SCREENING OF PAPAYA GENOTYPES AGAINST ROOT-KNOT NEMATODES

MELOIDOGYNE INCOGNITA AND *M. JAVANICA* IN POT HOUSE

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ABSTRACT

Screening of papaya genotype or varieties carried out against Root-knot nematodes, *Meloidogyne incognita* and *M. javanica* in pot house. There have taken result from observation of papaya genotypes viz., Shoot and root length, Shoot and root weight, Root-knot Index (0-5), Number of egg mass per root, Number of eggs per egg mass, Number of juveniles per 200 cm³ soil, Number of Females per 3 g root and total nematode population with relevant increasing or decreasing percentage. Papaya genotype (G-189) found moderately resistant against *M. javanica*, Whereas G-112 found moderately susceptible to *M. incognita* and *M. javanica*.

KEYWORDS: Genotype, Papaya & Nematodes

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INTRODUCTION

Fruits and vegetables constitute an important part of our dietary, providing minerals and vitamins for necessary growth and development of the body. Papaya (*Carica papaya* Linn.) is a tropical fruit having commercial importance because of its high nutritive and medicinal value. Papaya cultivation had its origin in South Mexico and Costa Rica. It belongs to the family *Caricaceae*. Bustillo *et al.* (2000) estimated 22.5% reduction in papaya yield due to *M. incognita*. Nematode attacked plants remain stunted with pale yellow leaves. On uprooting such plants, profuse root galling with egg sacs are seen under severe nematode infection. Therefore, with a view to study screening of papaya genotypes or varieties against root-knot nematodes was carried out in the year 2018 in pot house.

MATERIALS

Sandy loam soil (coarse sand 1.3%, fine sand 63%, silt 15% and clay 20%) was collected and sieved through 25 mesh sieve to remove bigger sized stones and matters. Then, it was filled in aluminum trays of 45 × 35 × 15 cm size and steam sterilized at 1.05 kg/cm² pressure constantly for three hours in steam sterilizer. This steam sterilized soil was used for conducting various pot experiments. For counting population of the nematode in roots, the plants were carefully uprooted along with roots, washed with water to remove soil and stained in 0.05 per cent boiling acid fuchsin lacto phenol solution (Franklin and Goodey, 1949) for two minutes. After cooling, the stained roots were washed gently in plain water to remove excess stain and then kept in plain lactophenol till they were teased and examined under stereo binocular microscope to count the number of nematodes viz., number of females, number of egg mass/3 g roots and number of eggs/egg mass.

PROCEDURE

Earthen pots of 8 cm diameter were washed with water and disinfected with 4% formaldehyde (Formalin 40 EC). After drying, the pots were filled with steam sterilized soil @ 450 g/pot. Seedlings of different genotypes of papaya were raised. Seeds of each genotypes/varieties of papaya were seeded in each pot. On germination, plants were thinned down to one plant/pot. Twenty days after seeding, the plants were inoculated with 1000 J₂ of *M. incognita* and *M. javanica* per plant extracted from the egg masses by making ring around the stem. After inoculation rings were covered by adding steam sterilized soil and pots were kept in net house. Uninoculated plants of each variety were kept as control. Each genotype (treatment) was repeated three times. Plants were watered as and when required and protected from pest and diseases by adopting recommended practices in vogue. Plants were depotted carefully after 65 days after sowing (DAS) and roots were washed with simple tap water to make free from the soil for recording various observations.

