

Corn soil insecticide use rising

By ROD SWOBODA

THE use of soil-applied insecticides on corn increased dramatically in 2012 and is expected to continue to rise as growers react to larger corn rootworm challenges. That's the observation of crop consultants, farm chemical dealers and industry sources.

This is a reversal of what happened in the last decade when corn hybrids became available with genetic traits built-in to control rootworm, the major pest of corn. Plant those CRW-trait hybrids, and you don't need to use a soil-applied insecticide — an appealing management strategy that caught on and is still used successfully by many farmers today. As a result of corn hybrids with CRW traits coming on the market, the application of soil-applied insecticides declined. Now, insecticides are making a comeback, for several reasons.

When planting CRW-trait hybrids farmers either have to plant a refuge area, consisting of a non-trait hybrid, or use a blended RIB (refuge-in-a-bag) corn to keep populations of resistant rootworms from building. Soil-applied insecticides are used on refuge acres when these areas are in strips or blocks. In rows next to the refuge, some farmers have applied a soil insecticide to the CRW trait hybrids and have seen a yield increase. Meanwhile, other farmers began seeing rootworm control failures of the CRW trait hybrid they planted. These failures occurred after planting the same CRW trait for several consecutive years in fields of continuous corn.

Acres treated with corn soil insecticides from Amvac, which include Aztec, Counter and SmartChoice, climbed more than 30% in 2012 compared to 2011. "Treated acres are projected to increase another 40-plus percent in 2013," says Joe Short, Midwest marketing manager for Amvac, the largest U.S. manufacturer of granular corn soil insecticides. The 2012 treated acreage increase followed a 10% gain in 2011, which broke from more modest year-over-year gains in the late 2000s. Sales of Amvac's SmartBox precision soil insecticide application system also are up substantially.

Responding to rootworm risk

Corn soil insecticide use was up across the Corn Belt in 2012. The largest increases were in Iowa, southern Minnesota, parts of Nebraska and northern Illinois, where continuous corn production systems are common and have increased in recent years. "Much of the higher demand for soil insecticides is on continuous corn," says Short. "Growers are responding to larger, more difficult-to-control corn rootworm populations. Applying rootworm insecticides enhances control from the CRW-trait



ROTATE TRAITS: This Iowa field, planted to corn hybrids with Cry3b1 and mCry3a traits, had severe lodging caused by rootworms. Rootworm resistance to traits has been observed where the same traits are planted year after year in the same field.

Key Points

- Corn soil insecticide use rose dramatically in 2012 and will expand again in 2013.
- Growers are responding to larger and harder-to-control rootworm populations.
- This is occurring especially in areas where continuous corn acres have increased.

hybrids, reduces lodging, improves harvest efficiency and boosts yield."

Growers want to reduce risk and increase yields. Research at major universities in the Corn Belt in 2010 and 2011 showed an average 5- to 10-bushel-per-acre yield advantage to applying soil insecticides on rootworm trait corn, depending on pest pressure and field conditions. "At today's high grain prices, this practice is very profitable," notes Short.

Aaron Gassmann, Iowa State University research entomologist has checked fields and investigated growers' reports of rootworms becoming resistant to rootworm traits in today's corn hybrids. Rootworms resistant to the Cry3Bb1 protein, the trait present in a number of CRW corn hybrids, have been documented in Iowa and Illinois, and are suspected in Minnesota, Nebraska and North Dakota.

"Using a granular soil insecticide to add a second method of control will help preserve the durability of rootworm traits," says Richard Porter, Amvac's Midwest product development manager. "Growers want to enhance the performance of CRW-trait corn and do what they can to reduce the chances of resistant rootworms gaining a foothold in their fields."

A lot goes into your decision

What about the insecticide that is on the seed you plant? Does it control corn rootworm? Even the high rates of insecticide seed treatments have very minimal effect on rootworm, university studies show. Seed treatments control other soil insects such as wireworm, but the data shows seed treatment insecticides alone aren't something to rely on for rootworm control.

When putting together a rootworm control strategy, farmers also need to consider secondary pests such as wireworms and grubs. If your fields have a history of these pest problems, choose a soil insecticide that controls them, advises Porter. Also,

do you have a corn nematode problem? If you do, consider using a soil-applied insecticide that controls nematodes.

Many corn hybrids today come with a CRW trait. "But sometimes the best hybrid for your farm or field situation may be a conventional hybrid, one that doesn't have the trait," says Porter. "If you want to plant a good conventional hybrid, a non-CRW trait corn, you may have good reason. You can use a soil-applied insecticide."

