Yield Performance of Different Lentil Varieties under Different Sowing Dates

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Abstract

The experiment was conducted at agricultural farm of Palli Siksha Bhavana, Visva-Bharati at Sriniketan of Birbhum district,West Bengal during *rabi* season of 2014-15 in red and lateritic soil to study the effects of different sowing dates on growth of different lentil varieties. The soil at experimental site was analysed sandy loam in texture with low in available N, medium in available P_2O_5 and K_2O and slightly acidic (p^H: 5.79) in nature. The experiment consisted of three levels of sowing dates (i.e. 31st October, 15th November and 30th November) and four levels of lentil varieties (i.e. L 4710, RKL 607-1, PL 406 and KLS 218) thus making twelve treatment combinations which were replicated thrice and was laid out in factorial randomized block design and grain yield, stalk yield and harvest index were recorded.

Keywords: Earliness, grain yield, HI, lentil, sowing dates, stalk yield, variety.

1. Introduction

Lentil (*Lens culinaris* Medik.) is one of the man's oldest food crops. It is an old world grain legume food crop that was domesticated in the near East arc along with other pulses such as pea, chickpea, and fababean in early Neolithic times. Lentil seed is a rich source of protein, minerals (K, P, Fe, Zn) and vitamins for human nutrition. Seeds can be fried and seasoned for consumption; flour is used to make soups and mixed with cereals to make bread and cakes. Furthermore, because of its high lysine and tryptophane content, its consumption with wheat or rice provides a balance in essential amino acids for human nutrition. Lentil straw is also a valued animal feed. Planting date is the most important factor affecting the yield due to change in environment and by thermo-and photosensitive effects on growth and development of lentil. Under late planting conditions, growing season especially from flowering to maturity shortened due to forced maturity of crop, consequently, lentil yield was reduced in late planted crop as compared to normal planted crop. Varietal responses to planting dates will be of great importance as varieties differ in their growth and development behaviour under different agro-ecological situation. Most of the lentil sowings in India get deferred because of the delayed harvest of the preceding crop, which quite often happens to be paddy. So, growing of this crop after preceeding rice in *kharif* season, farmer may not be able to sow summer crop in due time. Also, the crop suffers around the seed-filling stage due to the rising high temperatures in most of its cultivated areas. Since the growing time, thus, gets squeezed, it is imperative that early maturing varieties will be more suitable in India. Extra early varieties of lentil thus may pave the way of growing another crop in subsequent season and its potential yield is concerned.

2. Materials and Methods

2.1. Description of study Area

The experiment was conducted at agricultural farm of Palli Siksha Bhavana, Visva-Bharati at Sriniketan of Birbhum district,West Bengal during *rabi* season of 2014-15 in red and lateritic soil on a sandy loam soil. The farm was situated at 23°39' N latitude and 87°42' E longitude with an average altitude of 58.90 m above mean sea level. The soils of the experimental field had 215.74 kg ha^{-1} alkaline permanganate oxidizable nitrogen (N), 29.48 kg ha^{-1} available phosphorus (P), 146.54 kg ha^{-1} 1 N ammonium acetate exchangeable potassium (K) and 0.42% organic carbon (OC). The pH of soil was 5.79 (1: 2.5 soil and water ratio) recommended by soil reaction committee.

2.2. Experimental treatments and design

The experiment consisted of three levels of sowing dates (i.e. 31st October, 15th November and 30th November) and four levels of lentil varieties (i.e. L 4710, RKL 607-1, PL 406 and KLS 218) thus making twelve treatment combinations which were replicated thrice and was laid out in Factorial randomized block design.

2.3. Field preparation, fertilization, sowing and intercultural

operation

At optimum moisture condition the land was ploughed twice by tractor drawn harrow thoroughly for obtaining good tilth. A general recommended dose of $N:P_2O_5:K_2O$ for rainfed lentil was applied uniformly to each plot at the rate of 20:40:40 kg ha^{-1}. Boron @ 0.2% was sprayed once in the form of borax. Properly graded seeds of varieties L 4710, RKL 607-1, PL 406 and KLS 218 were sown @40 kg ha^{-1}. The lentil varieties were sown in row spaced at 25 cm apart on 31st October, 15th November and 30th November, 2014 respectively. Thinning operation was done at 20 days after sowing to maintain the optimum plant population for the different dates of sowing. First hand 1st weeding operation was done at 25 DAS and 2nd hand weeding was done at 45 DAS to control the weeds for the different dates of sowing.

2.4. Studies on yield of lentil

The following observations were taken to study the effect of varietal performance of lentil on different yield attributes of lentil legumes are grain yield (q ha^{-1}), stalk yield(q ha^{-1}) and harvest index(HI).

