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Influence of spacing on sucking pests infesting dodi, *Leptadenia reticulata (Retz.)* Wight and Aruott*

Among the various medicinal crops grown for pharmaceutical drugs, dodi, *Leptadenia reticulata* (Retz.) Wight and Aruott commonly known as "Jivanti" is one of the important crops in middle Gujarat region of the state. The crop is mainly attacked by plant suckers such as aphid (*Aphis nerri* Boyer de Fonscolombe), leaf bug (*Psylla*), red spider mite, (*Tetranychus* sp.) and leaf eating caterpillar. Among these, the group of sucking pests is the most important one. These insects cause direct damage to dodi crop by sucking the cell sap and deteriorate the quality of the product.

In order to determine the influence of plant spacing on sucking pests infesting dodi, a field experiment was conducted at Medicinal and Aromatic Plants Scheme, Anand Agricultural University, Anand (Gujarat) during the year 2008-09. The experiment was laid out in Randomized Black Design with three replications having gross and net plot size was 3.90 x 2.70 m and 3.60 x 2.40 m, respectively. Local cultivar of dodi crop was planted at four different spacing (60 x 30 cm, 60 x 60 cm, 60 x 90 cm and 90 x120 cm). Observations on aphid population were recorded on two randomly selected twigs (about 10 cm in length) from 5 tagged plants of net plot area and mean population of aphids per twig was worked out. Similarly, incidence of leaf bug was recorded by counting number of rolled leaves from 5 randomly selected plants of each net plot area and mean number of rolled leaves per plant was worked out. Red mite population was recorded from 3 leaves of 5 randomly selected plants of each net plot area and mean population of mites/ leaf was calculated. The data on incidence of aphid, leaf bug and mite recorded in different treatments are presented in table 1, 2 and 3, respectively.

Data on aphid numbers (Table 1) revealed that significantly least (18.16 aphids/twig) population of the pest was registered during first week of September in the crop planted at wider (60 x 120 cm) spacing than other treatments. This was followed by 60 x 90 (23.51) and 60 x 30 cm (28.66) spacing. More or less same results were obtained during first week of December. Aphid population recorded in different treatments from second week of December to first week of January revealed non-significant results however, in general it was relatively high in the treatments of narrow spacing in comparison to wider spacing. Pooled data indicated that significantly least (47.80 aphids/twig) population was registered in crop planted at wider spacing (60 x 120 cm) over other spacing. Narrow spacing (60 x 30 and 60 x 60 cm) found to be statistically at par and exhibited 57.72 to 58.94 aphids/ twig. Results inferred that narrow spacing of dodi crop provided congenial conditions and favoured for multiplication of *A. nerri* which might has resulted in higher population of the pest.

Observations on *Psylla* incidence (Table 2) recorded in different treatments during last week of September and first week of October indicated that significantly minimum numbers of rolled leaves were registered in the crop planted at wider distance (60 x 120 cm) and it was significantly low than the other spacing. Incidence recorded during second and third week of October showed non-significant results, however, relatively more number of rolled leaves were found in narrow spacing and it decreased with increasing the spacing. Leaf bug incidence was not noticed from last week of October to first week of February. More or less same level of incidence was found in all the treatments during February and March. Incidence recorded during second and third week of May revealed that the treatment of wider spacing (60 x 120 cm) exhibited significantly low incidence (4.93 to 6.95 rolled leaves/ plant) over narrow spacing (60 x 30 cm). Pooled data indicated that significantly least (9.05) number of infested leaves due to *Psylla* were registered in the crop planted at wider (60 x 120 cm) spacing than the crop planted at other spacing. Maximum (14.02 rolled leaves/ plant) incidence was found in narrow spacing (60 x 30 cm) followed by 60 x 60 cm (12.97) and 60 x 90 cm (11.89) spacing.

Mite population in experimental plot was noticed from August to September and March to May (Table 3). Observations recorded during second week of September revealed significantly least (7.17 mites/ leaf) population of mite in wider spacing (60 x 120 cm) over the narrow spacing (60 x 30 cm). The treatments of 60 x 120 and 60 x 90 cm were at par. Mite was not noticed throughout the winter season. It was recorded from second week of March to first week of April. Both the treatments of wider spacing (60 x120 cm and 60 x 90 cm) registered significantly low population of red mite over the treatment of narrow spacing (60 x 30 cm) as it evident from the observations made during March- April. Pooled data clearly showed that minimum (12.97 mites/leaf) population was found in the treatment of 60 x 120 cm spacing followed by 60 x 90 cm spacing (14.25 mites/leaf).These two treatments were at par and registered significantly lower population of mite than the treatments of narrow spacing *i.e.* 60 x 60 cm and 60 x 30 cm.

