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Resistance of Some Cultivars of Tomato and Potato to *Meloidogyne javanica**

KHALIFA H. DABAJ AND M. WAJID KHAN[1]

ABSTRACT

Meloidogyne javanica is commonly encountered root-knot nematode species in the Western region of the Libyan Jamahiriya. Some cultivars of tomato and potato were screened against this namatode. Potato cultivars showed better resistance than tomato cultivars. Most of the tomato cultivars were found to be highly susceptible; only one (Tobol No. 748 VFN RF_1 RS) showed resistance. On the other hand, most of the potato cultivars were slightly susceptible. Two of the potato cultivars, Cardinal and Ajax exhibited resistance.

INTRODUCTION

Tomato and potato are the most vulnerable crops to the attack of root-knot nematodes all over the world (5, 14). Tomato is attacked by all the four major species of **Meloidogyne** and their known races. Considerable losses in yield have been attributed to the attack of the tomato crops by root-knot nematodes (8). Some tomato cultivars show resistance to root-knot nematodes. Fassuliotis (3) mentioned that 65 cultivars of tomato resistant to *Meloidogyne incognita*, *M. javanica* and *M. arenaria* has been selected or developed. Singh and Chaudhury (11) showed that Sl –120 and Nematex cultivars can be used for commercial cultivation and VFN-8, 65 255–1 and 65N 251–1 cultivars can be used as a source of resistance for evolving commercial cultivars. Krinjaic *et al.* (7) observed the response of 42 tomato cultivars grown in an hydroponic substrate heavily infested with *M. incognita*. In a screening, Sikora *et al.* (10) found resistance in some cultivars such as Healani, Kalohi, Anahu, Hawaii 7526, Atkinson, Nematex, Y - 207 and Y - 240 against *M. javanica*. Abu-Gharbieh (1) screened over 100 tomato cultivars under glasshouse conditions for resistance to *M. incognita* and *M. javanica*. Fourteen cultivars exhibited high degree of resistance to both species.

Potato is attacked by nine species of *Meloidogyne* (14). In Africa, *M. incognita* and *M. javanica* are dominant (14). In the tropics 24% of the loss to potatoes is attributed to

* *Adopted from M.Sc thesis by the first author.*

[1] *Department of Plant Protection, Faculty of Agriculture, University of Al-Fateh, Tripoli, Libya (S.P.L.A.J.).*

the attack by root-knot nematodes (9). Root-knot nematodes cause considerable damage to potato which is grown late in March in the Mediterranean region (8). Potato cultivar Alpha was reported by Sosa Moss and Juarez (12) as highly susceptible to *M. incognita*. Franco (4) reported that a complex hybrid obtained from crosses between *Solanum tuberosum* and *S. demissum* and between *S. tuberosum* and *S. andigenum* showed resistance to *M. incognita* and gave best commercial performance.

In recent studies Khan & Dabaj (6) and Dabaj and Khan (2) observed that tomato and potato crops in Western region of the Libyan Jamahiriya are attacked to a varying extent in different localities by root-knot nematodes. *M. javanica* was the dominant species.

The cultivars of tomato and potato that are commonly grown in this part of the country as well as those cultivars which are under experimentation for introduction in future have not been screened against root-knot nematodes. Therefore, some selected cultivars of tomato and potato currently grown and some from those which are under trial for introduction were screened against local population of *M. javanica* under glasshouse conditions.

MATERIALS AND METHODS

Ten cultivars of tomato namely Early Bak No. 7, Sambre No. 749 VFN F_1RS, Varda No. 331 VFN F_1RS, Ventura FR, Tobol No. 748 VFN F_1RS, Mandel No. 502 VFN F_1RS, ES 58 FR, Maramande, Ropreco FR RS and Rome VF and ten cultivars of potato namely Diamont, Universe, Maris Piper, Jaerla, Vittorini, Cardinal, Spunta, Mirka, Estima and Ajax were screened against *M. javanica* in a greenhouse experiment. The cultivars screened included some of those commonly grown in this region and also the cultivars which are under experimentation for introduction.

Seeds of tomato and potato cultivars to be tested were sown in 20 cm plastic potted sterlized soil. After emergence, seedlings were thinned to one plant per pot. After 2 weeks of growth, seedlings were inoculated with 1,000 freshly hatched second stage juveinles obtained from a pure culture of *M. javanica* maintained in the greenhouse. Treatments were arranged in a randomized block design and replicated three times. After inoculation plants were allowed to grow for 55 days in a greenhouse at 25–30°C. At harvest, roots were washed free of soil and rated for galling and eggmass production on the following scale: $\underline{0}=0$, $\underline{1}=1-2$, $\underline{2}=3-10$, $\underline{3}=11-30$, $\underline{4}=31-100$ and $\underline{5}=$greater than 100 galls or eggmasses per root system (13). The susceptibility of the cultivars on the basis of gall and eggmass indices was rated as given below:

0 = Resistant, 1–2 = Slightly susceptible,
3 = Moderately susceptible,
4–5 = Highly susceptible.

