



TO SPRAY OR NOT TO SPRAY

BY LORNE McCLINTON

NEW TECHNOLOGIES STRIVE TO ELIMINATE GUESS WORK FROM FUNGICIDE DECISIONS.

Deciding to spray to control weeds or insects is an easy decision for most producers; scouting will quickly reveal whether it makes economic sense.

Fungicides are a different story. They have to be applied before there are visible signs of disease to be effective, so producers base their spraying decisions on forecasting and risk assessment models. The downside though is they're never entirely sure if the economic returns justified the expense. Fortunately, there is a stream of new technologies being introduced to take away some of the uncertainty.

Disease outbreaks depend on three variables, the host crop, the

presence of a pathogen, and the right environmental conditions for the pathogen to infect the crop. Together this trio is known as the disease triangle; if any side is missing, an outbreak can't occur.

"There are two basic classes of tools that have come online to help producers with their fungicide application decisions, spore sensing technologies and weather modeling technologies," says Clinton Jurke, Agronomy director with the Canola Council of Canada in Lloydminster, Saskatchewan.

"The two target different sides of the disease triangle. Spore sensing technology, like the Spornado Sampler, or the labs doing petal testing, actually detect and quan-

tify the presence of spores in the field. Environmental modeling systems use information collected by field weather stations to determine if conditions are right to have a disease problem this year."

A vanguard of Canadian cereal, canola, potato and grape producers are using the Spornado Sampler to determine fungicide application timing, says Michael Saleh, the chief technical officer with Spornado in Toronto, Ontario. Basically, it's a passive air sampler; the wind blows through the device and any spores in the air are captured on a membrane in a cassette. Afterwards the producer pops out the cassette and sends it to a lab for analysis.

"If you are looking for a sclerotinia stem rust in canola you would put a cassette in at the 10% flowering stage for two to four days," says Sarah Foster with 20/20 Seed Labs in Nisku, Alberta. "After that they would replace the cassette and the test would be repeated at the 20%, 30% and 40% flower stage. If there are any sclerotinia spores in the area the Spornado will find them and producers can decide whether or not they should apply fungicides."

The same process and cassettes are used for every crop, whether testing for fusarium in wheat, late blight in potatoes or powdery mildew in grapes, Saleh says.

The Spornado is very good at detecting any spores that are present in the air. Currently they are still doing research to try to correlate the number of spores that are being detected to an economic threshold for fungicide application for every crop.

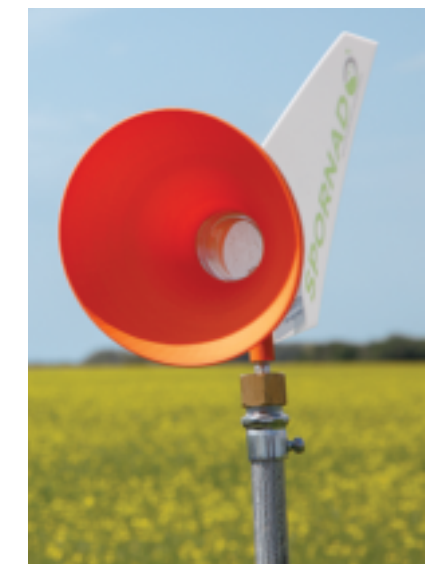
"It's an easy decision to spray fungicides to control late blight in potato," Saleh says. "It's such a devastating disease that producers are willing to spray if any spores are detected. However, it's a lot trickier for something like powdery mildew on grapes. There are always powdery mildew spores in the environment so we're still trying to determine what's a background spore load and when it's time to take action."

"On the other hand, the environmental model fungicide application tools don't consider spore concentration at all, they strictly look at whether or not the right environmental parameters are in place for there to be a disease outbreak," Jurke says. "That's important because with a crop like canola, the environmental parameters are likely the biggest factors that need to be considered."

There are other fungicide application tools further out in the

development pipeline too, Jurke says. Some are trying to develop a predictive model that uses radar satellites to measure crop bio-mass and soil moisture from space. Another is trying to incorporate spore sensing technology directly into field weather stations that would let producers know if spores were present and the right environmental conditions were in place to warrant a treatment.

"For now, the Canola Council isn't comfortable recommending one system over another," Jurke says. "Companies need to collect more data to show they can effectively predict whether it's economical to spray or not. So, we're still referring producers to the sclerotinia checklist on our website. These new technologies can be incorporated into the checklist to help growers make better fungicide application decisions." ❁



Above. Timing a fungicide application is rarely a simple decision. **Opposite, clockwise from left.** Gary Hartl with 20/20 Seed Labs explains how the Spornado works. The Spornado is a passive air sampler; it collects any airborne spores that are present on a membrane on a cassette. Molecular tests in a lab then determines what spores are present.