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Screening and evaluation of ridge gourd varieties /cultivars against induced population of root-knot nematode, *Meloidogyne incognita*

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Abstract

Out of fifty two varieties/cultivars screened against root-knot nematode, only 6 showed resistant reaction with 7-10 number of galls per plant, 7 showed moderately resistant reaction with 23-31 number of galls per plant, 32 susceptible reaction with 31-91 number of galls per plants & 5 highly susceptible with more than 112-116 numbers of galls per plants. After infection of root-knot nematode, the maximum average shoot length of ridge gourd varieties was 160cm in BSS-1036, and root length was 38.66cm in Ridge gourd 12 patra. The decrease in shoot length & root length were more pronounced i.e., in SS-Ramu (16.83cm) and Ramu F1 (11.36) respectively. The decrease in shoot weight (5.53g) and root weight (0.23) of the ridge gourd variety, Nayagarh Local and Tauri, BSS-1009 respectively. Possible reason for reduction of shoot weight and root weight in infected plant may be due to improper supply of nutrients resulting from nematode infection for which it is compensated to some extent in resistant varieties.

Keywords: *Meloidogyne incognita*, root-knot index, final population, ridge gourd, *Luffa acutangula* (L.) Roxb.

Introduction

Plant parasitic nematode, *Meloidogyne incognita* alters the metabolic processes of the host plant which are manifested in the form of cellular, physiological and biochemical changes in the infected host. Williamson and Gleason, 2003 observed the root-knot nematodes cause measurable changes in the morphology and physiology of the tomato plant. Traditional approaches for development of nematode resistant cultivars are tedious, time consuming and often limited by intraspecific barrier. Though it is necessary to have adequate knowledge about biochemistry and physiology of host and parasite in order to understand the actual mechanism of resistance.

Ridge gourd (*Luffa acutangula*) belonging to the family cucurbitaceae popularly known as angled gourd or sponge gourd is a tropical annual climbers, cultivated for its edible young fruits. A ridge gourd also commonly known as Turai or Turiya is a native of India and also seen grown as an ornamental plant in many parts of the world. It has white pulp spongy flesh containing a gelatinous compound called luffein and has medicinal importance. Ridge gourd is quite low in saturated fats as well as calories. It really is abundant with dietary fibre, vitamin C, riboflavin, zinc, thiamin, iron, as well as magnesium.

Root knot nematode, *Meloidogyne* species is one of the most wide spread nematode limiting world agriculture productivity. It has a very wide host distribution and causes serious losses to important crop plants, Particularly damaging vegetable crops in tropical and subtropical countries (Sikora and Fernandez, 2005) [7]. Indiscriminate and injudicious use of chemical pesticide has cause harm to human health, environment and pollute ground water. Therefore, economically safe option is integrated pest management considered as a spring board to sustainable crop management. In this context, the use of resistant varieties to manage the abnoxious nematode is an ideal means and important component of overall integrated nematode management system.

Materials and Methods

In the present study, 52 varieties of ridge gourd were collected from the locality of Bhubaneswar and nearby villages of Dhenkanal. Egg masses of *M. incognita* were collected from pure culture already maintained on tomato plants. Second stage juveniles used in these

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experiments were obtained from egg masses raised on infected tomato plants. The experiment was carried out in screen house of the Nematology Department, College of Agriculture, OUAT, Bhubaneswar, Orissa and treatments were arranged in Complete Randomized Block Design with three replications each. Earthen pots of 15cm dia. were filled with denematised, sterilized sand: soil: FYM in 1:2:1 ratio @1Kg/pot. Ridge gourd genotypes were transplanted singly in each pot and after establishment of plants in the pots inoculated with freshly hatched larvae of root knot nematode (*M. incognita*) @ 1000J2/ pot by exposing the roots. Ridge gourd plants were uprooted from the pots after 45 days of sowing i.e. 30 days after inoculation and screening of germplasm for resistance and susceptibility against root knot nematode (*Meloidogyne incognita*) was done by adopting 1-5 scales as Highly Resistant (1= no gall/egg mass per plant), Resistant (2=1-10 galls/ egg mass per plant), Moderately resistant (3= 11-30 galls / egg mass per plant). Susceptible (4= 31-100 galls/ egg mass per plant) and Highly Susceptible (5 = more than 100 galls/egg masses per plant) as per Root-knot Index scale suggested by Taylor and Sasser (1978)^[8].

