Original Research Paper

Volume - 12 | Issue - 08 | August - 2022 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Agricultural Science

# COMPARATIVE STUDIES OF DIFFERENT ORGANIC SOURCES ON GROWTH OF LESION NEMATODE ON CHICKPEA

**Megha Chaturvedi** Assistant Professor(Entomology), RNT College of Kapasan, MPUAT Udaipur.

**Bharat Kumar** Assistant Professor (Horticulture), RNT College of Agriculture Kapasan, MPUAT Udaipur

**Mahendra Oad** Technical Assistant (Horticulture), RNT College of Agriculture Kapasan, MPUAT Udaipur

**ABSTRACT** The chickpea (Cicer arietinum) is an annual legume of the family Fabaceae sub family Papilionoideae. Its different types are variously known as gram or Bengal gram, Garbanzo or Garbanzo bean, or Egyptian pea. Chickpea seeds are high in protein. The lesion nematode Pratylenchus thornei is described as a major limiting factor in chickpea. In this taking experiment we have taken 10 treatments i.e. T1 - Compost, T2 - Glomus etunicatium, T3 Rhizobium, T4 - Oil seed cake, T5 - Acaulospora scrobiculata, T6 - Compost + Glomus etunicatium + Acaulospora scrobiculata, T7 - Compost + Rhizobium + Acaulospora scrobiculata, T8 - Oil seed cake + Glomus etunicatium + Acaulospora Scrobiculata, T9 - Oil seed cake + Rhizobium + Acaulospora scrobiculata) and used T0 - Control as a check. We have analyzed it statistically on the basis of observation made in this research. The observations include pot and field experiments having growth parameters [Days flowering initiation, Branches (No.), Shoot length (cm), Flower (no.)]. In this research paper we have compiled the all above information and study the studies of different organic sources on growth of lesion nematode on chickpea.

**KEYWORDS :**

## INTRODUCTION

Among pulses, chickpea (Cicer arietinum L.) is one of the most important 'Rabi' pulse crops in India and ranked third amongst the important pulse crops growing countries of the world. India alone contributes more than 70 per cent to the global chickpea production. The crop is being grown in an area of 7 .89 million hectares with 5.97 million tones production. The important chickpea growing states of India are Madhya Pradesh, Uttar Pradesh, Haryana, Punjab, Rajasthan and Maharastra.

The lesion nematode Pratylenchus thornei is described as a major limiting factor in chickpea production in many countries of the world especially in Syria (Greco et al., 1984) and Italy (Vito et al., 1987). In India, Walia and Seshardri (1985), Tiwari et al., (1992) and Bhatt (1994) reported the pathogenic effect of Pratylenchus thornei on chickpea. In recent years, there has been a surging interest in phytoparasitic nematodes affecting crop plants. Soil samples collected under AICRP on nematodes around the rhizophere of crop in Madhya Pradesh revealed the occurrence of Pratylenchus sp. predominantly (Anon 1981). Sharma (1985) catalogued 22 species of plant parasitic nematodes associated with chickpea in different parts of the country.

Pratylenchus thornei may be one of the major constraints for decline in the production of chickpea throughout the state and due to monoaxenic cultivation of chickpea especially during 'Rabi' in agro-climatic regions of Bundel khand region, the population of lesion nematode has crossed threshold level of damage. All India Co-ordinate Research Project on Nematodes has studied the significance of this nematode, which reduced the yield to the tune of 26 per cent (Anon, 2000.) However, other species of Pratylenchus also have been identified viz., P. zeae, P. coffeae, P. indicus, and P. scribeneri associated with maize, banana, rice, citrus respectively affecting the host crops in Bundel khand region in present proposed luscareh work, chickpea has been selected as model crop due its overwhelming adoption and cultivation being in practices by farmers while chemical fertilizers and organic sources has been selected as treatments for comparing the response in improving quality and productivity of chickpea yield. Among chemical fertilizers, NPK has been taken as alone and in-combination as per the prescribed and requisite dose, in contrast to above, among organic sources, vesicular arbuscular Mycorrhiza (VAM), rhizobium, vermicompost, compost and poultry manure has been used in needful combination.

