Field Crops Research and Observations from the Sacramento Valley

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Weed Competition During Alfalfa Stand Establishment

Efficient N Management in Wheat

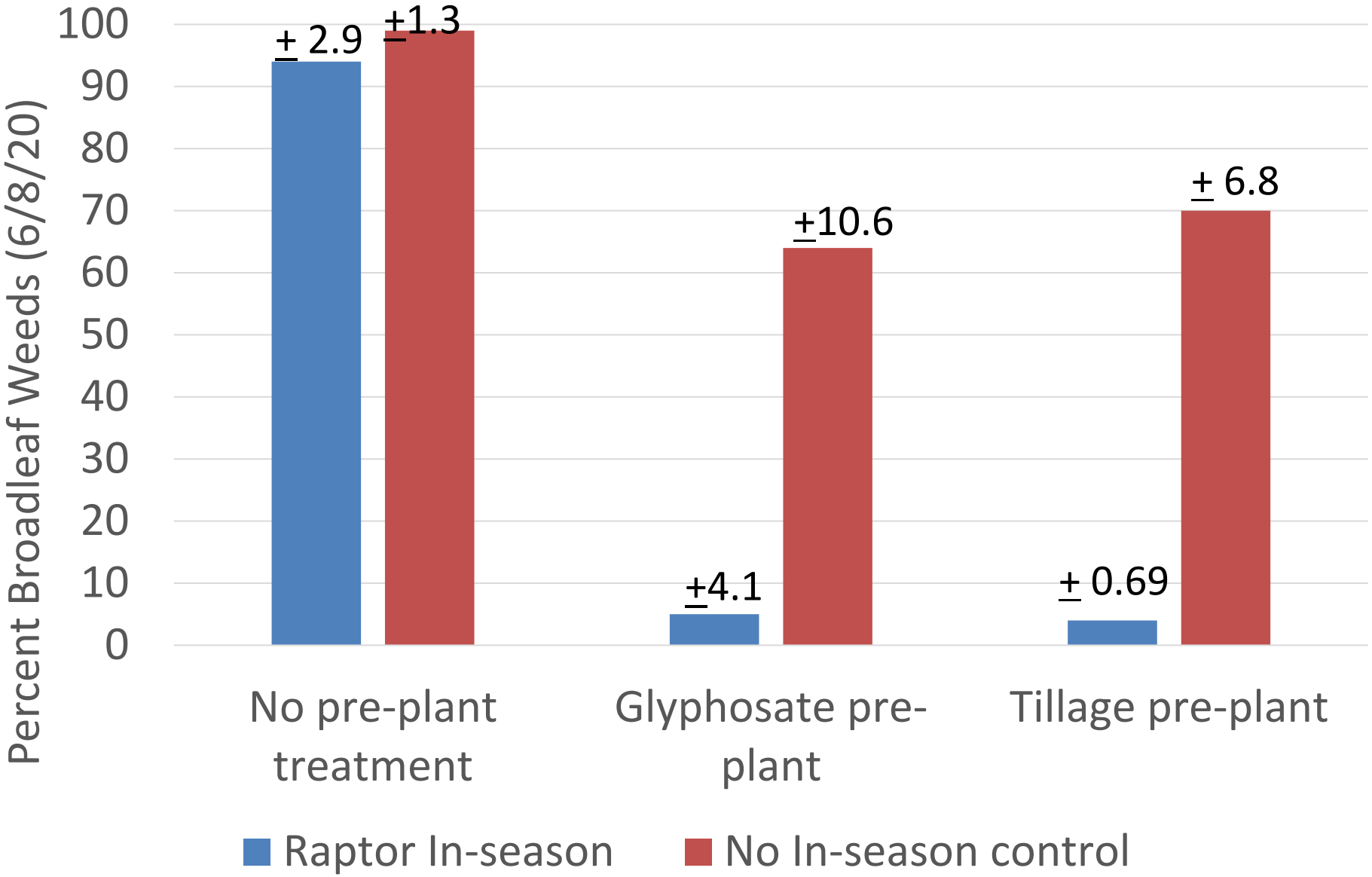
Bean Diagnostics and Observations

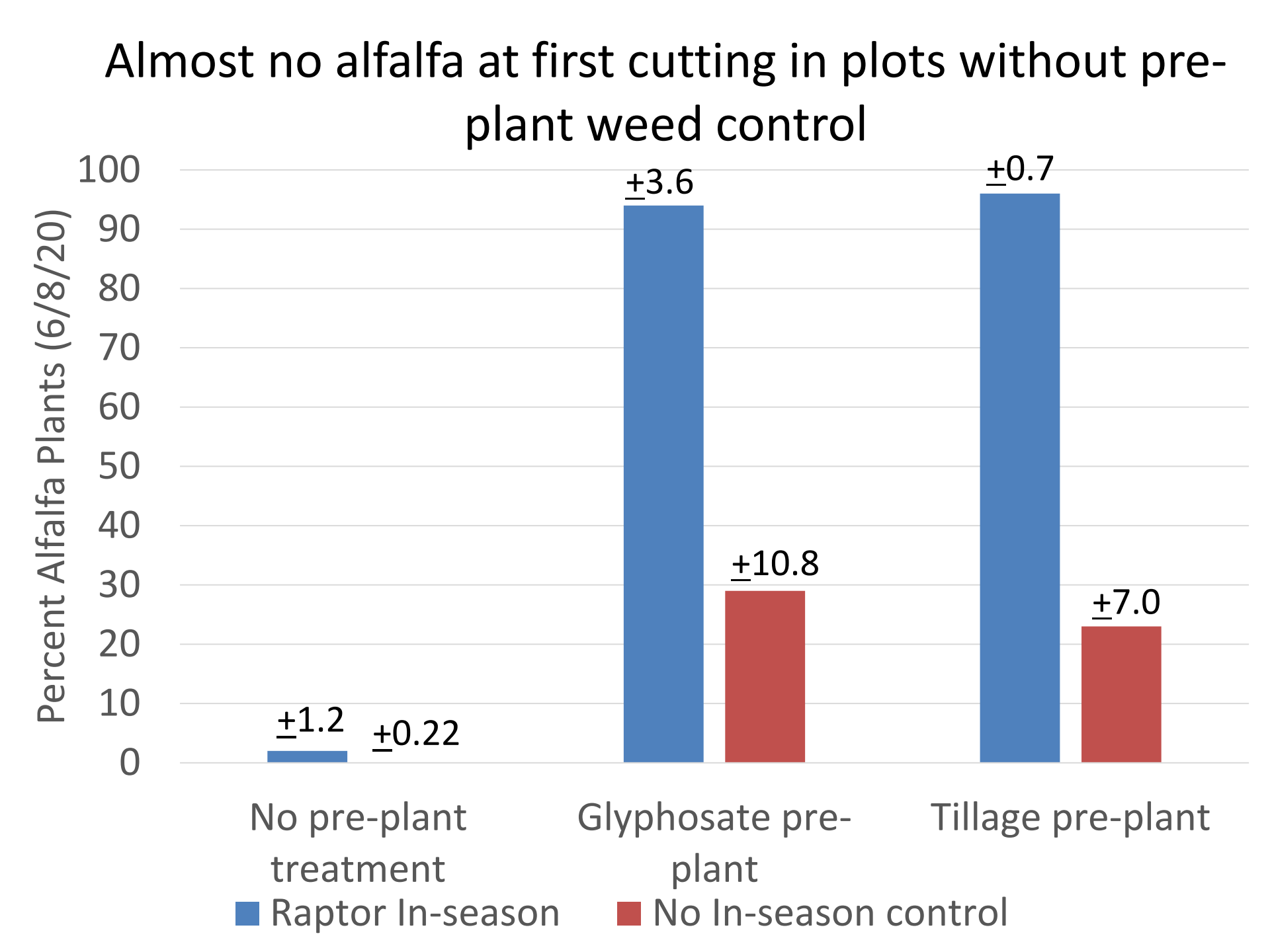
Weed competition during alfalfa stand establishment may be irreversible and can affect the crop for years: reduced root growth, thinner alfalfa stands, and lower forage quality.

