THE USE OF PLANT MAPPING TECHNIQUES TO ASSESS SPATIAL VARIABILITY IN COMMERCIAL COTTON PRODUCTION

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Abstract

Spatial variability in plant growth and yield within a field is the result of localized differences in soils, weather, pests or management practices. Measurements of plant development during the growing season can help to integrate these complex interactions into individual parameters. Geographic display of plant growth parameters can be useful for site specific management of crops. The objective of this paper is to demonstrate the usefulness of plant mapping to assess spatial variability in commercial cotton crops. The study was conducted in 1996 in Kingsville, Texas. A 100 Acre field was systematically divided into twenty cells of approximately five acres each. Plant mapping was done by selecting six plants from each cell, four times during the growing season. The plant mapping program PMAP (Landivar and Benedict, 1996) was used enter and summarize the data. PMAP was modified to produce plant mapping summaries for each cell. Parameters studied included plant height, number of main stem nodes, height to node ratio, total number of fruiting sites, percent retention at position one, percent retention at position two and number of green and open bolls. At the end of the growing season, 30 feet of rows were harvested from each cell to estimate lint yield. The data was used to produce maps displaying the geographic variability in plant growth parameters in the field. Spatial distribution maps showed that number of mainstem nodes, height to node ratio and percent retention at positions one and two were not well correlated with final yield. However, plant height and total number of fruiting sites were the best indicators of yield potential early in the season. We concluded that plant mapping software such as PMAP can be useful to generate geographical distribution maps of plant growth parameters. The data can be also used to validate yield monitoring harvest equipment, remote sensing maps and crop simulation models.

References

Landivar, J. A. and J. H. Benedict. 1996. Monitoring System for the Management of Cotton Growth and Yield. Bull. B2. Texas A&M University Agricultural and Extension Center, Corpus Christi, Texas.

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