

Preventing yield losses in potato from late blight outbreaks

The Situation

“Northeast Tomatoes Lost, and Potatoes May Follow” was the headline from the *New York Times* on July 28, 2009, describing how the tomato crop in the Northeast had been devastated by disease. In 2009, many gardeners and commercial farmers in the Northeast saw their entire crop of lovingly cared for tomatoes overcome with disease and rot on the vine, while the plants withered up and died. This disease, known as late blight, is caused by a fungus-like organism and was responsible for the Irish Potato Famine. It is devastating on both tomato and potato plants and once established there is very little that can be done to halt its progress. In 2009, late blight is thought to have started in tomato transplants and then spread from diseased tomato plants to tomato and potato plants in surrounding gardens and commercial fields. This disease can infect and kill plants within 10 days and the spores of pathogen can be carried in the air.

The disease outbreaks that occurred in the Northeast in 2009 were mainly due to a new strain of the late blight pathogen called US22. There was also an outbreak of late blight on potatoes in southeastern Idaho in 2009. Fortunately, it was limited to a couple of fields. However, what is worrying is that the strain responsible was identified as US22, suggesting that it also came from infected tomato plants, as it did in the Northeast. In 2010, late blight occurred at some level in many of the seed potato production regions across the US and Canada. In many areas the outbreaks were traced back to infected tomato plants.

The occurrence late blight and timing of its appearance is highly dependent on several factors including survival of the pathogen over the winter in infected potatoes, the weather, and fungicide use patterns by



Figure 1. Typical symptoms of late blight on a potato leaf and stem.

growers. Late blight epidemics in Idaho tend to be sporadic and do not occur every year. This is mainly because the dry climate of southern Idaho is not conducive to the survival and spread of late blight. In the past when late blight epidemics have occurred in Idaho the outbreak has been traced to infected seed potatoes which were imported from outside of Idaho. The emergence of new strains of late blight that are easily transmitted from tomato to potato is a troubling development as it means there is now a new potential source for late blight epidemics. As such, growers in areas where tomatoes are grown need to be extra vigilant for the presence of late blight in their fields.

Our Response

Dr. Phillip Wharton, Assistant Professor of Potato Pathology, prepared for the possible outbreak of the new strain US22 or other unknown strains of late blight by acquiring the ability to rapidly identify late

blight genotypes utilizing molecular techniques. In the spring of 2010 we worked with the Idaho Potato Commission (IPC) to produce a flyer, the "Tomato and Potato Late Blight Alert," for distribution to home owners and potato growers warning of the dangers of spreading late blight from infected tomato seedlings to commercial potato fields. The flyer advised what symptoms to look for on tomatoes, what to do if you found infected tomato seedlings and how to avoid getting and spreading late blight. The flyer was distributed electronically via email to IPC members and county educators. In spring 2010 and 2011 growers were also warned of the dangers of late blight through the publication of articles in trade magazines such as Potato Grower and via direct emails with the cooperation of the IPC and their mailing list.

We aggressively monitored disease submissions for late blight in 2010 and '11 and tested all potential late blight samples with late blight diagnostic test kits. All positive results were confirmed with conventional methods which involve growing the pathogen out on media and identifying it morphologically. Pest alerts were regularly sent to industry representatives and growers via the potato pathology twitter account "@potatodiseases," the Pacific Northwest Pest Alert Network website, and the Idaho Late Blight Hotline. These services enable us to keep the industry updated on confirmed outbreaks, permitting timely applications of fungicides to contain outbreaks and prevent further spread of an epidemic. In 2010, there were no reported outbreaks of late blight in Idaho. However, in late August 2011, late blight was confirmed on tomato plants from a home garden in Preston, ID. This outbreak was close to a late blight outbreak in a commercial potato growers fields in Northern Utah which was also confirmed by Dr. Wharton. Unfortunately for the grower by the time the outbreak was detected it was widespread throughout several potato fields and the crops had to be destroyed to prevent the spread of the disease to surrounding healthy fields. Fortunately, there were no other potato growers in the immediate area and it was close to harvest so most potato fields had already been vine killed. Those growers who were not vine-killing were personally alerted to the fact that they should apply protective fungicide sprays to protect their crops. It is not known whether this outbreak in the potato grower's fields originated from the infected tomatoes in the homeowners garden or if the tomatoes were infected by late blight spores which blew in from the infected potato fields in Northern Utah.

Program Outcomes

Early warnings via the Idaho Potato Conference in January 2011 and articles in trade publications warning of the potential of late blight being present in potato seed stocks lead to many growers using fungicide seed treatments to prevent late blight and to incorporate late blight fungicides in

their foliar disease management programs.

- Training of growers, crop consultants and field men resulted in increased awareness of the need and importance of scouting for late blight in potato fields in Idaho. This led to the submission of more potential late blight disease samples in 2010 and 2011 and the submission of diseased potato and tomato samples in August 2011. This led to a positive late blight diagnosis. Early detection of the disease enabled rapid counter measures and limited spread of the disease to surrounding potato growing areas.
- Fungicide spray trials for late blight control are being conducted in northern Idaho in an isolated location away from any potato growing areas to determine the efficacy of current and new fungicides for the control of late blight and to determine the best management techniques to prevent the outbreak of the disease in potatoes.
- Trials are being conducted in cooperation with the USDA potato breeding program in Aberdeen to develop new potato cultivars that are resistant to late blight.

FOR MORE INFORMATION

Dr. Phillip Wharton, Potato Pathologist
Aberdeen Research and Extension Center
1693 S 2700 W
Aberdeen, ID 83210
Phone: 208.397.4181
Fax: 208.397.4311
E-mail: pwharton@uidaho.edu

Dr. Phillip Nolte, Seed Potato Specialist
University of Idaho Extension
Idaho Falls R & E Center
1776 Science Center Dr. TAB Suite 205
Idaho Falls, ID 83402
E-mail: pnolte@uidaho.edu
Phone: 208.529.8376
Fax: 208-522-2954