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Research Article

EVALUATION NEMATODE OF SOME MEDICINAL PLANT IN ISFAHAN

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ABSTRACT
Plant parasitic nematodes are one of the limiting factors for crops in the world. To investigate the role and importance of medicinal plants, of the rhizosphere soil of 20 types medicinal plants grown in Dastgerd stations, 15 types of medicinal plant research, desertification Kashan and 25 types of medicinal plants Shahid Fazveh Najaf Abad respectively 26, 15 and 51 of the 92 samples and in 200 ml of soil nematodes extracted and gender population was counted. The results are evergreen from *Calendula officinalis*, *Hypericum perforactum*, *Artemisia absinthium*, *Matricaria chamomilla*, *Thymus serphyllum*, *Rosmarinus officinalis*, *Salvia viridis*, *Melissa offcinalis* and *Apium graveolens* medicinal plants Gal index higher and nematode Gal on roots, was sensitive. Plants such as *marrubium vulgarel*, *Morus nigra*, *Lavandula angustifolia*, *Artemisia siberi*, *Artemisia fragrans*, *Echium amoenum* Gal index 3 and 4 were relatively high sensitivity. Although the larvae eggs and larvae of nematodes in the 200 ml of soil around the roots of from *Valeriana officinalis*, *Foeniculum vulgare*, *Achillea millefolium*, *Zizyphus vulgaris*, *Rosa damascena*, *Rubus idaeus* and *Artemisia vulgaris* medicinal plants but wasnot found Gale in the roots of the plants.

Keywords: *Medicinal Plants, Nematodes, Root- Knot Nematodes, Population*

INTRODUCTION
Due to the extensive use of medicinal plants and natural compounds in pharmaceutical, food and cosmetic and health, basic and applied research in the field of plant pests and diseases as an important step in the process of increasing the quantity and quality of medicinal plants products seems necessary. Among plant pathogens, nematodes parasites capable of high pathogenicity and the damage is estimated that annually about one hundred million dollars (Park *et al.,* 2004). Plant parasitic nematodes are one of the limiting factors for crops in the world. Root-knot nematodes such as *Meloidogyne* species of cyst Nematode ornamental plants including *Cactodera cacti* the roots of plants fed and internal parasites live that the plant has made major changes in and absorption of water and nutrients by the plant is disturbed (Williamson, 2000). More nematode damage by nematodes genus *Meliodogyne* spp. is (Ripoll *et al.,* 2003). Root-knot nematodes (*Meliodogyne* spp.) are spreading around the world. More and more of these nematodes in areas with warm weather short and winters can be found. Root-knot nematodes are over 2,000 species of plants, all crops, attack and global product agricultural production by about 5% lower (Izadpanah, 2010). The purpose of this study was to identify the species of nematodes the soil around the roots 60 medicinal plants grown in Shahid Fazveh Najaf Abad, Dastgerd station Isfahan and Kashan desertification research center and influence the degree of sensitivity of the plants root gall nematode deals.

Theoretical Study
Over the years natural remedies in particular, basis medicinal plants and even in some cases the treatment was considered and while raw materials were used in the pharmaceutical industry. An important raw material in plants is stored, continuous as the materials used and will be irreplaceable. Pharmaceutical industry needs to obtain active ingredients of so much that it is possible to obtain from nature makes it impossible. So many of these plants should be planted on farms leaves. Of the plant in order to maintain

the quality and amount of active ingredients, specific conditions should be considered. Cultivation of medicinal plants, the first step to choosing the right plant species with habitat conditions that obtains the most economical too.

Seedbed must plow through appropriate procedures, fertilizer, seeding and plot layout with appropriate intervals disinfected and free of pathogens in soil planted. Plant parasitic nematodes are one of the main factors limiting plant growth are considered (Nicol, 2002). Nematode *M. incognita* weakening of the damage plant roots and reduce water absorption. The nematode *Meloidogyne* spp. To penetrate into the root and a special enzyme secretion of protease, the host metabolism to win and fungus pathogenic change.

