REACTION OF GOLDEN YELLOW CASSAVA TO *Meloidogyne* spp. INOCULATION

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ABSTRACT

The reaction of Golden Yellow cassava differed at varying inoculum levels of *Meloidogyne incognita* and *M. javanica*. Initial populations of approximately 10,000 and 20,000 eggs of *M. incognita* significantly reduced (P = 0.05) the root and top weights of cassava over the control; however, reduction in tuber weight was not significant between all treatments. Although there was a reduction in root, tuber and top weights at varying inoculum levels of *M. javanica* no significant differences were found between the treatments.

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At present, there is limited information available on diseases caused by nematodes. Surveys conducted by investigators in the Philippines and abroad revealed the association of several plant parasitic nematodes with cassava (Hogger, 1968, 1971; Brathwaite, 1972; Castillo and Maranan, 1974; and Gapasin, 1979). Root-knot caused by *Meloidogyne incognita* has been reported as a serious disease of cassava in the Gold and Ivory Coast (Edwards, 1953, 1955).

Inoculation studies to determine the effect of major nematode genera on cassava are lacking. This study was conducted to determine the reaction of Golden Yellow cassava to *Meloidogyne* spp. inoculation.

Cassava cuttings about 10 cm long were obtained from the Department of Agronomy, UP at Los Baños, College, Laguna and planted in 20 cm diam. clay pots containing sterilized sandy loam soil. *Meloidogyne incognita* and *M. javanica* were used in this experiment. Eggs

were used as inoculum and were obtained from cultures following the procedure described by Sasser (1976). The inoculum levels used were approximately 0, 1,000, 5,000, 10,000, and 20,000 eggs per pot. Plants were inoculated two weeks after planting by pipetting the desired number of eggs in water into several holes in the soil around the base of the plant. After four months, the reaction of cassava to the inoculation was evaluated. The fresh weights of roots, tubers and tops and the severity of infection were determined. The degree of root galling was assessed using the galling index, based on percentage of the galled portion of the root system: 1 = no galls (1%); 2 = trace (1-25%); 3 = slight (26-50%); 4 = moderate (51-75%); 5 = severe (76-100%). The egg mass index was determined following the procedure used by Sasser (1976).

Table 1 shows the reaction of Golden Yellow cassava, to *Meloidogyne incognita* and *M. javanica* inoculations. Gall ratings and egg mass indices of 4.6 and 5 were observed in plants four months after inoculation with 10,000 and 20,000 eggs, respectively. Several egg masses were found protruding in root surfaces (Fig. 1). However, galls induced by *M. incognita* were bigger compared to those induced by *M. javanica*. Similar observations were reported by Cortado and Davide (1968) on tobacco.

When inoculated with *M. incognita,* the root and top weights were found to be affected and the plants became stunted (Fig. 2A). Reduction in root and top weights were different (P-0.05) at the 10,000 and 20,000 inoculum levels over the control. This would indicate that the initial populations of 10,000 and 20,000 eggs of this nematode species could adversely affect plant growth and development after four months. There was a direct correlation between excessive galling and

Table 1. Reaction of Golden Yellow cassava to inoculation with *Meloidogyne* incognita and *M. javanica* from single egg mass culture. [1]

Inoculum level (egg)	Galling index	Egg mass index	Fresh weight (g) [2]			Tuber reduction (%)
			Roots	Tubers	Tops	
M. incognita						
0 (control)	1.0	0	24.0a	26.6a	68.6a	-
1000	2.6	3.6	20.6a	22.6a	63.6a	15.0
5000	3.6	4.3	17.3ab	23.0a	58.6a	13.5
10000	4.6	5.0	10.3b	18.0a	44.3b	32.3
20000	5.0	5.0	9.0b	14.0a	40.3b	47.4
M. javanica						
0 (control)	1.0	0	21.3a	27.3a	60.6a	-
1000	2.6	3.3	15.6a	24.6a	50.6a	9.8
5000	3.6	4.3	16.0a	24.3a	48.6a	10.9
10000	4.6	5.0	15.0a	20.3a	40.0a	25.6
20000	5.0	5.0	13.0a	17.3a	38.0a	36.6

[1] Mean of 3 replications.

[2] Means followed by the same letters are not significantly different at 5% level according to Duncan's Multiple Range Test.

