Estimation of Optimum Plot Size and Replicates Number Using Data from Rice Uniformity Trials

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Summary

Efficient testing of treatment differences in field experiments depends on experimental precision. Agronomists constantly have to face the decision of the optimum choice of plot size and replicates number to achieve the best efficiency for their experiments. Too small plots and replicates may give unreliable results; unnecessarily large plots and replicates waste time and resources. The objective of this research was to determine optimum plot size and replicates number by using data from rice uniformity trials in Taiwan Agricultural Research Institute. The trials were subdivided following a criterion of hierarchical classification, simulating various plot sizes. Variances for different plot sizes were estimated. Using the methods of comparison of variances and maximum curvature, the optimum plot size was estimated within a range of 20 to 100 plants that depended on the limit of experimental areas and available resources. Using the Hatheway's method, the true differences of treatments for various combinations of plot size, treatments number and replicates number were used to estimate the optimum replicates number in a randomized complete block design. The optimum replicates number with an adequate plot size was four.

Key words: Rice, Uniformity trial, Plot size, Replicates number, Soil heterogeneity index.

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