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Integrated control of Potato Late Blight
in the Nordic and Baltic Countries

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Changes of late blight attack in conventional fields in the Nordic countries

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After introduction of A2 mating type and the new plight population in the Nordic countries during 1990s there has been discussion on the impact of the new population to the onset of blight outbreaks and the course of blight epidemics. Several exceptionally early blight outbreaks have been reported from all Nordic countries especially when the beginning of growing season has been rainy.

In Finland changes in the incidence and onset of potato late-blight epidemics were investigated and compared to possible changes in climate, presence of soil-borne inoculum, and aggressiveness of the blight population. Datasets were constructed from leaf blight assessments of untreated plots at eight experimental sites of fungicide efficacy and potato variety trials that took place during the periods 1933–1962 and 1983–2002. Additional data were obtained from late-blight monitoring projects carried out from 1991 to 2002.

From 1998 to 2002, the risk of blight outbreak was 17-fold compared to the periods 1933–62 and 1983–1997. Simultaneously, the outbreaks of the epidemics began two to four weeks earlier. The changes observed were associated with a climate more conducive to blight in the late 1990s. Lack of rotation also advanced blight epidemics by an average of nine days in 1998–2002, but it did not have this effect in 1992–1997. This suggests that soil-borne inoculum was not a significant threat to potato until the late 1990s. Earlier attacks in short crop rotations have also been reported in Denmark.

The aggressiveness of the *P. infestans* strains seemed to have only a minor effect on the onset of the epidemics after 1991, as the Apparent Infection Rate remained unchanged despite of weather conditions more favourable to blight in the late 1990s. As a consequence of the more frequent and earlier epidemics, the sales of fungicides used against late blight increased four-fold from the 1980s to 2002.

In Sweden, Norway and Denmark late-blight occurs every year in potato crops, although the time of onset and the severity of the epidemic vary from one year to the next. This is generally because weather conditions are critical in the development of this disease. It is difficult to quantify and distinguish between the effects of weather on the one hand and the incidence of 'new' late-blight fungal strains on the other. In addition to these two factors (the weather and the biology and adaptability of the new *Phytophthora infestans*) a number of other factors influence late-blight attack.

In 1949, a working group was established in Sweden to advise farmers on how to control potato late-blight, at that time 'undoubtedly the most serious disease of potatoes'. During the 1950s and 1960s, more effective fungicides were developed and copper compounds were replaced by maneb and mancozeb, but severe outbreaks still occurred, e.g. in 1958, 1960 and 1961.

In Scania in southernmost Sweden, around July 20 was the normal date for appearance of the first late-blight in food potato crops (Bintje) during the 1960s, 1970s

and 1980s. This date has now been moved forward due to earlier inoculum from early potatoes. In addition, the growing period is today probably 1-2 weeks longer than previously, which means that the time to become aware of late-blight is now longer and the modern consultants and farmers are perhaps more familiar with the disease.

A European network for development of an integrated control strategy of potato late-blight required countries to record the date of the first outbreaks of late-blight. In Sweden, date of onset was mid- to late May during the period 1997-2005, with all cases being recorded in polythene-covered early potatoes. The source of inoculum for these first outbreaks might be infested seed, volunteer plants or oospores. In southern Sweden, early potatoes are grown year after year on the same field. During the past two decades more and more of these early potato crops have been covered, which has promoted early outbreaks and probably the spread of spores to neighbouring regions.

Tuber quality is very important and tuber blight is the ultimate outcome of late-blight. Just as late-blight in foliage demands specific weather conditions, tuber blight also has its demands, e.g. rain at the right moment to make it possible for the zoospores to swim to the tubers. Even very low attacks of late-blight can result in surprisingly high tuber blight attacks. However, in a longer-term perspective, tuber blight is probably not as serious nowadays as it was in previous decades.

In Denmark there are strong indications that oospores play a role in conventional potato growing. The discussion about the practical implication of soil infection is intensive and on-going among advisers and farmers. Early attacks have been observed since 1997. The worst cases were in 2005, when for the period of 8-12th June there were reported more than 20 fields with an early infection. In some cases more than 25% of the plants in several hectares were infected. When looking closer at the fields it was noticed that all the fields had been grown with potatoes in 2001, and this is considered to be a normal and acceptable crop rotation. In 2004 there was no early infection in the fields that had been grown with potatoes in 2001, and in 2005 there was no early phytoftera infection in the fields grown with potatoes in 2002.

In Norway also oospores are commonly found. No shift towards earlier epidemics has been obvious probably due to relatively good crop rotations.

References

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