

EFFECT OF SOWING METHODS AND CUTTING MANAGEMENT ON GREEN FODDER AND SEED YIELD OF PERENNIAL LUCERNE

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SUMMARY

Lucerne is one of the important legume fodder crop for dairy animal which is more palatable, digestible and have high protein content and commonly grown in central and southern part of India. On other hand the supply of quality seed was not adequate Development of new packages in view of increasing the green biomass productivity is necessary. But looking towards the availability of quality seed is the major constraint. So that the experiment was designed in such way that a farmer can get regular green fodder along with yearly seed production at own farm. A field experiment was conducted at BAIF, Central Research Station, Urulikanchan to study the influence of different sowing methods and cutting management on green fodder and seed yield of Lucerne. The experiment was laid in split plot design with two sowing methods and three cutting management treatments in three replications. Among the two different sowing methods, highest green fodder yield of 695.77q/ha/year was recorded in broadcasting method of sowing whereas in case of cutting management regular cutting for two & half years & leaving for seed production at the end of March month was recorded significantly maximum green fodder yield of 751.05 q/ha/year. The significant maximum seed yield of 1.65 q/ha was recorded by the line sowing method and regular cutting at 25 days intervals and leaving for seed production in the second week of March month every year. The highest net monetary returns of Rs.1,26,683/ha and the benefit-cost ratio of 3.26 was recorded in line sowing among two methods whereas it was Rs. 1,32,540/ha/year and 3.42 benefit cost ratio respectively in regular cutting at 25 days interval and leaving for seed production in the second week of March every year and this treatment combination was found to be more economical in terms of highest net monetary returns and benefit cost ratio.

Keywords: Lucerne, Yearly seed production, sowing methods, economics

Fodder plays an important role in the livestock sector, which includes a both cereal and legumes. The cultivated forage legumes like berseem, lucerne, cowpea etc. were adopted by farmers for cultivation. Among these crops lucerne is perennial crop, having higher yield potential and high nutritive value.

Lucerne is more palatable and rich source of protein which ranges between 18-22% and also contains amino acids, Calcium and other minerals (Kale and Takawale, 2019). It is also rich in vitamins and if cut at the early flowering stage, it supplies a good blend of energy and fiber.

In the current situation, one of the major reason in shortfall of area under crops is authentic seed availability. Seed production of different fodder crops is largely focused in the unorganized sector and an effective seed production chain is lacking (Chauhan *et al.*, 2017). The availability of good quality seeds is estimated to be around 15-25% only for cultivated forages (Chauhan *et al.* 2017). In India, only 25-30%, 20% and 15% of the required seed were available for sowing cultivated fodder, range grasses and legumes,

respectively as reported by Malaviya *et al.* (2013). Being a perennial in nature and good source of protein, farmer demand for Lucerne seeds is at higher side. Because of the limited availability of quality seed in the market seed cost is higher. Looking towards the demand for quality seed, enhancement in production of lucerne seed is important. To increase the seed yield various agronomic practices were adopted by farmers. Regular cutting of lucerne for green fodder and leaving for seed production in last year is traditionally practices by farmers to ensure trust own source. In view of optimising the practices for enhanced production of green fodder and seed production and make it more profitable, the research was designed for three years.

MATERIALS AND METHODS

The field experiment was conducted at BAIF Development Research Foundation, Urulikanchan during *Rabi* 2008-09 to 2010-11. The experiment was sown on 25 November, 2008 with two sowing methods: S₁. Broadcasting method S₂. Line sowing method at 30 cm distance and three cutting

management practices viz; C₁: Regular cutting at 25 days intervals and leaving for seed production in the second week of March month every year, C₂: Regular cutting for one and half years and leaving for seed production in the second week of March month and C₃: Regular cutting for two and half years and leaving for seed production at the end. In the case of line sowing 25kg/ha and for the broadcasting method, 50kg/ha seeds were used for sowing. The recommended packages of practices were followed in all the treatments. First cut was taken at 60 days after sowing and subsequent cuts were taken at 25 days interval. The data of every cut was taken for green fodder yield, dry matter yield and crude protein yield. Seasonal data on plant height, leaf stem ratio and quality parameters like dry matter and crude protein content were taken. Seed yield data was recorded as per treatments. All the data were statistically analysed using the OPSTAT software.

RESULTS AND DISCUSSION

Effect on growth and yield parameters

The pooled data on the growth and yield parameters for 3 years were presented in Table 1. The data indicated that sowing methods did not influenced the growth parameters like plant height and leaf stem ratio but it was significantly influenced by cutting management practices in plant height only. A maximum plant height of 79.89 cm was recorded by treatment of

regular cutting for two and half years and leaving for seed production at the end (C₃) followed by regular cutting at 25 days intervals and leaving for seed production in the second week of March every year (C₁) with plant height of 78.55 cm whereas, the interaction of sowing methods and cutting management was found non-significant. The leaf stem ratio was not affected by the sowing methods and cutting management practices and interaction was also non-significant.

