BETTER TOOLS IN SIGHT FOR DRY BEAN DISEASE MANAGEMENT

This researcher wants to make it easier to predict when white mould will occur, and know which cultivars and seed sources are the best match against bacterial blight.

Dry bean plant showing infestation with white mould. This can occur on a single plant or spread to large patches of plants depending on favourability of conditions.

If disease was less of an issue, dry beans could be an even bigger crop than the 50,000 acres it's averaged in recent years in southern Alberta. If this happened, more growers could enjoy the soil-building and economic benefits of the different market classes of dry bean.

With funding from the Canadian Agricultural Partnership AgriScience Program, AAFC Plant Pathologist Dr. Syama Chatterton is midway through a four-year effort aimed at the key bean diseases of white mould and bacterial blight, with the goal of adding management options and reducing risk.

For Chatterton's team, 2019 was the second year of collecting white mould spores. Based in Lethbridge, she oversaw spore sampling in Alberta,

while project colleagues did the same in Manitoba and Ontario.

"In a hot, dry year like 2018, white mould incidence was fairly low," Chatterton said. "Even so, our work showed spores are continuously being released into the environment."

Correlating spore counts to prevailing weather conditions to white mould incidence, Chatterton would ultimately like to develop a way to give growers advance warning of an outbreak. A PhD student at the University of British Columbia is examining how machine learning, a field related to artificial intelligence, could make this prediction faster and more precise.

"A prediction model would take into account some of those different weather variables," Chatterton said.

"We need three years of data to create a really robust data set for modelling and 2020 will be our third growing season doing the spore sampling."

One observation to date is that fine-tuning irrigation could help keep white mould in check. When more irrigation is applied to dry beans, the canopy becomes denser and more likely to trap spores. A more open canopy, associated with less irrigation, traps fewer spores.

Seed source is one key to bacterial blight

With bacterial blight being a seed-borne disease, Chatterton started her inquiry with the seed itself. While most southern Alberta dry bean producers plant certified seed grown in Idaho, farm-saved seed is also available. Chatterton screened both kinds of seed for bacterial pathogens.

"There was definitely a big difference," she said. "The seed lots coming from Alberta seed had very high levels of most bacterial pathogens. The Idaho seed was pretty much clean."

One piece of a bacterial blight defence could be planting dry bean varieties known to be less susceptible to the disease. It hasn't been clear, however, which varieties qualify.

"In 2019, we set up field trials with five different market classes, with two different cultivars each from two different seed sources," Chatterton said.

To track disease development through the growing season, a technician visits these extensive trials to assign a disease rating on as many as 240 plots per site. This is complex research that, combined with the white mould work, will help growers stay ahead of disease and keep dry beans productive and profitable.

"The white mould spore sampling and the bacterial blight trials have both showed good progress," Chatterton said. "We'll be continuing this work in the 2020 growing season."