fungivorus Franklin and Hooper, 1962 and their attractiveness to these nematode species. Canadian Journal of Microbiology 10, 727-737.


The first record of Heterodera goettingiana on field beans (Vicia faba) was by Leibscher (1890). Beans can tolerate many more H. goettingiana than peas and reproduction on beans maintains populations that damage peas (Hooper, 1983). Shepherd (1963) did not obtain in vitro hatch from cysts of H. goettingiana exposed to root diffusates from beans and peas but pea root diffusate is now known to hatch this species in vitro with an activity which varies with the age of the host plant (Perry et al., 1980). We have, therefore, now examined the in vitro hatch of H. goettingiana exposed to diffusate from field beans of different ages.

Diffusate was collected at intervals of 2 weeks by the method of Fenwick (1949) from four bean plants (cv. Minden) per 18 cm pot of sterile soil. After 30 weeks the senescent plants were removed and the soil sieved to extract any remaining root pieces; soil was replaced in the pots and leaching was continued at weekly intervals for a further 4 weeks. The hatching activity of diffusate at each interval was tested on four replications of 25 cysts for 5 weeks; counts of hatched juveniles were made at weekly intervals and percentage hatch of the total number of eggs containing juveniles was determined at the end of each trial. Diffusate was added each week from stock solutions kept at 5°C. Cysts of H. goettingiana, grown for a single generation on pea cv. Kelvedon Wonder in pots, were recovered from moist soil (stored at 2°C) immediately before use in the hatching trial on each diffusate; after acclimatization to 15°C for 1 day in artificial tap water (Greenaway, 1970) cysts were set to hatch at this temperature in bean root diffusate.

As Fig. 1 shows, hatch of H. goettingiana in vitro is stimulated by root diffusate from beans; hatches from cysts in leachings from pots of sterile loam without plants were less than 5%. As with other cyst nematodes, the hatching response is related to the age of the plant producing the diffusate but with H. goettingiana this seems to be much less critical with diffusates from beans than with those from peas (Perry et al., 1980), which are much shorter lived. Hatches of > 50% of cyst contents were obtained with diffusates from plants 12 to 28 weeks old, with a maximum hatch of 87% in diffusate from 16 week old plants. Plants of

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14 to 20 weeks induced maximum hatch of >80%. Most juveniles emerged during the first two weeks of hatching tests. Diffusates had a pH range of 7.5 to 8.8, but variations in pH and hatch were not correlated.

As cysts were obtained from stock soil immediately before the hatch trial on each diffusate, the variation in their storage for 3-10 months might have influenced their subsequent hatch. Therefore, some cysts from a different population of *H. goettingiana* which had been stored in moist soil for 3 months at 2°C were exposed simultaneously to each of the diffusates. Fig. 1 shows that, although the hatch was not as great in this second population, the pattern of total hatch in relation to age of plant producing the diffusate is very similar. Hatches of >50% of cyst contents were obtained from cysts in diffusates from 20 to 24 week old plants, with a maximum hatch of 59% in diffusates from 20 week old plants.

In hatching trials with *Globodera rostochiensis*, Perry *et al.* (1981) found that potato root diffusate was active in soil in pots for a time after potatoes were removed. A similar effect was found with *H. goettingiana* (Perry *et al.*, 1980) where leachate from soil in which peas had been grown 12 weeks earlier induced hatches of almost 25%. Fig. 1 shows that bean root diffusate also persists in soil in pots for a short period after the host plant and any root pieces had

![Fig. 1](image-url)