Journal of Global Biosciences ISSN 2320-1355
Vol. 3(1), 2014, pp. 374-378 http://mutagens.co.in

EVALUATION OF SOME COMMON RICE VARIETIES OF MANIPUR FOR RESISTANCE AGAINST RICE ROOT-KNOT NEMATODE *MELOIDOGYNE GRAMINICOLA*

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Abstract

Screening of some common rice varieties of Manipur were tested for their resistance against rice root-knot nematode *(Meloidogyne graminicola).* The investigation was conducted on 10 ricei varieties, 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. All the varieties were susceptible to *Meloidogyne graminicola* except Dharam and Tampha which were moderately resistant. Maximum number of root galls (45) were recorded in rice variety Lamyanba whereas minimum root galls (2) were recorded in rice variety Dharam.

Key words: *Meloidogyne graminicola*, Screening, *Oryza sativa*.

Date of Online: 28-02-2014

INTRODUCTION

Rice (*Oryza sativa L.*) is an important staple food crop for majority of human population in the world in general and in Asia in particular. In India, rice occupies more than one-quarter of the cropped area and contribute between 40-43 % of total food grain. *Meloidogyne graminicola,* the root-knot nematode is an obligate parasite of rice, *Oryza sativa.* Yield loss up to 50% might be incurred due to severe infestation of *Meloidogyne graminicola* in upland, rainfed and direct seeded rice (Lorenzana et al. 1998) under field condition. In pot experiment, reduction in grain yield was reported up to 98% (Plowright and Bridge 1990). The use of resistant cultivars is a low cost and sustainable option for the control of nematodes in the long term. Which does not impose unwanted changes in traditional agronomic practices (Amoussou et al. 2004). So far, efforts to breed rice cultivars resistant to root-knot nematode have been limited. However attempts have been made to screen popular varieties (Sampath et al. 1970: Israel & Rao, 1971: Roy, 1973) to identify those that are suitable to be cultivated in nematode infested areas. The present investigation was undertaken resistance varieties of rice by screening of some common rice varieties cultivated in Manipur was tested against *Meloidogyne graminicola* under tub condition in the Nematology Laboratory DM College of Science, PG Deprtment of Zoology during July 2012 upto November 2012.

MATERIALS AND METHODS :

Some common ten varieties of rice viz: Dharam, Tampha, RCM-9, SK, Ayangleima, Jatra, Mamingthondabi, Thangjing, Priya and Lamyanba were subjected to screening for resistance against root knot nematode *Meloidogyne graminicola* durig July to November 2012 in 2 kg capacity tub. Germinated seed of each variety were sown in tubs (15 cm height, 50 cm diameter) filled with steam sterilized soil at the rate of 10 seeds per tub. When the seedlings were 15 days old, the seedling were inoculated with 5000 second stage juveniles of *Meloidogyne graminicola* in three replicates. Three months after inoculation, plants were uprooted, washed, cleaned and then fixed in 4% formalin. Staining was done in lactophenol aniline blue and cleared in pure lactophenol and observations were made on the number of galls, number of seeds, plant height, fresh and dry weight of root and shoot and final nematode population of the soil for each tub. Root gall index was assessed on 0-5 scale.

RESULTS AND DISCUSSION

Data presented I table 1 & 2 indicated the pathogenicity of *Meloidogyne graminicola* on rice varieties viz: Dharam, Tampha, RCM-9, SK, Ayangleima, Jatra, Maminthondabi, Thangjing, Priya and

Lamyanba. Rice variety Lamyanba showed maxnimum root length 10 cm, shoot length 45 cm, fresh shoot weight 22g, fresh root weight 3.4 g, number of seeds 100, number of galls 45 and total nematode population 11000, followed by rice variety Priya and Thangjing. Rice varity Dharum showed maximum root length 15 cm, shoot length 60 cm, fresh shoot weight 44 g, fresh root weight 5.3 g, number of seeds 375, which was followed by Tampha and RCM-9.

Out of the 10 varieties, Dharam was recorded as moderately resistant variety against root-knot nematode followed by rice variety Tampha were recorded.SRCM-9, SK, Ayangleima, Jatra were recorded as susceptible whereas Mamingthondabi, Thangjing, Priya, Lamyanba were recorded as highly susceptible.