Table 1: List of Genotypes Screened against *M. Incognita* and *M. Javanica*

Sl. No.	Genotypes	Sl. No.	Genotypes
1	G-7	12	G-112
2	G-11	13	G-118
3	G-13	14	G-174
4	G-16	15	G-180
5	G-24	16	G-185
6	G-47	17	G-188
7	G-64	18	G-189
8	G-66	19	G-211
9	G-80	20	Big Papaya
10	G-102	Check	Madhubindu
11	G-104		

Table 2

Rating Scale (0-5), Per Cent Root Infection and Reaction Pertaining to Root-Knot Nematodes		
Root Knot Index (RKI)	Per cent Root Infection	Reaction
0	No galling	Highly resistant
0.01–1.0	Up to 20% root galling	Resistant
1.01–2.0	Up to 40% root galling	Moderately resistant
2.01–3.0	Up to 60% root galling	Moderately susceptible
3.01–4.0	Up to 80% root galling	Susceptible
4.01–5.0	More than 80% root galling	Highly susceptible

RESULTS AND DISCUSSIONS

Screening of Papaya Genotypes Against *M. Incognita*

Shoot length (cm) at 65 DAS

Significantly highest shoot length was found in G-112 followed by G-80; both differed significantly from each other. Papaya genotype G-180 showed 32.67 cm shoot length and it was at par with G- 185, G-16, G-104 and G-7. Significantly minimum shoot length due to *M. incognita* was noticed in G-11 and maximum reduction (27.59%) in shoot length was noticed in Big Papaya (Table 3).

Root Length (Cm) at 65 DAS

Maximum root length (24.03 cm) was recorded in the genotype G-80 and it statistically differed significantly from rest of the genotypes. Genotype G-112 found to be second best genotype having 19.87 cm root length. However, it was at par with genotype G-180, G-185, G-16 and G-7. Genotype G-118 had minimum root length. Maximum reduction in root length (35.14 %) was noticed in genotype Big Papaya (Table 3).

Fresh Shoot Weight (G)

Fresh shoot weight was maximum (27.53 g) in G-80 which was statistically differed from all other genotypes. Genotype G-112 stood on second position having 22.53 g fresh shoot weight, but it did not differ significantly from genotype G-180, G-185, G-16 and G-7. Minimum fresh shoot weight (10.03 g) among all the genotypes was noticed in G-11. Maximum reduction (38.73%) was noticed in genotype G-112 (Table 4).

Fresh Root Weight (G)

The maximum fresh root weight found in G-11 was statistically at par with G-118. Least fresh root weight was found in G-112 followed by G-80, G-180, G-185, G-16 and G-7 which were statistically at par with each other. Maximum increase (75.67%) in root weight was recorded in G – 112 (Table 4).

Root-Knot Index

Lowest root-knot index (2.06) was registered in genotype G-104 and G-112 both were at par with each other, followed by genotype G-80 and it did not differ with genotype, G-180, G-185, G-16 and G-7. Genotype G-11 had maximum (4.61) root-knot index (Table 5).

Number of Egg Mass/Root

Minimum numbers of egg mass/root (59) were observed in genotype G-112 followed by G-80, G-180, G-16, G-7 and G-104, all remained at par with each other. Genotype G-118 had maximum (90) egg mass followed by genotype G-11. Similar trend was observed for number of eggs/ egg mass, number of females/3 g root and number of juveniles/200 cm³ soil as observed for number of egg mass/root (Table 5).

Total Nematode Population

Total nematode population was significantly less (999) in the genotype G-112 and differed significantly from rest of the genotypes, followed by genotype G-80 with 2238 total nematode population. It was at par with genotype G-180. Maximum nematode population *i.e.* 6760 was recorded in the genotype G-185 which was statistically at par with G-11 (Table 5).

SCREENING OF PAPAYA GENOTYPES AGAINST *M. JAVANICA*

Shoot Length (Cm) at 65 DAS

Shoot length was significantly highest (59.47 cm) in G-112 followed by G-80 both were significantly differed from rest of the genotypes. Papaya genotype G-11 had significantly least shoot length (16.33 cm) among all the genotypes screened. Maximum (12.53%) reduction in shoot length was noticed in G-11 (Table 6).

Root length (cm) at 65 DAS

Maximum root length (29.50 cm) was recorded in the genotype G-112 and it was significantly at par with G-80. G-11 had minimum root length (9.00 cm) and it was significantly differed with rest of the genotypes. Maximum (16.90%) reduction in root length was found in G-11 (Table 6).

