



Research Article

EFFECT OF DIFFERENT DATE OF SOWING AND TEMPERATURE ON ROOT KNOT NEMATODE OF WHEAT CROP IN WESTERN UTTAR PRADESH

KHILARI KAMAL¹, MUKESH¹, JAIN SACHIN KUMAR¹, SINGH HEM² AND RANA ROHIT^{2*}

¹Department of Plant Pathology, Sardar Vallabhbhai Patel University of Agriculture & Technology Modipuram, Meerut 250110 India

²Department of Plant Entomology, Sardar Vallabhbhai Patel University of Agriculture & Technology Modipuram, Meerut 250110 India

*Corresponding Author: Email-rohitrana.ento@gmail.com

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Abstract- Rice root-knot nematode, *Meloidogyne graminicola* cause considerable yield loss in rice-wheat cropping system due to which it gained a wide importance in the world. An experiment was undertaken on the infested pot, soil to evaluate the effectiveness of temperature with different time of sowing on infestation of root knot nematode in the wheat crop. This experiment was conducted from mid October 2014-mid January 2015 and wheat seed were sown at 15 day intervals. The temperature range was determined from minimum 7.06°C to maximum 30.12°C during the experiment. The infestation of root knot nematode was found only in early three sowing (mid October–mid November). The highest infestation of root knot nematode (Av. 24.33 galls/ plant) was observed in wheat crop, which was sown at 15/10/14 followed by 7.67 and 3.17 galls/plant at 01/11/14 and 15/11/14 date of sowing respectively and significantly decrease root length. In another four sowing time (1st December- 15 January), the infestation of root knot nematode was not observed and significantly increase the root length. The present study revealed that sowing of wheat after the first week of December in western Uttar Pradesh reduces the infestation of root knot nematode.

Keywords- Wheat, root-knot nematode, Date of Sowing and Temperature.

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Introduction

Rice and wheat are the important cereal crop. Rice and wheat cropping system is major cropping system in western U. P. The rice root nematode is as emerging as an important problem in rice crop. Wheat crop has been found to support the population of this nematode in between two crops of rice. Rice-wheat cropping system is increasing severity of this nematode. This nematode is emerging as one of the major pathogen of rice-wheat cropping system worldwide and limit cereal production [1&2].

Rice during *kharif* and wheat during *Rabi* cultivate in Uttar Pradesh. There are several factors viz. availability of irrigation water, status of nutrients in the soil and biotic factors i.e. insect, pest and diseases cause huge loss and decreased the average yield of rice and wheat in India [3&4]. The wheat was found to support a high population of this nematode in between two crops of rice, thus increasing the severity of this nematode in rice-wheat cropping systems [5]. It has been reported that more than 200 species of nematodes associated with rice crop in the world [6] and about 17-30 per cent yield loss in rice crop occurred due to infestation of root knot nematode in India [7&8]. According to [1&2] root knot nematode is an important pathogen found in rice-wheat cropping system worldwide and responsible for yield loss in cereal crops, estimated loss in the yield range from 20-70 per cent [9&10]. Selected cropping sequences and weed management in a rice-based crop rotation seems crucial in the management of this nematode.

Materials and Methods

Pot experiment was conducted from mid October 2014-mid January 2015 and wheat seed were sown at 15 days intervals at the main campus of SVPUA&T, Meerut.

Preparation of sick pot

Root knot nematode *Meloidogyne graminicola*, infected rice roots were collected from Crop Research Centre, S. V. P. University of Agriculture and Technology, Meerut for the propagation of pure culture. The infected rice roots were grinded by the grinder. After the teasing/grinding, egg and juveniles were come out from the roots which were collected and inoculated in earthen pots containing satirized sandy soil in preparation of sick pot.

Effect of Root knot nematode on wheat crop of different time of sowing with temperature

The sick soil was removed from each pot and properly mixed by spade 2-3 times and fill-up into 5 kg. Earthen pot and 100 gm. soil sample was taken for knew the population of second stage juvenile. After fulfil the earthen pot PBW-373 wheat variety 15 seeds were sown into each pot replicated three times. The per day maximum and minimum temperature were recorded by a thermometer. The plants were gently uprooted after 30 days of transplanting. Plants were carefully washed in running tap water and observation was recorded for plant growth parameters root length and number of root gall from each pot.

