Scientists Look for Effective IPM Systems

Researchers with the LSU AgCenter are working to give corn and grain sorghum producers flexible integrated pest management plans that maximize yields, are cost-effective and decrease the time spent in the field.

The challenges are many, however. Researchers and farmers face problems such as the decreasing number of insecticides available for use with corn and grain sorghum, the discovery of new pests and the surge of others.

Some of the major challenges include:

- Many insecticides proven successful in fields are no longer practical to use for a variety of reasons.
- Emphasis on efficiency means producers are looking for more seed treatments to control pests and decrease the time required to plant the crop – as opposed to spending time, effort and money on conventional herbicide sprays and soil-applied insecticides.
- Insects, much like weeds, are developing resistance to the chemicals being used to control them. But developing and registering new chemicals is costly and a risk some companies are not willing to take.
- The cost of re-registering certain products through federal and state regulatory agencies also can exceed the potential financial gains for the respective chemical companies, which means some products simply go off the market.
- Other registrations are not being renewed because of environmental concerns. An example of this problem is the insecticide Furadan.

LSU AgCenter entomologist Dr. Rogers Leonard says growers in Louisiana are at a disadvantage from those in the Midwest because of the number of seed and seedling pests that attack field corn here.

Photo by Fangneng Huang

Moodna businuella is a relatively new pest on corn in Louisiana – so new that it does not yet have a common name. The pest, which is one being studied by LSU AgCenter entomologist Dr. Fangneng Huang, causes damage when its larvae tunnel between rows of corn kernels.

"Our corn fields are subjected to a high number of pests, and those insecticide-use strategies that work across the Midwestern Corn Belt are not as effective across the Gulf South area," Leonard explained.

Without an effective pest management system, growers may see as much as a 50 percent loss in stand and similar losses in grain yield, according to Leonard.

"We've found that for some Louisiana pest complexes growers need to increase the rate of insecticide on seed from 50 to 100 percent to obtain effective pest management and optimal yields," Leonard said.

Leonard notes that the sugarcane beetle is one pest that requires a much higher rate of insecticide. Some species of wireworms also require higher rates, although not as high as those needed for the sugarcane beetle.

The LSU AgCenter researcher is examining insecticides in the neonicotinoid class in seed treatment applications. Products in that class marketed under the commercial names of Poncho, Cruiser and Gaucho 600 have shown promise and are available as treatments on seed.

"Unfortunately, there are very limited research efforts from university scientists in the Gulf South area," Leonard said. "There are not as many entomologists working on corn as those in cotton and soybeans. This is an area that would greatly benefit from more focused research."

Dr. Fangneng Huang is another LSU AgCenter scientist who is examining pests of field corn and grain sorghum. One of those is an old resident of Louisiana, the sugarcane borer. Another, Moodna bisinuella, is so new, however, that it lacks a common name.

The sugarcane borer has surpassed the European corn borer and southwestern corn borer as the No. 1 pest of corn in Louisiana. The situation is so serious that Huang's work has even led him to identify the only sugarcane borer colony in the world that is resistant to Bt corn.

"This Bt-resistant colony will allow us to do many things in the area of corn pest management research," Huang said. "It will allow us to evaluate novel toxins developed by chemical companies that may be incorporated into newer Bt technology.

"It will also allow us to perform genetic research on resistant insects and determine what gene is responsible for its resistance to the toxins in Bt corn," he added.

Moodna bisnuella was first identified in the United States during 1984 in North Carolina. Its first documented appearance on corn in Louisiana was in 2004.

Because it is a new pest, very little is known about its biology – such as its reproductive cycle and where the insect overwinters. In addition, those Bt corn varieties that are so effective against corn stalk-boring caterpillars appear to have less activity on this pest.

Preliminary research suggests that late-planted corn and grain sorghum are most vulnerable to M. bisnuella. According to Huang, one Louisiana farmer estimated a loss of nearly 30 percent to an infestation of this pest in 2004.

Because it is an invasive species from Central America and little is known about it, Huang says he first will investigate potential strategies for managing this new pest with currently available products. Craig Gautreaux