Fresh Shoot Weight (G)

Fresh shoot weight was maximum (33.67 g) in G-112 which was statistically differed from all genotypes. Genotype G-80 stood second position having 25.53 g fresh shoot weight, but it was statistically at par with G-180, G-185, G-16, G-7 and G-104. Minimum fresh shoot weight (12.37 g) was recorded in papaya genotype G-11 followed by G-118 and Big papaya. Maximum reduction (13.22%) was noticed in G-118 (Table 7).

Fresh Root Weight (G)

Maximum fresh root weight (12.73 g) found in G-11 which was statistically at par with G-118. Minimum fresh root weight (3.27 g) was found in G-112 followed by G-80, G-180, G-185 and G-16 which all were statistically at par with each other. Maximum increase (14.58%) in fresh root weight was recorded in G-80 (Table 7).

Root-Knot Index

Lowest root-knot index (2.00) was found in genotype G-189 which exhibited statistically at par with G-66 and G-174. Maximum root-knot index (4.61) was found in G-185 which is statistically at par with Big Papaya, G-188, G-118, G-47 and G-80 (Table 8).

Number of Egg Mass/Root

Minimum number of egg mass/root (64) was observed in genotype G-189, followed by G-80, G-180, G-185, G-16 and G-7, all were at par with each other. Genotype G-11 had maximum (95) egg mass/root. Similar trend was observed for number of eggs/egg mass, number of females/3 g root and number of juveniles/200 cm³ soil as observed for number of egg mass/root (Table 8).

Total Nematode Population

Total nematode population was significantly least (850) in the genotype G-189 and it differed significantly with rest of the genotypes, followed by genotype G-80 with 2088 total nematode population. Maximum nematode population (5753) was recorded in the genotype G-11 which was statistically at par with Big papaya, G-118, G-102, G-13, Madhubindu and G-47 (Table 8).

Table 2: Effect of *M. Incognita* on Shoot and Root Length of Different Papaya Genotype at 65 DAS

Sl. No.	Genotype	Shoot length, cm			Root length, cm		
		Inoculated	Control	Reduction over control (%)	Inoculated	Control	Reduction over control (%)
1	G-7	30.67	38.73	20.81	17.60	23.16	24.01
2	G-11	14.00	16.33	14.27	11.90	9.00	32.22
3	G-13	25.33	33.33	24.00	12.50	19.00	34.21
4	G-16	31.17	39.17	20.42	18.17	24.67	26.35
5	G-24	29.83	37.83	21.15	16.17	22.67	28.67
6	G-47	25.67	33.67	23.76	12.63	19.13	33.98
7	G-64	26.33	34.33	23.30	13.23	19.73	32.94
8	G-66	28.50	36.50	21.92	13.47	19.97	32.55
9	G-80	37.67	45.67	17.52	24.03	29.03	17.22
10	G-102	23.83	31.83	25.13	12.17	18.67	34.82
11	G-104	30.73	38.67	20.53	16.60	23.10	28.14
12	G-112	45.97	60.47	23.98	19.87	29.50	32.64
13	G-118	20.50	26.83	23.59	9.20	13.73	32.99
14	G-174	29.33	37.33	21.43	15.10	21.60	30.09

Table 2: Contd.,

15	G-180	32.67	40.67	19.67	19.00	27.17	30.07
16	G-185	31.90	39.90	20.05	18.40	24.90	26.10
17	G-188	28.33	36.33	22.02	13.33	19.83	32.78
18	G-189	29.00	37.00	21.62	14.73	21.23	30.62
19	G-211	29.67	37.67	21.24	15.50	22.00	29.55
20	Big Papaya	21.00	29.00	27.59	12.00	18.50	35.14
21	Madhubindu (check)	26.23	34.23	23.37	12.67	19.17	33.91
Avg.	--	28.49	36.45	21.84	15.15	21.23	28.64
SEm±	--	0.89	1.55	--	1.13	1.29	--
CD at 5%	--	2.55	4.43	--	3.21	3.68	--
CV%	--	5.44	7.37	--	12.84	10.51	--

