but doing so could help against an insect like pea leaf weevil."

Beneficial insects. The enemy of your enemy is your friend, they say. In that regard, predators and parasitoids of target insects can potentially be deployed in the grower's cause. Interactions between target and beneficial insects are being studied (see page 18) and this work could yield major improvements in control at lower environmental cost.

The potential of beneficials underlines what Mori sees as a major challenge of agricultural entomology: how to truly understand what's happening in the field.

"If you take a step back and look at the whole system, there's still a lot we don't know," Mori said. "Overall, we need to know more about issues like population dynamics, including how insects overwinter. To try to understand how they overwinter, you're dealing with temperature, snow cover, moisture and other issues. You can try to simulate all that in the lab, but of course, it's different in the field."

Insect forecasting. Organizations like the Prairie Pest Monitoring Network do valuable work aggregating observations about insect pests. This doesn't provide a dependable future forecast for growers, but it's a step in the right direction. Having a true forecasting method would help growers even more.

As Mori sees it, having a viable lineup of insecticides for pulse crops is no reason not to seek a better way. However complex and dynamic the interactions between pests, beneficials, crops and the environment, researchers are digging in and aiming to innovate.

"As a scientist, I like the process," Mori said. "Do the research work, get results and apply what we learn. If we can develop a better toolkit for farmers, it will help them grow their crops in a more sustainable way."

NEW WAYS TO SCOUT AND EVALUATE WIREWORM

Wireworm can be big trouble for cereal growers. This pest's damaging larvae can live in the soil for several years, making them challenging to scout for. Wireworm feeds on multiple crops (pulses included) and has no established economic threshold.

Given that, many growers get their cereal seed treated just in case. In significant wireworm years, that's a sound investment. Some years, it's an unnecessary expense.

Dr. Haley Catton, Lethbridge-based Research Entomologist with Agriculture and Agri-Food Canada, wants to take some of the guesswork out of wireworm management. In a new project starting in 2021, she will study novel monitoring strategies for this pest.

In one, she'll look into using drone-captured imagery for scouting. Thin patches this year in your cereals could indicate wireworms will be a problem next year in a pulse crop.

In another, Catton is excited about the potential of a pheromone newly discovered by Dr. Wim van Herk at AAFC-Agassiz and the Gries Lab at Simon Fraser University. This pheromone attracts wireworms and could provide an effective monitoring shortcut.

"Farmers need an easier way to decide if they have wireworm," Catton said. "We are trying to give farmers new tools and a better decision-making process for this insect."