

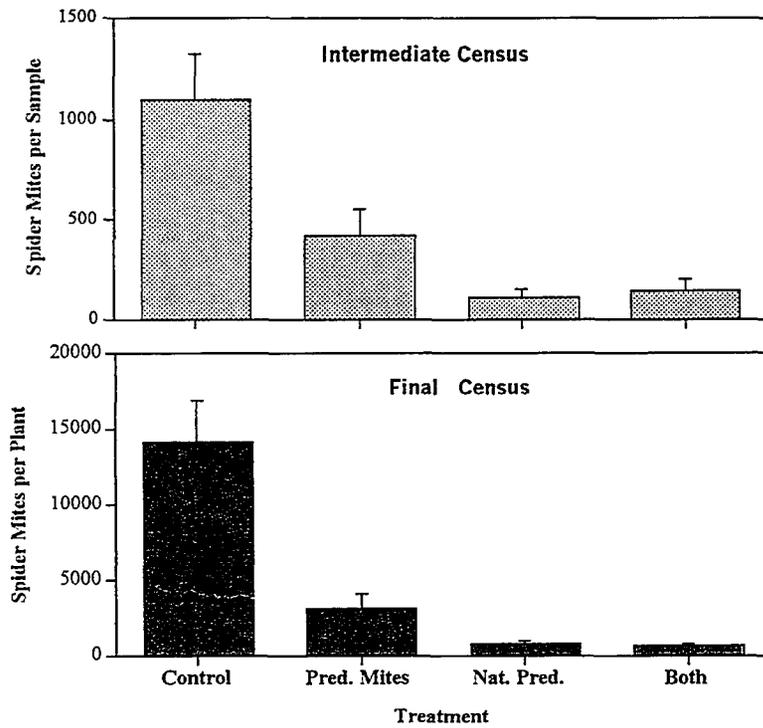
# ECOLOGY OF GENERALIST PREDATORS IN THE COTTON AGROECOSYSTEM

Ramy G. Colfer, Jay A. Rosenheim, Larry D. Godfrey  
Department of Entomology  
University of California  
Davis, CA 95616

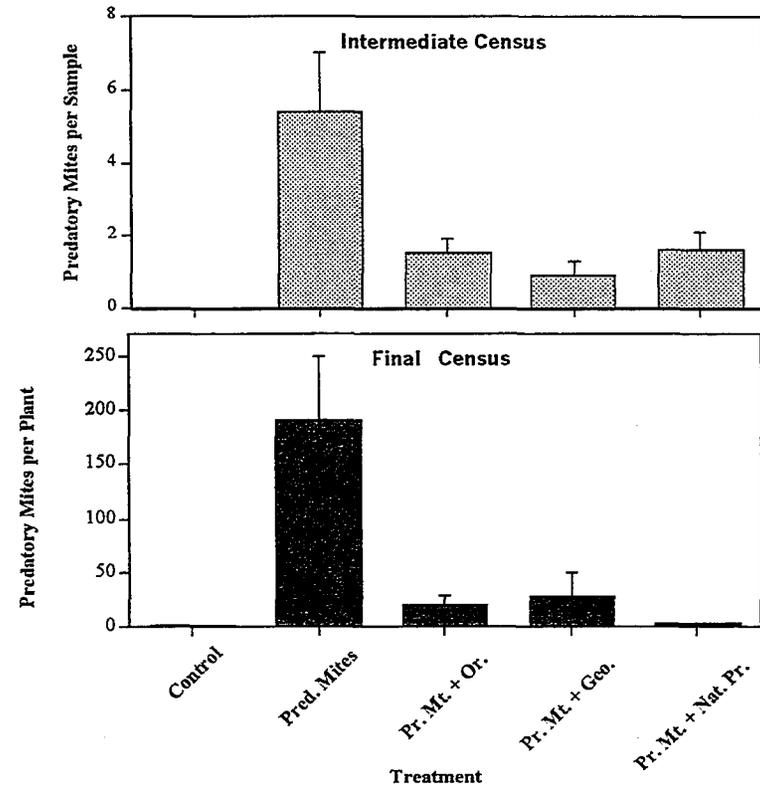
The goals of our research are to examine the role that naturally-occurring predators play in controlling spider mites and determine if predatory mite releases can improve spider mite control. During 1996 & 1997, we performed large-scale releases of the western predatory mite using low release rates and found that releases did not increase predatory mite numbers and did not improve spider mite control. Thus, we have attempted to identify factors that could be limiting predatory mites in hope that we can improve spider mite biological control. During 1998 & 1999, we completed four experiments evaluating: (1) compatibility of predatory mites with naturally-occurring insect predators, (2) influence of host plants on western predatory mites, (3) effect of western flower thrips on spider mite control, and (4) the importance of pollen and nectar for predator survival.

We have identified two factors that probably explain why western predatory mites do not thrive in cotton: predation and host plant effects. Results from field experiments during 1999 through 1997 showed that generalist predators had a large negative effect on the western predatory mite; they prevented predatory mite populations from increasing. However, in the absence of these predators, predatory mite populations grew by more than seven times their initial density and reduced spider mites. Also, we found that western predatory mites were more abundant on soybeans and grapevines than on cotton in a common garden experiment. Thus, western predatory mite releases are unlikely to reduce spider mites in cotton unless high release rates are used and generalist predator abundance is low. Other species of predatory mites that we have found at higher densities in cotton are being further studied. Preliminary results from 1999 indicate that releases of these species effectively reduced spider mites.

Research from 1997, 1998, and 1999, showed that naturally-occurring predators substantially contributed to the control of spider mites. Specifically, we found that the minute pirate bug (*Orius* spp.), the big eyed-bug (*Geocoris* spp.), and the western flower thrips (*Frankliniella occidentalis*) all could reduce spider mite densities. We also found that pollen and nectar availability improved minute pirate bug survival. Therefore, efforts should be made to conserve these predators by using selective pesticides for target pests. Broad spectrum insecticides should be avoided.



Suppression of spider mites by the western predatory mite and the unmanipulated predator community (Nat. Pred.) when present individually and together at the Shafter Research and Extension Center, 1998.



Western predatory mite abundance when alone (Pred. Mites) and in combination with the predators *Orius* (Pr. Mt. + Or.), *Geocoris* (Pr. Mt. + Geo.), and the unmanipulated predator community (Pr. Mt. + Nat. Pr.) at the Shafter Research and Extension Center, 1998.