Experimental treatments			
Treatment number	Pre-plant treatment	In-season treatment	Herbicide rate(s)
1	None	None	N/A
2	Cultivation	None	N/A
3	Glyphosate	None	3 pt/acre
4	None	Raptor	6 fl oz/acre
5	Cultivation	Raptor	6 fl oz/acre
6	Glyphosate	Raptor	3 pt/acre + 6 fl oz/acre

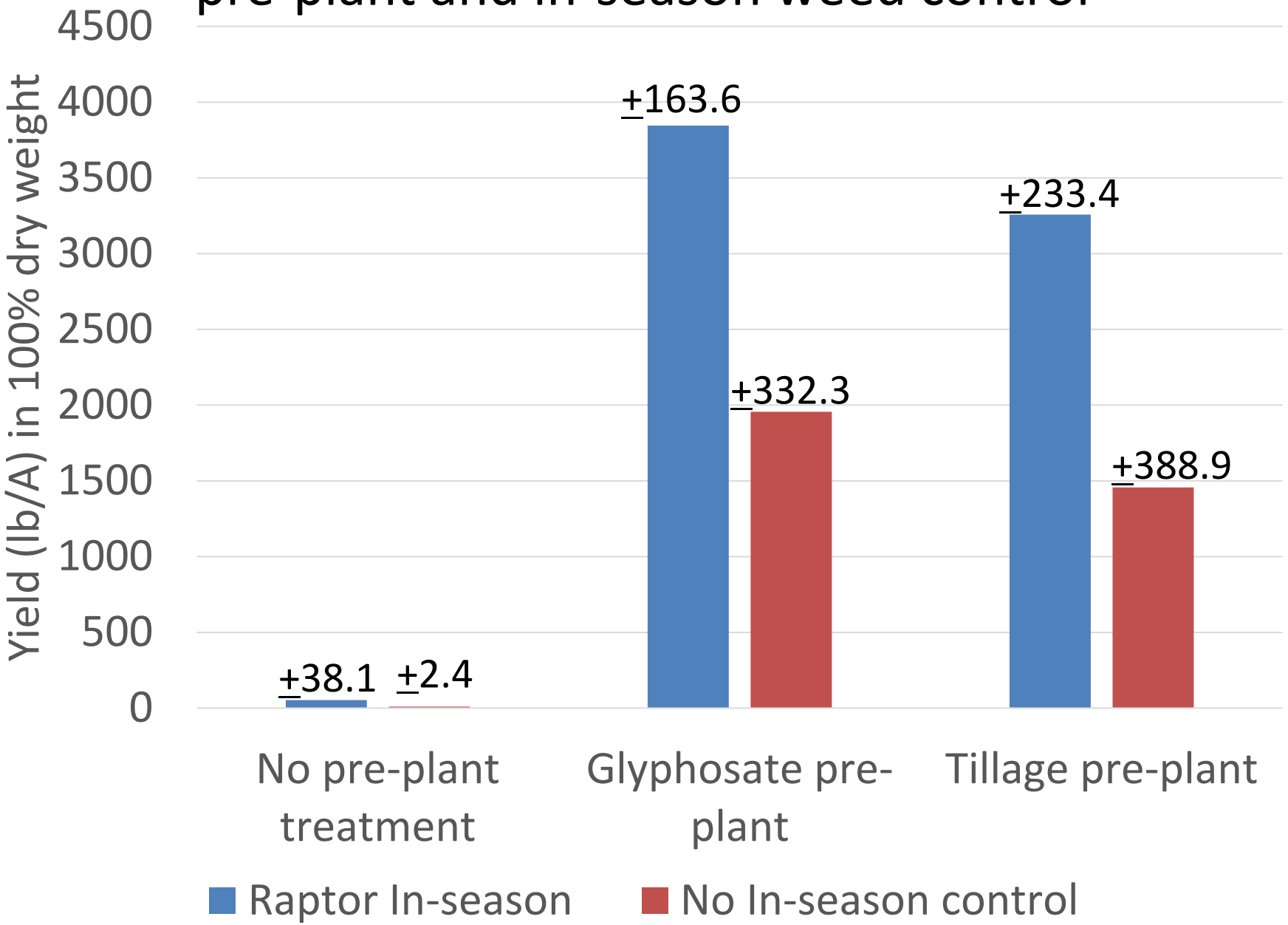
Glyphosate spray: 1/31
Mechanical Cultivation: 2/11
Field Planted: 3/4
In-season spray: 4/25

Pre-plant weed control reduced broadleaf weeds at first cutting; Raptor + pre-plant further reduced weeds




Almost no alfalfa at first cutting in plots without pre-plant weed control
Percent Alfalfa Plants (6/8/20)
100
90
80
70
60
50
40
30
20
10
0
±1.2
±0.22
±3.6
±10.8
±0.7
±7.0
No pre-plant treatment
Glyphosate pre-plant
Tillage pre-plant
Raptor In-season
No In-season control

