

A mixed model analysis of variance for multi-environment variety trials

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Abstract

Of interest is the analysis of variance (ANOVA) of data resulting from a series of experiments repeated at several environments with the same set of plant varieties. Suppose that the experiments, multi-environment variety trials (as they are called), are all conducted in resolvable incomplete block designs. Adopting the randomization-derived mixed model obtained in Caliński, Czajka, Kaczmarek, Krajewski and Pilarczyk (2005), a suitable ANOVA methodology is considered. Three types of such analysis are proposed. At first, a preliminary ANOVA is devised, such which allows hypotheses concerning the presence of variety by environment (VE) interactions to be tested. Next, two kinds of ANOVA are considered. One for the case of no VE interactions, the other for the more frequent situation when these interactions are present. For each of these three types of ANOVA relevant test procedures are examined. The methods proposed are illustrated by the analysis of results of a series of trials with rye varieties.

References

- Caliński, T., S. Czajka, Z. Kaczmarek, P. Krajewski, and W. Pilarczyk (2005). Analyzing multi-environment variety trials using randomization-derived mixed models. *Biometrics* 61, 448–455.