Table 3: Effect of *M. Incognita* on Fresh Shoot and Root Weight of Different Papaya Genotype at 65 DAS

Sl. No.	Genotype	Fresh Shoot Weight, G			Fresh Root Weight, G		
		Inoculated	Control	Reduction Over Control (%)	Inoculated	Control	Increase Over Control (%)
1	G-7	19.73	24.73	20.22	6.80	4.30	58.14
2	G-11	10.03	12.43	19.31	14.73	12.23	20.44
3	G-13	15.27	20.27	24.67	9.43	6.93	36.08
4	G-16	20.03	25.03	19.98	6.47	3.97	62.97
5	G-24	19.60	24.60	20.33	7.33	4.83	51.76
6	G-47	15.50	20.50	24.39	9.40	6.90	36.23
7	G-64	16.70	21.70	23.04	8.67	6.17	40.52
8	G-66	17.73	22.73	22.00	8.20	5.70	43.86
9	G-80	27.53	28.33	2.82	5.93	3.43	72.89
10	G-102	13.83	18.83	26.55	9.47	6.97	35.87
11	G-104	19.67	24.67	20.27	6.93	4.43	56.43
12	G-112	22.53	36.77	38.73	5.27	3.00	75.67
13	G-118	10.13	15.13	33.05	13.20	10.70	23.36
14	G-174	19.47	24.47	20.43	7.90	5.40	46.30
15	G-180	22.47	27.47	18.20	6.10	3.60	69.44
16	G-185	20.87	25.87	19.33	6.33	3.83	65.27
17	G-188	17.67	22.67	22.06	8.33	5.83	42.88
18	G-189	18.87	23.87	20.95	8.00	5.50	45.45
19	G-211	19.50	24.50	20.41	7.80	5.30	47.17
20	Big Papaya	10.80	15.80	31.65	10.57	8.07	30.98
21	Madhubindu (check)	16.57	21.57	23.18	9.07	6.57	38.05
Avg.	--	17.87	22.91	22.00	8.38	5.89	42.28
SEm±	--	0.98	1.01	--	0.57	0.46	--
CD at 5%	--	2.81	2.90	--	1.62	1.30	--
CV%	--	9.55	7.67	--	11.73	13.42	--

