

# Root Extracts of Pangola Digitgrass Affect Egg Hatch and Larval Survival of *Meloidogyne incognita*<sup>1</sup>

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*Key words:* allelopathy, biological control.

Winchester (2) reported that Pangola digitgrass (then called Pangolagrass), *Digitaria decumbens* Stent., adversely affected the root-knot nematode *Meloidogyne incog-*

*nita acrita* Chitwood and Oteifa, 1952. Earlier he reported that extracts from roots of young Pangola digitgrass plants stimulated hatch of eggs and that extracts from roots of old plants killed the larvae (1). He did not define "young" and "old."

The research reported in this paper was designed to determine 1) the influence of root extract from various age Pangola digitgrass plants on egg hatch and larval survival of *M. incognita* and 2) whether

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larvae hatched in extract from roots of old plants had been irreversibly harmed or whether they would survive if transferred into root extract from young plants.

Pangola digitgrass cuttings were rooted weekly for 14 weeks. Then 10 grams of roots were taken from plants 3–14 weeks old. The roots were surface sterilized in 0.5% NaOCl for 3 minutes and rinsed in three separate changes of sterile water. The roots from each age plant were comminuted separately in a food blender for 30 seconds in 100 ml of sterilized water, and the solution passed through a sterile 0.45- $\mu$ m micropore filter to provide root extract. The pH was determined. Extract not used immediately was stored at 4.4 C and used in all subsequent tests.

Three replicates of root extract were prepared for each plant age. Ten milliliters of the extract were placed in a 5.5-cm-d. petri dish and 250 eggs of *M. incognita* added. Sterilized water was used as a control. The number of eggs that hatched each 24 hours for 10 days was recorded, and the larvae were transferred to another dish which contained 10 ml of the same root extract. These larvae were examined daily for 10 days after they hatched to determine the number living and dead. The experi-

ment was conducted under room temperature.

After 2 days a few eggs hatched only in root extract from plants 3, 4, and 5 weeks old (Table 1). In general, the older the plants from which root extracts were made, the later egg hatch began. The first 5 days seemed to be a natural dividing point for hatch in extracts from plants 3–10 weeks old versus plants 11–14 weeks old. These plants will be referred to hereafter as young (3–10 weeks) and old (11–14 weeks). During the first 5 days the mean percentage of eggs hatched in root extracts from young plants was 29%, while in root extracts from old plants the average was 0.3%; 36% hatched in controls. During the second 5 days, hatch in extracts from young plants was 63% and in old plants 87%; 54% hatched in the controls. Differences in hatch between young and old plant root extracts were statistically significant ( $P = 0.05$ ). At the end of 10 days the mean percentage of total egg hatch was 91% in the root extract from young plants, 87% from old plants, and 90% in the controls; differences were not significant. In root extract from 14-week-old plants, only 60% of the eggs hatched; that was less ( $P = 0.05$ ) than the controls.

Table 1. The influence of root extracts from various age Pangola digitgrass plants on hatch of *Meloidogyne incognita* eggs.\*

Age of plants used to make root extracts (weeks)	No. of eggs hatched per day†										Cumulative egg hatch‡		
	Day										First 5 days	Next 5 days	Total
	1	2	3	4	5	6	7	8	9	10			
3		15	42	20	11	23	11	26	10	34	88	104	192
4		7	40	36	36	0	19	9	28	51	119	107	226
5		4	18	21	37	10	17	12	36	61	80	136	216
6			6	4	40	23	13	45	67	50	50	198	248
7			1	17	43	12	13	15	34	48	61	122	183
8			36	17	5	12	38	31	49	43	58	173	231
9			25	13	33	12	28	18	30	87	71	175	246
10			6	7	36	2	15	45	124	50	49	236	285
11						12	10	52	78	90		242	242
12							16	50	38	120		224	224
13			3			6	32	39	78	94	3	249	252
14							18	28	40	65		151	151
(water control)			1	50	38	7	16	22	26	65	89	136	225

\*Approximately 250 eggs per replicate.

†Each figure is the mean of three replicates.

Root extracts from plants 3–8 weeks old had no effect on larval survival, but survival decreased sharply in extracts from older plants (Fig. 1).

The pH, which ranged from 6.2 to 6.5 in the root extracts and was 6.8 in the water control, had no apparent effects on egg hatch and larval survival.

