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"Solidarity in a competing world — fair use of resources"

Development of the Different Population of *Heterodera schachtii* in *Arabidopsis thaliana*

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Abstract

Plant parasitic nematodes are obligate and biotrophs. Cyst nematodes of the genus *Heterodera* are economically most important plant parasitic nematodes worldwide. Among them, *Heterodera schachtii*, the beet cyst nematode, is a major pest for sugar beet production but also has wide host range covering the family Brassicacae. The second stage juveniles (J2) attack the roots of the plants after hatching from the cysts and induce the formation of specialised feeding sites which become their permanent source of nutrition during all of their sedentary life stages. Cyst nematodes result in a substantial damage to the yield with symptoms such as wilted leaves resulting in retarded growth and small sized beets bodies. *Arabidopsis thaliana* is a model plant which is commonly used to study various aspects of plant-nematode interaction. In this study, *A. thaliana* (Col-0) has been used to study the variation in the development of the populations of *H. schachtii* compared with a laboratory stock culture. This stock culture of H. schachtii is maintained on mustard roots for many years in *in-vitro* conditions. The samples of *H. schachtii* populations were collected from seven different locations of Germany i.e. Holle, Hildesheim, Harsum, Rommerskirchen, Boslar, Wolfenbüttel and Münster. The number of established males and females of these populations were compared with the control. The study revealed differences between the populations of the same species especially in virulence to the host. As a result, the establishment of the adult nematodes was strongly reduced in all samples compared to the stock culture. The female sizes and syncytia sizes were also used as important parameters to know the extent of infection. There were no differences in the female sizes and syncytia sizes between the populations and the stock culture. The different populations of *H. schachtii* were able to penetrate the roots of *A. thaliana* (Col-0) but were less successful in establishing parasitism compared to the stock culture. We conclude that the different populations are less virulent; the basis of this reduced virulence is a matter of further studies.

Keywords: *Arabidospsis thaliana*, *Heterodera schachtii*, plant-nematode interaction, population, virulence

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