Table 4: Reproduction Effect of *M. Incognita* on Papaya

Sl. No.	Genotype	Nematode Population							Reproduction Factor (RF)
		RKI (0-5)*	Reaction (Based on RKI)	No. of Juveniles/200 cm ² soil	No. of Egg Mass/Root	No. of Eggs/Egg Mass	No. of Females/3 g Root	Total	
1	G-7	1.91 (3.15)**	S	3.33 (2137)***	1.87 (73)***	2.49 (308)***	2.38 (239)***	3.44 (2753)***	2.75
2	G-11	2.26 (4.61)	HS	3.70 (5011)	1.96 (90)	2.60 (397)	2.67 (467)	3.77 (5887)	5.89
3	G-13	2.11 (3.95)	S	3.64 (4364)	1.93 (84)	2.55 (354)	2.57 (371)	3.71 (5128)	5.13
4	G-16	1.85 (2.92)	MS	3.30 (1994)	1.82 (65)	2.48 (301)	2.38 (239)	3.42 (2629)	2.62
5	G-24	1.97 (3.38)	S	3.36 (2290)	1.88 (75)	2.50 (315)	2.41 (250)	3.47 (2950)	2.95
6	G-47	2.11 (3.95)	S	3.63 (4265)	1.92 (82)	2.54 (346)	2.54 (346)	3.70 (5011)	5.01
7	G-64	2.05 (3.70)	S	3.60 (3980)	1.90 (78)	2.54 (346)	2.51 (323)	3.68 (4785)	4.79
8	G-66	2.03 (3.62)	S	3.54 (3466)	1.90 (78)	2.52 (330)	2.50 (315)	3.63 (4265)	4.26
9	G-80	1.79 (2.70)	MS	3.23 (1697)	1.79 (61)	2.41 (256)	2.32 (208)	3.35 (2238)	2.24
10	G-102	2.13 (4.04)	HS	3.64 (4364)	1.94 (86)	2.56 (362)	2.58 (379)	3.72 (5247)	5.25
11	G-104	1.59 (2.06)	MS	3.34 (2137)	1.87 (73)	2.49 (315)	2.38 (239)	3.45 (2817)	2.82
12	G-112	1.59 (2.06)	MS	2.76 (574)	1.78 (59)	2.40 (250)	2.03 (106)	3.00 (999)	1.00
13	G-118	2.23 (4.47)	HS	3.69 (4897)	1.96 (90)	2.58 (388)	2.63 (426)	3.76 (5753)	5.75
14	G-174	2.00 (3.50)	S	3.48 (3019)	1.88 (75)	2.50 (315)	2.48 (301)	3.57 (3714)	3.71
15	G-180	1.82 (2.81)	MS	3.24 (1737)	1.81 (64)	2.47 (294)	2.35 (223)	3.37 (2343)	2.34
16	G-185	1.82 (2.81)	MS	3.26 (1819)	1.81 (64)	2.47 (294)	2.36 (228)	3.83 (6760)	2.40
17	G-188	2.05 (3.70)	S	3.60 (3980)	1.90 (78)	2.52 (330)	2.51 (323)	3.67 (4676)	4.68
18	G-189	2.00 (3.50)	S	3.53 (3387)	1.89 (77)	2.52 (330)	2.49 (308)	3.61 (4073)	4.07
19	G-211	1.97 (3.38)	S	3.39 (2454)	1.88 (75)	2.50 (315)	2.45 (281)	3.49 (3089)	3.09
20	Big Papaya	2.21 (4.38)	HS	3.68 (4785)	1.95 (88)	2.57 (371)	2.63 (426)	3.76 (5753)	5.75
21	Madhubindu (check)	2.07 (3.78)	S	3.63 (4265)	1.91 (80)	2.54 (346)	2.54 (346)	3.70 (5011)	5.01
SEm±	--	0.05	--	0.03	0.03	0.03	0.02	0.02	--
CD at 5%	--	0.16	--	0.08	0.09	0.09	0.06	0.06	--
CV%	--	4.84	--	1.40	2.76	2.14	1.53	1.11	--

*0=Free; 5 = Maximum disease intensity.

Figures in parentheses are retransformed values of transformation ($\sqrt{x+0.5}$)*Figures in parentheses are retransformed values of transformation $\log X+1$, G=GenotypesTable 5: Effect of *M. Javanica* on Shoot and Root Length of Different Papaya Genotype at 65 DAS

Sl. No.	Genotype	Shoot length, cm			Root length, cm		
		Inoculated	Control	Reduction over control (%)	Inoculated	Control	Reduction over control (%)
1	G-7	37.73	38.73	2.58	21.60	23.16	6.74
2	G-11	16.33	18.67	12.53	9.00	10.83	16.90
3	G-13	32.33	33.33	3.00	16.50	19.00	13.16
4	G-16	38.17	39.17	2.55	22.17	24.67	10.13
5	G-24	36.83	37.83	2.64	20.17	22.67	11.03
6	G-47	32.67	33.67	2.97	16.63	19.13	13.07
7	G-64	33.33	34.33	2.91	17.23	19.73	12.67
8	G-66	35.50	36.50	2.74	17.47	19.97	12.52
9	G-80	44.67	45.67	2.19	26.53	29.03	8.61

