



NJF-Seminar 386

**Potato seed: Physiological age, diseases and
variety testing in the Nordic countries**

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Ongoing research of *Rhizoctonia*

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Rhizoctonia solani, soil-borne pathogenic fungus, causes stem canker and black scurf –disease on potato. It is common problem in potato production worldwide, but especially in areas with low temperature. It is associated to tuber size distribution, reducing effect on stem and tuber number, yield and starch content. Main goals of study on *Rhizoctonia* were: to describe the way of infection in different stages, to identify and characterize *Rhizoctonia* races, to study infection-induced changes in the gene expression of *R. solani* and potato, and to determine the relative importance of infested seed, soil qualities and variety to the disease development.

Rhizoctonia study was started by University of Helsinki in 2003. Three full time researchers are involved in research: post graduate students Paavo Ahvenniemi and Mari Lehtonen and post doctoral researcher Paula Wilson. Study is supervised by professor Jari Valkonen.

The basic configuration in agronomical part of study is very practical. Seed tubers of Saturna and Van Gogh were graded according to black scurf coverage on tubers. Five classes were used: similar classification what NAK is using, where first class (0) represents totally free from black scurf spots. Seed lot of tubers totally free from *Rhizoctonia* and in addition sterilized by 1 % sodium hypochloride was used as control.

Farming strategies were studied by growing above mentioned seed material of different degrees of black scurf on soil with monocultural potato history and on organically farmed soil with profound rotation. Stem canker, stem number, tuber number, yield, starch content, black scurf cover, green tubers, deformed tubers, brown center, hollow heart and growth cracks have been measured. In addition, cooking quality; appearance, dryness, darkening, stickiness, hardness, colour and evenness of colour has been measured. Stem cancer was increased, whereas stem and tuber number, yield and starch content decreased with increasing black scurf scores in seed tubers. Also most quality defects increased, especially amount of green and disformed tubers.

Commercial biological antagonist, *Trichoderma harzianum* has been studied as well. It showed some antagonistic response in pot trial, but the effect was severely diminished in field. Biological diversity and level of pathogenicity was studied by collecting *Rhizoctonia* isolates from infected potato samples (stems and tubers) all over the country, altogether 500 samples. Anastomosis group of isolates was determined by comparing ITS-regions of DNA. About 98 % of strains belonged to AG 3.

Final results are expected to be ready during this year. In seed regulations, accepted black scurf infection will be re-evaluated. Instructions for instance concerning chemical haulm killing and presprouting are already reconsidered. Study is financed by ministry of agriculture, but exceptionally large founding from food industry, seed companies, agrochemical business, potato packing companies, starch industry has been involved.