

# DEVELOPMENT OF A SCREENING METHOD FOR RESISTANCE TO *PHYTOPHTHORA CACTORUM*

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## Summary

In The Netherlands the fungus *Phytophthora cactorum*, which causes crown rot in strawberry plants, has become a problem. Because of high losses of plants and the difficulty of chemical control, resistant cultivars are wanted. Therefore we wish to develop an efficient, reliable and fast screening method, which can be used for breeding and for determining the Value for Cultivation and Use (VCU) with regard to Plant Variety Rights..

In previous research cultivars were screened by a "crown-test", which is destructive, inaccurate and very laborious. So a new method was developed using a hydroponic system (NFT). Runners of different cultivars were planted out in rockwool plugs, followed by artificial inoculation of the NFT system with a spore suspension of *P. cactorum*. The resistance level was determined by the period between infection and plant death.

Large differences in resistance between cultivars were found. Susceptible cultivars started dying ten days after infection. Highly resistant cultivars were still apparently healthy after 90 days. Results corresponded well with earlier experiences. The test proved to be sufficiently accurate for testing cultivars.

## 1. Introduction

*Phytophthora cactorum* occurs on strawberry in fields as well as in greenhouses and is reported in many countries (Vlasveld, 1968; van der Scheer, 1973; Seemüller, 1977; Gooding *et al.*, 1981; Harris and Stickles, 1981; Pettitt and Pegg, 1994). The normally used "crown test" (van der Scheer, 1973; Seemüller, 1977), in which the wounded crowns of strawberries are inoculated with a mycelium disk, is laborious, inaccurate and destructive. Therefore a new test was desired. New cultivation methods, like growing strawberries on nutrient solution recycling systems in greenhouses create ideal opportunities for epidemic development of *P. cactorum* (Jamart *et al.*, 1985; Stanghellini and Rasmussen, 1994), so we developed a test system for cultivars on a recycling NFT system with artificial infestation.

## 2. Materials and methods

A mixture of zoospores of four different isolates was added to a hydroponic system in the greenhouse in which strawberry plants were growing. To control algal growth Agral (250 g/L a.i. nonylfenolpolyglycoether) was added, up to a concentration of 0.005%. The assay was carried out with the highly susceptible cultivars Tamella and Avanta, the moderately susceptible cultivars Elsanta and Karina and the rather resistant cultivars Lambada, Senga Sengana, Bogota and Redgauntlet. On the fourth of August 1994, runner plants grown in a greenhouse free from soil, were planted in 2 x 2 x 4 cm rockwool plugs and rooted under a mist spray. On the 29th of August 25 plants per cultivar were placed on a NFT recycling system containing about 2000 L in a greenhouse. The day/night temperature was adjusted at 18/13°C. Inoculation of the nutrient solution took place on the seventh of November 1994. In this experiment, which was carried out as a randomized complete block design, the period between infestation and plant death was recorded.

## 3. Results and discussion

Ten days after infestation the first plants of susceptible cultivars (Avanta and Tamella) died. Ninety days after infestation almost all plants of the susceptible cultivars were dead, while of the more resistant cultivars only a few plants died (Figure 1). After slicing the crowns of the surviving plants hardly any symptoms of infection were found in the cultivars Redgauntlet and Bogota. The assay as described here is still destructive as the disease may remain latent in plants that look healthy. It also takes quite a long time to evaluate but the test is accurate and so suitable for screening strawberry genotypes for their resistance against *P. cactorum*.

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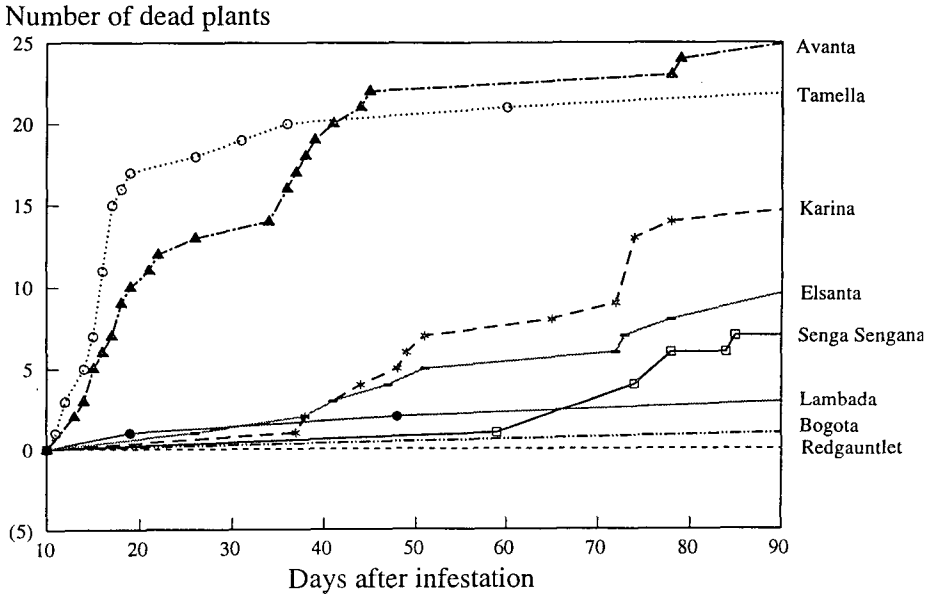


Figure 1. Number of dead strawberry plants out of 25, on the NFT system infected with *Phytophthora cactorum*.