

Introduction:

Previous studies have shown that applying nitrogen (N) fertilizer based on crop "need" may:

- 1) improve N management by decreasing N inputs
- 2) decrease the potential for N leaching
- 3) increase N use efficiency

Plant sensing techniques to access N sufficiency for in-season N management requires enriched N reference strips (areas with well fertilized non-yield limiting rates).

Fields containing variable soils may require reference strips in several areas of the field to minimize over or under application of N.

Objective:

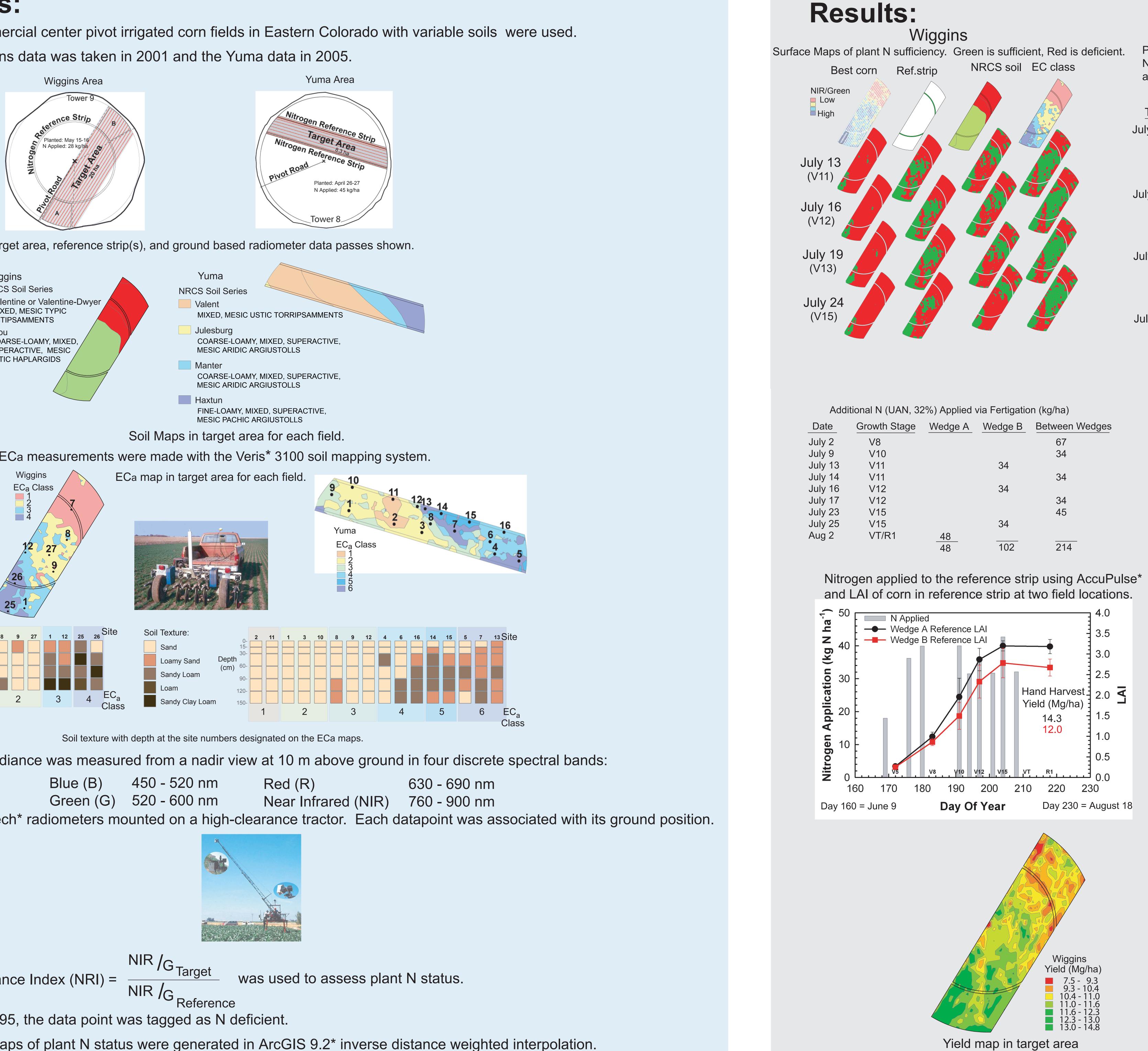
Evaluate four scenarios for locating and utilizing reference strips based on:

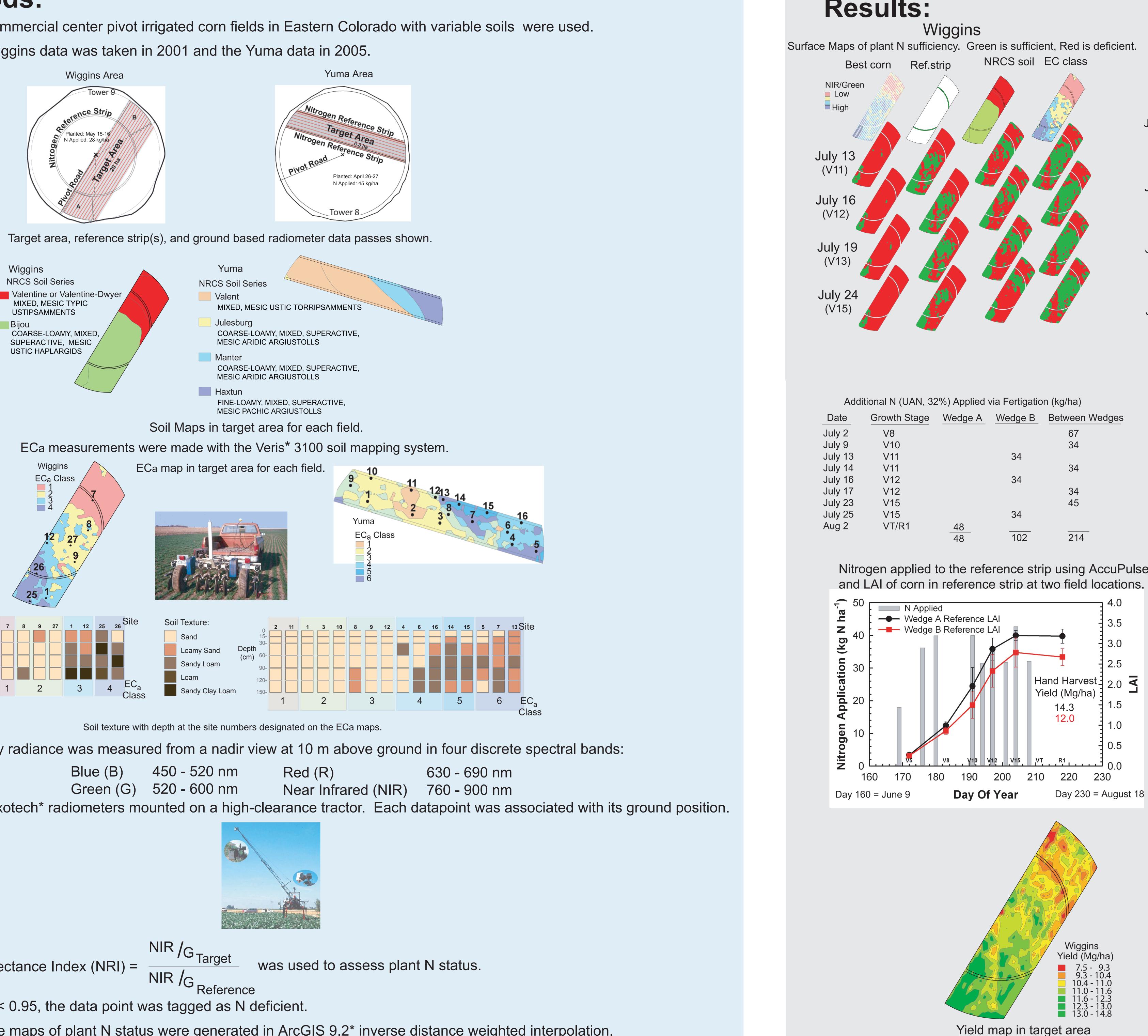
- 1) best crop condition that may exist in the field 2) average value from the reference strip(s)
- regardless of soil differences 3) NRCS soil mapping units
- 4) apparent electrical conductivity (ECa) as a surrogate for soil texture

