Indian Journal of Agronomy 44 (3) : 584–587 (September 1999)

Effect of seeding rate and row spacing on the yield and quality of lentil (*Lens culinaris*) varieties

R.M. SINGH* AND R.S. VERMA

R.B.S. College, Dr B.R. Ambedkar University, Bichpuri, Agra, Uttar Pradesh 283 105

Received: March 1998

ABSTRACT

Results of the field experiment conducted during the winter (*rabi*) seasons of 1993-94 and 1994-95 at Bichpuri, indicated that small seeded cultivar 'Pant L 406' of lentil (*Lens culinaris* Medikus) had highest mean yield (1,786 kg/ha) with 45 kg/ha seed rate and 20 cm row spacing followed by bold seeded cultivar 'LH 84-8' (1631 kg/ha). Row spacing had no effect on the yield but 45 kg seed/ha gave significant response over 30 and 60 kg seed/ha. Interaction between seed rate and variety was significant during both the seasons. The benefit : cost ratio was maximum (1.76) in 'Pant L 406' with 20 cm row spacing and 45 kg/ha seed rate. In 'K 75' and 'LH 84-8' with 60 kg/ha protein content was significantly higher than 'Pant L 406'.

Key words : Lentil, Varieties, Seeding rate, Row spacing, Yield, Quality

The lequmes, by and large, constitute an important group of crops and have been the main stay in Indian agriculture, as they restore fertility, improve physical condition of soil and provide rich food and fodder. Lentil is an important pulse crop of *rabi* season, sown from October to December all over India either as a pure crop or mixed crop. But due to use of traditional cultures, poor plant stand and inadequate plant density, average productivity is too low. Therefore, an attempt was made to find out the suitable cultivar, seeding rate and proper plant spacing to boost the productivity of lentil.

MATERIALS AND METHODS

The experiment was conducted at Bichpuri campus during winter (*rabi*) seasons of 1993-94 and 1994-95. The experiment was laid out in split-plot design with 4 replications, keeping cultivars ('T 36', 'Pant L 406', 'K 75' and 'LH 84-8') in main plots and combination of row spacing (20 and 30 cm) and seed rate (30, 45 and 60 kg/ha) in subplots. The soil of experimental site was sandy loam, having organic carbon 0.66%, total N 0.10% and available P_2O_5 and K_2O 24.75 kg/ha and 300.33 kg/ha respectively. Of the 4 varieties, 2 were bold

Present address : [1]Assistant Agronomist, N.D.U.A.T., Kumarganj, Faizabad, Uttar Pradesh 224 229

Table 1. Growth components and yield attibutes of lentil as influenced by cultivars, row spacing and seed rate.

Treatment	Population at harvest (plant/m)		Plant height (cm)		No. of pods/ plant		Weight of pods/ plant (gm)		No. of grains/plant		Grain weight (g)/plant	
	Y_1	Y_2	Y_1	Y_2	Y_1	Y_2	Y_1	Y_2	Y_1	Y_2	Y_1	Y_2
Cultivar												
'T 36'	40.42	40.46	35.39	34.88	120.4	127.00	4.87	5.97	192.9	181.8	2.02	2.10
'Pant L 406'	37.42	38.33	37.51	37.32	150.0	175.5	6.55	7.23	218.5	228.5	2.43	2.43
'K 75'	26.17	27.50	32.86	36.27	90.5	101.0	4.41	5.43	110.7	113.2	2.04	2.11
'LH 84-8'	26.58	27.54	35.63	35.56	130.8	138.8	6.63	6.99	170.3	169.5	2.19	2.19
CD (P = 0.05)	0.99	1.06	1.79	N.S.	13.88	16.80	0.17	0.84	10.60	24.30	0.10	0.25
Row spacing (cm)												
20	26.35	26.87	35.76	34.69	118.5	131.3	5.54	6.40	174.8	178.3	2.15	2.22
30	38.94	40.04	34.89	37.31	117.4	130.9	5.59	6.41	171.3	168.2	2.14	2.19
CD (P = 0.05)	1.02	0.05	0.80	1.73	NS	NS	NS	NS	NS	NS	NS	NS
Seed rate (kg/ha)												
30	23.39	24.03	34.62	33.55	144.7	164.5	6.58	7.35	214.0	207.9	2.56	2.62
45	32.97	32.22	35.23	35.75	123.7	135.8	5.65	6.66	180.9	174.7	2.16	2.23
60	41.59	43.12	36.72	38.70	83.3	93.0	4.21	5.20	124.3	127.1	1.72	1.77
CD (P = 0.05)	1.03	1.16	1.60	2.47	5.966	13.00	0.13	0.71	12.15	24.34	0.13	0.28