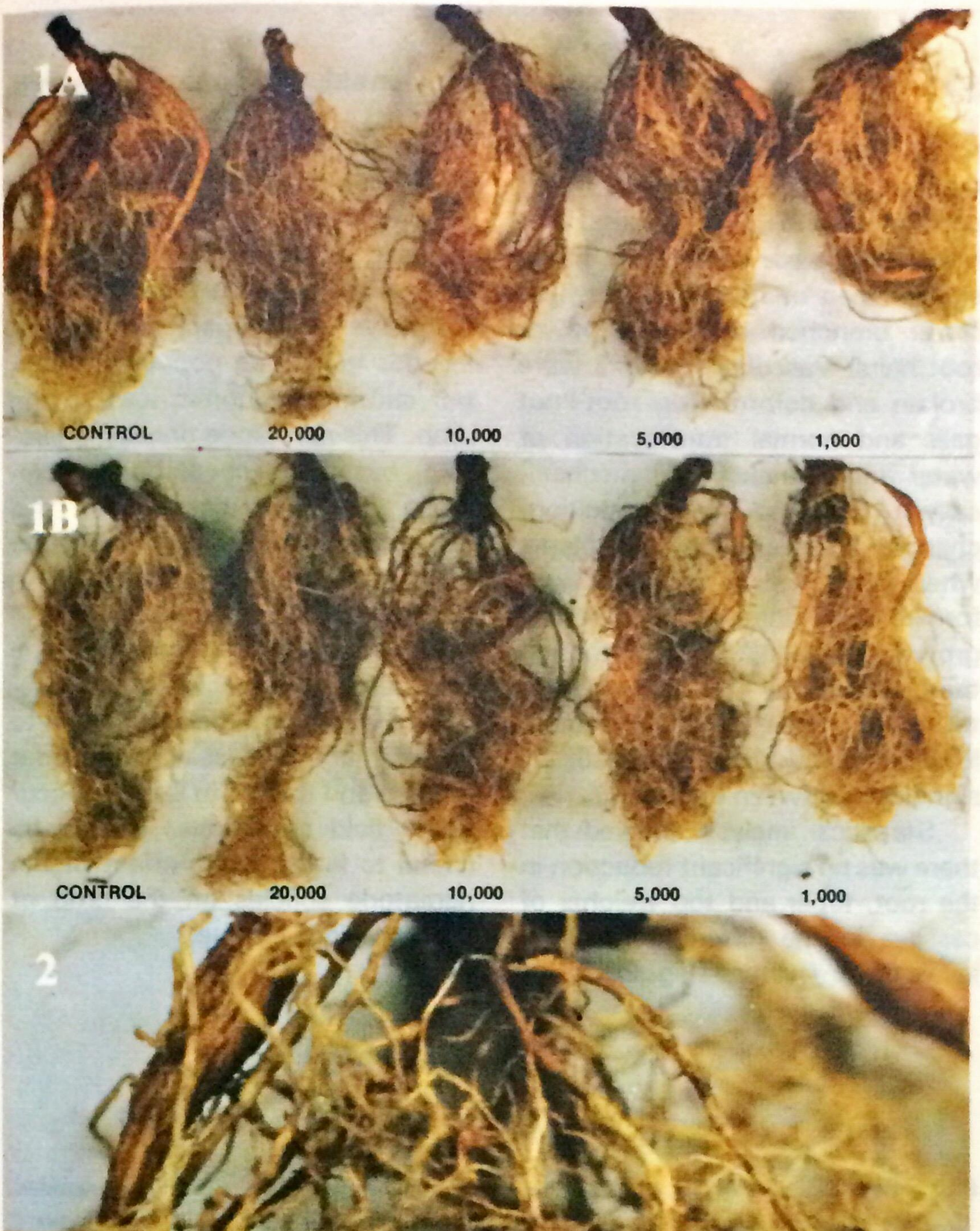

Fig. 1. Effects of varying inoculum levels of *Meloidogyne incognita* (A) and *M. javanica* (B) on the roots of Golden Yellow cassava. Note reduced volume with increasing inoculum.

Fig. 2. Galls and egg masses (Close up in INSET) on roots of Golden Yellow cassava induced by *Meloidogyne incognita*.

reduction of root and top growth, a reaction similarly noted by Taylor and Sasser (1978). They found that heavily infected roots were much shorter than uninfected roots, had fewer branched roots and fewer root hairs. Vascular elements were broken and deformed in root-knot galls and normal translocation of water and nutrients was mechanically hampered. In addition, changes in physiology of plants when giant cells and galls were formed contributed to reduced growth (Dropkin, 1972). Although there was 15 to 47% reduction in tuber weight at varying inoculum levels, this was not statistically significant between treatments.

Statistical analysis showed that there was no significant reduction in the root, tuber and top weights of cassava in the different inoculum levels of *M. javanica* (Fig. 2B). This seems to indicate that an initial population of 20,000 eggs of this nematode species after four months failed to disrupt the normal growth of the plants. Furthermore, the plants were still capable of supporting this nematode population without causing economic loss to the crop. This nematode density, therefore, has not exceeded the "tolerance limit" of cassava in this experiment and would then require higher density of *M. javanica*.

The result of the experiment in general seems to suggest that the two nematode species studied require a very high initial population to cause injury to cassava after four months and this is not likely to occur under field conditions. It may be useful to find out the effect of the nematode species on the crop at longer periods of time.

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