## MATERIALS AND METHODS

In this experiment we have conducted micro plot trial for justifing comparative effect of organic sources on growth and growth attributes of proposed research work. We have used randomized block design (RBD) to make a layout with ten treatments including untreated adequate control along with three replications. In proposed layout, thirty micro plots were prepared with individual size 2.5x2m$^2$ while 0.5m wide boarders were maintained among the treatments and replications. Prior to the seed sowing in prepared micro plot, adequate and equal amount of well decomposed farm yard manure (FYM) were amended in each micro plot as basal dose followed proper mixing. At the time of sowing, each micro plot was maintained with sufficient amount of moisture by clean surface leveling. This design allowed us to optimize resources while still maintaining realistic plot sizes under typical conditions of commercial production during the winter season of 2017-2018. Chemical fertilizer i.e. Urea, Sulpher and DAP were used at the time of seed sowing in form of farm yard manure (FYM) were also applied as accordance with recommended dose in each micro plot. Seed sowing of chickpea variety JG-16 was done on 22 Nov.2017 by spacing of seed to and row to row with 10x15cm.

To perform the experimental trial we have taken following treatments :-

| Treatments | Symbols |
|---|---|
| Control (Check plot) | T0 |
| Compost | T1 |
| Glomus etunicatium | T2 |
| Rhizobium | T3 |
| Oil seed cake | T4 |
| Acaulospora Scrobiculata | T5 |
| Compost+ Glomus etunicatium + Acaulospora Scrobiculata | T6 |
| Compost+ Rhizobium + Acaulospora Scrobiculata | T7 |
| Oil seed cake + Glomus etunicatium + Acaulospora Scrobiculata | T8 |
| Oil seed cake + Rhizobium + Acaulospora Scrobiculata | T9 |

The data from field observations were analyzed by using Randomized Block Design described by M-STAT software (1978). The data on various parameters were subjected to statistical analysis by adopting appropriate method of analysis of variance as described by Fisher (1958).The data have been presented in the form of summary tables with mean values of the characters and the C.D. at 5% level of probability. Suitable graphical illustrations have been shown in results for more justification of above research.

## RESULT AND DISCUSSION

Data recorded during experimental period has been critically analyzed for each concern parameters to find out the efficacy of different treatments to manage the root lesion nematode (Pratylenchus thornei) of chickpea crops following the layout of completely randomized design (CRD) for pod and randomized block design (RBD) for field with 10 treatments replicated thrice.

**Pot experiment:**

**1.1 Growth Parameters Day flowering initiation, Branches (No.), Shoot length (cm), Flower (No.)**

Data perusal in Table-1 was observed on day flowering initiation, branches (No.), shoot length (cm), flower (No.) indicated that it was affected statistically non significant data, general in all the treatment expect in day flowering as presented in Table-1 and represented with Figure-1 at 58 day.

**Table-1 Effect and assessment of indigenous organic formulation on growth parameters (Day to flowering initiation, branches, Shoot length and of pot of flowers) of field pea to avoid loss by major insect pest under conditions**

| Treatments | Formulations/ components | Day flowering initiation | Branches (No.) | Shoot length (cm) | Flower (No.) |
|---|---|---|---|---|---|
| T0 | Adequate control | 0.6 | 0.4 | 7.2 | 5.6 |
| T1 | V. Compost | 0.6 | 0.4 | 13.0 | 5.2 |
| T2 | Acaulospora scrobiculata Trappe | 0.6 | 0.9 | 12.3 | 15.4 |
| T3 | Rhizobium | 0.6 | 0.5 | 8.3 | 10.0 |
| T4 | Oil seed cake | 0.6 | 0.5 | 18.4 | 5.3 |
| T5 | Glomus intraradix | 0.6 | 0.5 | 15.7 | 4.5 |
| T6 | V. Compost +Acaulospora Scrobiculata | 0.6 | 0.4 | 28.3 | 14.3 |
| T7 | V. Compost +Glomus Intrardux+ Rhizobium | 0.6 | 0.4 | 16.7 | 16.5 |
| T8 | Oil seed cake+Glomus Intraradix+ Acaulospora Scrobiculata Trappe | 0.6 | 0.4 | 6.4 | 15.5 |
| T9 | Oil seed cake+Rhizobium+Glomus Intraadix | 0.6 | 0.4 | 19.9 | 15.4 |
| C.D. | 2.1 | 0.1 | N.S. | N.S. | |