Evaluations of Varieties against Root-Knot Nematode, *Meloidogyne Incognita*

Ridge gourd varieties of known resistance obtained from screening process were surface sterilized by treating with 0.1% Hgcl₂ solution for about four minutes followed by five risings with sterile water to remove the excess chemicals. For evaluation purpose inoculations and observations were followed as done before in the screening process. The 52 ridge gourd varieties were included in evaluation purpose.

Results and Discussion

Table 1: Root-knot Index Scale (Taylor and Sasser, 1978)^[8]

Root-knot Index Scale	Number of Galls/ egg mass per root	Reactions
1	0	HR
2	1-10	R
3	11-30	MR
4	31-100	S
5	>100	HS

Screening of ridge gourd varieties / cultivars against root-knot nematodes

Out of fiftytwo ridge gourd varieties/cultivars screened against root-knot nematode, only 6 showed resistant reaction with 7-10 number of galls per plant,7 showed moderately resistant reaction with 23-31 number of galls per plant,32 susceptible reaction with 31-91 number of galls per plants &5 highly susceptible with 112-116 number of galls per plants. Maximum gall was recorded in variety HARSHA (116.33) which supported maximum population of 3.27 and least population was recorded as 0.64 in the variety Krishna -51 with gall number 61.33(Table 1& 2)

Effect of nematode infections on plant growth parameters:

Plant height: Due to infection of root-knot nematode, the maximum average shoot length of ridge gourd varieties was 160cm in BSS-1036, and root length was 38.66cm in Ridge gourd 12 pata. The decrease in shoot length & root length were more pronounced i.e., in SS-Ramu (16.83cm) and Ramu F1 (11.36) respectively. The decrease was possibly due to improper uptake and transport of elements, nutrients and

water resulted from nematode infection. (Table 3)

After infection of root-knot nematode, the maximum average shoot length of ridge gourd varieties was 160cm in BSS-1036, and root length was 38.66cm in Ridge gourd 12 pata. The decrease in shoot length & root length were more pronounced i.e., in SS-Ramu (16.83cm) and Ramu F1(11.36) respectively. The decrease in shoot weight (5.53g) and root weight (0.23) of the ridge gourd variety, Nayagarh Local and Tauri, BSS-1009 respectively.

Pandey (2016)^[6] studied due to infection of root-knot nematode, the maximum average shoot length of greengram cultivars/varieties was 40.66 cm in 20 MH-175. The decrease in shoot length was more pronounced 22.03 cm in 5 DGG-5 variety, which was statistically different from other resistant varieties. The decrease is possibly due to improper uptake and transport of elements, nutrients and water resulted from nematode infection

Shoot weight and root weight: The decrease in fresh shoot weight (5.53g) and fresh root weight (0.23) of the ridge gourd variety, Nayagarh Local and Tauri, BSS-1009 respectively. These varieties were significantly different from the rest varieties showing susceptible and moderately resistant reaction to the test nematode. The same trend was observed for fresh root weight in both the varieties. The decrease in dry shoot weight (2.56g) in variety NHRG-1001 & dry root weight (1.10g) in Hybrid Patal Tarai was observed. Possible reasons for low shoot weight and root weight in infected plants may be due to improper supply of nutrients resulting from nematode infection for which it is compensated to some extent in resistant varieties (Table 3).

