SESSIE 2 A

Soil suppressiveness of Meloidogyne, Verticillium and Pythium in diverse agricultural soils: possible mechanisms, and options for sustainable management

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Soils originating from fourteen greenhouse horticultural companies were assessed in bio-assays for suppressiveness against major pathogens of vegetables and flowers, namely the root knot nematode *Meloidogyne incognita, Pythium aphanidermatum* and *Verticillium dahliae.* As controls, three well-documented soils in terms of disease suppressiveness (Os *etal.*, 2008) and coarse sand were included for each pathogen. In total 5640 bio-assays were examined.
Soils were homogenized by sieving and distributed over three treatments with each 40 replicates according to a random block design under standardized conditions. Each soil was sterilized by -radiation in order to asses the contribution of abiotic properties to disease suppressiveness. Non-sterilized soils served as a measure of abiotic- and biotic factors; and soil without the addition of pathogens served as a control to determine back-ground contamination of indigenous pathogens.
Soils were acclimatized for one week. Afterwards, irrigation was started and pathogens were inoculated. Survival stages of *V. dahliae* or *P. aphanidermatum* were added as pure suspensions, *i.e.*, microsclerotia or oospores. For *Meloidogyne*, second stadium larvae (12) were used. Seedlings were planted for *M. incognita,* while for *P. aphanidermatum* and *V. dahliae,* seeds were used according to Schreuders & Wurff (2009). Experimental time frame varied from six weeks for *P. aphanidermatum* till almost five months for *V. dahliae.*
A large variation in the level of suppressiveness was observed mainly attributed to biological

soil characteristics and bacteria. The impact of physical- and chemical- *versus* biological features of soils on each pathogen is discussed based on multivariate analyses of more than 50 soil parameters, ranging from nutrients, pore space, organic matter identity, soil classifications, to measures of biological activity, bacterial-, fungal- en nematode biomass, antagonists, actinomycetes as well as nematode- and bacterial communities. The results provide a framework in which suppressiveness can be classified according to soil type and -biota depending on the pathogen. This framework will be used in ongoing research to test hypotheses for sustainable and integrated soil management in which mechanisms of suppressiveness are stimulated.

References

Schreuders H & Wurff AWG van der (2009) Optimaliseren van biotoetsen voor het meten van bodemweerbaarheid van *Verticillium dahliae* en *Pythium* spp. Gewasbescherming 40:256.

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