The pooled data for yield parameters revealed that the green fodder yield was affected by the treatment combinations of sowing methods and cutting management practices whereas, dry matter and crude protein yield were only affected by cutting management practices. The line sowing and broadcasting methods recorded green fodder yield of 677.43 and 695.77 q/ha/year respectively which was non-significant. In case of cutting management practices, the significantly higher green fodder yield of 757.05q/ha/year was recorded by treatment of regular cutting for two and half years and leaving for seed production at the end (C₃) followed by the treatment of regular cutting for one and half years and leaving for seed production in the second week of March (C₂) with a green fodder yield of 696.52 q/ha/year. In the case of dry matter and crude protein significantly higher yield was obtained in the treatment of regular cutting for two and half years and leaving for seed production at the end (C₃) with 138.66 and 24.92 q/ha/year respectively followed by treatment of

TABLE 1
Effect of sowing methods and cutting management on growth, green fodder, dry matter, crude protein, seed yield and economics of Lucerne: pooled means of three years

Sowing methods	Plant height (cm)	Leaf stem ratio	Green fodder yield (q/ha/year)	Dry matter yield (q/ha/year)	Crude protein yield (q/ha/year)	Seed yield (q/ha)	1000-seed weight (g)	Net monetary returns (q/ha/year)	Benefit cost ratio
A. Sowing methods									
Broadcasting (S1)	78.64	1.26	695.77	130.18	23.25	1.10	3.12	125113.23	3.15
Line sowing (S2)	78.28	1.26	677.43	129.32	23.18	1.19	3.33	126683.04	3.26
S. Em±	0.18	0.009	6.12	1.07	0.21	0.002	0.007	1190.20	0.02
C. D. (P=0.05)	NS	NS	NS	NS	NS	0.01	0.033	NS	0.09
B. Cutting management									
C ₁	78.55	1.26	606.22	118.24	21.18	1.65	3.27	132540.39	3.42
C ₂	76.96	1.27	696.52	132.38	23.55	1.18	3.12	128391.98	3.21
C ₃	79.89	1.26	757.05	138.66	24.92	0.61	3.23	116762.04	2.98
S. Em±	0.52	0.010	5.53	1.24	0.30	0.003	0.24	1140.88	0.21
C. D. (P=0.05)	1.59	N.S.	17.05	3.80	0.92	0.011	0.79	3514.79	0.064
C. Interaction: S x C									
S. Em±	0.47	0.015	9.73	1.82	0.39	0.004	0.021	1918.46	0.03
C. D. (P=0.05)	NS	NS	NS	NS	NS	0.018	NS	NS	NS
CV %	1.73	0.63	10.02	7.25	7.32	40.57	4.49	5.874	6.46

C₁: Regular cutting at 25 days interval & leaving for seed production in second week of March every year.

C₂: Regular cutting for one & half years & leaving for seed production in second week of March.

C₃: Regular cutting for two & half years & leaving for seed production at the end.

regular cutting for one & half years & leaving for seed production in the second week of March (C_2) with a yield of 132.38 and 23.55 q/ha/year respectively. The dry matter and crude protein yield was not influenced by sowing methods. Amit Kumar and Patel (2017) reported that cutting interval of 25-30 days significantly gave the maximum green fodder yield in lucerne. The maximum green fodder, dry matter and crude protein yield were recorded by C_3 and C_2 treatments of cutting management practices may be because more number of cuttings during the crop growth period. The treatment C_1 obtained comparatively less cuttings as it was left for seed production in the second week of March every year resulted in comparatively low green fodder yield.

A significant variation in seed yield and 1000 seed weight due to sowing methods and cutting management practices in lucerne were observed (Table 1). Maximum seed yield of 1.19 q/ha was recorded by the treatment of the line sowing method at 30 cm followed by broadcasting method with a seed yield of 1.10 q/ha. Jamshaid *et.al.* (2020) also reported that wider line sowing method of lucerne gave maximum seed yield as compared to the broadcasting method. In the case of cutting management practices significant maximum seed yield of 1.65 q/ha was recorded by regular cutting at 25 days interval and leaving for seed production in second week of March every year (C_1) followed by regular cutting for one and half years and leaving for seed production in second week of March (C_2) with a yield of 1.18q/ha. The regular cutting for two and half years and leaving for seed production at the end (C_3) recorded comparatively low seed yield of 0.61 q/ha. Lower seed yield of this treatment was obtained because of seed production only once in crop cycle.

Effect on crop economics

Different treatment combinations of sowing methods and cutting management practices influenced the net monetary returns and benefit cost (BC) ratio. Maximum net monetary returns of Rs. 1,26,683.04 and benefit cost ratio of 3.26 was recorded in line sowing method whereas broadcasting method recorded Rs. 1,25,113.23 and 3.15 of net returns and benefit cost ratio respectively. In case of cutting management practices significantly higher net monetary return of Rs. 1,32,540.39 and benefit cost ratio of 3.42 was recorded with treatment of regular cutting at 25 days interval and leaving for seed production in second week of March every year (C_1) followed by regular cutting for one and half years and leaving for seed production in second week of March (C_2) with net monetary return and benefit cost ration of Rs 1,28,391.98 & 3.21 respectively.

CONCLUSION

The line sowing is the best method of Lucerne sowing for obtaining maximum seed yield along with green fodder. The cutting management of regular harvesting at 25 days interval and leaving for seed production in second week of March every year was beneficial in terms of seed yield, net monetary returns and benefit cost ratio under western Maharashtra condition. It could be concluded that line sowing of Lucerne along with regular cutting for fodder at 25 days interval and leaving for seed production every year during March is best treatment combination with highest net monetary returns and benefit cost ratio and can be recommended for Western Maharashtra conditions.

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