



Alternative measures to control replant disease in apple orchards in the Netherlands

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Introduction

- In the Netherlands chemical soil fumigation (metam sodium) is the standard method to control replant disease in apple orchards on sandy soils.
- This disease is mainly caused by the root-lesion nematode *Pratylenchus penetrans*.
- The negative impact of chemical control on the environment and ground water makes the development of alternative control measures necessary.

Research

- In 2007 a project was started to test alternative and biological treatments. The trials were carried out in an orchard where the apple trees were removed due to severe *Pratylenchus penetrans* infestations.
- The trial consisted of the following (soil) treatments:
 - Growing of marigold (*Tagetes patula*);
 - Growing of marigold followed by Anaerobic Biological Soil Disinfestation (ABSD);
 - Growing of black oat (*Avena strigosa*) followed by 'late' ABSD;
 - Growing of a biofumigation crop, Indian Mustard (*Brassica juncea*);
 - Compost (50 tons/ha);
 - Black fallow (control);
 - Chemical Soil Disinfestation (metam sodium; control).
- The trial was carried out in 5 replicates.



Figure 1: overview experimental site and anaerobic biological soil disinfestation.

- After the treatments the plots were replanted with apple trees (cultivars 'Elstar' and 'Boskoop').



Figures 2-5: (2) Marigold (*Tagetes patula*); (3) Biofumigation crop (*Brassica juncea*); (4) Chemical soil disinfestation; (5) Black oat (*Avena strigosa*).

Results – *Pratylenchus*

- The CSD, ABSD and Marigold were very effective in controlling the *Pratylenchus penetrans* populations.
- The biofumigation enhanced the nematode numbers.

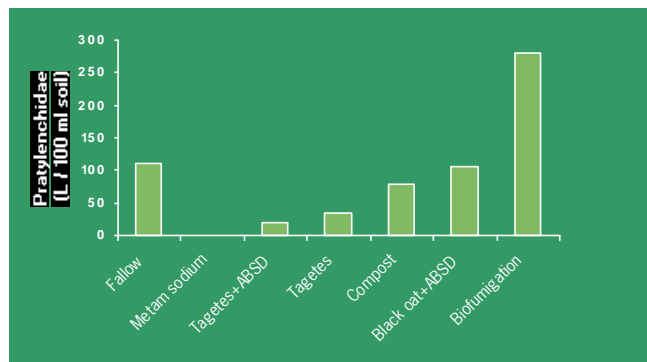


Figure 6: average number of *Pratylenchidae* after treatments.

Results – growth & production

- First results – second growth year - showed that the apple trees in the CSD treatment grew (too) vigorously, with a possible negative effect on flower bud formation.
- The trees in the marigold and ABSD treatments grew moderately and satisfactorily, according to the fruit growers.
- The tree growth was poor in the fallow, compost, and biofumigation treatments.
- In the following years the growth and production of the trees will be evaluated.