11:00

THE FORMABLE SOIL: DISEASE SUPPRESSIVE SUBSTRATES IN HORTICULTURE

A.W.G. VAN DER WURFF, M.A. VAN SLOOTEN and M.A. STREMINSKA
Wageningen UR Greenhouse Horticulture
Violierenweg 1, NL-2665 MV Bleiswijk, The Netherlands
E-mail: andre.vanderwurff@wur.nl

Greenhouse horticulture is confronted with an increased limitation on the use of biocides. This is the result of a complex of processes such as unwanted emission of chemicals to the environment; an increased public demand for horticultural products without chemical residues; substantial costs and time involved to authorise new means of crop protection. An alternative to chemical control is to learn from nature, i.e., what could we learn from nature to prevent outbreaks of soil borne plant pathogens? In a previous experiment, soils originating from fourteen greenhouse horticultural companies and an experimental field were assessed with aid of bio-assays for the level of disease suppressiveness of three major pathogens of vegetables and flowers, namely the root knot nematode *Meloidogyne incognita, Pythium aphanidermatum* and *Verticillium dahliae* (Van der Wurff *et al.*, 2011). The experimental field had a well-documented history of disease suppressiveness and was used as a reference. Prior to the bio-assay experiment, for each soil, sixty-one parameters were determined of which thirty-seven had a chemical and/or physical character, and twenty-four a biological nature. With aid of multiple regression analyses, models were constructed that significantly explained an increase in disease suppressiveness within these soils. For *Meloidogyne*, measured as the number of juveniles per gram roots, the model explained 92% of the variance within the dataset. Bicarbonate content, the fraction of particles smaller than 0.016 mm, chloride and organic matter contributed significantly to the level of soil suppressiveness. For *Pythium* and *Verticillium*, the models explained respectively 94% and 95% of the variance within the data set. The fraction of antagonists, respiration rate, bacterial biomass and active fungi, sodium and extractable magnesium oxide contributed significantly to the level of suppression of *Pythium*. For *Verticillium*, fungal biomass and nitrate were significant. Subsequently, for both *M. incognita* and *P. aphanidermatum*, bio-assays were used in a second experiment to test the obtained models. The results show that soil suppressiveness can be artificially enhanced when taking into account the complex nature of soil disease suppressiveness. The results are discussed in the context of designing disease suppressive growing media for horticulture.

Wurff, A.W.G. van der, Slooten, M.A. van, Hamelink, R., Bohne, S., Wensveen, W. van, 2011. Soil suppressiveness towards Meloidogyne, Verticillium or Pythium in greenhouse horticulture. Acta Horticulturae 915:141-149.

Key words: *Verticillium, Pythium, Meloidogyne*, growing media, horticulture