

Seed-production potential of oat (*Avena sativa*) as influenced by cutting management and nitrogen

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ABSTRACT

A field study was carried out during the winter seasons to 1988-89 and 1989-90 to investigate seed-production potential of 'Kent' oat (*Avena sativa* L.) as influenced by cutting management and nitrogen levels. The seed yield without cut for green forage was significantly higher than that with cutting management. N @ 120 kg/ha gave high mean seed yield (21.5 q/ha). However, 1 cut at 50 days after sowing for green forage and then leaving the crop for seed was found advantageous; giving seed yield 21.04 q/ha and green-forage yield 179.55 q/ha. This treatment was on a par with no-cut treatment in respect of monetary returns.

Non-availability of quality seed of promising strains is crucial factor in popularization of fodder crops. It is because of the fact that such crops are bred substantially for vegetative purpose and as such they are shy-seeders. Besides, these crops are required to cut for fodder at the vegetative stage and thus the opportunity for producing seed is eliminated. Therefore, it is necessary to develop strategies for higher seed yields without cutting for green forage and for obtaining moderate yields of green forage as well as seed from the same crop by following appropriate management. To assess the extent of seed yields without cutting and by following 1 cutting for green forage and then leaving the crop for seed, the present study was undertaken so as to overcome the problem of seed shortage.

MATERIALS AND METHODS

The study was undertaken during winter

seasons of 1988 and 1989 at Rahuri. Nine treatment combinations comprised 3 cutting management, viz. no cut, 1 cut at 50 days and allow the plant to regrow for seed, 1 cut at 70 days and regrow for seed, and 3 nitrogen levels, viz. 40, 80 and 120 kg/ha. The treatments were arranged in factorial randomized block design replicated 4 times. The gross and net plot size was 5.0 m × 4.0 m and 4.0 m × 3.0 m respectively. Half of the N and 40 kg P/ha and 40 kg K/ha were applied basal. One-fourth of the N of no-cut treatment was applied at tillering stage (30 days) and remaining one-fourth at the boot stage. For 1 cut treatments at 50 days and 70 days after sowing, the remaining half N was applied after cutting the green forage. The plots of 1-cut treatment were harvested at respective days (50 and 70). The soil of the experimental plot was medium black and slightly alkaline, low in available N, medium in available P, rich in available K

Table 1. Seed yield and ancillary characters of oat as influenced by cutting management and nitrogen levels

Treatment	1988-89				1989-90			
	Green-forage yield (q/ha)	Seed yield (q/ha)	Straw yield (q/ha)	Monetary returns (Rs/ha)	Green-forage yield (q/ha)	Seed yield (q/ha)	Straw yield (q/ha)	Monetary returns (Rs/ha)
<i>Cut (C)</i>								
No cut		23.92	77.46	12,736		26.86	73.85	14,421
1 cut at 50 days	175.6	19.75	62.57	12,452	183.5	22.34	56.58	13,937
1 cut at 70 days	276.6	8.7	36.45	7,939	252.0	9.72	22.37	8,108
CD (P = 0.05)		2.41	11.34	1,252		0.87	2.90	566
<i>N (kg/ha) (N)</i>								
40	168.3	15.22	50.40	9,468	146.10	15.64	41.62	9,989
80	229.1	17.56	60.99	11,375	251.00	19.89	49.87	13,455
120	247.8	19.60	65.08	12,283	256.00	23.40	61.31	15,385
CD (P = 0.05)		2.41	11.34	1,252		0.87	2.90	566
<i>Interaction (C × N)</i>								
CD (P = 0.05)		NS	NS	NS		1.51	5.03	980

and low in organic matter content. Plots were irrigated as per need of the crop. Green forage was harvested from net plots of the 1-cut treatment as per schedule and the crop was allowed to set seed. The seed and straw yields of net plots of respective treatments were recorded. To work out monetary returns, price considered for green forage was Rs 120/tonne and Rs 100/tonne for straw and Rs 500/q for seed. Statistical analysis was carried out by analysis of variance method.

RESULTS AND DISCUSSION

Effect of cuts

Seed and straw yields were significantly influenced by cutting management. The seed yield was maximum (23.92 q/ha) from the no-cut treatment, followed by 1 cut at 50 days for forage and the seed from the

regrowth (19.75 q/ha) during 1988-89. The respective values were 26.86 and 22.34 q/ha during 1989-90. These treatments differed significantly for seed yield, however, for monetary returns they were at par (Rs 12,936 and Rs 12,452 respectively). Similar trend was observed during next year also. The results are in conformity with those of by Desai and Deore (1982), who reported that harvesting oat at 50% flowering and leaving the crop for seed gave better forage and seed yields than the other systems, although the seed yield of no-cut treatment outyielded other treatments.

Effect of N

Linear response was obtained with each incremental level of N up to 120 kg/ha. Maximum green forage, seed and straw yields/ha were obtained with N @ 120 kg/

ha. However, straw yield and monetary returns/ha were at par with 98 kg and 120 kg N/ha during 1988-89 and significantly during 1989-90. The higher seed yield with increase in N level was due to greater number of spikelets (sink) and higher leaf area (source). Rao and Patil (1979) also reported similar trend.

Effect of interaction

Interactions were found significant only during 1989-90. The grain yield was higher with no-cut treatment at all the levels of N and it was highest with 120 kg N/ha at all the levels of cutting management. Similar trend was observed in respect of straw yield and

monetary returns. With the treatment of no cut and 120 kg N/ha, the mean seed yield, straw yield and monetary returns/ha were respectively 29.42 q/ha, 99.35 q/ha and Rs 15,917/ha, whereas with 1 cut at 50 days and 120 kg N/ha the respective values were 24.29 q/ha 63.33 q/ha and Rs 15,124/ha in our experiment.

REFERENCES

- Desai, S. N. and Deore, D. D. 1982. Influence of cutting management on seed production in oats. *Forage Research* 8 (1) : 151-154.
- Rai, Ch. N. and Patil, B. D. 1979. Effect of nitrogen levels on yield of oats. *Forage Research* 5 (2) : 151-153.