The host plants with great reactions and properties of cells and cell proliferation the synthesis of auxin in root tissues and other substances or growth hormones to confront and thus the from spewing normal. The invading nematodes many cells surrounding the tumor leading to the formation of the root node. As a result, the host plant roots cannot grow normally and its main functions are to absorb nutrients through the soil to supply nutrients to perform well (Bergeson *et al.,* 1970). Species of *Meloidogyne javanica* common species in the world which exists in almost all parts of the world and the most common species in the world's second release (Park *et al.,* 2005).

History of Research

Hasseb and Pandy (1995) by studying the medicinal plants of the eight species of medicinal plants belonging to seven families for the first time as root-knot nematodes the host species reported. The results of the survey responses of various medicinal plants (Consist of *Gautheria fragrantissima, Cinochona officinalis, Citroidora Eucalyptus, Solanum khaziamum*) the most common species of root-knot nematode, indicates the dominance of plant pathogenicity of *Meloidogyne hapla* (Sivakumar and Vadivelu, 1997). Research studies on plant parasitic nematodes, especially root-knot nematodes, particularly in the fields of medicinal plants of Pakistan indicates severe contamination of some medicinal plants (For example, *Aloe vera* with *M. incognita*) with different types of root-knot nematodes are (Tariq *et al.,* 2007). Of *M. javanica* in Iran the distribution and abundance of first-rate importance (Damadzadeh, 2007). However, this group of pathogenic fungi pathogenic effects on medicinal plants have been less studied. Hashemi and Akbarinia (2008) in their study concluded that Arugula, castor, lemon balm, cumin and caraway as a species are susceptible to nematode *M. javanica.*

MATERIALS AND METHODS

Sampling and Extraction of Nematodes from Soil: Medicinal plant cultivation centers in Isfahan Dastgerd stations Isfahan, Najaf Abad Shahid Fazveh, Kashan, Jannat Abad Mobarake medicinal plants grown in soil around a kilogram amounts collected and transferred to the laboratory. In the lab, the 200 cm^3 of soil by sieving and centrifugation (Jenkins, 1964), washed and nematodes were extracted.

Preparation and Identification of the Nematodes: To eliminate fixation and transfer vermiform nematodes to anhydrous glycerin Seinhorst methods (1950) and completed DeGrisse (1969) was used. Detection of different sexes was identified using keys. Then population the suspension was extracted separately using slides counts was calculated.

Examine the Roots of Medicinal Plants: To assess the prevalence of medicinal plants root to root endoparasitic nematodes, dissolve 5 g of roots of plants sampled were stained with lacto phenol Fuchsin acid and after bleaching in glycerol the group of nematodes were examined under a stereomicroscope. If there is a root knots, node number of galls and egg masses on the basis of zero to 5 degrees offered Taylor and Sasser (1978) were determined. The section passes through a drop of glycerin, lactic acid cleaned and placed on glass slides were prepared for identification of the permanent prep.

To determine the prevalence of root in root-knot nematodes, one gram of roots of each sample was weighed and their length of 1 to 2 cm and then trade Javelle water ten percent was shaken for four minutes. Until the gelatin dissolves the egg and egg free. The resulting suspension was respectively 250 and 20 micron sieve passing 20 micron the contents of sieve thoroughly washed with water and the eggs and larvae in which the slides were counted.

RESULTS AND DISCUSSION

Sampling and Extraction of Nematodes from Soil

Medicinal plants are planted in the rhizosphere environment of Dastgerd stations Isfahan, Kashan, Shahid Fazveh Najaf Abad, 26, 15 and 51 and a total of 92 samples were collected in 200 ml of soil nematodes have been extracted and gender population counts (Tables 1, 2 and 3).

Table 1: Nematode populations in 200 ml soil samples collected from the station Dastgerd medicinal plants

