

EFFECT OF NITROGEN RATES ON YIELD AND QUALITY OF TOMATO GROWN IN THE SPRING WITH SUB-SURFACE (SEEPAGE) IRRIGATION



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Thanks, Thanks and Thanks
to the "tomato grower" for in-kind
contributions: growing the crop
and labor



BMP Background

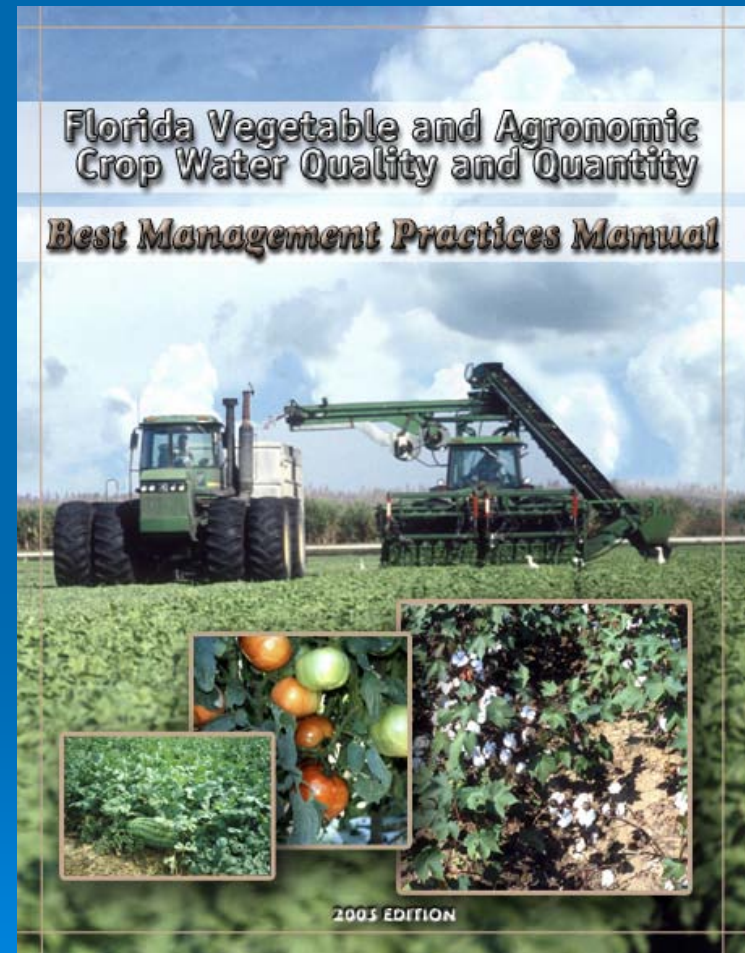
- As a response to the Federal TMDL mandate, the Florida legislature passed the Florida Watershed Restoration Act.
- The legislation gave the Florida Department of Agriculture and Consumer Services (FDACS) the authority to develop BMP (Best Management Practices) to reduce pollutants loads in target watershed.

BMP for Vegetables

DACS web-site:

- http://www.floridaagwaterpolicy.com/PDF/Bmps/Bmp_VeggieAgroCrops2005.pdf
- <http://swfrec.ifas.ufl.edu/bmp/vegetable>

The BMP program is "voluntary"

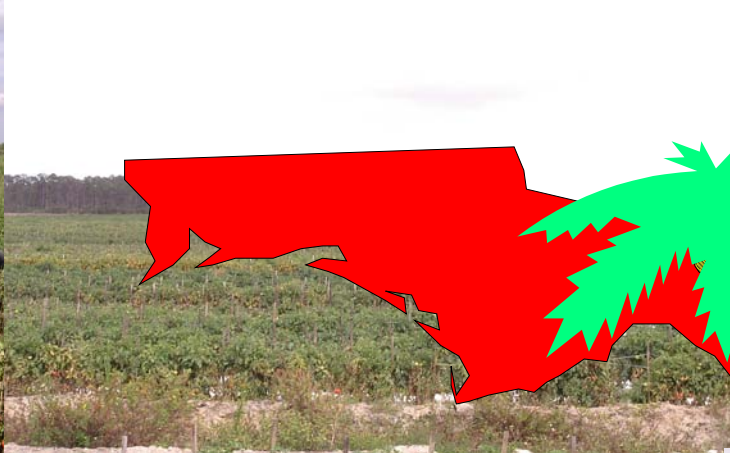


BMP N° 33

Optimum fertilizer management/application

Four years funding from DACS :