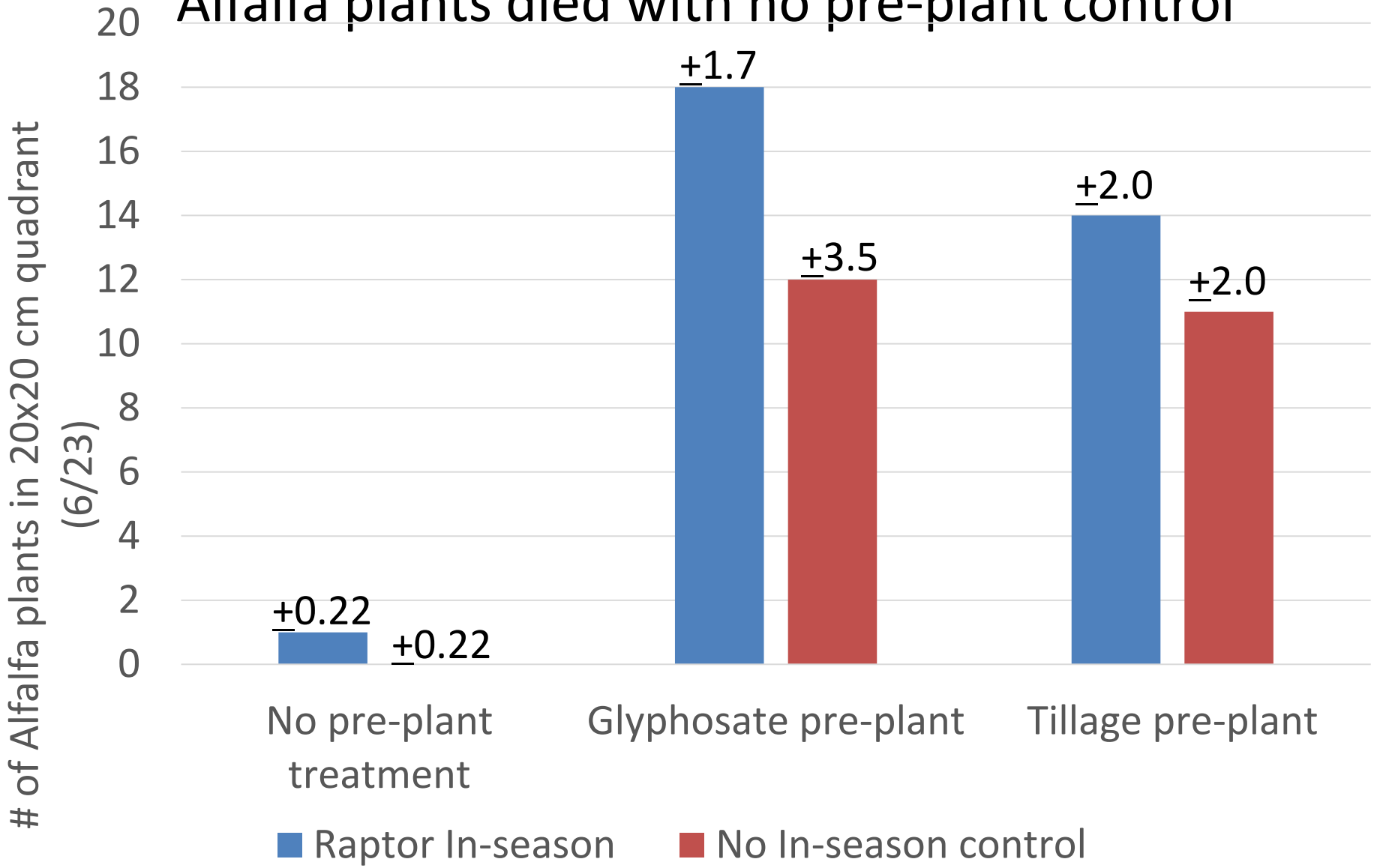
Alfalfa yields at first cutting were improved with both pre-plant and in-season weed control



Many weeds in treatments with no in-season herbicide spray, even those with pre-plant control. Alfalfa is robust in understory.

Pre-plant weed control made alfalfa stand more robust after first cutting, even with high initial weed pressure.

Alfalfa plants died with no pre-plant control



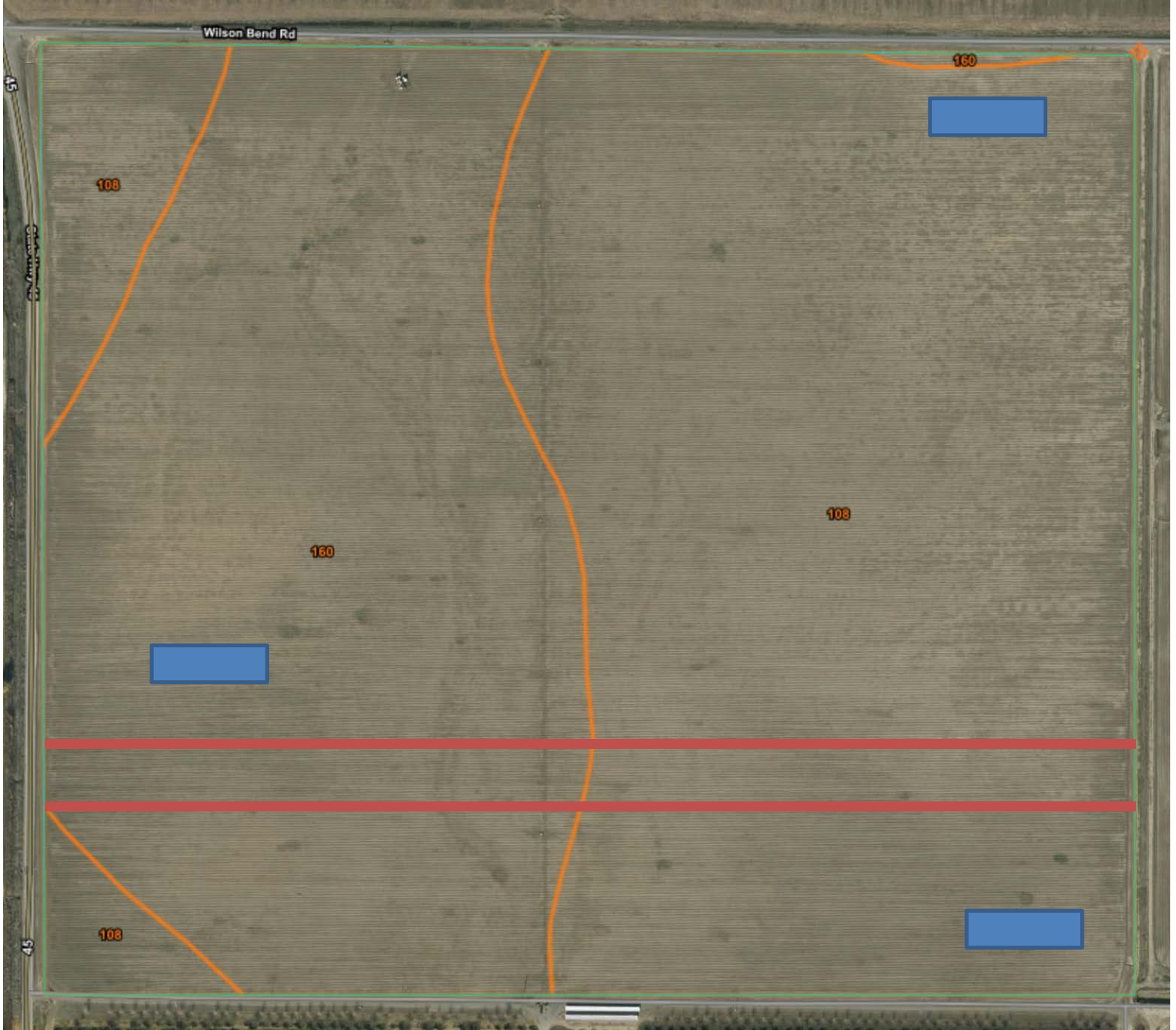
Summary and Conclusions:

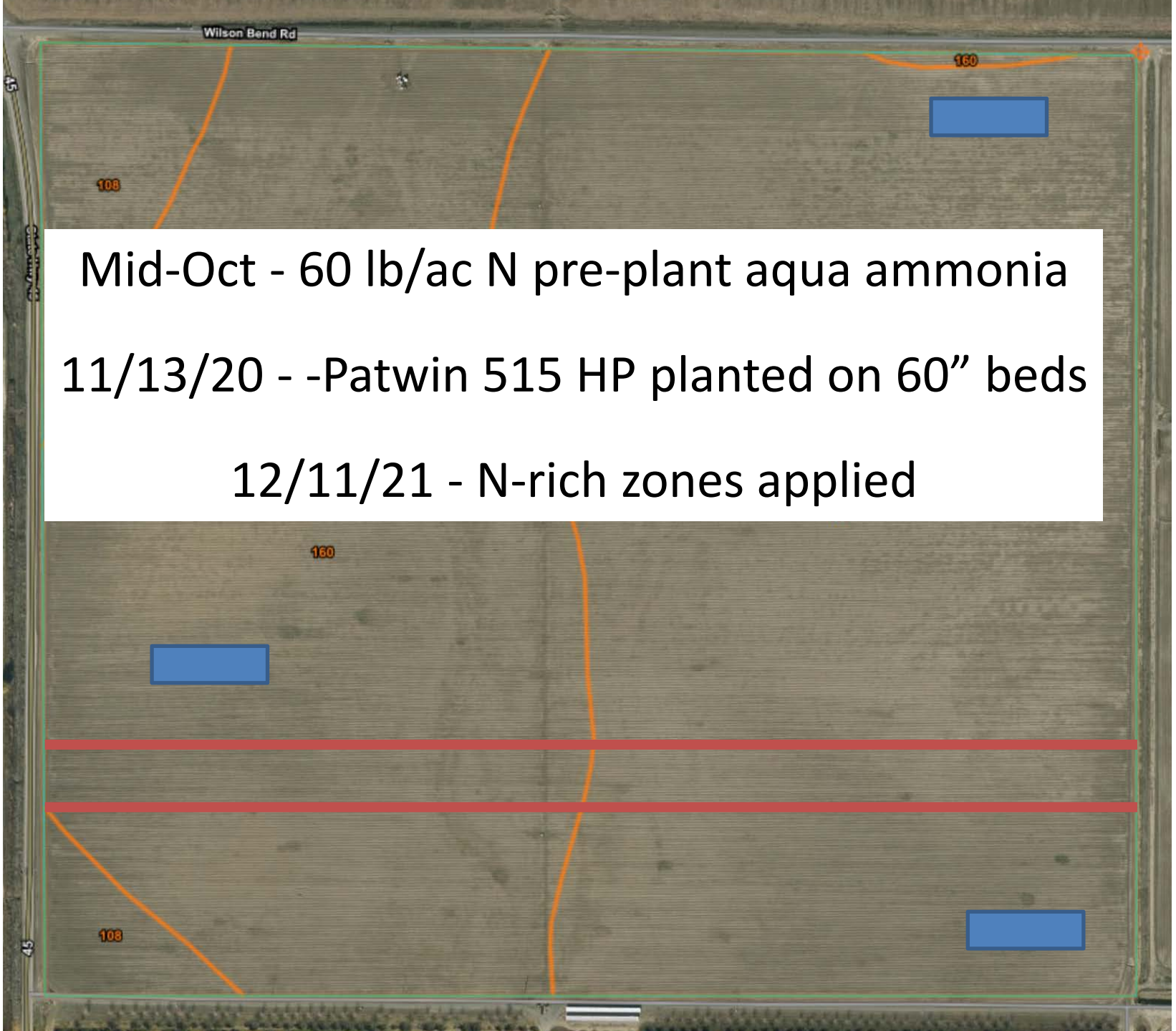
- Pre-plant weed control critical for reduced weed pressure, yield, and alfalfa stand counts.
- Highest yields and counts in plots with both pre-plant and an in-season control.
- Stand counts in plots with pre-plant control only were still relatively high.

Considerations for Organic Growers:

- Limited in-season control options
- Pre-plant mechanical cultivation for weed control and good stand establishment.
- Yield may be reduced for first cutting.
- Impact may not carry over to subsequent cuttings (weeds have already gone to flower).

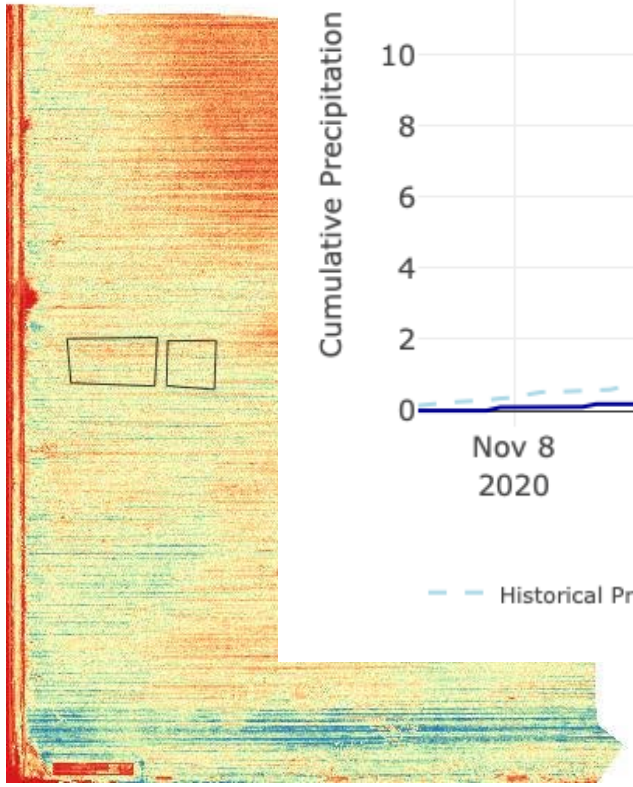
Optimizing Nitrogen Application in California Wheat and Assessing Pest Damage in Season