The scientific name	Different genera of nematodes										
	Melo.	*Helico.*	*Xiphi.*	*Tylen.*	*Tylencho.*	*Dory*	*Crico.*	*Psi.*	*Dity.*	*Praty.*	*Sapro.*
Thymus serpyllum	-	-	-	33	-	-	-	-	-	-	134
Helianthus tuberosus	-	434	-	100	100	33	-	-	-	-	133
Achillea santolina	-	-	-	-	-	33	-	-	-	-	133
Achillea millefolium	-	1166	-	-	-	34	-	-	-	-	500
Rubia tinctorum	-	250	-	50	-	-	-	-	-	-	50
Rosmarius officinalis	167	2600	-	-	-	-	-	-	-	-	33
Mentha spicata	-	533	-	-	33	-	-	-	-	-	33
foeniculum vulgare	67	67	-	-	100	-	-	-	-	-	100
Melissa offcinalis	500	200	100	-	-	-	-	-	-	-	367
Arctium lappa	200	167	-	-	-	-	34	-	34	-	268
Lavandula angustifolia	110	267	-	-	-	233	-	-	-	-	234
Salvia viridis	34	200	-	34	-	34	-	-	-	-	-
marrubium vulgarel	767	167	-	-	-	100	-	-	67	-	200
Apium graveolens	34	634 (134)	-	-	-	-	-	-	34	-	1534
Hypericum perforatum	100	100	-	-	-	100	-	-	-	-	300
Pelargonium odoratissimum	134	200	-	-	-	-	-	-	-	-	234
Valeriana officinalis	133	267	-	33	100	-	-	-	-	-	167
Artemisia absinthium	100	100	-	-	-	100	-	-	-	-	300
Borago officinalis	134	200	-	-	-	-	-	-	-	-	234
Nepeta hederacea	133	267	-	33	100	-	-	-	-	-	167

Table 2: The population of nematodes in 200 ml soil medicinal plants collected from desertification Kashan Station

The scientific name	Different genera of nematodes					
	Melo.	**Helico.**	**Xiphi.**	**Tylen.**	**Tylencho.**	**Dory**
Lavandula angustifolia	-	67	267	-	-	933
Achillea millefolium	67	133	233	-	-	833
Rubus idaus	67	-	167	-	-	233
Rubia tinctorum	-	33	100	-	-	500
Zizyphus vulgaris	167	33	-	-	-	133
Foeniculum vulgaris	100	300	233	667	67	833
Agave Americana	100	-	400	-	-	9670
Artemisia vulgaris	133	33	67	-	-	700
Sternbergia	300	-	100	-	-	2267
Gazania sp.	200	-	100	-	-	700
Artemisia fragrans	100	200	333	-	-	1067
Artemisia siberi	33	-	167	-	-	700
Achillea millefolium	100	100	333	-	-	1800
Morus nigra	133	33	133	-	-	1600
Rosa damascena	133	33	400	-	-	1533

Accordingly, in the territory of medicinal plants in Dastgerd station *Helictylenshus* genera between 67-1166, *Xiphinema* 100, *Tylenchus* between 33-100, *Tylenchorhynchus* between 33-367, *Dorylaimid* between 33-233, *Crconematid* between 34-66, *Psilenchus* 34, *Ditylenchus* 33-134 and *Pratylenchus* 33 number were counted in 200 ml of soil. The free-living nematode populations between zero (in the case of *Hypericum* and *Artemisia vulgaris*) the 1534 number (*Valeriana officinalis* L.) were obtained (Table 1). In Mehdikhani Moghadam and Mokramhesar (2010) nine species of four genera in the order *Tylenchina* includes species *Helicotylenchus pseudorobustus*, *H. californicus*, *H. indicus*, *H. nigeriensis*, *Merlinius microdorus*, *M. indicus*, *Boleodorus thylactus*, *Psilenchus minor*, *P. hilarulus* in the Rhizosphere rosemary medicinal plant were identified. Several species of the genus *Helicotylenchus* spp., *Tylenchus* spp., *Tylenchorhynchus* spp., *Hoplolamus* spp., *Xiphinema* spp., and other *Ectoparasite* external parasitic nematodes from soil around the roots of canola also been identified (Bhowmik, 2003). In soil of medicinal Plants from desertification Research Station Kashan, genus *Helictylenshus*, *Dorylaimid*, *Pratylenchus* and *Xiphinema* respectively, 33-200, 0-400, 67 and 667 per 200 ml of soil were counted. The free-living nematode population between 133 and 9670 numbers, respectively, jujube and Agave respectively (Table 2). Medicinal plants of the genera in soil station Najaf Abad Shahid Fazveh *Helictylenshus*, *Dorylaimid*, *Pratylenchus*, *Tylenchorhynchus*, *Ditylenchus*, *Aphelenchus*, *Longidorus*, *Criconematios*, *Psilenchus* and *Tylenchus* respectively, 33-5267, 33-433, 33-600, 33-167, 33-533, 100, 33 and 67 number in the 200 ml of soil medicinal plants were counted (Table 3). The free-living nematode population 67-2167 numbers was achieved (Table 3). To evaluate and identify free-living nematodes *Dorylaimidae* families in Chaharmahal and Bakhtiari, a total of 150 soil samples collected from different areas and tested by Hadi-Ailjanvand and Fadaiy-Tehrani (2013) was performed. By studying the morphology and morphometerical five species of *Mesodorylaimus Andrssy*, 1956, including *M. vulneratus*, *M. graciosus*, *M. ibericus*, *M. pseudobastiani*, and *M. litoralis*, was identified in the first of four species, the nematodes Iran were new. Mahalleh *et al.*, (2013) to investigate and identify plant parasitic nematode fauna of the *Tylenchida* order in sugarcane plantations, number of 120 to 2400 kg in the agro-industrial stage of Amir Kabir, Mirza Kouchak Khan, Da'bal Khazaei, Hakim Farabi, Salman Farsi, Imam Khomeini, Dehkhoda Caron, seven hills and Mian-Ab sampling and five genera and four species of nematodes were found.

