

Original Research Article

<https://doi.org/10.20546/ijcmas.2019.806.367>

Screening of Different Cultivar of Paddy and Wheat against Root-Knot Nematode *Meloidogyne graminicola*

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ABSTRACT

Keywords

Meloidogyne graminicola,
Resistant,
Susceptible

Article Info

Accepted:
24 May 2019
Available Online:
10 June 2019

Screening of some rice and wheat cultivars were tested for their resistance against rice root-knot nematode (*Meloidogyne graminicola*). The investigation was conducted on 19 Paddy cultivars along with 12 wheat cultivars, which showed evidence of damaging potential of *Meloidogyne graminicola* in terms of plant growth parameters and disease incidence. Disease intensity grade was classified on the basis of root knot index. Out of nineteen cultivar, 6 were moderately resistant to *Meloidogyne graminicola* while 2 varieties Pusa basmati and JR 503 susceptible with maximum number of galls per plant (36.66 and 57) while the 6 cultivars, IR64, JR75, Poornima, Shyamla, PS3 and Madhuri showed resistant reactions. Another rest cultivars, Mahamaya, Luchai, IR36 Kranti, JR201 and Shriram showed highly resistant to root-knot nematode *M. graminicola*. All cultivar of wheat showed susceptible reaction to root-knot nematode.

Introduction

Rice is the most important cereal crop during kharif and wheat during rabi season in Madhya Pradesh. Root-knot nematode *Meloidogyne graminicola* (Golden and Birchfield) infests both rice and wheat in the region (Pal and Jai Prakash, 1983). Chandel et al (2002) reported another species of root-knot nematode, *M. triticoryzae* affecting rice and other important crops including wheat. Infection by second stage juvenile stage juvenile (J_2) in root cause disruption and hypertrophy of cortical cells due to their secretions resulting in swelling of stele at the sites of nematode establishment. The galls are visible to naked eyes as knots on the roots. In

paddy, the nematode infection leads to poorly filling of karnels, stunting growth of infested seedlings (Rao *et al.*, 1985; Prasad *et al.*, 1990; Sharma and Prasad, 1995; Prasad, 2006a) we report here performance of selected cultivars of paddy and wheat against the root knot nematode *M. graminicola* in pot house evaluation and identified resistant material against the *M. graminicola*.

Materials and Methods

Nineteen paddy cultivars and twelve wheat cultivars are collected from Department of Plant Breeding and Genetics, JNKVV, Jabalpur and screened for resistance to root-knot nematode under pot house condition.

Good bold and healthy seeds of paddy and wheat were surface sterilized with mercuric chloride (1: 1000) and washed three times in sterile water. Seeds were then sown in ten centimeter earthen pots containing 500cm² sterilized soil. Each pots received two seeds and after germination one was retained seven days old seedling were used throughout the experiment. Freshly hatched and surface sterilized 1000 second stage juveniles of *M. graminicola* were inoculated in each pot. Level of inocula was carried out on seven days old seedlings by gently removing the soil around the seedlings in a circumference of four centimeter and then dispersing them over the area. After appropriate inoculation, the roots were covered by fresh sterilized soil. The pots were irrigated with 100 ml fresh water every day if needed and thereafter with equal quantity of water per day as and when required. All the plant protection methods were adopted to grow healthy crop. The experiment was terminated 45 days after inoculation. The observation was taken root gall index and rated resistance and susceptibility as per the root gall index scale (Taylor and Sasser, 1978).

S. No.	Root gall index scale	Rating
1	0 No galls per 5 gm root sample	Highly resistant (HR)
2	1-10 galls per 5 gm root sample	Rsistant (R)
3	11-30 galls per 5 gm root sample	Moderately resistant (MR)
4	31-100 galls per 5 gm root sample	Susceptible (S)
5	101 and above galls per 5 gm root sample	Highly susceptible (HS)

