

Notes brèves

THE EFFECT OF WEEKLY EXPOSURES TO NON-VOLATILE NEMATICIDES AND SUGARCANE ROOT DIFFUSATE ON THE HATCHING OF *HETERODERA SACCHARI*

Sahag Garabedian * and Nigel G. M. Hague **

Heterodera sacchari Luc & Merny, 1963 has been reported on sugarcane from India (Swarup, Prasad & Raski, 1964) and from Northern Nigeria (Jerath, 1968). However, little is known about the hatching of *H. sacchari* cysts, apart from the fact that second stage juveniles hatch in water after 24 h (Jerath, 1968) or about the effect of non-volatile nematicides on hatching of these cysts. Therefore we investigated the effect on hatching of *H. sacchari* of weekly exposure to sugarcane root diffusate and/or exposure to non-volatile nematicides.

Materials and methods

Hatching tests by previous workers were done in water suspensions containing both the nematode and the nematicide (Keerweewan, 1970 ; Bunt, 1975). The advantage of this technique is its simplicity and the ease of recovery of the second-stage juvenile that hatch in the solution, but the disadvantage is that such placing of cysts or juveniles in chemical suspension does not represent what takes place in natural soil conditions ; for example, the concentration of the chemical does not change during the time that the nematodes are in contact with the nematicide.

A simple technique was developed to use in hatching experiments. The base was removed from plastic cups of 300 ml capacity and replaced with muslin cloth (32 mesh). Batches of fifteen cysts containing an average of 214 eggs/cyst were placed in the lower half of the cup in an 80% sand and 20% loam mixture. More of this mixture was added to cover the cysts. Nematicides used were placed in the top centimeter of the soil. The cup was held in place in a second vessel to collect juveniles emerging from the upper section. The emerged juveniles in the collecting vessels were counted at the end of each week. The plastic cup (upper cup) was watered only at the start of the experiment, and maintaining adequate water in the collecting vessel was sufficient to keep the cup moist thereafter.

Soil leachate and sugarcane root diffusate were collected from pots containing four months old sugarcane plants according to the method described by Fenwick (1949). Full strength root diffusate was used anticipating that it would be diluted by the water in the collecting vessel.

The three nematicides used were aldicarb 10G [2-methyl-2-(methylthio) propionaldehyde-0-methylcarbamoyloxime], oxamyl 10G [S-methyl N', N' - dimethyl - N - (methylcarbamoyloxy) - 1 - thio-oxamimidate] and carbofuran 5G [2, 3-dihydro-2, 2-dimethyl-7-benzofuranyl methyl carbamate] at concentrations of 1.0, 2.0 and 4.0 mg a.i./kg soil. An additional treatment consisted of cups having 2 mg a.i./kg soil of the particular nematicide, but with the top cup watered at the beginning of the experiment with root diffusate and the collecting vessel subsequently filled with root diffusate instead of water. Additional cups treated only with water or root diffusate were kept as controls. All cups were kept in the greenhouse at 24-27°. Treatments were replicated ten times.

Results and discussion

With the three nematicides used there were significant interactions between the time of exposure of the cysts to the nematicides and the concentrations of the nematicide used ; therefore analysis of the results was based on the differences between the number of juveniles which emerged at the end of each week for the different concentrations of nematicides used and the number which emerged from untreated cysts during the same period.

There were no significant differences between the number of juveniles hatching at the end of each week from cups treated with root diffusate and cups treated with tap water, $P = 0.05$ (Fig. 1). The total mean hatch from cups treated with root diffusate was 1 890 juveniles compared with 2 145 juveniles for the untreated cysts. All three nematicides were equally effective in preventing hatching from cysts

* Department of Nematology, University of California, Riverside, Ca 92521, USA.

** Department of Zoology, Earlygate, Reading, England.

of *H. sacchari*. However, in cups containing cysts treated with 2.0 and 4.0 mg a.i. of aldicarb or oxamyl delay in juveniles hatch occurred up to the end of the second or third week (Fig. 1).

The addition of root diffusate to 2.0 mg a.i. of each particular nematicide resulted in slight increase

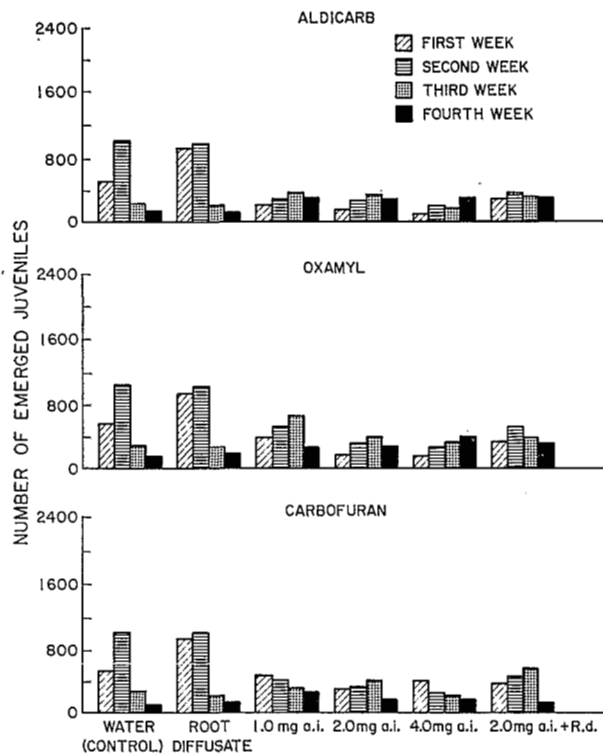


Fig. 1. The number of larvae merged from cysts of *Heterodera sacchari* in cups treated with aldicarb, oxamyl and carbofuran at the end of the first week, second week, third week and fourth week after exposure to root diffusate and chemicals (R.d. is root diffusate).

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in hatching compared to cysts treated with 2.0 mg a.i. of the particular nematicide.

The results indicate that hatching of *H. sacchari* is at most slightly increased in the presence of root diffusate. Our results agree with those of Unny (1981) who found that root diffusate enhanced hatching only slightly, although Henoomanjee (1977) reported that sugarcane root diffusate substantially increased hatching of *H. sacchari*.

The effect of nematicides in preventing hatching was greater with increased concentrations of the particular nematicide. The addition of root diffusate to cups treated with 2.0 mg a.i. of aldicarb resulted in significant increase of hatching ($P = 0.05$) at the end of the first and second week. Otherwise, cysts treated with 2.0 mg a.i. and root diffusate had only slight effect on hatching.

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