



Promising Findings in Bee Toxicity Research

Most newer insecticides that OSU researchers have looked at in a bee toxicity trial have short residual times, according to OSU bee specialist Andony Melathopoulos, and are relatively safe to bees if applied several hours before bee foraging.

“These products are nothing like the older products,” Melathopoulos said at the Oregon Clover Growers Annual Meeting in February. “You come back a few hours (after application) and bees walk all over the surface (of the plants), and they are all alive.

“It really comes down to product selection and spraying in the evening,” he said.

Melathopoulos, Associate Professor in Pollinator Health Extension, also said that some older broad-spectrum products might also be safer to bees than previously thought given that they break down faster on flowers than leaves.

“This was the second year in a row that we saw this,” Melathopoulos said. Products that showed this trait were malathion, an organophosphate, and lambda-cyhalothrin, a pyrethroid.

Bifenthrin, a widely used pyrethroid, did not show the same characteristic, Melathopoulos said.

“Bifenthrin stays hot regardless of leaf or flower,” Melathopoulos said.

The trials are an offshoot of work looking into alternatives for Lorsban, which will be banned in Oregon beginning next January.

“We are looking at bee health as these new products are being evaluated,” Melathopoulos said.

Alternatives being analyzed include flonicamid, which includes the product Beleaf, a systemic insecticide from FMC that is not acutely toxic to bees; pyropenes, a relatively new class of product that also is not acutely toxic to bees; diamides, such as chlorantraniliprole and cyantraniliprole; and oxazines, which includes the products Steward and Avaunt.

“These are the new insecticides. Likely because of cancelations and use mitigations, we are going to see these proliferate,” Melathopoulos said.



“The experiments (Extension Seed Production Specialist) Nicole (Anderson) and I were interested in was a series of questions about how long it takes for these products to dissipate, because if they dissipate in a short amount of time, they should dissipate from the surface of the plant over the course of an evening, and the next morning, bees can forage

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Andony Melathopoulos speaking at the Oregon Clover Growers Annual Meeting.

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on the crop and there is not enough residue left to kill them,” Melathopoulos said.

Working with Dani Lightle, IR-4 Specialty Crops Pesticide Registration Research Leader, and OSU Extension Entomologist Navneet Kaur, the researchers found that bifenthrin, or Brigade, was still toxic to bees 24 hours after an application. “It takes somewhere between 24 and 96 hours for it to wear off,” Melathopoulos said.

“It really comes down to product selection and spraying in the evening.”

Andony Melathopoulos

bees walk all over that surface and they are no different than the control.”

Researchers also tested nectar and pollen because even though the insecticides are no longer active on the surface, they may be moving through the plant to the flowers, Melathopoulos said. They looked at nectar and pollen bees collected eight hours after

“With Exirel, (a diamide), in contrast, bees are totally alive (after walking on leaves the morning after an evening application),” he said. “This is a product that is toxic to bees, but three hours later, you can have

an application to look for the insecticides, and, in nearly all cases, found only trace amounts.

“So, clearly whatever is in there is not going to be toxic to bees,” Melathopoulos said. “Avaunt was the only product that had levels in the pollen that could be toxic to bees.”

He added that Avaunt was one of the more effective products against white clover weevil, so more research is needed to confirm whether it results in high levels of residues in pollen.

Melathopoulos said he hopes to conduct further research into the difference of residual levels found on leaves versus flowers.

“We need to do more work on this, but potentially, two old broad spectrums might not be as bad to bee health as we thought,” he said.

For a more in depth look at the research, interested parties can check out the Bee Protection Protocols developed for specialty seed growers, which is available at the OSU Extension website, as well as look for a forthcoming Bee Protection Protocol for clover seed producers.



A Look at New Zealand Seed Production

Between a push for farmers to calculate and pay for greenhouse gas emissions and pressures to protect groundwater, grass seed growers in New Zealand have no shortage of regulatory concerns, according to a report at the OSU Extension Seed and Cereal Crop Production Meetings in January.

At issue with groundwater is a Danish study that suggested that any level of nitrates over one milligram per liter might cause cancer, a study that environmental advocates claim is relevant for regulatory purposes.

“Now even the Danes are saying there are still lots of question marks about that study,” said Phil Rolston, adjunct professor at Lincoln University in New Zealand. “But it is a big political issue facing us in New Zealand.”

Currently, the World Health Organization and the U.S. Environmental Protection Agency have established a maximum contaminant level for nitrates of 10 milligrams per liter, Rolston said during his presentation in Salem.

