APHIDS AS BENEFICIAL INSECTS? EFFECTS OF APHID INDUCED PLANT DEFENSES AND APHID NATURAL ENEMIES ON OTHER COTTON PESTS

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Abstract

We are studying the indirect effects of cotton aphids (*Aphis gossypii*) on arthropod pests of cotton (*Gossypium hirsutum*) via aphid-induced changes in plant chemistry and predator abundance and behavior. We have found that the indirect effects of aphids via these mechanisms on key pest species are strong. Aphids induce the increased production of defensive compounds in cotton plants, such as trypsin inhibitor, chitinase, and peroxidase, and an increase in the density of gossypol-containing pigment glands, which negatively affect beet armyworm (*Spodoptera exigua*) performance, development time, moth oviposition preference, and moth reproduction. In addition, cotton aphids affect the density of generalist predators on cotton plants through increased aggregation and predator oviposition. This increase in predator density has strong, negative effects on the survival of these caterpillars. Caterpillars and other non-aphid pests can cause greater economic loss than cotton aphids in cotton. Indirect suppression of these herbivores by cotton aphids via induced plant defenses and predator density is likely to result in increased cotton yield under a wide range of conditions (e.g., moderate to high densities of other pests).