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2019 ASA-CSSA-SSSA International Annual Meeting | Nov. 10-13 | San Antonio, Texas

306-2 - Understanding the Spatial Variability of Optimum Nitrogen Rates Using Remote Sensing and on-Farm Precision Experimentation

Tuesday, November 12, 2019

1:50 PM - 2:05 PM

Henry B. Gonzalez Convention Center - 006A

Abstract

The impact of in-field variability on crop yields has been extensively investigated. In contrast, the spatial variability of crop responses to agronomic treatments is less understood. On-farm precision experimentation (OFPE) can be a valuable tool to estimate the in-field variation of optimum input rates and thus improve agronomic decisions. In association with OFPE, remote and proximal sensing tools can provide additional benefits for in-season decisions. The objectives of this study were to investigate the spatial variation in the correlation between vegetation indices (VI's), and the economic optimum nitrogen rates (EONR) in four cornfields in central Illinois. Sentinel-2 images were acquired at side-dress and used to derive VI's. Geographically weighted regression was used to estimate the optimum nitrogen rates after harvest. Geographically weighted summary statistics were used to provide local estimates of correlation coefficients. The correlation varied from positive to negative values in different regions of the field for all tested VI's. The low ability of the VI's in predicting the EONR is likely related to the spectral signature of the leaves being influenced by factors other than N. At side-dressing, the nitrogen applied at pre-planting in addition to the soil supplied nitrogen may supply all the

crop demand up to this point, thus it may be too early to detect any deficiency. The results also indicate that using a single N-rich strip may not be representative of the field response and that using zero-N plots may provide better insights into crop response.

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