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Agricultural Sciences and Resource Management in the Tropics and Subtropics

Development of the different populations of *Heterodera schachtii* in *Arabidopsis thaliana*

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Background

Plant pathogenic nematodes (PPNs) affect many different crop plants through obligate biotrophic parasitism. *Heterodera schachtii*, the beet cyst nematode, is a major pest of sugar beet but has a wide host range including the family *Brassicacae.* The second stage juveniles (J2) invade the root tip after hatching from the cyst. They initiate the formation of large multinucleate feeding sites known as syncytia in the central cylinder of the host. During all sedentary life stages, syncytia serve as sole source of nutrition to the nematodes (Figure 1). Infections by cyst nematodes result in massive yield reduction due to retarded growth and small sized beets. Populations of *H. schachtii* are probably not equally virulent. The variation in virulence could occur due to adaptation to different hosts, or geographic and climatic conditions. The variation in the populations from different geographic locations was determined by performing infection assays in *in vitro* conditions on the same host. *Arabidopsis thaliana* was used as a model plant for this experiment.

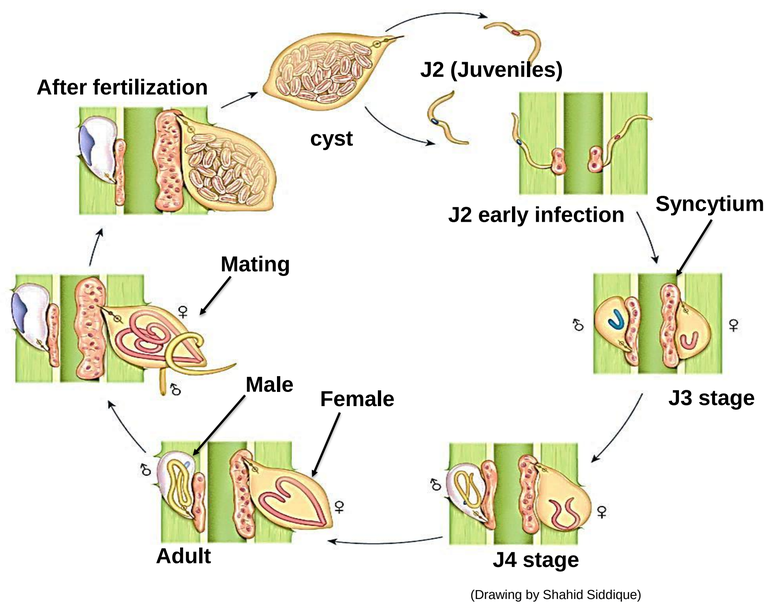


Figure 1 : Life cycle of *H. schachtii*

Materials and Methods

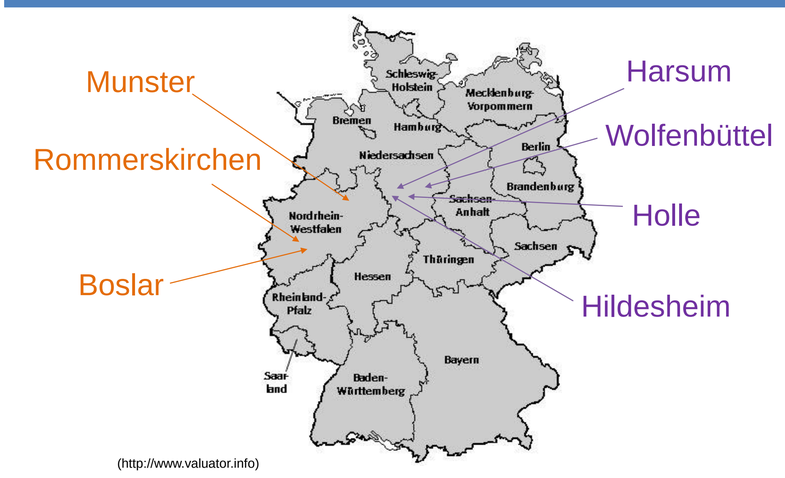


Figure 2 : Locations of the samples

Figure 3 : *Arabidopsis thaliana*

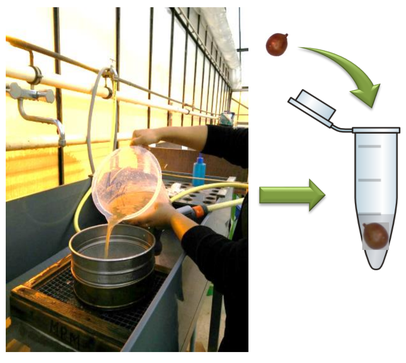


Figure 4 : Collection of the cysts

➢ Stock culture of *H. schachtii* used as a control

