Processing spatial data for delineating sampling and management zones. (S04-dobermann090248-Oral)

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Abstract:

Site-specific management requires understanding of spatial and temporal variability of soil properties and crop yield. Spatial classification of three fields in Nebraska was performed using prior information that (i) is available at no or little extra cost and (ii) represents stable characteristics measured with different techniques at different times and different vertical and lateral resolution. Data layers for deriving zones with potentially different crop performance included soil mapping units, digital images of bare soil, sensed electrical conductivity, digital elevation data, and historical yield map data. The performance of fuzzy k-means clustering and general hierarchical and non-hierarchical clustering techniques was compared. Sensitivity analysis was performed to evaluate changes in the classification due to different coding of categorical soil data, choice of a fuzzy exponent, and class number. The procedure resulted in a similar interpretation of classes at each site, including a range of classes with continuously varying characteristics as well as a distinctively different class. The latter mainly represented areas affected by specific management operations.

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