

COTMAN Research

Directed Sampling to Improve Management Efficiency

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Quick-View Guide for When to Quit Cotton Insect Control *from* University of Arkansas Cooperative Extension MP 144.

1) Determine date of cutout using the earlier of date of NAWF=5 or Weather-restricted date (North AR: 8 Aug, Central AR: 14 Aug, South AR: 21 Aug)

2) Record daily heat units (DD60s) from Date of Cutout. (DD60s are calculated by subtracting 60 from the average daily temperature.)

Insect Pest	When to Quit Control of NEW Infestations
Tarnished Plant Bug	Cutout+250 DD60s
Bollworms & Tobacco Budworms	Cutout+350 DD60s
Stink Bugs	Cutout+450 DD60s
Fall Armyworms	Cutout+500 DD60s

Crop termination recommendations are based on long-standing and ongoing COTMAN research conducted by University of Arkansas Division of Agriculture scientists. Date of Cutout is the flowering date of the last economically significant boll population. If a field reaches physiological cutout [average number of nodes above white flower=5 (NAWF=5)] in late July or early August in Arkansas, then heat units are accumulated from the NAWF=5 date. Otherwise, heat units are accumulated from a seasonal cutout date based on historical weather for that production region. Typically, a boll needs 850 DD60s to mature with acceptable size and quality. The weather-restricted, seasonal cutout date is the calendar date on which there is a 50% probability that the crop will have the benefit of late season temperatures sufficient to develop a mature boll. Seasonal cutout dates range across the state from August 8 in northernmost parts of Arkansas (Clay County) out to August 21 in the most southern portions of the state (Ashley County).

End of Season Management

Insect Control

Identify flowering date of last effective boll population and track heat units

+ 250 DD60s

Lygus lineolaris

+ 350 DD60s

Heliothines

QUIT *Spraying
for new infestations*



Crop Monitoring -- Maturity



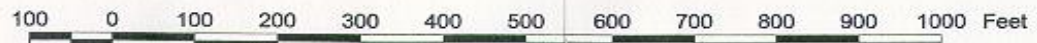
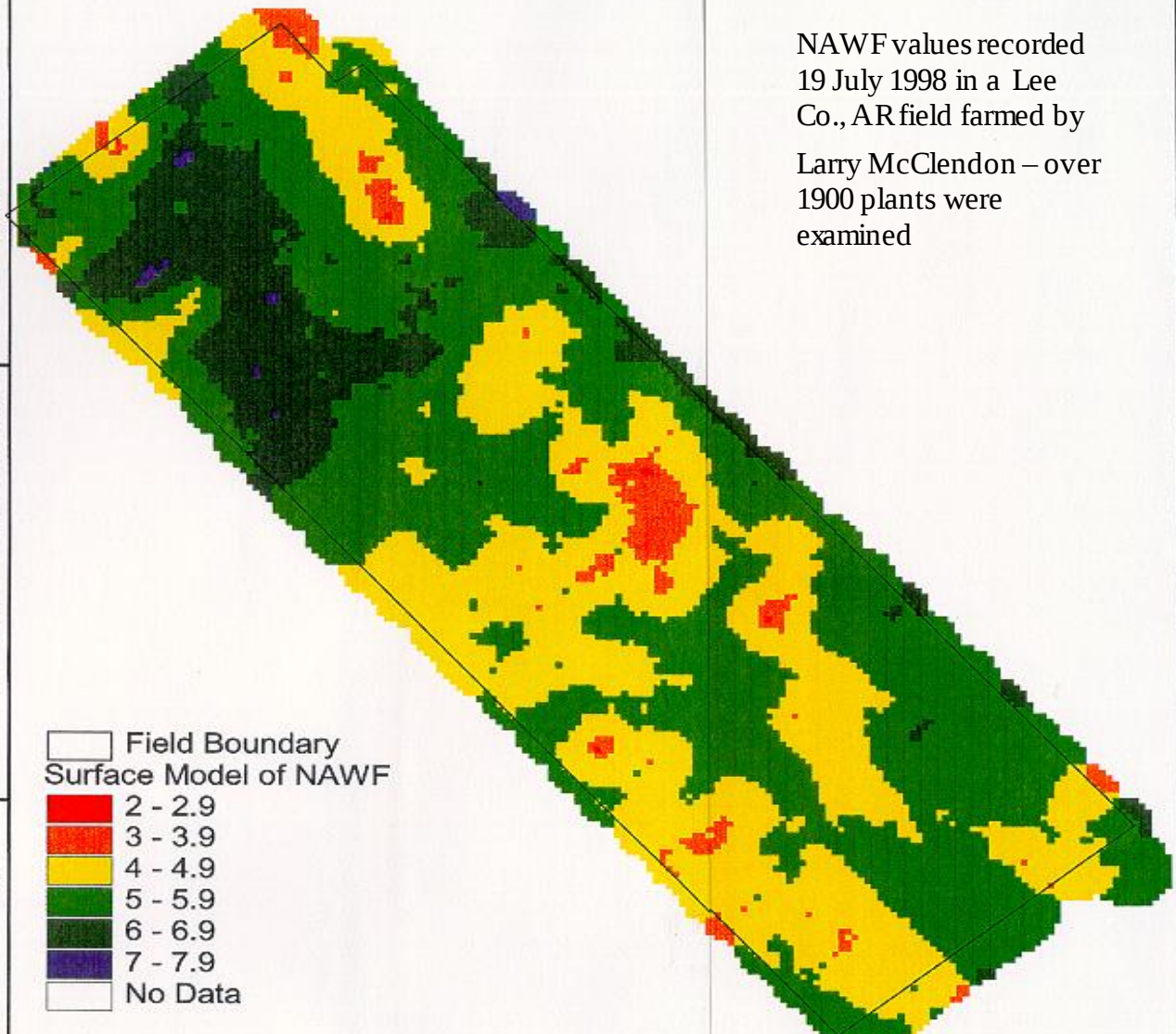
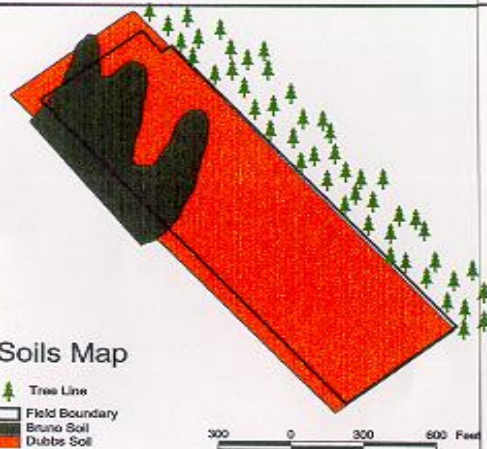
Late season
decision
making in a
variable
system

- Time Cutout date
- Space Soils, landscape,
 elevation,
 drainage

Spatial Variability



Whys of Where?



Crop Monitoring in spatially variable fields: field level management decisions → site specific management

**COTMAN –
Tool to help us
describe
geographic
distribution of
cutout**



Field 40 41 Pivot Circle

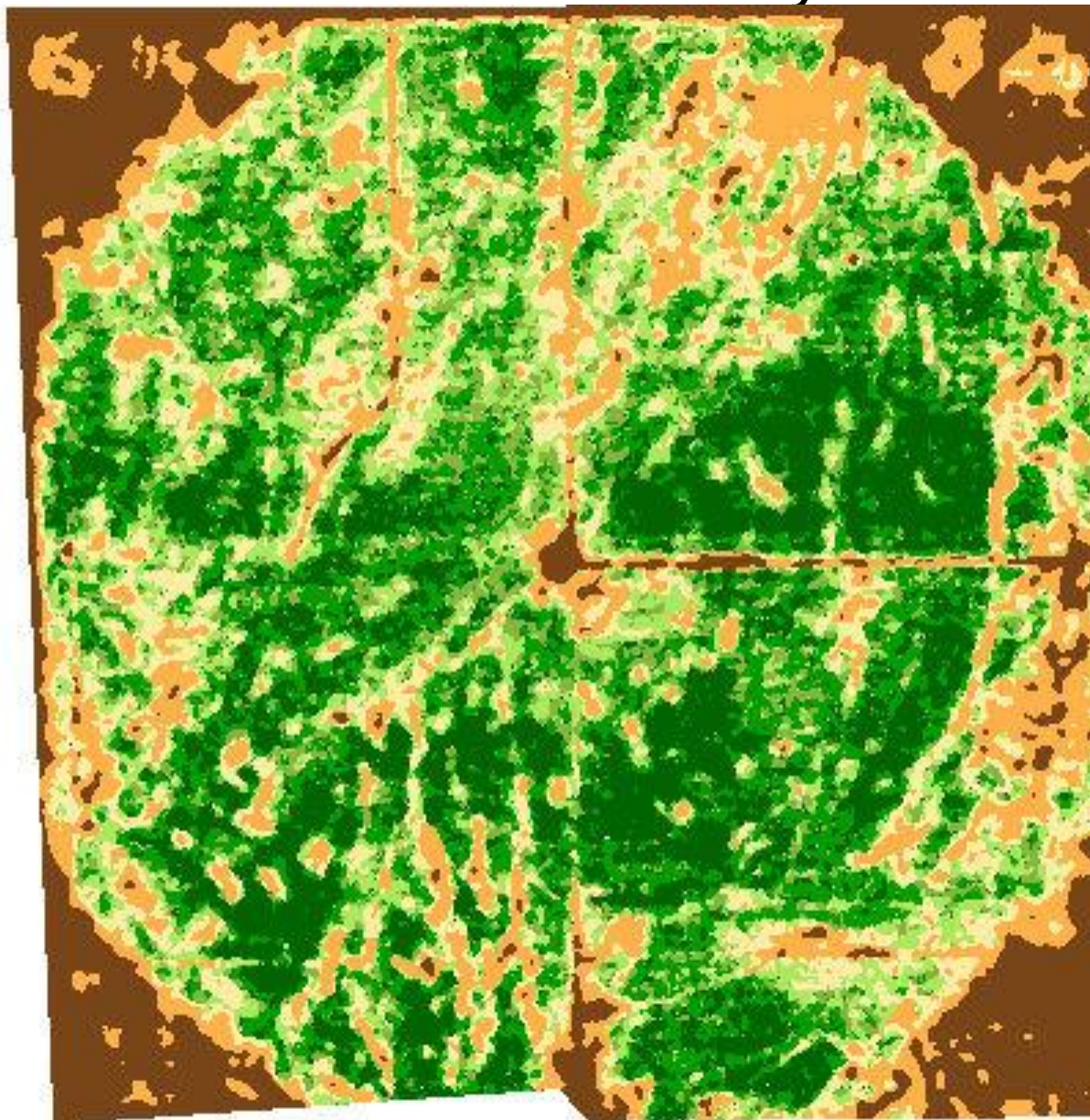
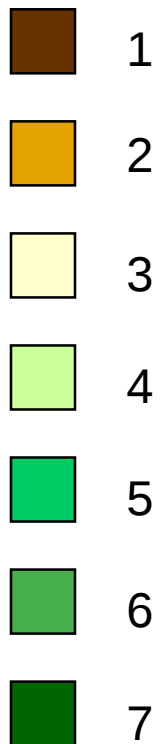


