Life cycle and development of entomopathogenic nematodes *Steinernema carpocapsae* and *S. feltiae* in monoxenic liquid culture

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Entomopathogenic nematodes (EPN), *Steinernema carpocapsae* and *S. feltiae* are symbiotically associated with the bacteria *Xenorhabdus nematophila* and *X. bovienii*. These bacto-helminthic complexes are used as biological control agents against a wide variety of insect pest in agriculture and horticulture. The infective stage of EPN is a so called dauer juvenile (DJ), which is a developmentally arrested third juvenile stage. Mass production of EPN is done in liquid culture media incubated with their symbiotic bacteria prior to DJ inoculation. DJ recovery is the first developmental step to the fourth juvenile stage of the nematodes. Major reasons for process variability are reduced DJ recovery and variable nematode population development. In order to improve the culture process, this contribution investigated the life cycle of *S. carpocapsae* and *S. feltiae* in monoxenic liquid culture, recorded the bacterial growth and the influence of the bacterial symbionts on DJ recovery and population development and studied the influence of culture temperature and variable inoculation density on nematode development and DJ yields.

The results indicate that a higher bacterial density at the beginning of culture induces a synchronous and faster development of the nematode population than lower bacterial densities. DJ recovery is usually less of a problem in monoxenic cultures of these two nematode species. The optimum culture temperature is 25°C for both species. At this temperature, a high percentage of offspring in the filial generation develops to DJs. Lower initial nematode inoculum density can induce multiple adult populations instead of DJs in cultures of *S. carpocapsae*. *S. feltiae* always developed a second and third generation of adults probably due to a second increase in the bacterial population. The optimal DJ inoculum density for *S. carpocapsae* is 3-6 x 10^3 DJs ml^{-1} and > 5 x 10^3 DJs ml^{-1} for *S. feltiae*. The mean yield recorded for *S. carpocapsae* was 135 x 10^3 and 105 x 10^3 for *S. feltiae*. Further possible improvements of the culture process are discussed.