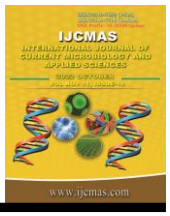
*Int.J.Curr.Microbiol.App.Sci* (2022) *11*(10): 187-191

*International Journal of Current Microbiology and Applied Sciences*
***ISSN: 2319-7706*** **Volume 11 Number 10 (2022)**
Journal homepage: http://www.ijcmas.com



**Original Research Article** https://doi.org/10.20546/ijcmas.2022.1110.022

# Studies on the Pathogenicity of *Meloidogyne incognita* on *Pseuderanthemum atropurpureum*

**Aasia Rashid Bhat***

*Department of Botany, Govt. P.G. College Rajouri, Jammu and Kashmir, India*

**Corresponding author*

**Keywords**

*Meloidogyne incognita*, health benefits

**Article Info**

***Received:***
05 September 2022
***Accepted:***
30 September 2022
***Available Online:***
10 October 2022

**A B S T R A C T**

A pathogencity test was conducted against root-knot nematode on *Pseuderanthemum atropurpureum*. Significant reduction in plant growth was recorded at or above inoculum level of 1000 $J_2$ / plant and hence this level was considered as pathogenic level for *P. atropurpureum*. It was observed that the nematode population increased with increasing the inoculum level of *M. incognita.* The maximum nematode population was recorded at highest inoculum level and the minimum population at the lowest inoculum level. The reproduction factor was significantly reduced with the increased in inoculum levels.

## Introduction

*Pseuderanthemum atropurpureum* (Purple False Eranthemum) is a very colorful tropical foliage plant in family Acanthaceae and has many health benefits. During the survey of plant parasitic nematodes associated with ornamental plant, *M.incognita* was found to be associated with *P. atropurpureum*.

Root -knot nematode, *M. incognita* is an important limiting factor in the production of ornamental plants. Each year they caused appreciable crop damage by inducing root galling and interfering in nutrient uptake resulting in dwarfing and unhealthy appearance. The present work was undertaken to study the damaging threshold level of root – knot nematode, *M. incognita* on *P. atropurpureum*.

## Materials and Methods

Seedlings of false eranthemum *(P.atropurpureum*) were raised through stem cuttings of uniform size. Before planting, the cuttings were sterilized with mercuric chloride for 2minutes and washed thrice in sterilized water.

These cuttings were transplanted singly in 15 earthen pots containing 2 kg sterilized soil and river sand and FYM (3:1:1) mixture. The plants were irrigated with water as and whenever required.

Three week old seedlings of *P. atropurpureum* were inoculated separately with 500,1000,2000,4000 and 8000 $J_2$ / plant by making 4-5 holes near the rhizosphere of each seedlings.

After inoculation, the holes were closed with soil followed by light irrigation. Uninoculated plants serve as control. All the treatments were replicated thrice.

After 2 months, the plants were uprooted and their roots were gently washed off the soil, taking utmost care to avoid injury to roots during the entire operation.

Data on plant growth (dry weight of shoot and root), number of galls/ root system and nematode reproduction factor ($R=P_f/P_i$) were recorded at the termination of experiment.

To estimate nematode population in roots 1.0 g root was macerated with enough water in a warning blender for 30 seconds to extract the nematodes and the numbers of females of different stages were counted.

Nematode population in each pot was also determined by Cobb's method followed by Baerman's funnel technique.

Reproduction factor (R) was calculated by the formula $R= P_f/P_i$ where '$P_f$' represents the final and ($P_i$) is the initial population of nematode. Data obtained were analyzed statistically and P=0.01 levels of probability.

## Results and Discussion

The data presented in Tables 1.1 and 1.2 clearly showed that with the increase in inoculum levels of *M. incognita*, there was corresponding increase in plant growth reduction.

Highest reduction in plant growth was recorded at a level of 8000 nematodes/plant and the lowest was at 500 nematodes.

Significant reduction in plant growth was recorded at and above inoculum level of 1000 $J_2$/plant. The plant growth was not significant between the inoculum levels of 2000 and 4000 $J_2$ and 4000 and 8000 $J_2$/ plants. A significant linear relationship was found between initial population (Pi) and the final population ($P_f$) of *M. incognita*.

