

Hybrid Rootstocks developed by ICAR-CCRI are resistant to Citrus nematode, *Tylenchulus semipenetrans* Cobb 1913

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Abstract: The response of 6 hybrid rootstocks developed by National Research Centre for Citrus, Nagpur (Maharashtra), India to *Tylenchulus semipenetrans* was determined in a greenhouse test. All the hybrid rootstocks did not support nematode reproduction. Hence, these hybrids may be used as an improved citrus rootstock.

INTRODUCTION

Citrus is grown on grafted trees worldwide in Mediterranean and subtropical climates. Numerous species of plant-parasitic nematodes have been associated with the citrus rhizosphere but few reproduce on citrus and cause damage to the trees. *Tylenchulus semipenetrans*, *Radopholus similis*, *Pratylenchus coffea* and *Meloidogyne* spp. are considered major nematode pests because they cause significant economic losses in multiple regions of the world. The degree of infection and damage to trees due to *Tylenchulus semipenetrans* greatly depends upon the rootstock used. This nematode causes a disease

syndrome that result in debilitation of the citrus plant. With the purpose of finding out resistant rootstocks, newly developed hybrids were screened against Citrus nematode, *Tylenchulus semipenetrans*.

MATERIALS AND METHODS

The screening of rootstocks was carried out under screen house conditions. Open-pollinated seeds from hybrid rootstock trees grown at NRCC Farm, Nagpur, were used in these studies. Seeds of each rootstock were planted in plastic trays containing steam-sterilized soil. One-year-old seedlings were transplanted in earthen pots (20 cm. diameter) filled

with steam sterilized soil mixture of field soil and sand in 1:1 ratio. Each rootstock was replicated five times. Two weeks after transplanting, each seedling was inoculated with 5000 active juveniles of *T. semipenetrans* obtained from culture pots maintained at N.R.C.C. Nagpur. The plants were watered regularly and maintained. One year after inoculation the experiment was terminated. Juvenile population in soil was determined by processing 250 cc soil from each pot as per Cobb's decanting and sieving technique. The roots were dried off water with blotting paper and weighed. The fibrous roots were cut into pieces and mixed well before taking half gram of roots for staining in hot acid fuchsin lactophenol for 30 seconds. The stained roots were cleared in plain lactophenol before counting the females infecting the roots. The reproduction factor (Rf) of *T. semipenetrans* on each rootstock was calculated by dividing the final population (soil population + root-wash population + root population) with initial population. Based on reproduction factor of the nematode, plant reaction was classified into three groups: highly resistant, resistant and susceptible.

RESULTS AND DISCUSSION

Reaction of hybrid rootstocks to citrus nematode, *Tylenchulus semipenetrans* is presented in Table 1.

Table 1. Reaction of different rootstocks to citrus nematode, *Tylenchulus semipenetrans*

S. No.	Rootstock	Rf*	Reaction
1.	NRCC Rootstock 1	0.14	R
2.	NRCC Rootstock 2	0.48	R
3.	NRCC Rootstock 3	0.78	R
4.	NRCC Rootstock 4	0.23	R
5.	NRCC Rootstock 5	0.34	R
6.	NRCC Rootstock 6	0.28	R

Rf	Reaction
0 - 0.09	Highly resistant (HR)
0.1 - 1.0	Resistant (R)
> 1.0	Susceptible (S)

All the hybrids were found highly resistant and the nematode did not multiply on them. Trifoliate have been reported resistant to citrus nematode by Baines *et al.* (1960); Hutchinson and O'Bannon (1978); Ibrahim *et al.* (1989), Singh (1997), Bamel and Singh 2012 (a) and Bamel and Singh, 2012 (b). This could have an important bearing in a breeding programme where a variety may react differently in different locations.

SUMMARY

The citrus nematode, *Tylenchulus semipenetrans* is a serious pest of citrus and is widely distributed in India. Studies on the resistance in rootstocks against this nematode could be of practical value in its management. Six hybrid rootstocks were screened for resistance against *Tylenchulus semipenetrans* under screen house conditions. One year after inoculation, the reproduction factor was calculated on the basis of final and initial population. The females per gram roots were also counted. Based on Rf value all the hybrids were found resistant to *T. semipenetrans* (Rf less than one). The result of this experiment will help determine which parental types should be used in a breeding programme to combine *T. semipenetrans* resistance with the other desirable characteristics in an improved citrus rootstock.

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