Nayak (2006) reported that plant height of brinjal varieties due to root-knot nematode infection were decreased by 9.04, 18.48, 23.50 percent in varieties Pusa Kranti, Kantabaigan and Pusa Purple Long, respectively over uninoculated control. Further, he had shown decrease of shoot weight (34.08%) and root weight (31.67%) of the susceptible brinjal cultivars, Pusa Purple Long which was different from other two resistant varieties showing resistance reaction.

Pandey (2016)^[6] observed the decrease in shoot weight (22.70 g) and dry root weight (0.3 g) of the greengram variety, 9 GM 11-02 and 15 IPM 2K 15-4 was significantly different from the rest varieties showing resistant and moderately resistant reaction to the test nematode.

Effects of nematode infection on different biochemical composition of plants and growth parameters

It is clearly evident from the table that, there is a reduction in fresh shoot weight in different varieties in infected plants over healthy counterparts and maximum reduction was found in variety Aneeta (22.55%) & least percent was observed in resistant variety Priya (10.83%).

Brow *et al.*, 1997^[2]; Jacquet *et al.*, (2005)^[4] investigated the occurrence of variation in susceptibility among forty tomato genotypes to *M. incognita* might be due to genetic differences. The highly susceptible genotypes supported greatest number of juveniles penetrated and completed their development to maturity as shown by high gall index, more number of females, egg masses and eggs with high reduction in root length and root dry weight present while in resistant cultivar limited numbers of juveniles were able to penetrate, develop to maturity and lay egg masses.

Plant growth reduction in ridge gourd genotypes might be due to severe root galling and arrested root system by nematode

infection. The ability of galled roots lead to modification in absorption of water and nutrient from soil and their translocation to foliage resulting in foliage chlorosis and

stunting of vegetative growth. The arrested root system could not be able to fully explore the soil for water and nutrients (Clark *et al.*, 2003) [3].

Table 2(a): Reaction of Ridge gourd cultivars / lines against root knot nematode, *Meloidogyne incognita*

S.I. No.	Reactions based on Root-knot index	Name of the varieties
1	Resistant (1.1 to 2.0)	Priya, Challenger, Jaipur long, BSS-1009, Tauri, Pallishree (6)
2	Moderately Resistant (2.1 to 3.0)	Narayana, Aneeta, NHRG-1001, Ridge gourd 12 pata, 12 Pata Jhinga, Dhenkanal local, Nayagarh local, Yeshvi-38, Indo-US-216 (9)
3	Susceptible (3.1 to 4.0)	Maharashtra 16 patajhinga, Hybrid patal tarai, Hybrid jhinga, SS-Ramu, Sumitrs, Machar jhinga, Debsundari, Ramu F1, Cluster, Sevenstar, Athgarh local, Sankarpur local, Mira, Vaishali, Devika-776, MHRG 7, Estilo, SS-Chandrani, SE-19 Marwari, Krishna-51, DEB-2404, SC-18, Kaveri, Lavanya, Avanti, BSS-1036, Saniya-4, Arun, Ankur Latika, NS-474, Lumbini (32)
4	Highly susceptible (4.1 to 5.0)	Aarti, Harsha, F1 Stella, Rohini, Laila (5)

Table 2: Screening of Ridge gourd varieties/cultivars against root-knot nematode (*Meloidogyne incognita*)

