MULTIVARIATE APPROACH IN RECOMMENDATION OF CROP VARIETIES

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ABSTRACT

Recommendations of crop varieties are made mainly based on yield and thus genetic improvements of crop varieties are given more attention towards the yield. However, there are other important aspects related to quality and agronomy needed to be considered in varietal recommendations. Some researchers had given their focus in this direction in the recent past, but the approaches they had used were subjective and do not have proper statistical base. Furthermore, some analyze each trait separately (univariate ANOVA) and draw conclusions which are error bound (Type two error). In addition, performance of a good crop variety should be consistent across locations over different seasons over a period of time. These aspects are usually measured by relative stability, performance and superiority, and are normally been set as goals in all breeding programmes. This study proposes a methodology for varietal selection based on all the important traits using Principal Component Analysis (PCA). The method can provide a solution to the above problem. The eigen values and their vectors from PCA provide the basis to develop a single aggregated index by which the consistency of the crop variety can be investigated. Using this index relative stability, performance and superiority can be computed and accordingly the selection can be done. Rice data sets on 3, 3½ and 4½ month maturity groups in Maha 2001 / 02 and Yala 2002, and large number of locations were used to illustrate the proposed methodology. The traditional univariate analysis (on yield) was also performed for the purpose of comparison. Generalization of the proposed methodology to other selection methods (variance component analysis) is also illustrated by using data from 3 month maturity group in Maha 2002 / 03.