Indian J. Pl. Genet. Resources 9(2): 269-271, 1996

VARIATION FOR QUANTITATIVE TRAITS IN OAT GERMPLASM

N.K. Singh* and S.N. Mishra

Department of Plant Breeding
G.B. Pant University of Agriculture and Technology,
Pantnagar, Distt. Nainital (U.P.)

Evaluation of 2576 oat germplasm in augmented design showed high range and per cent range of variation for grains/panicle, leaf width, 100-groat and grain weight, and leaf length. Panicle length, seed width, plant height and seed length exhibited medium range as well as per cent range of variation, however, less variations were observed for 50 per cent heading and maturity. Classification of germplasm based on frequency distribution into different classes revealed that majority of the genotypes concentrated towards mean. Both the extreme types of classes consisted of less number of genotypes.

Key words: Variability, germplasm, oat

Successful crop improvement programme depends upon the amount of variability either created or which already existed in the breeding material for valuable component traits. Germplasm serves as the most valuable reservoir of variability on which selection can be made directly for evolving superior genotypes or it may be used in hybridization programme. In view of above, the present investigation was undertaken to survey the extent of variation and classification of germplasm into different classes.

MATERIALS AND METHODS

The material used for this study comprised of 2576 oat germplasm alongwith three check varieties evaluated in augmented design in 1991-1992 at G.B. Pant University of Agriculture and Technology, Pantnagar. The experimental area was divided into 23 blocks of 112 test genotypes plus three check varieties plots. Randomization was done for checks only. Plot size comprised of single row of one meter length with inter row distance of 40 cm. The observations were recorded on days to 50% heading, leaf length and

**Present address*: Defence Agricultural Research Laboratory, Panda, Pithoragarh-262501 (U.P.)

width, plant height, days to maturity, panicle length, grains/panicle, seed length and width, and 100-grain and groat weight.

Each observation was adjusted for block effects according to augmented design analysis (Peterson, 1985). Range was estimated by taking the lowest and highest value for each trait. Germplasm were classified into different classes on the basis of frequency distribution.

RESULTS AND DISCUSSION

Evaluation of 2576 oat germplasm showed considerable degree of variation for different characters (Table 1). Range as well as per cent range of variation observed was highest for grains/panicle, leaf width, 100-groat weight, 100-grain weight and leaf length. These traits might be expected to be more responsive to selection because of high magnitude of variations.

Table 1. Mean, range and percent range of variation for different quantitative traits.

Characters	Mean	Range of variation	Percent range of variation
Days to 50% heading	108.59	86.26-125.26	100.0-145.21
Leaf length (cm)	39.15	15.95-61.34	100.0-384.64
Plant height (cm)	119.33	66.62-170.96	100.0-256.62
Days to maturity	149.09	124.22-159.88	100.0-128.71
Panicle length (cm)	28.22	13.00-40.67	100.0-312.85
Grains per panicle	60.17	27.54-128.54	100.0-466.74
Seed length (mm)	13.26	8.58-17.15	100.0-199.88
Seed width (mm)	2.77	1.44-4.47	100.0-310.42
100-grain weight (gm)	3.58	1.55-6.40	100.0-412.90
100-groat weight (gm)	2.63	1.10-4.50	100.0-414.54

On the other hand, heading and maturity duration showed narrow range of variation which may be restricted to certain degree in response to selection. Variability for panicle length, seed width, plant height and seed length were moderate as shown by range as well as per cent range of variation. In general, characters like grains/panicle, leaf width, 100-groat weight, 100-grain weight, leaf length, panicle length, seed width, plant height and seed length provide base of diverse forms upon which effective selection can be practiced for isolation of desirable type for direct use or as a parents in hybridization

programme. These results were in general agreement with those of Frey (1965), Sampson (1971), and Rahman and Roquib (1987).

Classification of 2576 oat germplasm based on frequency distribution showed the pattern of distribution into different classes. The distribution pattern indicated that most of the lines were occupied the intermediate classes. The maximum frequency class was, in general, median class i.e. the lines of this class were distributed around the mean value. However, the genotypes occurred in extreme classes are expected to have contrasting feature and widely distributed to mean value. Thus grouping into different classes showed a general pattern of divergence of the traits.

Comparison of test materials with the best check showed that 169 and 426 genotypes were earlier in heading and maturity period, respectively. The lines with longer leaves were 65 while 55 lines showed broader type of leaves. Tall type of statured was found in 105 lines while 223 lines showed short statured. Longer panicles and more number of grains were recorded in 187 and 270 lines, respectively. Longer and broader seeds were shown by 38 and 63 lines, respectively. Plants with maximum 100-grain and 100-groat weight were 51 and 52, respectively. These lines may be used in oat improvement programme.

REFERENCES

Frey, K.J. 1965. The utility of hill plots in oat research. *Euphytica*, **14**: 196-208.

Petersen, R.G. 1985. Augmented design for preliminary yield trials (revised). *Rachis*, **4**: 27-32.

Rahman, R. and Roquib, M.A. 1987. Genetic variability in Fodder oats (*Avena sativa* L.). *Environ. Ecol.* **5**: 747-750

Sampson, D.R. 1971. Additive and non-additive genetic variance and genotypic correlation for the yield and other traits in oats. *Can. J. Genet. Cytol.*, **13**: 864-872.