

Effect of Irrigation and Cutting Management on Growth and Yield of Lucerne (*Medicago sativa* L.)

A. S. Gawali, P. D. Bhalerao and R. B. Ulemale

Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth,
Akola 444 104

ABSTRACT

The field experiment comprising four irrigation levels (4, 60, 80 and 100 mm, cumulative pan evaporation) and three cuttings levels (50, 75 and 100 days after sowing) was conducted in split plot design at Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *Rabi* 2000-2001. There was significant increase in green fodder and seed yield of lucerne with increase in the level of irrigations. Scheduling of irrigation at 40 mm CPE recorded 27.32, 61.42 and 71.23 per cent more seed yield than 60, 80 and 100 mm CPE respectively. The green fodder and seed yield were also significantly increased with increase in number of cuttings from one to three. Cutting the crop thrice (50, 75 and 100 DAS) recorded 328.14 and 158.53 per cent more green fodder yield than cutting the crop once (50 DAS) and twice (50 and 75 DAS). Three cuttings gave significantly more seed yield (384 kg ha⁻¹) of lucerne than two (320 kg ha⁻¹) and one cuts (308 kg ha⁻¹) but difference between latter two treatments was not significant. For higher seed yield of lucerne, irrigation should be applied at 40 mm CPE and left the crop for seed production after taking three cuts for green fodder.

(Received on 16th Oct. 2001)

INTRODUCTION

Lucerne (*Medicago sativa* L.) is highly palatable nutritious and energy rich leguminous forage crop. Under proper management it can provide a continuous supply of green fodder for longer period (Nov.-June) in comparison to berseem (Dec.-April). The non availability of good seed in time hampered its cultivation in Maharashtra. Lucerne is notoriously erratic in seed production and seed yield is very low (50 to 250 kg ha⁻¹). Hence no acreage is devoted for seed production of lucerne. Low seed yield of lucerne is due to untimely last cutting of crop for forage and not to maintain desired soil moisture through irrigation water. Generally the crop is left for seed production after taking two to three cuts for green fodder. The seed yield of 300 to 400 kg ha⁻¹ was recorded at Nawagaon (Gujarat) after

two to three cuts for green fodder. The seed yield as high as 790 kg ha⁻¹ was recorded after four cutting for green fodder (Solanki, 1987). The information in respect of seed production of lucerne is very meagre in Maharashtra. In view of above the present investigation was undertaken to ascertain most appropriate combination of irrigation scheduling and time of last cutting for higher green fodder and seed yield of lucerne in Vidarbha region.

MATERIALS AND METHODS

The field experiment was conducted at Animal Husbandry and Dairying Department of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *rabi* season of 2000-2001. The experimental soil was clay loam in texture having total Nitrogen 0.054%, available P₂O₅ 32.34 kg ha⁻¹ and available K₂O 190.43 kg ha⁻¹ with pH

The significant increase in green fodder and seed yield was observed with increased in the levels of irrigation to its lower level (Table 1). The highest green fodder yield (255.28 q ha⁻¹) and seed yield (452 kg ha⁻¹) were recorded with I₁ treatment followed by I₂ treatment. The highest yield at I₁ treatment might be attributed to maintenance of favourable soil moisture in root zone of crop which reflected in higher values of growth and yield attributes. These results are in confirmation with the findings of Boehle *et al.* (1961) and Khot *et al.* (1997).

Effect of cutting management

Cutting the crop once at 50 DAS (C₁) recorded significantly more plant height (83.83 cm) than cutting the crop twice (C₂) and thrice (C₃) but difference between C₁ and C₂ was not significant. Cutting the crop frequently reduced plant height, (78.10 cm) which might be due to less vegetative regrowth of crop after each cutting for green fodder. However, the number of branches plant⁻¹ increased with increase in number of cuttings.

This might be due to more reproductive growth of plant rather than vegetative growth by cutting the crop frequently. Yield contributing characters viz., Number of capsules plant⁻¹, seed yield plant⁻¹ and test weight were showed significant with increase in number of cuttings from one to three for green fodder. However, the differences between C₁ and C₂ were not significant in respect of number of capsules plant⁻¹ and test weight (Table 1).