Newly available application and spatial technologies may provide producers with the ability to make “just right” applications of pesticides, plant growth regulators and harvest aid materials in variable fields

2003 Beltwide

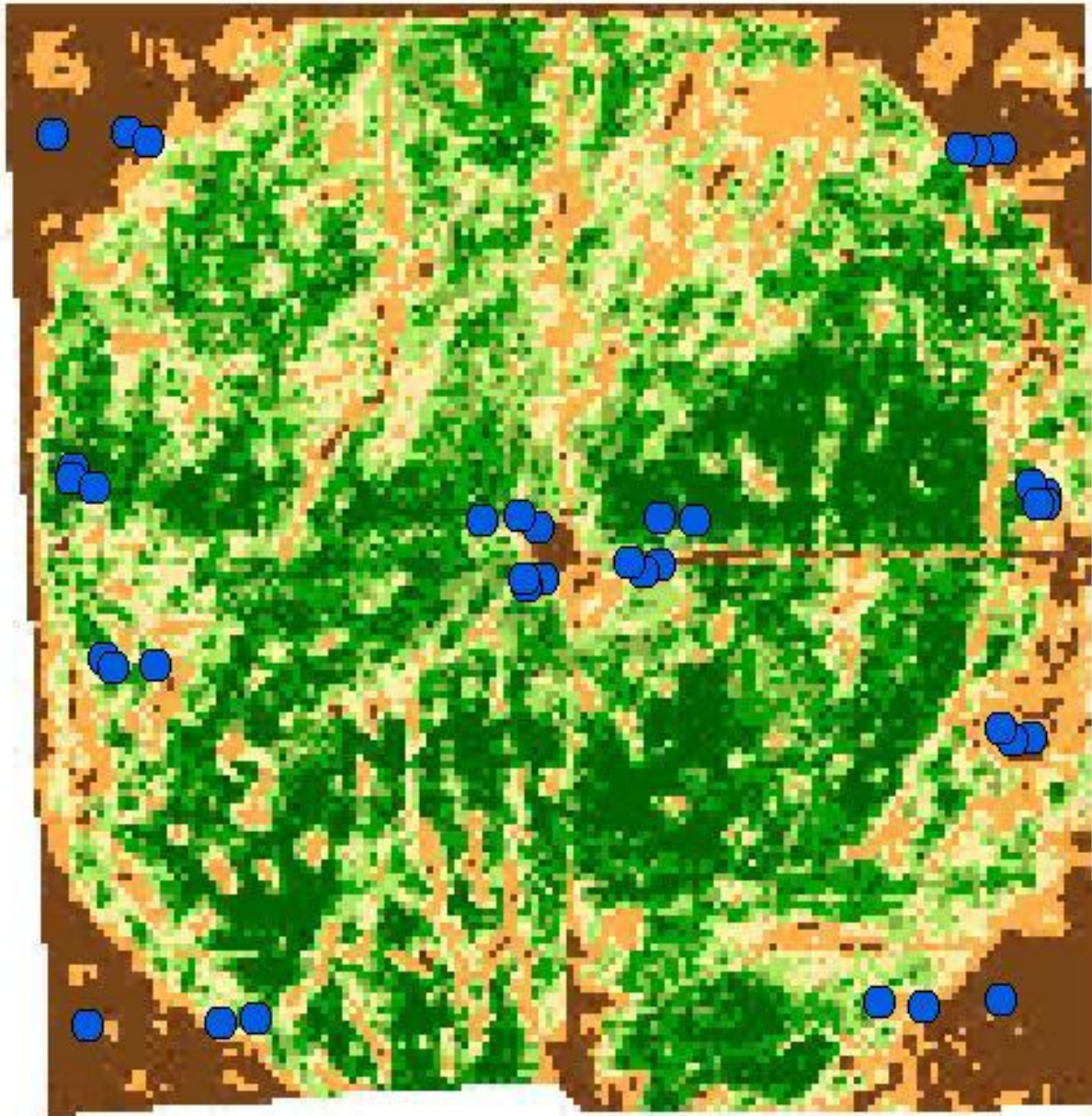
84 DAP - 25 July

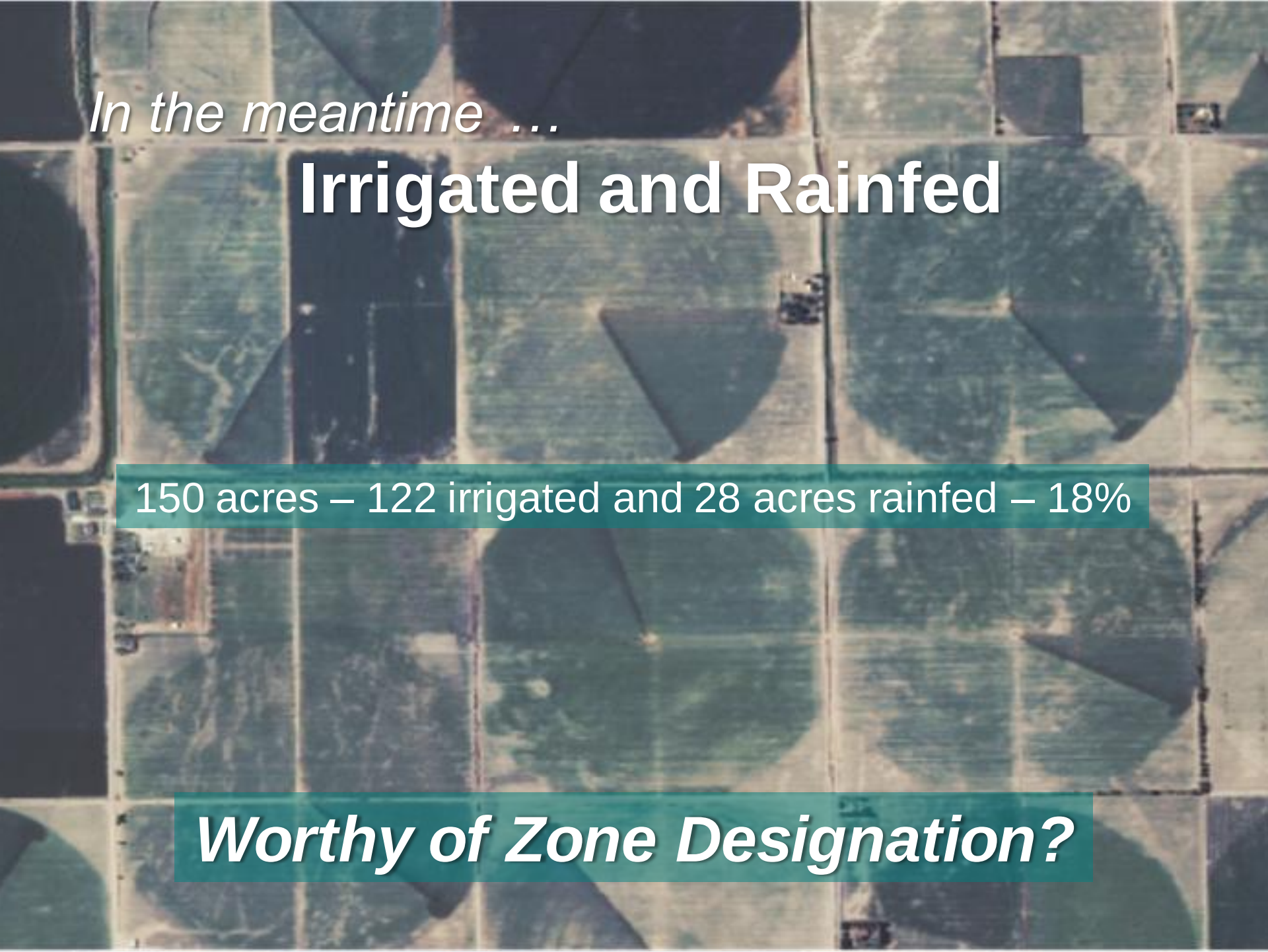
NDVI – In Time
Biomass
Classifications





Geo-Referenced Sample Points



An aerial photograph of a large agricultural field. The field is divided into several large, roughly rectangular sections by straight lines, likely roads or irrigation canals. Within these sections, there are numerous circular patterns, which are the result of center pivot irrigation systems. The colors of the fields vary from dark green to light brown, indicating different crops or stages of growth. The text is overlaid on the top left of the image.