Y_1 = 1993-94; Y_2 = 1994-95

Table 2. Grain yield, protein % and protein yield of lentil as influenced by cultivars, row spacing and seed rate

Treatment	1,000-seed weight (g)		Grain yield (kg/ha)			Protein %		Protein yield (kg/ha)	
	Y_1	Y_2	Y_1	Y_2	Mean	Y_1	Y_2	Y_1	Y_2
Cultivar									
'T 36'	17.36	17.52	1,493	1,552	1,522.5	25.38	25.38	394	380
'Pant L 406'	18.30	18.53	1,751	1,821	1,786.0	26.29	26.29	479	459
'K 75'	25.08	25.21	1,410	1,470	1,440.0	27.31	27.38	403	389
'LH 84-8'	27.01	26.29	1,592	1,671	1,631.5	27.13	27.08	453	433
CD (P = 0.05)	0.26	0.44	40.70	40.70	—	0.07	0.06	10.9	13.8
Row spacing (cm)									
20	21.92	22.07	1,576	1,652	1,614.0	26.52	26.54	438	419
30	21.94	22.04	1,546	1,605	1,575.5	26.53	26.52	426	412
CD (P = 0.05)	NS	NS	NS	NS		NS	NS	NS	NS
Seed rate (kg/ha)									
30	22.77	22.90	1,325	1,402	1,363.5	26.22	26.23	368	349
45	22.24	22.38	1,815	1,882	1,848.5	26.54	26.54	499	483
60	20.78	20.08	1,543	1,602	1,572.5	26.81	26.83	429	414
CD (P = 0.05)	0.24	0.34	39.0	50.3		0.07	0.06	13.6	10.6

Y_1 = 1993-94; Y_2 = 1994-95; NS = non-significant

seeded ('K 75' and 'LH 84-8') and 2 small seeded ('Pant L 406' and 'T 36'). Crop was sown on 18 November and harvested on 29 and 24 March respectively during both the seasons. An uniform application of basal dose of 20 kg N, 50 kg P_2O_5 and 30 kg K_2O/ha was applied at the time of sowing. The rainfall received during 1993-94 and 1994-95 was 47.5 and 35.6 mm respectively.

RESULTS AND DISCUSSION

Effect of cultivar

Seed yield and its attributes revealed that cultivar 'Pant L 406' and 'LH 84-8' showed significant difference in seed yield and its attributes as compared to cultivar 'T 36' and 'K 75' during 1993-94 and 1994-95 (Tables 1, 2). Cultivar 'Pant L 406' gave 117 and 124% higher seed yield over 'T 36' and 124% higher over 'K 75' during both seasons. Cultivar 'LH 84-8' gave (107 and 108% and 113, 124%) higher seed yield over 'T 36' and 'K 75' respectively in both seasons. Higher number of pods/plant and seeds/plant were responsible for higher seed yield in cultivar 'Pant L 406'. 'Pant L 406' recorded lower mean test weight (18.41 g) than bold seeded cultivar 'K 75' (25.15 g) and 'LH 84-8' (26.99 g) but higher than small seeded cultivar 'T 36' (17.44 g).

Effect of row spacing

Row spacing did not influence the seed yield significantly. However, closer row spacing of 20 cm gave slightly more yield (2.4%) over wider row spacing of 30 cm. Similar results were reported by Saheria (1980). Wider row spacing of 30 cm caused a depressive effect on dry matter production as well as grain yield.

Effect of seed rate

Significantly highest seed yield was recorded with 45 kg/ha seed over 30 and 60 kg seed rate/ha during both the seasons. Though, all the yield attributing characters were significantly higher in lowest seed rate of 30 kg/ha and lowest in highest seed rate of 60 kg/ha, but yield was significantly affected due to less plant population in 30 kg/ha seed rate and higher plant population in 60 kg/ha seed rate (Table 1).

Effect on protein content and yield

The protein contents in 'K 75' bold seeded cultivar was significantly higher over 'LH 84-8' by a margin of 0.8%. In small seeded cultivar Pant 'L 406', the protein content was significantly higher over 'T 36' by a margin of 3.5%. The protein content in bold seeded cultivar was significantly higher over small-seeded cultivar. Row spacing did not affect the protein content. The protein content due to increase in seed rate recorded significant increase in linear fashion with each increment of seed rate up to highest level of 60 kg/ha. Contrary to variation in protein contant, protein yield/ha was significantly more in small seeded cultivar 'Pant L 406' (469 kg) followed by 'LH 84-8' (443 kg) during both the seasons.

REFERENCE

Ahlawat, I.P.S., Singh, A. and Saraf C.S. 1982. Yield of lentil cultivars as affected by date and rate of seeding under late sown conditions. *Indian Journal of Agronomy* **27** (3) : 259-262.