

**RESEARCH ARTICLE****Studies on Productivity and Nutritivity of some popular Forages in winter season****Bendre KB<sup>1</sup> and Rathod MM<sup>2</sup>**<sup>1</sup>Nanasaheb Y.N. Chavan Arts Sci. and Com. College, Chalisgaon -424101 (MS), India.<sup>2</sup>SSMM Arts, Science and Commerce College, Pachora -424201 (MS), India.

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Manuscript details:	ABSTRACT
<p>Received: 01.08.2015 Revised : 18.08.2015 Accepted: 02.09.2015 Published : 10.10.2015</p> <p><b>Editor: Dr. Arvind Chavhan</b></p> <p><b>Cite this article as:</b> Bendre KB and Rathod MM (2015) Studies on Productivity and Nutritivity of some popular Forages in winter season, <i>Int. J. of Life Sciences</i>, 3(3): 255-259.</p> <p><b>Copyright:</b> © 2015   Author(s), This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>In present studies the three forage varieties Viz 'T9', variety of Lucerne, 'Kent', variety of Oat and 'Wordan', (S-99-1) variety of Berseem recommended by Mahatma Phule Krishi Vidyapeeth, Rahuri (Maharashtra) were cultivated at Maharashtra Sheli Va Mendhi Vikas Prakshetra, Bilakhed, Chalisgaon, Maharashtra during winter season of 1999 -2000. It was found that all the three varieties of the forage crops performed well and found suitable to cultivate in the area. In general the two essential mineral nutrients i.e. calcium and phosphorus found comparatively more in 'kent' variety of Oat and 'Wardan' variety of Berseem with better productivity. However, the overall performance of the T9 variety of lucerne is nutritionally superior to the other two varieties in percent crude protein, DM content and adequate quantities of the other nutrients.</p> <p><b>Keywords:</b> Forage, Lucerne, Berseem, Oat, Productivity, Nutritivity.</p> <p><b>INTRODUCTION</b></p> <p>The forages are important in agriculture and animal husbandry, they are the basic feed in the diet of livestock of all classes. The share of (green) forages is approximately 70% in livestock diet (Azam, 2010; Etuk <i>et al.</i>, 2012; Todkari, 2012). The supply of green forages in sufficient quantity is very important in livestock feeding in general and milch animals in particular. The success of</p>

any animal husbandry and dairy programme is usually known to depend upon four pillars, among them the supply of nutritious and balance feed through forage is very important (Patil, 1992, Bendre and Rathod, 2013a).

Farmers in this country are bestowed with a bounty of nature having large cafeteria of fodder crops to catter the needs of cattle. These may be grown on farms to get nutritious fodder throughout the year. Several fodder crops has been recommended for cultivated and feeding to the cattle. These include cereals, fodder, perennial grasses, leguminous fodder crops etc. In order to evaluate the suitability of popular fodder crops in Chalisgaon region. In view of their production potential and nutritive value, present investigation was undertaken by using the recommended forage crop varieties viz. T9 variety of Lucern, 'Kent' variety of Oat and 'Wardan' variety of Berseen of Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra were cultivated at Maharashtra Sheli Va Mendhi Vikas Prakshetra, Bilakhed, Chalisgaon (M.S.), India.

## MATERIALS AND METHODS

Three popular forages crops varieties viz. T9 variety of lucerne, 'kent' variety of berseen and 'Wardan' variety of Oat recommended by Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra were cultivated at "Maharashtra Sheliva Mendhi Vikas Prakshetra", Bilakhed (Chalisgaon), Maharashtra during winter in 1999-2000. The soil was analysed by Govt. Soil-Analysing laboratory, Jalgaon (1998) of its nutrient content before sowing. The soil was poor in phosphorous, moderate in nitrogen and potash with a normal pH 7.8.

A piece of land measuring about 270 sq.m. ( 15m x 18m) was prepared by ploughing and cross ploughings. While preparing the land "Compost" prepared on the farm was added at the rate of 3000 kg / ha. The land was than divided into 18 plots each with an area of 15 sq.m. for sowing the

crops. Each crop was sown in nine replicates. The plots were arranged in Randomised Block Design. The crops were sown in rows, each plot bearing 10 rows spaced 30.5 cms. part. The fertilizers were applied only at the time of sowing as recommended dose by agriculture department. All crops were raised under irrigated conditions.

The crops were harvested from three replica every time, at preflowering stages as shown in Table.1 the weight of the green fodder obtained from each plot was measure and the samples of green fodder were immediately brought to the laboratory for analysis. The samples were chopped into 2 to 3 cm. piece and dried in an electric oven at  $75 \pm 5^{\circ}$  C till constant weight for dry matter (DM) determination. Dried samples were ground to a fine powder and are used for estimation of crude protein. Nitrogen (N) content was determined in duplicate by MicroKejeldahl method (Bailey, 1967). The value of crude protein (CP) was expressed as  $N \times 6.25$ . Hanneberg acid alkali gravimetric method outlined by Lees (1968) was used for the estimation of crude fibre (CF). Crudefat was measured with chloroform: Methanol (2:1) as a solvent using soxhlet extractor. AOAC (1970) methods were followed for the determination of ash, acid insoluble ash (AIA), nitrogen free extract (NFE), total carbohydrate (TC) and calcium (Ca) Method of Fiske and Subbha Row (1925) describe by Oser (1979) was followed for the determination of phosphorus (P).