From available source of literature, it revealed that none of the earlier worker has studied the influence of plant density (spacing) on the incidence of sucking pests infesting dodi, however few reports in past have documented relatively higher incidence of insect pest with narrow spacing. According to Avasthy and Varma (1979), the narrow spacing would tend to increase shoot borer damage in sugarcane. Katanyakul *et al.* (1979) reported that the rice crop planted at high seedling density had higher damage by gall midge, *Orselia oryzae* (Wood-Mason). Malik *et al.* (2003) also opined that there was an inverse relation between increased line spacing and thrips population on onion. As per the report of Sarwar (2008), the mustard aphid, *Lipaphis erysimi* (Kalt.) population increased significantly as the inter row spacing decreased. All these earlier reports are in agreement with the present finding.

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Table 1. Influence of spacing on the incidence of aphid, *A. nerii* infesting dodi

Treatments	Mean number of aphids/twig (at different weeks)																	
	Aug - 08			Sep-08		Nov-08			Dec-08					Jan-09			Feb-09	
	4th	5th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	5th	1st	Pooled
S1: (60×30)	3.01	5.02	5.40	3.57	2.51	4.18	4.68	5.11	5.69	6.41	5.92	7.67	10.00	11.71	15.59	18.66	14.59	7.63
	(8.56)	(24.70)	(28.66)	(12.24)	(5.80)	(16.97)	(21.40)	(25.61)	(31.88)	(40.59)	(34.55)	(58.33)	(99.50)	(136.62)	(242.55)	(347.70)	(212.37)	(57.72)
S2: (60×60)	2.77	4.59	4.98	3.15	2.67	4.67	5.13	5.36	5.70	6.72	6.04	7.80	10.50	11.56	15.20	19.67	14.51	7.71
	(7.17)	(20.57)	(24.30)	(9.42)	(6.63)	(21.31)	(25.82)	(28.23)	(31.99)	(44.66)	(35.98)	(60.34)	(109.75)	(133.13)	(230.54)	(386.41)	(210.04)	(58.94)
S3 : (60×90)	2.61	4.68	4.90	3.13	2.33	4.14	4.44	4.97	5.40	6.38	5.61	7.96	9.98	11.10	14.82	17.82	13.28	7.27
	(6.31)	(21.40)	(23.51)	(9.30)	(4.93)	(16.64)	(19.21)	(24.20)	(28.66)	(40.20)	(30.97)	(62.86)	(99.10)	(122.71)	(219.13)	(317.05)	(175.86)	(52.35)
S4 : (60×120)	2.44	4.05	4.32	3.05	2.19	3.71	4.04	4.38	4.91	6.10	5.60	7.81	9.51	11.15	14.90	17.67	12.30	6.95
	(5.45)	(15.90)	(18.16)	(8.80)	(4.30)	(13.26)	(15.82)	(18.68)	(23.61)	(36.71)	(30.86)	(60.50)	(89.94)	(123.82)	(221.51)	(311.73)	(150.79)	(47.80)
S.Em. ±	0.15	0.29	0.17	0.20	0.23	0.25	0.26	0.21	0.21	0.19	0.22	0.25	0.22	0.20	0.14	0.16	0.26	0.05
C.D. at 5%	N.S.	N.S.	0.49	N.S.	N.S.	N.S.	0.75	0.62	N.S.	N.S.	N.S.	N.S.	0.64	N.S.	0.40	0.47	0.76	0.14
C.V. (%)	16.89	19.05	10.23	18.34	29.02	17.77	16.71	12.71	11.84	8.96	11.16	9.69	6.58	15.2	12.69	9.59	15.7	8.81