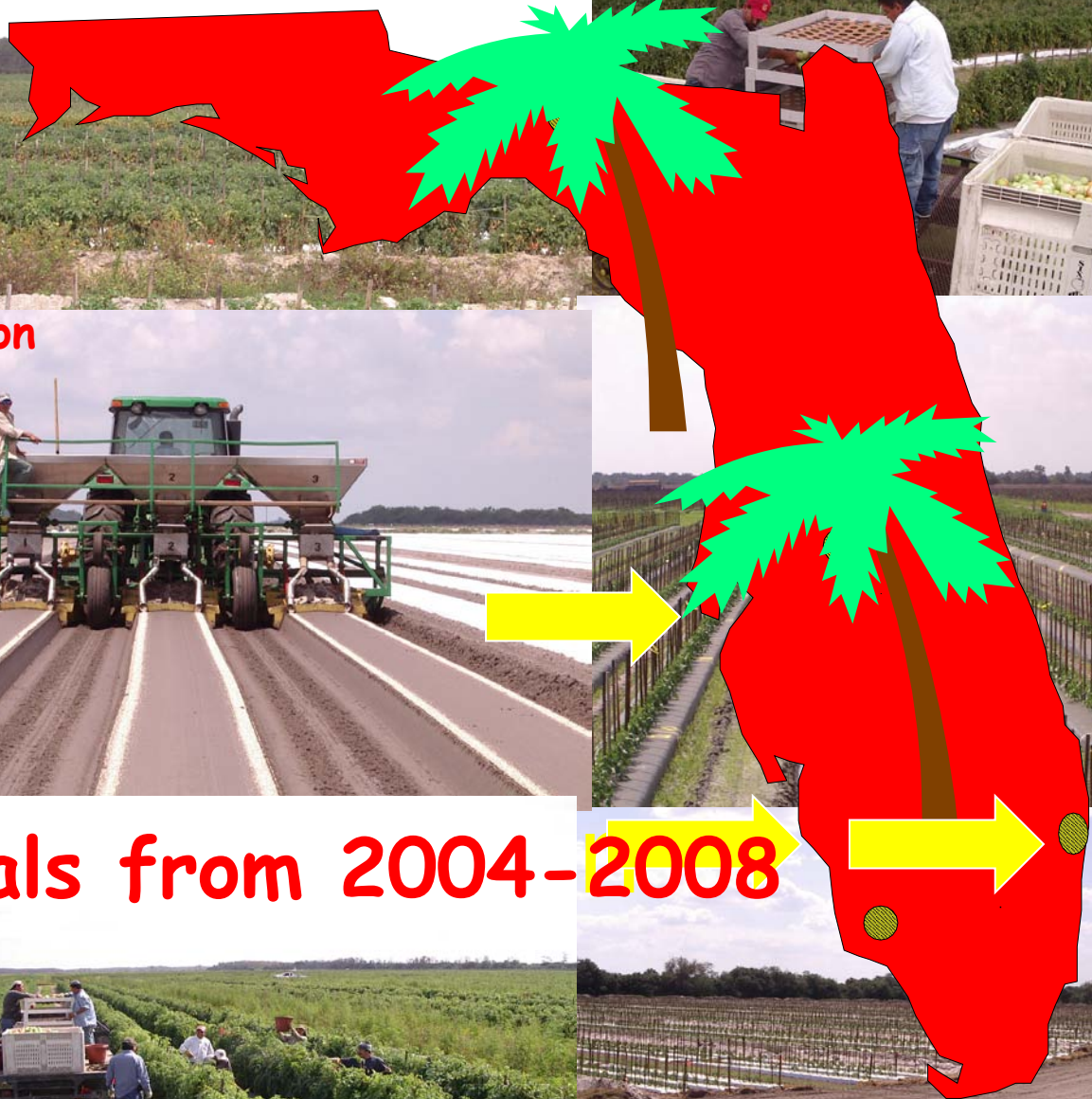
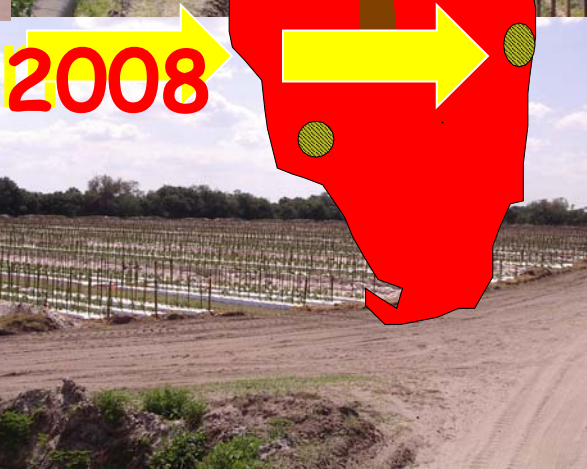
1. Establish partnerships tomato growers to evaluate the effects of N rates under commercial growing conditions.
2. Evaluate the N rates on plant growth, disease incidences, and production.
3. Determine the optimal N rate and evaluate the cost effectiveness.
4. Propose, if needed, a change in N recommendation



70% of the tomato production is in the Southwest Florida area: Collier and Manatee County in sandy soils

