

INFLUENCE OF BIOSTIMULANTS ON THE SUPPRESSION OF HAIRY ROOTS DISEASE IN GREENHOUSE TOMATOES

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Plant pathogenic strains of *R. rhizogenes* cause hairy roots disease. Virulent *R. rhizogenes* strains contain a plasmid, part of which, a so called T-DNA, is being integrated with plant DNA after infection and causes changes in plant physiology, leading to excessive growth of adventitious roots.

Hairy roots disease is a persisting problem for many greenhouse growers of tomato, cucumber and aubergine in the Netherlands. In rockwool grown vegetables, excessive root growth leads to loss of crop yield. At present, there are no curative measures available to inhibit disease progression once the plant have been infected. Outbreaks of disease are prevented by strict hygiene protocols or addition of minute amounts of hypochlorite in the irrigation water. Regardless of all the preventive measures taken, it is not always possible to suppress hairy root disease. More information is needed on its ecology and other factors influencing susceptibility of tomato plants to hairy roots disease. It has been suggested that an organic approach instead of strict hygiene may offer a solution. One of the options for suppressing hairy roots disease might therefor be the use of biostimulants.

Therefore, we have tested ten combinations of biostimulants in six week greenhouse trials with tomato (cv Komeett). Three of these combinations were commercially available in the Netherlands. Seven other combinations were assembled using: seaweed extracts, humic acids, orthosilicate, compost tea and micro-organisms. Tomato plants were treated with biostimulant preparations during propagation and cultivation phases. Plants were propagated in rockwool plugs and subsequently grown in rockwool or coconut coir substrates. We inoculated plants at two different time intervals to check whether susceptibility to *R. rhizogenes* infection changes with the age of the tomato plants. Half of the plants in each treatment were inoculated with *R. rhizogenes* during the propagation phase, i.e., two weeks after sowing. Remaining plants were inoculated at the start of greenhouse cultivation in substrate, i.e., 5 weeks after sowing.

Five of the treatments resulted in less severe symptoms of hairy roots in plants inoculated with *R. rhizogenes* during propagation phase. These treatments were based on: 1) seaweed extracts and humic acids; 2) seaweed extracts, humic acids and amino acids; 3) seaweed extracts, humic acids and *Glocladium catenulatum*; 4) compost tea and 5) formulation of beneficial bacteria and fungi. Tomato plants inoculated at the later stage of development also showed different susceptibility to infection with pathogenic bacterium. Correlation between tomato plant age at infection, growth substrate and severity of hairy root disease will be discussed.

Key words: hairy roots disease, tomato, disease suppression, biostimulants