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# PHENOTYPIC STABILITY ANALYSIS FOR FODDER YIELD AND CRUDE PROTEIN IN YIELD OAT

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## ABSTRACT

Ten genotypes were tested at four locations to determine the stability in fodder yield and crude protein yield in oat. The differences among the genotypes and environment were highly significant. Genotypes OS 6, UPO 272 and JHO 2001-1 for fodder yield and Kent, JO 6, JHO 2001-3 for crude protein yield were average responsive and stable. OL 125, SKO 12 and SKO 20 were responsive and unstable for fodder yield. Genotypes SKO 20, SKO 12 and JHO 2001-2 were responsive to favorable condition and stable for crude yield. These genotypes can be potential donor for improvement in fodder yield with better quality and stability in oat.

**Key words:** Phenotypic stability, fodder yield, crude protien, oat.

Oat is an important fodder crop of northern and central India. The relative performance of existing varieties different from location to location and over year by the influence of environment conditions. There is therefore urgent need to examine the stability of genotypes for fodder yield in order to develop high yielding varieties with stable performance. The information on this aspect is rare in oat. An attempt was therefore made in this study to determine the stability of fodder yield and cure protein yield in ten genotypes of oat by regression analysis technique.

Ten genotypes including Kent and OS 6 as national check were evaluated in randomized complete block design with there replication at four location viz., Jabalpur, Rahuri Uralikanchan and anand during rabi season of 2002-03. Each genotypesa was sown in ten rows plot to 0.4m length and row- to- row distance of 22.5m. Recommended agronomical practices were adopted for optimum crop growth and better harvest for fodder yield. The inner eight rows were harvested to record the fodder yield (kg/ha), which was converted into fodder yield (q/ha). The dry sample of fodder was used for estimation of nitrogen content by the method described in AOAC (1965). The estimated nitrogen content was multiplied by factor 6.25 to determine the protein percentage and consequent crude protein yield (q/ha). The method of Berhart and Russel (1966) was adopted for stability analysis. The analysis was carried out by using statistical package IRRISTAT developed at International Rice Research Institute, Manila, Phillipines.

The analysis of variance (Table-1) revealed significant differences among the genotypes and environments for fodder yield and crude protein yield. It further indicates the presence of sufficient variability among the genotypes and environments. The mean square for genotypes x environment interaction was also significant for both the traits. It indicates the differential response of genotypes in different environment, hence satisfying the requirements of stability analysis.

OL 125 recorded the highest fodder yield (660.60 q/ha) but it was responsive to favorable conditions and unstable having greater than one regression coefficient and high estimates of deviation from regression. Similarly, the second third tanking genotypes SKO 1.2 and SKO 20 were responsive to favourable condition and unstable. OS 6, JHO 2001-1 and UP 272 were average yielder, average responsive to change in environment and stable for fodder yield. These genotypes also showed the maximum estimates of $R^2$. These genotypes can be recommended for general cultivation in order to stabilize the productivity in fodder oat.

**Table -1: Stability analysis of variance for fodder yield and crude protein yield in oat**

| Source of variation | d.f. | Fodder yield (q/ha) | Crude protein yield (q/ha) |
|---|---|---|---|
| Environment | 3 | 47273.91** | 105.28** |
| Genotypes | 9 | 2842.67** | 4.60** |
| Genotype x environment | 27 | 2985.54** | 4.17** |
| Heterogenity | 9 | 1018.18* | 3.20** |
| Deviation | 18 | 3969.23** | 4.65** |
| Error | 80 | 960.03 | 0.88 |

* and ** significant at 5 and 1 percent level respectively

Crude protein yield ranged from 10.6 to 14.78 q/ha. Genotypes SKO 12 followed by Kent and SKO 20 recorded the maximum crude protein yield. However, Kent, JO 6 and JHO 2001-3 were average responsive and stable for this character having unit regression coefficient and deviation from regression around zero. Genotypes SKO 12, SKO 20 and JHO 2001-1 were responsive to favourable conditions and stable for crude protein yield.

It can be concluded from present study that genotypes OSD 6, UPO 272 and JHO 2001-1 for fodder yield and Kent. JO 6 and JHO 2001-3 for crude protein yield were average responsive and stable. Similarly, OL 125, SKO 12 and SKO 20 were responsive to favorable condition for crude yield. These genotypes can be used in fodder breeding programme in order to transfer the stability/ responsiveness in high yielding genetic background of oat. The study further suggests the testing of large number of genotypes over years and locations in order to identify the stable genotypes.

**Table -2: Stability parameters for fodder yield and crude protein yield in oat**

| S.No. | Genotypes | Fodder yield (q/ha) | | | | Crude protein yield (q/ha) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Regression coefficient (bi) | Deviation from regression ($S^2di$) | $R^2$ | Mean | Regression coefficient (bi) | Deviation from regression ($S^2di$) | $R^2$ |
| 1. | SKO 12 | 658.88 | 1.23 | 1758.70 | 18 | 14.78 | 1.45 | 1.00 | 76 |
| 2. | SKO 20 | 631.57 | 1.19 | 6364.21 | 4 | 13.35 | 1.27 | 1.16 | 50 |
| 3. | JHO 2001-1 | 624.40 | 0.75 | 469.26 | 49 | 12.73 | 0.73 | 4.13 | 21 |
| 4. | JHO 2001-2 | 631.35 | 0.90 | 6163.01 | 1 | 12.93 | 1.37 | 3.22 | 40 |
| 5. | JHO 2001-3 | 637.82 | 1.14 | 8348.10 | 2 | 13.00 | 1.06 | 0.67 | 7 |
| 6. | JO 6 | 833.27 | 1.17 | 2671.34 | 7 | 13.00 | 1.05 | 8.17 | 0 |
| 7. | UPO 272 | 696.08 | 0.66 | 920.00 | 47 | 10.60 | 0.74 | 5.29 | 16 |
| 8. | Kent | 636.97 | 0.82 | 1715.36 | 12 | 13.65 | 0.42 | 9.35 | 36 |
| 9. | OS | 607.52 | 0.71 | 295.59 | 67 | 12.18 | 0.87 | 6.62 | 4 |
| 10. | OL 125 | 660.60 | 1.45 | 7017.64 | 17 | 12.65 | 1.04 | 2.24 | 1 |
| | Mean | 631.9 | 1.00 | | | 12.91 | 1.00 | | |

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