

EFFECT OF DIFFERENT BIDI TOBACCO VARIETIES ON POPULATION DYNAMICS OF NEMATODES

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Studies on effect of bidi tobacco varieties on nematode population revealed that A 119, GT 7, MRGTH 1 and ABT 10 were susceptible to stunt and reniform nematodes as well as root-knot nematodes except ABT 10. ABT 10 being resistant to root-knot nematodes, the population was not detected at most of the periods. The same trend was observed for total plant parasitic, saprophytic and total nematodes with maximum and minimum population of total nematodes in A 119 and ABT 10, respectively. The population of reniform, root-knot and stunt nematodes increased at 75 to 105, 105 to 165 and 135 to 210 DAP, respectively, compared to at 0 DAP in each of the varieties studied except ABT 10 for root-knot nematodes. The root-knot disease was not appeared on resistant variety ABT 10; while, it was recorded in A 119, GT 7 and MRGTH 1 with maximum in A 119 affecting cured leaf yield. Maximum yield was realized in MRGTH 1.

INTRODUCTION

Tobacco (*Nicotiana tabacum* L.), a cash crop, occupies less than 0.27 per cent of the net cultivated area and earns sizable amount of foreign exchange (Rs. 9,731 crores) and central excise (Rs. 55,000 crores) to the national exchequer besides providing direct and indirect employment to 46 million people including 6 million farmers and workers. Plant parasitic nematodes cause severe damage to the crop. Root-knot (*Meloidogyne incognita*; *M. javanica*), reniform (*Rotylenchulus reniformis*) and stunt (*Tylenchorhynchus vulgaris*) nematodes are found predominantly attacking bidi tobacco in Gujarat. No information is available about the effect of different bidi tobacco varieties on population dynamics of nematodes in the field. Therefore, present investigation was carried out.

MATERIALS AND METHODS

An experiment was carried out at BTRS farm to study the effect of different bidi tobacco varieties

on population dynamics of nematodes in the field using split plot design. There were sixteen treatments comprising of four varieties (V) viz., Anand 119 (A 119) (V₁), Gujarat Tobacco 7 (GT 7) (V₂), Mosaic Resistant Gujarat Tobacco Hybrid 1 (MRGTH 1) (V₃) and root-knot resistant Anand Bidi Tobacco 10 (ABT 10) (V₄) as main plot along with four dates of planting (D) viz., third week of August (D₁), first week of September (D₂), third week of September (D₃) and first week of October (D₄) as sub plot treatments. Each treatment was replicated three times keeping the gross and net plot size of 4.5 X 5.25 m and 2.7 X 3.75 m, respectively. Each variety was transplanted at a distance of 90 and 75 cm between and within row, respectively. All agronomic practices in vogue were followed.

For estimation and recording soil population of nematodes, a composite soil sample (1000 cc) were collected from five selected plants of each plot up to the depth of 20 cm and 20-25 cm apart from the stem in clockwise direction at 90° angle with the help of an auger at planting and thereafter at 15 days interval till the harvesting of the crop. Subsequent rounds of sampling were carried out from the same plants selecting the spot in between past or foregoing sampling spots. The nematodes were extracted by processing well mixed 200 cc soil from the composite soil sample using Petridish Assembly Method (Chawla and Prasad, 1974). After 24 hrs, the suspension was collected and concentrated to make 100 ml volume. The nematodes per ml water suspension was estimated by identifying and counting nematodes three times under stereoscopic binocular microscope and average nematode count was worked out. Finally, the number of nematodes per 200 cc soil for each treatment was estimated by multiplying the observed value with proper multiplication factor. The root-knot index on each plant in net plot area using 0-5 scale was also recorded in each treatment. On maturity of the crop, sand leaves,

leaf lamina, mid ribs were harvested, sun cured and weighed. The data were analyzed using standard statistical procedure.

