Nematol. medit. (1977), 5: 313-317.

NOTE BREVI - SHORT COMMUNICATIONS

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PENETRATION AND MULTIPLICATION OF *SCUTELLONEMA BRADYS* IN YAMS (*DIOSCOREA* SPP.)

by

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Although much is known about the pathogenic effect of *Scutellonema bradys* (Steiner *et* LeHew) Andrassy on yam (*Dioscorea* spp.) tissues (Adesiyan *et al.*, 1975) little is known about the reproduction of the nematode in that host. Since the survival of *S. bradys* in yams depends very much on the extent to which the host is penetrated and its ability to reproduce therein, investigations were undertaken to acquire information on these aspects of the nematode's biology.

MATERIALS AND METHODS

The population increase of *S. bradys* under storage conditions was investigated using 3 species of yam (*D. rotundata* Poir, *D. cayenensis* Lam, and *D. alata* L.). Five nematode-free tubers of each species were surface cleaned with sterile distilled water and alcohol (Bridge, 1973) and approximately 500 surface sterilized nematodes (sex ratio 1:1) were inoculated into each tuber using a sterilized pipette inserted into a hole made with a cork borer. Tubers of each species inoculated with sterile water only provided the control treatment. The tubers were then stored in a yam barn from October to March where ambient temperature and relative humidity were recorded on a Cassela-type thermohygrograph. After the six months storage, 50 g of tissue were taken from the area of each inoculation site and the nematodes

extracted by leaving the macerated tissue in a Petri dish for 48 hr. A Peter's counting dish was used for nematode counting.

To determine the effect of temperature and humidity on nematode population densities in stored tubers, about 200 tubers of white (*D. rotundata*) and water (*D. alata*) yams showing symptoms of nematode infestation were divided into two lots (A and B) of 50 tubers for each yam species. Lot A was stored under ambient conditions, temperature 23-32° C and relative humidity 40-85%, and lot B was kept in a cool store, temperature 16-18° C and relative humidity 80-85%. At monthly intervals 5 tubers of each yam species were selected at random from each lot and nematodes extracted as indicated above.

Depth of penetration was investigated in the white yam by artificially inoculating tubers of five different cultivars, Akosu, Omifunfun, Esinmirin, Boninbonin and Efon, each with 500 nematodes (sex ratio 1:1) and storing them under ambient conditions for 6 months. Using a 2.5 cm diameter cork borer, ten samples were then taken from the periderm of each cultivar; each cylinder of tissue, about 3.5 cm long, was cut into 0.5 cm discs, and each disc then cut into smaller pieces and the nematodes extracted from each. The distribution of nematodes within the periderm was studied in detail in the susceptible cultivar Efon. Ten cork borer samples were taken from the infested portion of the tuber and each sample cut in 2 mm pieces from which the nematodes were extracted.

Penetration of the nematodes in white yam tubers was investigated by dividing the tubers into 3 portions, top, middle and bottom, and taking 10 g samples from each portion at 2 mm intervals starting at the periderm to a depth of 14 mm towards the central cylinder. The nematodes were extracted from each 2 mm sub-sample.

RESULTS AND DISCUSSION

The numbers of *S. bradys* increased substantially in the three yam species tested during the 6 months storage. In *D. rotundata* the final population was 4,600 ± 68; in *D. cayenensis* 3,980 ±63; and in *D. alata* 2,765 ± 53. These increases of x9, x8 and x5 respectively compare with the results of Bridge (1973) who obtained increases of up to 14 fold in *D. rotundata.*

Population increases in *D. rotundata* and *D. alata* stored at two different temperature regimes are shown in fig. 1. *S. bradys* increased

considerably during the storage period with similar rates of increase (as indicated by the slope of the graphs) in both yam species, but with lesser increases at the lower temperature.