Table 5: Contd.,							
10	G-102	30.83	31.83	3.14	16.17	18.67	13.39
11	G-104	37.67	38.67	2.59	20.60	23.10	10.82
12	G-112	59.47	60.47	1.65	29.50	30.03	1.76
13	G-118	25.83	26.83	3.73	13.73	15.90	13.65
14	G-174	36.33	37.33	2.68	19.10	21.60	11.57
15	G-180	39.67	40.67	2.46	23.00	27.17	15.35
16	G-185	38.90	39.90	2.51	22.40	24.90	10.04
17	G-188	35.33	36.33	2.75	17.33	19.83	12.61
18	G-189	36.00	37.00	2.70	18.73	21.23	11.78
19	G-211	36.67	37.67	2.65	19.50	22.00	11.36
20	Big Papaya	28.00	29.00	3.45	16.00	18.50	13.51
21	Madhubindu (check)	33.23	34.23	2.92	16.67	19.17	13.04
Avg.	--	35.61	36.45	2.30	19.26	21.23	9.28
SEm±	--	1.39	1.55	--	1.30	1.29	--
CD at 5%	--	3.97	4.43	--	3.72	3.68	--
CV%	--	6.76	7.37	--	11.71	10.51	--

Table 6: Effect of M. Javanica on Fresh Shoot and Root Weight of Different Papaya Genotype at 65 DAS

Sl. No.	Genotypes	Fresh Shoot Weight, g			Fresh Root Weight, g		
		Inoculated	Control	Reduction over Control (%)	Inoculated	Control	Increase over Control (%)
1	G-7	22.73	24.73	8.09	4.80	4.30	11.63
2	G-11	12.37	12.43	0.48	12.73	12.23	4.09
3	G-13	18.27	20.27	9.87	7.43	6.93	7.22
4	G-16	23.03	25.03	7.99	4.47	3.97	12.59
5	G-24	22.60	24.60	8.13	5.33	4.83	10.35
6	G-47	18.50	20.50	9.76	7.40	6.90	7.25
7	G-64	19.70	21.70	9.22	6.67	6.17	8.10
8	G-66	20.73	22.73	8.80	6.20	5.70	8.77
9	G-80	25.53	27.53	7.26	3.93	3.43	14.58
10	G-102	16.83	18.83	10.62	7.47	6.97	7.17
11	G-104	22.67	24.67	8.11	4.93	4.43	11.29
12	G-112	33.67	36.77	8.43	3.27	3.00	9.00
13	G-118	13.13	15.13	13.22	11.20	10.70	4.67
14	G-174	22.47	24.47	8.17	5.90	5.40	9.26
15	G-180	25.47	27.47	7.28	4.10	3.60	13.89
16	G-185	23.87	25.87	7.73	4.33	3.83	13.05
17	G-188	20.67	22.67	8.82	6.33	5.83	8.58
18	G-189	21.87	23.87	8.38	6.00	5.50	9.09
19	G-211	22.50	24.50	8.16	5.80	5.30	9.43
20	Big Papaya	13.80	15.80	12.66	8.57	8.07	6.20
21	Madhubindu (check)	19.57	21.57	9.27	7.07	6.57	7.61
Avg.	--	20.95	22.91	9.28	6.38	5.89	8.32
SEm±	--	1.00	1.01	--	0.57	0.46	--
CD at 5%	--	2.86	2.90	--	1.62	1.30	--
CV%	--	8.29	7.67	--	15.40	13.42	--

