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

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Oospore biology in the Nordic countries: Facts, hypothesis and anecdotes

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The migration of the A2 mating type of *Phytophthora infestans* and new blight populations into Europe in 1980s raised serious questions: Are oospores formed in the potato crop? Can they survive in soil? Can they infect following potato crops? What is their impact on late blight epidemiology?

Surveys carried out in Denmark, Finland, Norway and Sweden from early 1990s to 2003 have revealed that both mating types are present in all countries, both mating types can be found at same field, same plant, same leaf and same leaflet. The proportion of A1/A2 in blight population has varied between countries over time while in the latest survey in 2003 the proportion was close to 50/50 in each country indicating high probability of oospore formation in potato fields. Studies at the second half of 1990s and early 2000s showed that oospores can be found in leaves, stems and stolons of blighted potato under natural field conditions. It has also been shown that oospores can stay alive in soil up to four years under Nordic conditions.

The hypothesis that oospores can infect potato and act as a primary source of inoculum still lacks full direct evidence. However, plenty of circumstantial evidence to support the hypothesis has been gathered from each of the four countries. First indications of oospore-derived infections were reported from Uppsala in Sweden. In 1996 early and severe blight outbreaks were observed on experimental plots that overlapped plots which were heavily infested by blight in 1994. Both mating types were harvested from blight lesions and also oospores were later found in potato plants from the field. In the years to come numerous cases of disease foci appearing relatively early in potato fields where late-blight had occurred previous years were observed in all four countries. In these foci primary lesions often appear on the lowest leaves touching the ground. Mother tubers on the infected plants were free from visible tuber blight symptoms. Both mating types have been found in these foci at an early stage. There are also studies where soil collected from these types of foci has caused infections in a bioassay. Also, genotypic studies have given further support to the hypothesis that oospores serves as primary inoculum. Especially in Southern Sweden and Denmark it is rather common to find extremely severely blight infected plants soon after emergence. Also in these cases mother tuber have usually been healthy. In Denmark and Finland there are data that shows considerable earlier blight outbreaks in short crop rotations compared to long rotations.

In many other European countries A2-mating type is lacking or relatively rare in population. Therefore oospores and soil-derived epidemics currently seem to be somewhat specific for Nordic countries.