

Fungicides Protect Potatoes from a Disease that Caused the Death of Millions

U.S. Pesticide Benefits Case Study No. 21, May 2011

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The pathogen *Phytophthora infestans* causes a disease known as “late blight,” so named because in most sections of the country it attacks potato plants at or after the blossoming stage [1].

Following infection, the fungus grows within plant tissues, breaking down cell walls so that it can use the nutrients found within them. In the field, severely affected plants have an acrid odor which is the result of dying potato tissue. The disease spreads rapidly, with the result that all the plants in a field may be killed in a few days [1]. On a tuber, the fungus spreads irregularly from the surface through the flesh like the diffusion of a brown stain. An effect of the disease in storage is the wet rot phase, which is due to the invasion of secondary bacteria following late blight development. This phase develops rapidly and causes a very wet, soft, or slimy and foul smelling rot [2].

Late blight was first reported in the United States in Philadelphia in 1843, and subsequently spread throughout the country [3]. Late blight was reported in Europe in 1845 where it had spread to Belgium, England, and Ireland. Irish peasants subsisted almost entirely on potatoes. 40% of the Irish potato crop was destroyed by late blight in 1845 and almost 100% destruction occurred in 1846 [4]. An estimated 1.5 million Irish died of famine and disease during the late blight epidemic, and a similar number of people emigrated, mainly to North America [5].

Late blight continued to be a devastating disease until the 1880s when the first fungicide was discovered. A summary of twenty years of experimental data in Vermont (1890-1910) showed an average increase in potato yield of 64% with the use of copper-lime fungicides [6]. Research with synthetic chemical fungicides in the 1940s showed potato yield increases of 23% and 35% in comparison to the copper-lime fungicides for control of late blight [7],[8]

References

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Late blight infection in potato field



Late blight lesions consist of brown, granular, rotted tissue



Gleaning potato field after harvest during the Irish potato famine