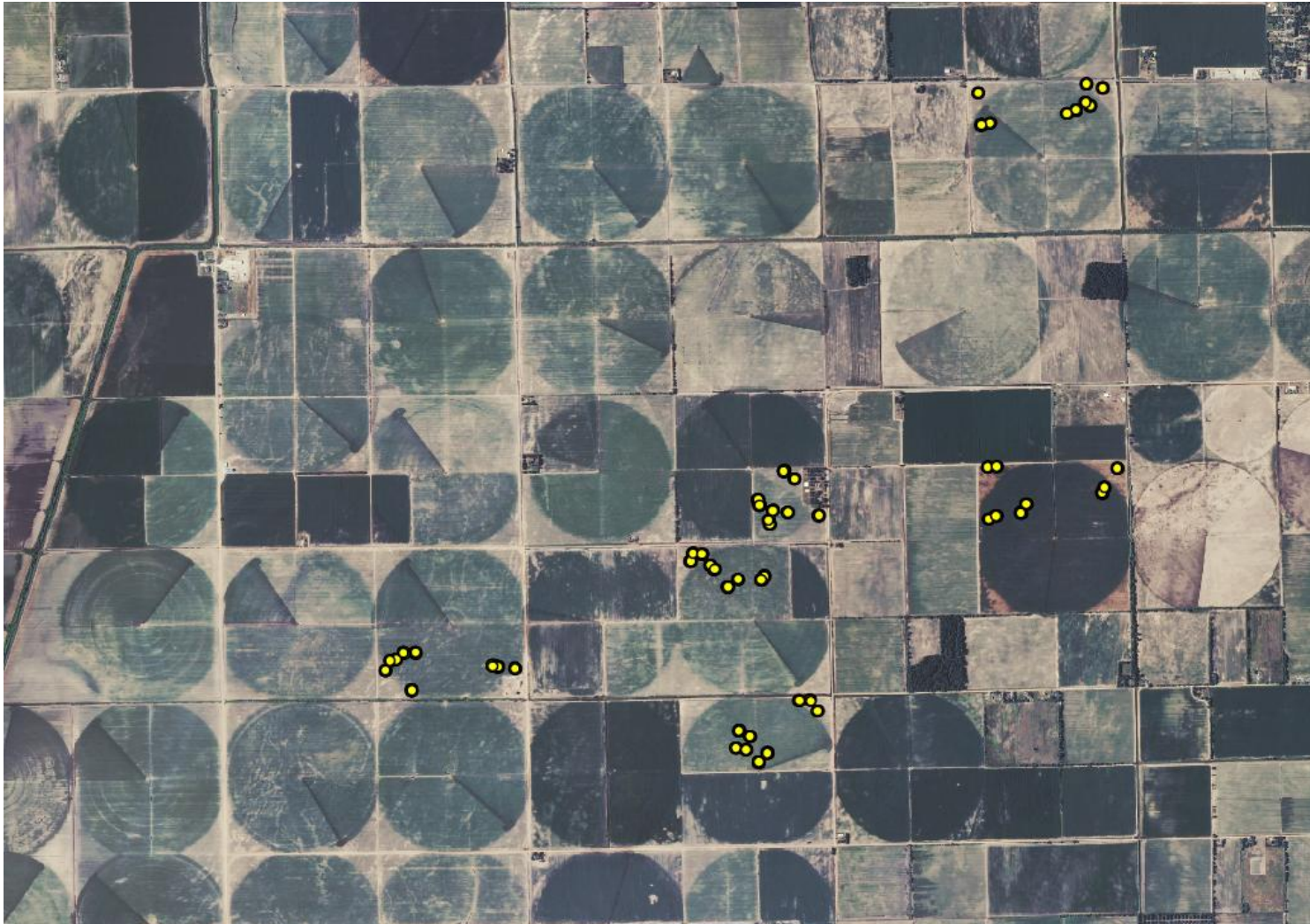
In the meantime ...

Irrigated and Rainfed

150 acres – 122 irrigated and 28 acres rainfed – 18%

Worthy of Zone Designation?

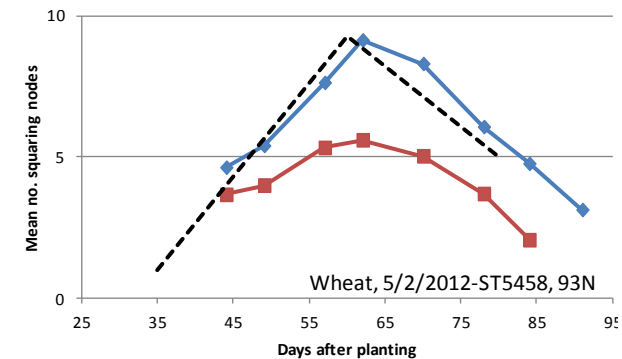
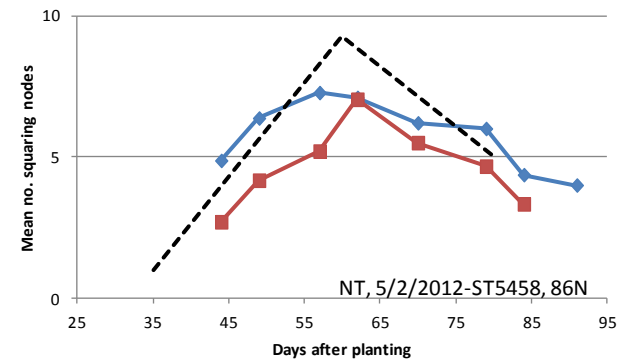
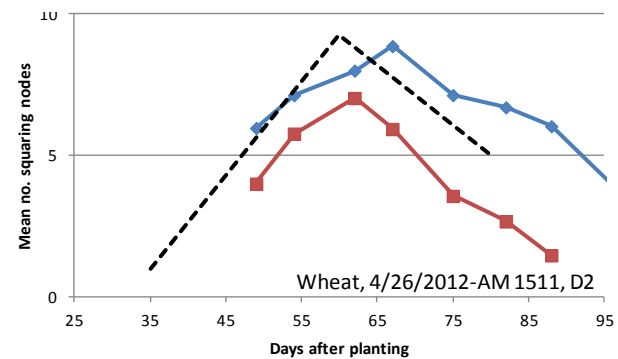
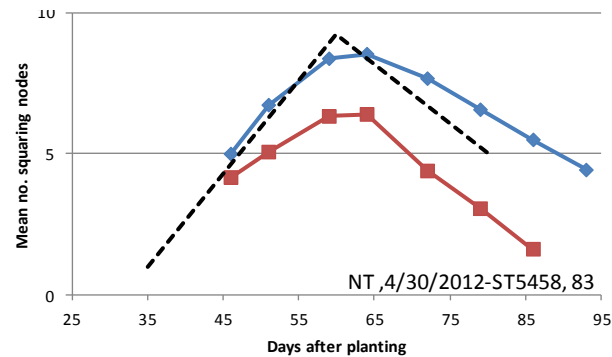
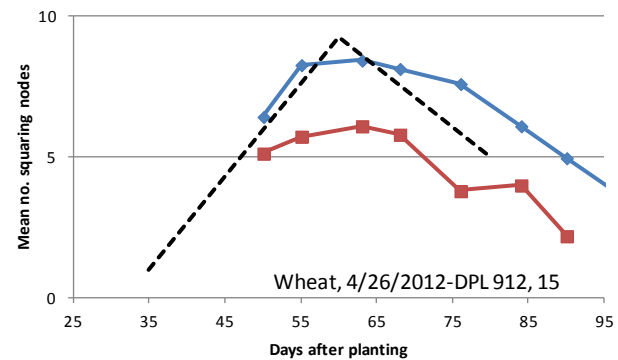
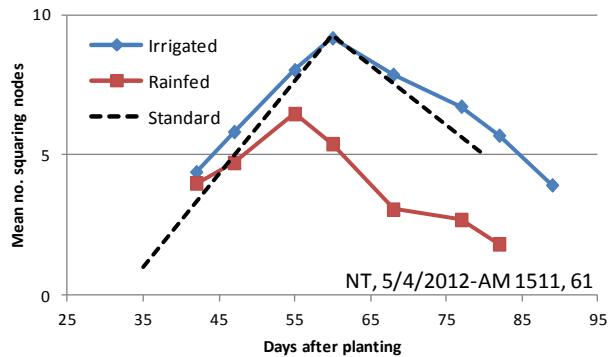
COTMAN monitoring in georeferenced sites – irrigated and rainfed zones



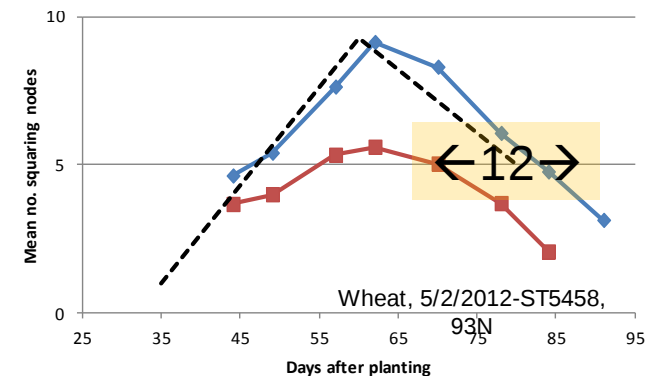
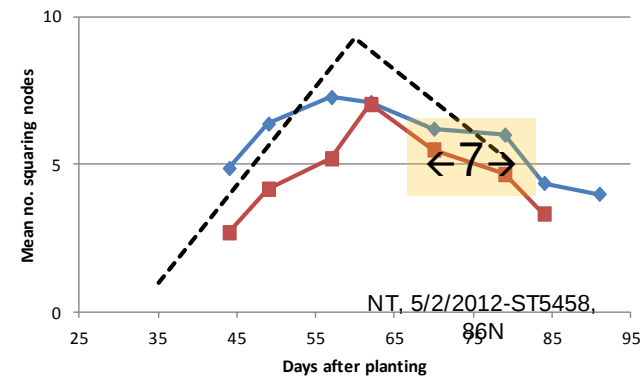
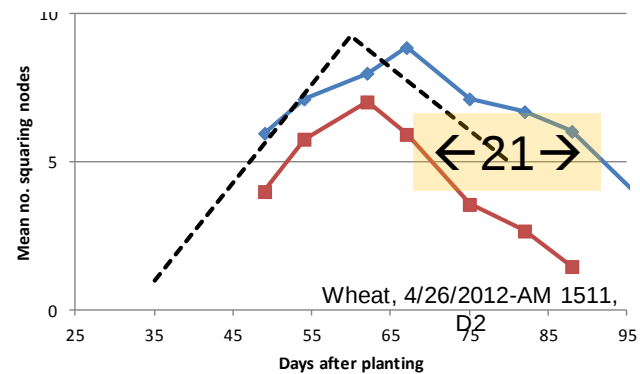
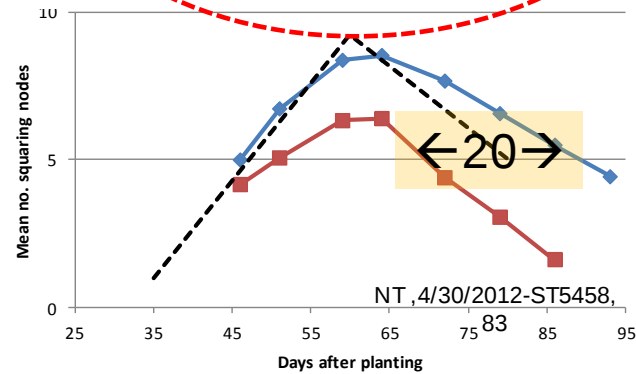
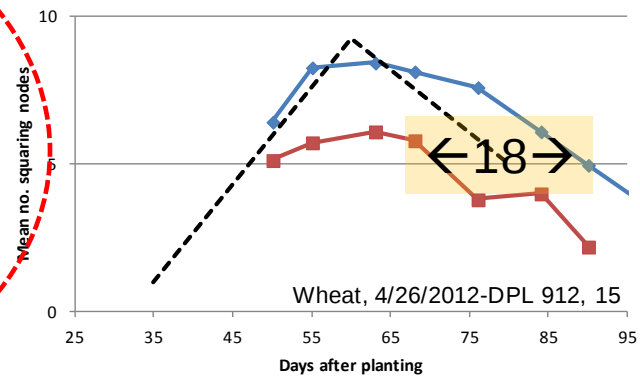
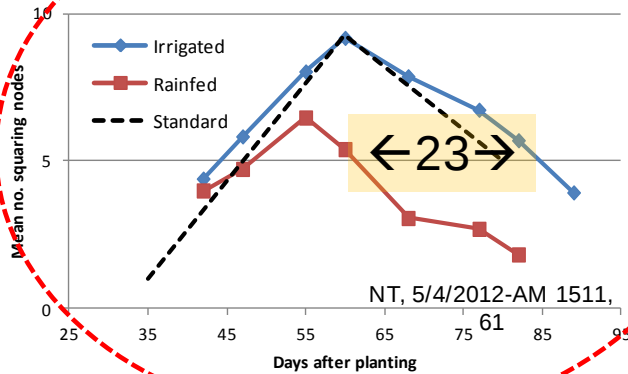
Wildy Farms 2010, 2011 and 2012