RESULTS AND DISCUSSION

The results presented in Table 1 revealed non-significant differences among the varieties for the population of stunt nematodes estimated at different intervals or periods as well as in pooled over periods except 15 days after planting (DAP) (P_2). This revealed that all the four varieties including root-knot resistant ABT 10 (V_4) were equally susceptible to stunt nematodes. The population of stunt nematodes was found to increase at 135 DAP (P_{10}) and onwards till the end at 210 DAP (P_{15}), compared to initial population at 0 DAP (P_1).

Perusal of data presented in Table 2 revealed non-significant differences among the varieties for the population of reniform nematode estimated at all the intervals or periods including pooled over periods. This indicated that all the varieties including root-knot resistant ABT 10 (V_4) were equally susceptible to reniform nematode. The population was started to increase at 75 DAP (P_6) with maximum at 135 DAP (P_{10}).

The data presented on root-knot nematodes in Table 3 revealed non-significant differences among the varieties starting from planting at 0 (P_1) to 60 DAP (P_5) and towards the end of the experiment. It was not observed from 180 (P_{13}) to 210 DAP (P_{15}). Significant differences were observed for root-knot nematodes among the varieties at 75 (P_6) to 165 DAP (P_{12}). It was found to increase at 105 (P_8) to 165 DAP (P_{12}), with the highest population at 135 DAP (P_{10}) among the A 119 (V_1), GT 7 (V_2) and MRGTH 1 (V_3) varieties of bidi tobacco; while, it was not observed in root-knot resistant ABT 10 (V_4). The data on pooled over periods among the varieties revealed significant differences with significantly least and negligible population of root-knot nematodes in ABT 10 (V_4). It was significantly higher in all the three root-knot susceptible bidi tobacco cultivars viz., A 119 (V_1), GT 7 (V_2) and MRGTH 1 (V_3) with maximum population in A 119 (V_1) compared to root-knot resistant ABT 10 (V_4). This indicated that root-knot susceptible varieties of bidi tobacco i.e. A 119 (V_1), GT 7 (V_2) and MRGTH 1 (V_3) supported the population of root-knot nematodes; while, root-knot resistant ABT 10 (V_4)

proved its resistance towards root-knot nematodes inhibiting the multiplication.

The results (Table 4) revealed non-significant differences for total plant parasitic nematodes among the varieties at most of the periods including pooled over periods except 135 (P_{10}) and 165 DAP (P_{12}). The differences in total plant parasitic nematodes among the varieties at 135 DAP (P_{10}) and 165 DAP (P_{12}) revealed that root-knot resistant ABT 10 recorded significantly least and minimum population of total plant parasitic nematode at both the periods compared to remaining three susceptible varieties of bidi tobacco. Root-knot susceptible bidi tobacco A 119 (V_1) recorded maximum population of total plant parasitic nematodes at both the periods.

The results (Table 5) on saprophytic nematodes on different varieties at different periods and in pooled over periods exhibited the same trend as observed for reniform nematode.

Perusal of data on total nematode population presented in Table 6 revealed more or less same trend as observed for root-knot nematodes among the varieties at different periods as well as pooled over periods. Significant differences among the varieties at 135 DAP (P_{10}) revealed that bidi tobacco A 119 (V_1) recorded significantly the highest and maximum population of the total nematodes compared to root-knot resistant ABT 10 (V_4) and susceptible MRGTH 1 (V_3).

The data presented in Table 7 revealed significant differences among the varieties with respect to root-knot disease. Among the four varieties, the disease was not appeared on root-knot resistant ABT 10 (V_4); while, it was appeared on remaining susceptible varieties of bidi tobacco i.e. A 119 (V_1), MRGTH 1 (V_2) and GT 7 (V_3) with highest root-knot index on A 119 (V_1).

The data represented in Table 7 on cured leaf yield of bidi tobacco, among different varieties, were found significant. Significantly the highest and maximum yield was recorded in MRGTH 1 (V_3) compared to ABT 10 (V_4) and A 119 (V_1). Significantly the minimum yield was observed in A 119 (V_1) compared to rest of the varieties.

