

# Potato Growers

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and germinates well," said Kirk. The amount of lesions per leaf are high.

In 1995, outbreaks of late blight were controlled, despite humid weather in Michigan, according to Kirk. One reason is that even though rains came, they were short-lived and evaporated quickly, and the pathogen couldn't get started on the plants. "There was no duration of leaf wetness, lucky for us," noted Kirk.

Michigan growers took heed and listened to the reports prepared by the university. Most used various tools, including Blitecast, to plan their fungicide programs. Spraying began before the appearance of the fungus on the actual plant.

Fungicide programs that spread material uniformly and get the underside of the leaf are effective. The fungus attacks the leaves of the potato, creating a brown lesion. Tomatoes and hairy nightshade plants are also at risk. Gradually, the disease moves to the tubers, eventually causing them simply to rot and die.

The pathogen can overwinter in

the tuber. Kirk showed evidence that even in cull piles at freezing temperatures, deep in the piles the fungus survives. "Culled piles are dangerous," said Kirk.

Researchers know the fungus can survive freezing temperatures, but for how long? The temperature range at which the fungus survives is wide, from below freezing to temperatures at 85 degrees. "The temperature range is absolutely frightening," said Kirk. More work is needed on the temperature survivability of the pathogen, according to the researcher.

Kirk offered tips to ensure control of the disease. Growers should select cultivars that are resistant to blight. The seedstock used should be pathogen-free. Crop rotation helps, but it is important the grower inspects the stands regularly, after planting, and use forecasting tools such as Blitecast and Envirocaster.

According to the researcher, timing and correct application of fungicides is critical. Kirk reviewed the Michigan spray program and the effectiveness of various fungicide applications. In the trials, fungicide was applied at a

water rate of 50 gallons per acre at 100 psi in a seven-day preventive program.

"We have a saying in Scotland, 'If it's raining, it's a blight period,'" said Kirk.

Equipment and storage areas must be sanitized. Also, domestic gardens that neighbor a potato field can harbor the pathogen.

"We can't wait before bringing in the artillery," said Kirk. We must work to remove the stigma associated with having a late blight problem in the field, because if a grower has it, neighbors need to know. "Nothing is more important than knowing a neighbor has late blight," he said.

### Air Assist

Potato growers can "provide good fungicide coverage even with lower volume applications if you use the right size droplet and right techniques" said Dr. Richard Derksen, Cornell assistant professor of engineering and pest management, to those at the institute.

Any sprayer can put fungicide on the top of the leaves. But by switching to a flat-fan sprayer and using air assist technology, canopy coverage can extend to the bottom of the leaves while using less water volume.

The water droplet size is decreased and more uniform spread of active ingredient occurs. Even better application of fungicide is achieved with the use of electrostatic sprayers, which electrically "charge" the water droplets, which fasten readily to the plant surface.

While there is no "silver bullet" of application technology, growers have a choice and that choice can determine how to improve pest management.

The key to improved fungicide application may be the use of the air-assist spraying technology, which provides a "superior" means of obtaining good application results over conventional, hollow-cone, drop sprayers.

Derksen reviewed the results of various treatments that compared various nozzle types and spray methods to control Colorado potato beetle. The results indicated that as long as some material made it to the leaf, control of the beetle was



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sufficient and wasn't different from differing spray technologies.

With control of fungus, the electrostatic sprayers provided more droplets per square inch and were more efficient, "even using 1/7 the spray volume of conventional sprayer," according to Derksen.

Results of the trials provide "no easy answers," said the pesticide engineer.

In 1995, these trials looked at a combination of nozzle and spraying technologies. The results showed that applicators can reduce the amount of water used to get the same coverage more efficiently by using flat fans, which provided "more uniform coverage and higher coverage than flood" techniques.

One study compared the electrostatic spraying system (ESS) with drop spraying. The ESS trial covered one acre at 4.5 gallons per acre at 30 psi in 8-inch spacing. The drop spraying was done at 20 gallons per acre at 60 psi at 43-inch spacing. Results point to a 16 percent coverage efficiency using ESS over 7 percent with the drop sprayer. Using air assist, coverage improves to 36 percent, according to Derksen.

A Wisconsin grower found that, in early blight management, best coverage came with an air-assist rig applying water at 21.5 gallons per acre.

Overall, the frequency and timing of application is most important to control insects and fungus.



Dr. Willie Kirk spoke about the challenges Michigan growers faced in the past two years with late blight outbreaks.

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