The present investigation is in conformity with Gitanjali et.al. (2007) who screened 8 rice varieties, screening rice varieties for resistance against root knot nematode (*Meloidogyne graminicola).* Anil Prashar *et al.* (2004) clearly demonstrated that the severity of *Meloidogyne graminicola* to rice increases with increase of water stress, hence the important of using rice cultivars that are tolerant to water stress and resistant to the nematode. Kalita *et al.* (2004) screened twelve commonly cultivated rice cultivars against rice root knot nematode (*Meloidogyne graminicola*) in sick soil under greenhouse condition.

From the above investigation it can be suggest that resistance is one of several tools for use in an integrated approach for root knot nematode management. Two primary attributes of host resistance for nematode management are relevant a) the value of resistance infection and b) the rotational value of resistance in cropping systems for protecting subsequent crops, based on the ability to suppress nematode population densities in soil by restricting nematode reproduction. These two attributes underpin most nematode resistance breeding and management decisions. Resistant lines will be proved useful parents for root knot nematode resistant breeding programme.

Table 1. Screening of selected rice varieties against rice-knot nematode, *Meloidogyne graminicola* in Manipur.

Sl. No	Varieties	Root Length (cm)	Shoot Length (cm)	Fresh root weight (g)	Fresh shoot weight (g)	Dry root weight (g)	Dry shoot weight (g)	No. of seeds
1	Dharam	15	60	5.3	44	3.1	19	375
2	Tampha	14.3	59	5.2	42	2.7	18.4	340
3	RCM-9	13	57	5	38	2.3	18	290
4	SK	12.8	55	4.9	37	2.1	17.4	250
5	Ayangleima	12.4	53	4.7	34	2	17.2	240
6	Jatra	11.8	52.5	4.4	32	1.9	16	215
7	Mamingthondabi	11	52	4.1	30	1.8	16	195
8	Thangjing	10.9	51	3.8	27.5	1.5	15.4	170
9	Priya	10.6	50	3.6	25	1.3	15	150
10	Lamyanba	10	45	3.4	22	1	14.8	100

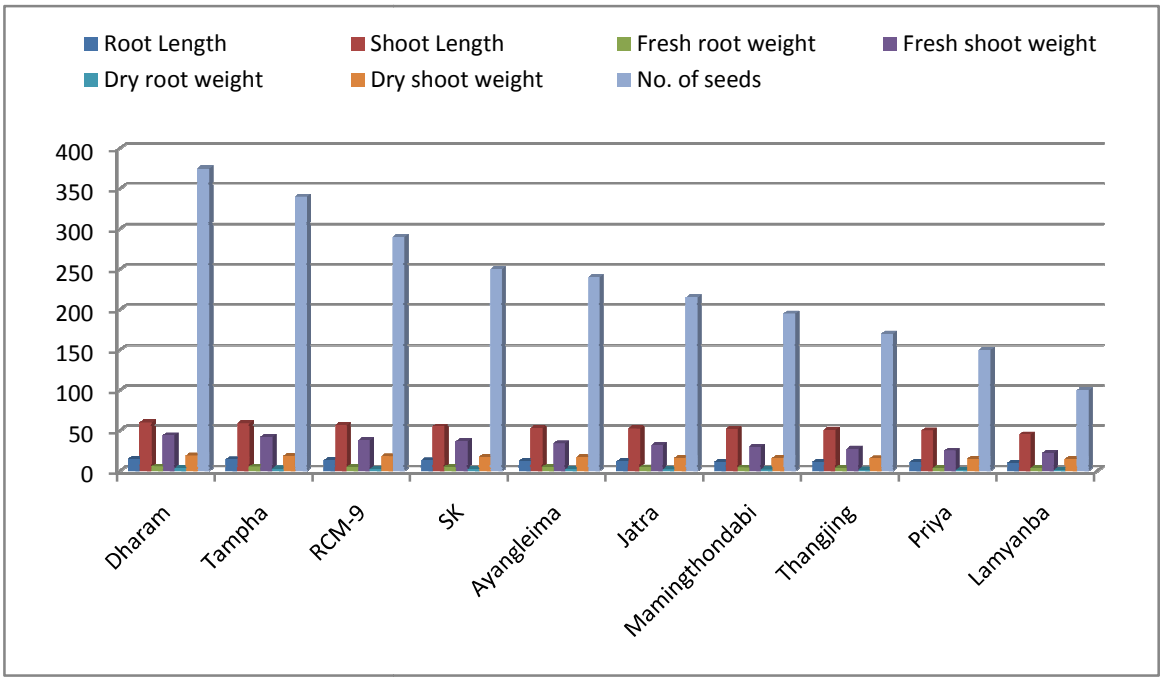
***The above given data is mean of three replication.**

Table 2. Response of 10 varieties of rice to *Meloidogyne graminicola* under tub culture.