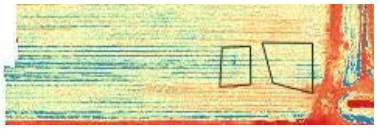

Wilson Bend Rd
160
108
108
160
108
45
45

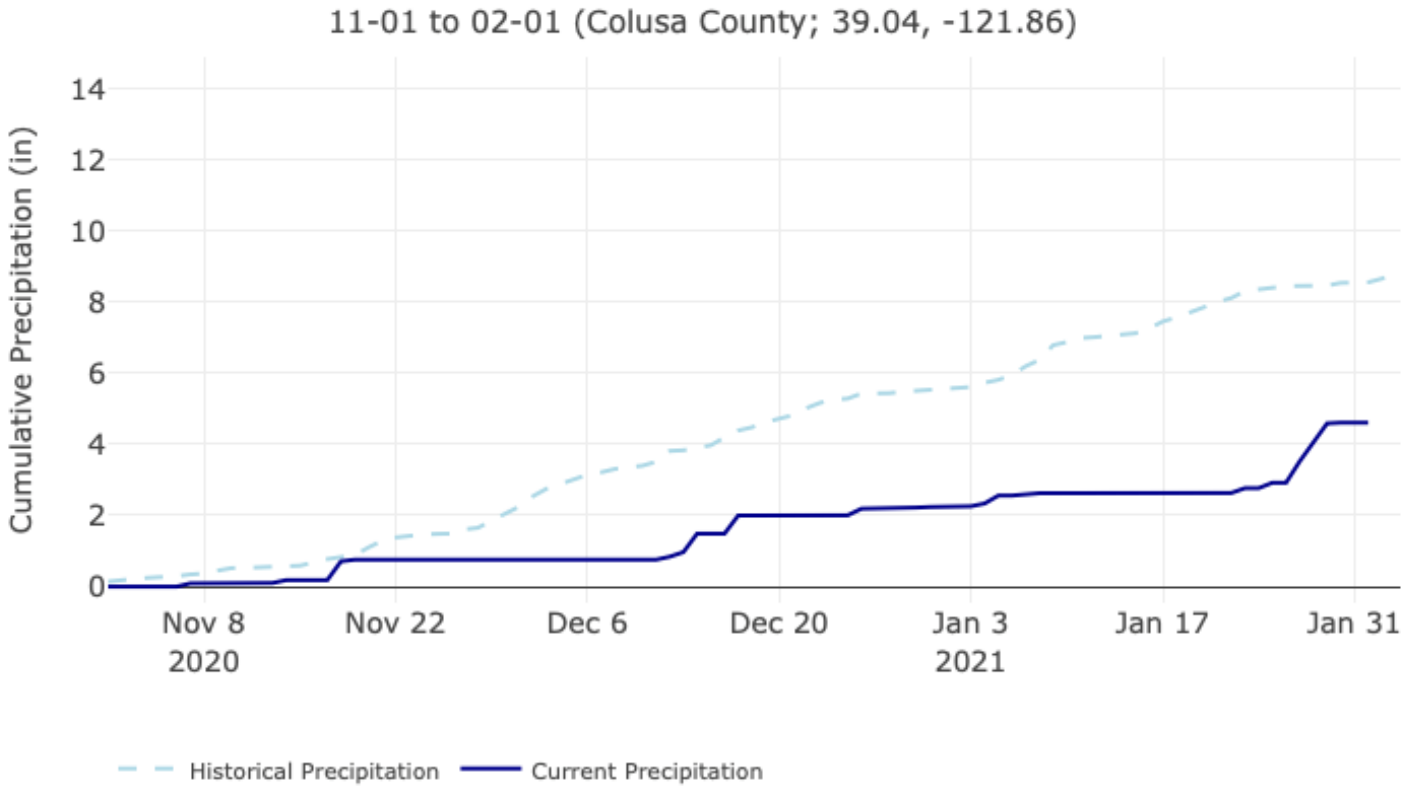

Wilson Bend Rd
160
108
Mid-Oct - 60 lb/ac N pre-plant aqua ammonia
11/13/20 - -Patwin 515 HP planted on 60” beds
12/11/21 - N-rich zones applied
160
108

Geese quickly ate ~20% of the field: Late Jan/Early Feb

Very low precipitation (7” for season)
Some plants did not emerge
Tiller counts were 24/ft^2 in geese damaged area
Fine in rest of field

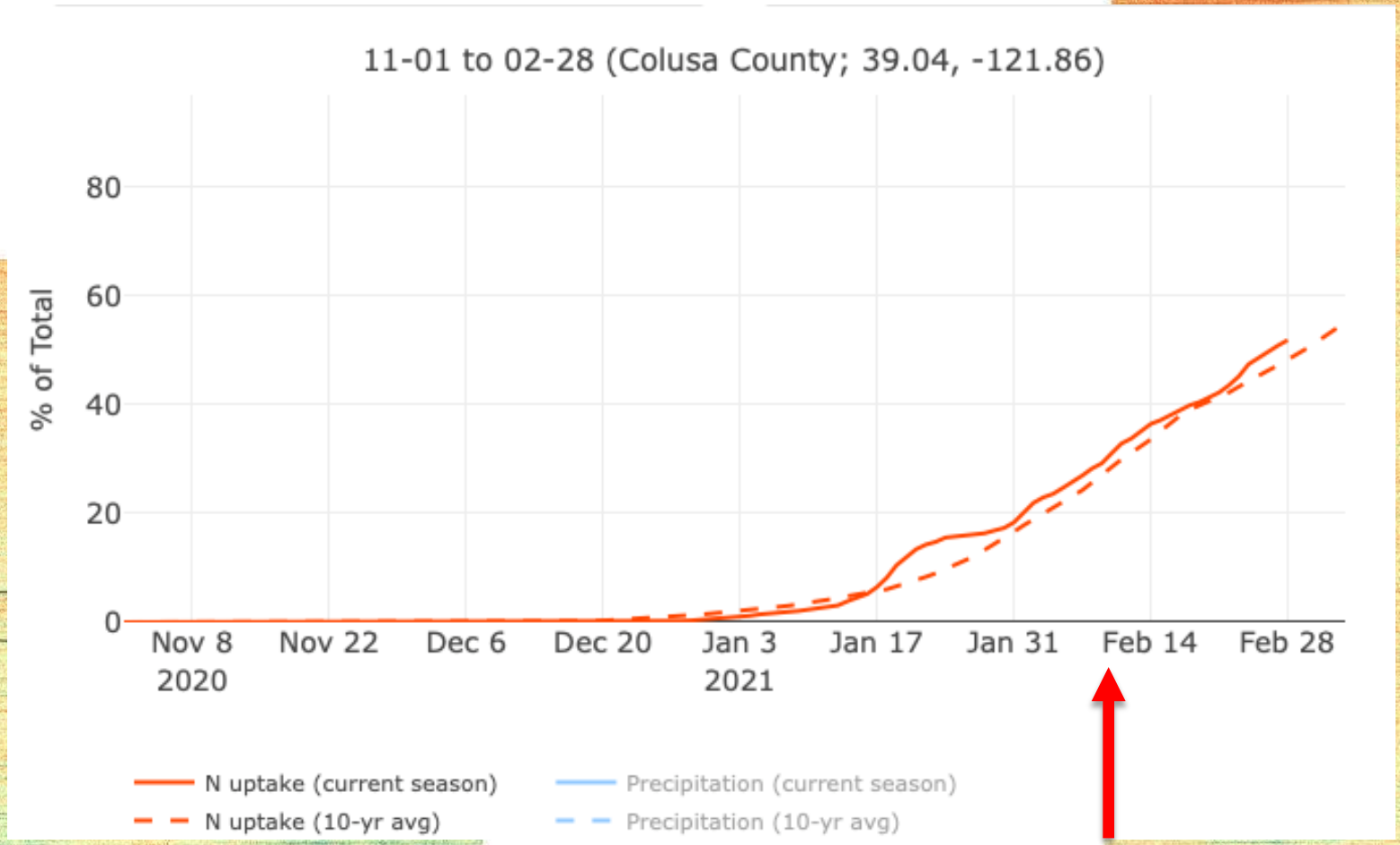






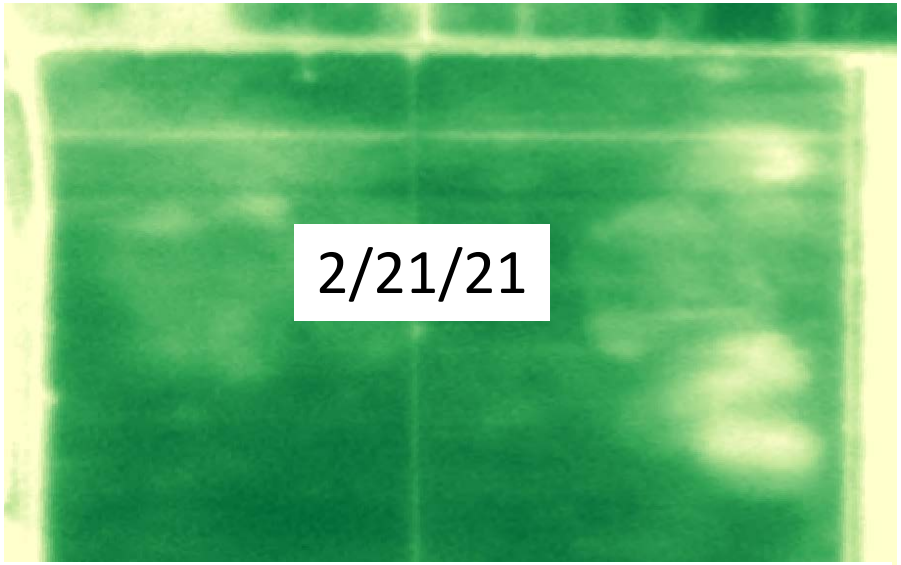
Plant monitoring on 2/8/21 did not indicate a crop response relative to N-rich zones.