Results and Discussion

Nineteen cultivars of paddy obtained from Department of Plant Breeding and Genetics, JNKVV, Jabalpur were screened, in vivo, against *M. graminicola* and root gall index was recorded. Root gall index varied from 2.00 to 57.00. Minimum of 2.00 and 2.66

galls were recorded in JR75, kranti and IR36 repectively. Heighst root gall index of 57.00 was noted in Pusa Basmati followed by 36.66 in JR503. Out of 19 varieties non was found as heighly susceptible. Only two varieteis Pusa Basmati and JR503 have shown susceptible reaction. Mahamaya, Luchai, IR36, Kranti, JR201 and Shriram were found heighly resistant and six cultivars *i.e.*, IR64, JR75, Poornima, Shyamla, PS3 and Madhuri showing resistant to *M. graminicola*. Another five cultivars viz, Kshatri, PS2, Tarai basmati, JR353 and HMT was recorded as Moderately resistant to *Meloidogyne graminicola* (Table 1).

The present investigation is in conformity with Kalita *et al.*, (2004) screened twelve commonly cultivated rice cultivars against rice root knot nematode (*Meloidogyne graminicola*) in sick soil under greenhouse condition. Gitanjali *et al.*, (2007) who screened 8 rice varieties, screening rice varieties for resistance against root knot nematode (*Meloidogyne graminicola*). Green house evaluation of 12 Nepalese rice varieties showed that Masuli and Chaite-6, were moderately resistant to the nematode (Sharma-Poudyal *et al.*, 2004). Field evaluation of eighty seven cultivars of rice and fifty nine cultures of wheat against root-knot nematode infection in the field during *kharif* 2007, 2008 & 2009 and *rabi* 2008 & 2009 reveled two rice cultivars Achhoo and Naggardhan and two wheat cultivars HS 295 and VL 829 as resistant with 2 score. Rice lines Ranbir Basmati, Hasan Sarai, and Purple cultures and wheat cultivar HS 240 were rated as susceptible Shrivastava *et al.*, (2011).

Similar evaluation of wheat cultivars revealed out of 12 cultivars obtained and screened for their resistance against *M. graminicola* none was found resistant to the nematode. The gall index in wheat cultivars ranged from 23 to 98.66 (Table 2).

Table.1 Screening of paddy cultivars against root-knot nematode (*Meloidogyne graminicola*)

S. No.	Cultivars	Mean of Root Gall Index	Rating
01	IR64	12.33	R
02	JR75	11.33	R
03	Mahamaya	02.00	HR
04	Luchai	08.66	HR
05	Poornima	06.66	R
06	IR36	02.66	HR
07	Kranti	02.00	HR
08	JR201	03.33	HR
09	Kshatri	15.66	MR
10	Shriram	04.33	HR
11	Shyamla	06.33	R
12	PS3	06.00	R
13	PS2	19.66	MR
14	Pusa Basmati	57.00	S
15	Tarai Basmati	12.00	MR
16	JR353	13.00	MR
17	JR503	36.66	S
18	Madhuri	7.66	R
19	HMT	29.33	MR

Table.2 Screening of cultivar of wheat against root-knot nematode (*Meloidogyne graminicola*)

S.No.	Cultivars	Mean of Root gall Index	Rating
1	JW-3211	50.66	S
2	JW-3336	71.00	S
3	JW-3288	78.00	S
4	JW-3173	52.66	S
5	JW-3269	65.66	S
6	JW-1544	75.33	S
7	JW-17	75.33	S
8	MP-1606	23.00	S
9	MP-1215	48.66	S
10	MP-1202	98.66	S
11	MP-1255	33.33	S
12	GW-273	95.33	S

HR= Highly Resistant, R= Resistant, MR= Moderately Resistant and S= Susceptible

Acknowledgement

The author are very thankful to Dr. R. S. Shukla and Dr. G. S. Kotu Dept. of Plant

Breeding & Genetics for providing breeding materials for investigation and guidance during the course of present study.

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How to cite this article:

Dinesh Singh Dhurwey, Jayant Bhatt and Singh, S.N. 2019. Screening of Different Cultivar of Paddy and Wheat against Root-Knot Nematode *Meloidogyne graminicola*. *Int.J.Curr.Microbiol.App.Sci.* 8(06): 3082-3085. doi: <https://doi.org/10.20546/ijcmas.2019.806.367>