FECUNDITY AND FERTILITY OF *RHYNCHOPHORUS CRUENTATUS* (COLEOPTERA: CURCULIONIDAE)

THOMAS J. WEISSLING[1] AND ROBIN M. GIBLIN-DAVIS
University of Florida, Institute of Food and
Agricultural Sciences, Ft. Lauderdale Research and Education
Center, 3205 College Ave., Ft. Lauderdale, FL 33314

The palmetto weevil (*R. cruentatus* F.) breeds in a variety of stressed or dying palms (Giblin-Davis & Howard 1988, 1989). These large (1.9 - 3.0 cm long) weevils are associated with the native cabbage palmetto, *Sabal palmetto* (Walter), in Florida (Woodruff 1967). Semiochemicals emanating from stressed or dying palms and male conspecifics (Weissling et al. 1992, 1993, 1994, Giblin-Davis et al. 1994) are attractive to *R. cruentatus* adults. Although not fully understood, mating apparently takes place on dying palms and females lay their eggs in the leaf bases or directly into the wounds of the host. Larvae develop primarily in the crown region but can occasionally be found in the stem tissue. Last instar larvae migrate to the fibrous stem periphery or petiolar bases and construct cocoons from fiber (Giblin-Davis & Howard 1988).

Research on an improved method to culture *R. cruentatus* has required the collection of a large number of eggs to produce neonate larvae for evaluation of diets. Using pineapple, *Anana comosus* (L.), as an ovipositional substrate, Giblin-Davis et al. (1989) reported the mean lifetime fecundity of field-collected females as 26 ± 15 eggs per female. However, pineapple proved to be a difficult media to dissect for removal of eggs. More suitable ovipositional substrates were investigated and we found that apple (*Pyrus malus* L.) slices were easily dissected and were readily accepted by *R. cruentatus* females. Using apple slices, we reinvestigated the fecundity of *R. cruentatus* females and determined fertility.

Cocoons were harvested in the field from infested palms or in the laboratory from sugarcane (*Saccharum officinarum* L.) stem (Giblin-Davis et al. 1989). Cocoons were placed individually in covered 100-ml plastic cups with moistened tissue paper (Giblin-Davis et al. 1989) and were stored at 29°C until adult emergence. One male and one female were placed in a 500-ml covered plastic container with moistened tissue. After 48-72 h, males were removed and a slice of apple ('Red Delicious') was added. Slices were thin (5-15 mm; 10-18 g wet weight), convex segments covered by peel. Females oviposit through the apple pulp and most eggs are found along the peel. All containers were placed in an environmental chamber at 29°C with a 13:11 (L:D) photoperiod. Apple slices were usually replaced every 1-3 days until female death. Slices removed from containers were carefully dissected and eggs were removed. This test was repeated five times with four or five females per test (22 females total). Data were converted to the number of eggs laid per female per week. In addition, the total number of eggs laid per female was determined. During two of the tests, eggs removed from apple slices were placed in 15 x 100 mm plastic petri dishes lined with water-moistened filter paper, sealed with parafilm, and placed in the environmental chamber. Neonate larvae were removed from each dish at daily intervals and the dish resealed until all eggs hatched or decomposed. For the first test, fertility was determined every one to three days for 45 d. During the second test, eggs were col-

[1]Current address: Yakima Agricultural Research Laboratory, USDA-ARS, 3706 W. Nob Hill Blvd., Yakima, WA 98902

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lected every one to three weeks for 14 weeks. Data on overlapping dates were combined and all data were converted to percent eclosion.

R. cruentatus produced an average of 207 ± 19 (range 12-433) eggs per female. This number is considerably higher than the previous estimate of 26 ± 15 eggs per female (Giblin-Davis et al. 1989) and is more consistent with fecundity reported for other *Rhynchophorus* species (Wattanapongsiri 1966). A reduced estimate of fecundity by Giblin-Davis et al. (1989) may have been caused by suboptimal conditions on pineapple slices, decreasing egg and larval survival. In addition, pineapple slices were difficult to dissect and eggs or larvae may have been overlooked (R.M.G.-D. pers. observ.). In this study, males were removed from containers after 48 - 72 h while Giblin-Davis et al. (1989) confined females with males throughout the course of the study. The presence of males in a small container may have interfered with oviposition or increased damage to larvae and eggs (Giblin-Davis et al. 1989). Rananavare et al. (1975) determined that *R. ferrugineus* Oliver females laid less eggs when confined with males than without. The mean number of eggs laid per *R. cruentatus* female per day declined until almost no eggs were laid 14 weeks after mating (Fig. 1). However, egg laying by surviving females increased over the subsequent 6 weeks. Reasons for this increase are unclear.

