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SCREENING OF WILD *Cicer* spp. LINES COLLECTED FROM TURKEY AGAINST TO *Meloidogyne* spp. *(Meloidogyne incognita, M. javanica* and *M. chitwoodi).*

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ABSTRACT

Fifteen accession of wild *Cicer* spp. *Cicer reticulatum, C. echinospermum* and C*icer arientinum* were screened against the resistance to *Meloidogyne* spp. In a greenhouse. Resistance evaluation was on a 1-9 damage index (1=highly resistance and 9=highly susceptible) based on number of gall. Almost all the tested breeding lines were susceptible to *Meloidogyne javanica* and *M. incognita* and also, in the most of the tested lines were observed symptoms of stress in terms of premature like chlorosis, drying leaves and finally stunting of plant growth. Observation of root and soil indicated that almost of all Chickpea line were affected by the *Melo*idogyne spp nematode and there were differences between lines of *Cicer echinospermum* and *C. reticulatum*. However, 3 lines of *C. echinospermum* of which 6 (50%) were rated ≤ 1 and were considered resistant to *Meloidogyne incognita* and *M. javanica* and none of the tested lines of *Cicer reticulatum* and *C. arientinum* were free of nematode. Also, we indicated high level of resistance to root knot nematodes *Meloidogyne incognita* and *M.javanica* in *Cicer echinospermum* species.

Keywords: *Cicer* spp., *Meloidogyne* spp., root-knot nematodes, Turkey

SUMMARY

Meloidogyne species, root-knot nematodes are most important plant parasites that infected thousands of different hosts, and case losses most agriculture crops in the world (Sasser and Freckman, 1987). Also, Root knot nematode is major pest of chickpea and could be cause a limiting factor in during the growing chickpea. *Meloidogyne incognita, M. javanica, M. arientina* and *M. chitwoodi* are species of nematodes common to damage chickpea this type of nematodes are widely distributed and attack chickpea in the Mediterranean region (Di vito et

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al.,1991). Typical symptom of parasitism by *Meloidogyne* spp in chickpea includes the establishment of permanent feeding that called root galling (Sasser, 1980). Moreover, blockage and deformation of plant tissue at feeding .There is no resistant cultivar to make public, so far, it is attractive to make new study the resistance of this crop against root-knot nematode and it was felt useful to screen the existing variety for tolerance which may be benefit the resistance the breeding of this crop against root knot nematode. This study describes the reaction of 15 accession of three wild *cicer* spp. were evaluated for resistance to three *Meloidogyne* spp. (*Meloidogyn incognita, M. javanica* and *M. chitwoodi*).

MATERIALS AND METHODS

Seeds of 6 accession of *Cicer echinospermum*, 6 of *C.reticulatum* and 3 of *C. arientinum* were made from Grains Research & Development Corp (GRDC) Motivation in Turkey. Seeds of each accession were disinfected by hypochlorite (4%) and alcohol (30%) before pre-germination. This seeds were placed on surface wet filter paper at 21°C for 3 days in sterile petri dishes then germinated seeds were planted in standard small tube (16 cm in high 2.5 cm in diameter) that contained the field soil, (73% clay,16.5% silt and 10% river sand) in 4-replicate under glasshouse condition. Before sowing plantlets soil were sterilized by autoclaving for 2 hours at 121°c. Eggs of *Meloidogyne javanica* and *M. incognita* were extracted from 8-week old cultures maintained on tomato and also eggs of *M. chitwoodi* were extracted from potato by treating a root with 0.1% sodium hypochlorite (Hussey and barker, 1973). Ten thousand eggs were added to the soil along with the seed (2500-2600 eggs per seed). all of the plants were conducted in the same time and grown in a growth chamber at 24°C, 50% humidity under 16/8 h day/night by high pressure sodium lamp, eight weeks after seedling emergence plants were carefully separated from the pots and roots assess for nematode damage in term of gall number. After treating the roots with 25% trypan blue. Nematode population was measured by counting the numbers of egg sacs that were stained deep blue. Root of each plant were evaluated for number of galls, egg sacs using a 1 to 9 index. Gall index (Gi):1=0 galls, 2=1-5,3=6-10,4=11-20,5=21-30,6=31-50,7=51-70,8=71-100,9 = > 100 (Taylor & Sasser, 1978). The Ak line Cagatay of *C. arientinum* selected as a susceptible check line for resistance to *Meloidogyne* nematodes between lines of *Cicer arientinum*. All lines of *Cicer* chickpea were accepted resistant with root infestation of ≤ 2 in four replications. Number of root-knot galls plant were used for contrasting the susceptibility of the varieties to *Meloidogyne* spp. (Table 1).

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Table 1: Parameters for resistance in chickpea against *Meloidogyne* nematodes.

