COTTON PLANT HEIGHT BASED ON VIGOR ZONE IMAGERY IN THE NORTHWEST PLAINS OF TEXAS

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Abstract

This two year study evaluated the relationship of commercial imagery based classes and NCRS soil maps to plant height and yield. Biomass indicators have been used for decades based on the Normalized Difference Vegetation Index (NDVI) index. Field scouts can carry the GPS-based maps with NDVI color coded classes to each field site and measure plant parameters (height, development, etc.) based on NDVI vigor zones. Variable rate applications can then be made of various agricultural inputs based on recommendations or predictions from the field measurements. Parameters that are visible from imagery include biomass, soil type, water stress, and nitrogen stress. The accuracy of imagery based classes in an environment with limited field variability (such as the High Plains of Texas) should be tested before recommending variable rate applications based on imagery.

Imagery was collected by Wilbur-Ellis Company (2006) and InTime (2007), and they then classified the images into different vigor groupings. We defined that no more than three classes be identified. Imagery based classes were used to collect field information including plant height and yield. Pocket PC's that are GPS capable and equipped with HGIS software (Integrated Mapping Systems, Star Pal version 5.44) were utilized for "zone scouting". Plant height information by vigor zone and soil type was collected from six fields in 2006 and three fields in 2007. A John Deere 7445 cotton stripper equipped with an Agriplan yield monitor (South Plains Precision Ag Inc, Plainview, TX) was used to harvest strips across the fields. Yield maps were used to determine yield by vigor zone and soil type. Yield data were collected from two fields in 2006 and three fields in 2007.

Imagery based classes did a better job predicting height and yield than using soil types. Both companies which sold the imagery product (Wilbur-Ellis and In-Time) were successful at creating classes that agreed with plant vigor (based on height and yield). There was only an average difference of 2.0 inches between the high and low vigor groups. The yield difference between adjacent vigor groupings were < 10% in 9 of 10 comparisons. Using imagery for management, like variable rate plant growth regulators, still is a difficult proposition. It is unlikely the observed differences in this project justify management by image zone. The vigor groupings are based on such small yield, plant height or biomass differences, that the question of how many classes should a field be broken into to give meaningful management classes still needs an answer.