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THE HATCHING RESPONSE OF *HETERODERA FICI* TO DIFFERENT CONCENTRATIONS OF SODIUM METAVANADATE SOLUTIONS

by
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Summary. The effect of different concentrations (0.2, 0.4, 0.6, 0.8, 1.0 and 1.2 mM) of sodium metavanadate solutions on the emergence of juveniles from cysts of *Heterodera fici* was compared with that of root leachate of commercial fig and distilled water. The cysts were collected by the Fenwick can from dried soil and batches of 50 each were incubated in the hatching agent for seven weeks at $25\text{ }^{\circ}\text{C} \pm 1$. The largest hatch (55.5%) occurred in fig root leachate. In sodium metavanadate maximum nematode emergence occurred at 0.6 mM.

The emergence of juveniles of many *Heterodera* species is stimulated by physical (temperature, aeration and soil moisture) and/or chemical (natural and artificial hatching agents) factors (Clarke and Perry, 1977; Greco, 1981; Perry, 1986). Hatching is frequently investigated with cyst nematodes and the use of an artificial hatching agent in tests would be useful in comparing results obtained by independent authors (Clarke and Perry, 1977). Natural and artificial hatching agents were screened by Di Vito and Sasanelli (1990) for their effect on the hatching of *Heterodera fici* Kirjianova, the fig cyst nematode. They obtained the largest egg hatch (64%) in 0.6 mM sodium metavanadate solution, a concentration also found to give the best hatch of *Globodera rostochiensis* (Clarke and Shepherd, 1966). However, other concentrations of the chemical were not tested on *H. fici* and therefore the investigation reported here was undertaken to ascertain the concentration required for the best hatch of this cyst nematode.

Materials and methods

A population of *H. fici* was obtained from an infested field at Barile (Potenza) and reared on commercial fig cv. Dottato in a glasshouse at 20-25 °C. Cysts were collected by the Fenwick can from dried soil. Batches of 50 cysts of similar size (about 50 eggs and juveniles/cyst) were each placed in a 20 mm diam sieve (215 µm aperture) arranged in a 35 mm diam Petri dish.

Six concentrations of sodium metavanadate (0.2, 0.4, 0.6, 0.8, 1.0 and 1.2 mM) were prepared for comparison with distilled water and root leachate from commercial fig plants. The root leachate was obtained by drenching the soil with excess tap water in fifteen 2,500 cm³ clay pots, planted with four-month old commercial fig plants cv.

Dottato. The root leachate was centrifuged at 1,300 g for 30 min, stored in plastic bottles, and kept in a freezer until used. Small quantities for immediate use were kept in a refrigerator at 5 °C.

Three millilitres of each hatching agent were added to each batch of cysts in the Petri dishes which were then incubated in a growth cabinet at $25\text{ }^{\circ}\text{C} \pm 1$ for seven weeks. There were four replicates per treatment. Emerged juveniles were removed and counted every week and the hatching solutions renewed at the same time. At the end of the test cysts were crushed (Seinhorst and Den Ouden, 1966) and eggs and juveniles remaining within cysts were counted to provide the total numbers at the beginning of the experiment. Numbers of second stage juveniles that emerged at each counting date were expressed as cumulative percentages of the total egg content of the cysts. Data were compared by analysis of variance and Duncan's multiple range test.

Results and discussion

The largest cumulative hatching (55.5%) occurred in fig root leachate and this was significantly different from all other treatments (Fig. 1). Few juveniles emerged from cysts incubated in distilled water (1%). Among the different concentrations of sodium metavanadate, the 0.6 mM solution gave the maximum egg hatch (30.5%) the 0.4mM solution the lowest hatch (14.1%).

Hatching in sodium metavanadate ≥ 0.6 mM was remarkably faster than in lower concentrations and in the controls: about 90% of juveniles emerged within two weeks, with a maximum of 97% in the 0.6 mM solution. Significantly more juveniles emerged in the 0.6 mM solution (29%) than in all the other concentrations and in distil-

led water (0.8%). However, root leachate gave the highest value in average hatch (47%).

These results confirm the findings of previous tests, which demonstrated that largest hatch of *H. fici* occurs in fig root leachate (Di Vito and Sasanelli, 1990) and

that sodium metavanadate provides a better nematode egg hatch at 0.6 mM.

We are grateful to Mr. F. Elia for help in the statistical analysis and Mr. V. Radicci for preparing the drawing.

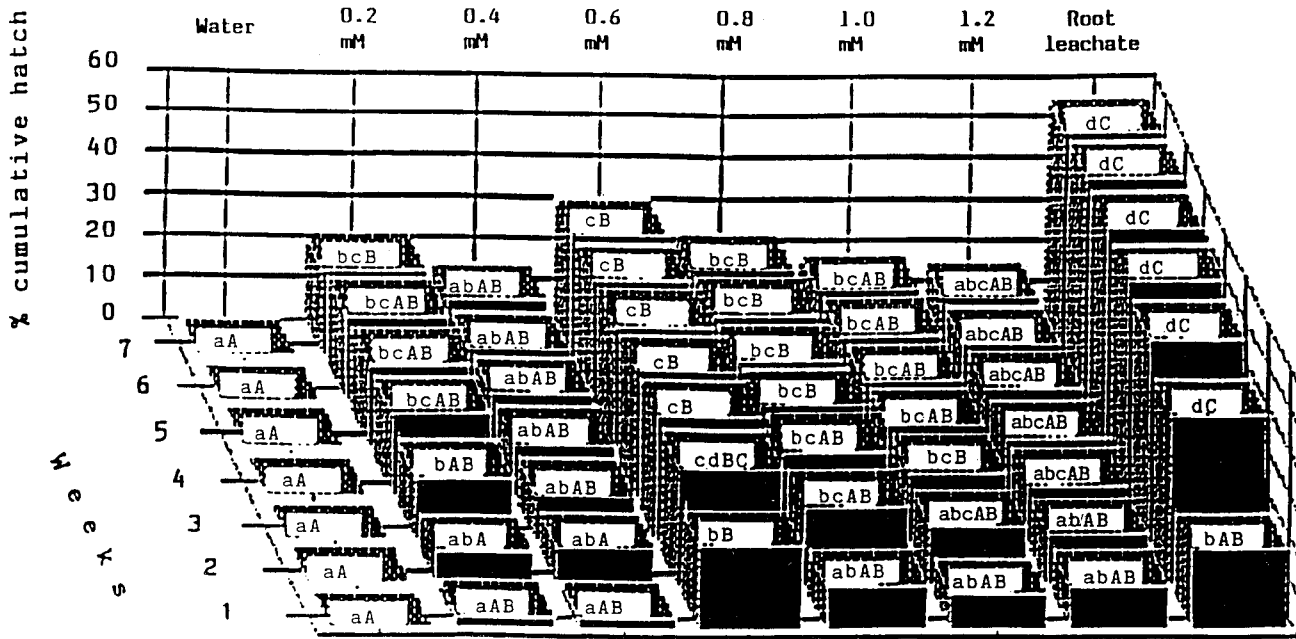


Fig. 1 - Effect of root leachate, distilled water and different concentrations of sodium metavanadate on hatching of *Heterodera fici* at 25 °C ± 1 (data flanked in any row by the same letter are not statistically different according to Duncan's multiple range test; small letters for P=0.05; capital letters for P = 0.01).

Literature cited

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