Results and Discussion

The initial population of second stage juvenile of *Meloidogyne graminicola* was found 200 J₂/100 gm sick soil sample. During the experiment, the average temperature range was determined from minimum 7.06°C to maximum 30.12°C. [Table-1] indicates that out of seven dates of sowing, the infestation of root knot nematode, *Meloidogyne graminicola* was found only in early three sowing (mid October–mid November). The highest infestation of root knot nematode (Av. 24.33

galls/ plant) was observed in wheat crop, which was sown on 15/10/14 and on this date maximum and the minimum average temperature was (30.12) and (15.41) respectively. Average 7.67 and 3.17 galls/plant were recorded at Nov, 1st 2014 and Nov, 15th 2014 date of sowing with (27.83) (11.45) and (25.78) (8.76) maximum and the minimum temperature respectively. In another four sowing time (Dec, 1st and 15th 2014) and (Jan, 1st and 15th 2015), the infestation of root knot nematode was not observed and significantly increase the root length. It was concluded that the plant growth parameter (root length) was significantly

decreased by root knot nematode *Meloidogyne graminicola* as well as temperature. Same results have been reported by many scientists in previous studies. [11] reported less infection of *M. graminicola* in late sown (22th November) than early sown (2nd November) wheat. [12] reported that the temperature had a pronounced effect on hatching of *M. graminicola*. Late sowing of wheat by using recommended late sown variety is the best way for the management of root knot nematode observed by [13].

Table-1 Effect of Root knot nematode on wheat crop of different time of sowing and temperature.

| S. No. | Different sowing date | Average of Max. Temperature | Average of Min. Temperature | Average of root galls/Plant | Average of root length/plant (cm.) |
|--------|-----------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------------|
| 1 | 15/10/14 | 30.12 | 15.41 | 24.33 | 6.12 |
| 2 | 01/11/14 | 27.83 | 11.45 | 07.67 | 7.62 |
| 3 | 15/11/14 | 25.78 | 8.76 | 03.17 | 6.91 |
| 4 | 01/12/14 | 20.69 | 7.06 | 00.00 | 7.12 |
| 5 | 15/12/14 | 16.61 | 7.40 | 00.00 | 6.75 |
| 6 | 01/01/15 | 16.55 | 8.07 | 00.00 | 7.87 |
| 7 | 15/01/15 | 19.53 | 7.96 | 00.00 | 8.37 |

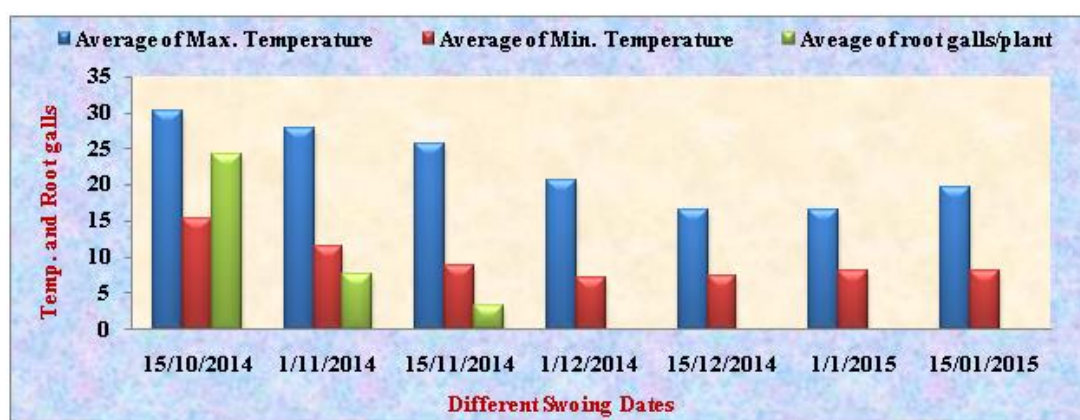


Fig-1 Effect of Root knot nematode on wheat in different sowing time and temperature

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Conflict of Interest: None declared

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