Non-chemical alternatives for soil fumigation in greenhouse-grown lettuce

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Abstract

Due to intensive management, soils of Belgian lettuce greenhouses are exhausted and very conducive to soilborne pathogens. As a result, lettuce often shows symptoms of basal rot, i.e. rotting of the leaves in contact with soil. Several pathogens are known to cause rotting of the basal leaves of lettuce. The most important fungal pathogens are *Sclerotinia* spp., *Rhizoctonia solani*, *Botrytis cinerea* and *Pythium* spp. The first three are able to produce sclerotia, by which they can survive in soil for many years. The control of soilborne pathogens in Belgian lettuce greenhouses still mainly relies on chemical control. Usually a lettuce greenhouse is fumigated yearly or two-yearly with chemical fumigants. Next to fumigants, fungicides are frequently used to prevent infection. In this presentation potential non-chemical alternatives for soil fumigations are discussed. A first strategy investigated is non-chemical soil disinfestation. Two methods were evaluated in a field trial: steaming by a steam injector at two different running speeds and biological soil disinfestation with Herbie 22 and Herbie 25. The effect on survival of *R. solani* AG1-1B and *S. sclerotiorum* sclerotia, disease severity and crop weight was compared. Another strategy explored is the stimulation of soil suppressiveness. We have observed in pot and field trials that incorporation of lignin-rich materials, such as kraft pine lignin, flax shives or grape seeds have a negative effect on the survival of *R. solani* sclerotia. The suppressive effect appears to rely on the stimulation of certain groups of indigenous microorganisms and therefore is soil dependent. Currently we are trying to identify the soil parameters involved.