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Evaluation of Different Varieties of Oats for Green Fodder Yield Potential

¹Muhammad Naeem, Muhammad Arif Khan, Muhammad Shahid Munir Chohan,
Ahmad Hassan Khan and Sultan Salahuddin

¹Pakistan Agricultural Research Council, Islamabad, Pakistan
Ayub Agricultural Research Institute, Faisalabad, Pakistan

Abstract: Seventeen varieties of oats including a check were evaluated for green fodder yield potential. Significant differences ($p < 0.05$) were observed for plant height (102.78-127.67 cm), number of tillers per meter (85-114.33), leaf area (52.32-91.30) and green fodder yield, while differences for number of leaves per tiller were non significant. The variety reil produced the highest green fodder yield, of 83.95 t ha⁻¹ followed by No.646 (81.17 t ha⁻¹), jasper (80.86 t ha⁻¹) and foot hill (80.25 t ha⁻¹). The check variety local Sargodha produced a green fodder yield of 66.05 t ha⁻¹.

Key words: *Avena sativa* L., varieties, yield, plant characters

Introduction

Cultivated oats (*Avena sativa* L.) is an important winter fodder crop of both irrigated and rainfed areas of Pakistan. Many cultivars of oats are of high feed value if cut at the flowering stage or soon after. The demand for meat, milk, butter and their by-products is increasing due to rapidly growing human population in Pakistan. Although 1/6th of the total cropped area of Pakistan is under the cultivation of fodder crops annually still the animals are generally underfed resulting in poor performance (Hussain *et al.*, 1993). Therefore, to run an efficient livestock industry high yielding and more nutritious oat cultivars that can feed more animals are needed.

Singh and Singh (1992) evaluated eleven oat cultivar and reported that JHO 811 produced the highest green fodder yield of 55 t ha⁻¹ followed by JHO816 (54.3 t ha⁻¹) and JHO817 (53.9 t ha⁻¹). Kumar *et al.* (1992) reported that the variety kent was superior in fodder yield as compared to local varieties. Weilenmann *et al.* (1992) reported the performance of two varieties of oats namely edo and tomba. Edo was an early lodging resistant variety with a yellow lemma while tomba was lodging resistant but with white lemma. Both varieties were found suitable for green fodder production. Tabata *et al.* (1992) reported that oat variety akiwase was suitable for fodder production with longer and stiffer culms. It had larger panicles than the Australian cultivar West. Akiwase was extremely early maturing with vigorous early growth. It headed at about the same time as West but matured ten days earlier. It gave more green fodder yield than those of West, Zenshin and Ohotsuku. Bhatti *et al.* (1992) evaluated thirteen promising cultivars of oats and reported that PD2LV65 and S-81 were superior to all the other cultivars in plant height, tillers per plant, stem thickness, leaves per tillers, leaf area, green fodder yield and dry matter yield.

Hussain *et al.* (1993) evaluated fifteen indigenous and exotic varieties of oats. The cultivar No.725 proved its superiority over all the other cultivars. This cultivar produced tall plants, greater number of tillers per plant, more leaves and leaf area, highest green fodder and dry matter tonnage as compared to all other varieties. Therefore, it was recommended for general cultivation. Mufti *et al.* (1996) tested ten promising cultivars of oats and found significant differences for plant height, number of tillers per meter, stem thickness, leaves per tiller, leaf area, green fodder yield, dry matter, days to harvesting and protein contents. Parkash *et al.* (1997) observed the performance of nine oat varieties with the reference variety Kent. Highest green fodder yield was shown by OS-6 followed by OS-92, OS-96, JHO-828, OS-134, OL-125, Kent, JHO-829, OL-113 and UPO-94. Naeem *et al.* (2002) evaluated eleven varieties of sorghum for their green fodder yield potential and its components. They observed that green fodder yield ranged from 18.06 to 69.44 t ha⁻¹. Number of leaves per plant varied from 9.0 to 13.78 while plant height ranged from 101.11 to 209.40 cm. Leaf area varied from 264.12 to 379.44 cm² and stem thickness ranged from 1.1 to 1.67 cm.

This study was therefore conducted to identify high green fodder yielding varieties of oats.

Materials and Methods

Sixteen varieties of oats viz; reil, No.646, jasper, foothill, Nile, valley, No.663, steel, S-99, PD2LV65, local Sheikhupura, marlu, winjardo, hakae, superlate, murray and a check variety local Sargodha were planted at Fodder Research Sub-station, Ayub Agricultural Research Institute, Faisalabad during rabi 2000-2001. The design of the trial was randomized complete block with three replications. Each plot consisted of 6 rows, 6 m long and 30 cm apart and thus having a plot size of 10.8 m². Seed rate used was 75 Kg ha⁻¹. Fertilizers were applied @ 75-50-00 NPK kg ha⁻¹. The trial was planted on 11.11.2000 and harvested on 13.03.2001 on the completion of 50% flowering. In total four irrigations were applied during the entire period of crop growth. Data for the following plant characteristics were recorded:

Plant height (cm), number of tillers per meter, number of leaves per tiller, leaf area (cm²) and green fodder yield (t ha⁻¹).