COTMAN Growth curves

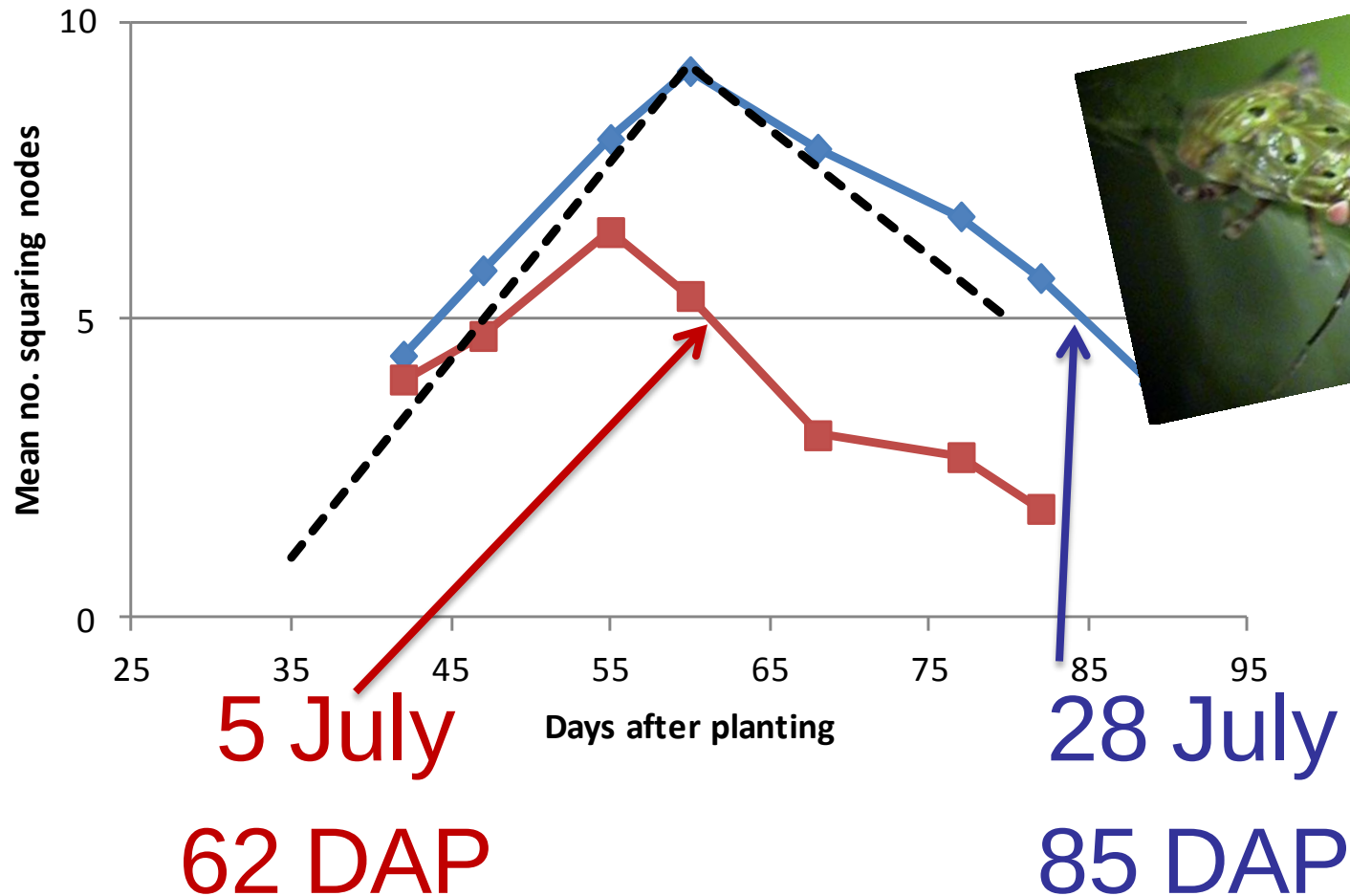
– rainfed and irrigated zones



Difference in days to cutout?



Difference in days to cutout?



After Physiological Cutout

Irrigated
+110 DD60s

Rainfed
+653 DD60s

COTMAN FIELD REPORT for Irrigated Field 61

CUTOUT INFORMATION

Physiological Cutout (NAWF = 5): 07/28

Days, Planting to NAWF = 5 : 85

HEAT UNIT TOTAL and THRESHOLD DATES

Heat unit total (to date 08/01): **110**
calculated from NAWF = 5: 07/28.

