Note brève

LABORATORY PRODUCTION OF *NEOAPLECTANA CARPOCAPSAE* WEISER AFFECTED BY NIPAGIN AND STREPTOMYCIN

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Biological control of insect pests by the rhabditid nematode *Neoaplectana carpocapsae* has shown a real potential for agriculture (Gaugler, 1981). As far as tropical agriculture is concerned, Laumond, Mauléon & Kermarrec (1979) underlined a large host range for this parasite in Guadeloupe. Various studies also showed a possible control of the banana weevil *(Cosmopolites sordidus)* by this worm, at least under experimentally controlled conditions (Kermarrec & Mauléon, 1974).

Mass production of *Neoaplectana spp.* should no longer present any major technical difficulty to industry. Nevertheless, laboratory rearings of small quantities for experiments still necessitate artificial host productions. We show here that some ingredients used in artificial diets for the rearing of lepidopterous larvae may have tremendous effects on the production of the nematodes, as already underlined by Guennelon (1968) for entomophagous insects. This seems particularly the case of antibiotics, like Nipagin (methylparaben or methyl parahydroxybenzoate) and Streptomycin, commonly used to stabilise diets.

Material and methods

Caterpillars of two Pyralid moths *(Diatraea saccharalis* and *Galleria mellonella)* are used as follows :

a) *D. saccharalis* (second and third instars) are reared on fresh sugarcane and on an artificial diet contaiging 1 ‰ Nipagin ($^{w}/_{w}$) and composed of : agarose 5 g; semolina (corn) : 28 g; corn spoutings 7 g; beer yeast 7.5 g; ascorbic acid 1 g; benzoic acid 0.25 g, Nipagin M 0.2 g for 170 g of water.

Some 250 caterpillars of the sugarcane borer are opposed to five concentrations of infective larvae (L_3) of *N. carpocapsae :* 0, 20, 200, 2 000, and 20 000 L 3 " agriotos " obtained according to the method described by Dutky, Hompson and Cantwell (1964). The contact is realised in 9 cm Petri dishes to evaluate LD 50 variations (Bliss, 1935) according to hosts diet.

b) *G. mellonella* (second and third instars) are fed during four days on bee wax dipped in increasing concentrations of Nipagin M : 0,30 and 270 mg Nipagin per 100 ml of water some ten replicates of each treatment (n = 10 caterpillars per treatment) are placed in Petri dishes, each receiving 30 000 L 3 of *N. carpocapsae.*

Table 1

Variation of LD 50 of *D. saccharalis* larvae, according to diet, three days after infestation by *N. carpocapsae*

Diet	*Sugarcane*	*Synthetic*	*LD 50 ratio*
LD 50 for all instars	300	63 000	200
LD 50 according to instar ..... L 3	700	37 000	50
..... L 5	50	12 000	240

Table 2

Effect of Nipagin and Streptomycin (ingested/injected) on the production of *N. carpocapsae* by *G. mellonella* caterpillars. The densities of produced nematodes are evaluated by a discrete notation and summed (see text)

A. *Nipagine*	Concentration (mg/100 ml water)		
(ingested by *Galleria)*	0	30	270
% parasitized *Galleria*	78	20	15
Production of *Neoaplectana*	101	28	8

B. *Streptomycin* (5 µl injected to *Galleria)*	Concentration (ppm) 0	12	50	100
% parasitized *Galleria*	100	100	80	60
Production of *Neoaplectana*	86	66	55	19

C. *Streptomycin* (ingested by *Galleria)*	Streptomycin	Control
Production of *Neoaplectana*	81	158

c) *G. mellonella* caterpillars are also submitted to Streptomycin : ingested with wax or injected (5 µl in a false leg) at different concentrations (0, 12, 50, 100 ppm) and placed against 30 000 L 3 of *N. carpocapsae.*

The percentages of parasitized caterpillars are evaluated after eight days by dissection and the production of *N. carpocapsae* (sexuates and new generation) is estimated by a discrete notation (0 : none to 3 : very high density). The final notation will be the sum of the notes given to each replication of the treatment.

Results

Table 1 shows that Nipagin clearly lowers susceptibility to *N. carpocapsae* by 200 times (all instars) and from 50 to 250 times with larval aging from third to fifth instar.

Table 2 (A, C) underlines a dose linked effect for Nipagin (ingested) and Streptomycin (injected) on the percentage of parasitized *Galleria* as well as on the production of new *N. carpocapse.* Higher concentrations of Nipagin occured to be antiphagant to *Galleria.*

Ingested Streptomycin answered in the same direction (Tab. 2, B) than Nipagin by lowering the production of *N. carpocapsae* by the insect host.

Conclusion

The use of artificially reared caterpillars to produce infestive *N. carpocapsae* in the laboratory must obviously take in account the fact that antimicrobial chemicals may strongly depress hosts suitability. This observation is close to the conclusions of Grenier (1977) on entomophagous insects.

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