Table 2. Influence of spacing on the incidence of *Psylla* infesting dodi

Treatments	Mean number of rolled leaves/plant (at different weeks)												
	Sept-08		Oct-08			Feb -09		Mar-09			May-09		Pooled
	4th	1st	2nd	3rd	2nd	3rd	4th	1st	2nd	3rd	4th	5st	
S_1 : (60×30)	3.08	3.50	3.81	4.25	3.50	4.06	4.23	4.09	3.18	3.50	3.98	4.48	3.81
	(8.99)	(11.75)	(14.02)	(17.56)	(11.75)	(15.98)	(17.39)	(16.23)	(9.61)	(11.75)	(15.34)	(19.57)	(14.02)
S_2 : (60×60)	2.84	3.47	3.80	4.04	3.26	3.81	4.11	3.90	3.03	3.40	3.90	4.47	3.67
	(7.57)	(11.54)	(13.94)	(15.82)	(10.13)	(14.02)	(16.39)	(14.71)	(8.68)	(11.06)	(14.71)	(19.48)	(12.97)
S_3 : (60×90)	2.75	3.28	3.61	3.96	3.00	3.87	3.96	3.78	2.63	3.19	3.74	4.43	3.52
	(7.06)	(10.26)	(12.53)	(15.18)	(8.50)	(14.48)	(15.18)	(13.79)	(6.42)	(9.68)	(13.49)	(19.12)	(11.89)
S_4 : (60×120)	1.98	2.54	3.04	3.33	2.80	3.46	3.54	3.68	2.33	2.73	3.48	4.14	3.09
	(3.42)	(5.95)	(8.74)	(10.59)	(7.34)	(11.47)	(12.03)	(13.04)	(4.93)	(6.95)	(11.61)	(16.64)	(9.05)
S.Em. ±	0.26	0.18	0.21	0.27	0.16	0.32	0.21	0.25	0.17	0.17	0.14	0.16	0.07
C.D. at 5%	0.77	0.54	N.S.	N.S.	0.48	N.S.	N.S.	N.S.	0.50	0.50	N.S.	N.S.	0.21
C.V. (%)	29.66	17.21	17.96	20.71	15.60	24.86	16.21	19.61	18.41	15.94	11.38	11.23	21.19

Table 3. Influence of spacing on the incidence of red spider mite infesting dodi

Treatments	Mean number of mites/leaf (at different weeks)													
	Aug-08			Sep-08		Mar-09			Apr-09				May-09	Pooled
	4th	5th	1st	2nd	3rd	2nd	3rd	4th	1st	2nd	3rd	4th	1st	
S1: (60×30)	3.54	4.38	5.03	3.60	2.91	3.27	4.03	4.90	6.41	4.73	5.70	4.20	3.18	4.30
	(12.03)	(18.68)	(24.80)	(12.46)	(7.97)	(10.19)	(15.74)	(23.51)	(40.59)	(21.87)	(31.99)	(17.14)	(9.61)	(17.99)
S2: (60×60)	3.89	4.29	4.61	3.32	2.86	2.97	3.60	4.43	6.23	4.70	5.44	4.01	3.17	4.12
	14.63	17.90	20.75	10.52	7.68	8.32	12.46	19.12	38.31	21.59	29.09	15.58	9.55	16.47
S3 : (60×90)	4.12	3.86	4.27	2.99	2.54	2.61	3.34	4.00	5.87	4.47	5.14	3.79	2.91	3.84
	(16.47)	(14.40)	(17.73)	(8.44)	(5.95)	(6.31)	(10.66)	(15.50)	(33.96)	(19.48)	(25.92)	(13.86)	(7.97)	(14.25)
S4 : (60×120)	3.95	3.73	4.14	2.77	2.17	2.44	3.15	3.84	5.69	4.11	4.96	3.54	3.15	3.67
	(15.10)	(13.41)	(16.64)	(7.17)	(4.21)	(5.45)	(9.42)	(14.25)	(31.88)	(16.39)	(24.10)	(12.03)	(9.42)	(12.97)
S.Em. ±	0.31	0.20	0.23	0.17	0.22	0.14	0.14	0.16	0.16	0.21	0.24	0.20	0.27	0.07
C.D. at 5%	N.S.	N.S.	N.S.	0.49	N.S.	0.41	0.40	0.48	0.46	N.S.	N.S.	N.S.	N.S.	0.22
C.V. (%)	23.88	14.37	15.30	15.66	25.09	14.69	11.47	11.49	7.82	13.61	13.61	15.42	26.21	20.01

* Figures outside the parentheses are $\sqrt{x+0.5}$ transformed values, those inside are retransformed values NS = Not significant

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References

Avasthy, P. M. and Varma, A., 1979, The influence of row spacing and nitrogen on shoot borer incidence in sugarcane. *Indian J. Entomol.,* 14(4): 387-388.

Katanyukul, W., Kadkoa, S. and Chantaratd, A., 1979, Effect of seedling density on gall midge infestation and rice yields in Northern Thailand. *IRRI Newsl*., 4: 5.

Malik, M. F., Nawz, M. and Hafeez, Z., 2003, Inter and Intra row spacing on thrips (*Thrips* spp.) population in onion. *Asian J. Plant Sci.,* 2(9): 713-715.

Sarwar, M., 2008, Plant spacing – a non polluting tool for aphid management in canola, *Brassica napus. J. Entomol. Soc. Iran,* 27(2): 13-22.