Heat Unit Threshold	Actual date	Projected date

350	--	08/14
850	--	09/12

COTMAN FIELD REPORT for Rainfed Field 61

CUTOUT INFORMATION

Physiological Cutout (NAWF = 5): 07/05

Days, Planting to NAWF = 5 : 62

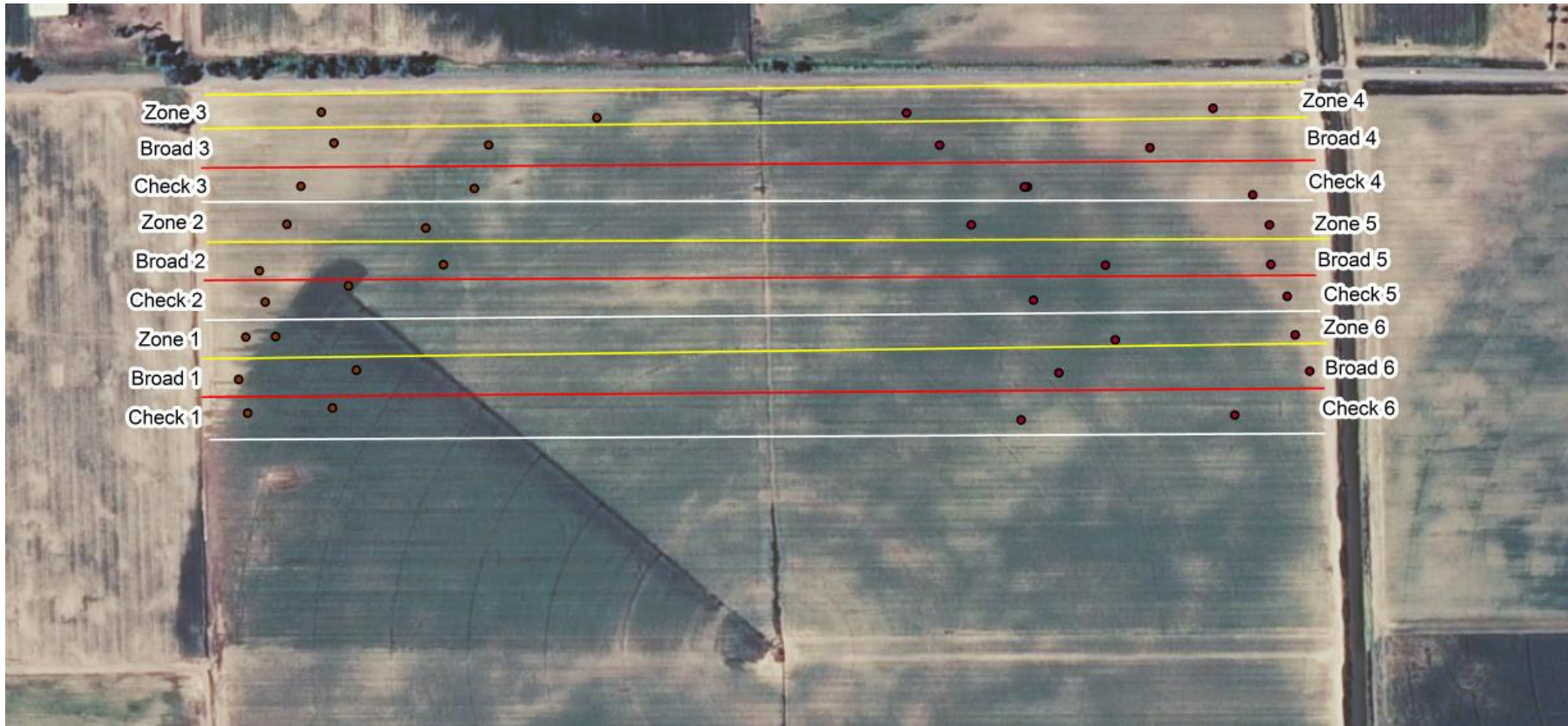
HEAT UNIT TOTAL and THRESHOLD DATES

Heat unit total (to date 08/01): **653**
calculated from NAWF = 5: 07/05

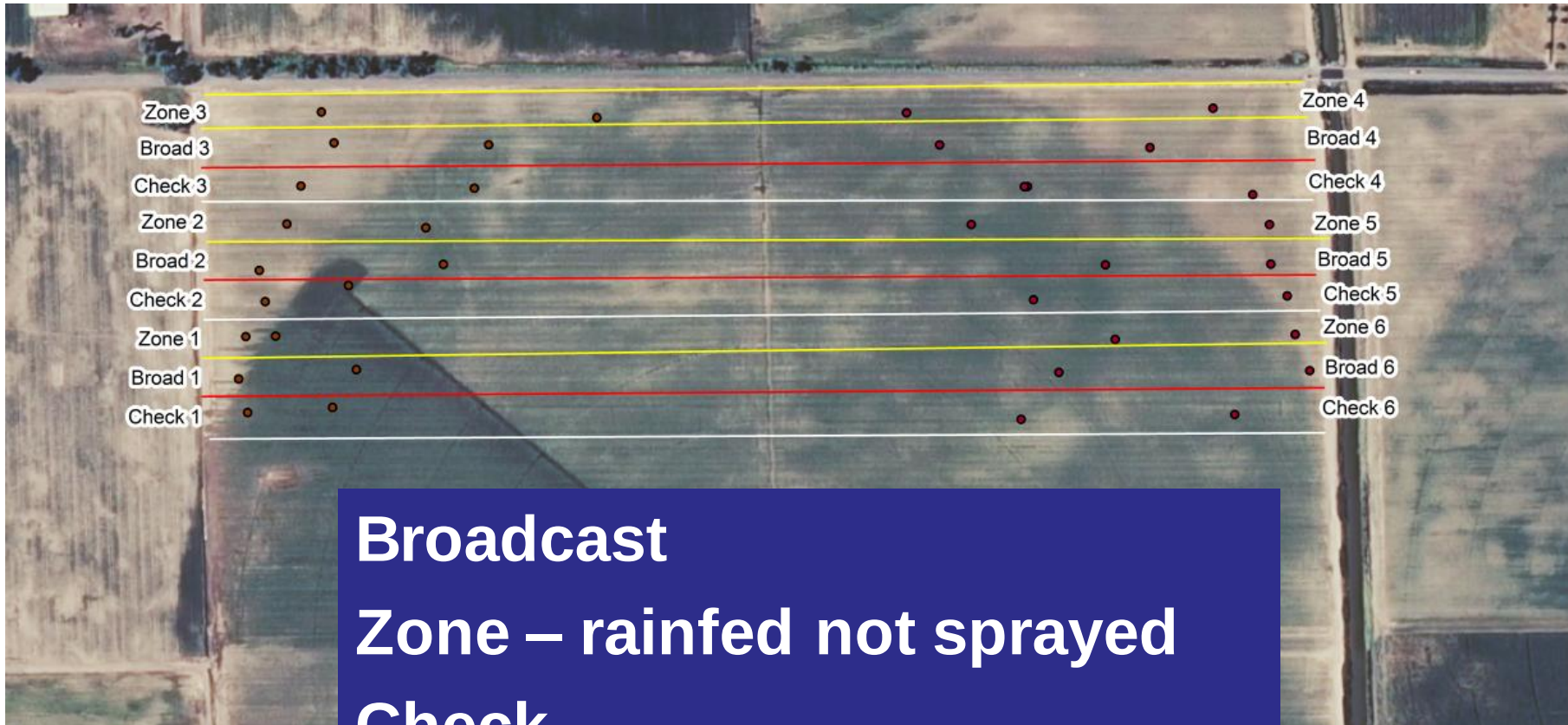
Heat Unit Threshold	Actual date	Projected date

350	07/20	
850	--	08/12

Zone Termination?



Insect Control Termination Comparisons – 3 treatments



TPB Counts

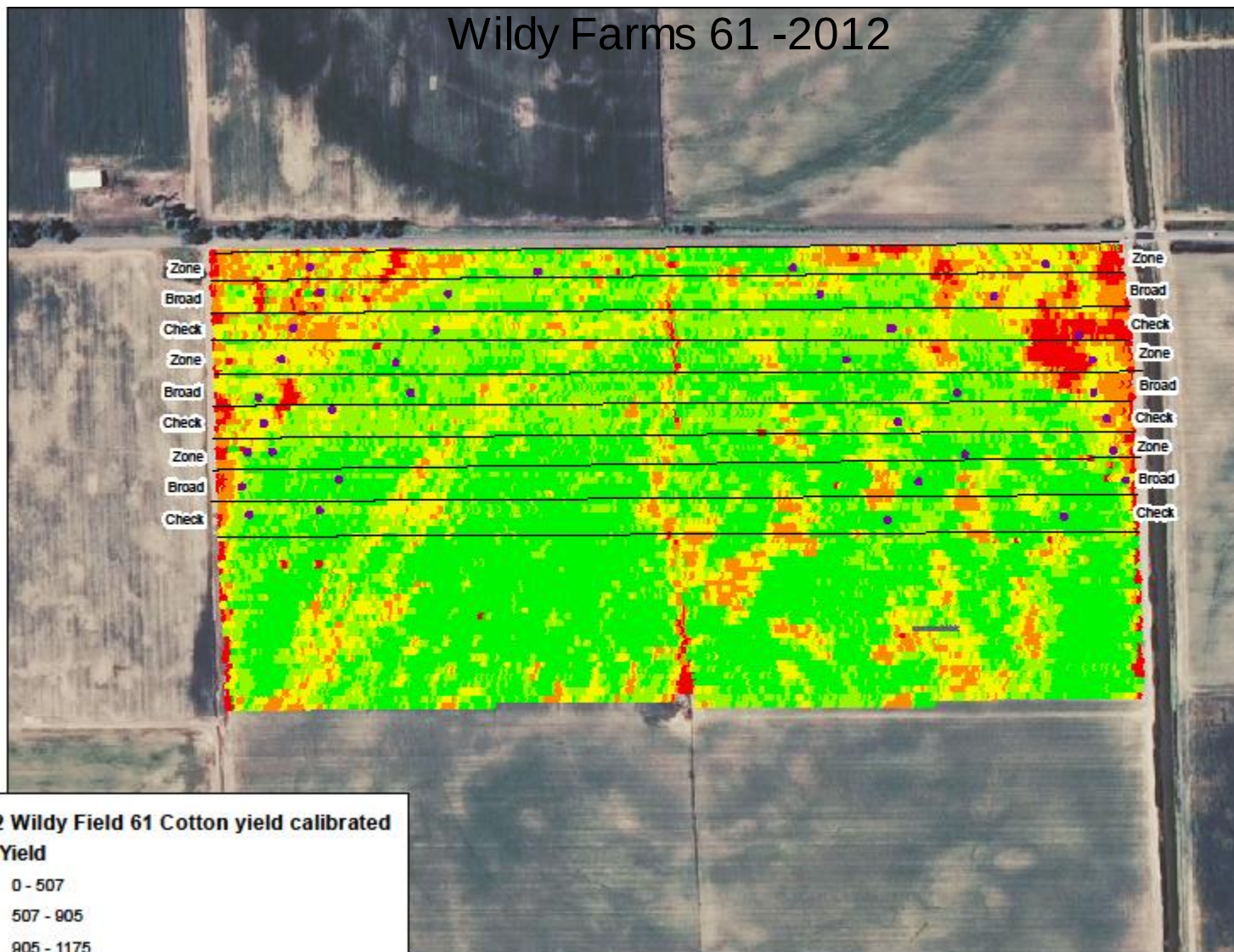
Broadcast, Zone and Check

Mean no. plant bugs per drop at 4, 11 and 18 days after application of Bidrin & Bifenithrin on 2 August 2012, Wildy Farms, Leachville, AR.

Sample date	Days after spray	Broadcast Insecticide		Zone Management		Check	
		rainfed	irrigated	rainfed	irrigated	rainfed	irrigated
1 Aug	-1	0	3.2	0.2	4.1	0.1	2.8
6 Aug	4	0	1.2	0.3	1.4	1.3	3.3
11 Aug	9	0	3.2	1.0	4.8	0.3	30.5
18 Aug	16	0	6.9	1.0	8.2	1.0	25.5