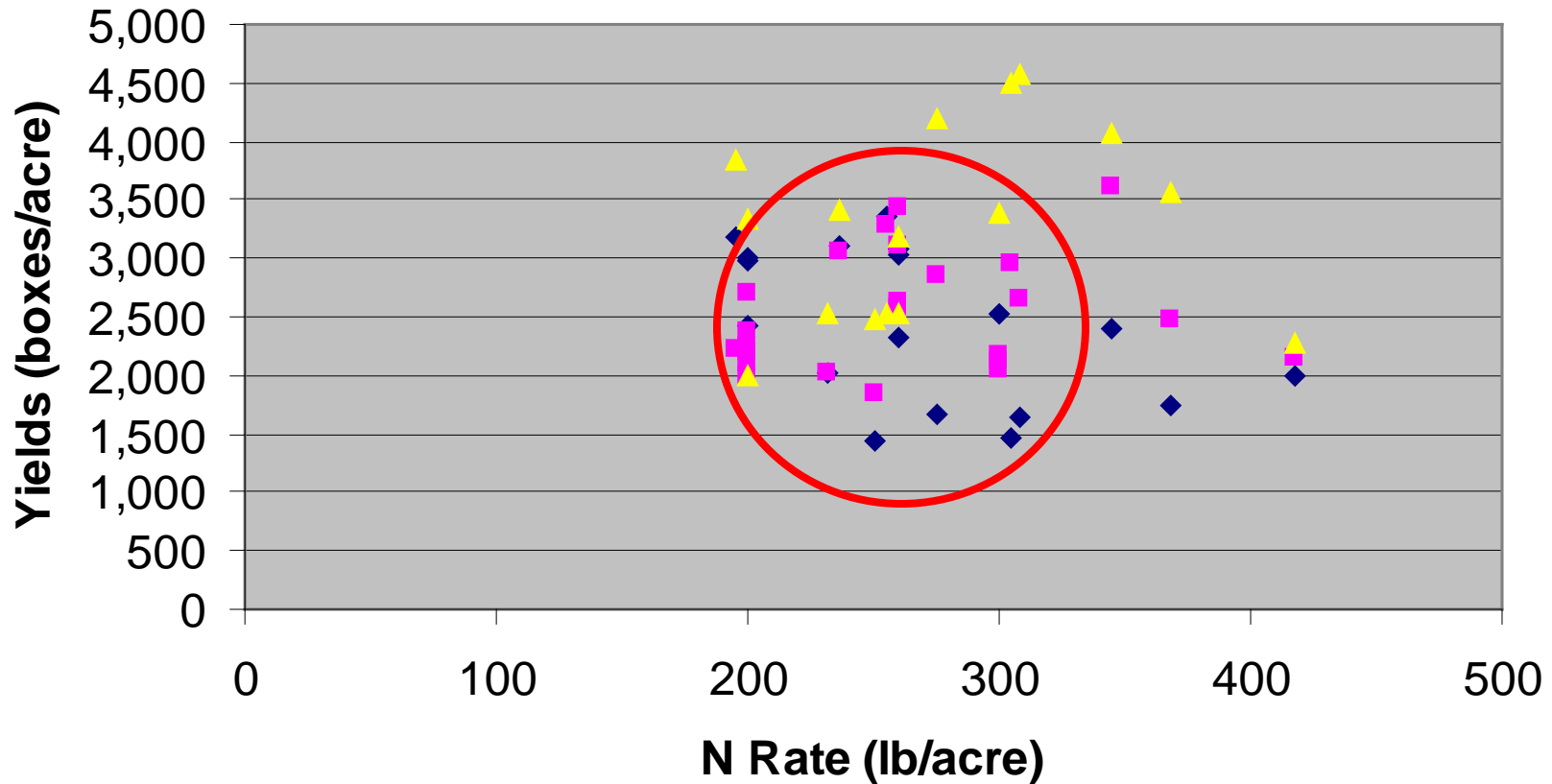


30 N Trials from 2004-2008



Total Tomato Yields (30 trials 2004-2008)

- ◆ Fall
- Winter
- ▲ Spring



Field History

Spring 2007

Two weeks after transplant



At third harvest



Experimental Design	CRBD (4 reps)
Irrigation	Seepage
Plot size	90'
Planting Date	February 15, 2007 (Spring)
Variety	Florida 47
Fumigation	Methyl Bromide
Linear ft per acre	7,260
Bed Spacing	6 ft
Plant population	3,630
Bed Height	8 in
Plant Spacing	24'
Bed Wide	36 inch
Row run	North - South
Monitoring Wells	4
Harvest Date	
1st	15-May-07
2nd	29-May-07
3rd	12-Jun-07
Planting to 3er pick	17 weeks

