Forage Res., **39** (1) : pp. 42-44 (2013) **http://forageresearch.in**

VARIATION IN FORAGE YIELD AND QUALITY TRAITS OF DUAL PURPOSE BARLEY UNDER DIFFERENT AGRONOMIC PRACTICES

GURPREET KAUR*, AJAIB SINGH, C. S. AULAKH AND J. S. GILL

Department of Agronomy,
Punjab Agricultural University,
Ludhiana-141 004 (Punjab), India
**(e-mail : maan_gk@rediffmail.com)*

(Received : 20 September 2013; Accepted : 25 October 2013)

SUMMARY

A field experiment on barley crop was conducted during **rabi** 2006-07 at Punjab Agricultural University, Ludhiana. The treatments consisting of combination of three varieties (PL 172, PL 426 and RD 2552) and two row spacings (15 and 22.5 cm) in the main plots and two forage cutting stages (at 45 and 60 DAS) in the sub-plots were laid out in split plot design with three replications. PL 172 variety gave significantly higher yield of dry fodder (19.4 q/ha), crude protein (2.1 q/ha), ether extract (10.52 q/ha) and nitrogen free extract (10.31 q/ha) than varieties PL 426 and RD 2552. Row spacing of 15 cm produced significantly higher yield of dry fodder (18.4 q/ha), crude protein (1.9 q/ha), ether extract (0.51 q/ha), mineral matter (1.93 q/ha) and nitrogen free extract (9.46 q/ha) than the row spacing of 22.5 cm. The forage cut at 60 DAS produced significantly higher yield of dry fodder (24.2 q/ha), crude protein (2.1 q/ha), crude fibre (6.4 q/ha), ether extract (0.62 q/ha), mineral matter (2.31 q/ha) and nitrogen free extract (0.62 q/ha) than forage cut at 45 DAS. However, significantly higher crude protein content (13.3 %) and dry matter digestibility (76.06%) were obtained in forage cut at 45 DAS.

Key words : Variation, time of cutting, row spacing, dry fodder, crude protein, dry matter digestibility, barley

Barley (*Hordeum vulgare* L.) is an important winter season crop grown under Indian conditions. In India, it is primarily grown for human consumption, while most of it is used as cattle feed in USA and Europe. Barley has considerable potential to provide fodder during lean periods and low temperatures due to its fast growth. It is a source of early nutritious fodder to overcome the winter feed problem. Most grasses have high nutritive value during early growth but their forage value declines rapidly at maturity (Stidham *et al.*, 1982). The digestibility of the temperate grasses decreased and the fibre increased linearly with the advancing age of the plant (Sanderson and Wedin, 1989).

The importance of any forage crop depends upon the green fodder yield, chemical composition and availability of good quality nutrients. The chemical composition and nutritive values of fodder are influenced by variety of crops (Gupta *et al.* 1975). The climatic factors and optimum plant population play a paramount role in realizing the yield potential of crop. Keeping this in mind, present study was conducted to evaluate the effect of row spacing, varieties and cutting management on production potential and quality traits of barley fodder in dual production system.

MATERIALS AND METHODS

Field studies were conducted at Student's Research Farm, Punjab Agricultural University, Ludhiana during **rabi** 2006-07. The experiment was laid out in factorial split plot design keeping combination of three varieties (PL 172, PL 426 and RD 2552) and two row spacings (15 and 22.5 cm) in main plots and two time of cutting for forage (at 45 DAS and at 60 DAS) in sub-plots with three replications. The soil of experimental field was loamy sand in texture, low in available N, medium in available P and K. Treatment effects were evaluated on dry matter yield and quality of barley fodder. One kg of sample was taken from each plot and dried in shade followed by drying in hot air oven at 100^0C overnight for dry matter estimation. Dried samples were

[1]Department of Vegetables.

ground in Willey grinder mill using 2 mm sieve and used for proximate analysis and for estimation of *in sacco* dry matter digestibility. The proximate analysis of nutrients was carried out as per the method of AOAC (1990). Samples were incubated in triplicate for 24 h in the rumen of four rumen fistulated adult male buffalo bulls for estimation of *in sacco* digestibility of dry matter (DM) as per standard procedure (Mehrez and Oreskov, 1997).

RESULTS AND DISCUSSION

Effect of Varieties

PL 172 variety produced significantly higher dry fodder yield (19.4 q/ha) than the other two varieties of barley i. e. PL 426 (16.8 q/ha) and RD 2552 (16.8 q/ha) which were statistically at par with each other (Table 1). The higher dry fodder yield might be due to more green fodder yield and more periodic dry matter accumulation. The dry matter production was truly correlated with the tillers per plant and green forage yield of barley. Sethi and Singh (1978) also reported highly significant differences in the barley varieties with respect to all the forage yield components.

RD 2552 had significantly higher content of crude protein (25.4%), mineral matter (11.0%) and dry matter digestibility (79.67%) and significantly lower ether extract (2.56%). All the three varieties did not differ significantly for crude protein and nitrogen free extract. PL 172 variety produced significantly higher yield of crude protein (2.1 q/ha), ether extract (0.52 q/ha), nitrogen free extract (10.31 q/ha) and dry matter digestibility (14.92 q/ha). For crude fibre and mineral matter yield differences were non-significant for all the three varieties.

Effect of Row Spacing

Further perusal of data (Table 1) indicated that closer row spacing of 15 cm produced significantly higher dry fodder yield (18.4 q/ha) than the wider row spacing of 22.5 cm (16.1 q/ha). It might be due to more number of tillers per unit area and more green fodder yield in closer row spacing. Similarly, Shaikh *et al.* (2004) observed significantly higher forage yield and growth attributing characters of oats at 22.5 cm row spacing than 30 cm row spacing.