## RESULTS AND DISCUSSION

### i) Oat - *Avena sativa* L

Popularly known as 'Javi' is an important rabi Fodder Crop in India. Its fodder is nutritious and palatable containing high percent of protein (Arora, *et al.*, 1998). As a fodder it is an excellent and highly nutritive for milchlivestocks. The crop was cultivated during Oct 1999 to Feb. 2000 (Table-1) for yield measurement as well as to assess the nutrient composition of green fodder.

**Table 1:** Details of cultivation practices and harvesting of popular rabi fodder crops.

Crop	Cultivar	Date of Sowing	Seed rate (kg/ha)	Total fertilizers added(kg / ha)			Type of Cut	Date of harvest
				N	P	K		
Oat	Kent	20Oct. 1999	100	120	60	40	I <sup>st</sup> Cut	30 Dec.1999
							I <sup>st</sup> Regrowth	30 Jan. 2000
							II <sup>nd</sup> Regrowth	28 Feb. 2000
Lucerne	T9	20 Oct. 1999	30	30	60	40	I <sup>st</sup> Cut	30 Dec.1999
							I <sup>st</sup> Regrowth	25 Jan. 2000
							II <sup>nd</sup> Regrowth	20 Feb. 2000
							III <sup>rd</sup> Regrowth	20 Mar. 2000
Bers eem	Ward an	20 Oct. 1999	30	30	60	40	I <sup>st</sup> Cut	30 Dec. 1999
							I <sup>st</sup> Regrowth	25 Jan. 2000
							II <sup>nd</sup> Regrowth	20 Feb. 2000

**Table 2:** Yield of green fodder, dry matter and crude protein from Popularrabi fodder crops.

Crop	Cultivar	Duration	Type of cut and age of crop in days		Green Fodder		Yield (kg / ha )		
					%DM	N% of DM	Green fodder	Dry matter	Crude protein
Oat	Kent	Oct.-Feb.	I <sup>st</sup> Cut	(70)	13.5	1.76	31174	4208	463
			I <sup>st</sup> Regrowth	(30)	22.0	1.66	17222	3789	398
			II <sup>nd</sup> Regrowth	(28)	24.0	1.66	10764	2583	261
			<b>Total</b>				<b>59160</b>	<b>10580</b>	<b>1122</b>
			<b>Mean</b>				<b>19720</b>	<b>3526</b>	<b>373</b>
			S.D.				<b>8510</b>	<b>688</b>	<b>83</b>
			<b>C. V. (%)</b>				<b>43.17</b>	<b>19.51</b>	<b>22.25</b>
Lucerne	T9	Oct.-Apr.	I <sup>st</sup> Cut	(70)	27.0	3.68	6197	1673	385
			I <sup>st</sup> Regrowth	(25)	21.0	3.64	7083	1487	338
			II <sup>nd</sup> Regrowth	(25)	23.0	3.60	7083	1629	337
			III <sup>rd</sup> Regrowth	(30)	25.0	3.52	5312	1328	292
			IV <sup>th</sup> Regrowth	(30)	28.0	3.48	3586	1004	374
			<b>Total</b>	..			<b>29261</b>	<b>7121</b>	<b>1726</b>
			<b>Mean</b>				<b>5852</b>	<b>1424</b>	<b>345</b>
			S.D.				<b>1690</b>	<b>312</b>	<b>41</b>
<b>C.v. (%)</b>				<b>28.87</b>	<b>21.91</b>	<b>11.88</b>			
Berseem	Wardan	Oct.-Feb.	I <sup>st</sup> Cut	(70)	24.0	3.52	30091	7222	1589
			I <sup>st</sup> Regrowth	(25)	16.5	3.50	35445	5848	1279
			II <sup>nd</sup> Regrowth	(26)	20.0	3.44	6444	1289	277
			<b>Total</b>				<b>71980</b>	<b>14359</b>	<b>3145</b>
			<b>Mean</b>				<b>23993</b>	<b>4785</b>	<b>1048</b>
			S.D.				<b>1260</b>	<b>2535</b>	<b>560</b>
			<b>CV. (%)</b>				<b>52.51</b>	<b>52.96</b>	<b>53.43</b>

