Effect of mating status and food on longevity and reproductive output of female *Diaprepes abbreviatus* under field conditions

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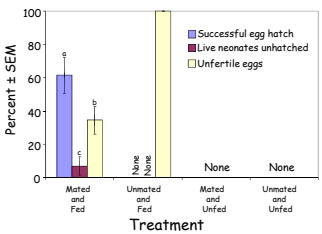
Introduction

- The *Diaprepes* root weevil, *Diaprepes abbreviatus* (L.), is the most damaging of the weevil species in Florida citrus.
- The most significant injury to citrus is caused by the larval stage, which feed on roots throughout the majority of the year. Cumulative root injury can reduce yield or girdle and kill trees.
- Importantly, larval feeding on the bark of roots creates lesions which facilitate root infection by a number of root-rotting fungi, particularly *Phytophthora nicotianae* Dastur and *P. palmivora* (Butler).
- Larval feeding can result in rapid tree decline or tree death and an entire grove can be devastated within a few years of *Diaprepes* detection.

Objective:

- Determine the effect of mating status and food availability on longevity and reproductive output of females under field conditions.

Fig. 1: Effect of mating status and food on egg fertility under field conditions



Results

- Female *D. abbreviatus* were not parthenogenic
- Under field conditions, egg fertility was ca. 60 % in the absence of predation.
- Mated and unmated females produced an equal number of eggs, when provided a food source
- Unfed females did not lay eggs, irrespective of mating statuss

Fig. 2A: Egg masses per female

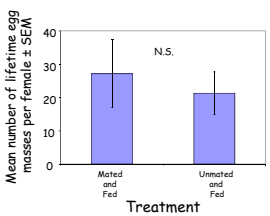


Fig. 2B: Eggs per female

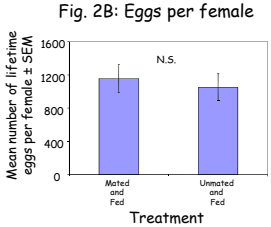
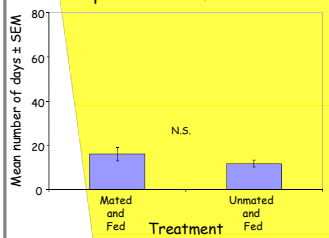


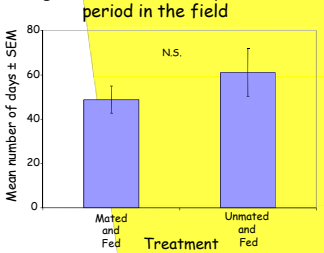
Fig. 5A: Duration of pre-oviposition period in the field



Results

- Pre-oviposition and oviposition periods of female *D. abbreviatus* were ca. 20 and 50 days, respectively, in the field.

Fig. 5B: Duration of oviposition period in the field



Methods summary

Teneral adult *D. abbreviatus* were collected prior to emergence from soil by excavating the soil around the rhizosphere of citrus trees and sifting soil with a mechanical sifter.

Female Treatments:

- Six replicates arenas were established per treatment
- Arenas were maintained in a Hamlin grove in Oceola Co. housed within a ventilated weather shelter

- Arenas were maintained in the field until beetle death, June through October
- Numbers of egg masses and total eggs per female were counted 2-3 times per week
- Successful egg hatch and live, but unhatched neonates were also determined 2-3 times per week
- Fresh wax paper ovipositional substrates and citrus flush were replaced in arenas during each inspection

Fig. 3: Effect of mating status and food on female longevity under field conditions

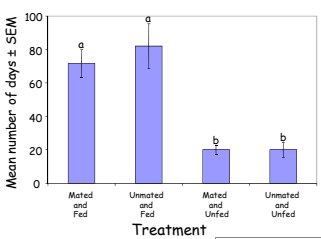
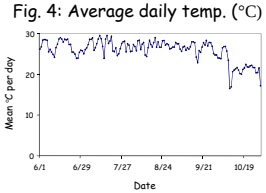


Fig. 4: Average daily temp. (°C)



Results

- Field longevity of fed and unfed females was ca. 80 and 20 days, respectively, irrespective of mating status.
- Average temperature was 26.9 °C over the period from June 1 through September 28, and 22.1 °C for the remainder of the study.

Conclusions

- Female *D. abbreviatus* cannot reproduce parthenogenetically unlike certain other weevil species (e.g.. Fuller Rose beetle)
- Mating status does not affect the total number of eggs produced in a female's lifetime
- Females must feed in the field to successfully oviposit
- In the absence of predation, egg fertility reaches a maximum of 60 % under field conditions
- Food but not mating status affect field longevity, reaching ca. 80 days on average
- In the field, there is a 20 day pre-oviposition and subsequent 50 day oviposition period