AgriLife researcher studies chemical control of potato psyllid

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A Texas AgriLife Research entomologist in Lubbock is trying to determine the best management practices to reduce a potato crop's risk to zebra chip, a disease that discolors the potato and causes discounts to the producer.

Dr. Christian Nansen is part of a multi-disciplinary team that is examining a variety of factors, including insecticides, spray applications, performance, farming practices and potato plant attractiveness.

To reduce risk of the disease, researchers must determine how to control the potato psyllid, which spreads the *Liberibacter* bacteria that causes zebra chip, Nansen said.

Currently, only two practices are effective at managing potato psyllids - delaying planting and avoiding highly susceptible potato varieties - so insecticide-based control of the tiny bug is the most important tactic to concentrate on, he said.

"It is important that we collect enough information about insecticide performance before we make recommendations about which ones to use," Nansen said.

During the past growing season, Nansen and his team evaluated the "knock-down" effect and repellency of 12 insecticides on adult psyllids.

Knock-down effect was evaluated by determining mortality of potato

psyllids exposed to treated potato leaves, he said. Repellency of insecticides was tested by spraying either one side or both sides of potato leaves and then exposing them to potato psyllids.

For some of the examined insecticides, there was much lower mortality when only one side of potato leaves was treated compared to trials in which both sides were treated, Nansen said. The most logic explanation for these findings is that these insecticides are repellent to potato psyllids.

"Repellency is a very important but vastly overlooked aspect of insecticide performance," he said. "An insecticide which is repellent will likely be much less efficient, because target pests will avoid treated leaf surfaces."

For some of these insecticides, Nansen also examined whether insecticides affected feeding on potato leaves by potato psyllids.

"Zebra chip is vectored by potato psyllids to potato plants, and transfer of the bacteria occurs during feeding, so it is equally important to suppress feeding by the insects," he said.

To quantify feeding, Nansen's research team developed a chemical staining technique, which allows them to count how many times potato psyllids inserted their mouth parts into a given potato leaf.

"Using this staining technique, we were able to demonstrate that several insecticides markedly reduced or suppressed feeding of adult potato psyllids," he said. "This means that insecticide treatments reduced the likelihood of transfer of the bacteria to potato plants, which reduces the risk of zebra chip expression."

Nansen said it is known from other psyllid pests that there is a great risk

for these insects to become resistant to insecticides, so it is important that control efforts embrace other tactics as well.

"We are collaborating with Dr. Creighton Miller, a potato breeder at Texas A&M, on evaluating the attractiveness of different potato varieties," he said. "The hope is that we can identify high-yielding potato varieties that are less attractive to potato psyllids and get them incorporated into commercial operations."

Preliminary results are promising and suggest that potato psyllids prefer certain varieties over others, and work by Nansen's research also suggests that the development stage of the potato plant is important.

"We conducted choice-tests, in which potato psyllids were given a choice between leaves in different development stages, and we also tested the attractiveness of flowers from potato plants," he said.

"These tests showed a clear preference for leaves of plants in the flowering stage, and this information may be important for determining when insecticide applications are most needed," Nansen said.

More information: More information on Nansen's work can be found at: www.pssc.ttu.edu/cnansen/Website.html

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