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Effect of Leaf Extracts of Some Medicinal Plants on Root-Knot Nematode *Meloidogyne Incognita* on Eggplant *Solanum Melongena*

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Abstract:

Fresh leaf extracts of Azadirachta Indica, Andrographis Paniculta, Ocimum Sanctum, Rosa Vubiginosa, Withania Sounifera, Murrage Koenigi, Allium Sativum, Ziziphus Jujube, Allium Cepa And Callistema Citrinus were tested against root-knot nematode, Meloidogyne inconita. All used extracts of medicinal plants against nematode Meloidogyne Incognita ,to see how much impact on the eggplant Solanum melongena (variety: black beauty) in 13 treatment and 3 replication where T_0 control and from T_1 to T_{10} only extracts of medicinal plants and T_{11} used only nematode and T_{12} chemical (Carbofuran). In the preliminary studies, almost all the plant species exhibited nematicidal property. Azadirachta Indica (Neem) and Murrage Koenigi (Carry leaf) gave best results against the nematode Meloidogyne inconita.

Key words: Eggplant, leaf extracts of medicinal plants, *Meloidogyne incognita*

Introduction

Eggplant *Solanum melongena* is a species of nightshade commonly known in British English as aubergine and also known as melongene, garden egg, or guinea squash. It is known in South Asia, Southeast Asia and South Africa as brinjal. It

bears a fruit of the same name (commonly either "eggplant" in American and Australian English or "aubergine" in British English) that is widely used in cooking, most notably as an important ingredient in dishes such as moussaka and ratatouille.

Meloidogyne incognita is a nematode, a type of roundworm, in the family *Heteroderidae*. It is commonly called the "southern root-knot nematode" or the "cotton root-knot nematode". This parasitic roundworm has worldwide distribution and numerous hosts. It is an important plant parasite classified in parasitology as a root-knot nematode, as it prefers to attack the root of its host plant .when *M. incognita* attacks the roots of plants, it sets up a feeding location, where it deforms the normal root cells and establishes giant cells. The roots become gnarled or modulated, forming galls, hence the term "root-knot" nematode.

M. incognita has been found to be able to move along shallower temperature gradients (0.001C/cm) than any other known organism, **(Pline and Dusenbery 1988**) an example of thermo taxis. The response is complicated and thought to allow the nematodes to move toward an appropriate level in soil, while they search for chemical cues that can guide them to specific roots **(Diez and Dusenbery 1989).**

Medicinal plants have been identified and used throughout human history. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and nematode herbivorous mammals. At least 12,000 such compounds have been isolated so far; a number estimated to be less than 10% of the total **(Tapsell *et al.,* 2006)**

Materials and Methods

Extraction: Fresh leaves of neem (*Azadirachta Indica* L.*)* , kalmegh (*Andrographis Paniculta* L.*)* , tulsi *(Ocimum Sanctum* L.*)* , ceine rose *(Rosa Vubiginosa* L.*)* , ashwagandha *(Withania Sounifera* L.*)* , carry leaf *(Murrage Koenigi* L.*),* garlic *(Allium Sativum* L.*),* ber *(Ziziphus Jujube* L.*),*onion *(Allium Cepa* L.*)* and bottle brush *(Callistema Citrinus* L.*)* were obtained from india -Allahabad on a farmers plantation . They were washed under running tap water and sterile distilled water .Leaf extracts of each plant were prepared by blending 25g of chopped leaf in 100ml – distilled water with a warring blender. Thereafter, the suspension was filtered through sterile muslin cloth. Suspensions of concentrations of 10, 25, 50 and 100% were prepared with distilled water (**Orisajo *et al*., 2007**)

Preparation of root-knot nematodes cultures:
Roots of eggplant plants naturally infested with root-knot nematodes were collected from Department of plant protection farm in Allahabad. The root-knot nematodes species were identified with the help of perennial pattern as described by **Taylor and Netscher (1974).** Galled roots with egg mass were washed free of soil and cut into 2-cm pieces. After placing in 0.5% Sodium hypochlorite they were triturated for 30s at maximum speed (1000 rpm) in a two-speed blender.

