

Cover Crops Shelter Beneficial and Harmful Insects

BY MATTHEW O'NEAL

Entomologists expect that the addition of cover crops within a corn-based cropping system will affect both pests and beneficial insects. As more corn and soybean farmers incorporate cover crops, researchers are working to understand how the modified environment is affecting insect populations.

Currently, the soil of most farms in the Midwest from fall through spring is left uncovered. This provides little habitat for insects to survive, especially those that migrate from the south to the Midwest in the spring. Cover crops can provide habitat for migrating insect pests and beneficials in a way that bare soil does not. One group of insects that migrate into the Midwest is moths, like the armyworm (*Pseudaletia unipuncta*), which arrives from the south during April and May. The adults fly to the Midwest looking for a mate, food and sites to lay eggs. Crop damage is done by the caterpillars that come from these eggs. The damage to corn with or without a cover crop can be highly variable, even within a single farm. Some factors that contribute to this variation are the timing of the migratory flights, the planting date and emergence of corn as well as the presence of ground cover. Estimating the risk of these outbreaks requires a greater understanding of how these and other factors contribute to the risk of insect pest outbreaks.

The incorporation of cover crops can contribute to conserving beneficial insects that attack pests. Many of the predatory insects that feed on herbivores like armyworm also require habitat to survive Midwestern winters. Research being conducted within the Sustainable Corn Project is measuring the response of these beneficial insects to cover crops. This research is not yet complete. However, previous research has demonstrated that cover crops significantly increase the abundance of predatory insects compared to bare soil, which translated into greater removal of crop pests.



< True armyworm larvae can cause severe defoliation. Early season problems occur in no-tilled fields following pasture or sod or that have high grassy weed populations. Fields with a winter rye cover crop are at a higher risk of infestation.

A two-year study in Virginia compared the amount of natural enemies that feed on armyworms in corn planted into a rye cover crop and the method of removing the cover crop — mowed versus herbicide. More predators of armyworms were found in the mowed cover crop compared to the herbicide sprayed plots. However no difference was observed in the abundance of parasitoid wasps that attack armyworm larvae.

It is not yet known how much cover crops increase the risk of insect damage to corn but we do find that beneficial insects remain within the cover crop regardless of how the cover crop is removed.

Farmers will need to continue to scout corn early in the spring to assess the risk to farm fields and pay attention to cover crop management.

Matthew O'Neal is an associate professor in the Department of Entomology at Iowa State University and a principal investigator on the Sustainable Corn Project. His research is focused on developing economically and environmentally sustainable methods to manage insect pests of annual crops. He and his graduate student, Michael Dunbar, are contributing to the Sustainable Corn Project by studying the response of both pests and beneficial insects to extended rotations and cover crops.



MORE IPM/COVER CROP STUDIES NEEDED

A better understanding of the interaction between crop disease organisms and cover crop hosts will help researchers and extension personnel design management plans that minimize risk to the primary crop of interest. For example, recent greenhouse research determined that the cover crop annual ryegrass hosts the bacteria *Clavibacter michiganensis* var. *nebraskensis*. This bacterial species causes Goss's wilt on corn (as in the photo to the left) which is a potentially destructive foliar disease. While the role of annual ryegrass in the disease cycle of Goss's wilt is still unknown, research is underway in Indiana to determine if and when annual ryegrass could influence Goss's wilt levels in corn.

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< Goss's wilt is a bacterial disease of corn appearing as long, grayish-green to black, water-soaked lesions with wavy edges. Photo by Adam Sisson.