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***Short communication***

# EFFECT OF VARIETIES AND FERTILIZER MANAGEMENT ON YIELD OF LENTIL UNDER LATE SOWN CONDITION IN EASTERN UTTAR PRADESH

**M.V. SINGH, NEERAJ KUMAR AND R.K.SINGH**
Crop Research Station, Bahraich -271801 (U.P.)
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The sowing of lentil gets delayed due to late harvesting of low land and upland paddy in eastern U.P. Location base lentil variety affects plant growth as well as yield of crop. In eastern U.P. Narendra Masoor-1 and Pant Masoor-406 were found most remunerative after harvesting of paddy. The chemical fertilizer with different microbial cultures and sulphur play a key role in lentil production. Specific dose of fertilizers and its proper application will affect the crop growth as well as yield. The present investigation was carried out to study the effect of varieties and fertilizer management on yield of lentil. The experiment was carried out during the winter season *(rabi)* of 2008-09 and 2009-10 at Crop Research Station, Bahraich. The soil was sandy loam in texture, having available N 130.8 kg $ha^{-1}$, phosphorous 12.5 kg $ha^{-1}$ and available potassium 195.8 kg $ha^{-1}$ and soil pH 7.5. The experiment was laid out in factorial randomized block design with variety in main plot and phosphorus +PSB + sulphur level in sub plot with three replications. The treatment consisted of 2 varieties ( Narendra Masoor-1 and Pant Masoor-406) and 4 levels of phosphorus + PSB+ sulphur (0 kg $P_2O_5$ , 20 kg $P_2O_5$ + 20 kg PSB + 20 kg S $ha^{-1}$, 40 kg $P_2O_5$ , + 10 kg PSB + 10 kg S $ha^{-1}$ and 60 kg $P_2O_5$ + 5 kg PSB + 5 kg S $ha^{-1}$ ). The crop was sown on 10th November in both the years. Full dose of N and K was applied as urea and muriate of potash at the time of sowing and phosphorus + PSB + sulphur was applied as per treatment as triple superphosphate and sulphur was applied as elemental sulphur in basal dressing. All agronomic practices like weeding, intercultural practices and irrigation were done according to need of the crop. Growth and yield attributes were recorded at the time of full maturity of crop. Net income and benefit cost ratio were also calculated on market price of materials. The content of P and S was estimated in di-acid extract as per methods described by Jackson (1973).

Table 1: Effect of varieties, fertility management on growth and yield of Lentil (Pooled data of year 2009-10 and 2010-11)

| Treatments | Plant height (cm) | Branch/ plant | Pods/ plant | Test weight (g) | Grain yield (q $ha^{-1}$) | Straw yield (q $ha^{-1}$) | Harvest Index (%) | Net Profit (Rs $ha^{-1}$) | C:B ratio | P uptake (kg $ha^{-1}$) | S uptake (kg $ha^{-1}$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Varieties | | | | | | | | | | | |
| Narendra Mansoor-1 | 42.32 | 11.8 | 234.6 | 25.2 | 12.90 | 15.46 | 44.5 | 30971 | 4.27 | 45.1 | 16.5 |
| Pant Masoor-406 | 40.67 | 10.5 | 213.1 | 23.4 | 11.50 | 13.48 | 44.6 | 26521 | 3.79 | 40.2 | 16.3 |
| CD ( P=0.05) | 0.16 | 0.61 | 5.15 | 0.10 | 0.21 | 2.80 | 0.73 | 8005 | 0.16 | 0.59 | 0.15 |
| Fertility Levels | | | | | | | | | | | |
| O kg $P_2O_5$ | 38.11 | 7.8 | 185.0 | 21.8 | 5.2 | 8.13 | 39.0 | 7726 | 1.90 | 18.2 | 9.3 |
| 2O kg $P_2O_5$+20 kg PSB+20 kg S $ha^{-1}$ | 41.31 | 11.6 | 208.3 | 23.5 | 10.77 | 13.86 | 43.6 | 14481 | 3.65 | 37.7 | 12.2 |
| 4O kg $P_2O_5$+10 kg PSB+10 kg S $ha^{-1}$ | 42.51 | 12.1 | 237.6 | 25.7 | 15.71 | 17.11 | 47.8 | 39356 | 5.14 | 55.0 | 16.5 |
| 6O kg $P_2O_5$+ 5 kg PSB + 5 kg S $ha^{-1}$ | 43.45 | 13.0 | 264.6 | 26.2 | 17.13 | 18.81 | 47.6 | 43421 | 5.42 | 59.9 | 17.7 |
| CD ( P=0.05) | 0.223 | 0.86 | 7.28 | 0.15 | 0.30 | 3.96 | 1.03 | 900.4 | 0.18 | 1.13 | 1.15 |