S.I. No.	Varieties	No. of galls	Reaction	Final population*
1	Priya	8.66	Resistant	239.33 (2.37)
2	Challenger	10	Resistant	244.33 (2.38)
3	Narayana	26	Moderately Resistant	293.66 (2.46)
4	Aneeta	24.33	Moderately Resistant	458.33 (2.66)
5	NHRG-1001	27	Moderately Resistant	352.66 (2.54)
6	Maharashtra 16 pata jhinga	61.66	Susceptible	762.66 (2.88)
7	Aarti	112.66	Highly Susceptible	1426 (3.15)
8	Hybrid Patal Tarai	47.33	Susceptible	985 (2.99)
9	Jaipur long	9	Resistant	271.66 (2.43)
10	Ridge gourd 12 pata	30.33	Moderately Resistant	455 (2.65)
11	12 Pata Jhinga	27	Moderately Resistant	471.66 (2.67)
12	Hybrid Jhinga	52.33	Susceptible	968.33 (2.98)
13	Harsha	116.33	Highly Susceptible	1226.66 (3.08)
14	SS-Ramu	47	Susceptible	975 (2.98)
15	Sumitra	91.33	Susceptible	762.66 (2.88)
16	BSS-1009	9.66	Resistant	241.66 (2.38)
17	Machar Jhinga	52.66	Suseptible	961 (2.98)
18	Debsundari	64.33	Suseptible	970 (2.99)
19	Ramu F1	46.66	Suseptible	761.66 (2.88)
20	Cluster	38.66	Suseptibe	971.66 (2.98)
21	Seventstar	32.33	Suseptible	772.66 (2.88)
22	Dhenkanal local	23	Moderately Resistant	428 (2.63)
23	Nayagarh local	31	Moderately Resistant	255 (2.40)
24	Athgarh local	58.66	Suseptible	935 (2.97)
25	Sankar pur local	61.33	Suseptible	941 (2.97)
26	Mira	49	Suseptible	935 (2.97)
27	Tauri	8.66	Resistant	941 (2.97)
28	Yeshvi-38	29.33	Moderately Resistant	775 (2.88)
29	Vaishali	51.66	Suseptible	265 (2.42)
30	Devika-776	47.33	Suseptible	420 (2.62)
31	Indo-US-216	26.33	Moderately Resistant	985 (2.99)
32	F1 Stella	115	Highly Susceptible	978.33 (2.99)
33	MHRG 7	45.66	Susceptible	435 (2.63)
34	Estilo	60.66	Susceptible	1615 (3.20)
35	SS-Chandrani	52.66	Susceptible	970 (2.98)
36	SE-19	47	Susceptible	767 (2.88)
37	Marwari	47	Susceptible	968.33 (2.98)
38	Krishna -51	61.33	Susceptible	975 (2.98)
39	DEB-2404	89.66	Susceptible	985 (2.99)
40	SC-18	60.66	Susceptible	967 (2.98)
41	Rohini	113.33	Highly Susceptible	746 (2.87)
42	Kaveri	57.33	Susceptible	961.66 (2.98)
43	Lavanya	31.33	Susceptible	1295 (3.11)
44	Avanti	45.66	Susceptible	772.66 (2.88)
45	BSS-1036	91	Susceptible	785 (2.89)
46	Saniya-4	51.33	Susceptible	985 (2.99)
47	Arun	46.33	Susceptible	978.33 (2.99)
48	Laila	114.33	Highly Susceptible	1472.33 (3.16)

49	NS-474	59.66	Susceptible	771.66 (2.88)
50	Lumbini	63	Susceptible	818.33 (2.91)
51	Pallishree	7.33	Resistant	763.33 (2.88)
52	Ankur Latika	31.33	Susceptible	651.66 (2.81)
	SEM(±)	4.69	-	20.878
	CD(0.05)	13.13	-	58.521
	CV%	16.15	-	45.55

*log transformed value

Table 2(a): Effect of root-knot nematode, *M. incognita* on growth parameters of five Ridge gourd cultivars as compared to Healthy plant (H)