Category	No. of galls plant	Suppression in total biomass
Resistant	1-5	Up to 5%
Moderately resistant	6-10	5-10%
Tolerant	11-20	10-15%
Susceptible	31-100	15-25%
Highly susceptible	>100	>25%

RESULT

Observation of root and soil indicated that almost of all Chickpea line were affected by the *Meloidogyne* nematode and there were not differences between lines of *Cicer echinospermum* and *C. arientinum* (Table.1). However, number of galls 2 lines of *C. echinospermum* of which 6 (33%) were counted ≤ 2 and were considered resistant in both *Meloidogyne javanica* and *M. incognita* and about *M. chitwoodi*. Galls number ≤ 2 to *meloidogyne* nematode was detected in Aklines 73, 75 and 166 of *C. echinospermum* (Tables 2,3). The remaining accession of other lines were counted susceptible to highly susceptible to *Meloidogyne* nematodes. Under controlled condition screening of the wild *Cicer* species gave a result that will be used on accession of wild Chickpea against to nematodes in the other experiment. However, for more testing will be needed identify lines with higher-ranking resistance to *Meloidogyne species.*

Table 2: Accession of 3 wild *Cicer spp*. for resistance to *Meloidogyne* spp. in laboratory condition at Turkey, 2016-2017.

Cicer species	Province	Accession ID	Ak line
Cicer reticulatum	Mardin	Bari1_064	3
Cicer reticulatum	Mardin	Bari1_065	4
Cicer reticulatum	Mardin	Bari1_066	5
Cicer reticulatum	Sirnak	CudiB_005	87
Cicer reticulatum	Sirnak	CudiB_006	88
Cicer reticulatum	Sirnak	CudiB_008	90
Cicer echinospermum	Diyarbekir	Cermi_061	73
Cicer echinospermum	Diyarbekir	Cermi_063	75
Cicer echinospermum	Diyarbekir	Cermi_071	78
Cicer echinospermum	Sanliurfa	Deste_065	165
Cicer echinospermum	Sanliurfa	Deste_066	166
Cicer echinospermum	Sanliurfa	Deste_071	168

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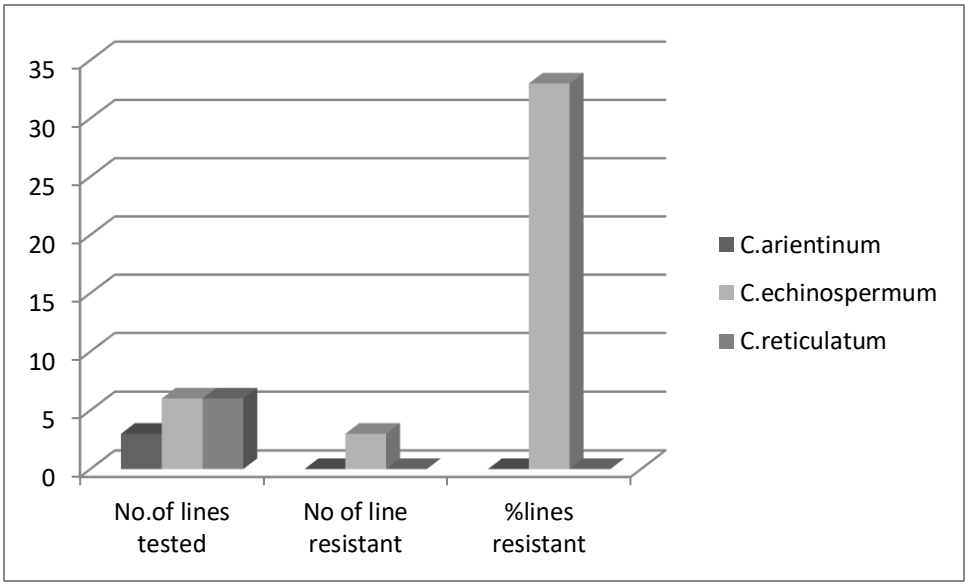
Cicer arietinum	Domestic	Dom	Catay
Cicer arietinum	Domestic	Dom	Gokce
Cicer arietinum	Domestic	Dom	Azkan

Table 3: Response of 3 wild *Cicer* spp. for against to *meloidogyne* spp.

Cicer species	No. of lines tested	No. of lines resistant	% of lines resistant
C.*arientinum*	3	0	0
C.*echinospermum*	6	3	50
C.*reticulatum*	6	0	0

Fig 1: Response of *Cicer* spp. lines to *meloidogyne* spp.



DISCUSSION

Many species of plant parasitic nematodes attack chickpea, root-knot nematodes are considered to be widespread economic importance (Sikora & Greco, 1990). Control of nematodes by using of nematicides and soil application is not possible but expensive (Sharma & Nene, 1990; Di vitro et al.,1991). Also crop rotation is complicated and seed treatment is not effective sometimes. Because of these reason use of host plant resistance against to nematodes has great potential. Growing of nematode resistant cultivars is economical than other way to against nematode and to

prevent environmental pollution. Unluckily, limited try have been made to detect sources of resistance and grow for nematode resistance in chickpea (Taylor, 1983). This study focus on methods for diagnosis of species resistance, identify sources of resistance and perspective for future research in chickpea. Root-knot nematodes, *Meloidogyne incognita*, *Meloidogyne chitwoodi* and *M. javanica* are economically important nematodes of chickpea (Sikora & Greco, 1990). *Meloidogyne incognita* and *M. javanica* are the most important nematode pests of chickpea in many country (Greco et al., 1990).

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Among nematodes infesting chickpea (*Cicer arietinum* L.), cyst nematode (*Heterodera ciceri* Vovlas, Greco et Di Vito) is very damaging in northern Syria (Greco et al., 1984; Vovlas et al., 1985), where complete crop failure occurs in fields infested with > 32 eggs of the nematode g-1 soil (Greco et al., 1988).