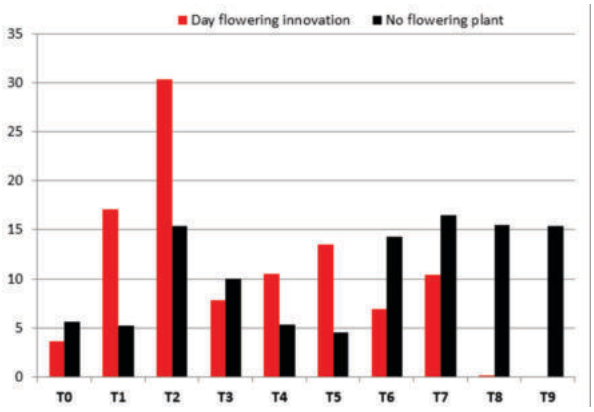


**Figure- 1: representing day flowering initiation and no flowering plant**

The results furnished in Table-1 on day flowering indicated that the plant of chickpea was for end affected significantly in all the treatments out of all pot treatment minimum day (62) has been taken to sprout the blooming in Acaulospora scrobiculata treated chickpea plants grown in pot while maximum day has been taken in $T_9$ treatments which were found at par as presented in Table-1 and represented with Figure-1 Observation on day of flowering may get significantly affected by its amended treatment because it has vital and significance role in boosting nutrient to the plant by the colonization in roots. In contrast to above, rest all the growth parameters has been found non significant.

**2 Field experiment:**

**2.1 Growth Parameters (day flowering, braches (no.), shoot length (cm), and flower (no.):**

Data was observed in Table-2 based on day flowering, branches (no.), shoot length (cm), and flower (no.) indicated that it was affected statistically non significant data in all the treatments expect in day flowering as presented in Table-2 and represented with Figure-2 at 58 DAS.

**Table-2: Effect and assessment of indigenous organic formulation on growth parameters (Day to flowering initiation, Branches, Shoot length and Flowers) of field pea to avoid loss by major insect pest under field conditions.**

| Treatments | Formulations /components | Day flowering initiation | Branches (No.) | Shoot length (cm) | Flower (No.) |
|---|---|---|---|---|---|
| T0 | Adequate control | 62.3 | 26.2 | 44.2 | 43.4 |
| T1 | Compost | 64.3 | 16.3 | 29.3 | 16.3 |
| T2 | Acaulospora scrobiculata Trappe | 62.0 | 39.1 | 38.2 | 39.1 |
| T3 | Rhizobium | 64.3 | 27.6 | 36.3 | 27.6 |
| T4 | Oil seed cake | 65.3 | 36.0 | 39.2 | 36.0 |
| T5 | Glomus Intraradix | 64.7 | 26.0 | 26.0 | 26.0 |
| T6 | Compost+Acaulospora Scrobiculata Trappe | 61.9 | 25.9 | 25.9 | 25.9 |
| T7 | Compost+ Glomus intrardux+ Rhizobium | 64.6 | 30.3 | 37.2 | 30.3 |
| T8 | Oil seed cake+ Glomus intraradix+ Acaulospora Scrobiculata Trappe | 65.0 | 34.0 | 24.5 | 34.0 |
| T9 | Oil seed cake+ Rhizobium +Glomus intraadix | 65.6 | 23.7 | 34.6 | 23.7 |
| C.D. | 2.0753 | N.S. | N.S | N.S. | |

The results furnished in Table-2 on day flowering indicated that the plant of chickpea was affected significantly generally in all the treatments while minimum day (62) has been taken to sprout the blooming in Acaulospora scrobiculata treated field while maximum day has been taken is various treatments which were found at par as presented in Table-2 and represented with Figure-2. Observation on day of flowering may get significantly affected by its amended treatment because it has vital and significance role in boosting nutrient to the plant through by the colonization in roots. In contrast to above, rest all the growth attribution supply of micro and macro has been found statically non significant

