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ANALYZING YIELD TRIALS : TAKING OUT SPATIAL VARIABILITY

Daryl T. Bowman
North Carolina State University
Raleigh, NC

Abstract

Uniformity of experimental units within blocks is difficult to achieve in typical cotton field trials. Various analytical methods have been proposed to account for variability. Experimental designs like the lattice are useful ; however they have limitations like restrictions on entry number and randomizations. Experimental analytical procedures like the Nearest Neighbor Analysis (NNA) and the Trend Analysis also account for spatial variability. These methods were examined to determine the most accurate and all have their limitations. Both trend and NNA do not account for plot to plot variability but assume smooth changes in spatial variability. Thus plots that are unique within a small area of several plots may be unduly adjusted in the wrong direction. A modified version of the NNA was designed to eliminate these adjustments. Typically in the NNA each plot is adjusted by the average of the residuals of the adjoining plots. The residual is the plot value minus the mean for that entry. Unique plots have residuals that have the opposite sign of the average of the adjoining residuals thus they should not be adjusted in that direction. The modified NNA sets the adjustment or covariate to 0 whenever this occurs in the data set. After one iteration the modified NNA produced EMS much lower than the NNA. After two iterations the EMS were almost the same between the two versions of NNA. The number of iterations allowed in NNA should be negatively correlated to the number of reps. Bartlett suggests that 3 replicates of data would need 6 iterations. Therefore 4 replicates of data would require only 5 iterations, and 5 replicates would require 4 iterations.