The above results indicated that all the four varieties i.e. A 119, GT 7, MRGTH 1 and ABT 10 were equally susceptible to stunt and reniform nematodes. They were also susceptible to root-knot

Table:1: Effect of different bidi tobacco varieties on nematode population at 15 days period: Effect on stunt nematodes

Treatment	P ₁ (0 DAP)		P ₂ (15 DAP)		P ₃ (30 DAP)		P ₄ (45 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	1.43	100	0.53	33	0.33	17	0.17	8
V ₂	1.83	158	0.67	25	0.50	17	0.00	0
V ₃	1.54	158	1.24	83	0.33	17	0.00	0
V ₄	1.49	125	0.00	0	0.36	25	0.00	0
S.Em.±	0.46		0.21		0.28		0.08	
CD 0.05	NS		0.71		NS		NS	
CV%	102.02		117.19		253.66		692.82	
Treatment	P ₅ (60 DAP)		P ₆ (75 DAP)		P ₇ (90 DAP)		P ₈ (105 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	0.00	0	1.12	108	1.58	100	2.13	142
V ₂	0.17	8	0.78	100	1.53	83	1.77	117
V ₃	0.17	8	1.38	83	0.91	75	1.91	117
V ₄	0.00	0	1.43	100	0.69	42	1.94	125
S.Em.±	0.13		0.2		0.23		0.12	
CD 0.05	NS		NS		NS		NS	
CV%	529.15		60		68.63		21.8	
Treatment	P ₉ (120 DAP)		P ₁₀ (135 DAP)		P ₁₁ (150 DAP)		P ₁₂ (165 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	2.13	142	2.62	508	2.68	575	2.66	542
V ₂	2.19	167	2.18	167	2.81	717	2.67	500
V ₃	2.08	125	2.48	333	2.57	458	2.56	408
V ₄	2.17	158	2.49	325	2.62	533	2.59	400
S.Em.±	0.04		0.09		0.12		0.07	
CD 0.05	NS		NS		NS		NS	
CV%	7.27		13.05		15.16		9.77	
Treatment	P ₁₃ (180 DAP)		P ₁₄ (195 DAP)		P ₁₅ (210 DAP)		Pooled over periods	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	2.70	558	2.82	683	2.89	775	1.72	286
V ₂	2.61	467	2.69	508	2.75	583	1.65	241
V ₃	2.74	625	2.66	483	2.72	550	1.69	234
V ₄	2.74	625	2.70	550	2.78	675	1.60	246
S.Em.±	0.08		0.07		0.08		0.04	
CD 0.05	NS		NS		NS		NS	
CV%	10.58		8.86		9.62		33.34	

Log*- Log (X+1) Trans.
Ori- Original

V₁- A 119
V₃- MRGTH 1

V₂- GT 7
V₄- ABT10

Table 2: Effect of different bidi tobacco varieties on nematode population at 15 days period: Effect on reniform nematode