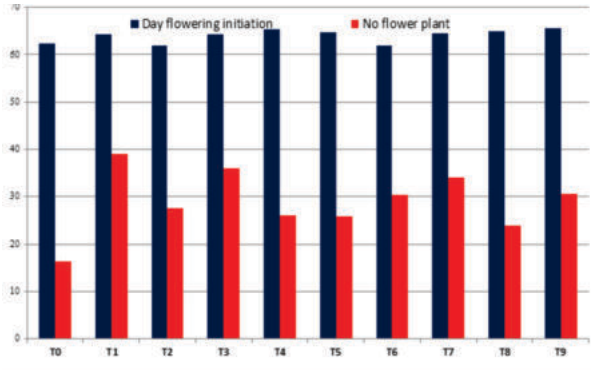


**Figure-2: representing day flowering initiation and no flower plant**

**CONCLUSION**

In this experiment we have recorded the data on pot and field experiments with difference organic treatment of root lesion nematode

on chickpea and conclusion were made. In pot experiment among all the treatment minimum day to initiate flowering (62) was recorded in Acaulospora scrobiculata treated chickpea plants while maximum day to initiate flowering (62) oil seed cake + Glomus intraradix + rhizobium in pot experiment. In all other treatment maximum of flower (123) was recorded in Compost treated chickpea plants while minimum number of flower (123) oil seed cake + Glomus intraradix + rhizobium . In case of branches among all the treatment maximum of branch was recorded in compost treated chickpea plants while minimum branch oil seed cake + Glomus intraradix + Acaulospora scrobiculata. On the other hand in case of shoot length among all the treatment maximum of shoot length was recorded in Acaulospora scrobiculata treated chickpea plants while minimum shoot length compost + Glomus intraradix + rhizobium

In case of field experiment, among all the treatment minimum day to initiate flowering (62) was recorded in Acaulospora scrobiculata treated chickpea plants while maximum day to initiate flowering (62) oil seed cake+ Glomus intraradix + rhizobium in field experiment. On considering branches in all the treatment maximum of Branch (no.) was recorded in Acaulospora scrobiculata treated chickpea plants while minimum Branch (no.) oil seed cake + Glomus intraradix + Acaulospora scrobiculata in field experiment. Also in case of shoot length among all the treatment maximum of Shoot length(cm) was recorded in Acaulospora scrobiculata treated chickpea plants while minimum Shoot length(cm) compost + Glomus intraradix + rhizobium in field experiment. Among all the treatment maximum of flower (no.) was recorded in compost treated chickpea plants while minimum flower (no.) Glomus intraradix in field experiment. And in all the treatment maximum of pod (no.) was recorded in compost + Glomus intraradix + rhizobium treated chickpea plants while minimum pod (no.) compost + Glomus intraradix + rhizobium experiment in field experiment.

## REFERENCES


1. Anon (1981 ). Biennial Report. All India Co-ordinated Research Project on Nematodes, Center JNKVV, Jabalpur.
2. Anon (1981). Quiquiennial Report All India Co-ordinated Research Project on Nematode, Center JNKVV, Jabalpur.
3. Anon (2000}. Quiquiennial Report AH India Co-ordinated Research Project on Nematode, Center JNKVV, Jabalpur. Anon, (201 O). Agriculture statistics at a glance. Directorate of Economics and Statistics, Department of Agriculture and Cooperation.105 32
4. Bhatt, J. (1994) Effects of different levels of inoculum of migratory nematode Pratylenchus thomei (filipjev, 1936) Sher and Allen 1953 on growth of gram. Cicer arietinum (L.) Advances Plant Science. 7 (2): 239- 243.
5. Greco, N., M. Di Vito, M. V. Reddy, and M. C. Saxena (1984) A preliminary report of survey of plant parasitic nematodes of leguminous crops in Syria. Nematol Medit. 12. 87-03
6. Sharma, S.B. (1985). A world list of nematode pathogens associated with chickpea, groundnut, pearlimillet, pigeon pea arid sorghum. Progress report No 42. /CR/SAT. pp. 36.
7. Tiwari, S.P., I. Vadhera, B.N. Shukla and J. Bhatt (1992). Studies on the Pathogenicity and relative reactions of chickpea lines to Pratylenchus thomei (Filipjev, 1936) Sher and Allen, 1953. India Journal of Mycology and Plant Pathology. of 22 (3) 255-259.
8. Walia, R.K. and A.R. Seshadri (1985). Pathogenicity of the root lesion nematode Pratylenchus thomei on chickpea. International chickpea Newsletter.12: 31.