Soil measurements: 90-166 lb N/ac

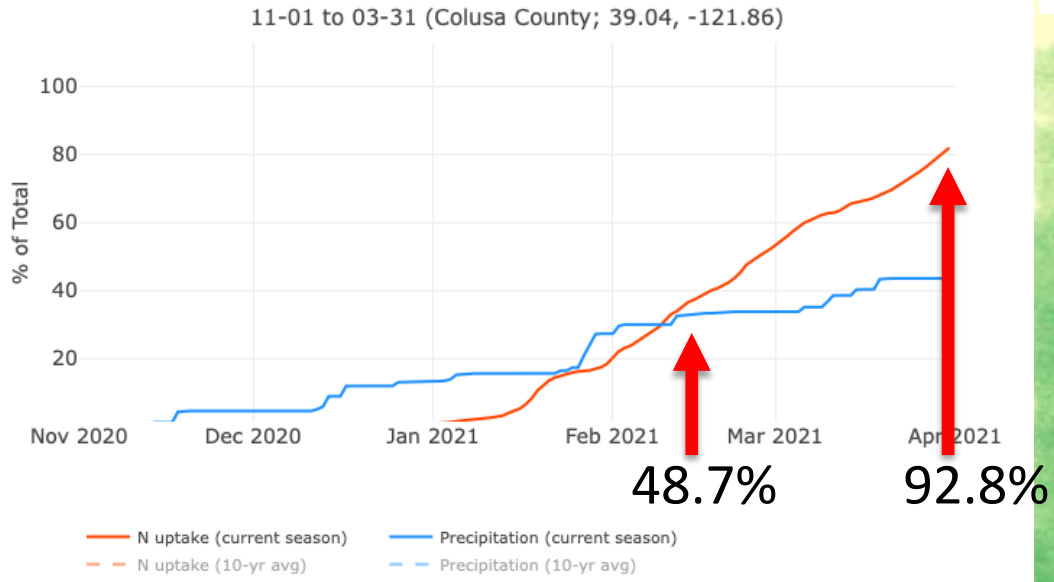


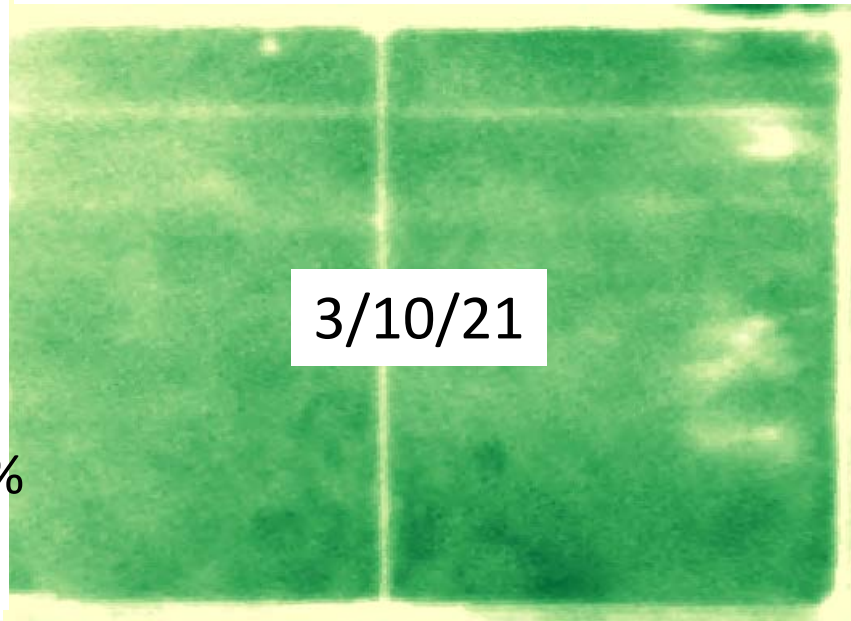
28.3% of total N

Drought conditions meant few opportunities to fly on N. Field was monitored with Planet images

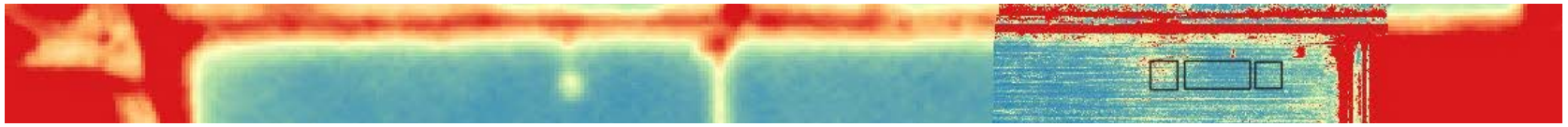


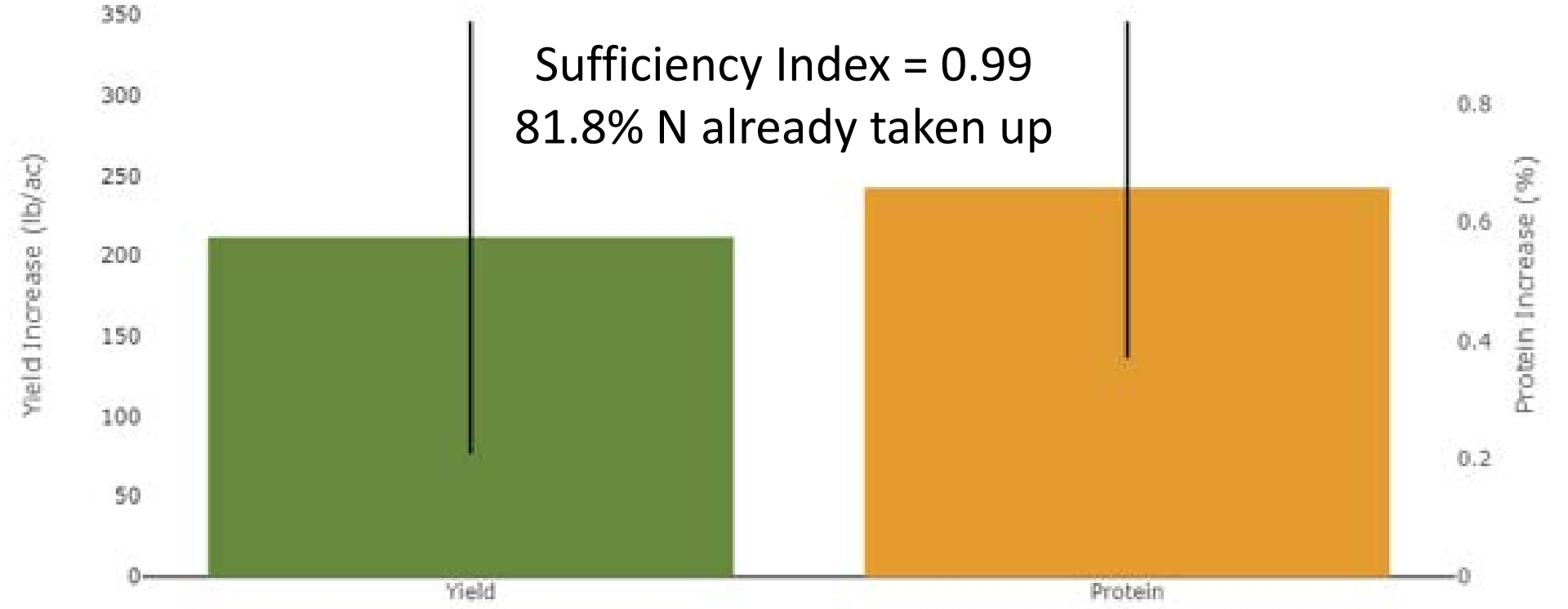
2 irrigations (12” each):
Begin 2/25/21
Begin 4/10/21