Multiple N Fertilizer Rates Spring 2007

Treatments	Fertilizer Bottom mix (lb N/acre)	Fertilizer Hot mix (lb N/acre)	Fertilizer Total N Rate (lb N/acre)
1	20	0	20
2	20	40	60
3	20	100	120
4	20	160	180
5	20	220	240
6	20	280	300
7	20	340	360
8	20	400	420



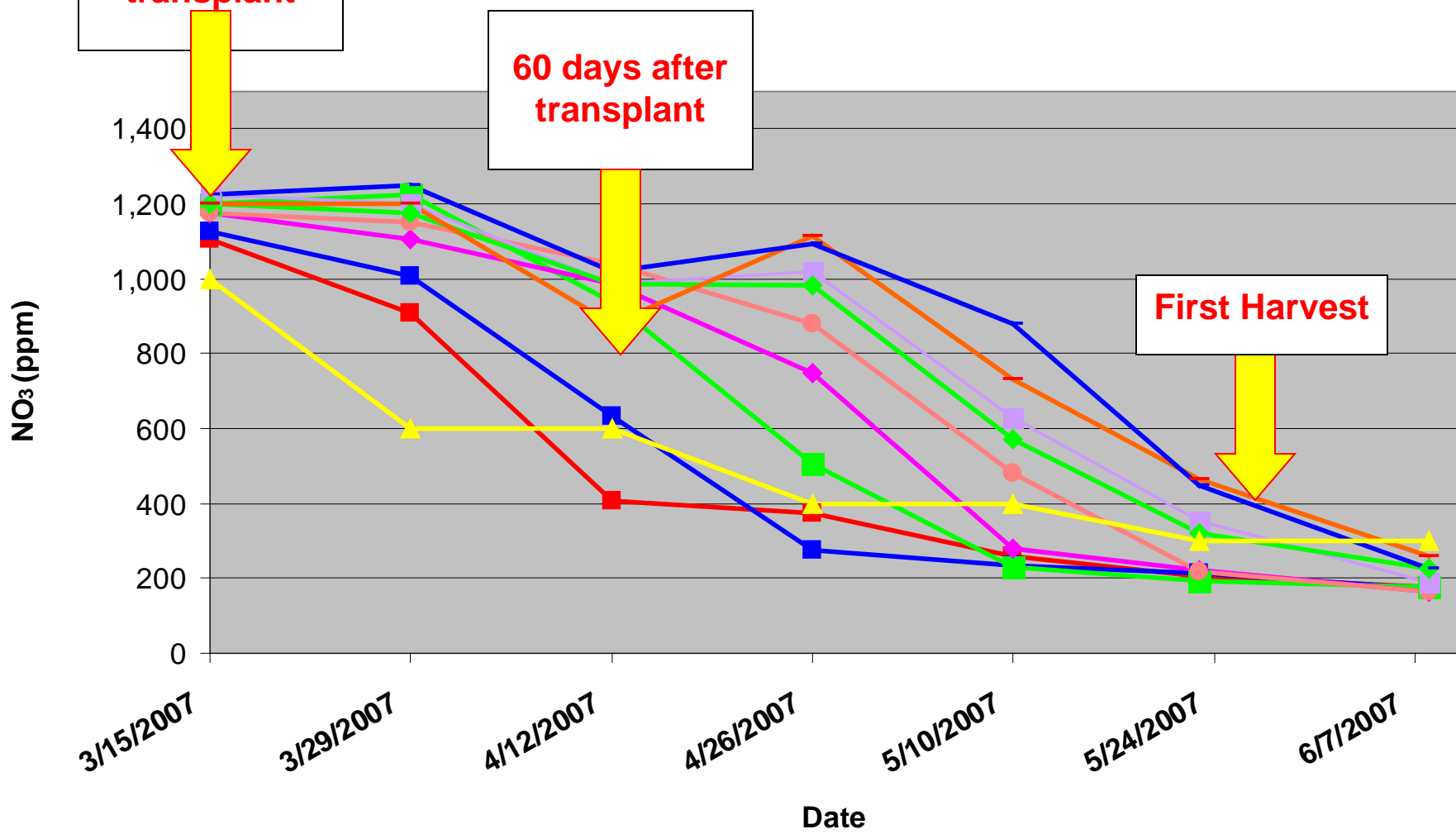
Data Collection



Results and Conclusions



Nitrogen Sap



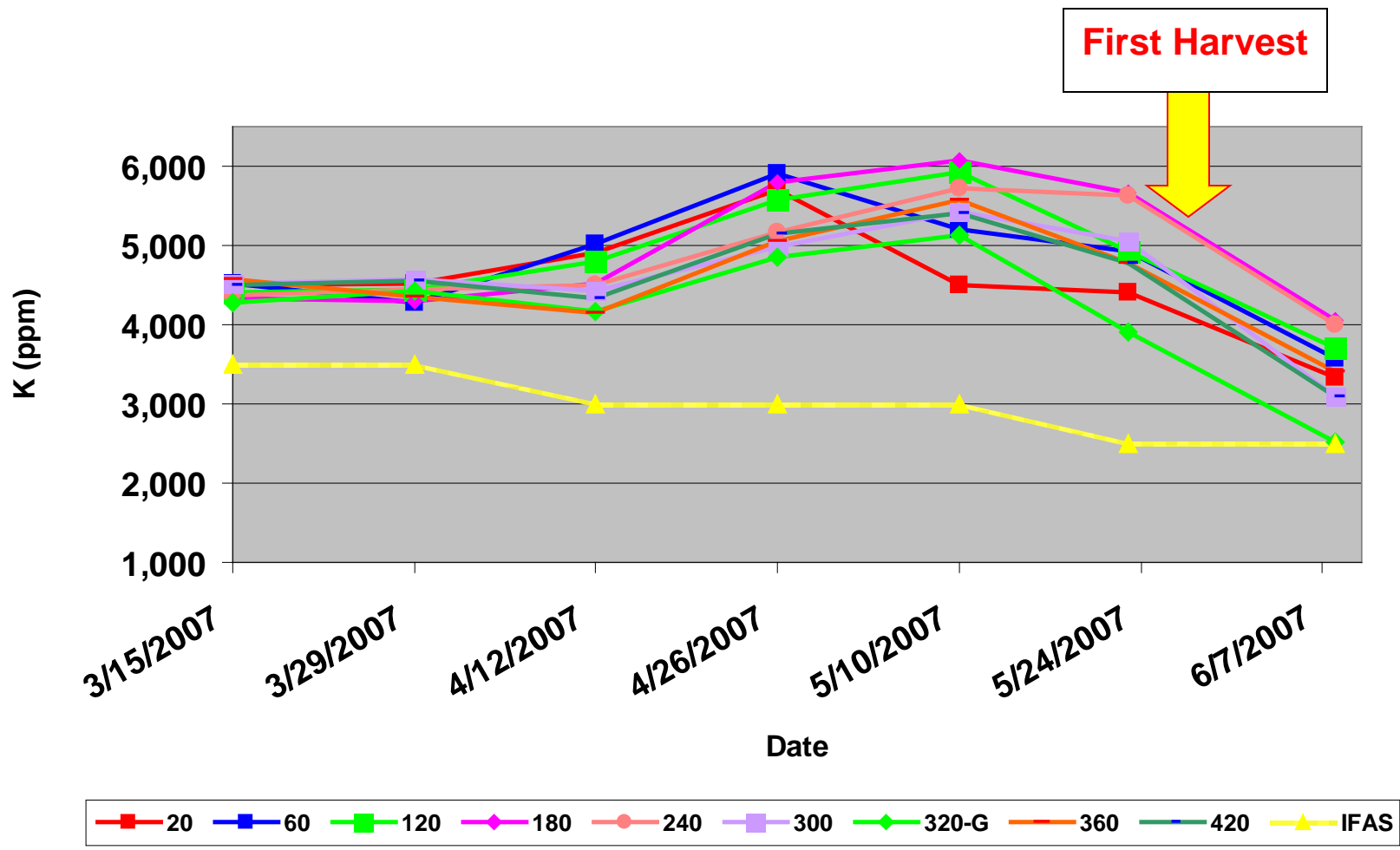
30 days after transplant

60 days after transplant

First Harvest

- 20
- 60
- 120
- 180
- 240
- 300
- 320-G
- 360
- 420
- IFAS

Potassium Sap