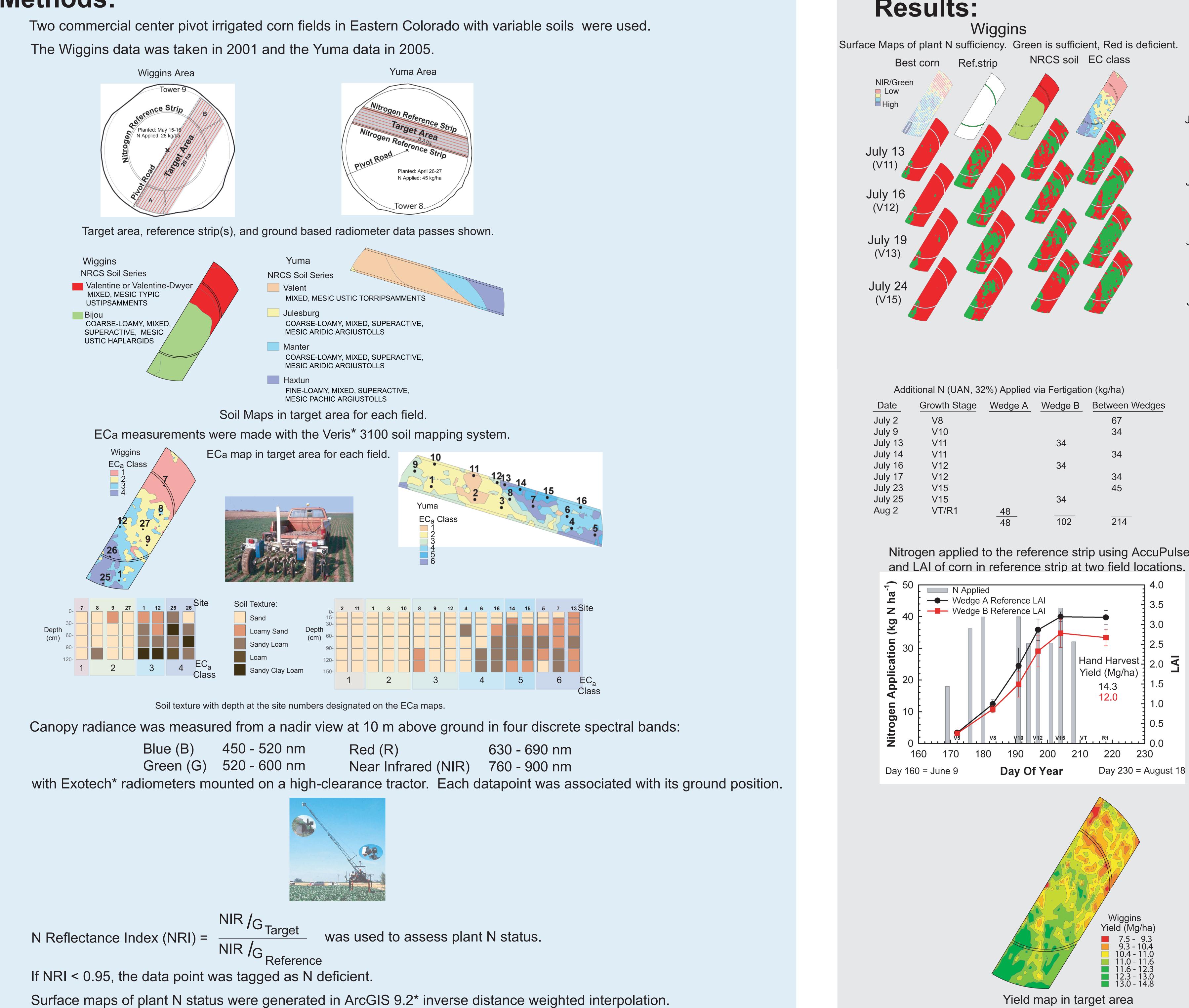


Center pivot with AccuPulse* chemical application system

Methods:







If NRI < 0.95, the data point was tagged as N deficient. Grain yields were obtained with combines equipped with yield monitors.