Treatment	P ₁ (0 DAP)		P ₂ (15 DAP)		P ₃ (30 DAP)		P ₄ (45 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	1.72	167	1.94	125	1.83	142	0.53	33
V ₂	1.54	150	1.32	125	1.41	92	0.00	0
V ₃	1.85	175	1.48	133	2.17	233	0.36	25
V ₄	1.64	133	1.63	125	1.47	125	0.00	0
S.Em.±	0.48		0.25		0.3		0.16	
CD 0.05	NS		NS		NS		NS	
CV%	98.44		53.90		61.30		248.06	
Treatment	P ₅ (60 DAP)		P ₆ (75 DAP)		P ₇ (90 DAP)		P ₈ (105 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	0.92	92	2.16	258	2.09	342	2.39	392
V ₂	1.34	133	2.31	250	1.94	233	2.39	392
V ₃	1.66	267	2.32	258	2.38	300	2.39	267
V ₄	1.24	92	2.31	225	1.79	233	2.52	392
S.Em.±	0.42		0.1		0.27		0.19	
CD 0.05	NS		NS		NS		NS	
CV%	112.39		15.13		45.56		26.68	
Treatment	P ₉ (120 DAP)		P ₁₀ (135 DAP)		P ₁₁ (150 DAP)		P ₁₂ (165 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	2.57	383	2.89	842	2.70	525	2.68	500
V ₂	2.55	400	2.84	775	2.70	550	2.64	458
V ₃	2.69	533	2.68	517	2.68	567	2.55	367
V ₄	2.62	450	2.60	483	2.77	633	2.67	483
S.Em.±	0.08		0.09		0.08		0.06	
CD 0.05	NS		NS		NS		NS	
CV%	11.12		10.99		10.67		7.26	
Treatment	P ₁₃ (180 DAP)		P ₁₄ (195 DAP)		P ₁₅ (210 DAP)		Pooled over periods	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	2.41	275	2.43	275	2.31	217	2.10	304
V ₂	2.42	275	2.30	208	2.36	233	2.01	285
V ₃	2.34	233	2.31	208	2.35	233	0.15	288
V ₄	2.52	358	2.32	225	2.31	225	2.03	279
S.Em.±	0.04		0.05		0.04		0.08	
CD 0.05	NS		NS		NS		NS	
CV%	5.22		7.46		6.35		48.67	
Log* - Log (X+1) Trans.			V ₁ - A 119		V ₂ - GT 7			
Ori - Original			V ₃ - MRGTH 1		V ₄ - ABT10			

Table 3: Effect of different bidi tobacco varieties on nematode population at 15 days period: Effect on root-knot nematodes

Treatment	P ₁ (0 DAP)		P ₂ (15 DAP)		P ₃ (30 DAP)		P ₄ (45 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	0.96	100	0.00	0	0.00	0	0.00	0
V ₂	0.78	83	0.00	0	0.00	0	0.00	0
V ₃	0.91	67	0.00	0	0.00	0	0.00	0
V ₄	0.53	33	0.17	8	0.00	0	0.00	0
S.Em.±	0.24		0.08		0.00		0.00	
CD 0.05	NS		NS		NS		NS	
CV%	105.61		692.82		0.00		0.00	

Treatment	P ₅ (60 DAP)		P ₆ (75 DAP)		P ₇ (90 DAP)		P ₈ (105 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	0.17	8	0.69	42	2.01	100	2.14	325
V ₂	0.00	0	0.88	58	1.76	83	2.12	225
V ₃	0.00	0	0.67	33	1.47	75	1.79	125
V ₄	0.00	0	0.00	0	0.17	42	0.00	0
S.Em.±	0.08		0.17		0.21		0.2	
CD 0.05	NS		0.6		0.71		0.68	
CV%	692.82		107.45		52.51		45.16	

Treatment	P ₉ (120 DAP)		P ₁₀ (135 DAP)		P ₁₁ (150 DAP)		P ₁₂ (165 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	2.43	283	3.27	2200	2.96	967	2.90	842
V ₂	2.41	300	2.99	1200	2.80	675	2.77	608
V ₃	2.34	242	2.87	775	2.70	533	2.71	567
V ₄	0.00	0	0.00	0	0.00	0	0.00	0
S.Em.±	0.07		0.09		0.03		0.04	
CD 0.05	0.24		0.31		0.10		0.13	
CV%	13.34		13.78		4.80		6.15	

Treatment	P ₁₃ (180 DAP)		P ₁₄ (195 DAP)		P ₁₅ (210 DAP)		Pooled over periods	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	0.00	0	0.00	0	0.00	0	1.204	331
V ₂	0.00	0	0.00	0	0.00	0	1.101	223
V ₃	0.00	0	0.00	0	0.00	0	1.055	161
V ₄	0.00	0	0.00	0	0.00	0	0.057	3
S.Em.±	0.00		0.00		0.00		0.036	
CD 0.05	NS		NS		NS		0.123	
CV%	0.00		0.00		0.00		56.03	

Log*- Log (X+1) Trans.
Ori- Original

V₁- A 119
V₃- MRGTH 1

V₂- GT 7
V₄- ABT10

Table 4: Effect of different bidi tobacco varieties on nematode population at 15 days period: Effect on total plant parasitic nematodes