Yield Monitor

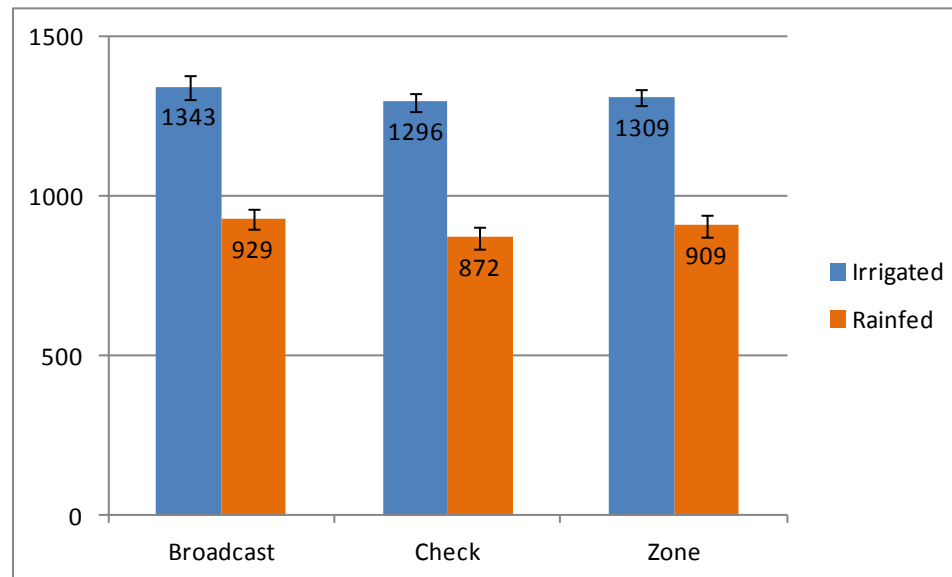
Wildy Farms 61 -2012



Yields – zone termination

No yield differences among spray treatments

Zone - **18%** reduction in spray costs compared to Broadcast



3 Year Avg Yield



Soil EC

Veris Soil Surveyor



4 Soil EC based Management Zones



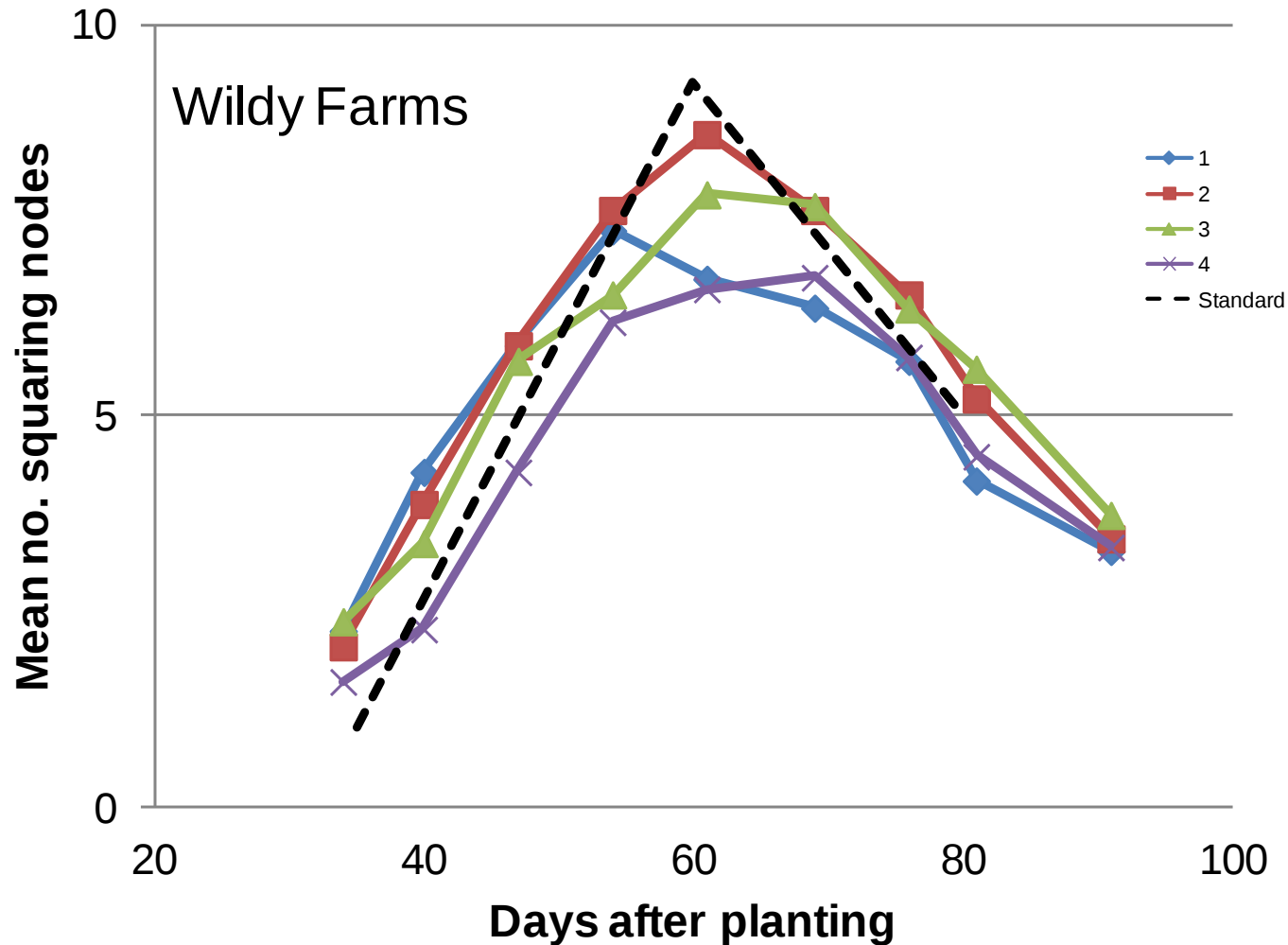
**Low EC
Sand**



**High EC
Clay**

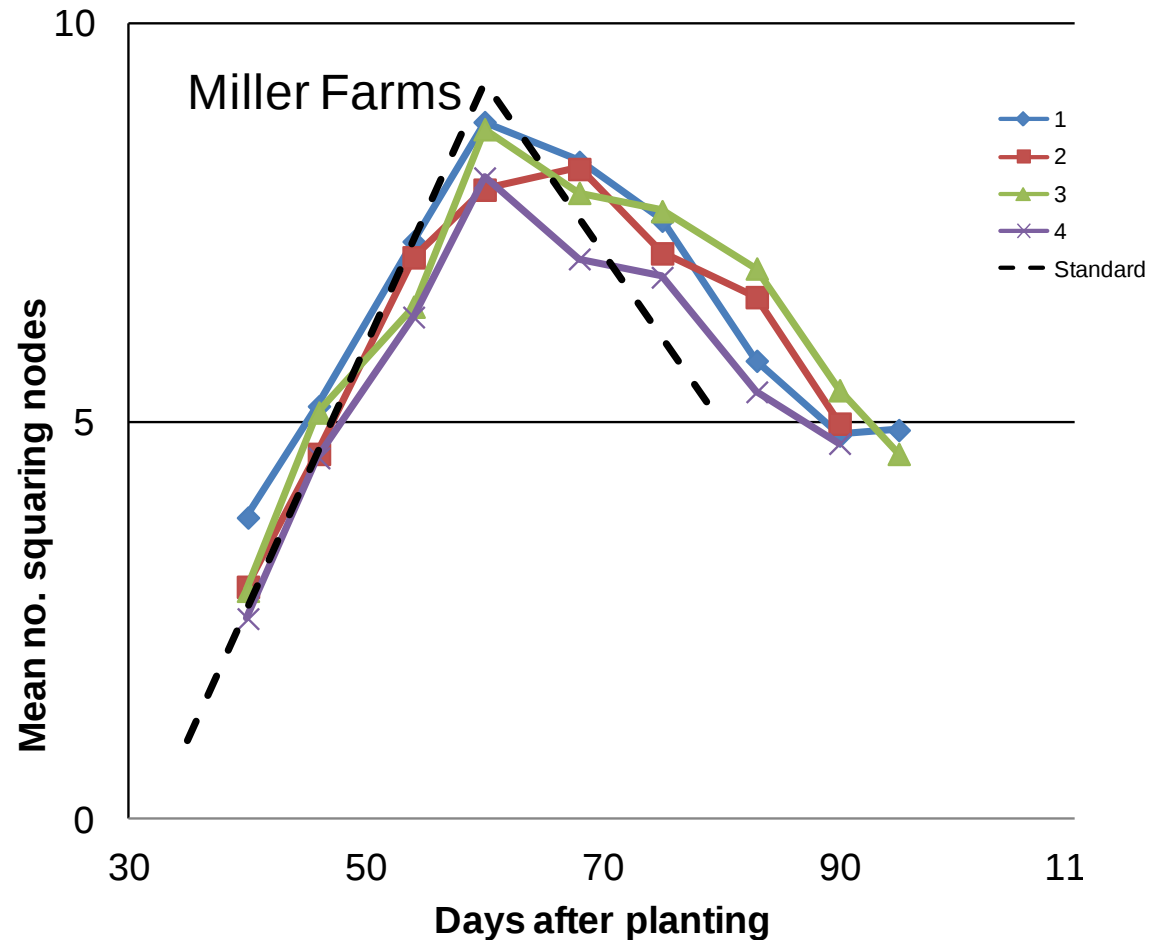
COTMAN Growth Curves

4 Soil EC Based Management Zones



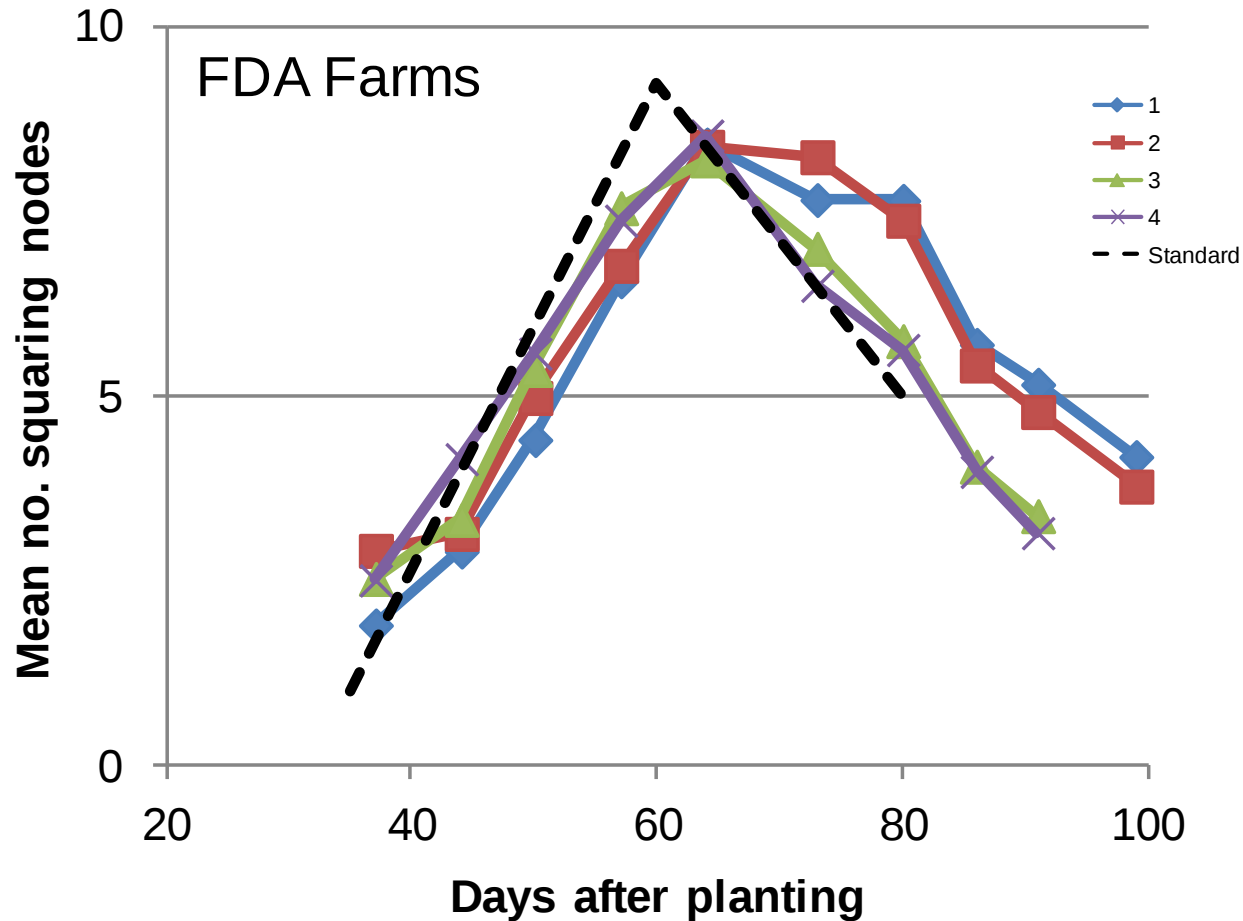
COTMAN Growth Curves

4 Soil EC Based Management Zones



COTMAN Growth Curves

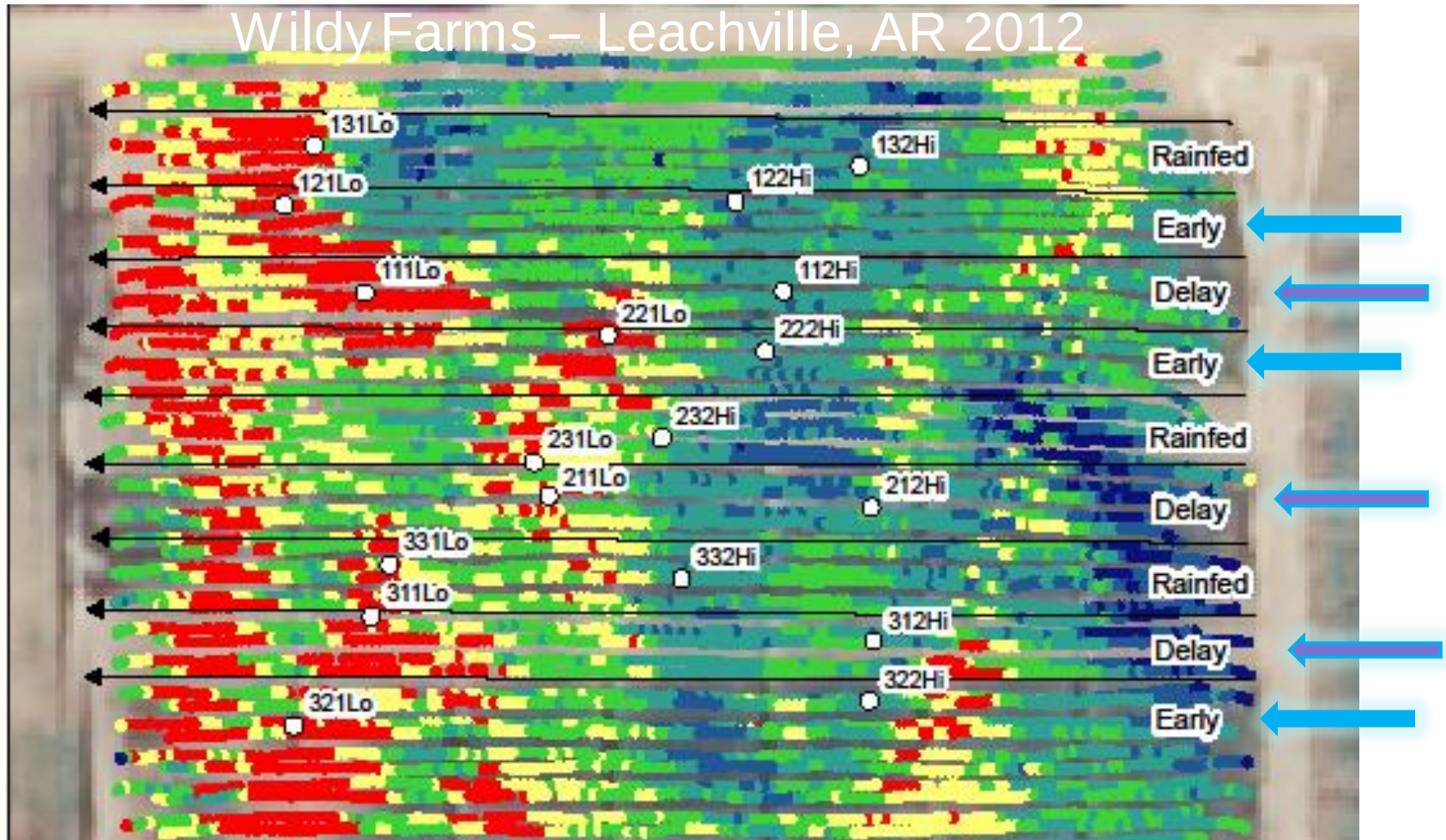
4 Soil EC Based Management Zones



Small Plot

Irrigation timing -Soil EC