As for the greenhouse gas emissions, the government has proposed charging farmers for emissions above a certain level



Phil Rolston speaking at the OSU Extension Seed and Cereal Crop Production Meeting.

beginning in 2025 and have instructed growers to begin calculating their emissions, Rolston said.

“It’s basically driven by how much nitrogen fertilizer you are using, the type of nitrogen and your livestock,” Rolston said.

To help farmers, researchers in New

Zealand have created an online calculator growers can use to determine their emissions.

In general, Rolston said, “the impacts for us potentially going forward, we think, are going to be on our water usage.”

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A Look at New Zealand Seed Production *continued*

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Rolston, who obtained his PhD at OSU and has traveled to Oregon many times over the years, provided the updates on regulations facing New Zealand seed growers as part of a presentation on New Zealand seed production.

Rolston said seed growers in New Zealand and Oregon face many similar production issues. At lower elevations in New Zealand, however, it is drier than in Oregon. Because of that, pretty much all seed production in New Zealand is irrigated, he said.

Complex Rotations

Farms in New Zealand tend to be a bit smaller than Oregon farms, averaging about 1,000 acres, he said. And New Zealand farmers have complex rotations, with maybe 30 to 50 percent of a farm in wheat and barley, 25 percent in grass seed crops, mostly perennial ryegrass, which is grown as an annual crop, and about 25 percent in other crops, including clovers, peas, brassica crops and vegetable seeds.

“One of the big differences is there is always a livestock component integrated into the production,” he said. Farmers will graze livestock through the winter and sell them in the spring.

Like in Oregon, he said, New Zealand farmers are facing rapidly increasing costs of production, he said. And, because much of their production is exported, New Zealand farmers have been significantly affected by supply chain issues caused by COVID.

Rolston talked briefly about seed-production incentive programs in New Zealand, which have led to dramatic increases in yield over the years, beginning with what they called the Ryegrass 2,0000 program.

“We started that in 1994 with the objective of getting, 2,000 kilos per hectare by the year 2000, which is about 1,800 pounds per acre,” he said. At the time they started, yields were roughly half of that, he said.

By the early 2000s, many growers were achieving that goal, in part because the plant growth regulator Palisade became commercially available about that time. So, researchers began a second campaign, called Ryegrass 3,000.

Key to maximizing benefits with Palisade, Rolston said, is to apply it at the optimum timing. He said researchers originally thought growth stage 31 was optimum timing, but eventually noticed in studies that they had better response when applying the PGR at growth stage 32.

“It gave us a lot better response,” Rolston said.

He added that researchers found if growers could get one more seed per spikelet, that would equate to 800 additional pounds per acre. Also, researchers found for every day they could prevent a crop from lodging, they were adding between 25 and 40 pounds of seed per acre per day.

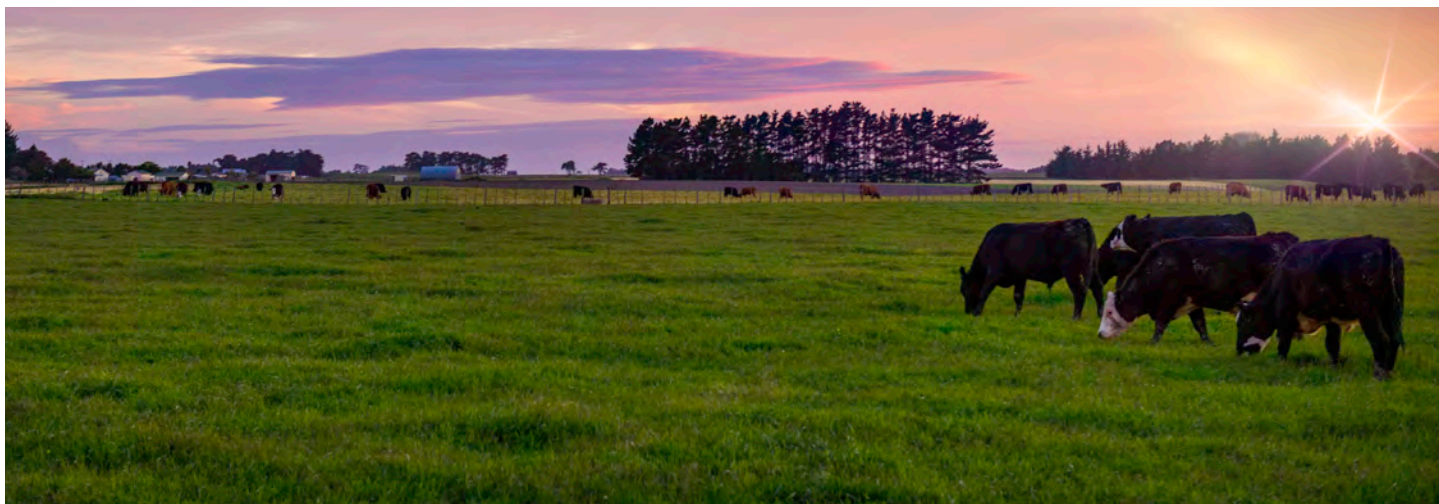
Researchers also helped growers refine their nitrogen rates, and like findings in Oregon, found that greener wasn't necessarily better when it came to seed yields, Rolston said.