Table 7: Reproduction Effect of *M. Javanica* on Papaya

Sl. No.	Genotypes	Nematode Population							Reproduction Factor (RF)
		RKI (0-5)*	Reaction (Based on RKI)	No. of Juveniles/200 cm ³ soil	No. of Egg Mass/root	No. of Eggs/egg Mass	No. of Females/3 g Root	Total	
1	G-7	1.82 (2.81)**	MS	3.31 (2041)***	1.89 (77)***	2.46 (287)***	2.27 (185)***	3.42 (2629)***	2.63
2	G-11	1.82 (2.81)	MS	3.69 (4897)	1.98 (95)	2.58 (379)	2.62 (416)	3.76 (5753)	5.75
3	G-13	2.05 (3.70)	S	3.63 (4265)	1.95 (88)	2.52 (330)	2.51 (323)	3.70 (5011)	5.01
4	G-16	2.00 (3.50)	S	3.29 (1949)	1.85 (70)	2.45 (281)	2.27 (185)	3.39 (2454)	2.45
5	G-24	1.97 (3.38)	S	3.35 (2238)	1.90 (78)	2.46 (287)	2.31 (203)	3.45 (2817)	2.82
6	G-47	2.21 (4.38)	HS	3.62 (4168)	1.94 (86)	2.52 (330)	2.47 (294)	3.69 (4897)	4.90
7	G-64	2.07 (3.78)	S	3.60 (3980)	1.92 (82)	2.51 (323)	2.44 (274)	3.67 (4676)	4.68
8	G-66	1.59 (2.03)	MS	3.54 (3466)	1.92 (82)	2.50 (315)	2.42 (262)	3.61 (4073)	4.07
9	G-80	2.23 (4.47)	HS	3.21 (1621)	1.82 (65)	2.37 (233)	2.20 (157)	3.32 (2088)	2.09
10	G-102	2.00 (3.50)	S	3.63 (4265)	1.96 (90)	2.53 (338)	2.51 (323)	3.70 (5011)	5.01
11	G-104	2.03 (3.62)	S	3.32 (2088)	1.89 (77)	2.46 (287)	2.28 (190)	3.43 (2691)	2.69
12	G-112	1.79 (2.70)	MS	3.52 (3310)	1.91 (80)	2.49 (308)	2.41 (256)	3.60 (3980)	3.98
13	G-118	2.13 (4.04)	HS	3.68 (4785)	1.97 (92)	2.55 (354)	2.58 (379)	3.75 (5622)	5.62
14	G-174	1.69 (2.36)	MS	3.47 (2950)	1.91 (80)	2.47 (294)	2.40 (250)	3.56 (3630)	3.63
15	G-180	1.91 (3.15)	S	3.22 (1659)	1.83 (67)	2.43 (268)	2.24 (173)	3.34 (2187)	2.19
16	G-185	2.26 (4.61)	HS	3.24 (1737)	1.84 (68)	2.44 (274)	2.24 (173)	3.36 (2290)	2.29
17	G-188	2.11 (3.95)	MS	3.60 (3980)	1.92 (82)	2.49 (308)	2.43 (268)	3.67 (4676)	4.68
18	G-189	1.58 (2.00)	MR	2.70 (500)	1.81 (64)	2.36 (228)	1.74 (54)	2.93 (850)	0.85
19	G-211	1.97 (3.38)	S	3.37 (2343)	1.90 (78)	2.47 (294)	2.36 (228)	3.47 (2950)	2.95
20	Big Papaya	2.11 (3.95)	S	3.67 (4676)	1.97 (92)	2.54 (346)	2.57 (371)	3.75 (5622)	5.62
21	Madhubindu (check)	2.05 (3.70)	S	3.62 (4168)	1.93 (84)	2.51 (323)	2.46 (287)	3.69 (4897)	4.90
SE _{mt}	—	0.06	—	0.03	0.03	0.03	0.03	0.02	—
CD at 5%	—	0.16	—	0.08	0.08	0.10	0.08	0.07	—
CV%	—	4.95	—	1.45	2.67	2.35	2.10	1.16	—

0=Free; 5=Maximum disease intensity.

**Figures in parentheses are retransformed values of $(\sqrt{x}+0.5)$.

***Figures in parentheses are retransformed values of $\log X+1$.

SUMMARY AND CONCLUSIONS

Out of twenty genotypes, papaya G-189 found moderately resistant against *M. javanica*. Papaya genotype G-112 was found moderately susceptible to *M. incognita* and *M. javanica*. Furthermore, papaya genotypes G-16, G-80, G-104, G-180 and G-185 were found moderately susceptible to *M. incognita*. Similarly, G-7, G-11, G-66, G-174 and G-188 were moderately susceptible to *M. javanica*. Rest of papaya genotypes was observed in a range of susceptible to highly susceptible against *M. incognita* and *M. javanica*.

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APPENDIX

Figure 1: Highly Susceptible Papaya Genotype, G-11