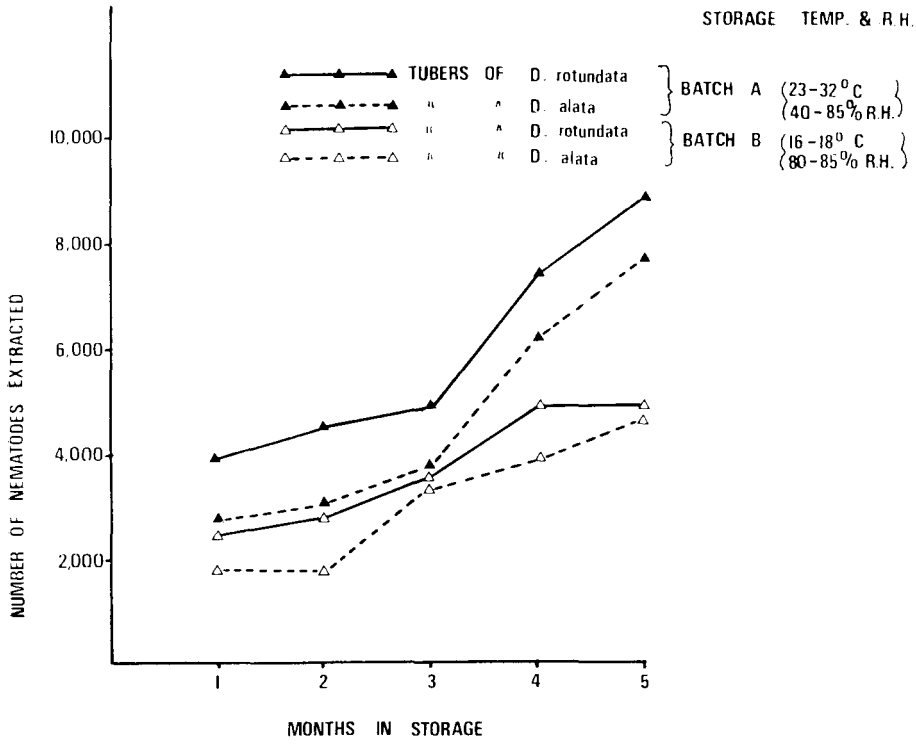

Fig. 1 - Increase in numbers of *S. bradys* in yam tubers stored at two temperature/humidity regimes.

In each of the five cultivars of *D. rotundata* most *S. bradys* were extracted from the surface layers (Table I), but only in cvs Efon, Esinmirin and Akosu were nematodes extracted at a depth of 1.0-1.5 cm from the surface. The numbers of nematodes recovered from the samples suggest that cv. Efon was the most susceptible to penetration and Omifunfun the least although the experiment did not attempt to evaluate the influence of cultivar on reproduction of *S. bradys*. Sampling at 1 mm intervals in cv. Efon revealed that most of the nematodes were concentrated in the first 6 mm of the periderm with the largest number at a depth of 2-4 mm (Table II). Comparing

Table I - *Number of* Scutellonema bradys *at different depths in five cultivars of* Dioscorea rotundata. *Mean of 10 samples at each depth.*

Cultivar Depth from the periderm cm	No. of nematodes		
	0-0.5	0.5-1.0	1.0-1.5
Efon	1,000	440	180
Esinmirin	680	390	100
Akosu	620	220	30
Boninbonin	560	190	0
Omifunfun	380	140	0

Table II - *Distribution of* S. bradys *within 12 mm of peridermal layer of the yam tuber* (D. rotundata *var Efon*).

Depth from the periderm	No. of nematodes
0-2	560
2-4	2,500
4-6	440
6-8	170
8-10	60
10-12	0

Table III - *Numbers of* S. bradys *at different depths in top, middle and bottom portions of tubers of* D. rotundata.

Part of tuber	Depth from the periderm mm					
	0-2	2-4	4-6	6-8	8-10	10-12
Top	1250	1680	430	200	120	110
Middle	600	800	350	120	105	0
Bottom	130	400	120	0	0	0

apical, middle and bottom parts of the white yam tuber, most nematodes were found in the apical part and fewest in the bottom part (Table III). In each part the greatest proportion of nematodes were at 2-4 mm depth from the periderm, and penetration reached 10-12 mm in the apical part, 8-10 mm in the middle part and only 4-6 mm in the bottom part. Depth of penetration may, however, be correlated with the rate at which *S. bradys* reproduces in the different parts of the tuber, and longer storage may reveal that greater penetration could occur in the bottom part of the tuber.

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Accepted for publication on 28 March 1977.