Closer row spacing of 15 cm had significantly higher content of ether extract (2.87%) and mineral matter (11.07%) but all the other parameters did not differ significantly with the row spacing. Closer row spacing of 15 cm had significantly higher yields of dry fodder (18.4 q/ha), crude protein (1.9 q/ha), ether extract (0.51 q/ha), mineral matter (1.93 q/ha) and nitrogen free extract (9.46 q/ha) than the wider row spacing of 22.5

TABLE 1
Proximate principles and dry matter digestibility (on DM basis) of barley fodder as affected by various treatments

Treatment	Dry matter yield (q/ha)	(%)*					Yield (q/ha)					ISDMD* (%)
		Crude protein	Crude fibre	Ether extract	Mineral matter	Nitrogen free extract	Crude protein	Crude fibre	Ether extract	Mineral matter	Nitrogen free extract	
Varieties												
PL 172	19.4	11.2	22.8	2.79	10.29	52.89	2.1	4.5	0.52	1.90	10.31	77.50
PL 426	16.8	11.4	25.2	2.87	10.99	49.51	1.7	4.4	0.48	1.74	8.44	76.83
RD 2552	16.8	10.1	25.4	2.56	11.06	50.83	1.5	4.4	0.42	1.78	8.62	79.67
C. D. (P=0.05)	1.3	NS	2.0	0.22	0.50	NS	0.2	NS	0.04	NS	0.79	2.02
Row spacings (cm)												
15	18.4	10.9	24.4	2.87	11.07	50.71	1.9	4.6	0.51	1.93	9.46	77.89
22.5	16.1	10.9	24.5	2.61	10.47	51.45	1.7	4.2	0.43	1.70	8.79	78.11
C. D. (P=0.05)	1.1	NS	NS	0.18	0.41	NS	0.1	NS	0.03	0.12	0.65	NS
Time of cutting for forage												
45 DAS	11.1	13.3	22.5	2.91	12.00	49.27	1.5	2.5	0.32	1.32	0.32	79.94
60 DAS	24.2	8.6	26.5	2.54	9.55	52.86	2.1	6.4	0.62	2.31	0.62	76.06
C. D. (P=0.05)	1.0	0.8	0.8	0.11	0.39	0.97	0.1	0.3	0.03	0.13	0.03	0.81

*Each value of proximate parameters represents the mean of two observations and ISDMD mean of three replications. NS–Not Significant.

cm. Boss and Carlson (2001) found that narrow band width (4.4 inches) produced quality forage of barley than did the wide band width (7.0 inches).

Effect of Time of Cutting

Data revealed that forage cut at 60 DAS produced significantly higher dry fodder yield (24.2 q/ha) than the forage cut at 45 DAS (11.1 q/ha) and this gave 119 per cent higher dry fodder than the forage cut at 45 DAS. It might be due to 15 days longer period of vegetative growth. Similar results of oats were reported by Dost *et al.* (1994) and Singh *et al.* (1997) when it was harvested at 60 and 75 DAS. Wheat fodder harvested late also resulted in higher fodder yield (Dunphy *et al.*, 1982). Forage cut at 45 DAS had significantly higher content of crude protein (13.3%), ether extract (2.87%), mineral matter (12.0%) and dry matter digestibility (79.94%) but forage cut at 60 DAS had significantly higher content of crude fibre (26.5%) and nitrogen free extract (52.86%) than forage cut at 45 DAS. Forage cut at 60 DAS had produced significantly higher yield of crude protein (24.2 q/ha), crude fibre (2.1 q/ha), ether extract (6.4 q/ha), mineral matter (0.62 q/ha), nitrogen free extract (2.31 q/ha) and digestible dry matter (0.62 q/ha) than forage cut at 45 DAS. Hussain *et al.* (1998) and Boss and Carlson (2001) showed earlier cutting of barley appeared to be of higher forage quality than late cutting.

REFERENCES

AOAC, 1990 : *Official Methods of Analysis, 15th edn.* Association of Official Agricultural Chemists, Washington. DC.

Boss, D., and G. Carlson, 2001 : *Project Proposal Montana Board of Research and Commercialization.*

Dost, M., A. Hussain, S. Khan, and M. B. Bhatti, 1994 : *Pak. J. Sci. Ind. Res.,* **37** : 198-200.

Dunphy, D. J., E. C. Holt, and M. E. McDaniel, 1982 : *Crop Sci.,* **22** : 106-109.

Gupta, P. J., and K. Pradhan, 1975 : *Haryana agric. Univ. J. Res.,* **4** : 242-246.

Hussain, A., S. Khan, M. Dost, M. B. Bhatti, and M. U. Mufti, 1998 : *Sarhad J. Agric.* **14** : 219-224.

Mehrez, A. Z., and E. R. Orskov, 1997 : *J. Agric. Sci. Comb.,* **88** : 645-650.

Sanderson, M. A., and W. F. Wedin, 1989 : *Agron. J.,* **81** : 864-869.

Sethi, G. S., and H. B. Singh, 1978 : *Forage Res.,* **4** : 53-59.

Shaikh, A. K., P. R. Munde, K. T. Jadhav, V. P. Suryawanshi, S. B. Suryawanshi, and G. R. Wayal, 2004 : *J. Soils and Crops,* **14** : 137-141.

Sidhu, M. S., A. Singh, and B. D. Sharma, 1997 : *J. Res. Punjab Agric. Univ.,* **34** : 379-383.

Singh, J., D. S. Rana, and R. K. Joon, 1997 : *Forage Res.,* **23** : 115-117.

Stidham, M. D., J. Powel, F. Gary, and P. L. Claypool, 1982 : *J. Range Manage.,* **35** : 301-304.