Varieties	Fresh shoot weight		% Increase (+) or % decrease (-) over Healthy	Fresh root weight		% Increase (+) or % decrease (-) over Healthy	Shoot length		% Increase (+) or % decrease (-) over Healthy
	Healthy	Inoculated		Healthy	Inoculated		Healthy	Inoculated	
Priya	27.40	24.43	-10.83	0.29	0.26	-10.34	114.30	112.33	-1.72
BSS-1009	15.36	12.36	-19.53	0.26	0.23	-11.53	57.30	55.5	-3.14
Aneeta	13.3	10.3	-22.55	2.56	2.53	-1.17	85	83	-2.35
Aarti	18.9	15.9	-15.87	2.43	2.40	-1.23	100.23	99.66	-0.56
Harsha	18.33	15.33	-16.36	1.39	1.36	-2.15	116.33	113.33	-2.57

Table 2(b): Effect of root-knot nematode, *M. incognita* on growth parameters of five Ridge gourd cultivars as compared to Healthy plant (H)

Varieties	Root length		% Increase (+) or % decrease (-) over Healthy	Dry shoot weight		% Increase (+) or % decrease (-) over Healthy	Dry root weight		% Increase (+) or % decrease (-) over Healthy
	Healthy	Inoculated		Healthy	Inoculated		Healthy	Inoculated	
Priya	28.26	24.26	-14.15	13	8	-38.46	0.14	0.13	-7.14
BSS-1009	30.96	25.96	-16.14	7.76	2.76	-64.43	0.14	0.13	-7.14
Aneeta	24.16	20.16	-16.55	8.14	3.16	-61.17	2.21	2.2	-0.45
Aarti	28.83	24.83	-13.87	8.86	3.86	-56.43	1.87	1.86	0.53
Harsha	28.56	23.56	-17.50	7.4	2.40	-67.56	0.94	0.93	-1.06

Table 3: Evaluation of ridge gourd varieties /cultivars against root-knot nematode, *Meloidogne incognita*

S.I. No.	Varieties	Fresh shoot wt.(g)	Fresh root wt.(g)	Shoot length (cm)	Root length (cm)	No. of galls	Reaction	Root Knot index (1-5 scale)	Dry shoot wt.(g)	Dry root wt.(g)	Final population*
1	Priya	24.43	0.26	112.33	24.26	8.66	Resistant	2	8	0.13	239.33 (2.37)
2	Challenger	10.86	0.6	95.66	15.23	10	Resistant	1.66	6.03	0.26	244.33 (2.38)
3	Narayana	21.2	0.3	85.33	18.43	26	Moderately Resistant	2.66	4.06	0.13	293.66 (2.46)
4	Aneeta	10.3	2.53	83	20.16	24.33	Moderately Resistant	2.66	3.16	2.2	458.33 (2.66)
5	NHRG-1001	12.66	0.53	118	25.03	27	Moderately Resistant	3	2.56	0.33	352.66 (2.54)
6	Maharashtra 16 pata jhinga	15.43	1.33	159	18.16	61.66	Susceptible	3.66	4.03	0.76	762.66 (2.88)
7	Aarti	15.9	2.4	99.66	24.83	112.66	Highly Susceptible	4.66	3.86	1.86	1426 (3.15)
8	Hybrid Patal Tarai	8.5	1.46	77.5	18.66	47.33	Susceptible	4	3.43	1.1	985 (2.99)
9	Jaipur long	12.66	0.5	84.66	14.5	9	Resistant	2	5.16	0.3	271.66 (2.43)
10	Ridge gourd 12 pata	8.46	0.83	72	38.66	30.33	Moderately Resistant	3	3	0.63	455 (2.65)
11	12 Pata Jhinga	11.93	1.13	71.33	28	27	Moderately Resistant	2.66	3.26	0.83	471.66 (2.67)
12	Hybrid Jhinga	11.7	1.63	43	19.16	52.33	Susceptible	4.33	3.13	0.4	968.33 (2.98)
13	Harsha	15.33	1.36	113.33	23.56	116.33	Highly Susceptible	4.66	2.4	0.93	1226.66 (3.08)
14	SS-Ramu	22.96	1.8	16.83	16.2	47	Susceptible	3.66	5.46	1.43	975 (2.98)
15	Sumitra	11.73	1.63	56	32.33	91.33	Susceptible	4	2.56	1.3	762.66 (2.88)
16	BSS-1009	12.36	0.23	55.5	25.96	9.66	Resistant	2	2.76	0.13	241.66 (2.38)
17	Machar Jhinga	10.56	1.9	107.5	24.93	52.66	Susceptible	3.66	3.43	1.53	961 (2.98)
18	Debsundari	26.46	1.76	115	17.43	64.33	Susceptible	4.33	5.23	1.3	970 (2.99)
19	Ramu F1	14.76	2.26	100	11.36	46.66	Susceptible	3.66	3.66	1.6	761.66 (2.88)
20	Cluster	14.46	0.63	107.33	14.7	38.66	Susceptible	3.66	4.03	0.4	971.66 (2.98)
21	Seventstar	14.2	2.03	100.33	30.66	32.33	Susceptible	4.33	4.6	1.26	772.66 (2.88)
22	Dhenkanal local	6.53	0.56	62	13.83	23	Moderately Resistant	3	2.6	0.23	428 (2.63)
23	Nayagarh local	5.53	0.8	53.5	17	31	Moderately Resistant	3	1.96	0.63	255 (2.40)
24	Athgarh local	11.53	1.16	125.66	18.03	58.66	Susceptible	4.33	4.26	0.43	935 (2.97)
25	Sankar pur local	11.46	1.4	155.66	16.66	61.33	Susceptible	4.33	4.33	3.83	941 (2.97)