The green fodder yield was significantly increased with increase in the number of cuttings. Cutting the crop thrice (C₃) recorded 328.14 and 158.53 per cent more green fodder yield than cutting the crop once (C₁) and twice (C₂). These results are in conformity with the findings of Tomer *et al.* (1973). Data presented in Table 1 indicate that seed yield of lucerne was significantly more by leaving the crop for seed production after three cuts (C₃) for green fodder than two (C₂) and one cut (C₁) but the difference between C₁ and C₂ was not significant. These results confirm the findings of Dhaliwal and Bains (1983).

TABLE 2

Interaction effect of irrigation and cutting management on green fodder and seed yield lucerne.

Treatment		Green fodder yield (q ha ⁻¹)		
I/C		C ₁	C ₂	C ₃
I ₁		127.23	255.45	383.18
I ₂		106.05	200.40	325.79
I ₃		67.70	151.54	236.11
I ₄		43.05	104.70	183.88
C.D. (P=0.05)				13.52
		Seed yield (kg ha ⁻¹)		
I/C				
I ₁		370	392	595
I ₂		351	348	360
I ₃		262	278	301
I ₄		250	261	281
C.D. (P=0.05)				25

Note : I₁ - 40 mm CPE C₁ - Cutting at 50 DAS
 I₂ - 60 mm CPE C₂ - Cutting at 508.75 DAS
 I₃ - 80 mm CPE C₃ - Cuttings at 50, 75 and 100 DAS
 I₄ - 100 mm CPE

Irrigation x Cutting management

Data presented in Table 2 revealed that scheduling of irrigation at 40 mm CPE with three cuttings (I_1C_3) recorded significantly higher green fodder yield (383.18 q ha^{-1}) than all the treatment combinations. The higher yield under this combination might be due to fast regrowth of lucerne after each cut with moist soil conditions. Significantly higher seed yield of lucerne (595 kg ha^{-1}) was recorded when the crop was left for seed production after taking three cuts for green

fodder in combination with irrigation at 40 mm CPE (I_1C_3) than rest of the treatment combinations. This might be due to higher values of yield attributing characters under I_1 and C_3 treatments.

Thus it can be concluded that for higher seed yield of lucerne irrigation should be applied at 40 mm CPE and allowed the crop for seed production after taking three cuts at 50, 75 and 100 DAS for green fodder.

REFERENCES

- Boehle, J. J., Louis, K. and Washko, J. B., 1961. Effect of irrigation and deep fertilization on yields and root distribution of selected forage crops. *Agron. Journal* **53** : 153 - 158.
- Dhaliwal, J. S. and Bains, D. S., 1983. Investigation in to the seed setting in lucerne II. Effect of cutting schedules and growth retardant. *J. Res. PAU* **20** (4) : 423-427.
- Dhaliwal, J. S., Bains, D. S. and Cheema, S. S., 1987. Investigations in to the seed setting in Lucerne III. Effect of irrigation at cumulative Pan Evaporation and phosphorus levels *J. Res. PAU* **24** (4) : 545-554.
- Khot, A. B., Yargatkar, A. T. and Patil B. N., 1997. Effect of irrigation scheduling and phosphorus levels on green forage yield of lucerne (*Medicago sativa* L.). *Indian J. Agron.* **42** (3) : 544-546.
- Solanki, S. S., 1987, A note on lucerne (*Medicago sativa* L.) Response to phosphate manuring for seed production. *Forage Res.* **13** (2) : 145 - 148.
- Solanki, R. M. and Patel, R. G., 2000. Effect of irrigation, methods of sowing and levels of phosphorus on growth and yield of lucerne (*Medicago sativa* L.). *GAU Res. J.* **24** (2) : 13-18.
- Tomer, P. S., Tripathi, N. P. and Singh, R. C., 1973. Effect of cutting interval and levels of phosphorus and nitrogen on lucerne. *HAU J. Res.* **3** (4) : 210-213.