30 days



20



60



120



180



240



300



360



420



Grower

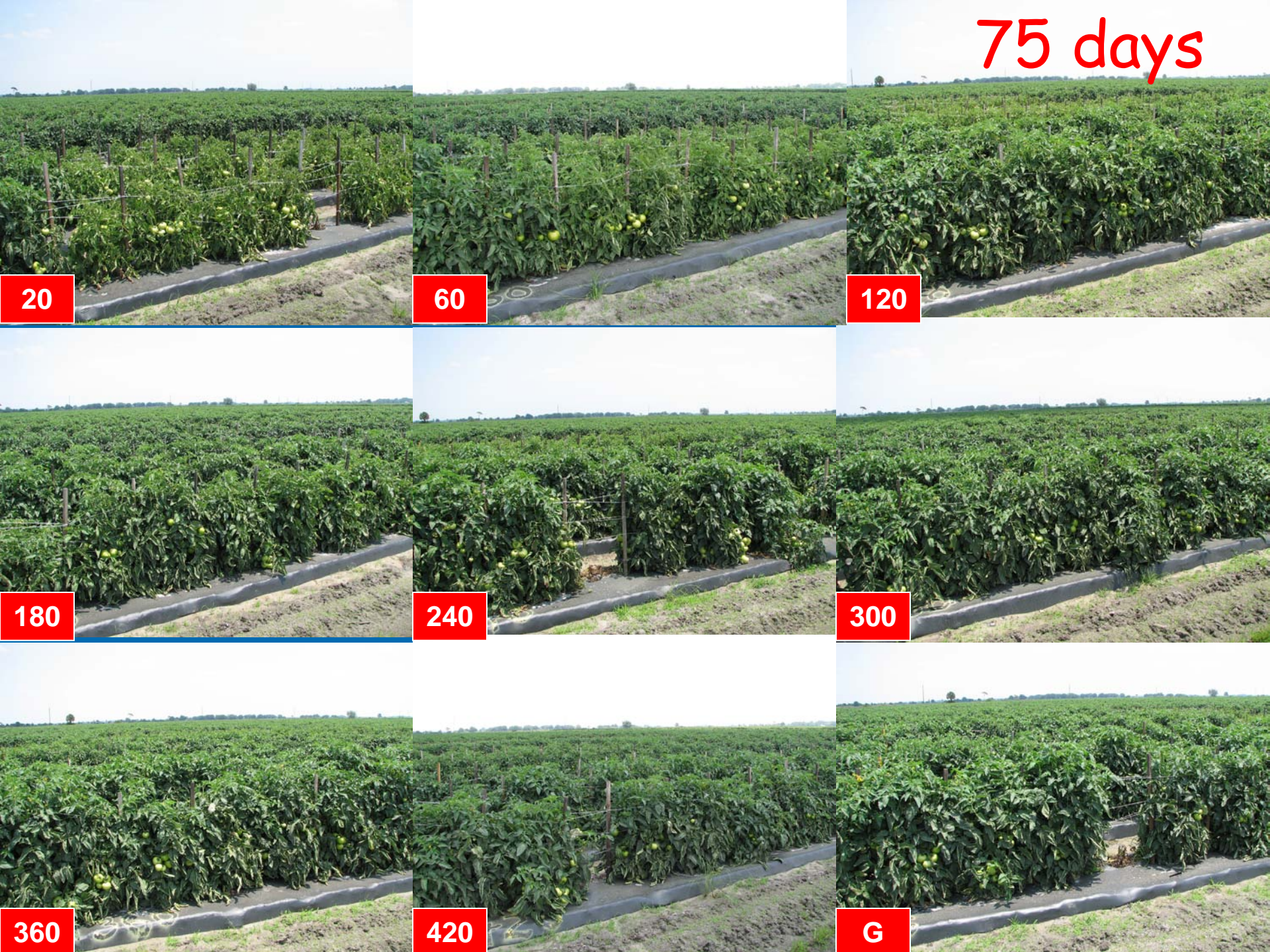
45 days



60 days



75 days



20

60

120

180

240

300

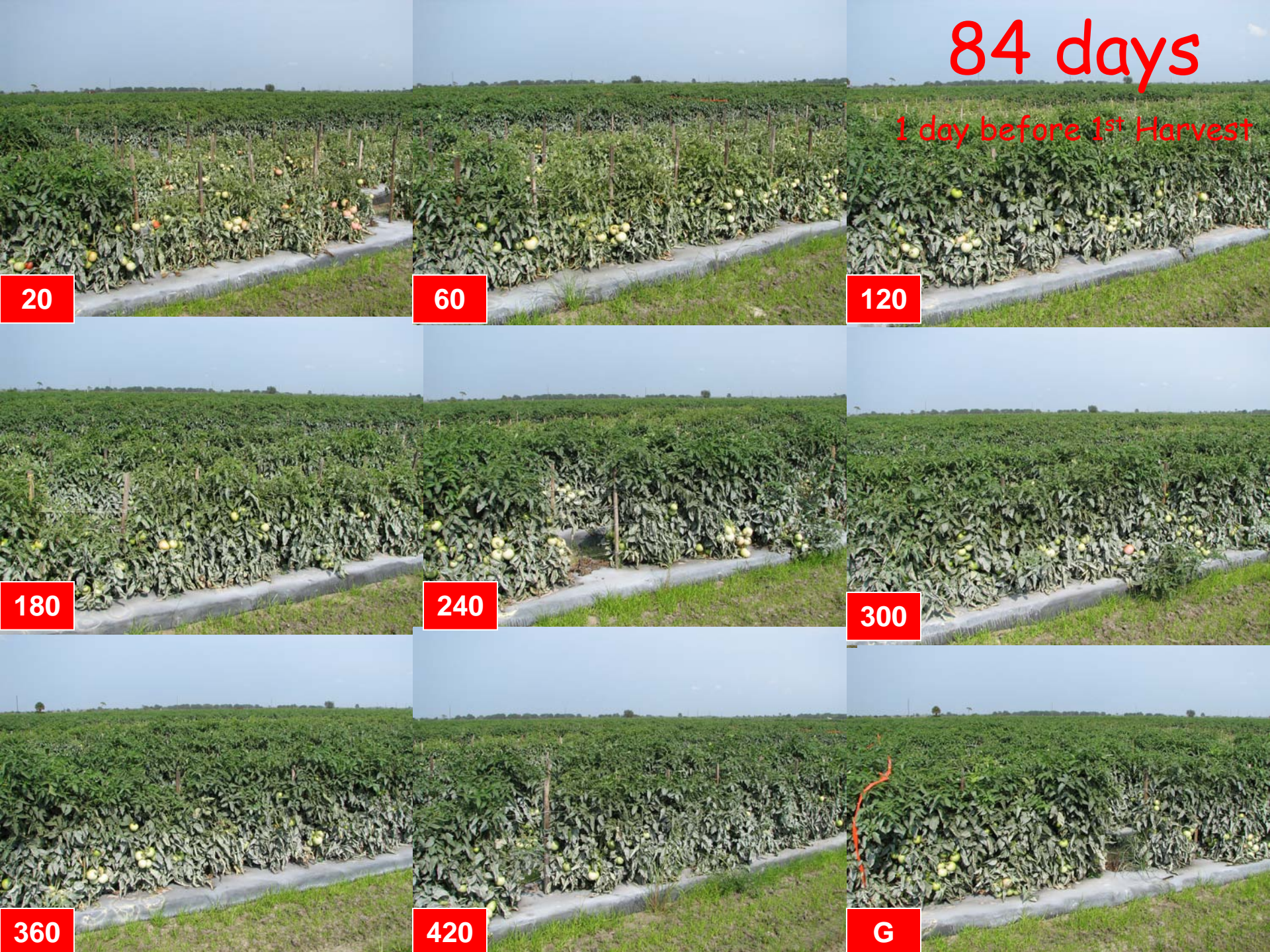
360

420

G

84 days

1 day before 1st Harvest



