Advantages of E-BLUP in Zoned-Based Yield Prediction and Ranking

In Sweden, the number of cultivar trials has been decreasing; yet, there is a demand for improving the accuracy of cultivar performance assessment and ranking in different environments.

The question of whether cultivars should be modeled as fixed (BLUE) or random (BLUP) has been discussed in several studies. The argument for modeling cultivar effects as random is that it avoids over-optimistic estimates for the best-performing cultivar and permits borrowing information between zones.

A cross-validation (CV) study, recently published in Crop Science, was done to compare the performance of different linear mixed models that use either empirical best linear unbiased estimation (E-BLUE) or empirical best linear unbiased prediction (E-BLUP) for zone-based cultivar recommendation with a few trials within zones. The mean squared error of prediction (MSEP) differences of CV revealed that the E-BLUP method outperformed the E-BLUE method, increasing the accuracy of zone-based yield prediction and ranking for the tested cultivar.

The use of E-BLUP for routine analysis in cultivar trials is worthwhile since it always performed better than E-BLUE, providing better information for making cultivar recommendations to farmers and selecting cultivars for breeders.


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Idea Factory: The Maize Genomes to Fields Initiative

Increases in agricultural productivity are necessary to meet anticipated demands, and these increases must occur in an environmentally sustainable fashion. This is a large-scale, systematic problem that must be addressed through new ideas across multiple dimensions from research to development to production.

From the research dimension, the maize Genomes to Fields (G2F) Initiative addresses this need by bringing together researchers across diverse disciplines to create discussion environments that generate new ideas for research, development, and education. From there, plans are developed and ideas implemented that seem feasible. A recent article in Crop Science describes the discussions and plans derived from a recent 2018 USDA-NIFA Food and Agriculture Cyberinformatics and Tools (FACT) Initiative Workshop held at Iowa State University entitled, “High Throughput, Field-Based Phenotyping Technologies for the Genomes to Fields Initiative.”

“We believe that readers of Crop Science are very likely to know and interact with researchers across diverse disciplines who have an interest in, and an appreciation for, needed agricultural innovation,” the authors write. “We call on you to spread this message and request that you and your colleagues visit the G2F website at www.genomes2fields.org.”


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