

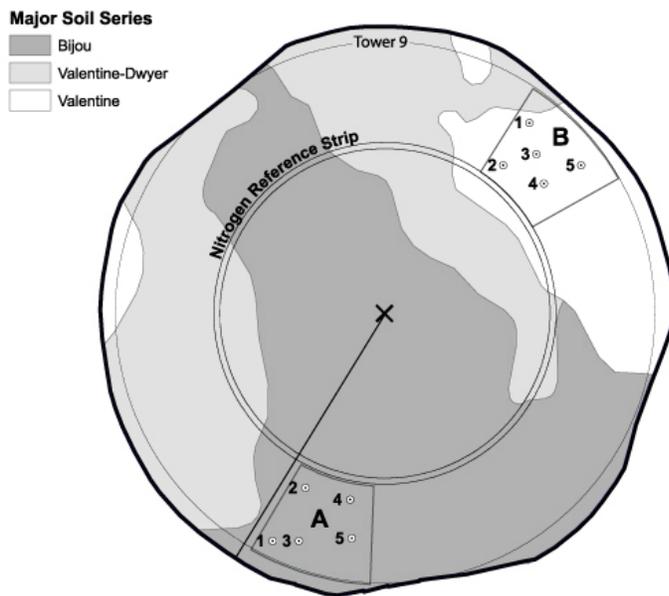
# In-season Nitrogen Management using Remote Sensing

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**OBJECTIVE:** Improve nitrogen use by crops with in-season N management to meet crop needs and to minimize potential leaching of nitrates below the crop root zone.

**APPROACH:** Utilize remote sensing techniques to assess the N status of the crop and then respond to the crops' "need" by applying nitrogen when and where required.

**PAST STUDIES:** Wiggins area ---- center pivot irrigated cornfield.



## RESULTS:

### Fertigation

Wedge A - 43 lb N/ac vs 191 lb N/ac (outside)

Wedge B - 91 lb N/ac vs 191 lb N/ac (outside)

### Yield

201 bu/ac vs 191 bu/ac (outside)

172 bu/ac vs 171 bu/ac (outside)

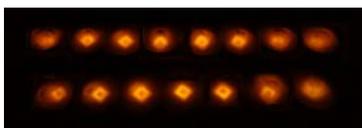
## CONCLUSION:

1. Less cost required to produce the crop for the same yield
2. Less N in the root zone at harvest for potential leaching

**CURRENT STUDIES:** Ft. Collins (ARDEC) and Yuma ---- sprinkler irrigated corn.

Evaluate commercially available active sensors to determine their goodness for monitoring in-season plant N status.

Use the N Reflectance Index (ratio of ***NIR / Vis*** for target to ***NIR / Vis*** from reference strip where ***Vis*** is Green for Exotech and GreenSeeker and Amber for the CropCircle) to assess plant N.



