



NJF Seminar No 352

## **PLANT PROTECTION IN SUSTAINABLE STRAWBERRY PRODUCTION**

Honne, Biri (Norway)  
5-6 November 2003



Poster

## HEATING OF STRAWBERRY PLANTS FOR ELIMINATION OF STRAWBERRY TARSONEMID MITE – POSSIBILITIES AND RISKS

**Tuomo Tuovinen\*, Isa Lindqvist\* & Saira Karhu\*\***

\*Agrifood Research Finland, Plant Production Research, Jokioinen, Finland

\*\*Agrifood Research Finland, Plant Production Research, Piikkiö, Finland

Correspondence to: [tuomo.tuovinen@mtt.fi](mailto:tuomo.tuovinen@mtt.fi)

Hot water treatment of strawberry runners was applied already in the 1950's to control strawberry tarsonemid mite *Phytonemus pallidus* ssp. *fragariae* and leaf nematodes *Aphelenchoides* spp. The method was never adopted as an essential part of the production of planting materials, partly due to endosulfan, a pesticide which effectively controlled tarsonemid mites. In Finland, use of endosulfan is now strictly restricted in healthy plant production and effective other control methods are badly needed. Recently, in Norway, hot humid air treatment has been used to disinfect planting materials, and those treatments are believed to control tarsonemid mites, too.

We treated strawberry runner cuttings, cold stored potted and bare rooted runner plants, and potted runner plants in a growing chamber for 30-90 minutes in humid 40-46°C temperatures. The aim of the study was to find out combinations of temperature and time to achieve 100 % mortality of tarsonemid mites without damaging the plants. Temperature was measured in the air by the chamber's thermometer and near the crowns by a temperature data logger. The effect of the treatments on mites was observed after each treatment and 1-2 weeks later from young, unopened leaves. Part of the tests included planting of the treated plants either in a glasshouse or in the field to observe the effect of treatments on plant vigour and yield components; these effects were compared with a standard hot water treatment (8-10 min. in 46 °C).

After technical improvements the chamber's temperature was steady at  $\pm 0.5$  °C and Rh between 80-100 %. Preliminary tests indicated that plants were often injured at temperatures over 44 °C. Tests with different time/temperature combinations on potted runner plants showed that half an hour warming up plus 42 min treatment at 43 °C killed all mites. Immediately after treatment plants were cooled for two hours at + 8 °C. The treatment slightly injured the outer leaves, which partly turned brown, but it had no serious effect on plant vigour. Both hot air, 42-43 °C, and hot water, 46 °C, treatments reduced numbers of flowers and runners of the bare-rooted cold stored plants but the reduction was less in the potted cold stored plants.

The hot water technique is effective and safe for cut runners when carefully applied. Although the growing chamber applied in this study was not adequate for practical purposes, the study demonstrated that the hot air treatment can be used for potted fresh plants to get rid of strawberry tarsonemid mite. The detrimental effect of the hot air and hot water treatments on yield of the bare-rooted cold stored plants in the planting year restricts the treatments of frigo plants. Studies on the effect of the treatments on different plant types and varieties as well as technical developments are needed before the method can be recommended in practice.

*This poster has previously been presented at the NJF 22<sup>th</sup> Congress, July 1 to 4, Turku, Finland*