Ryegrass 4,000

Today, Rolston said the research community is looking to start Ryegrass 4,000, which is about 400 pounds an acre more than the highest commercial seed yield ever recorded in New Zealand.

“But to get to these high yields, we've got to understand why we're losing 60 to 75 percent of those baby seeds,” he said, noting that 60 to 75 percent of baby seeds never make it to a saleable seed. “And to understand that, we've got to have a better understanding of what is our limitation in terms of photosynthates getting to the seed.”

And, he said, growers have to reduce seed shattering, an effort that is expected to involve a breeding component.



Clover Seed Weevil Found Resistant to Bifenthrin

It's official. Clover seed weevil is resistant to bifenthrin, a pyrethroid insecticide sold under several trade names, including Brigade.

In a 2022 laboratory study, it took three times the label rate of bifenthrin to get 90 percent control of the weevil, said OSU Extension Entomologist Navneet Kaur.

“When compared to a susceptible strain collected from Alberta, Canada, part of our population was almost 850 times resistant, another 550 times resistant, others were 200 times resistant,” Kaur said in a presentation at the Oregon Clover Growers Annual Meeting in February in Wilsonville. “These levels are extremely high and the first ever report of bifenthrin resistance in our weevils.”

In her presentation, Kaur said researchers first noticed clover seed weevil field resistance issues in a 2021 study. The study included seven insecticide treatments of different groups, along with Brigade, which was used as the grower standard.

“To our surprise, Brigade had some suppression three days after treatment,” she said, “but the population rebounded by seven days and this trend stayed consistent for the fourteen days.”

The study convinced researchers that something was happening with Brigade. “There was some indication of it failing to provide sufficient control,” she said.

Researchers subsequently developed a project to determine the extent of the resistance and develop an integrated approach to manage the pest. The project was funded by the Oregon Clover Commission, the USDA under its Western Sustainable Agriculture Research and Education grant program and OSU through its Agricultural Research Foundation.

During that study, resistance was confirmed.

As for the integrated management approach, researchers sought first to identify any weak links in insect biology, Kaur said. They

determined that weak links occurred when adult weevils attempt to puncture white clover florets for egg laying and when larvae are still feeding inside the clover florets.

“So, the goal is to optimize our control window and target the egg and larval stage in the insect life cycle, which is up to forty days long,” Kaur said.

An issue with that strategy, however, is there is no insecticide available in clover that has 35 or 40 days of residual activity.

“So, we are trying to narrow that down with two insecticide application timings where we can target the larval detection or the egg laying with newer chemistries known to provide protection for a 21-day residual period,” Kaur said.

Researchers also are looking at sampling techniques for larvae to help determine the optimum spray window.

One piece of good news from the study, researchers have found that several products provided good control, including malathion and chlorantraniliprole.

“The Oregon population have not become insensitive to malathion, and we did not see insect resistance (to the other compounds tested),” Kaur said. “That is good news that we can still use other tools that are present at this time for weevil management.”

Researchers plan to continue to evaluate chemistries for seed weevil control, as well as look at different sampling techniques, Kaur said.



Navneet Kaur speaking at the Oregon Clover Growers Annual Meeting.

Calendar

March 7	Oregon Ryegrass Commission Meeting, Cascade Grill, 110 Opal St N.E., Albany
March 22	Oregon Clover Commission Meeting, 7 a.m., Roth's 1130 Wallace Rd NW, Salem
April 3	Oregon Fine Fescue Commission Meeting, 7 a.m., Roth's 1130 Wallace Rd NW, Salem
April 6	Oregon Tall Fescue Commission Meeting, 6 p.m., Roth's 1130 Wallace Rd NW, Salem

THE E-NEWSLETTER The goal of this e-newsletter is to provide timely updates to Oregon seed producers and field reps. It includes a snapshot of what's happening currently with respect to weather, pest and disease outbreaks, harvest, label updates, and other management activities. Growers or field reps can provide input anytime at mitchlies@comcast.net.

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