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FACTORS AFFECTING HATCHING OF THE SOIL NEMATODE *DIPLOSCAPTER ORIENTALIS*

by

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Summary. Hatching in *Diploscapter orientalis* was found to be affected by temperature, age of agar medium, tap and distilled water and two saline (NaCl) solutions. In fresh agar medium the rate of hatching varied from 10-15% at temperatures of 5-15 °C and at 35 °C while at a temperature range of 20-30 °C it was 70-97%. In old agar medium the maximum hatch was 40% at 20-30 °C. At a constant temp. of 30 °C the tap water showed maximum percentage of eggs hatched compared to distilled water or saline (0.025% and 0.05% NaCl) solutions.

Hatching in nematodes takes place as the cleaving embryo is transformed into a juvenile which is thus exposed to the external environment. Hatching is brought about by a combination of endogenous and exogenous factors (Gooris and d'Herde, 1972). Some work has already been done on the effect of exogenous factors like temperature on hatching (Banyer and Fisher, 1971; Williams and Beane, 1979; Srivastava and Sethi, 1986) and development (Pillai and Taylor, 1968). Factors such as host plant root exudates, were also reported to affect hatching in phytophagous nematodes (Williams and Beane, 1979; Perry and Beane, 1983). In the present studies the effects of temperature, culture medium and chemicals on the hatching of *Diploscapter orientalis* Kannan, 1960 were observed.

Materials and methods

The experiment was initiated by placing sterilized gravid females separately in 5 cm diameter Petri dishes containing 1% autoclaved water agar. The dishes were kept at 15±2 °C temperature. At this temperature the eggs that were laid underwent embryonic development up to pretzel stage but did not hatch and large numbers could be obtained for stock cultures to be used to assess hatching.

Batches of five replicates of eggs were placed each in freshly prepared agar at 5°, 10°, 20°, 30° and 35 °C. The above procedure was followed in a second experiment except that the eggs were placed in 30 days old agar. The number of eggs that hatched were recorded at weekly intervals for 13 weeks.

Hatching of eggs was also observed over a 13 week period by placing 50 eggs separately in tapwater, distilled water and 0.025%, and 0.05% saline solutions (NaCl) at 30 °C (saline solutions were prepared in distilled water).

Results

It was observed that the percentage hatch in old culture medium was considerably low as compared to that in fresh medium (Fig. 1A, B). Of all the temperatures tested 30 °C appeared to be ideal for hatching in both the media. The percentage hatch in the old agar medium (40%) was far less than in the fresh culture medium (97%). The percentage hatch in fresh agar medium could be grouped in two broad temperature regimes. The lower temperatures 5°, 10° and 15 °C as well as the higher temperature 35 °C induced a hatch that ranged from 4-10% while the temperature range of 20°, 25° and 30 °C produced a significantly higher percentage hatch (70-97%).

In fresh agar medium, the increase in percentage hatch was gradual, usually reaching a peak between the 7th and 9th week and declining afterwards (Fig. 1A). However, in the old agar medium there was a sudden increase in percentage hatch up to 9th week. Then the hatch declined sharply (Fig. 1B).

The percentage hatch (96%) in tap water was significantly higher than in distilled water (28%) or in saline solutions (42% and 23% at 0.025% and 0.05% NaCl respectively). The highest percentage hatch in all solutions was recorded in the 9th and 10th week which was followed by a gradual decline (Fig. 1C).

