Research Note

SUITABILITY OF PUMPKIN GENOTYPES AS HOSTS OF MELOIDOGYNE INCOGNITA[1]

The gross income from vegetables and legumes in Puerto Rico in 1986-87 was $24.4 million. Among the vegetables, cucurbits are very popular. Pumpkin is the most extensively cultivated. In 1986-87 the entire production of pumpkin (441,500 cw.) was consumed locally[2]. This cucurbit requires regular spray programs to control pests that reduce yields. The use of nematode-resistant cultivars with good horticultural characteristics could be a feasible alternative to pesticide use.

Two greenhouse experiments were conducted to evaluate the suitability of pumpkin genotypes as hosts of a population of *Meloidogyne incognita* from Isabela, P. R. In the first experiment, seeds of 19 pumpkin genotypes were planted in plastic pots of 15-cm diameter with 1300 cm of a steam-sterilized soil. The soil was composed approximately of 65% sand, 15% clay and 20% silt with pH 6.7. Ten groups of 19 pots each were planted with 3 seeds per pot of one of the following genotypes: DR-05; DR-14; DR-8; DR-10; DR-04; DR-18; DR-11; DR-15; DR-02; DR-09; DR-03; DR-13; DR-17; DR-19; #21 line B-15, DR-12; DR-01; DR-20 and Borinquen. Similarly, 10 pots were planted with 2-week-old tomato (cv. Flora Dade) seedlings. These served as viability indicators for the *Meloidogyne* inocula. Three weeks after planting, all pots received approximately 5,000 *M. incognita* eggs and second stage juveniles which were added with an Oxford pipette. Nematode eggs and larvae were extracted from infected tomato roots from Isabela, P. R., by the method of Hussey and Barker[4]. Ten replicates of each treatment were arranged in a randomized complete block design. The plants were maintained in a greenhouse at Mayagüez. They were watered as needed and a 20-20-20 fertilizer was applied twice per month.

A second experiment was performed as a follow-up evaluation of 13 genotypes which showed some degree of resistance in the first experiment. Two-month-old pumpkin seedlings were planted 30 cm apart in 13 m^2 seedbeds containing soil infested with *M. incognita*. Susceptible tomato cultivar Flora-Dade was planted between the pumpkins in each seedbed. They were used as viability indicator of *Meloidogyne* inocula. Treatments replicated 5 times were included in a randomized complete block design with each seedbed as a replicate. The plants were irrigated as needed. A 20-20-20 fertilizer was applied every 2 weeks. Insects and foliar diseases were controlled in accordance with the Agricultural Experiment Station recommendations[5].

[1]Manuscript submitted to Editorial Board 7 June 1986.

[2]Medrano, H., 1985. Situación Económica Empresa Hortalizas. En las Empresas Agrícolas de Puerto Rico. Situación y Perspectiva. Servicio de Extensión Agrícola, Univ. P. R.

[3]Chamberlain, J., 1984. Growing cucumbers, melons, squash, pumpkins and gourds. Home yard and garden. Circ. HO-8. Cooperative Extension Service Dep. Hort., Purdue University. West Lafayette, IN.

[4]Hussey, R. S. and K. R. Barker, 1973. A comparison of methods of collecting inocula of *Meloidogyne* spp. including a new technique. *Plant Dis. Rep.* 57: 1025-28.

[5]Anónimo, 1979. Conjunto tecnológico para la producción de hortalizas. Estación Experimental Agrícola, Recinto Universitario de Mayagüez.

TABLE 1.—*Response of nineteen pumpkin (*Cucurbita pepo *L.) genotypes to* M. incognita, *based on root-knot indexes and number of eggs per root system*

Genotype	Root-knot index (0-5)[1]	Number Eggs/root system
Tomato Flora Dade	5.0 a[2]	826,200 a
DR-03	5.0 a	550,470 cde
DR-17	4.7 b	840,780 a
# 21 line B15	4.7 b	404,912 fg
DR-19	4.6 c	773,462 ab
DR-09	4.6 c	658,530 bc
DR-02	4.6 c	566,190 cd
DR-13	4.6 c	439,465 efg
DR-20	4.6 c	413,27 fg
Borinquen	4.6 c	230,850 hi
DR-15	4.4 d	520,020 def
DR-18	4.1 e	517,590 def
DR-01	4.0 f	419,298 fg
DR-08	4.0 f	356,470 g
DR-10	4.0 f	343,180 gh
DR-14	3.7 g	138,350 i
DR-11	3.6 h	379,080 g
DR-12	3.3 i	546,750 cde
DR-04	3.0 j	500,785 def

[1]0 = 0, 1 = 1-2, 2 = 3-10, 3 = 11-30, 4 = 31-100, 5 = over 100 galls.

[2]Values in columns followed by the same letter do not differ statistically (P = 0.05) according to Duncan's multiple range test.

Fifty-five days after inoculation, all plants were harvested and root knot indexes per root system were determined on the basis of a scale 0-5 in which zero indicates no root galls, 1 = 1 to 2 galls, 2 = 3 to 10 galls, 3 = 11 to 30 galls, 4 = 31 to 100 galls, and 5 = over 100 galls. The number of eggs per root system was also recorded. We did the analysis of variance for all data. Means between plants within a genotype were compared with a t-test, and those among genotypes were compared by means of Duncan's multiple range test.

In the first experiment, genotypes that ranked either fewer than 4 in root knot index or contained fewer than 400,000 eggs per root system, were categorized as "promising" (table 1). These included DR-14, DR-8, DR-10, DR-4, DR-11 and DR-12. All of these except DR-4 were reevaluated in the second experiment at Gurabo Substation.

Table 2 shows root knot indexes from plants of the second experiment. All

TABLE 2.—*Evaluation of the response of pumpkin (*Cucurbita pepo *L.) genotypes to* M. incognita *based on root-knot indexes*

Genotype	Root-knot index (0-5)[1]
DR-10	4.8[2]
DR-1	4.8
DR-02	4.6
DR-11	4.6
DR-18	4.5
DR-12	4.4
DR-14	4.4
DR-08	4.4
Borinquen	4.3
DR-09	4.3
DR-17	4.0
DR-19	4.0
DR-05	3.8

[1]0 = 0, 1 = 1-2, 2 = 3-10, 3 = 11-30, 4 = 31-100, 5 = over 100 galls.

[2]Means in column do not differ statistically (P = 0.05), according to Duncan's multiple range test.

genotypes were susceptible to *M. incognita*. Apparently it is difficult to develop cucurbit cultivars resistant to nematodes. Fassuliotis reported that several screening programs failed to uncover any desirable amounts of resistance to the *M. incognita* group, *M. javanica* and *M. arenaria* in squash and pumpkin[6]. Therefore, we must evaluate more pumpkin genotypes in order to identify those suitably resistant for commercial production.

Nydia E. Vicente
Research assistant
María de L. Lugo
Research assistant
Nelia Acosta
Nematologist

[6]Fassuliotis, G., 1982. Plant Resistance to Root-Knot Nematode, *In* Nematology in the Southern Region of the United States, pp. 31-49, Edited by R. D. Riggs, Dep. Plant Pathol., Univ. Arkansas.