26	Mira	22.03	1.16	78.66	19.33	49	Susceptible	4.33	33.2	3.46	935 (2.97)
27	Tauri	23.66	0.23	109.66	23.66	8.66	Resistant	2	4.9	6.36	941 (2.97)
28	Yeshvi-38	7.66	2.4	115	18.66	29.33	Moderately Resistant	2.66	3.23	2.76	775 (2.88)
29	Vaishali	10.63	0.66	59.33	17.46	51.66	Susceptible	4.33	5.43	4.06	265 (2.42)
30	Devika-776	11.96	0.6	59.33	18.66	47.33	Susceptible	2	3.33	3.43	420 (2.62)
31	Indo-US-216	11.7	0.4	61.66	38.33	26.33	Moderately Resistant	2.66	1.86	2.66	985 (2.99)
32	F1 Stella	14.06	1.3	110.66	23.66	115	Highly Susceptible	4.66	2.3	3.66	978.33 (2.99)
33	MHRG 7	11.1	1.4	154.66	17	45.66	Susceptible	3.66	4.06	3.13	435 (2.63)
34	Estilo	10.9	1.5	59	16.53	60.66	Susceptible	3.66	5.33	2.86	1615 (3.20)
35	SS-Chandrani	11.43	2.2	17.66	29.66	52.66	Susceptible	4	3.4	3.36	970 (2.98)
36	SE-19	10.53	2.2	114.33	17.33	47	Susceptible	4.33	5.36	5.46	767 (2.88)
37	Marwari	10.53	1.23	99	18.66	47	Susceptible	4.33	3.4	3.26	968.33 (2.98)
38	Krishna -51	10.46	1.5	90.33	32	61.33	Susceptible	4.33	5.2	3.9	975 (2.98)
39	DEB-2404	10.53	1.2	102.33	29.66	89.66	Susceptible	4	5.4	3.46	985 (2.99)
40	SC-18	10.56	0.7	107	15	60.66	Susceptible	4.33	2.83	2.93	967 (2.98)
41	Rohini	13.03	1.23	109.33	23	113.33	Highly Susceptible	4.66	2.43	2.36	746 (2.87)
42	Kaveri	10.8	1.16	112.33	15	57.33	Susceptible	4.33	3.03	3.9	961.66 (2.98)
43	Lavanya	11.23	0.66	101.66	24.66	31.33	Susceptible	3.66	3.5	5.66	1295 (3.11)
44	Avanti	10.76	1.86	80.33	16	45.66	Susceptible	4	5.6	3.4	772.66 (2.88)
45	BSS-1036	11.43	0.6	160	29.66	91	Susceptible	4	3.36	4.6	785 (2.89)
46	Saniya-4	10.76	2.1	57.33	16.36	51.33	Susceptible	4.33	3.56	5.4	985 (2.99)
47	Arun	10.6	1.43	103.66	29.66	46.33	Susceptible	3.66	3	2.53	978.33 (2.99)
48	Laila	14.66	2.06	114.66	22.33	114.33	Highly Susceptible	4.66	2.46	2.46	1472.33 (3.16)
49	NS-474	25.13	1.2	157.66	18.33	59.66	Susceptible	3.66	5.46	5.13	771.66 (2.88)
50	Lumbini	14.43	1.23	60	16.66	63	Susceptible	3.66	2.36	2.83	818.33 (2.91)
51	Pallishree	23.6	0.36	112.66	25.33	7.33	Resistant	2.33	5.16	2.86	763.33 (2.88)
52	Ankur Latika	13.53	1.23	60	29.66	31.33	Susceptible	4.33	3.4	4.03	651.66 (2.81)
	SE(m)±	1.15	0.29	9.66	1.45	4.69	-	0.498	0.658	0.534	20.878
	CD(0.05)	3.22	8.23	27.04	4.06	13.13	-	1.395	1.842	1.495	58.521
	CV%	14.86	41.12	17.99	11.59	16.15	-	23.84	29.68	24.11	45.55