Treatment	P ₁ (0 DAP)		P ₂ (15 DAP)		P ₃ (30 DAP)		P ₄ (45 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	2.49	383	2.17	158	1.87	158	0.69	42
V ₂	2.50	383	1.52	120	1.59	108	0.00	0
V ₃	2.49	400	2.11	217	2.20	250	0.36	25
V ₄	2.06	267	1.80	133	1.51	150	0.00	0
S.Em.±	0.26		0.26		0.27		0.23	
CD 0.05	NS		NS		NS		NS	
CV%	38.09		47.65		51.99		303.52	
Treatment	P ₅ (60 DAP)		P ₆ (75 DAP)		P ₇ (90 DAP)		P ₈ (105 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	1.09	100	2.49	408	2.71	600	2.90	892
V ₂	1.36	142	2.45	408	2.64	517	2.82	733
V ₃	1.66	267	2.48	375	2.60	500	2.69	508
V ₄	1.24	92	2.46	325	2.15	283	2.69	558
S.Em.±	0.43		0.04		0.13		0.06	
CD 0.05	NS		NS		NS		NS	
CV%	111.37		6.30		17.26		7.00	
Treatment	P ₉ (120 DAP)		P ₁₀ (135 DAP)		P ₁₁ (150 DAP)		P ₁₂ (165 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	2.71	600	3.50	3550	3.29	2067	3.25	1883
V ₂	2.64	517	3.30	2142	3.27	1942	3.18	1567
V ₃	2.60	500	3.20	1625	3.15	1558	3.11	1342
V ₄	2.15	283	2.88	808	3.02	1167	2.93	883
S.Em.±	0.13		0.08		0.06		0.05	
CD 0.05	NS		0.27		NS		0.16	
CV%	17.26		8.36		6.56		5.04	
Treatment	P ₁₃ (180 DAP)		P ₁₄ (195 DAP)		P ₁₅ (210 DAP)		Pooled over periods	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	2.91	858	2.97	958	2.99	992	2.55	924
V ₂	2.85	742	2.84	717	2.90	817	2.41	749
V ₃	2.90	858	2.83	692	2.88	783	2.51	687
V ₄	2.96	983	2.86	775	2.92	900	2.28	529
S.Em.±	0.06		0.06		0.06		0.04	
CD 0.05	NS		NS		NS		NS	
CV%	6.80		7.50		7.20		15.93	
Log*- Log (X+1) Trans.			V ₁ - A 119		V ₂ - GT 7			
Ori- Original			V ₃ - MRGTH 1		V ₄ - ABT10			

Table 5: Effect of different bidi tobacco varieties on nematode population at 15 days period: Effect on saprophytic nematodes