Table 3: The population of nematodes in 200 ml soil medicinal plants collected from Shahid Fazveh Najaf Aabad

The scientific name	Different genera of nematodes										
	Melo.	Helico.	Xiphi.	Tylen.	Tylencho.	Dory	Crico.	Psi.	Dity.	Praty.	Sapro.
Iris florentina	43	125	-	-	-	-	-	-	-	3	-
Dracocephalm kotschy	233	167	133	300	133	-	-	-	-	4	-
Cynara drancunchulus	-	300	67	-	-	-	-	-	-	2	-
Lavandula angustifolia	-	67	-	-	-	167	-	-	-	3	-
Hyssopus officinalis	-	367	167	-	-	-	-	-	-	6	-
Pimpinella anisum	-	833	200	-	-	-	-	-	-	7	-
Arachis hypogea	367	367	167	-	-	-	-	-	767	-	-
Sanguisoba minor	333	567	167	-	-	-	-	-	33	-	-
Thymus daenensis	933	6100	433	-	-	-	-	-	433	-	-
Stachys byzanthina	33	233	-	-	-	-	-	-	67	-	-
Origanum vulgare	67	33	-	-	-	-	-	-	100	-	-
Leomurus cardiaca	767	33	33	-	-	-	-	-	167	-	-
Silybium marianum	33	400	133	-	-	-	-	-	133	-	-
Cannabis sativa	133	123	33	-	-	-	-	-	267	-	-
Clinopodium vulgaris	67	300	-	-	-	-	-	-	200	-	-
Hypericum perforactum	367	-	-	-	100	-	-	-	1000	-	-
Echium amoenum	133	1267	-	-	-	-	-	-	1677	-	-
Dracocephalus modavica	67	1100	-	-	-	-	-	-	33	-	-
Borago officinalis	-	1200	-	-	-	-	-	-	1367	-	-
Echium khuzistanicm	667	1533	33	-	-	-	67	33	1533	-	-

Ruta gravelones	200	600	100	-	-	-	-	-	1600	-	-
Zygophyllum eurypterum.	133	333	-	-	-	-	-	-	1033	-	-
Arctium lappa	3233	200	67	-	-	-	-	-	400	-	-
Calendula officinalis	433	133	100	-	-	-	-	-	33	-	-
Artemisia absinthium	5500	867	133	-	-	-	-	-	-	1	-

Table 4: Reaction of medicinal plants grown in Dastgerd station to root knot nematode (Meloidogyne javanica)