20

60

120

180

240

300

360

420

G

100 days

2 days after 2nd Harvest



20



60



120



180



240



300



360



420



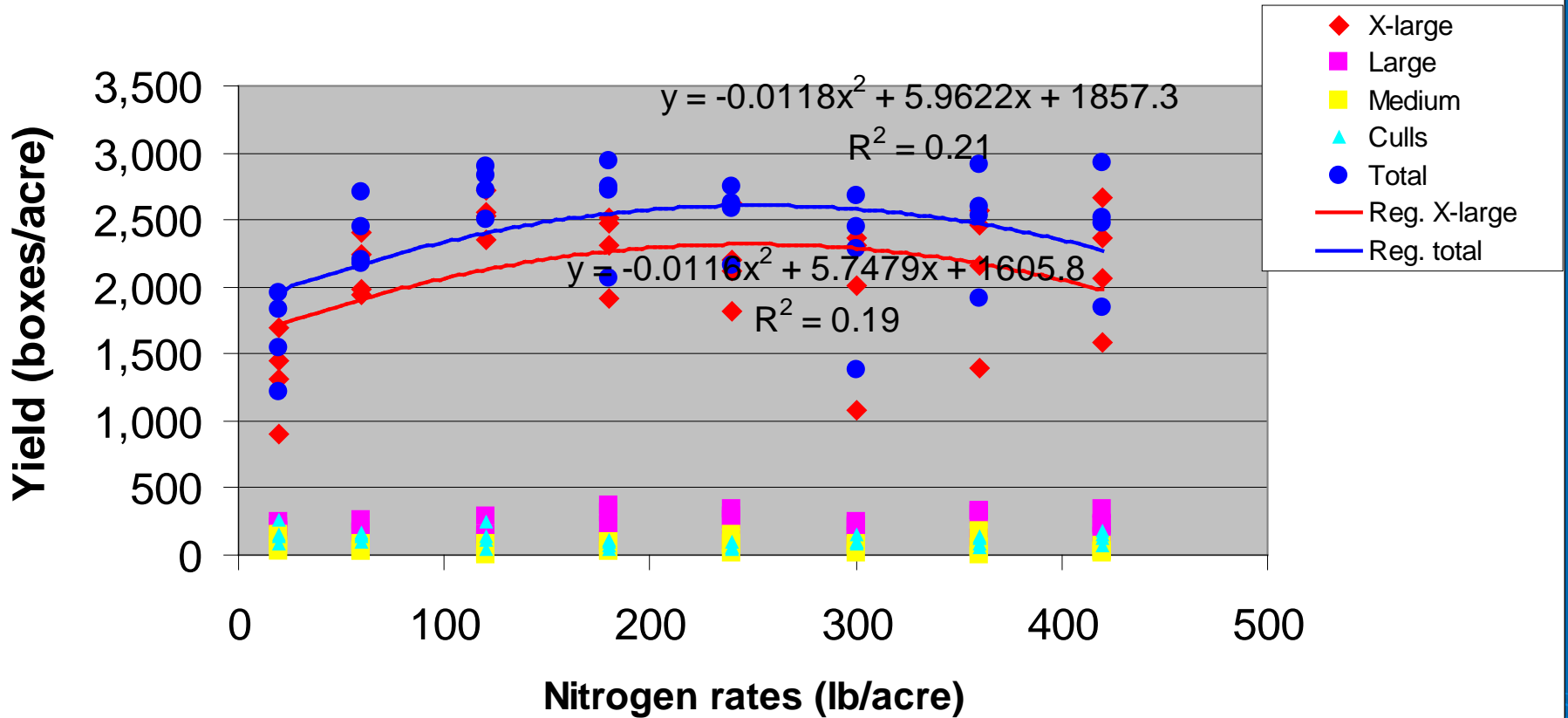
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Yield Tomato, Harvest and Fruit Quality