Sl. No	Varieties	Soil population	No. of galls	Root-Knot index	Root population	Total population	RF	Reaction
1	Dharam	101	2	1	20	121	0.03	Moderately Resistant
2	Tampha	375	5	1	25	400	0.08	Moderately resistant
3	RCM-9	800	14	2	85	885	0.17	Susceptible
4	SK	1000	18	2	120	1120	0.22	Susceptible
5	Ayangleima	2800	23	2	300	3100	0.62	Susceptible
6	Jatra	3200	30	3	750	3950	0.79	Susceptible
7	Mamingthondabi	4000	35	3	960	4960	0.9	Highly Susceptible
8	Thangjing	5400	35	3	1650	7050	1.41	Highly Susceptible
9	Priya	6800	40	3	2900	9700	1.94	Highly Susceptible
10	Lamyanba	7500	45	3	3500	11000	2.2	Highly Susceptible

The above data is mean of three replication.

GRAPH 1 : **Screening of selected rice varieties against rice-knot nematode, *Meloidogyne graminicola* in Manipur.**



GRAPH 2 : Response of 10 varieties of rice to *Meloidogyne graminicola* under tub condition

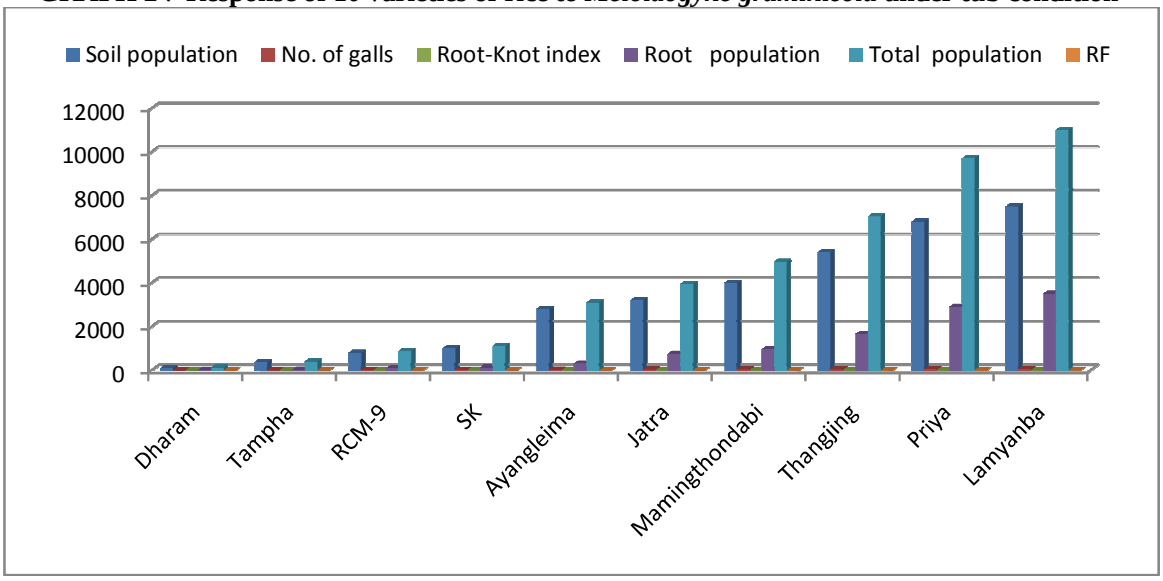


Photo : Infected rice root with ***M. graminicola*** on local rice varieties

Experimental tub with rice varieties at Nematology laboratory

ACKNOWLEDGEMENT

The author greatly acknowledged DST, New Delhi for financial assistance and Principal, D.M. College of Science for providing Laboratory facilities during the course of studies.

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