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COMPARATIVE PERFORMANCE STUDY OF DIFFERENT OAT VARIETIES UNDER AGRO-CLIMATIC CONDITIONS OF SIBI

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ABSTRACT

Fodders are the main source of animal feed in Sibi region. However, the yield per acre is still far below than optimum level of production. Considering such a miserable picture in the region, a series of different fodder production trials were initiated at Large Ruminant Research Institute, Sibi. In the present study, nine cultivars of oats (*Avena sativa*) were evaluated for different yield components during November, 2007 to January, 2008. Data on plant height, leaf area and fodder yield per unit area were recorded. Differences among cultivars were considered as significant ($P< 0.05$). The results further revealed that variety No. 725 excelled over all other varieties in higher fresh fodder yield (47.6 kg/hectare) under agro-climatic conditions of Sibi. However, further studies are needed in order to recommend a suitable variety for general cultivation to meet increasing demand of fodder in the region.

Key words: Oats; improved varieties; agro-climatic conditions; Sibi; Pakistan.

INTRODUCTION

Fodder species and fodder production depend mainly on the climate (temperature, frost, duration of winter, availability of water, distribution of rainfall, growth period length) and on the soils (structure, texture), (Bruzon, 2007). Fodder plays an important role in rearing of livestock. It is a reasonable source of livestock feeding and is being used since centuries. Balochistan contribute 2.33% to the 54.40 million tons of total fodder production in the country (Anonymous, 2004-05). There are two major seasons of Fodder crops i.e., Summer (Kharif) and Winter (Rabi). Winter fodder crops are mainly berseem (Trifolium alexandrinum), oats (Avena sativa), and mustard (Brassica spp.), and secondarily shaftal (Trifolium resupinatum), lucerne (Medicago sativa), vetch (Vicia species), barley (Hordeum vulgare) and rye grass (Lolium perenne).

Oats (*Avena sativa* L.) is one of the most important rabi cereal fodder crops grown in Pakistan under irrigated and barani conditions. It is quick growing palatable, succulent and nutritious crop. The oat fodder cultivation generally has 40-60-0 kg NPK/ hectare nutrient requirements while water requirement is 4-6 irrigations.

Oats fodder is mostly fed as green but surplus is converted into silage or hay to use during fodder deficit period. It is preferred feed of all animals and its straw is soft and superior to wheat and barley. The oats grain is also valuable feed for horses, dairy cows, poultry and young breeding animals.

The farmers face fodder deficiency in winter when they have only dry stalks of kharif cereal fodder or dry summer grasses. There is a dire need to maximize fodder production per acre which could be increased 2-3 fold by adopting improved varieties and agronomic practices (Bhatti, 1996). The introduction of new high yielding oats varieties in Pakistan, the farmers in Balochistan in general and in Sibi particular has recognized oats as important rabi fodder for filling the fodder gap. In this connection, studies are being conducted in different agro-climatic conditions. While evaluating ten oats varieties for green fodder yield and nutritive quality Habib *et al.* (2003) found that Avon and PD2LV65 excelled all other varieties in green fodder, dry fodder yield and days to maturity. Hussain *et al.* (1993) studied yield and quality components of 15 exotic and indigenous varieties of oats. They reported that highest mean fresh forage and dry matter yields were obtained from variety PD2LV65 while variety No. 681 had higher crude fibre content.

Sibi, being the plain area of the Balochistan province has ample quantity of fodder production for the sustainability of livestock. Fodder production in Sibi and Kacchi are reported to be about 241830 tons (Anonymous, 1996). The average fodder yield in case of oats production is 24 tons per hectare which is far below the potential production of the improved oat varieties. Keeping in view these facts, the present study was chalked out to evaluate the comparative efficiency of different varieties of oats under climatic conditions of the region. The main objective was to recommend high yielding oat variety in order to optimize the fodder yield and fulfill the fodder requirements of ruminant livestock in Sibi region.

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MATERIALS AND METHODS

Nine improved varieties of oats viz. No.725 (V1), X 5229-1(V2), CK1(V3), AVONXEM(V4), SCOTT(V5), No. 97081(V6), PD2LV65(V7), UGG(V8), and No. 75525(V9) were planted at Large Ruminant Research Institute, Sibi in order to evaluate their performance and to recommend the best variety under agro-climatic conditions of Sibi region. The average range of temperature remained 08-23 ^{0}C during the study period. The soil is clay loam in characteristics; however it is deficient in nitrogen and phosphorus but adequate in potassium. The layout of the experiment was according to the randomized complete block design (RCBD) with three replications. The plot size was fixed at 4.2 x 6 meter with line spacing of 30 cm. The total numbers of plots were twenty seven. Seed in the designed plots was applied at the rate of 40 kg per acre. Sowing was done on 14th November, 2007. In the present trial, no fertilizer was applied in any replication or treatment. Plots were irrigated 6 times during the study period. Weeds were removed manually. Harvesting was done on 25th January, 2008 at 50% flowering and data were recorded on plant height, leaf area and fresh fodder yield. Plant height was measured in centimeters from base to tip of the plant by selecting five plants at random from each variety and then average was worked out. Leaf area was recorded by measuring the length into width. i.e., *Leaf area (cm2) = Leaf length (cm) x leaf width (cm).* Leaf area was measured by selecting five plants at random from each of the nine varieties. For fresh fodder yield, plots were harvested at 50 percent flowering and weighed. The diurnal temperature at harvesting ranged from 14-28 ^{0}C with humidity 58%.