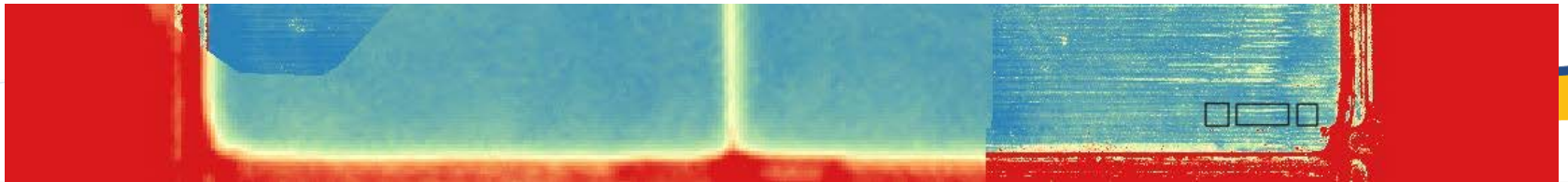


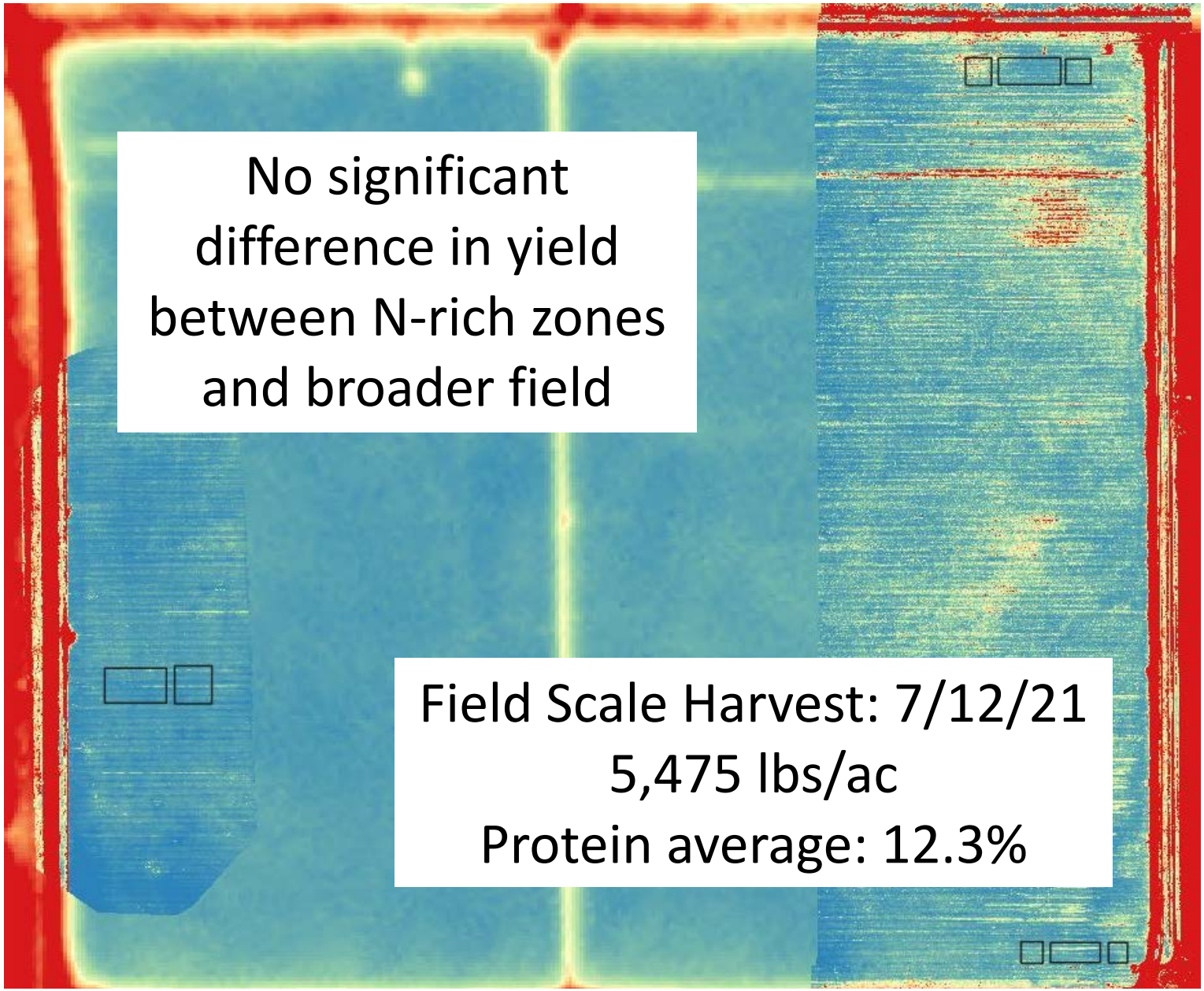


Decision support tool output (3/31) indicated minimal protein and negligible yield increases with 20lb/a N applied ~ not worth the cost of application.








No significant difference in yield between N-rich zones and broader field
Field Scale Harvest: 7/12/21
5,475 lbs/ac
Protein average: 12.3%