Holland CropCircle

Illuminated area & sensor field-of-view

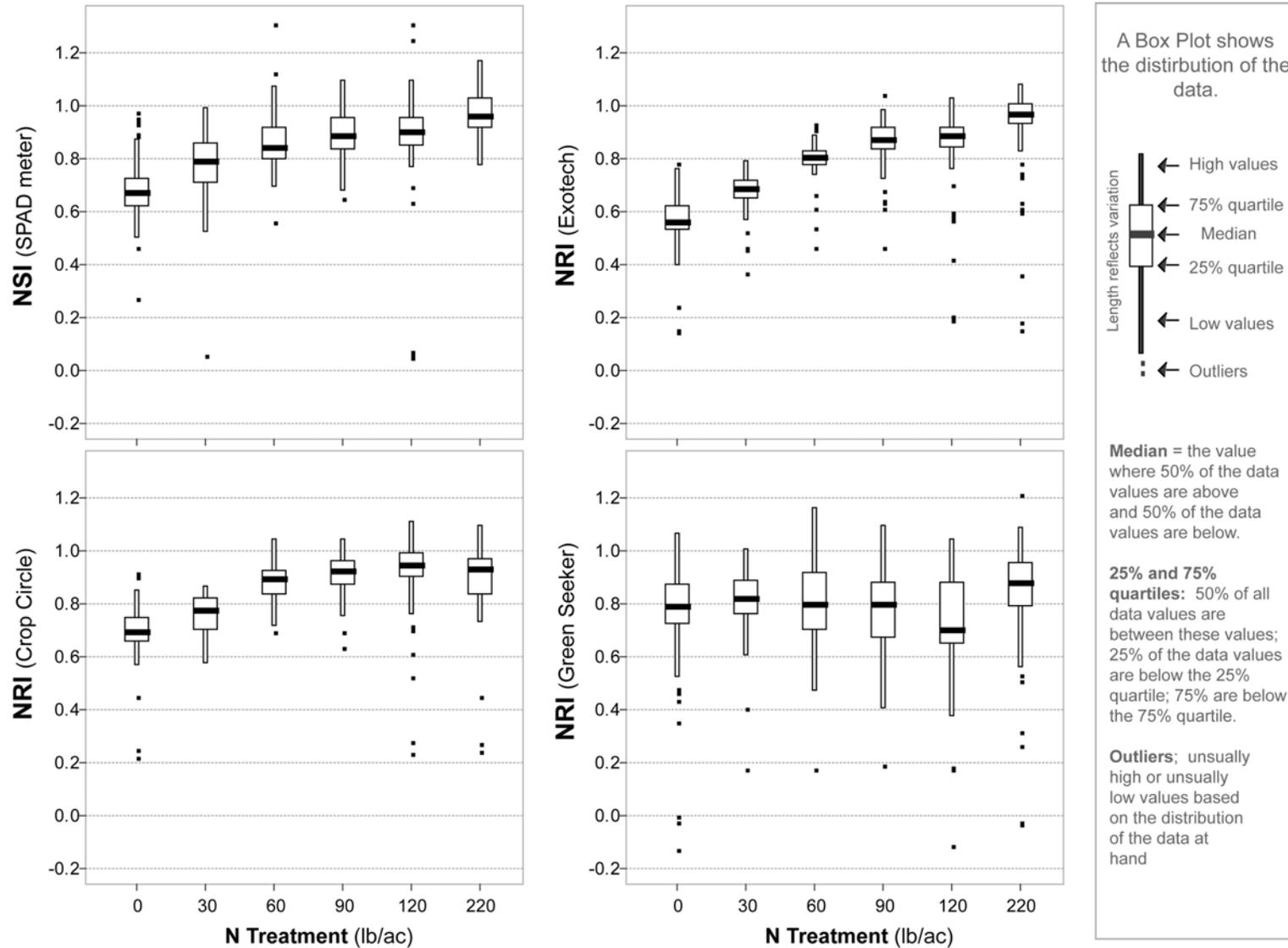


NTech GreenSeeker



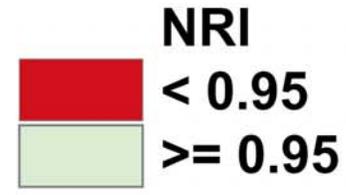
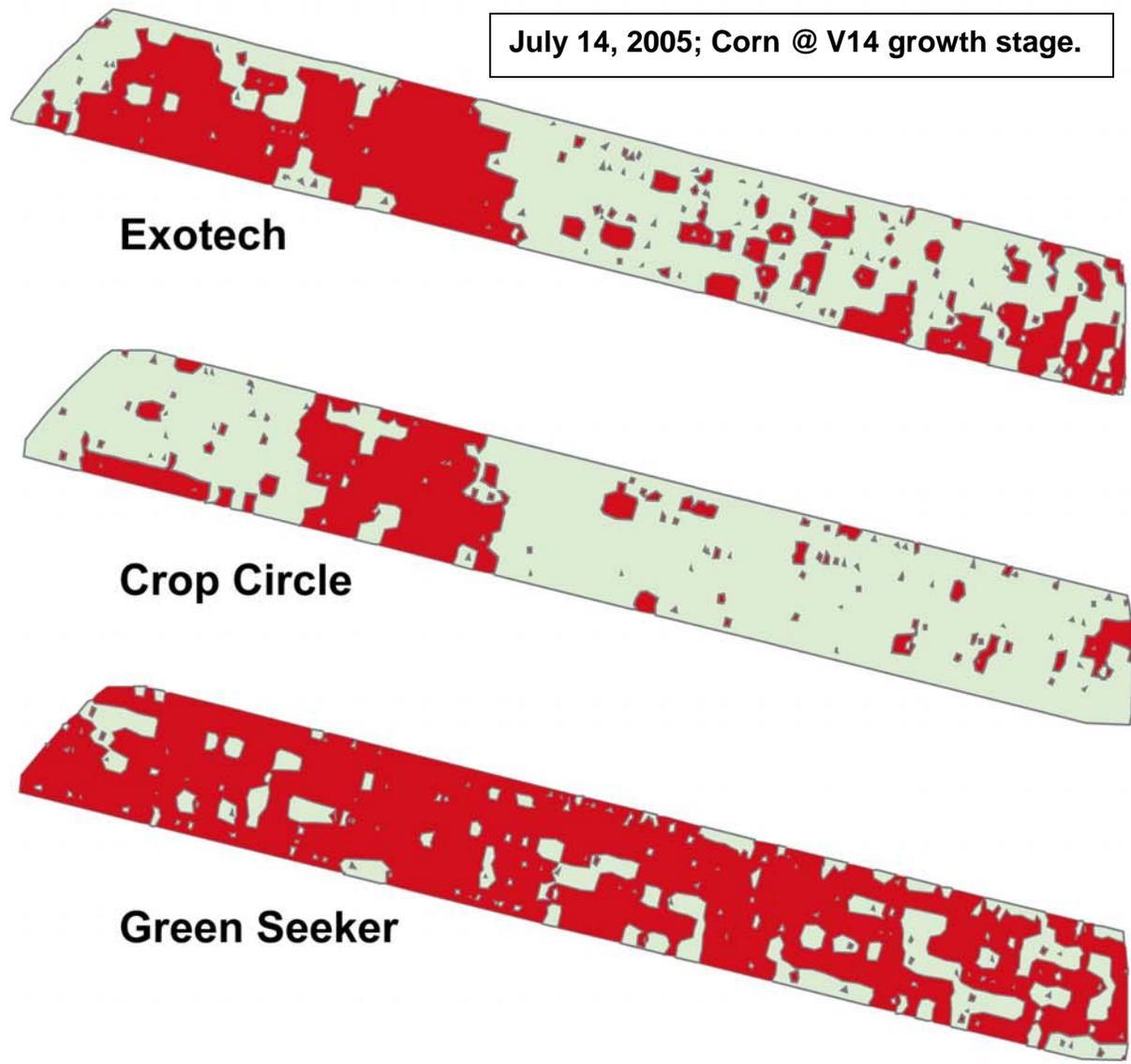
Active sensors have a 45°- view angle; the Exotech radiometer is at 20°.

Sensor response in terms of N Sufficiency Index (NSI) and N Reflectance Index (NRI) to imposed N treatments on irrigated corn. Corn growth stage was early blister. Exotech data acquired from nadir.



Plant N sufficiency maps for study area derived from each sensor (seven data transects through area).

July 14, 2005; Corn @ V14 growth stage.



**N Sufficient:**  $\text{NRI} \geq 0.95$   
**N Deficient:**  $\text{NRI} < 0.95$

