bryonic fruit. Thrips, contrariwise, may increase mango fruit set by pollination of the flowers. Low populations, 4-10 per flower, of the tiny insects is a common observation. This number may remain harmless or even increase pollination. If the number becomes 18-25 per flower, blast and loss of fruit may occur unless control measures are taken.

Twenty mango trees, each about 14 feet high, were used in a spray test to reduce thrips populations in the flowers. Dieldrin, an insecticide generally accepted as providing good thrips control was used as were 3 other common insecticides. Insecticidal treatments and unsprayed (check) trees were arranged in randomized plots in which 4 weekly applications were made to wet the trees. Twelve to 15 thrips per flower were found in the flowers previous to the spray applications. Three days after the last application approximately 4 thrips per flower were found in the dieldrin sprayed flowers. Approximately 15 per flower were found in the unsprayed flowers. Flowers on the trees sprayed with other than dieldrin had means of from 6 to 10 thrips each. Previous to harvest, the numbers of fruit were counted per tree.

A summarization of the data showed significant mean differences in thrips populations and insignificant mean numbers of fruit harvested from the trees. This is taken to indicate that reduction of thrips in the flowers resulted, but that no consequent change in fruit production resulted from the spray treatments.

In cooperation with Mr. James Miner, a Boynton Beach member of our Florida State Horticultural Society, a larger field experiment was conducted. Twenty rows, each of 31 trees, 12-14 feet high were set aside for the treatments. There were 4 spray treatments and an unsprayed check, arranged in 4 replications, one row in each. Nine weekly spray applications were made during the flowering period of the trees. Mild infestations of the thrips were present. Although no count of thrips was made, a census of the fruit was made previous to the harvest. Only slight differences were found in the numbers of fruit produced by the trees. No effort was made for statistical analysis.

Observations were made of honey bees foraging mango flowers on trees around a 13-colony apiary. Trees were flowering around the apiary in the 4 cardinal directions to 700 feet or more.

Honey bees on trees were counted per unit of time in each direction. Bees were counted on the trees nearest and to distances therefrom. Two or 3 bees per 3 minutes time was the usual count. Fruit counted on trees previous to harvest were practically equal on nearby trees and on those more distant. This showed no response of distance from the apiary affected fruit production.

More seasons of observations of honey bee foragers on mangos are needed since growers report that more honey bees are seen on mangos some seasons than others. Competition of different species or kind of flowers for honey bees is often observed. Hence, further work is needed to determine mango fruitfulness through pollination.

A lead in mango pollination may have been obtained by Dr. Robert J. Knight, Jr., Horticulturist, USDA Subtropical Horticulture Research Unit, Miami, Florida, through the use of carrion flies.

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EVALUATION OF PEACH ROOTSTOCKS FOR ROOT-KNOT NEMATODE RESISTANCE[1]

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Abstract. **The widespread occurrence of root-knot nematodes in Florida soils represents a major problem in peach production. Rootstocks resistant to** Meloidogyne incognita **and** M. javanica **have been available and widely used for a number of years; however, galls produced by a biotype have appeared in the past decade. Field and tank screening tests conducted over the past several years have yielded several selections which have potential as rootstocks for peaches and nectarines grown in Florida.**

Two species of root-knot nematodes, *Meloidogyne incognita* and *M. javanica* commonly occur in commercial peach and nectarine orchards in Florida. Their damage has led to the widespread use of resistant 'Nemagard' as well as 'Okinawa' seedlings as rootstocks in Florida. Root-knot galling on 'Nemagard' and 'Okinawa' seedlings growing in Gainesville breeding blocks was observed in 1966. In addition, all but 1 of the selections previously screened for *M. incognita* and *M. javanica* resistance had galls. This selection also escaped infestation the following season but died during the third year (3).

Part of the peach rootstock breeding program has been directed since 1966 toward finding selections resistant to the biotype of root-knot nematode. The most promising selections so far have been derived from crosses involving 'Okinawa' x *Prunus davidiana* (1, 2, 4). This study was initiated, as an integral part of the breeding program, to screen selections for possible resistance to the nematode biotype as well as to *M. incognita* and *M. arenaria.*

Materials and Methods

For several years after the new root-knot biotype was first observed, the roots of established trees growing in an infested area were examined annually for the presence of galling.