* Figures in parentheses are log transformed values.

Conclusion

It is clearly evident from the table that, there is a reduction in fresh shoot weight in different varieties in infected plants over healthy counterparts and maximum reduction was found in variety Aneeta (22.55%) & least percent was observed in resistant variety Priya (10.83%). Due to infection of root-knot nematode, the maximum average shoot length of ridge gourd varieties was 160cm in BSS-1036, and root length was 38.66cm in Ridge gourd 12 pata. The decrease in shoot length & root length were more pronounced i.e., in SS-Ramu (16.83cm) and Ramu F1 (11.36) respectively. After infection of root-knot nematode, the maximum average shoot length of ridge gourd varieties was 160cm in BSS-1036, and root length was 38.66cm in Ridge gourd 12 pata. The decrease in shoot length & root length were more pronounced i.e., in SS-Ramu (16.83cm) and Ramu F1 (11.36) respectively. The decrease in shoot weight (5.53g) and root weight (0.23) of the ridge gourd variety, Nayagarh Local and Tauri, BSS-1009 respectively. The decrease in fresh shoot weight (5.53g) and fresh root weight (0.23) of the ridge gourd variety, Nayagarh Local and Tauri, BSS-1009 respectively. These varieties were significantly different from the rest varieties showing susceptible and moderately resistant reaction to the test nematode. The same trend was observed for fresh root weight in both the varieties. The decrease in dry shoot weight (2.56g) in variety NHRG-1001 & dry root weight (1.10g) in Hybrid Patal Tarai was observed.

Shoot growth parameter like shoot length; fresh weight and dry weight of different varieties of ridge gourd in general were reduced significantly due to poor translocation of water

and nutrients upward for proper growth of the plants. Due to rootknot nematode infection gibberellin production was greatly reduced, while production of cytokinin increased. Root knot nematode causes giant cells in the roots and this disrupts the root vascular system, reducing the uptake of water and nutrients and their transport from the roots to the shoots (Abad *et al.*, 2003) [1]. A plant response to nematode parasitism causes a morphological and physiological change that affects photosynthetic process. The reduction in length and weight of shoots, root weight increase in infected plants, possibly due to the formation of giant cells in root systems. Basing on nematode population, root gall index and susceptibility, the effect of varietal reactions on root gall numbers per root system was also observed to be significant.

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