The scientific name	**Number of galls**	**Gall index**	**Eggs and larvae of nematodes**	
			200 ml soil	One gram of root
Calendula officinalis	100>	5	167	4400
marrubium vulgarel	53	4	467	13100
Echium amoenum	12	3	267	200
Borago officinalis	6	2	134	150
Hyperium perforatum	100>	5	233	2550
Artemisia absinthium	100>	5	100	133
Tragopogon pratensis	2	1	-	-
Matricaria chamomilla	100>	5	300	460
Thymus serphyllum	100>	5	-	450
Arctium lappa	5	2	434	60
Salvia viridis	100>	5	200	1600
Helianthus tuberosus	2	1	-	-
Pelargonium odoratissimum	3	2	767	0
Rosmarinus officinalis	100>	5	167	150
Silybum marianum	5	2	-	-
Melissa officinalis	100>	5	500	150
Ruvia tinctorum	7	2	0	100
Valeriana officinalis	0	0	34	0
Achillea santolina	0	0	0	0
Achillea millefolium	1	1	0	0
Mentha spicata	0	0	0	0
Foeniculum vulgare	0	0	67	0
Lavandula angustifolia	20	3	500	160
Nepeta hederacea	5	2	133	0
Apium graveolens	100>	5	1100	1750

Table 5: Reaction of medicinal plants grown in Shahid Fazveh station to root knot nematode (Meloidogyne javanica)

The scientific name	Number of galls	Gall index	Eggs and larvae of nematodes 200 ml soil	200 ml soil
Iris sp	-	-	42	-
Dracocephalm kotschy	-	-	233	-
Thymus vulgaris	-	-	67	-
Cynara drancunculus	-	-	33	-
Lavandula angustifolia	-	-	33	-
Hyssopus officinalis	-	-	7133	-
Pimpinella anisum	-	-	5500	-
Artemisia absinthium	-	-	67	-
Echium amoenum	-	-	133	-
Dracocephalus moldavica	-	-	67	-
Echium khuzistanicm	-	-	67	-
Ruta graveloens	6	2	200	170
Zygophyllum eurypterum.	1	1	133	0
Arctium lappa	100>	5	3233	4700
Calendula officinalis	5	2	433	200
Arachis hypogea	-	-	367	-
Sanguisoba minor	-	-	333	-
Thumus daenensis	-	-	933	-
Stachys byzanthina	-	-	33	-
Origanum valgare	-	-	67	-
Leonurus cardiaca	-	-	767	-
Silybium marianum	-	-	33	-
Cannabis sativa	4	2	133	140
Clinopodium vulgare	-	-	67	-
Hypericum perforactum	-	-	367	-
Pelargonium odoratissimum	-	-	33	-

Table 6: Reaction of medicinal plants grown in Kashan Desertification Research to root knot nematode (Meloidogyne javanica)

The scientific name	Number of galls	Gall index	Eggs and larvae of nematodes 200 ml soil	200 ml soil
Lavandula angustifolia	58	4	267	*
Achillea santolina	2	1	100	-
Artemisia siberi	18	3	173	-
Morus nigra	15	3	133	-
Gazania sp.	4	2	200	-
Artemisia fragrans	27	3	233	-
Agave Americana	2	1	100	-
Achillea millefolium	0	0	67	0
Zizyphus vulgaris	0	0	167	0
Rosa damascena	0	0	133	0
Rubia tinctorum	0	0	0	0
Rubus idaeus	0	0	67	0
Foeniculum vulgare	0	0	100	0
Artemisia vulgaris	0	0	233	0