Pot experiments:
Eggplant **(**Variety: Black Beauty) seedling with two leaves was transplanted in pots by 13 treatment and 3 replication before placing in the soil where bots sterilized by autoclave sterilizer soil where he developed large bags and sterilized for two hours but two times and then was added to the boot .

In the first method, 5-7 days after seedling transplanted, 2000 ± 10 second stage juveniles were added to pots around the root seedling, and after 2 days, 20 ml of extracts was added to

pots separately, which was repeated after two days **(Bridge *et al* 2005)**. And T_{11} used only nematode and T_{12} chemical (Carbofuran). Treatments were replicated three times in greenhouse conditions at 24-28 ^{o}C at a Completely Randomized Design. After 60 days plant growth parameters (one plant for each pot) for shoot length , root length , root weight and root knot and harvest all plants after 90 days parameters for shoot length , root length , root weight and root knot and nematode reproduction factors were recorded and compared.

Statistical analysis: Data were analyzed according to analysis of variance (ANOVA) using SAS program ,Treatment means were compared using least significance differences (LSD) at $p<0.05$.

Results and Discussion

The efficiency of the leaf extracts to medicinal plants agents in the management of root knot nematode *meloidogyne incognita* was assessed from reduction in root galling expressed in terms of Root Knot nematode. The efficiency leaf extract of neem to reducing nematode infestation, the biocontrol agents enhanced the growth of the plant.

Effect on plant growth:

It is evident from the (Table 1) that most of the treatments showed significant results (at p= 0.05). For shoot/ root fresh and dry weights, as well as, shoot and root length of the plant,T_1 Neem (*Azadirachta indica*).T_6 Carry leaf(*Murrage koenigi*) treatment resulted in highest fresh weight measurement for both plant shoot and root followed by T_5 Ashwagandha (*Withania sounifera*) and T_2Kalmegh (*Andrographis paniculta*) were similarly found to show good results for dry weight and length of shoot and root.

Effect on Root Knot nematode population:

Maximum reduction in root galling as was also the soil population, occurred in soil treated with leaf extracts of medicinal plants which was also observed by **(Khan and Goswami, 2000)**. Neem and carry leaf showed adverse effect on root galling number. T_1 Neem (*Azadirachta indica*). T_6 Carry leaf (*Murrage koenigi*) treatment resulted in highest reducing of root galls number measurement for root knot number followed by T_5 Ashwagandha (*Withania sounifera*) and T_2 Kalmegh (*Andrographis paniculta*) .There was difference in number of galls in roots when treated with leaf extracts. Besides the natural antagonists of nematodes, naturally occurring organic compounds such as neem leaf extract may also be effectively used **(pandey and kalra, 2003**) .The active principle of neem such as nimbidin and thionimone were reported to be highly active against nematodes (**Fatema and Ahmad, 2005).**

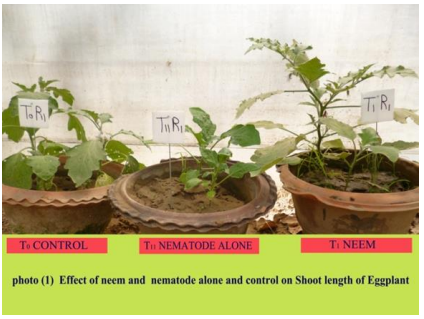

photo (1) Effect of neem and nematode alone and control on Shoot length of Eggplant

Photo (3) Effet of T1 Neem on root weight of Eggplant

Photo (2) ROOT-KNOT NEMATODE *MELOIDOGYNE INCOGNITA* ON EGGPLANT

Table 1. Represents the effect of medicinal plant extracts on nematode meloidogyne Incognita in terms of plant height and root length and weight of roots and number of root knot, within 30, 60, 90 DAS .

