[MN-CCA Column for The Farmer June -July, 2016]

Insecticide resistance threat emerges in soybean aphids

BY Allen Van Grouw

Resistant soybean aphids may be coming soon to a field near you.

Soybean aphid resistance to widely-used pyrethroid insecticides was confirmed last year in southern Minnesota. In bioassays performed by the University of Minnesota, aphids taken from fields with poor control were about 44 times more resistant to bifenthrin than susceptible laboratory aphids, and 10 times more resistant to lambda-cyhalothrin.

These failures are a wake-up call on the importance of insecticide resistance management (IRM). If we do not manage our insecticide use properly, we could lose these tools.

Unfortunately, our chemical options for controlling soybean aphids are limited. Growers are restricted primarily to three effective modes of action:

•Group 1, the organophosphates, such as Lorsban;

•Group 3, the pyrethroids, such as Warrior and Hero;

•Group 4, the neonicotinoids and sulfoxamines, such as Poncho, Gaucho, and Transform.

In 2015, there were numerous reports of Group 3 failures in southern Minnesota, especially in the Minnesota River Valley north and west of New Ulm, says Robert Koch, University of Minnesota Extension entomologist. In these areas, multiple applications were required to control soybean aphids. (We did not hear of performance problems in west central or northwestern Minnesota.) The southern Minnesota reports spanned multiple counties, chemical compounds, and application methods, suggesting that it wasn't a problem with just one applicator or batch of insecticide, Koch says.

These insecticide failures demonstrate the need for correct resistance management. The University of Minnesota recommends that soybean aphid management programs should:

Treat only when necessary. Scout through R6.5, regardless of the calendar date, and do not spray for aphids unless economic thresholds are reached.

Through R5 soybeans, treat when aphid populations are increasing, at least 80% of plants in the field are infested, and average aphid counts across the field — not just in isolated hot spots — exceed 250 aphids/plant.

Avoid applications of insecticide as "insurance." This adds unnecessary expense, kills beneficial predators that can keep aphids in check, and often leads to the need for re-treatment.

Alternate insecticide modes of action. The insecticide mode of action group is listed on the product label. Or, you can look it up at www.iraconline.org

You should switch modes of action from one season to the next. Do this even if you haven't experienced performance problems with your usual insecticide. If you sprayed a pyrethroid from Group 3 last year, choose an organophosphate from Group 1 this year.

If it is necessary to re-treat a field for soybean aphids or another pest this season, use a different mode of action for the second treatment. For example, if you sprayed a Group

1B insecticide, such as Lorsban, the first time, the subsequent treatment should not contain any product from Group 1. Likewise, if you used a neonicotinoid seed treatment, avoid spraying a Group 4 foliar insecticide later in the season.

Koch recommends against using formulated mixtures or tank mixes of insecticides. While mixes can work well for insect suppression, alternating modes of action in sequence is better for insect resistance management, he says. Note that this is different than recommendations for herbicide resistance management for weeds.

Use insecticides correctly. Apply the full labeled rate. Sometimes, growers reduce rates to save money, but below-label rates can increase selection for resistance.

Spray only when conditions are favorable for insecticide application, and always follow the label directions. Use the proper nozzles, pressure and water volume. And avoid combining insecticide and herbicide applications. The timing is rarely right to do this, and sprayer specifications for herbicides and insecticides usually differ, compromising the effectiveness of both.

Reduce the likelihood of needing to treat. Employ integrated pest management practices such as crop rotation and planting pest-resistant varieties. Koch adds that the routine use of soybean seed treatments across many acres violates the principles of integrated pest management. He reminds growers that neonicotinoid seed treatments usually don't last long enough to control soybean aphids. Neonicotinoid concentrations remain effective up to 23 to 49 days after planting. But soybean aphid colonization typically occurs later in the season.

If you suspect resistance

If you experience poor soybean aphid control this season, it doesn't necessarily mean aphids are becoming resistant. Before you assume resistance, rule out other factors that can cause insecticide performance problems. These include:

•***Misapplication of insecticide.*** Did you use the correct insecticide and the full labeled rate? Did you achieve good coverage and canopy penetration?

•***Unfavorable weather.*** Was it too windy, wet or hot? For example, some pyrethroids are less effective at high temperatures.

•***Recolonization.*** Did you scout after spraying? Aphid recolonization can occur very quickly in favorable environments — in as little as three to five days, especially if it rains after application.

If you still suspect insecticide resistance, University of Minnesota Extension entomologists have set up a website for reporting insecticide failures. Go to: http://z.umn.edu/aphidinsecticidefailure

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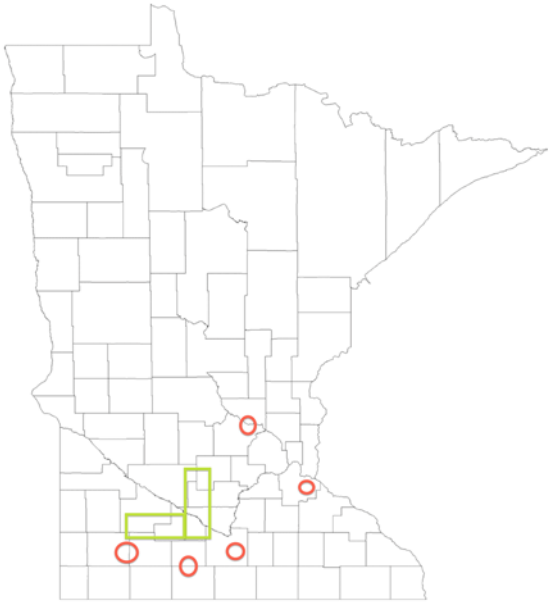
Key points

•Pyrethroid-resistant soybean aphids were confirmed in southern Minnesota in 2015.
•Adopt insecticide resistance management strategies.
•Rotate insecticide modes of action year-to-year and within the season.

[Optional Map]

Pyrethroid failures to control soybean aphids in 2015



Source: Bruce Potter, Robert Koch, University of Minnesota

Areas outlined in green experienced bifenthrin failures to control soybean aphids in 2015. Areas outlined in red reported poor performance with lambda cyhalothrin on soybean aphids.