**: Due to root rot nematodes were extracted*

Examine the Roots of Medicinal Plants

The extent of damage *Meloidogyne* spp. among the world's most important genera of plant nematodes listed and one of top five factors are pathogenic to plants (Tanha-moafi and Mahdavian, 2008). Therefore root knot nematodes (*Meloidogyne* spp.) in these experiments some of the medicinal plants were identified. For this purpose, number of galls on roots, gall index, population of eggs and larvae are in 200 ml of soil and one gram of roots of medicinal plants were planted in different stations. Accordingly, the 20 types of medicinal plants planted in Dastgerd station, 21 kinds of plants including *Borago officinalis, Hypericum perforatum, Artemisia absinthium, Thymus serphyllum, Arctium lappa, Salvia viridis, Helianthus tuberosus, Pelargonium odoratissimum, Rosmarinus officinalis, Melissa officinalis, Ruvia tinctorum, Achillea millefolium, Lavandula angustifolia, Nepeta hederacea and Apium graveolens* As hosts of *M. javanica* were identified (Table 1). Root-knot nematodes sensitivity medicinal plants include *Calendula officinalis*, *Hypericum perforatum*, *Artemisia absinthium*, *Matricaria chamomilla*, *Thymus serphyllum*, *Salvia viridis*, *Rosmarinus officinalis*, *Melissa officinalis* and *Apium graveolens* are very severe and gall index was calculated as 5. In some plants, such as *Valeriana officinalis, Achillea millefolium, Mentha spicata* and *Foeniculum vulgaris* with eggs and larvae of nematodes in soil around the roots of any node on which the roots were observed (Table 4). 25 kinds of medicinal plants planted in Shahid Fazveh station Najaf Abad 5 kinds of plants, including *Ruta gravelones*, *Zygophyllum eurypterum*, *Arctium lappa*, *Calendula officinalis* and *Cannabis sativa* as host for *M. javanica* were identified species *Arctium lappa* plant due to high nematode populations in which the root gall index showed 5 however, borage, calendula, root gall index 2 and medicinal plant cannabis spp Gal index showed 1. But *Ruta gravelones*, *Calendula officinalis* and *Cannabis sativa* root Gal index 2 and medicinal plant *Zygophyllum eurypterum* Gal index 1 showed that represents the low sensitivity of plants to root Gal index nematode (Tables 3 and 5). Hajihasani *et al.,* (2008) in their test results to nematode infection in 4.8% of the wheat fields sampled high, on average 12 percent and 22.9 percent declared low. 15 types medicinal plants grown in the Research Station desertification Kashan, 6 kinds of plants such as *Lavandula angustifolia*, *Achillea millefolium, Artemisia fragrans, Artemisia siberi, Gazania sp.* and red *Agave Americana* as host for *M. incognita* race two were identified (Table 2). But *Achillea millefolium, Zizyphus vulgaris, Rosa damascena, Rubia tinctorum, Rubus idaeus, Foeniculum vulgare* and *Artemisia vulgaris* despite the nematodes in the soil around their roots in the Gali was not observed (Table 6). The majority of medicinal plants mentioned as new hosts for root knot nematodes and were introduced the need to increase the application mentioned plants as a major factor in choosing a healthy Earth or preparing healthy cuttings or suckers and free of nematodes considered (Ahmadi and Esfahani, 2002).

Conclusion

The results are evergreen from *Calendula officinalis, Hypericum perforactum, Artemisia absinthium, Matricaria chamomilla, Thymus serphyllum, Rosmarinus officinalis, Salvia viridis, Melissa offcinalis* and *Apium graveolens* medicinal plants Gal index higher and nematode Gal on roots, was sensitive. Plants such as *marrubium vulgarel, Morus nigra, Lavandula angustifolia, Artemisia siberi, Artemisia fragrans, Echium amoenum* Gal index 3 and 4 were relatively high sensitivity. So in the cultivation of these plants should be careful about the lack of contamination of soil and plant cuttings and seeds for reproduction to occur. From medicinal plants as *Borago officinalis, Tragopogon pratensis, Agave Americana, Achillea santolina, Helianthus tuberosus, Pelargonium odoratissimum, Gazania sp., Zygophyllum eurypterum, Calendula officinalis, Cannabis sativa* and *Nepeta hederacea* has low sensitivity to the nematode Gal on the roots. medicinal plant *Arctium lappa* Dastgerd station with 434 eggs and larvae of nematodes in 200 ml of soil around the roots of the plant's manufacturing Gal index showed 2 representing the low sensitivity of the plant to the nematode Gal. But in Shahid Fazveh Najaf Abad station with 3233 eggs and larvae of nematodes in 200 ml of soil root Gal index increased to 5 and high sensitivity which indicates that the number of eggs and larvae around the root of the plant, sensitivity causing Gal on the roots of the plant rises. Although the larvae eggs and larvae of nematodes in the 200 ml of soil around the roots of from *Valeriana officinalis, Foeniculum vulgare, Achillea millefolium, Zizyphus vulgaris, Rosa damascena, Rubus idaeus* and *Artemisia vulgaris* medicinal plants but wasnot found Gale in the roots of

the plants (Tables 4, 5 and 6). Therefore these plants, resistant to *Meloidogyne javanica* nematodes are introduced.

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