larvae, *L. franki* pupae were obtained and shipped to Ft. Pierce in order to invigorate the laboratory colony with wild genes. Sixty pupae were received on December 11 and 12 pupae were received on December 24. From these pupae at least 53 adult flies have emerged and have been inserted into the colony breeding cage.

No field releases of flies were conducted during the reporting period in order to increase the fly population in the laboratory breeding cage. This enhancement has now been accomplished and field releases will resume in January 2009.

The final retrieval of pineapple tops was on 15 September from Big Cypress National Preserve. No recoveries were made from these traps or any previous traps except for the recovery in Lake Rogers Park in 2007. That part of T. Cooper's field research is complete. Dates of releases and monitoring trips can be found at:
http://savebromeliads.ifas.ufl.edu/field/fly-release-chronology/fly-schedule-2007-2008.htm

Field research in the Enchanted Forest continues. Monthly monitoring trips are made to look for *M. callizona* and bromeliads killed by the weevil. Activity has been very low and the bromeliad population has remained steady. This is expected for this time of year.

LABORATORY RESEARCH:

In October 2008, 90 pupae were received from Ft. Pierce to start a fly colony in Gainesville. One hundred thirty-seven weevil larvae were exposed to the adult flies, of which 50 were successfully parasitized and produced a total of 89 pupae.

When the parent fly population was nearing an end, the remaining 10 females were removed and used to artificially larviposit maggots on pineapple mash in a Petri dish containing 2 weevil larvae per dish. In 5 dishes, the weevil larvae were separated by a barrier and could not make contact. The other 5 dishes had no barriers and the weevil larvae could make contact. Ten

maggots were deposited on each dish. In the 5 barricaded dishes, no weevil larvae attacked or killed other weevil larvae. Seven of the 10 weevil larvae were successfully parasitized and produced 12 pupae. In the 5 dishes without barriers, 3 weevil larvae were killed by other weevil larvae and 3 weevil larvae were successfully parasitized, producing 4 pupae.

Weevil larvae were set up in similar dishes (5 with barricades and 5 without barricades) but no maggots were deposited on these dishes. No weevil larvae killed other larvae in the barricaded dishes; 3 weevil larvae were killed in the non-barricaded dishes. At first glance, it would appear that parasitism by *L. franki* does not influence weevil killing behavior.

In total 105 pupae were produced from the parent generation. Second-generation flies have emerged from these pupae and have successfully mated. The females are presently larvipositing and are being used in tests to assess the influence of weevil larval density on parasitism by systematically exposing host weevil larvae of variable density in pineapple mash to the fly population.

Examination of parasitized weevil larvae showed that *L. franki* maggots create and use a respiratory funnel for respiration (Figure 1). The funnel is attached to the host weevil larva's tracheal tube. Artificial larviposition will be used to parasitize weevil larvae which will then be dissected at regular time intervals to determine the physiological development of the maggot inside its host. The following questions will be answered: How many instars does the maggot have? Which instar creates and uses the respiratory funnel? Does each instar have similar physiological features or are there significant changes between instars?

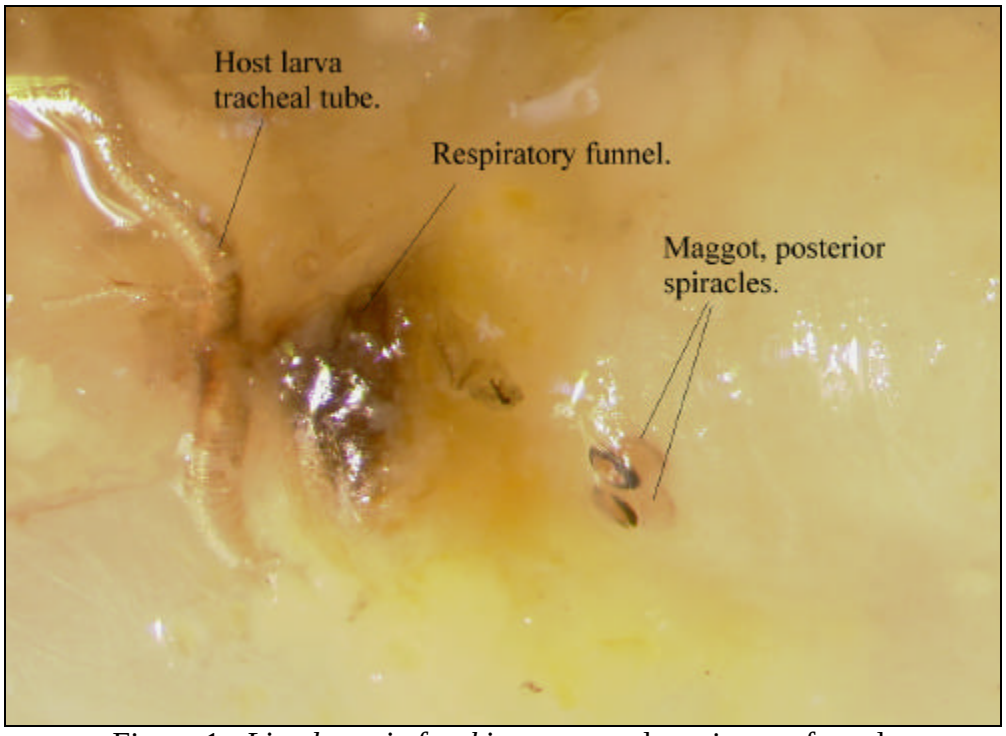

Figure 1: *Lixadmontia franki* maggot and respiratory funnel.

PUBLICATIONS:

Cooper, T.M. 2008. Seasonality and abundance of *Metamasius callizona* (Coleoptera: Dryophthoridae), an invasive insect herbivore, on two species of *Tillandsia* (Bromeliaceae) in Florida. Journal of Natural History 42: 2721-2734.