

Unreplicated experiments in early stage breeding programs

Katarzyna Marczyńska and Stanisław Mejza

Poznań University of Life Sciences, Poland

Abstract

In plant breeding trials, during the early stages of the improvement process, it is not possible to use an experimental design that satisfies the requirement of replicating all the treatments because of the large number of genotypes involved, the small amount of seed and the low availability of resources. Hence, the unreplicated designs are used for early generation testing when hundreds or even thousands new genotypes need evaluation in the same trial using a limited amount of seed that is enough for one replicated only. To control the real or potential heterogeneity of experimental units, control (check) plots are arranged in the trial.

There are many methods of using information resulting from check plots. In the paper the main tool of exploring this information will be based on a response surface methodology (RSM). At the beginning we will try to identify response surface characterizing experimental environments. The obtained response surface we will be then used to adjust the observations for genotypes. Finally, so adjusted data will be used for inference concerning the next steps of breeding program. The theoretical considerations will be illustrated with the example dealing with spring barley.