What about rotating corn with soybeans? "In most cases, that's still considered to be the best way to control rootworm and not have to use an insecticide. A corn-bean rotation still works well for most farmers," says Erin Hodgson, ISU Extension entomologist. It depends on where you are farming in Iowa, she adds. There is pressure from extended diapause of the northern corn rootworm species in some areas. The western corn rootworm doesn't have the problem. Where extended diapause of northern corn rootworm is a concern, you may have to use a soil-applied insecticide on first-year corn following soybeans in the crop rotation. Keep in mind that extended diapause becomes less of a risk if you're located farther south in Iowa, especially south of Interstate 80.

Rotate CRW corn hybrid traits

If you're growing continuous corn, don't plant hybrids that have the same CRW trait yearly, advises Hodgson. For example, you can rotate the use of Cry3Bb1 and mCry3a traits by planting a Cry34/35Ab1 (Herculex Extra) hybrid or Cry3Bb1 + Cry34/35 (SmartStax) hybrid. Hodgson and Gassmann strongly encourage rotating pyramided traits every two or three years. They say rotating hybrids with different traits is a better long-run solution than planting the same trait continuously and applying a soil insecticide.

Why plant a CRW-trait hybrid if you are going to apply a soil insecticide anyway? Because it may be the hybrid that has the yield potential and agronomic characteristics you want, a hybrid that will perform well on your farm, says Porter. "It's still very important to choose the right corn hybrid to plant for your situation," he adds. "You should choose the hybrid first, then look at what you can do to maximize yield. That includes what you need to do to control corn rootworm and other corn insect pests."

Tips to control corn rootworm

WESTERN corn rootworm is an adaptable pest, and will eventually overcome any strategy that is used continuously. The longer a field is in continuous corn, the more inputs will be needed to protect yield.

In order to keep growing profitable corn, farmers must use multiple tactics to prolong the effectiveness of commercially available tools. Those observations come from Iowa State University entomologists Erin Hodgson and Aaron Gassmann. They offer the following recommendations for managing corn rootworm.

The single most effective tool in Iowa is to rotate corn to soybeans or another crop. Breaking the cycle of continuous corn (even once every four to six years) will dramatically improve corn rootworm management. Corn rootworm can't survive on non-corn crops, thus crop rotation will break the life cycle. A farmer should expect nearly zero root injury after rotating back to corn, and could significantly reduce the management costs in first-year corn. If crop rotation isn't an option, farmers should incorporate a diversified management strategy, including these options:

- Use pyramided corn rootworm transgenic traits, like SmartStax (Cry3Bb1 and Cry34/35Ab1) or Agrisure 3122 (Cry34/35Ab1 and mCry3A). But understand if rootworm populations have developed resistance to one trait, the second trait is likely controlling most of the larvae. Using pyramided traits continuously will increase the chances of developing resistance to both traits, which is the "worst-case scenario" and something to try to avoid. ISU entomologists strongly encourage rotating pyramided traits every two to three years.

- Use a soil insecticide on non-rootworm *Bt* corn. Remember soil insecticides only protect a small area of roots. Transgenics, on the other hand, will be expressed throughout the root system and will come in contact with the entire rootworm population. So if a field has high larval numbers and you use a soil insecticide, there may still be root pruning. Soil insecticides won't necessarily eliminate resistance because individual larvae (resistant and susceptible) will be able to survive outside the insecticide-treated zone.

- Rotate among single *Bt* corn rootworm traits. For example, if you are noticing root injury greater than one node of roots destroyed with Cry3Bb1 (Genuity VT Triple Pro) or mCry3A (Agrisure RW), then consider switching to Cry34/35Ab1 (Herculex XTRA). ISU recommends rotating single *Bt* traits annually, or at least every two years.

- Scout every field, every year. Farmers should monitor fields for larval corn rootworm injury, regardless of which rootworm management strategy they use. Evaluate root injury using ISU's 0-to-3 rating scale to determine corn rootworm pressure and product efficacy.

Check results

RESULTS from Iowa State University's 2011 research trials are posted at www.ent.iastate.edu/dept/faculty/gassmann/rootworm. The 2012 trial results are to be posted in early 2013. The site includes studies from previous years, too. Click on the tab "Evaluation of Insecticides and Plant-Incorporated Protectants."