The multiplication of root – knot nematode significantly reduced with the increase in the inoculum levels.

The reproduction factor was highest (12.78) at minimum inoculum level (500$J_2$/ plant and lowest (2.23) at the maximum inoculum level (8000 $J_2$/plant).

Thus, the rate of nematode multiplication showed a decling trend with the increase in the initial inoculum levels. *P. atropurpureum* infected with *M. incognita* were dwarfed, yellowish with smaller foliage and overall showing poor growth of plant.

This might be due to the destruction of root system by parasitism of root-knot nematode which lead the competition of food and nutrition among the developing nematode within the root system and also due to inability of juveniles to find out new infection sites for subsequent generation.

This view holds true with the present findings where plant growth was proportionately affected with the increase in the number of galls and final nematode population.

The progressive decrease in inoculum of root – knot nematode on different crops have also been reported by Seinhorst (1960); Fazal *et al.*, (1994); Pathak *et al.*, (2000); Khan and Ashraf (2006).

From the present study, it can be concluded that the damaging thresh hold level of *M. incognita* on *P. atropurpureum* was 1000 $J_2$/plant.

The present study results are also in conformity with those of Reddy (1981), Tyagi and Alam (1988) who reported the damaging threshold level of *M. incognita* was 1000 $J_2$ /plant.

**Table.1** Studies on the Pathogenicity of *Meloidogyne incognita* on *Pseuderanthemum atropurpureum*.

| Inoculum levels | Plant length (cm) | | | Plant fresh weight (g) | | | Plant dry weight (g) | | | Percentage reduction Over Control | No .of galls per root system |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Shoot | Root | Total | Shoot | Root | Total | Shoot | Root | Total | | |
| 0 | 42.6 | 24.2 | 66.8 | 90.5 | 48.2 | 138.7 | 30.1 | 16.1 | 46.1 | - | 0 |
| 500 | 41.5 | 22.9 | 64.4 | 89.0 | 47.2 | 136.3 | 29.9 | 14.8 | 44.7 | 3.0 | 46 |
| 1000 | 32.1 | 17.5 | 49.6 | 72.8 | 38.5 | 111.3 | 23.3 | 11.7 | 35.0 | 24.0 | 105 |
| 2000 | 30.7 | 17.1 | 47.8 | 70.3 | 36.9 | 107.3 | 21.9 | 10.9 | 32.8 | 28.8 | 140 |
| 4000 | 29.6 | 16.4 | 46.0 | 66.4 | 35.3 | 101.7 | 21.0 | 10.3 | 31.1 | 32.1 | 159 |
| 8000 | 28.8 | 15.7 | 44.5 | 64.8 | 34.3 | 99.1 | 20.2 | 9.9 | 30.1 | 34.7 | 172 |
| C.D (P=0.05) | | | 3.92 | | | 6.10 | | | 3.37 | | 9.57 |
| C.D (P= 0.01) | | | 5.94 | | | 9.23 | | | 5.11 | | 15.00 |

**Table.2** Effect of different inoclum levels on the multiplication of *Meloidogyne incognita* in *Pseuderanthemum atropurpureum*.

| Inoculum Reproduction factor levels | Namtode population per pot | | | |
|---|---|---|---|---|
| | Juveniles | Female | Total | (R=Pf/Pi) |
| 500 | 6107 | 283 | 6390 | 12.78 |
| 1000 | 9423 | 410 | 9833 | 9.83 |
| 2000 | 12513 | 467 | 12980 | 6.49 |
| 4000 | 16546 | 519 | 17065 | 4.26 |
| 8000 | 17292 | 588 | 17880 | 2.23 |
| C.D (P=0.05) | | | | 1.54 |
| C.D (P= 0.01) | | | | 1.93 |

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**How to cite this article:**

Aasia Rashid Bhat. 2022. Studies on the Pathogenicity of *Meloidogyne incognita* on *Pseuderanthemum atropurpureum*. *Int.J.Curr.Microbiol.App.Sci.* 11(10): 187-191.
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