

# *Aphanomyces* i odlarprov vid betleverans

SBU projektkod 2004-1-1-411

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## ***Aphanomyces* i odlarprov vid betleverans**

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**4/2001 *Aphanomyces cochlioides* orsakar rotbrand på sockerbeter**

**3/2002 Resultat från odlarprover 2001 – rotbrand på sockerbeter**

**1/2003 Kartläggning av rotbrand 2002**

**Se även bilaga som presenterades som en poster på IIRB 67<sup>th</sup> Congress i Bryssel den 11-12 februari 2004**

# Geographic distribution of the soilborne fungus *Aphanomyces cochlioides* in Sweden

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## Introduction

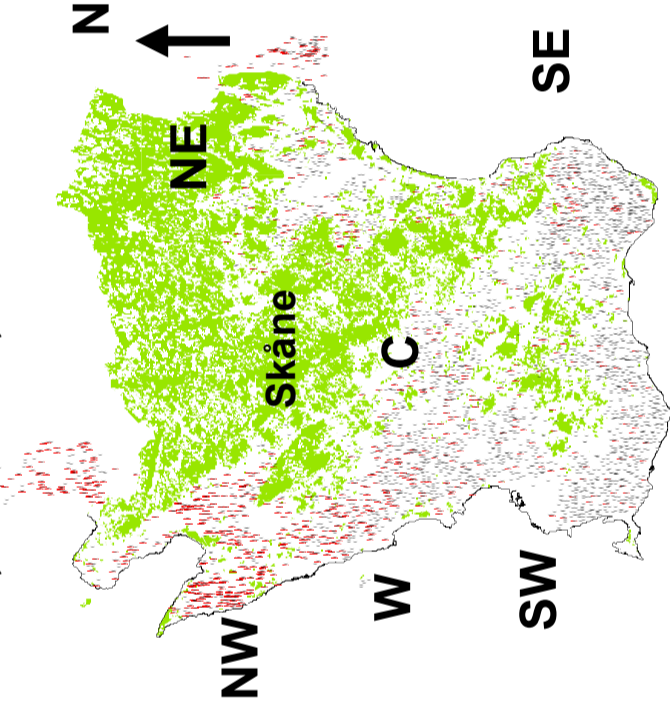
This study was started in 2000 as a first introductory investigation to see if there are regional differences in the number of farms where chronic root rot caused by *Aphanomyces cochlioides* occur in Skåne in the south of Sweden. The investigation was repeated 2001 and 2002.

*Aphanomyces cochlioides* is a water mold fungus that is particularly fond of warm and wet soil. The fungus infect sugar beet roots by swimming zoospores. Infected roots become brown and water soaked. Severe infections may lead to complete rot of the entire hypocotyl as well as of the cotyledons. Early attacks may thus result in substantial plant loss or surviving plants with various degrees of root deformation (chronic root rot). Later attacks reduce growth. The fungus overwinters by sexually produced oospores that may persist in soil for almost 20 years. Damping-off can also be caused by *Pythium* spp. In contrast to *A. cochlioides*, *Pythium* spp. prefers cold soil and often attack the plants very early during the seedling stage. *Pythium* damping-off is often the cause of substantial plant loss. In general, *A. cochlioides* is by far the most common fungi causing damping-off and chronic root rot in Sweden (L. Persson, SBU, pers. comm.).



Above: in warm an wet soil *Aphanomyces* damping-off may lead to substantial plant loss.

Left: Seedling with severe root rot.



- All registered beet growing farms 2002
- Farms with strong infestations

## Materials and methods

During the period 2000 - 2002, samples from sugar beet deliveries from commercial cultivations in Sweden were evaluated for the occurrence of beets with typical symptoms of *Aphanomyces* root rot; a severely deformed tap root with a typical constriction below the beet head. The evaluations were carried out at the central tare house in Örtofta sugar beet factory during the harvest period from September to January each year (2000; November – January). Each sample (comprised of around 20 kg sugar beets) was classified into one of three groups: 1. samples with more than one strongly infected beet, 2. samples with not more than one strongly infected beet and 3. samples with healthy beets.

Samples were then associated with farms and each farm was plotted on a digital map with the help of geographical coordinates (X, Y; RT90) and the computer software ARCVIEW. The percentage of farms with samples in category one and two taken together was calculated.



## Results and discussion

During 2001 and 2002, around 50,000 samples from beet deliveries were investigated each year. In 2001, 13% of the farms had at least one sample which contained beets with chronic symptoms of root rot. In 2002, this number of farms was almost 50%.

There are clear differences between the regions in the percentag of farms which had delivered samples with more or less deformed roots. In both years, the lowest percentag of farms was found in the southwest and southeast of Skåne. The highest percentag of farms was in 2001 found in the northeast, northwest and central Skåne and in 2002 in the northwest of Skåne.

The geographical structure in the distribution of the disease may be partly explained by differences in climatic factors between the regions. The northwestern part of Skåne receives significantly more rain than other regions. Other parameters such as the soils geological origins, mineralogical composition or ability to suppress disease by microbiological antagonists may also explain the observed geographical pattern. A research programme aimed at investigating the different factors that may contribute to the observed geographical pattern has recently been started in Sweden.

Percentag of farms with chronic root rot in samples from beet deliveries

Region	2001	2002
NW	23.8	85.6
W	12.0	64.0
SW	3.5	34.1
SE	3.4	33.7
NE	26.4	52.3
C	23.6	45.8
Total:	13.0	44.0

## Conclusions

- The occurrence of chronic root rot is geographically structured
- Chronic root rot occur frequently in northwestern Skåne, but seldom in the southwest
- Disease development is probably dependent on climate as well as the geological origin of the soils