Three raised concrete tanks located in an uncovered greenhouse structure became available for use in 1975 enabling the extension and refinement of the field evaluation procedure. Soil temp was maintained above 75°F at all times with hot water circulated in pipes in the bottom of the tanks. Two of the tanks were filled with soil and fumigated with methyl bromide for 48 hours. One was subsequently inoculated with tobacco roots infected with *M. incognita.* The second tank was inoculated with peanut

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roots infected with *M. arenaria*. The third tank was filled with soil from a field test area containing the biotype ('Nemagard' tank). Nematode populations were maintained during non-testing periods by growing either 'Rutgers' tomato or susceptible peach seedlings in the tanks. Tests were made to determine nematode populations in the tanks.

Germinated seedlings from promising selections were grown in flats until they averaged 10-15cm in height for the 1975 tank tests. They were divided and planted in August so that approximately 1/3 of the seedlings were placed in each tank. Seedlings of a selection were put into only the 'Nemagard' tank when only a few were available. The seedlings from all 3 tanks were examined individually in January, 1976 for galling and assigned a rating ranging from 0 = no galls to 5 = severe galling. Gall-free seedlings of promising selections were planted back into the 'Nemagard' tank for additional exposure to the biotype. These were again evaluated in September, 1976.

The same basic procedure was followed in 1976, with seedlings planted in the tanks in September. Plant growth was checked for a prolonged period of time due to an extended cold period during the fall and winter. The seedlings were evaluated in April, 1977. Selections from the Nemagard tank showing no galling were replanted and evaluated again in September, 1977.

Results and Discussion

Seedlings obtained from promising field-grown peach selections were subjected to a much more severe test when planted in the 'Nemagard' inoculated tank (Table 1). A selection with a gall rating of 1 or less was considered worthy of continued evaluation. Of the 9 selections listed with field ratings of 1 or less in 1974, the average rating of all the seedlings tested in 1976 was considerably higher in each case and as much as 4 units higher in the case of selection 9-116. Only a small portion of the root system of the trees evaluated in the field was examined at several points. In contrast, seedlings in the tanks were removed entirely, excess soil shaken off, and evaluated. Difference in the extent of the root system examined may have had an influence on the ratings. Had it been possible to examine a large portion of the roots of existing field-grown trees they might have received higher ratings. More likely, however, optimal growing conditions in the inoculated tank resulted in a higher overall nematode population and resulted in heavier infestations on susceptible peach roots.

Table 1. Comparison of testing for nematode resistance in the field (1974) and in inoculated tanks (1976).

	Gall rating[a]			
	Field		Inoculated tanks	
Selection	Tree age	Rating	M. incognita	'Nemagard' type
4-117	5	1–	0	2+
5-115	4	0	0	2+
5-122	5	0	0	3
7-114	4	0	0	2+
7-120	4	0	0	1+
9-116	4	0	1–	4
12-85	3	1	0	2+
13-84	3	1–	0	3
17-64	13	0	0	3

[a]Gall Ratings: 0 = Free of galls, 5 = Severe galling.

Seedlings of all of 9 field grown selections listed in Table 1 and 2 others receiving gall ratings of 1 or better in 1974 had ratings of 1+ or more. Seedlings obtained from 13 new selections had ratings of 1 or less in 1976.

Table 2. Comparison of nematode galling on peach selections at the initial evaluation and after replanting in 1976 or 1977.

	Gall rating[a]				
	1976			1977	
Selection	Initial	Replant	Selection	Initial	Replant
3-123	1	5	3-122	2	4
4-115	1	1+	3-128	2.5	3
4-122	0	4	3-130	2	3
8-118	0	3	3-131	2.5	3
8-121	1	4	4-131	2	3
8-124	1	4	5-132	1.5	5
13-88	0	3	6-107	1	3
13-90	0	0	6-127	2	Dead
13-93	0	2	14-76	2	Dead

[a]Gall Rating: 0 = Free of galls, 5 = Severe galling.

Screening for resistance to 2 other species of root-knot nematode revealed a high degree of resistance to both. Five of 78 selections tested in 1976 and 4 of 69 in 1977 had galling due to *M. incognita*. Five of 69 selections in 1976 and 6 of 59 in 1977 were attacked by *M. arenaria*.

The length of time seedlings were exposed to high populations of the Nemagard type nematode influenced the eventual gall ratings. The gall rating assigned to individual selections in January, 1976 had increased by September with seedlings which had been replanted, except for 13-90 (Table 2). This trend occurred again in 1977 although only 4 months had elapsed between evaluations compared to 9 the previous year.

Several selections to date have demonstrated initial resistance to the root-knot biotype attacking 'Nemagard' and 'Okinawa' seedlings in Florida, but the stability of this resistance will be examined closely over the next several years as tank and field tests continue. Propagation potential and other desirable characteristics will be examined after suitable stable resistance is found in several selections.

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