Treatments	Shoot Length		Root length		Root Weight			Root Knot	
	30 DAS	60 DAS	60 DAS	90 DAS	60 DAS		90 DAS	60 DAS	90 DAS
	Means (CM)	Means (CM)	Means (CM)	Means (CM)	Fresh	Dry	Means	Means	Means
T_0 Control	18.00	49.33	18.60	24.00	37.33	21.33	39.00	0.00	0.00
T_1 Neem (*Azadirachta indica*)	16.50	45.00	15.00	18.33	31.33	17.80	36.33	6.67	7.20
T_2 Kalmegh (*Andrographis paniculta*)	9.00	41.00	13.65	16.00	21.40	17.30	33.00	11.00	12.67
T_3 Tulsi (*Ocimum Sanctum*)	8.00	28.00	7.33	10.00	24.00	13.33	26.00	12.67	14.33
T_4 Ceine rose (*Rose Vubiginosa*)	14.67	41.00	11.00	12.67	28.00	15.60	36.67	13.33	15.33
T_5 Ashwagandha (*Withania Sounifera*)	15.33	41.20	13.67	16.20	29.67	17.33	34.33	10.33	12.00
T_6 Carry leaf (*Murrage Koenigi*)	16.83	42.00	14.67	16.50	30.67	17.40	35.00	8.20	9.50
T_7 Garlic (*Allium Sativum*)	14.50	28.67	12.67	15.00	29.33	17.00	32.30	12.33	14.67
T_8 Ber (*Ziziphus jujube)*	9.50	39.00	7.67	10.33	24.67	16.33	29.67	12.67	15.67
T_9 Onion (*Allium cepa*)	7.83	29.00	8.33	10.67	25.33	17.20	30.67	11.70	13.67
T_{10} Bottle Brush (*Callistema Citrinus*)	9.17	37.33	6.67	11.67	26.33	16.67	28.67	12.33	13.67
T_{11} Nematode alone	6.50	16.67	5.67	9.20	12.33	7.63	14.50	37.67	64.00
T_{12} Chemcal (Carbofuran).	16.60	30.00	10.00	12.57	20.67	12.00	14.83	18.33	22.67

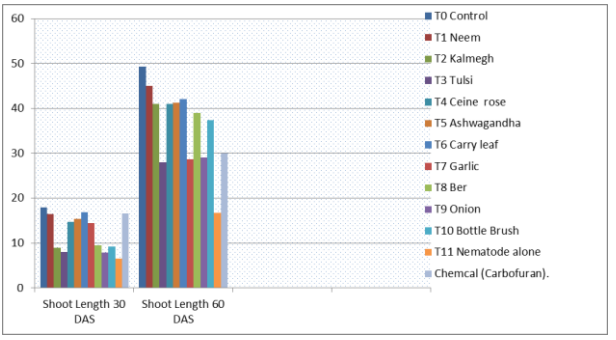

Fig (1) : Effect Of Medicinal Plants On Shoot Length (30 DAS) ,(90 DAS).

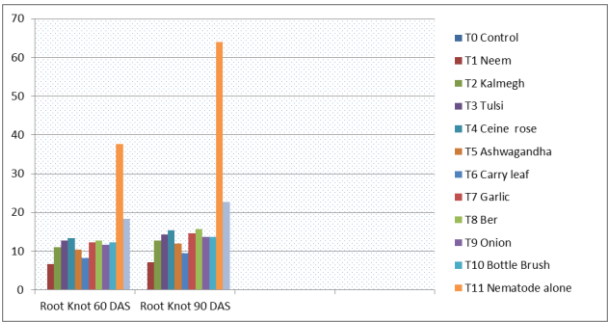

Fig (2): Effect Of Medicinal Plants On Root-Knot Nematode *Meloidogyne Incognita* (30 DAS) ,(90 DAS).

Discussions

It was evident from the results experiments that the growth of eggplant was significantly inhibited by these plant leaf. of these plant Neem *(Azadirachta indica)* and followed by Carry leaf (*Murrage koenigi*) leaves extract was found more effective treatment resulted in highest reducing of root galls number measurement for root knot number and showed significant results (at p= 0.05). For shoot /root fresh and dry weights, as well as, shoot and root length of the plant.

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