The data recorded was statistically analysed using the analysis of variance technique and least significant differences at 5% probability level (Steel and Torrie, 1980)

Results and Discussion

Data (Table 1) showed that significant differences ($p < 0.05$) were observed for plant height, it ranged from 102.78 cm (Murray) to 127.67 cm (Reil). The variety No.646 (126.89 cm) ranked second

Table 1: Data regarding yield and yield parameters of different varieties of oats

| Varieties | Plant height (cm) | No. of tillers Per meter | No. of leaves per tillers | Leaf area (cm ²) | Green fodder yield (t ha ⁻¹) |
|-----------------|-------------------|--------------------------|---------------------------|------------------------------|--|
| Reil | 127.67 | 114.33 | 9.00 | 75.48 | 83.95 |
| No.646 | 126.89 | 114.00 | 8.89 | 72.84 | 81.17 |
| Jasper | 124.33 | 113.00 | 8.89 | 67.17 | 80.86 |
| Foot hill | 122.33 | 112.00 | 8.89 | 67.07 | 80.25 |
| Nile | 110.22 | 110.78 | 8.44 | 57.95 | 79.01 |
| Valley | 120.89 | 105.56 | 8.56 | 67.78 | 76.54 |
| No.663 | 120.22 | 106.67 | 8.89 | 69.35 | 73.46 |
| Steel | 114.11 | 107.33 | 8.22 | 69.31 | 73.15 |
| S-99 | 118.33 | 107.00 | 8.56 | 68.09 | 72.84 |
| PD2LV65 | 120.78 | 106.00 | 8.78 | 91.30 | 72.22 |
| Local | 109.89 | 105.00 | 8.56 | 52.32 | 69.75 |
| Sheikhupura | | | | | |
| Local | 119.22 | 102.00 | 8.89 | 56.28 | 66.05 |
| Sargodha(check) | | | | | |
| Marlu | 122.00 | 105.33 | 8.89 | 69.92 | 64.83 |
| Vinjardae | 110.67 | 105.34 | 8.22 | 71.81 | 64.81 |
| Hakae | 112.45 | 93.89 | 8.22 | 73.05 | 57.41 |
| Superlate | 113.22 | 90.00 | 8.22 | 75.40 | 54.32 |
| Murray | 102.78 | 85.00 | 8.22 | 68.68 | 46.29 |
| LSD(0.05) | 10.31 | 8.50 | NS | 8.37 | 11.51 |
| CV (%) | 6.34 | 5.85 | 4.68 | 8.75 | 11.79 |

Naeem *et al.*: *Avena sativa* L., varieties, yield, plant characters

in plant height followed by Jasper (124.33 cm) and Foot hill (122.33 cm). Check variety local Sargodha was 119.22 cm tall. Bhatti *et al.* (1992), Hussain *et al.* (1993), Mufti *et al.* (1996) and Naeem *et al.* (2002) reported similar results. The variety reil produced highest number of tillers per meter (114.33) closely followed by No.646 (114), jasper (113) and foot hill (112). Check variety local Sargodha produced 102 tillers per meter, while murray (85) produced the lowest number of tillers per meter. Bhatti *et al.* (1992), Hussain *et al.* (1993) and Mufti *et al.* (1996) made similar findings. Reil produced maximum numbers of leaves per tiller (9) closely followed by No.646, jasper, foot hill, No.663, local Sheikhpura and check variety local Sargodha each producing an identical number of leaves (8.89) per tiller. Bhatti *et al.* (1992), Hussain *et al.* (1993) and Mufti *et al.* (1996) also reported similar findings.

Leaf area varied from 52.32 (Local Sheikhpura) to 91.30 cm² (PD2LV65). Reil (75.48 cm²) ranked second in leaf area closely followed by superlate (75.40 cm²). The check variety local Sargodha showed a leaf area of 56.28 cm². Bhatti *et al.* (1992), Hussain *et al.* (1993), Mufti *et al.* (1996) and Naeem *et al.* (2002) also reported similar results.

Reil (83.95 t ha⁻¹) ranked top in green fodder yield followed by No. 646 (81.17 t ha⁻¹), jasper (80.86 t ha⁻¹), foot hill (80.25 t ha⁻¹) and Nile (79 t ha⁻¹). Check variety local Sargodha produced a green fodder yield of 66.05 t ha⁻¹ while murray produced the lowest green fodder yield of 46.29 t ha⁻¹. Chaudhary *et al.* (1985), Irwin (1991), Singh and Singh (1992), Kumar *et al.* (1992), Weilenmann *et al.* (1992), Tabata *et al.* (1992), Bhatti *et al.* (1992), Hussain *et al.* (1993), Mufti *et al.* (1996), Parkash *et al.* (1997) and Naeem *et al.* (2002) also reported similar results.

In conclusion, the varieties reil, No. 646, jasper, foot hill and Nile possess very high green fodder yield potential and could be considered for general cultivation.

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