

ON WHEAT (*TRITICUM AESTIVUM* L. EM THELL.) BREEDING

Shri Niwas Singh* and Utkarsh Tiwari

Department of Genetics & Plant Breeding,
B.R.D. P.G. College, Deoria, Uttar Pradesh – 274001, India.

Email: singhshriniwas769@gmail.com

Received-04.07.2020, Revised-26.07.2020

Abstract: A small data set on wheat breeding is used here to demonstrate a nonparametric statistical analysis to select desirable plant types. Only six varieties in three replications were evaluated on nine parameters. The proposed selection procedure has the flexibility to consider any combination of parameters and gives a preference order of selected plant types. The selection was carried out in two steps: 1. calculation of ranks of each genotype and summing the ranks to find cumulative ranks, and 2. normalizing the cumulative ranks by minimum value to find a preference order of genotypes by sorting the normalized cumulative ranks. The two steps are represented by the following set of two formulae: 1. $CR = \sum_{i=1}^n Ri$ and 2. $NCR = CR/CR_{min}$, where, CR = cumulative rank; NCR = normalized cumulative rank; R = Rank; n = number of parameters/characters evaluated. The values of NCR range from one to CR_{max}/CR_{min} . The higher values of NCR indicate the worst genotypes and range is an indicator of diversity evaluated. The NCR values near one indicate the most desired genotypes. In this example, the whole preference order is 1. HD3086, 2.Goal, 3.HD2967, 4.PBW502, 5.PBW343 and 6.NABI-BW. Crisscross planting, flowering synchronization and suitable modifications in crossing technique were also suggested for wheat breeding.

Keywords: Crop ideotype, Normalized cumulative ranks, Selection, Wheat breeding

REFERENCES

Altpeter, F., Vasil, V., Srivastava, V., Stöger, E. and Vasil, I.K. (1996a). Accelerated production of transgenic wheat (*Triticum aestivum* L.) plants. *Plant Cell Rep.* 16: 12-17.

Altpeter, F., Vasil, V., Srivastava, V. and Vasil, I.K. (1996b). Integration and expression of the high-molecular-weight glutenin subunit 1Ax1 gene into wheat. *Nature Biotech.* 14: 1155-1159.

Huber, M., Hahn, R. and Hess, D. (2002). High transformation frequencies obtained from a commercial wheat (*Triticum aestivum* L. cv. 'Combi') by microbombardment of immature embryos followed by GFP screening combined with PPT selection. *Molecular Breeding* 10: 19–30.

Thomas, H. (1975). The growth response of weather simulated vegetative swards of single genotype of *Lolium perenne*. *The Jn. Of Agl. Sci.* 84: 333-343.

Singh, S.N. (2017). Normalized Cumulative Ranks for

Plant Breeding: An Example. *Frontiers in Crop Improvement Journal*, 5 (Special Issue): 304-306.

Singh, S. N. (2018). Normalized Cumulative Ranks for Rice Breeding: An Example. In *Practices For Sustainable Development*. ANU BOOKS, Meerut. Pages. 34-42.

Donald, C.M. (1968). The breeding of crop ideotypes. *Euphytica* 17: 385-403.

Rasmuson, D.C. (1987). An evaluation of ideotype breeding. *Crop Sci.* 27: 1140-1146.

Chandler and Robert, F. Jr. (1969). Plant Morphology and Stand Geometry in Relation to Nitrogen. *Agronomy & Horticulture*, Faculty Publications. 196.

Singh, S. N., Sahu, R.K. and Tarkeshwar (2018). Selection from Quinoa (*Chenopodium quinoa* Willd.) accessions through normalized cumulative ranks. *Progressive Research* 13 (Special Issue): 537-538.

*Corresponding Author