Treatment	P ₁ (0 DAP)		P ₂ (15 DAP)		P ₃ (30 DAP)		P ₄ (45 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	3.21	1958	2.84	900	3.08	1417	2.81	808
V ₂	3.19	1825	2.97	1000	3.24	1808	2.79	858
V ₃	3.15	1525	2.74	600	3.02	1125	2.86	1042
V ₄	3.05	1350	2.77	642	3.21	1767	2.86	1000
S.Em.±	0.09		0.06		0.09		0.11	
CD 0.05	NS		NS		NS		NS	
CV%	10.26		7.57		9.70		12.93	
Treatment	P ₅ (60 DAP)		P ₆ (75 DAP)		P ₇ (90 DAP)		P ₈ (105 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	3.25	2125	3.38	2525	3.50	3300	3.38	2755
V ₂	3.44	3217	3.43	2908	3.46	3250	3.48	3133
V ₃	3.35	2450	3.40	2792	3.32	2283	3.51	3358
V ₄	3.29	2192	3.38	2525	3.32	2358	3.42	2783
S.Em.±	0.08		0.07		0.07		0.07	
CD 0.05	NS		NS		NS		NS	
CV%	8.31		7.06		7.52		7.07	
Treatment	P ₉ (120 DAP)		P ₁₀ (135 DAP)		P ₁₁ (150 DAP)		P ₁₂ (165 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	3.46	2950	3.69	4958	3.43	2767	3.67	4850
V ₂	3.43	2808	3.62	4275	3.43	2817	3.62	4317
V ₃	3.46	3017	3.49	3183	3.52	5467	3.64	4667
V ₄	3.41	2683	3.50	3333	3.48	3142	3.57	3850
S.Em.±	0.06		0.05		0.04		0.05	
CD 0.05	NS		NS		NS		NS	
CV%	6.43		4.93		4.05		4.92	
Treatment	P ₁₃ (180 DAP)		P ₁₄ (195 DAP)		P ₁₅ (210 DAP)		Pooled over periods	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	3.56	3867	3.59	3958	3.69	4917	3.37	2937
V ₂	3.60	4425	3.64	4608	3.67	4867	3.40	3074
V ₃	3.63	4508	3.62	4292	3.71	5408	3.36	2909
V ₄	3.59	4325	3.68	5058	3.70	5125	3.35	2809
S.Em.±	0.15		0.03		0.04		0.04	
CD 0.05	NS		NS		NS		NS	
CV%	4.20		2.39		3.53		15.93	
Log*- Log (X+1) Trans.					V1- A 119		V2- GT 7	
Ori- Original					V3- MRGTH 1		V4- ABT10	

Table 6: Effect of different bidi tobacco varieties on nematode population at 15 days period: Effect on total nematode population

Treatment	P ₁ (0 DAP)		P ₂ (15 DAP)		P ₃ (30 DAP)		P ₄ (45 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	3.30	2342	3.02	1208	3.13	1575	2.83	850
V ₂	3.28	2209	3.04	1150	3.27	1917	2.79	858
V ₃	3.25	1925	2.87	817	3.12	1375	2.86	1067
V ₄	3.14	1625	2.86	775	3.24	1917	2.86	1000
S.Em.±	0.10		0.07		0.08		0.11	
CD 0.05	NS		NS		NS		NS	
CV%	10.25		8.21		9.04		13.30	
Treatment	P ₅ (60 DAP)		P ₆ (75 DAP)		P ₇ (90 DAP)		P ₈ (105 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	3.27	2225	3.45	2933	3.57	3900	3.57	3883
V ₂	3.46	3358	3.48	3317	3.53	3767	3.57	3867
V ₃	3.39	2717	3.45	3167	3.40	2783	3.58	3875
V ₄	3.30	2283	3.43	2850	3.37	2658	3.50	3375
S.Em.±	0.08		0.06		0.07		0.04	
CD 0.05	NS		NS		NS		NS	
CV%	8.28		6.45		7.21		3.64	
Treatment	P ₉ (120 DAP)		P ₁₀ (135 DAP)		P ₁₁ (150 DAP)		P ₁₂ (165 DAP)	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	3.57	3759	4.03	11575	3.67	4833	3.82	6733
V ₂	3.55	3675	3.91	8642	3.67	4758	3.76	5883
V ₃	3.58	3967	3.78	6158	3.68	4908	3.76	6008
V ₄	3.49	3208	3.68	5017	3.62	4308	3.66	4733
S.Em.±	0.06		0.06		0.04		0.03	
CD 0.05	NS		0.22		NS		NS	
CV%	5.93		5.64		3.82		3.23	
Treatment	P ₁₃ (180 DAP)		P ₁₄ (195 DAP)		P ₁₅ (210 DAP)		Pooled over periods	
	Log*	Ori	Log*	Ori	Log*	Ori	Log*	Ori
V ₁	3.65	4700	3.68	4917	3.77	5908	3.49	4089
V ₂	3.68	5167	3.71	5325	3.74	5683	3.50	3972
V ₃	3.71	5375	3.68	4983	3.78	6192	3.46	3688
V ₄	3.68	5308	3.73	5583	3.77	6025	3.42	3378
S.Em.±	0.04		0.03		0.04		0.04	
CD 0.05	NS		NS		NS		NS	
CV%	3.38		2.63		3.50		14.41	
Log*- Log (X+1) Trans.			V ₁ - A 119		V ₂ - GT 7			
Ori- Original			V ₃ - MRGTH 1		V ₄ - ABT10			