Lentil variety Narendra Masoor-1 had significant beneficial effect on yield attributes viz. plant height, number branches/plant and number of pods/plant and test weight of seed (Table 1) and which was higher by 4.6, 11.2, 9.0 and 6.7 %, respectively over the Pant Masoor-406. The higher gain yield of 12.9 q $ha^{-1}$ was recorded under variety Narendra Masoor-1 which was 10.8 % higher over Pant Masoor-406. The non significant variation was recorded under both

varieties for harvest index. The P uptake was also higher in Narendra Masoor-1 as compared to Pant Masoor-406. On the other hand, net return of Rs. 30971ha$^{-1}$ and C:B ratio were higher under Narendra Masoor-1.

The data (Table 1) indicated that application of phosphorus significantly increased the plant height, branch per plant, pods per plant, seeds per pods and test weight no P application. All the growth and yield attributing characters increased progressively up to 60 kg $P_2O_5$ ha$^{-1}$. Maximum seed and straw yield (17.13 and 18.81 q ha$^{-1}$) was obtained with 60 kg $P_2O_5$ + 5 kg PSB + 5 kg S ha$^{-1}$, which was 69.6 , 37.1, 11.6 % higher in seed yield and 56.77, 16.31, 9.03 % higher in straw yield over the control and other level of $P_2O_5$ + PSB + sulphur. This increase might be due to well developed root system, which might increase the nitrogen fixation and its availability to plant along with other nutrients Nath et al. (2004) and Singh et al. (2008) also reported similar results. Maximum net return of Rs. 43421 ha$^{-1}$ was recorded with 60 kg $P_2O_5$+ 5 kg PSB + 5 kg S ha$^{-1}$. This was 82.2, 43.6 and 9.3 % more than other level of $P_2O_5$ + PSB + sulphur application. The C:B ratio of 5.42 were recorded under application of 60 kg $P_2O_5$+ 5 kg PSB + 5 kg S ha$^{-1}$ which was higher by 64.9, 32.6, 5.16 % over control and other levels of phosphorus + PSB + sulphur. Application of PSB + sulphur was more pronounced along with higher levels of phosphorus. The higher dose of phosphorus was more pronounced for better root development. The uptake of P and sulphur by crop were positively and significantly affected by various treatments. The maximum values of P and S uptake were noted with 60 kg $P_2O_5$ + 5 kg PSB + 5 kg S ha$^{-1}$ treatment and minimum under control. The higher uptake may be due to higher availability of nutrients to the crop. Similar finding have been reported by Mishra and Tiwari (2001) and Pathak et al. (2003). The PSB plays a vital role in the solubilization inorganic and organic phosphorus present or added in the soil. Production of humic acid and substances like $H_2S$, $H_2SO_4$ $CO_2$ and enzymes are also reported to play an important role in the solubilization of inorganic phosphates (Gaur et al. 1990).

On the basis of results, Narendra Masoor-1 fertilized with 60 kg $P_2$ $O_5$ + 5 kg PSB + 5 kg S ha$^{-1}$ was recommended for eastern U.P. farmers to grow after harvesting of low and up land paddy for better yield as well as higher net return from the crop.

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