Wildy Farms – Leachville, AR 2012

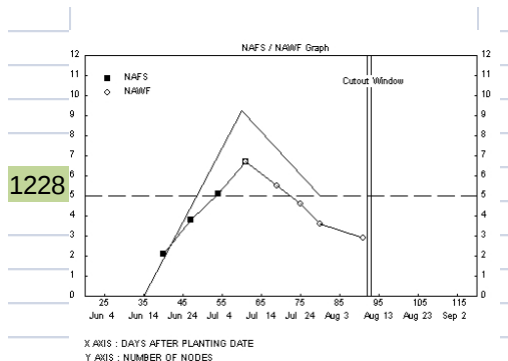


Early start 33 DAP and Late start 41 DAP

Low Soil EC – Sand Blow

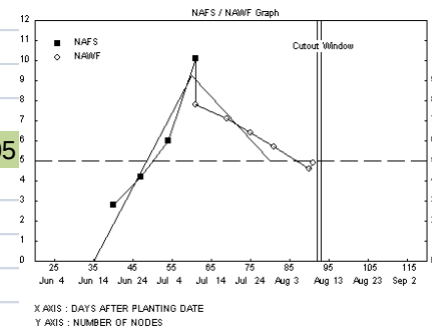
Sandy Loam

Early



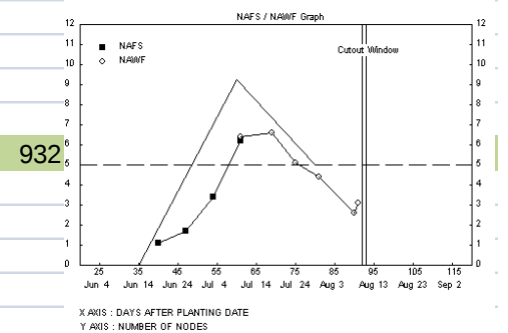
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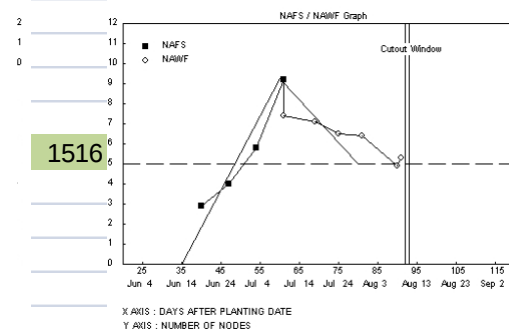
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Late



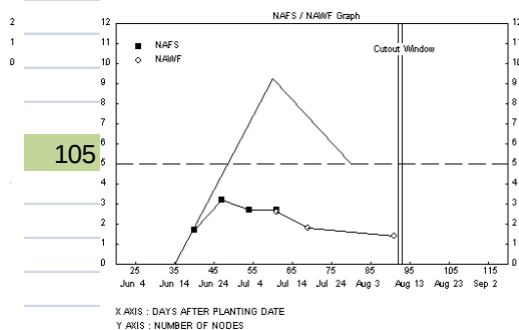
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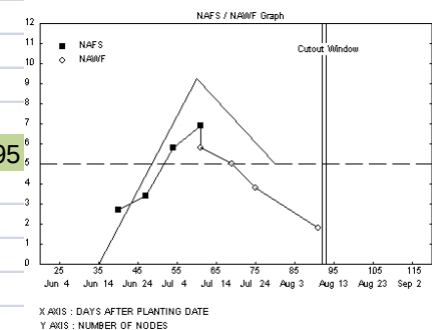
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Rainfed



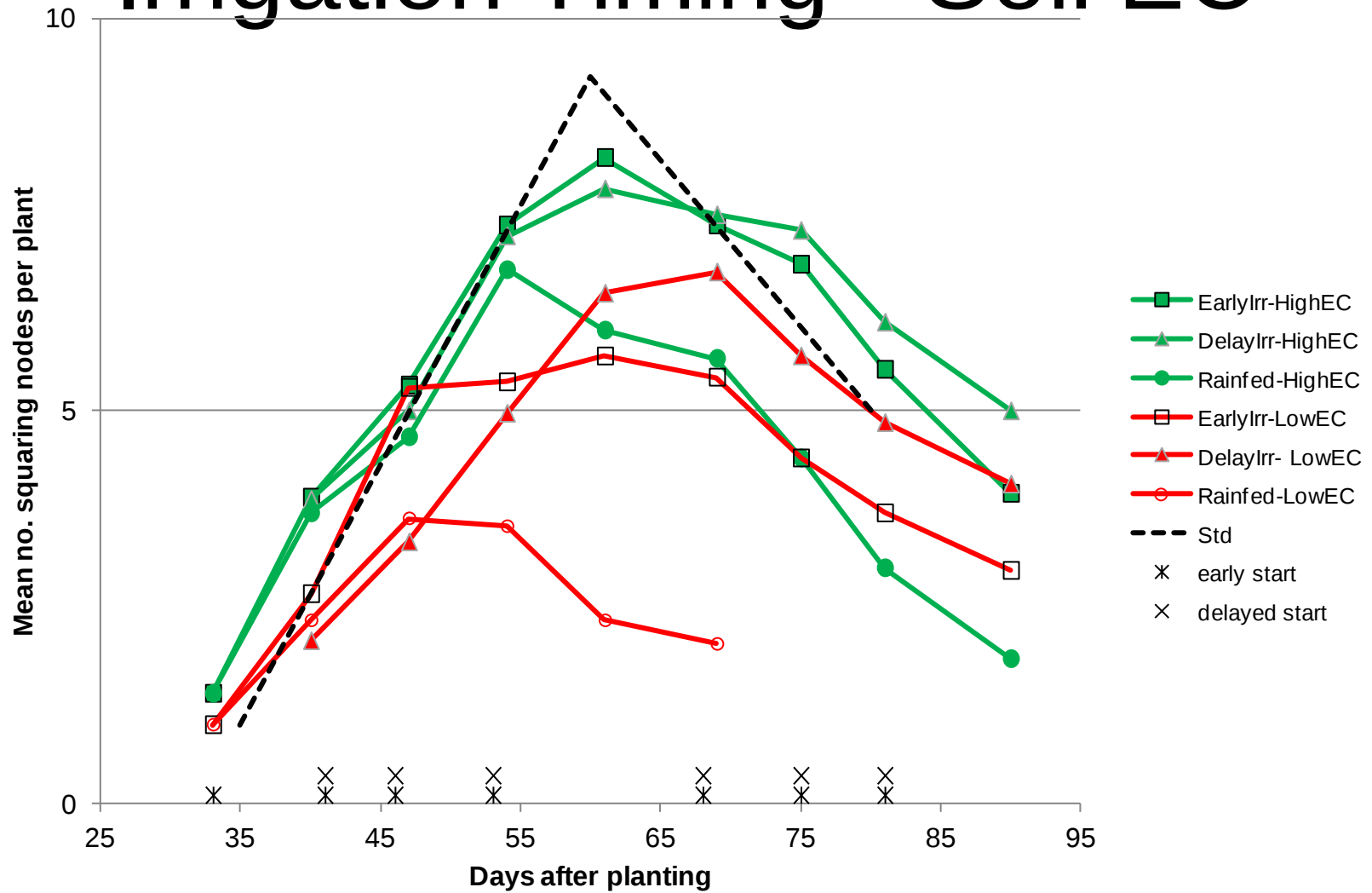
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995