Inoculation of J2s

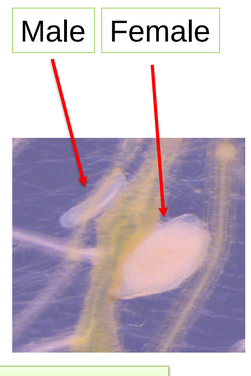


Figure 5 : Infection assays

Conclusions

Geographically seperated populations of *H. schachtii* responded differently in *in vitro* conditions

The infection and development of these populations were significantly reduced compared with control

Virulence among the selected populations vary significantly

H. schachtii populations from Boslar and Harsum responded with least nematode infection and development

Figure 4 : Measurement of female and syncytium sizes

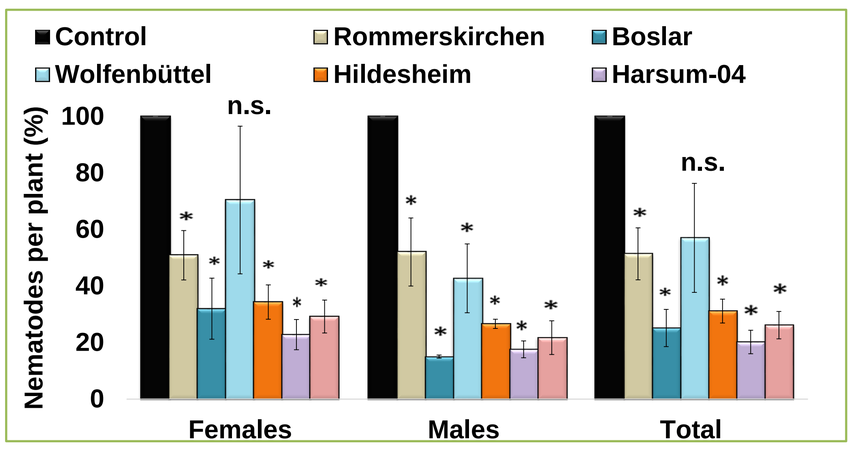
Future work

Analyze the genetic variation among the populations asssociated to their virulence

Compare the infection and development of these populations on Arabidopsis in the greenhouse

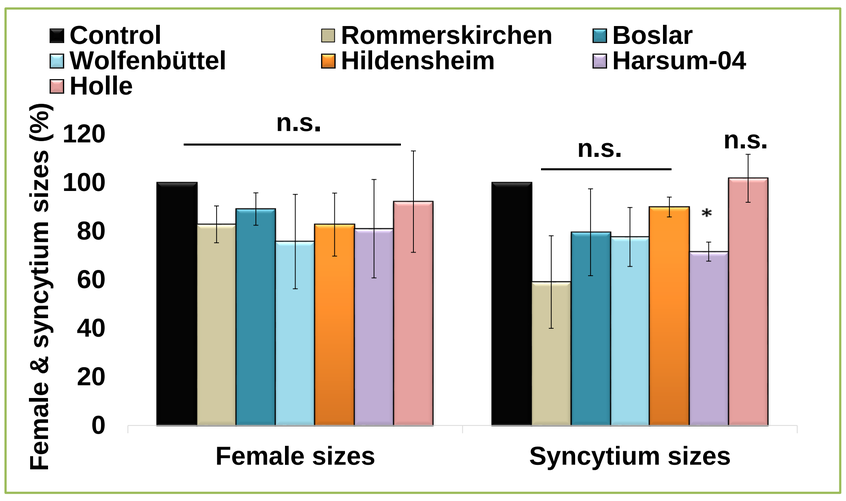
Results

All the populations are less successful in development of the nematodes to adulthood on the same host compared to control except Wolfenbüttel



The graph is the combination of four replications and presented in percentage. It shows significant reduction in all the populations in terms of adult nematodes compared with control except Wolfenbüttel with P≤0.05 and the number of the plants per replication (n)= 20.

No significant differences were observed between the populations and control except Harsum-04 having significant reduction in sycytium sizes



The graph is the combination of four replications and presented in percentage which shows no significant difference between the populations in terms of female and syncytium sizes compared with control except Harsum-04 with P≤0.05 and the number of adult female and syncytium per replication (n)= 25.