Blackspot alert

Growers must stay on the lookout for blackspot in peas this year, according to South Australian Research and Development Institute (SARDI) researcher Jenny Davidson.

Jenny said the dry summer and autumn had increased the risk of a blackspot outbreak occurring in-crop. "We recommend field pea crops should be sown so that the majority of blackspot spores have been released prior to the crop emerging," she said.

"With the current dry conditions very few spores would be out there at present, and as we approach sowing this is increasing the chance of the fungus occurring in emerging peas."

Jenny recommended growers 'road test' the newly released *Blackspot Manager*, an on-line decision-making model which helps growers to identify optimum sowing times for peas. It is supported by growers and the Australian Government through the GRDC and can be accessed on-line at www.agric.wa.gov.au/cropdiseases. ■

Blackspot infection.

Wanted: Rust samples

Recent rainfall in south-eastern Australia has created opportunities for re-growth of cereal stubbles resulting in a 'green bridge' that may harbour rust pathogens.

Dr Colin Wellings, a NSW DPI scientist on secondment to the University of Sydney's Plant Breeding Institute, has asked growers and advisers to be vigilant in looking for rust samples on self-sown cereals in stubble, and also in locations such as roadsides and grain storages where isolated plants may be growing.

"If rust samples can be collected during this pre-cropping phase, it will give us an opportunity to capture vital information on rust distribution and the potential for rust problems in the 2008 winter cereal season," Colin said.

Samples can be mailed in paper envelopes to: Australian Cereal Rust Survey, Plant Breeding Institute, Private Bag 11, Camden, NSW 2570.

The Australian Cereal Rust Control Program is supported by growers and the Australian Government through the Grains Research and Development Corporation (GRDC). Growers can access detailed information about rust management by visiting www.grdc.com.au/rustlinks.pdf. ■

Flower power, bacteria style, makes wheat fungus wilt

By Jan Suszkiw, ARS–USDA

Flower-dwelling bacteria could soon join the fight against *Fusarium graminearum*, the fungus that causes Fusarium head blight disease, or scab, in wheat, barley, and other cereal crops.

According to David Schisler, a plant pathologist in ARS's Crop Bioprotection Research Unit at Peoria, Illinois, the bacteria colonise the flower's anthers, or pollen-making structures, which naturally exude a smorgasbord of nutrients. One of these, choline, is rich in carbon that the bacteria need for growth.

But what does the wheat plant get in return? Protection, it turns out.

Typical premature whitening of a wheat head infected with the fungus that causes Fusarium head blight. (Photo: Crop Bioprotection Research)

In greenhouse studies and field tests conducted in Peoria and Wooster, Ohio, starting in 2002, David and colleagues have shown that inoculating wheat anthers with specific choline-metabolising bacteria helps keep scab to a minimum.

Unchecked, the disease causes economic losses in wheat by crippling the growth of kernels and turning them chalky white.

The researchers aren't sure exactly how the bacteria protect the crop, but one possibility may be tied to the fungus's reliance on choline as a chemical signal that cues it to form a specialised tube for breaching anther tissues. By gobbling up the anthers' choline stores, the bacteria leave less around for the fungus, depriving it of that chemical cue.

"The bacteria may keep that signal from being as 'visible' as it would be otherwise," says David.

That observation got him and colleagues thinking: "If we could cover wheat heads and anthers with organisms that use choline, could we 'blind' the scab fungus to this cue?"

Of 123 choline-metabolising bacteria they isolated from wheat-field soils and tested in the greenhouse, the researchers chose 10 strains whose scab-suppression warranted further study under field conditions.

Spraying formulations of the bacteria onto plots of two commercial wheat cultivars, at the time of flowering, reduced severity of scab by as much as 63 per cent. That was close to the level of disease control attained with Folicur 3.6F, the only fungicide in the US that can currently be considered for use against scab on wheat.

A Pseudomonas species dubbed 'AS 64.4' proved to be the best all-around performer. But its future as the magic bullet against scab is unlikely. More realistic would be its combination with other scab-fighting microbes, including yeasts and antibiotic-secreting strains of bacteria that David's group previously identified and patented.

So why bother with the choline eaters, then?

"Because they have a different mode of action. Combining them with the other antagonists could result in a more uniform and higher level of activity against scab," explains David.

Mindful of that prospect, ARS has applied for a patent on the choline eaters.

Meanwhile, David's group is collaborating with a company seeking to develop one of the yeasts as a biopesticide. That could give growers another measure of insurance against scab outbreaks, which have cost billions of dollars in losses to wheat and barley growers across the globe.

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Plant pathologist David Schisler scores greenhouse wheat treated with microbial antagonists for symptoms of Fusarium head blight. (Photo: Crop Bioprotection Research)