The experiment was repeated twice.

RESULTS AND DISCUSSION

The response of cultivars to screening against *M. javanica* is given in Table 1 and 2. Results indicated that all the tested cultivars of tomato were susceptible to a varying extent to *M. javanica* with the exception of Tobol No. 748 VFN F_1RS which was resistant. Cultivars, Early Bak No. 7, Ventura FR, ES 58 FR, Maramande and Rome

Table 1. Reaction of tomato cultivars to *M. javanica.*

Cultivar	Root-knot index**	Eggmass index**	Response
Early Bak No. 7	4	4	HS
Sambre No. 749 VFN F_1RS	1	1	SS
Varda No. 331 VFN F_1RS	1	1	SS
Ventura FR*	4	4	HS
Tobol No. 748 VFN F_1RS	0	0	R
Mandel 502 VFN F_1RS	1	1	SS
ES 58 FR*	4	4	HS
Marmande*	5	5	HS
Ropreco FR RS*	3	3	MS
Rome VF*	4	4	HS

R = Resistant; SS = Slightly susceptible; MS = Moderately susceptible and HS = Highly susceptible.
* Cultivars commonly grown in the Western region of the Libyan Jamahiriya.
** Root-knot and eggmass indices are mean of the three replicates.

Table 2. Reaction of potato cultivars to *M. javanica*

Cultivar	Root-knot index**	Eggmass index**	Response
Diamont*	2	2	SS
Universe	3	3	MS
Maris piper	1	1	SS
Jaerla*	1	1	SS
Vittorini	2	2	SS
Cardinal*	0	0	R
Spunta	1	1	SS
Mirka*	2	2	SS
Estima	2	2	SS
Ajax	0	0	R

R = Resistant; SS = Slightly susceptible; MS = Moderately susceptible.
* Cultivars commonly grown in the Western region of the Libyan Jamahiriya.
** Root-knot and eggmass indices are mean of the three replicates.

VF were highly susceptible, whereas Ropreco FR was moderately susceptible. Sambre No. 749 VFN F_1RS, Varda No. 331 VFN F_1RS and Mandel 502 VFN F_1RS were only slightly susceptible. All the commonly grown tomato cultivars except Ropreco FR RS were highly susceptible to *M. javanica.* Ropreco FR SR was only moderately susceptible. Cultivars under experimentation showed better resistance. Tobol No. 748 VFN F_1RS was resistant whereas other except Early Bak No. 7 were only slightly susceptible. Early Bak No. 7 was, however, highly susceptible (Table 1). This indicates that the tomato cultivars which are currently cultivated by farmers are highly susceptible to widely distributed *M. javanica.* This situation demands an early introduction of suitable resistant cultivars to check the onslaught of the pathogen.

Out of the ten cultivars of potato tested, two cultivars namely Cardinal and Ajax were resistant to *M. javanica.* The other eight were susceptible. However, none of the cultivars was highly susceptible. The Universe cultivar was moderately susceptible and the rest of the cultivars were found to be slightly susceptible (Table 2).

Potato cultivars showed better resistance than tomato cultivars. All the commonly grown cultivars of potato were only slightly susceptible except one (Cardinal) which was resistant. Similar response was exhibited by the cultivars under experimentation. This situation is encouraging in comparison to the performance of tomato cultivars grown. Nevertheless, there is a necessity to introduce more resistant cultivars in order to grow root-knot free crops.

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إختبار بعض أصناف الطماطم والبطاطس ضد نيماتودا تعقد الجذور

م . خليفة حسين دعباج د . محمد واجد خان

المستخلـــص

لقد تم اختبار مقاومة عشرة أصناف طماطم وعشرة أصناف بطاطس ضد نيماتودا تعقد الجذور (*Meloidogyne* spp.) وقد روعي في الإختيار الأصناف المعروفة لدى المزارعين بالإضافة إلى بعض الأصناف الأخرى .

وقد تبين من نتائج الإختبار أن معظم أصناف الطماطم المعروفة لدى المزارعين قابلة للإصابة بدرجة كبيرة جداً وخاصة الصنف (Maramande) ، وقد وجد صنف واحد فقط مقاوم وهو الصنف (Tobol No.748 $VFNF_1$ RS)

ودلت النتائج أن أصناف البطاطس أقل قابلية للإصابة بهذا المرض . وأن الصنفين (Ajax, Cardinal) مقاومين لنيماتودا تعقد الجذور .