To determine whether larvae which hatched in root extracts from old plants were irreversibly harmed, we placed 100 eggs in petri dishes containing 5 ml of root extract from either young (4 weeks) or old (14 weeks) plants. After five days, hatched larvae were counted. Each treatment was replicated twice. Half of the 16 larvae hatched in root extracts from old plants were transferred to a petri dish containing 10 ml of extract from roots of young plants and half to a dish containing 10 ml of root extract from old plants. The 86 larvae hatched in extracts from young plants were transferred similarly to serve as controls.

Seven of the eight larvae transferred

from old to young extract were alive after 10 days, while all eight larvae in old extract died within 1 day. All 43 larvae transferred from young to old extract died within 2 days, while 32 of the 43 transferred from young to young extract survived 10 days and all 43 survived for 3 days.

In conclusion, root extracts from *Pangola digitgrass* plants, no more than 10 weeks old, stimulated eggs of *M. incognita* to hatch 2–3 days early. Root extracts from plants 11–14 weeks old delayed egg hatch 5–6 days. However, just as many eggs hatched within 10 days in extracts from the older plants as in that from the younger plants, except at 14 weeks where fewer hatched. Larval survival was affected little or none by root extracts from plants 3–8 weeks old, but extracts from plants 9–14 weeks old killed most of the larvae within 10 days. Larvae that hatched in root extract from old plants, but did not remain in it, were not harmed irreversibly.

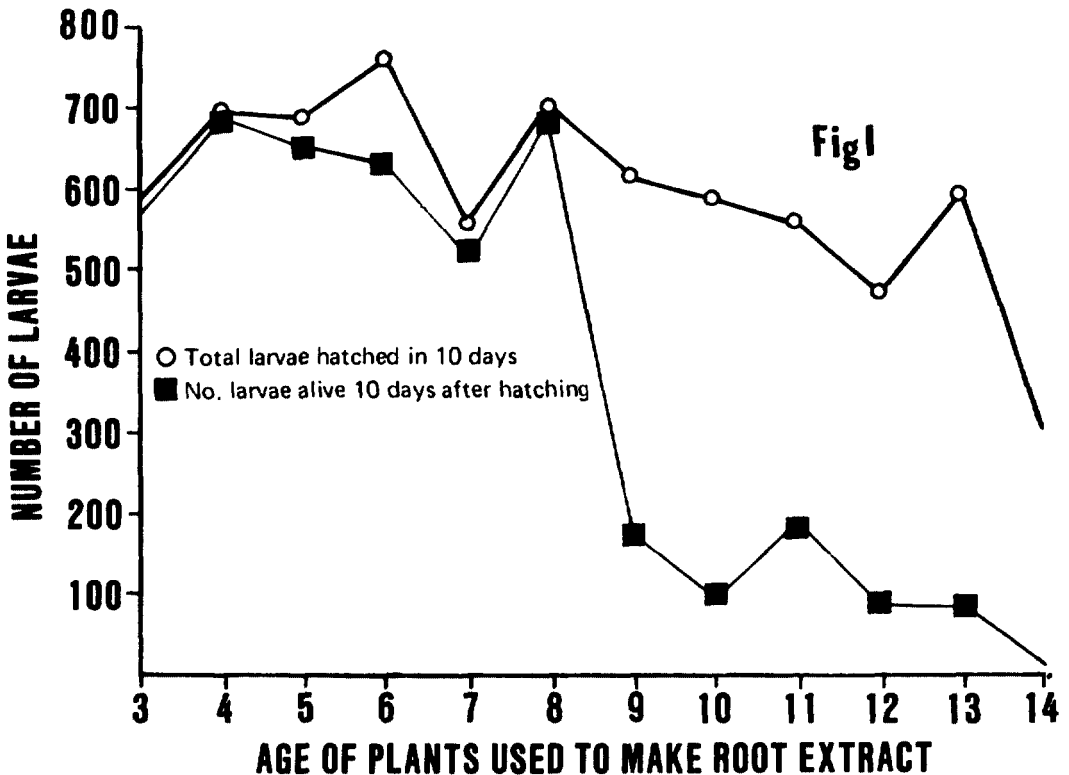


Fig. 1. Effect of root extracts from various age (wks) *Pangola digitgrass* plants on survival of larvae of *Meloidogyne incognita*.

### LITERATURE CITED

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