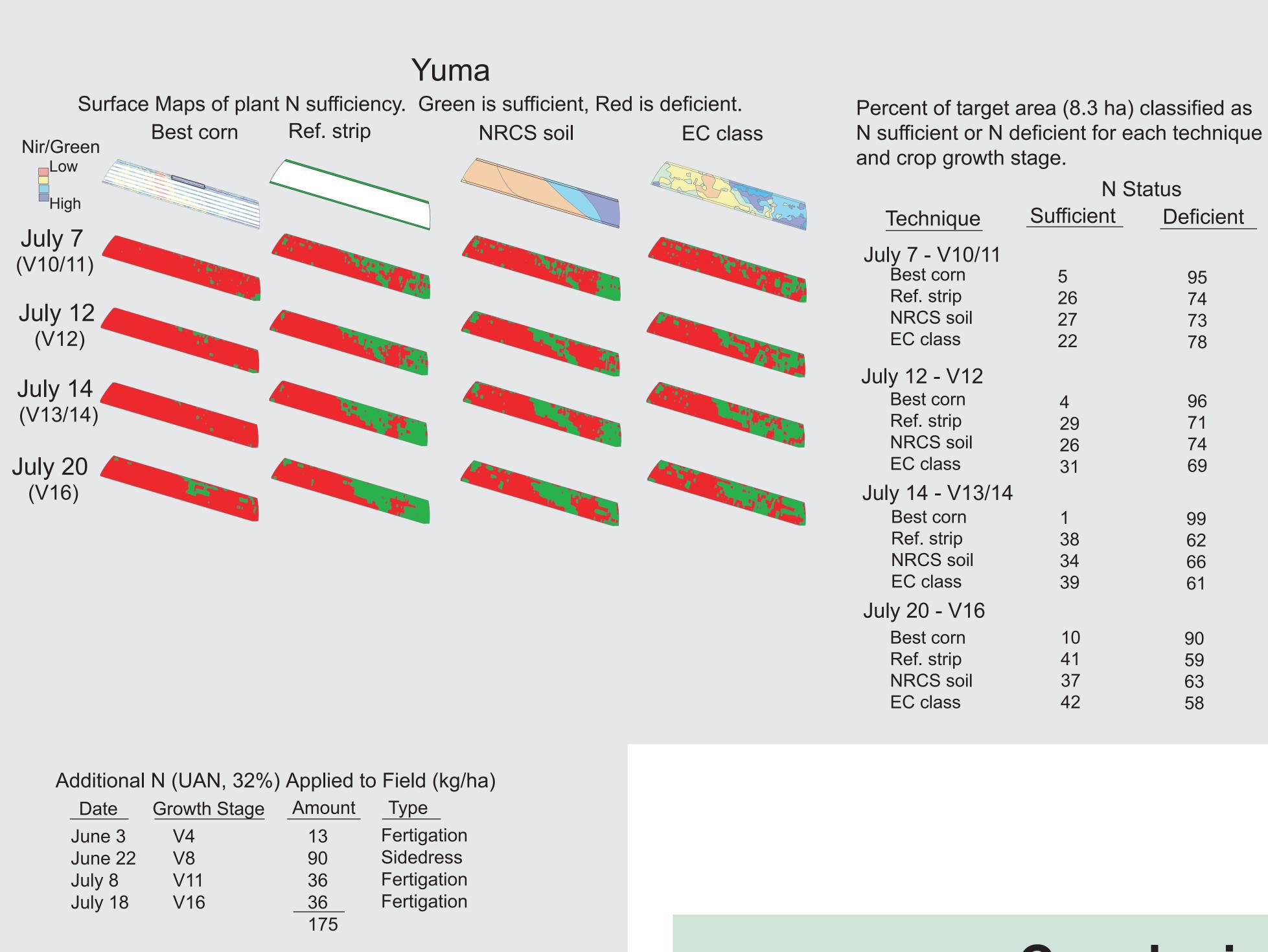
Reference Strip Location for In-Season Nitrogen Management Walter C. Bausch, Agricultural Engineer Mary K. Brodahl, Soil Scientist