Table 7: Effect of different bidi tobacco varieties on root-knot index (RKI) and cured leaf yield

Treatment	Yield, kg/ha	RKI (0-5)*	
		" X+1 Trans.	Retran.
V ₁	2551	1.85	2.5
V ₂	3397	1.50	1.4
V ₃	3840	1.50	1.4
V ₄	3140	1.00	0.0
S.Em±		156.9	0.12
CD 0.05	542.8	0.42	
C.V. %	16.8	28.62	
V₁- A 119	V₃- MRGTH 1*0= Free; 5= Maximum disease intensity		
V₂- GT 7	V₄- ABT 10		

nematode except ABT 10. ABT 10 being resistant to root-knot nematodes, the population of the nematode was not detected at most of the periods studied. The result on total plant parasitic, saprophytic and total nematodes also showed the same trend with maximum population of total nematodes in A 119 while the minimum in root-knot resistant ABT 10. Susceptibility of A 119 to the nematodes was also reported by many scientists (Markose and Patel, 1977; Patel *et al.*, 1986) while, resistant nature of ABT 10 to root-knot nematodes was reported by Patel and Patel (2010), Bairwa and Patel (2012) as well as Patel *et al.*, (2008;2010).

The population of reniform, root-knot and stunt nematodes started to increase at 75 to 150, 105 to 165 and 135 to 210 DAP, respectively compared to initial population at 0 DAP in each of the varieties studied, except ABT 10 for root-knot nematodes. Overall, variety A 119 recorded maximum; while, ABT 10 recorded minimum population of total nematodes at 135 DAP. Our results are in agreement with results reported by Bairwa and Patel (2012) and Patel *et al.*, (2008; 2010) about no multiplication of root-knot nematodes on ABT 10.

Root-knot disease was not observed on resistant variety ABT 10; while, it was recorded in A 119, GT 7 and MRGTH 1 with maximum in A 119. This ultimately affected the cured leaf yield of A 119. Maximum yield was realized in Mosaic Resistant Gujarat Tobacco Hybrid 1. Similarly, no infection of root-knot nematodes on ABT 10 was also reported by Bairwa and Patel (2012) and Patel *et al.*, (2008;2010) and Patel and Patel (2010).

REFERENCES

- Bairwa, A. and H.R. Patel. 2012. Comparative effect of root-knot nematodes on seedling growth, nematode penetration and multiplication in susceptible and resistant bidi tobacco. **J. Mycol Pl. Pathol.**42: 406-09
- Chawla, M.L. and S.K. Prasad. 1974. Techniques in Nematology II. Comparative efficacy of sampling tools and nematode extraction methods. **Indian J. Nematol.**4: 115-23.
- Markose, V.T. G.J. Patel. 1977. Effect of soil fumigation and nitrogen manuring on bidi tobacco. **Tob. Res.**3: 7-10.
- Patel, A.D. and H.R. Patel. 2010. ABT 10: A root-knot resistant Bidi tobacco variety for Gujarat. **Tob. Res.**36: 75-80.
- Patel, H.R.; A.D. Patel and B.A. Patel. 2010. ABT 10: Highly resistant to *Meloidogyne* spp. occurring from Gujarat. **Indian J. Nematol.**40: 245-46.
- Patel, H.R.; B.N. Patel.; M.G. Makwana.; H. R. Kher.; A. D. Patel and G. C. Jadeja. 2008. Highly resistant reaction of bidi tobacco lines to root-knot nematodes. **Tob. Res.**34: 85-86.
- Patel, S.K.; D.J. Patel and H.V. Patel. 1986. Estimation of losses due to root-knot nematodes in bidi tobacco field (Abst.). National conference on plant parasitic nematodes. India: Problems and Progress held at IARI, New Delhi. Dec. 17-20. pp: 12.