

Poverty a factor in potato blight's return

by Marcia Merry

There is bad news from the world of food pests. The same fungus responsible for the extensive potato blight that swept Europe and parts of North America in the 1840s, *Phytophthora infestans*, has been found to be present in a new type (called the "A 2" mating type) in many parts of the world, as of the early 1990s. Plant pathologists and agronomists are now working around the globe to confirm the extent and characteristics of new populations of the infestation, which also afflicts tomatoes, to study its spread and relative susceptibility to various means of control and eradication.

The good news is that there are effective fungicides, although the chemical perhaps most commonly in use, met-alaxyl, may not be effective. And it is to be expected that there are cultivars of the potato with resistance to even the new type of blight, from which hybrids can be developed and introduced.

However, it was poverty, not simply a food pest, that caused the arrival of potato blight in Ireland in the 1840s to result in mass famine in 1845-46. Tragically, the very same factors are present today in many parts of the world—in particular, eastern Europe, former Soviet Asia, parts of China, India, Africa, and South America.

The key factors in famine are subsistence diet and monoculture. Under British economic policy, the Irish population in the 1840s was subsisting on a diet based on daily potato rations, and little else, save some occasional milk and perhaps some meat once a week. Moreover, the household's potato supply commonly came from their own little plot. When the blight swept through, there were no substitute food items available to the family, and moreover, there was no capability to switch crops in this nationwide subsistence monoculture system.

If we look today for the same factors predisposing peoples to famine—the arrival of the pest, and the presence of subsistence diet and monoculture—we see that the preconditions exist for terrible famine. Only emergency measures to 1) provide pest control and food relief; and 2) to restore healthy economies and the ability to eat well to the human race, will end the threat.

First, look at the potato growing areas of the world, in particular the dependency on the potato in eastern Europe

and Russia; and secondly, at the pathology and extent of migration of the A 2 mating type of *P. infestans*.

The world output of the common "white" or "Irish" potato (*Solanum tuberosum*) averages, as of the mid-1980s, over 300 million metric tons a year. It originated in the Andes highlands of Peru, and since the 1500s, spread over the centuries all around the globe.

By "farm weight" of commodity, the relative importance of Irish potatoes today can be seen by comparing the annual 300 million ton output to 510 million tons of wheat produced worldwide, 470 million tons of rice, and 480 million tons of corn. Thus in weight, the potato ranks fourth after the staple grains.

While, in contrast to the grains, the potato has a lot of water content, in turn, the potato needs no milling or complicated baking or processing to be edible.

The potato belt

By far the world's most concentrated regional output is the "potato belt" extending along the north European plain well into Russia. Of the annual world output, the former Soviet Union region accounts for up to 28%. Poland alone accounts for 12%. Moreover, in Russia, over 90% of the potato crop is produced today on private plots, not on collectives or state farms. Much of this mode of production and dietary predominance is exactly counterpart to 1840s Ireland. If the newly discovered type of *P. infestans* is not countered, the results could be catastrophic.

P. infestans affects the potato plant by causing a late blight on the leaves and stems, and causes the infected tubers to turn brownish purple outside, with a corky rot inside. Scientists think that the fungus originated in the Mexican highlands, where there is a great variety of wild potatoes, particularly in the Toluca Valley. The 1840s saw the first major migration of *P. infestans*. It is thought that the type of *P. infestans*, which can reproduce both asexually and sexually, was A 1, which travelled the globe in the 19th century. Up until the early 1980s, tests at points around the world found the A 1 type exclusively present.

Then, more recent tests began to show that another type, A 2, has embarked on a new migration, also from Mexico, where it had been known, but apparently restricted to the Mexican habitat. The danger now is that the A 2 type may bring more virulent forms of the blight.

Dr. William Fry of Cornell University warned in an article (*Plant Disease*, July 1993): "The 1984 report of A 2 mating types of *P. infestans* (Mont.) de Bary in western Europe was the first indication of new and dramatic developments in populations of that fungus." He advocated across-the-board action, saying, "Studies of the epidemiology of A 1 and A 2 isolates are in progress in Europe. . . . Cultivar resistances and fungicides effective against the old population [of *P. infestans* A 1] should be evaluated against the new populations."