Statistical Analysis: The data was analyzed through the standard procedure of analysis of variance according to the Randomized Complete Block Design (Steel *et al*., 1997). Means were compared for significance of difference with the Duncan Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

a) Fodder yield: Green fodder yields of oats significantly ($P<0.05$) varied due to varieties which ranged from 33.332 to 47.600 ton/hectare used in the experiment (Table 1). Maximum green fodder yield 47.6 ton/hectare was obtained from (V1) i.e., No.725 followed by X 5229-1(V2) and PD2LV65 (V7). Minimum fodder yield 33.332 ton/hectare was observed in CK1 (V3).The green fodder yields of remaining varieties were comparable (42.400 - 43.068 ton per hectare). These results are inconformity with Nawaz *et al*., 2004 who reported that oats varieties differ in green and dry matter yields. Hussain *et al.* (1993) also reported that fresh forage yield differed due to differences in leaves per tiller and plant height. Like wise, Amanullah *et al.* (2004) stated that higher yields of fodder in oats cultivars can be possibly attributed to their greater leaf area, responsible for more photosynthetic activities, having high capacity to store assimilative products of photosynthesis.

b) Plant height: The data obtained of plant height revealed that cultivars have significant differences ($P<0.05$). The tallest plants (118.02 cm) were produced by (V1) No.725 followed by variety (V7) PD2LV65 (108.25 cm). Minimum plant heights (92.66, 92.78 cm) were produced by variety CK1 (V3) and UGG (V8) respectively (table-1). Kim and Seo (1988) observed that high yielding varieties of oats tended to gain more plant height than low yielding varieties which agreed with our study as (V1) No.725 has both maximum plant height and fodder yield among varieties. The variation in plant height could be due to genetic make-up of the varieties. Zaman *et al*. (2006) explained that plant height may differ in varieties due to environmental conditions which in turn cause variation in hormonal balance and cell division rate.

c) Leaf Area: The results revealed that statistically significant differences ($P<0.05$) in leaf area are found among varieties. Maximum leaf area (124.24 cm2) was recorded for variety (V1) No.725 followed by variety AVONXEM (V4) (119.95 cm2) which are shown in table-1. Minimum leaf area (89.88 and 93.68 cm2) was observed in UGG (V8) and SCOTT (V5). Kim and Seo (1988) also reported that high yielding varieties tended to be upright with broad leaves than low yielding varieties as in case of our study . The variation in leaf area may also be attributed to variation in genetic make-up and adaptability of these varieties to different environmental conditions. Similarly, Ahmad *et al*. (2008) in his findings explained that the variation in leaf area and other parameters in different varieties at different locations may also be attributed to varying genetic make-up, soil and environmental adaptability.

Table 1: Mean ± S.D of fodder yield, plant height and leaf area of nine oat varieties grown under agro-climatic conditions of Sibi

Varieties	Fodder yield (tones/hec.)	Plant Height (cm)	Leaf Area (cm^2)
(V1) No.725 (V2)	47.600 ±3.610	118.02 ±3.98	124.24 ±5.49
X 5229-1	46.800 ±6.430	102.61 ±3.97	104.79 ±5.43
(V3) CK1	33.332 ±4.930	092.66 ±2.44	101.36 ±1.92
(V4) AVONXEM	42.400 ±7.230	102.27 ±4.32	119.95 ±8.27
(V5) SCOTT	43.732 ±10.07	100.22 ±2.93	100.22 ±2.93
(V6) No. 97081	45.332 ±10.79	105.09 ±2.93	102.72 ±3.73
(V7) PD2LV65	46.000 ±5.570	108.25 ±5.28	115.74 ±5.77
(V8) UGG	43.068 ±9.290	092.78 ±2.31	089.88 ±5.24
(V9) No. 75525	43.868 ±6.510	103.93 ±4.17	116.16 ±4.75

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REFERENCES

Ahmad, G., M. Ansar, S. Kaleem, G. Nabi and M. Hussain (2008). Performance of early maturing oat (*Avena Sativa*) cultivars for yield and quality. J. Agric. Res. 46: 341-346.

Amanullah, P. S., K. Zada and S. Perveen (2004). Growth characters and productivity of oat varieties at Peshawar. Sarhad J. Agric. 20: 5-10.

Bhatti, B. (1996). Fodder production in rainfed areas of Punjab. Fodder Production in Pakistan. PARC. p. 113-114.

Bruzon, V. (2007). Feed and fodder consultant. EC/GOP project ALA/01/129.Strenthening of Livestock Services Project.

Duncan, D. B. (1955). Multiple Range and Multiple F Tests. Biometrics. 11:1-42

Hussain, A., S. Khan, D. Muhammad and M. B. Bhatti (1993). Yield and quality of various varieties of oats. Pakistan J. Sci. Ind. Res. 36: 258-260.

Habib, G., T. Ahmad, I. Saba and N. Akhtar (2003). Gentoype variation in the yield and nutritive quality of oats fodder. Sarhad J. Agric. 19: 419-422.

Nawaz, N., A. Razzaq, Z. Ali and M. Yousaf (2004). Performance of different oat (*Avena sativa* L.) varieties under the agro-climatic conditions of Bahawalpur-Pakistan. Int. J. Agric. Biol. 1560-8530/2004/06-4: 624-626.

Kim, D. A. and S. Seo (1988). Comparative study of introduced oats for forage production, growth characteristics and yield of spring oats. Korean J. Anim. Sci. 30: 269-275.

Steel, R. G. D., J. H Torrie and D. A. Dickey (1997). Principles and procedures of statistics. A biochemical approach (3nd ed.) McGraw Hill Book Co.Inc., New York, USA.

Zaman, Q. M., N. Hussain, A. Aziz and K. Hayat (2006). Performance of high yielding oats varieties under agro-climatic conditions of D. I.Khan . J. Agric. Res. 44: 29-36.