PARAMETERS ASSOCIATED WITH SPATIAL CHANGE ACROSS SWEETPOTATO FIELDS. M.W. Shankle, J.T. Reed, J.L. Main, and D.F. Fleming; Mississippi State University, Pontotoc Ridge-Flatwoods Branch Experiment Station, Pontotoc, MS and Department of Entomology and Plant Pathology, Mississippi State, MS.

ABSTRACT

Since sweetpotato (*Ipomoea batatas*) is a high value crop, it has the potential to reap rewards from the investment in the time, effort, and equipment needed for site-specific management than do crops of less value. Sweetpotato variability is prevalent in both total yield and proportion of the most valuable USDA No. 1 grade roots. The agricultural system as a whole is also a complex system of soil, water, air, topography, nutrients, pests, microorganisms, and many other parameters. Some parameters of the agroecosystem can be managed by people for purposes of agriculture production, while others can only be consequential to the decision-making processes important in site-specific technology. Remotely sensed imagery is useful in management zone delineation and crop modeling can be used to develop prescriptions for site-specific applications to zoned areas. However, a crop model does not exist for sweetpotato production. Since sweetpotato is notorious for variability, basic input rates needed for maximum productivity, maximum profit, and minimum adverse environmental affects have not been well documented. Research to date has indicated that some of the sweetpotato yield variability may be due to factors such as weed density and soil pH, P, K, Ca, S, Zn, Cu, Mn, compaction, and organic matter content. These and other important factors affecting sweetpotato production have demonstrated substantial spatial variability in soils representative of those used for the majority of sweetpotato production in Mississippi.

A weed density study indicated that crop canopy coverage was at least 58 and 86% with low weed density treatments at Houlka and Mantee, MS, respectively. This was greater than crop canopy coverage with medium and high weed density treatments. Pigweed (*Amaranthus* spp.) canopy coverage at Houlka, MS was 16% with the low weed density treatment and 56% with the high weed density treatment. Canopy coverage for pigweed at Mantee, MS was 5% with the low weed density treatment and 42% with the high weed density treatment. US No. 1 and total marketable yields were combined across locations. US No. 1 yield was highest with low weed density (493 boxes/A), which was greater than 306 and 238 boxes/A with medium and high weed densities, respectively. Total Marketable yield was also highest with low weed density (705 boxes/A), which was greater than 465 and 389 boxes/A with medium and high weed densities. Digital numbers from high, medium, and low weed density areas of interest (AOI) were generated from a multi-spectral image and used to classify weed density in a producer filed using ERDA Imagine software. US No. 1 grade yield from directed sampling locations in the field were inversely related to weed density.

Field-scale spatial research has been investigated at several producer locations near Vardaman, MS. Fields were mapped, images were collected, and data analyses conducted. Spectral data from imagery, ground-truth data, and sweetpotato yield grades collected from each site within each field were subjected to correlation and stepwise regression analyses. Correlation coefficients for soil properties to US No. 1 grade sweetpotato yield indicate that P, K, Ca, S, and OM (r=0.40, 0.37, 0.38, 0.45, and 0.45, respectively) have the strongest relationship among soil parameters. At the root enlargement stage of development, US No. 1 yield was best describe by tissue boron, potassium, iron, and manganese (R^2=0.76). Similar nutrients across sample dates were soil pH, soil magnesium and tissue nitrogen. Therefore, these parameters require further investigation to determine the likelihood of applying these nutrients to improve uniformity of US No. 1 yield across a field using site-specific applications to within field management zones.