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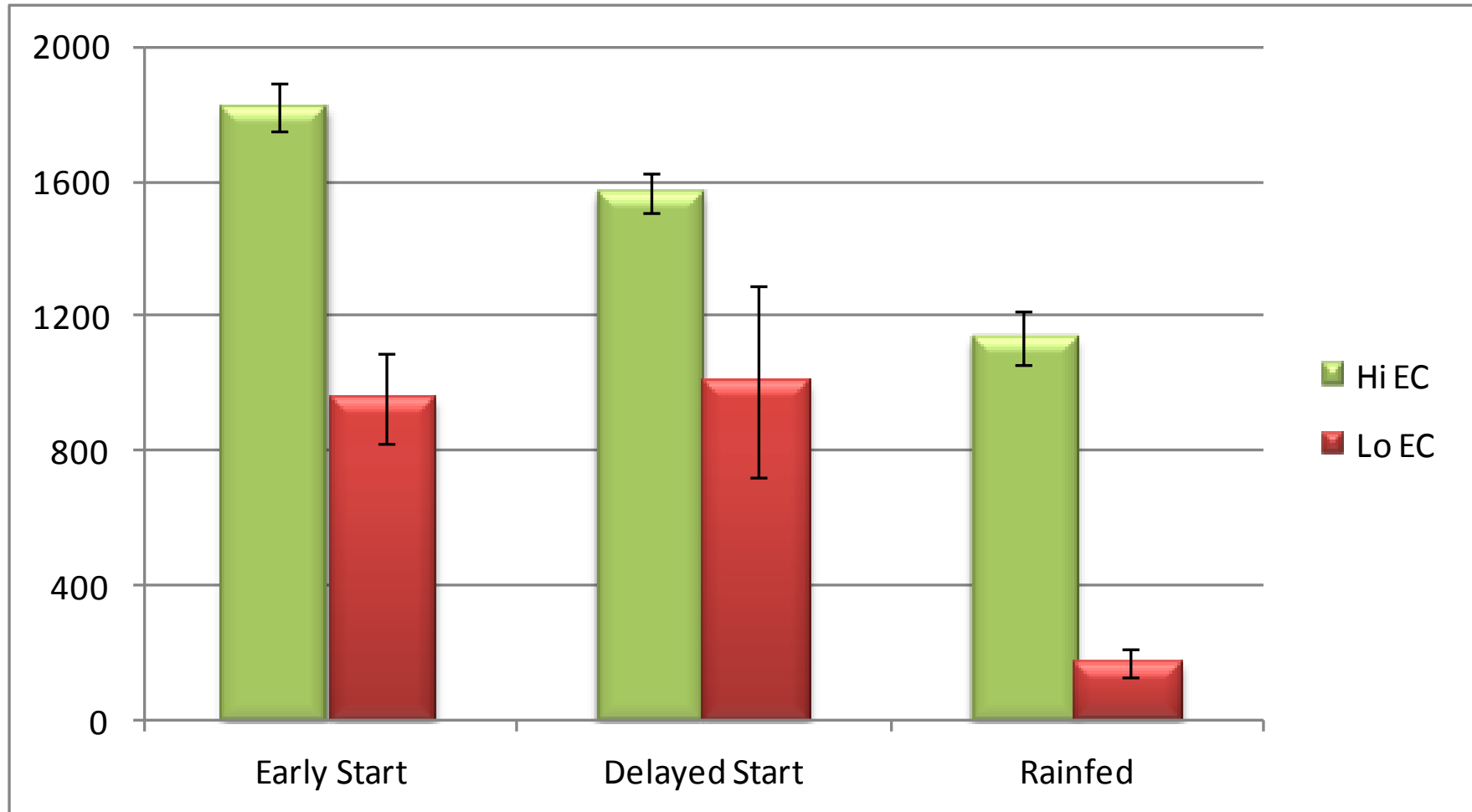
Irrigation Timing * Soil EC



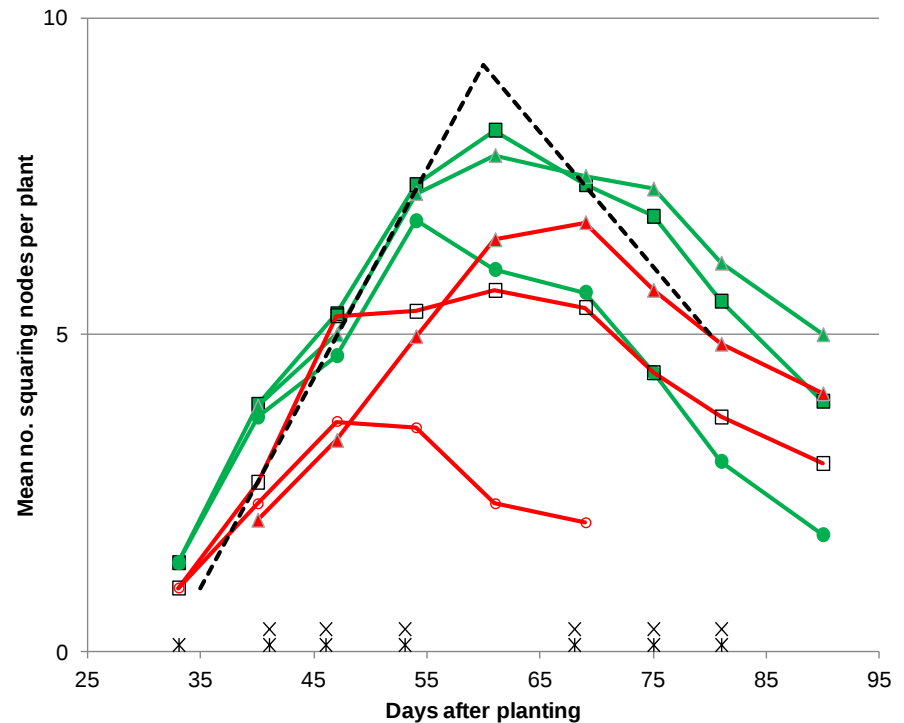
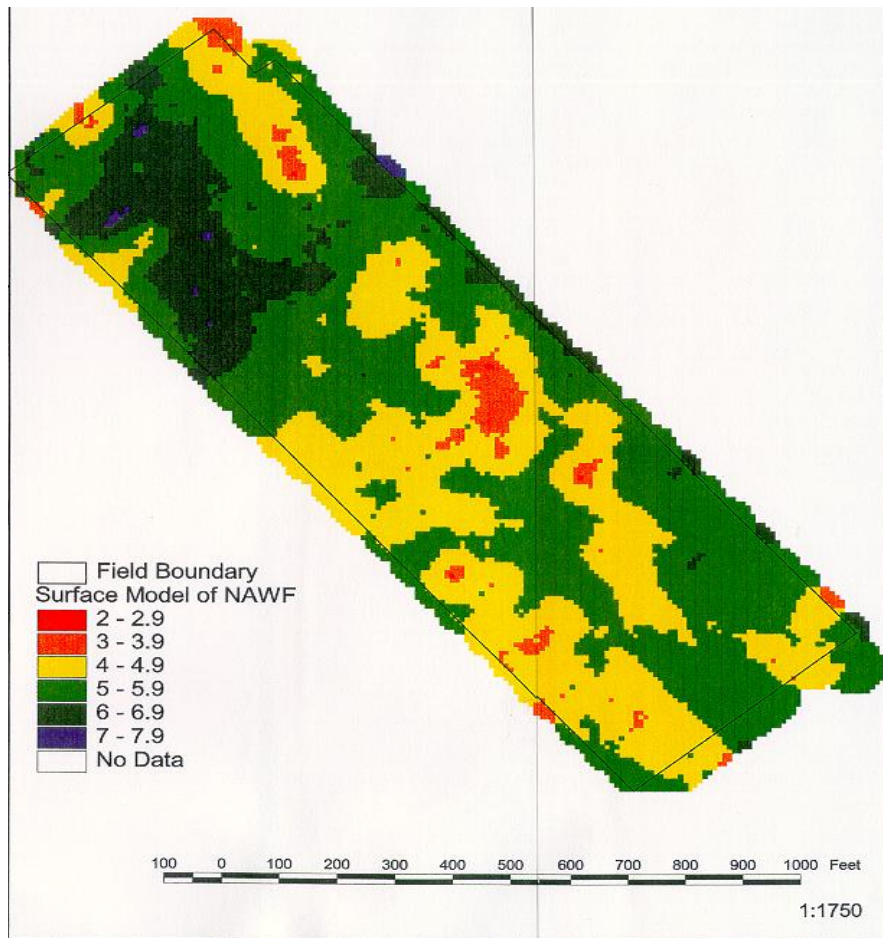
Early start 33 and Late start 41 DAP

Irrigation * Soil EC

2012 Yields



Where did you take the samples?



Acknowledgments



Wildy Family Farms – David Wildy, Justin Wildy, Paul Harris

Miller Farms – Gordon Miller

FDA Farms – Danny Finch and Brandon Finch

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