Fertility of eggs laid by *R. cruentatus* varied through time, however, eggs collected eight weeks after female mating did not eclose (Fig. 2). These results suggest that females had utilized all sperm indicating the need for multiple matings. Rananavare et al. (1975) reported the need for multiple matings in *R. ferrugineus* to maintain fertility.

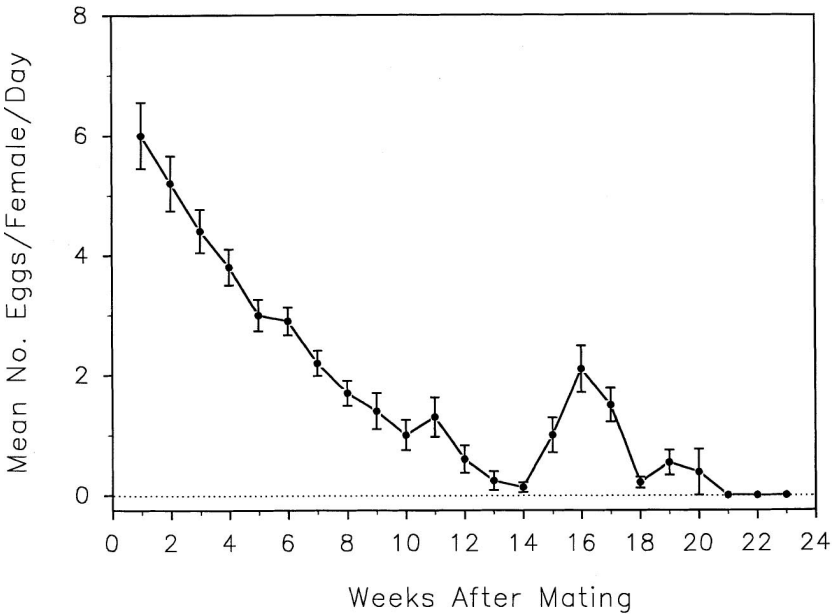

Fig. 1. Mean (± SEM) weekly egg production by newly-emerged *R. cruentatus* females (n = 22) confined individually on an apple slice at 29°C after 48 - 72h confinement with males.

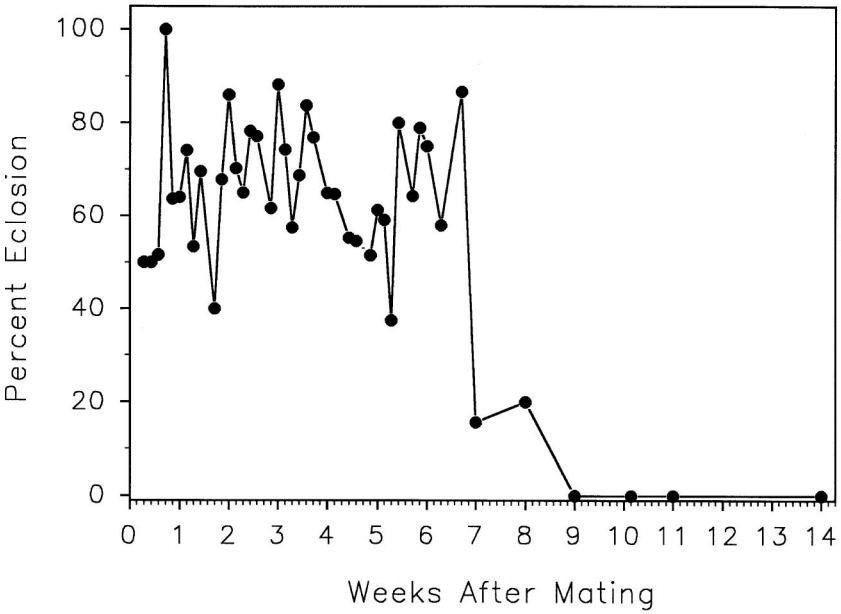

Fig. 2. Percent eclosion of eggs produced by newly-emerged *R. cruentatus* females (n = 9).

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Summary

The mean fecundity of *R. cruentatus* when provided apple slices as an oviposition media was almost eight times higher (207 ± 19 eggs per female) than previously estimated (26 ± 15 eggs per female). The rate of egg-laying decreased through time until 14 weeks after mating when there was a temporary increase. Fertility of *R. cruentatus* eggs remained between 40 and 100 percent eclosion until seven weeks after females were mated but dropped to zero by nine weeks.

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