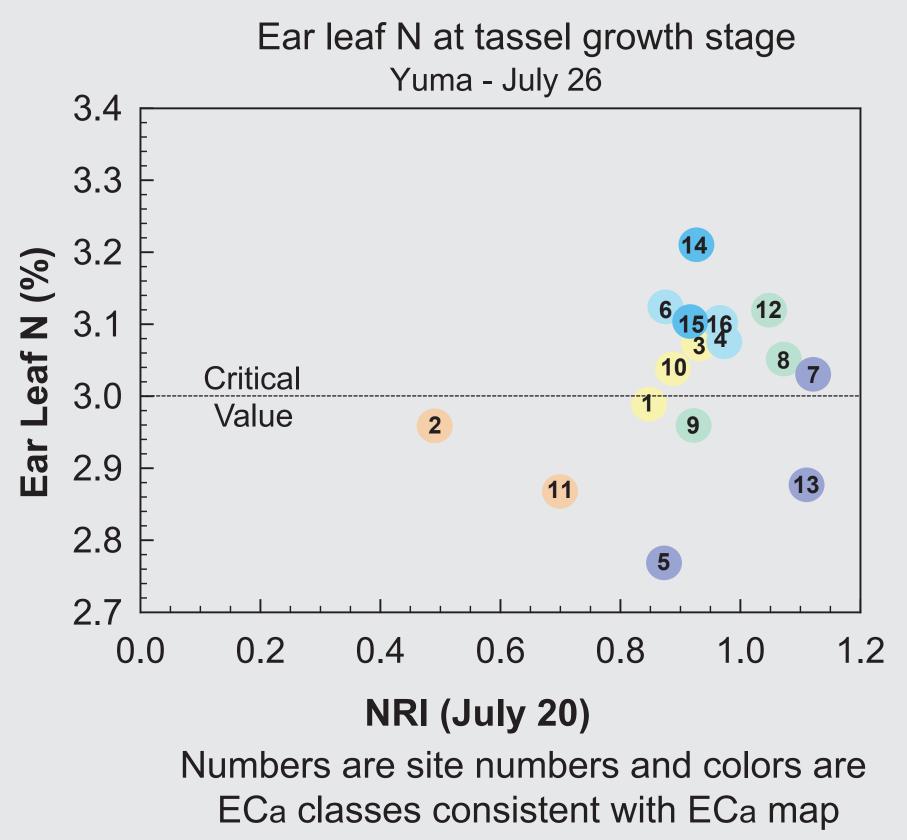
USDA-ARS Water Management Research Unit Fort Collins, CO

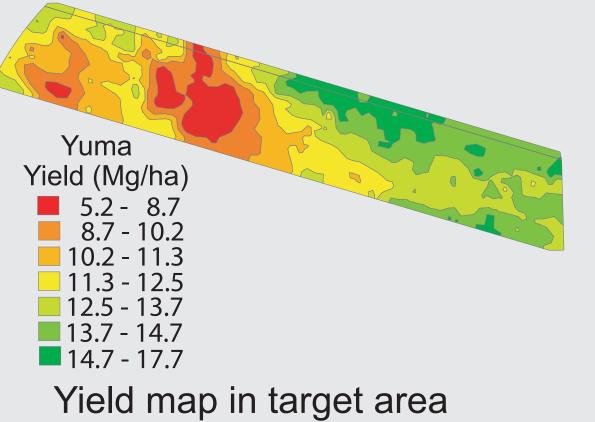
nal N (UAN, 32	2%) Applied	via Fertigatio	on (kg/ha)
rowth Stage	Wedge A	Wedge B	Between Wedges
V8			67
V10			34
V11		34	
V11			34
V12		34	
V12			34
V15			45
V15		34	
VT/R1	48		

Percent of target area (20 ha) classified as N sufficient or N deficient for each technique and crop growth stage.

	N Status	
Technique	Sufficient	Deficient
July 13 - V11		
Best corn	6	94
Ref. strip	41	59
NRCS soil	34	56
EC class	54	46
July 16 - V12		
Best corn	6	94
Ref. strip	42	58
NRCS soil	40	60
EC class	55	45
July 19 - V13		
Best corn	6	94
Ref. strip	43	57
NRCS soil	39	61
EC class	56	44
July 24 - V15		
Best corn	6	94
Ref. strip	25	75
NRCS soil	29	71
EC class	54	46









Conclusions:

1. Of the four techniques for locating and utilizing reference areas, the "best crop" technique produced N sufficiency maps indicating the whole target area was deficient for **both** fields at all growth stages monitored.

2. Association of data in ECa classes in the reference strip to that in the target area consistently produced N sufficiency maps with larger portions of the target area classified as N sufficient for the Wiggins field. These maps mimicked the yield map more so than the N sufficiency maps based on average reference strip or NRCS soil map units.

3. Average values from the reference strips for creating N sufficiency maps of the target area at the Yuma field were equal to or better than the ECa technique with respect to percent of target area designated as N sufficient. However, the ECa class technique N sufficiency maps may agree more with the yield map.

* Mention of trade names or commercial products is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture.