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To Control the Pesticidal Pollution by Application of Fungal Bioagent, Neem Oil Seedcake and Farm Yard Manure on Disease Complex Caused by Root Knot Nematode Meloidogyne Incognita & Wilt Causing Fungus on Tomato

Dr Manish Singh
I.E.T. Dr. RML Awadh University Faizabad
manishrnspgc@gmail.com

Abstract: Tomato (Lycopersicon esculatium mill) one of the most important vegetable crop grown throughout the world, rank second in important to potato in several countries and in India It is consumed by a large number of people in various form in daily diet, in India it is grown throughout the country is from garden and is commercial scale for processing purpose continue about 0.32 million ha under cultivation with annual production of 4.8millon tones (FAQ, 1995). It is considered to be the most important protective food both because of its special nutritive value due to high vitamins like A, B and C, rich sources of carbohydrate and also contain high ratio of Potassium, Sodium. It is use as Salad, pickle, Puree, Sauce and many other ways in our daily life, by virtue of its various attributes tomato is considered as an important and an ideal plant for research.

To develop the long term package of protection under integrated In this paper we study about the integrated management of the disease complex caused by root knot nematode Meloidogyen incognita and the fungus Fusarium oxysprumon tomato crop the present investigation we carried out the colonization and development of fungal bioagent under glass house condition secondly soil amended with farmyard manure and neem oil seed cake and after that the process amended by adding fungal bioagent this treatment which contain fungal bioagent ,neem oil seedcake and farmyard manure reduced the disease incidence to a great extent with most promising improvement of plant growth. This investigation is one of the ideal ecofreindly treatments for management of this disease complex

Key Words *- Antogonism, fungicides, nematicides, endophytic, resistance strain, obligate bio-protectant, biological control*

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I. Introduction-

The crop is highly susceptible to root pests especially nematodes e.g *Meloidogyne garacia; Meloidogyne incognita and Hetrodera sp,* shoot and fruit pests *Epilachna sp Leucinodes orbonalis, Empoasca devastans , Dist;Centrococcus insolitus G, Aphis fabae,Aphis gossypiiand Hyperapsis maindronii Si*c.A number of fungi causing damping of seedlings, leaf spot root and fruits root several viruses and phytoplasm (The Wealth of India 2002). Of the various pathogens and diseases mentioned above caused bythe root knot nematode Meloidogyne incognita is the most serious disease in India (Bhatti, 1988; Verma 2003; Tiwari et.al, 2007).The assessments of yield losses have been published from time to time in differentareas of the country. Reddy and Singh (1981) reported economic losses due to rootknot nematode disease of tomato in tropics and subtropics. The yield losses of tomato crop in Rajasthan was reported to be 33.70/0 (Reddy and Singh 1981) whereas the damage in other parts of the country was to range between 27.3-44.9% (Bhatti and Jain 1977; Krishnappa et al, 1981).

The nematodes not only cause direct damage to plants at their own, but generally help fungi, bacteria and plant viruses to invade host plant (Abu Gharbieh et al; 1978, Bagawati and Goswami,2000) This leads to the development of a disease complex, the fungus also develops synergetic relationship with Meloidgyne sp. leading to root).knot wilt disease complex (Patel et al, 2000; Akram and Khan, 2006). Thus the disease complex is high to tomato plant. Several studies have been made on the population dynamics and management of root knot nematodes (Goswami and Swarup, 1972; Raut and Patil, 2005; Tripathi et al, 2006Through extensive survey's a Farmer's was identified and selected as hot spot heavily infested with root wilt fungus and root knot nematode complex for proposed management experiment on Tomato. In recent year attempts have been made for combating plant disease and pest with non-chemical method which Mycorrhiza is one of the most important ones both alone and as one the component of Integrated Disease Management. This beneficial management particularly G. fasciulatum leaves no toxic residues in soil and rather sustain the soil health with rich nitrogen phosphorous (NPK) and phosphorous from cake and vesicular Arbuscular mycorrhiza (VAM) respectively G. fasciculatum which is known to help conservation of non-soluble phosphorous to soluble, suppression of invaders by the phenolics and thickening of vascular tissue for protecting against pathogen play an important role in defense, mechanism improving plant health. In the present investigation the attempt is made for its mass multiplication along with its role in ecofriendly management of disease complex also proposed an excellent medium of the obligate bio-protectant G. fasciculatum.

Different survey are been carried out from various pulse crop and one of the best performance was selected for further studies. Although considerable efforts have been made to minimize the losses due to these pathogens. thus with the mission of attempting Eco friendly management of the pathogenic fungus and the root knot nematode causing disease complex on tomato and with some non-chemical method of plant disease management including the fungal bioagents, occurring some natural ecosystem, which have been reported as potential fungal bioagents against both Attention is diverted to integrate these compound of management with oil seed cake In addition to proposing an idea ecofriendly treatment for the management of this disease complex also proposed an excellent medium for the proliferation of obligate bio-protectiant management of root knot nematode disease infecting tomato, by the use of fungal bioagent isolated from the egg masses of M. incognita infecting tomato has been carried out. The above proposed management components would sustain soil health and improve the diversity of the beneficial micro-organism without having any toxic residues, therefore the environmental quality improves the soil degradation is arrested.

3- OBJECTIVES

a) To isolate and identify the beneficial Saprophytic) fungi eg *Paecilomyces lilacinusTrichoderma* sp. etc. (known as bioagents) from the rhizospere of tomato crops which are reported to be frequently occurring in farmers field. The above isolated bioagents will be compared with already existing isolates.

b) To identify wilt causing fungi and also root knot nematode separately from the same crop.

c) To test the most potential fungal bioagents (Trichoderma viride and Paecilomyces lalicinus) against root knot nematode and wilt causing fungi separately under " in-vivo" and "in-vitro" (glass house) condition.

II. Material and Method

a) Survey of vegetables crops, particularly tomato in farmers field for the incidence of disease complex caused by root knot nematode and wilt causing fungi.

b) Collection of diseased materials and wilt causing other soil borne fungi and root knot nematode from both rhizosphere of, sub culturing, purification and identification of all the associated fungi including wilt tomato.

c) Isolation, sub culturing, purification and identification of all the associated fungi including wilt causing ones along with root knot nematode from diseased material.

d) Cataloguing of the fungi associated with the diseased material and maintain each separately on Potato Dextrose Agar (PDA) for the experimental studies of in vitro, glass house also micro plat trials will be conducted for the present investigation.

e) obtained was filled in 10cm diameter plastic pot which had earlier been sterilized by giving a dip in 1% formalin solution.

For experiment oil seed cake it was regularly watered for two week for decomposition. The seed were surface sterilized by 0.01% mercuric chloride solution for two minute and then washed three times with sterilized water to remove toxicant. After drying the seed were sawn in 10 cm diameter plastic pot containing 500g sterilized soil for which initially three seed were shown in each pot about one week after germination Inoculation was done after 10 days using six different level of inoculums associated check (A/c) 10,000, 100º, 10,000 larvae per 500 gm of soil. For A/c filtrate obtained when suspension containing 10,000 larvae in passed through 400 mesh sieve was used this check is perform to confirm the damage done is due to nematode and not by any other pathogen. Each treatment was replicated 5 times, a high irrigation was given as and when need.

Table 1.Effect on growth of tomato plant due to different inoculums level of M. incognita.

S. No.	Treatments	Shoot Length	Shoot weight (g)		Root weight (g)	
			Fresh	Dry	Fresh	Dry
1	Uninocuted Check	45.25	6.21	1.96	3.25	1.92
2	A/c	45.86	8.10	1.94	3.01	1.16
3	10	43.25	6.23	1.90	3.15	1.12
4	100	41.36	4.25	1.72	4.96	2.01
5	1000	36.23	3.63	1.74	5.01	2.15
6	10,000	23.91	2.28	0.72	5.82	2.92
S. Em ±		3.74	1.96	0.73	0.59	0.35
Mean of three replication.						

The observation recorded after 45 days of inoculation in respect to plant growth parameter viz. shoot and root length, shoot and root fresh and dry weight for final nematode and root population of nematode the method was followed earlier. The plants were processed and methods adopted are as described under processing of soil.

III. Management of Disease Complex –

The integrated management of root knot wilt complex disease caused by M. incognita and F. oxysporum, F. splycopersici on healthy susceptible seed and seedling was carried out on soil infestation with root knot nematode and wilt causing fungus at hot spot. An experiment was carried out under pot condition for the management of disease on 4 week old healthy susceptible seedling with 9 treatment including check. Each treatment replicate thrice. For this integrated management 15 cm diameter sterilized pot filled with 1 kg autoclaved soil with freshly hatched M. incognita larvae @ $2.j_2$/gm along with f 15 days old culture of mass multiplied pathogen @ 2g/kg soil with spare load 2x104g at transplantation of seedling. Consequently treatment of talc based bio formulation of both fungal bioagent as follows (i) T.viride alone @ 10g/ w/w + N + F (ii) P. lilacinus@ 10g w/w + N + F, (iii) Karanj cake alone (K.C) @ 2% w/w + N+ F+, (iv) T. viride + KC + N + F, (v) P. lilacinus KC + N + F, (vi) T. viride + P. lilacinus + N + F (vii) T.viride + P. lilacinus + KC + N + F, (viii) Nematode alone @ 3 x 10/g soil. Plant growth and disease incidence were recorded at 15 days interval on maturity of crop plant i.e., 60 days of transplantation of seedling.

Secondly conducted in block design with three replicates with 1 x 1 m^2 micro plot size. The initial soil status of nematode wilt population were 2 larvae/g soil and spare load with 3 x 10^8g soil 2 larvae/g soil respectively. Followed by 2 bare root dip treatment prior to transplantation on hot spot at infested micro plot with initial population of 3 second stage larvae/gm soil and selecting best treatment through invive plot and above micro plot trials with sustainable management component to combat disease complex caused by soil borne root knot nematode and root wilt fungus it is expected to involve a package which would be economical and safe for farmers.

IV. Result and Discussion –

In respect to plant growth parameter, disease incidence due to cumulative effect of both root knot nematode and wilt fungus on common host along with nematode multiplication showed conspicuous difference between all the treatments under investigation. Out of all the treatment the fungal bioagent in integration with karanj oil seed cake were recorded to perform best in improving the plant biomass (g/plant) and yield of tomato (kg/ha). In some treatment as regards the percentage of wilt incidence and nematode multiplication, both in root and soil, result exhibited significantly outstanding reduction of root gall no of egg masses. The maximum percentage of egg parasitization by P. lilacinus on egg masses of M. incognita were recorded under stereo binocular microscope in same treatment showing maximum colonization in the gelatinous matrix. Some treatment was most effective in recovering the wilt incidence where tomato plant looked almost healthy. The study was initiated with preliminary survey of the disease incidence of tomato involving root knot nematode M. incognita in association with wilt causing fungus F. oxysporum f .splycospersicishowing synergetic effect on the last which mostly appeared extremely weak unhealthy, highly stunted and without any fruit set. As the present investigation is mainly targeted on management of disease complex caused by root knot nematode and wilt causing fungus on tomato through eco friendly, integrated management. Thus karanj oil seed cake besides its fungicidal and nematicidal properties made plant more tolerant, P. lilacinus managed to reduce M. incognita population while T. viride contribute in suppressing the fungus. The outstanding results as observed in the treatment with combine effect of both fungal bioagent which although helped in reducing nematode population and wilt incidence, when the same treatment was compared with karanj oil seed cake the latter showed better results on plant biomass.

V. Conclusion –

Through the above survey of vegetables crop particularly tomato on farmer's field showing heavy infestation several beneficial fungi were also isolated and identified out of which fungal bioagent viz Paecilomyces lilacinus , TricodermaViride and G. fasciculatum after isolation and identification from rizosphere and rhizoplane of root knot affected plants were maintained as management component of present study. These isolated of each of the above fungal bioagents collected from fields along with other two isolates from already existing once procured from IARI Delhi were subjected to in vitro tests for selecting the most potential isolates of each. For achieving the target of minimize the incidence of disease complex caused by M. incognita and F. oxysporum f. splycospersici most potential isolates of each fungal bio agent viz. P. lilacinus and T. Viride were proved to be very important management component for the present integrated package.

References-

[1] Ahmad, A. Tiyagi S. A and Alam, M. M. (1988).Self interaction of root nematode, Melidogyne incognita on Tomato NematolMedit 16 : 227.228

[2] Arora D K, Elander, R.P and Mukerji K. G. (1992) Handbook of applied mycology,Fungal Biotechnology Vol 4, Marcel Dekker, New York.

[3] Ayyar P. N (1926). on root knot nematode infesting vegetables and other crops in South India. Madar A. gric J. 14: 113-118.

[4] Bansal R. K., Walia R. K. and Bhatti, D. S (1992) Wood Charcoal powder, a carrier of Paecilomyceslilacinus spores. NematolMedit 20: 5 - 7

[5] Barber, C. A. (1901) Root knot nematode infesting tea in South India. Bull GovMadarasDept Land Records and Agric, 45: 227-234.

[6] Bhagwati B and Goswami, B. K (2000). Interaction of Meloidogyne incognita Fusarium oxysporum f. sp. lycospersici on tomato.Indian J Nematol 30(i). 93.94.

[7] Bulter, E. J. (1918) Fungi and disease in plants. Thacker spink and Co ltd 547

[8] Chahal PPK (2007) Interaction of Meloidogyne.incognita and Fusarium osyspuorum f. sp lycopersici and fusarium oxysproum f. sp. pesi on tomato pea Indian phytopath 60 : 56-57.

[9] Devi L. S. and sharma, Richa (2002) Effect of Tricodemasp against root knot nematode Melidogyne incognita on tomato. Indian Journal of Nematology 32(2): 227-228.

[10] Dubey, B and smart Jr. G.C.(1987)Biological control of Meloidogyne incognita

[11] Elias K. S. and Schneider R W (1991) Vegetable compatibility groups in Fusarium oxysporum f splycospersici, phytopath 81 : 159-162

[12] F.A.O (1995) Food and Agriculture Organization-Production year Book Volume 49 FAO Rome.pp. 130.

[13] Goswami B.K. and Bhattacharya D. (1989) Efficacy of neem & ground nut oil cake as influenced by Micro-Organism, Changes in rhizosphere mycroflora during decomposition of oil seed cake in sterilized soil. Ind. J. Nematode l19 :72-92

[14] Kapoor, J.J. (1989) Fungi involved in tomato wilt syndrome in Delhi, Maharastra andTamilnadu Indian Phytopath 41 : 208-213.

[15] Khan M. R and Goswami B. K. (2000) Effect of different doses of paecilomyces lilacinus isolate - 6 on Melioidogyne incognita infecting tmato Indian Journal of Nematology 30 (1): 5 - 7.

[16] Massee G. (1895) the 'sleepy disease' of tomato garachronser 3 :707 - 708.