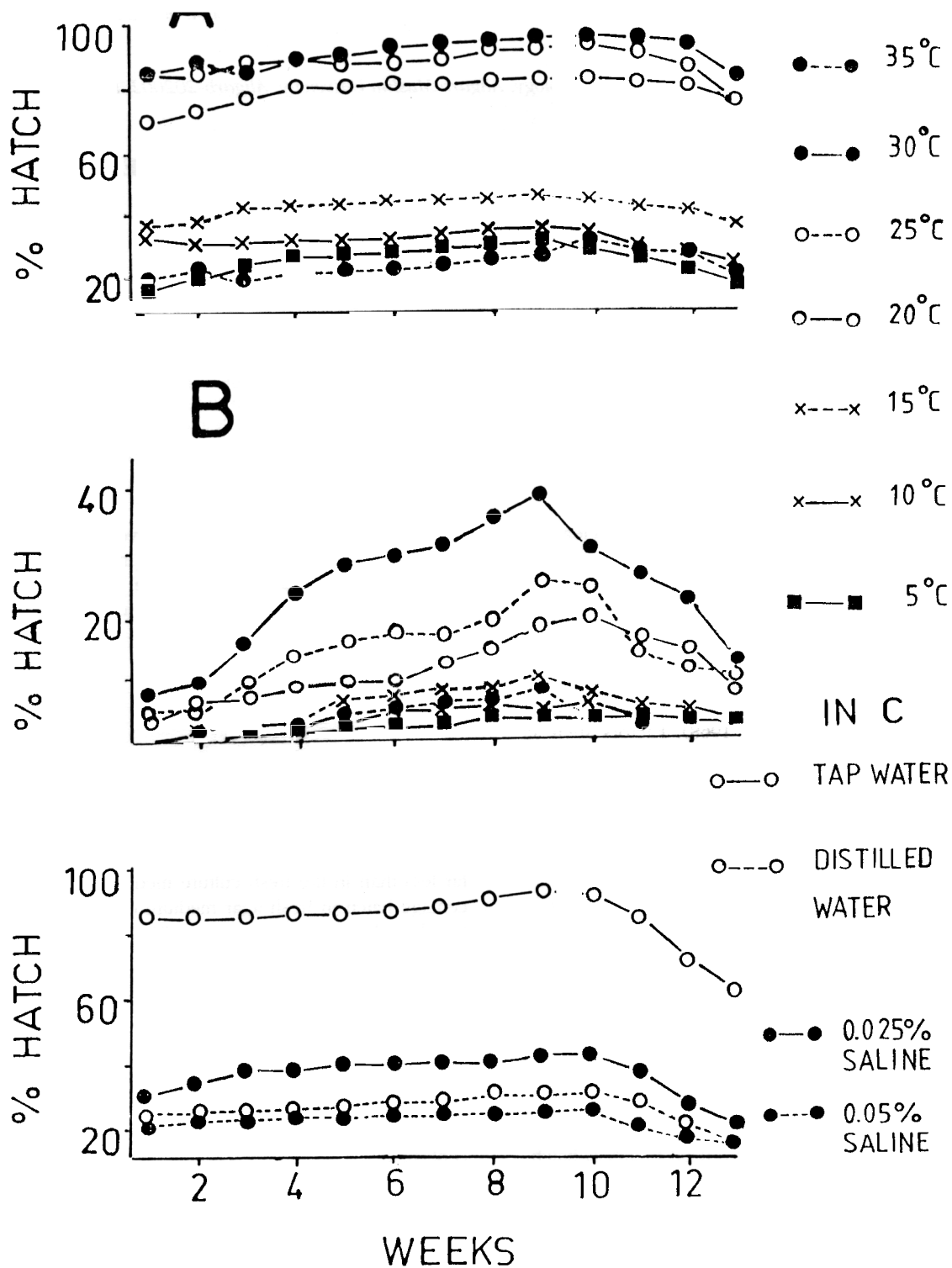


Fig. 1 - Effect of temperature, culture medium and chemicals in solutions on hatching in *Diploscapter orientalis*. A, effect of temperature in new culture medium; B, effect of temperature in old culture medium; C, effect of various solutions.

Discussion

It is well established that exogenous factors play an important role in altering the rate of development in nematodes (Pillai and Taylor, 1968; Williams and Beane, 1979). Our study indicates that temperature and age of agar medium influence hatching in *D. orientalis*. Although the increase in temperature enhanced the rate of hatching the percentage hatch was markedly lower in old agar medium than fresh medium may be because of the degradative changes in the former which tend to override the influence of temperature.

Hatching occurred, although at a reduced rate, even at the extreme temperatures. This may be due to the fact that eggs in their terminal stages (pretzel stages) of development were used for the study. The results also support the views of Flegg (1969) that temperature enhances hatching rate.

The enhanced percentage hatch in tap water as compared to distilled water or saline solutions may be due to dissolved minerals in the former.

Acknowledgements. The first author is grateful to CSIR, New Delhi for providing financial assistance.

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