HOST SUITABILITY OF GUARDIAN™ PEACH ROOTSTOCK TO *MELOIDOGYNE* SPP.

A. P. Nyczepir[1]*, T. G. Beckman[1], and G. L. Reighard[2].
[1]USDA-ARS, Southeastern Fruit & Tree Nut Research Laboratory, 111 Dunbar Rd., Byron, GA 31008; [2]Clemson University, Box 340375, Clemson, SC 29634.

Ring (*Criconemella xenoplax*) and root-knot (*Meloidogyne spp.*) nematodes are known to coinhabit peach tree short life (PTSL) orchards in the southeastern United States. Generally, *C. xenoplax* is associated with the predisposition of peach trees to cold injury and (or) bacterial canker (*Pseudomonas syringae* pv. *syringae*); the two factors directly identified with tree death in PTSL. *Meloidogyne* spp., on the other hand, are generally associated with causing reduced growth, vigor and yield, and early defoliation of trees. Recently it was demonstrated that the interaction between *C. xenoplax* and *M. incognita* caused a significant reduction in Lovell tree growth as compared to either nematode alone (two years after inoculation in field microplots). Reduced tree growth and defoliation symptoms were similar to those observed in commercial orchards.

The current preplant nematicide recommendation for managing *C. xenoplax* and *Meloidogyne* spp. in the Southeast includes the use of methyl bromide, one of two soil fumigants still available to growers. Lovell rootstock is also recommended over Nemaguard because trees have a higher survival rate on PTSL sites, even though Lovell is susceptible to root-knot nematode. Finding a rootstock superior to Lovell that survives on PTSL sites and also is root-knot nematode resistant would be of great value to the peach industry throughout the Southeast. Such a rootstock would provide an alternative to methyl bromide fumigation and be an important component to a peach integrated crop management program.

Last year we reported that a peach seedling rootstock, BY520-9 (=Guardian™), was identified in an unbudded trial in 1991 as providing greater($P \leq 0.05$) tree survival than Lovell. Tree survival was greater than for Lovell on two independent PTSL field sites after eight years of evaluation. Furthermore, preliminary greenhouse reports indicate that Guardian™ rootstock has some resistance to *Meloidogyne* spp. Grower demand has resulted in commercial availability of Guardian™ before all testing was completed.

Currently, the USDA-Byron and Clemson University are providing commercial nurseries with "bulk" seed of BY520-9 selections from seed orchards of surviving seedlings from the mother tree, which was lost. An unanswered question about the commercially available Guardian™ seed is its host suitability toward root-knot nematodes, specifically *M. incognita* and *M. javanica*. In 1995-96, studies were initiated to determine the susceptibility of Guardian™ rootstock to *M. incognita* and *M. javanica*.

Briefly, 10-day-old Guardian™-USDA, Guardian™-Clemson, and Lovell peach seedlings were transplanted into 10-cm-diam. pots containing 450 cm^3 sand/vermiculite (50:50 v/v). Approximately 4,000 eggs of *M. incognita* or *M. javanica* were added to each pot five days later. Uninoculated seedlings served as controls. Treatments were replicated 10 times. The experiment was arranged as a randomized complete block with a split-plot design (main treatment = nematode). The experiment was terminated after ca. 110 days and the following data were collected: number of egg masses per root system, number of eggs per root system, and dry root weight.

The experiment was repeated once at which time Nemaguard was included and root systems were additionally rated for number of galls per root system. Root penetration and development of *M. incognita* into Guardian™-USDA and Lovell seedlings at 3, 6, 12, and 24 days after inoculation were also studied in the laboratory.

Greenhouse results indicate that both Guardian™-USDA and Guardian™-Clemson commercial seed sources are poor hosts to the populations of *M. incognita* and *M. javanica* tested. Reproduction by *M. incognita* and *M. javanica*, as indicated by number of eggs and number of eggs per egg mass was less ($P \leq 0.05$) on plants from both Guardian™ sources as compared to Lovell (Table 1). However, gall formation was detected on roots of plants from both Guardian™ sources, and for *M. incognita* there were just as many galls produced as on Lovell. Root gall formation by *M. javanica* was less abundant ($P \leq 0.05$) on the Guardian™ sources as compared to Lovell. Root penetration studies indicate that *M. incognita* J2's penetrate Guardian™ roots, root galls form, but the majority of the nematodes do not complete their life cycle.

Guardian™ rootstock is showing promise as an alternative to preplant fumigation with methyl bromide for control of *M. incognita*, *M. javanica* and PTSL induced by *C. xenoplax*. Furthermore, evaluation of *Prunus* rootstocks for resistance to *Meloidogyne* spp. should not be based on a root-galling index alone as demonstrated in this study. Guardian™ rootstock needs to be evaluated against additional isolates of *M. incognita* and *M. javanica* and other *Meloidogyne* spp. to determine how broad and effective its resistance is.

Table 1. Host suitability of Guardian™(USDA), Guardian™(Clemson), Lovell, and Nemaguard peach seedlings to *Meloidogyne incognita* and *M. javanica* grown in the greenhouse after 110 days.[a]

	No. Egg Mass		No. Eggs		No. Eggs/Mass		No. Galls	
Rootstock	Test 1	Test 2	Test 1	Test 2	Test 1	Test 2	Test 1	Test 2
			M. incognita					
Lovell	92 a	13 a	218,290 a	15,640 a	2,175 a	1,543 a	----[b]	100 a
Guardian (USDA)	< 1 b	< 1 b	20 b	20 b	15 b	5 b	----	93 a
Guardian (Clemson)	< 1 b	< 1 b	60 b	30 b	33 b	10 b	----	100 a
Nemaguard	----	0 b	----	17 b	----	0 b	----	19 b
			M. javanica					
Lovell	86 a	48 a	26,750 a	10,250 a	276 a	202 a	----	93 a
Guardian (USDA)	< 1 b	< 1 b	5 b	0 b	0 b	0 b	----	14 b
Guardian (Clemson)	< 1 b	< 1 b	5 b	0 b	0 b	0 b	----	26 b
Nemaguard	----	< 1 b	----	0 b	----	0 b	----	15 b

Data are means of 10 replicates, except for Nemaguard rootstock, which had six replicates. Means within a column followed by the same letter for a particular *Meloidogyne* sp are not different according to LSD ($P \leq 0.05$).

[a] Initial population density of *Meloidogyne incognita* and *M. javanica* = 4,000 eggs per pot.

[b] ---- = not included.