

# Genetic improvement of cold temperature activity and desiccation tolerance of the entomopathogenic nematode *Steinernema feltiae* (Filipjev)

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In order to improve the beneficial traits desiccation tolerance and activity at low temperature of the entomopathogenic nematode *Steinernema feltiae* a genetic improvement programme first characterized these traits in wild type populations. Then most tolerant strains were crossed and afterwards subjected to selective breeding. Adaptation to desiccation stress enhanced the tolerance significantly. Major progress in improvement of desiccation tolerance was recorded after hybridisation of the most tolerant strains. Progress was rapidly lost during propagation in *Galleria mellonella* but was recovered again during six selection steps. The heritability of  $h^2 = 0.35$  was calculated for adapted tolerance of *S. feltiae*. In addition, desiccation tolerance of the species *S. abbasi*, *S. affine*, *S. arenarium*, *S. kraussei*, *S. glaseri* and *S. ethiopiense* was assessed. *S. carpocapsae* and *S. abbasi* were the most tolerant species.

Screening for low temperature active wild type strains, followed by hybridization of the most active strains and genetic selection using the most active hybrid strain lowered the temperature at which 10% of the DJs were active from 2 °C (mean of all strains) to 0.98 °C for the most active strain FIN1 and to 0.09 °C by hybridization of FIN1 and ISR1. The heritability of  $h^2 = 0.45$  was calculated for the low temperature activity. Negative trade-off effects on the virulence and reproductive potential of the selected hybrids were not detected.

Future exploitation of the breeding success for commercial application will depend on the possibilities to stabilise the obtained breeding success.

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