

COTTON APHIDS BENEFIT YIELD BY INCREASING FIRE ANT PREDATION OF CATERPILLAR PESTS**John D. Styrsky****Auburn, AL****Micky D. Eubanks****Auburn, AL****Abstract**

Fire ants (*Solenopsis invicta*) commonly form mutualistic associations with cotton aphids (*Aphis gossypii*) in which the aphids gain protection from predators and parasitoids in return for producing a food resource (honeydew) for the ants. Although cotton aphids are considered a pest of cotton, their presence at low to moderate densities might indirectly benefit the plant in the presence of fire ants because they may increase fire ant suppression of other, potentially more economically injurious pests. This benefit, however, may vary depending on the densities of other pests – cotton plants should benefit most from increased fire ant suppression of non-aphid pests when those pests are most abundant. We tested these hypotheses in a field cage experiment in 2004 in Alabama in which we manipulated the presence and absence of cotton aphids and the density of an important caterpillar pest of cotton, the beet armyworm (*Spodoptera exigua*). Because fire ants were attracted to cotton aphid honeydew, greater numbers of fire ants foraged on the plants with cotton aphids than on those without aphids. The greater abundance of fire ants on plants with cotton aphids resulted in a significant reduction in caterpillar survival and caterpillar herbivory of leaves, squares, and bolls on plants with aphids. Consequently, cotton aphids indirectly benefited cotton yield both in terms of total boll number and seedcotton mass. Plants with cotton aphids produced on average 30% more bolls than plants without aphids and on average 10% greater seedcotton mass. Further, the benefit to yield tended to be greater at higher densities of beet armyworm caterpillars. We found no evidence that cotton aphids negatively affected yield, despite remaining at densities of approximately 40 aphids per leaf for over eight weeks. Our results highlight the potential indirect benefit of cotton aphids to biological control of cotton pests by fire ants.