2.5. Statistical analysis

The analysis of variance method was followed to statistically analyse the various data. The significance of different source of variations was tested by "Error Mean Square Method" of Fisher Snedecor's 'F' test at probability level of 0.05. In the tables of result and discussion chapter, the standard error of Mean (SEm±) and the value of critical difference (CD) to compare the differences between means have been provided.

3. Results and Discussion

In respect to variety, PL 406 recorded highest seed yield among the other varieties. Interestingly though this variety resulted 3.57% higher seed yield but was statistically at par with KLS 218. The extra early variety RKL 607-1 recorded seed yield of 9.1 q ha^{-1} which was significantly 81.63% higher than the other extra early varieties L 4710. Among the three different dates, sowing on 31st October resulted highest seed yield which was significantly 38.97% and 68.28% higher than 15th November and 30th November, respectively. The interaction effect of varieties and sowing dates on seed yield was found to be statistically significant. PL 406 sown on 31st October recorded maximum (14.59 q ha^{-1}) seed yield that was significantly higher to all treatment interactions except KLS 218 sown on 31st October. Interaction between sowing on 31st October and PL 406 variety resulted highest (14.59 q ha^{-1}) seed yield which was significantly 55.21% and 77.92% higher than 15th November and 30th November, respectively.

The extra early variety RKL 607-1 recorded stalk yield of 22 q ha^{-1} which was significantly 73.2% higher than the other extra early variety L 4710. Among the three different dates, sowing on 31st October resulted highest stalk yield which is significantly 36.61% and 64.47% higher than 15th November and 30th November, respectively.

Table 1: Effect of sowing dates and lentil varieties on seed yield (q ha^{-1}), stalk yield (q ha^{-1}), and harvest index (%) of different lentil varieties

Variety	Seed yield (q ha^{-1})	Stalk yield (q ha^{-1})	Harvest index (%)
Treatment			
L 4710	5.01	12.65	28.40
RKL 607-1	9.10	21.98	29.26
PL 406	10.72	21.64	33.09
KLS 218	10.35	21.77	32.19
SEm±	0.45	1.23	0.10
CD (*p*=0.05)	1.31	3.61	0.29
CV%	15.18	18.91	0.97
Sowing date			
31st Oct, 2014	11.41	24.98	30.92
15th Nov, 2014	8.21	18.33	30.72
30th Nov, 2014	6.78	15.23	30.58
SEm±	0.39	1.07	0.09
CD (*p*=0.05)	1.13	3.12	0.25
CV%	15.18	18.91	0.97

Interaction between sowing dates and lentil varieties on seed yield

Variety	Sowing date		
	31st October, 2014	15th November, 2014	30th November, 2014
L 4710	5.50	5.23	4.30
RKL 607-1	11.60	8.60	7.10
PL 406	14.57	9.40	8.20
KLS 218	13.95	9.60	7.50
SEm±		0.77	
CD (*p*=0.05)		2.26	

In respect to variety, PL 406 though recorded significantly higher harvest index than KLS 218. The extra early variety RKL 607-1 recorded harvest index of 29.3% which was significantly higher than the other extra early variety L 4710. Sowing on 31st October showed higher harvest index but it was at par with 15th November.

Rai et al. (1991) reported about the increase in seed yield of different lentil varieties under different doses of P. Singh and Singh (1991) also reported differences in seed yield of different lentil varieties. Kundu et al. (2014) observed significant differences in the yield of crop variety. Significant differences in seed yields of lentil varieties were reported by Singh and Singh (1992), El-Far (2000), Ezzat (2005). Same trend was reported

by Weigand et al. (1992) also reported that yield increase was generally higher in early than late sown crops. Khan and Keihn (1989) concluded that high yields were obtained from early sowing. Silim et al. (1991) stated that seed yields were higher in early sowing. Again, Gray and Delgado (1986) reported that delay in sowing can reduce seed yield. Aziz (1992) also reported about the decrease in seed yield as sowing get delayed. Mishra et al. (1996) said that seed yields decreased due to delay in sowing. Similar studies were reported by Siddique et al. (1998), El-Nagar and Galal (1997), Singh et al. (2005), Singh et al. (2009) and Moosavi et al. (2014).

Kundu et al. (2014) also reported of significant differences in stalk yields of different lentil varieties. Silim et al. (1991) reported that early sowing produced higher stalk yield than late sowing of lentil. Gurung et al. (1996) reported late October sowing produced higher stalk yield of lentil.

Allam (2002) reported that harvest index was higher when sowing was conducted on 1st and 15th November. Moosavi et al. (2014) also concluded that delay in sowing significantly decreased harvest index.

4. Conclusion

From the investigation, it can be concluded that among the extra early varieties, the optimum date for RKL-607-1 was 31st October whereas L 4710 may be sown any time of the given dates 31st October, 15th November and 30th November and the traditional variety PL 406 performed best, however it was statistically at par with KLS 218 proved best in influencing yield attributes

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