**Table 3:** Nutrient content of green fodder from Popularrabi fodder crops.

Crop	Cultivar	Date of harvest and Type of cut	% Dry Matter (OM)	% of DM								
				CP	CF	EE	Ash	AIA	NFE	TC	Ca	P
Oat	Kent	30 Dec. 1999 Ic	13.5	11.00	23.8	7.00	15.3	0.54	42.90	66.7	1.01	0.45
		30 Jan. 2000 Ir	22.0	10.30	24.7	6.40	14.6	0.50	44.00	68.7	0.90	0.41
		28 Feb. 2000 IIr	24.0	10.06	26.0	6.90	15.1	0.49	41.94	67.9	0.92	0.43
Lucerne	T9	30 Dec.1999 Ic	27.0	23.00	25.0	4.90	10.8	-	36.30	61.3	1.90	0.25
		25 Jan. 2000 Ir.	21.0	22.75	28.0	4.20	10.7	-	34.35	62.3	1.92	0.27
		20 Feb. 2000 IIr	23.0	22.50	27.0	4.00	10.2	-	36.30	63.3	1.85	0.29
		20 Mar. 2000 IIIr	25.0	22.00	30.0	4.40	10.6	-	33.00	63.0	1.83	0.32
		19 Apr.2000 IIVr	28.0									
Berseem	Wardan	30 Dec. 1999 Ic	24.0	22.00	22.0	2.26	11.8	-	41.94	63.9	2.16	0.40
		25 Jan. 2000 Ir	16.5	21.80	25.0	2.12	11.2	-	39.88	64.8	2.10	0.35
		20 Feb. 2000 IIr	20.0	21.50	28.0	2.25	10.9	-	37.35	65.0	2.06	0.42

The crop yielded 31174, 4208 and 463 kg/ ha green fodder, dry matter and crude protein respectively in first cut (Table-1), while total yields work 59160, 10580 and 1122 kg/ ha green fodder, dry matter and crude protein respectively in 128 days, when it was harvested Thrice ( 1 cut + 2 regrowth). The results are in agreement to those recommended by Joshi *et al.*, (1993), Pisal *et al.*, (1993), Prasad (1993) Pradhan and Mishra (1994) and Rawat and Hazra (1997-98).

Percent dry matter (DM) on this crop was 10.5% at the 1st cut taken on 30 Dec. 1999 which increased to 24.0% at the 2nd regrowth harvested on 28th Feb. 2000. Table-2 gives chemical composition of green foliages from Oat. It was found to be rich in protein containing from 10.06% to 11% protein content on DM basis. The values from crude protein content were at par with those recommended by Pradhan and Mishra (1994).

The crop contained 26% crude fibre and was rich in two essential mineral nutrients i.e. calcium and phosphorus. The results thus indicated suitability of this crop for fodder production. However, higher yields than those recorded during present trials were reported by Patil (1991).

#### ii) Berseem (Egyptian clover ) *Trifolium alexandrinum* L

Berseem, which was introduced from Egypt in 1904, has become a popular and potential forage legume in India for the cultivation during winter season under assured irrigated system (Joshi *et al.*, 1988). It is soft nutritious and palatable. 'Wardan' (S-99-1) variety of berseem was used for cultivation raised during Oct. 1999 to Feb. 2000 (Table-1). When it was harvested for 03 times in 121 days. It yielded 71980 kg/ha green fodder which was higher than that recorded with lucerne (Table-2) Nutritionally it was slightly inferior to lucerne containing 21.5 to 22% crude protein on DM basis (Table -3). In general the crop as rich in calcium and other essential nutrients. The yields recorded during present investigation were similar to those recorded by Singh and Dixit (1990) and Hazra (1996).

#### iii) Lucerne - *Medicago sativa* L

Lucerne, highly productive leguminous fodder crop. It is called "queen" of fodder crops as it is nutritionally superior. It is cultivated at several places of Maharashtra. The crop is perennial and

can be cut for 12 to 14 times in a year (Dahiphale *et al.*, 1991, Bendre and Rathod, 2013b).

The T9 variety of lucerne harvested after 70 days (Table-1) and subsequently for the four regrowths till 19th April 2000 in 180 days, yielded, 29261 Kg/ ha. C.V. Value indicates T9 variety is more suitable than Oat and Berseem (Table-2). The yields were slightly lower than desire. Table-3 gives nutrient composition of lucerne which reveals its nutritional superiority. On an average the crop contained 21 to 28% DM. The DM was with 22 to 23% crude protein and adequate quantities of other nutrients. It is advisable to cultivate this crop as it is productive and it can supply nutritious fodder throughout the year.

#### **CONCLUSION :**

It was found that all the three varieties of the forage crops performed well and found suitable to cultivate in the area. In general the two essential mineral nutrients i.e. calcium and phosphorus found comparatively more in 'kent' variety of Oat and 'Wardan' variety of Berseem with better productivity. However, the overall performance of the T9 variety of lucerne is nutritionally superior to the other two varieties in percent crude protein, DM content and adequate quantities of the other nutrients.

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