Field Scale N removed:
146 lb N/ac

60 lb N/ac applied

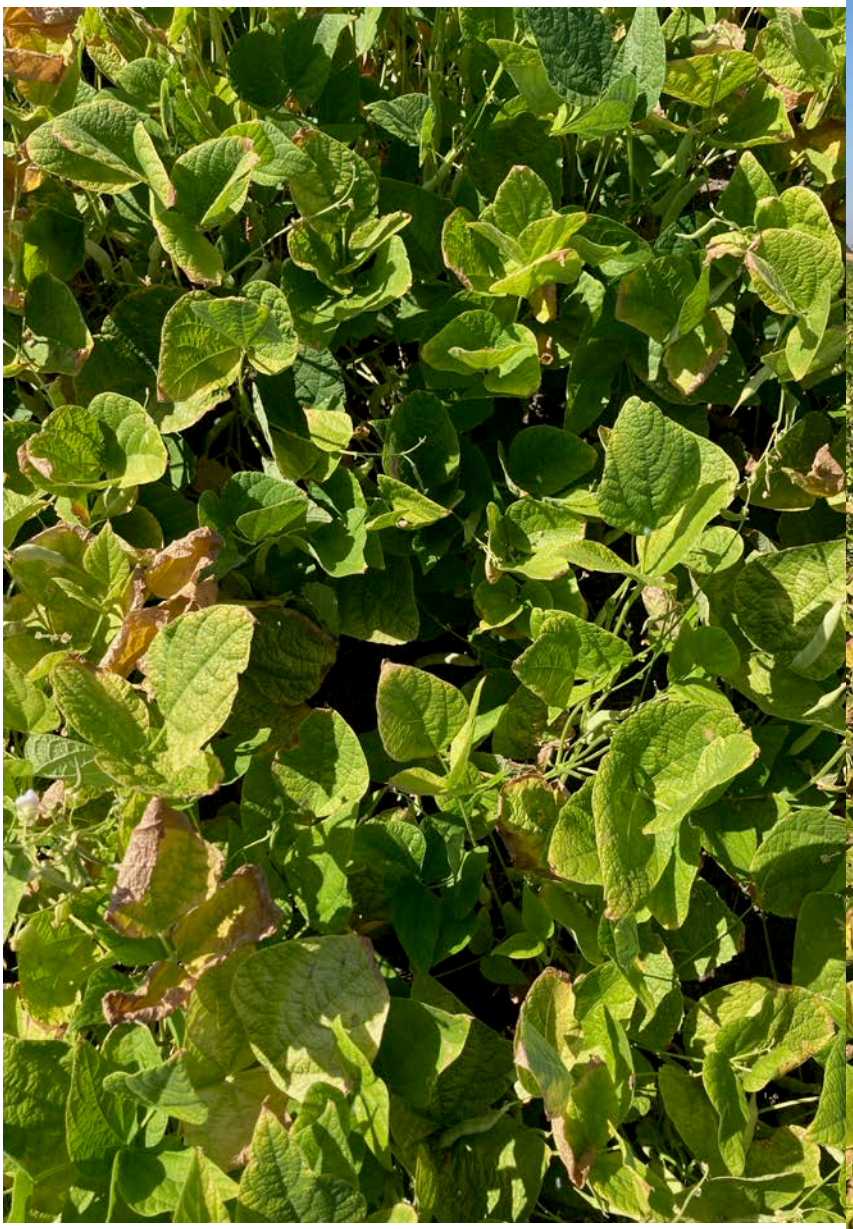
Crop took up 86 lb N/ac more than applied.

No N applied in-season.

60lb N/ac less than typical N rate

$45 savings/ac

Bean Diagnostics and Observations

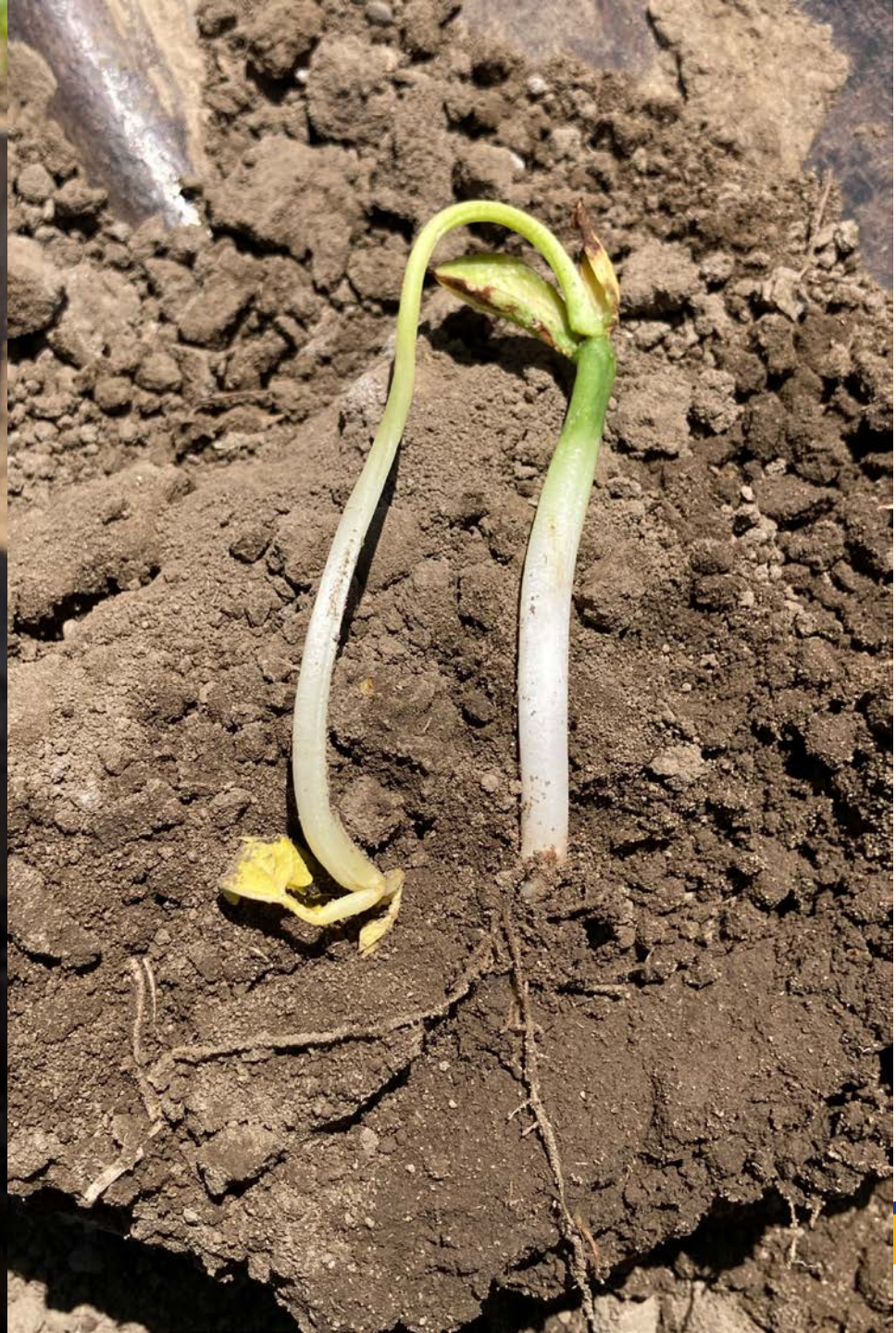


Combination of salt and boron damage

- Take pre-plant soil and irrigation water samples especially in drought years (reduced leaching and effluent water).
- Rotate with crops that have a higher tolerance for salt or boron if field levels are high.
- Optimize fertilizer applications every year will reduce the risk of salinity in the future.

Darkling Beetle Damage

- Many in soil and field.
- Darkling beetles can quickly eat a stand during seedling stage but do not cause damage after plants are established.
- Unfortunately, no baits are labeled for baby limas.
- Grower applied Lamdicide per PCA recommendation.

Herbicide Damage Due to Cold Spell

- Planted late April followed by low of 37F two weeks later - slowed emergence.
- More exposure to pre-plant herbicide mix of Brawl (inhibits seedling shoot growth) and Sonalan (inhibits root growth).
- Combination and longer residence time led to malformed plants
- Field yielded well, over 3,500 lbs/acre (uncleaned).

Soil Compaction Stunted Plants

- Herbicide damage symptoms were consistent throughout field.
- Water pooled in affected area (where equipment moved into field, tank mix, etc.)
- Soil compaction restricted root growth

THANK YOU!

Erdman Farms

River Garden Farms

UCCE Small Grains Team

CDFA Fertilizer Research and Education Program

California Alfalfa and Forage Association