- First harvest X-large = 65% of the total marketable fruits.
- Total harvest X-large = 81% of the total marketable fruits.
- Total culls = 7.6% of the total marketable fruits.
- Blossom end rot = 2.1% of the total marketable fruit.
- Total marketable fruits = 100%

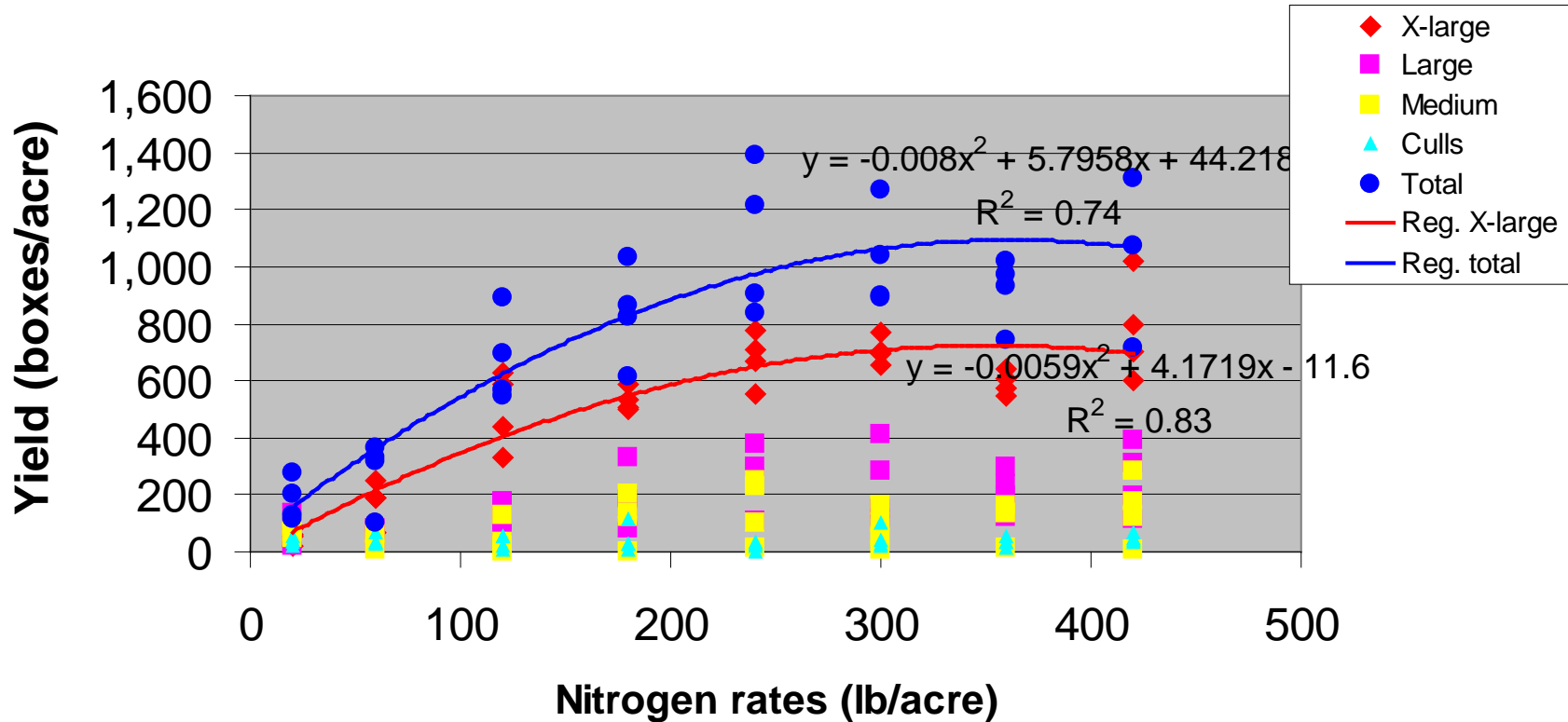


First Harvest (May 15, 2007)



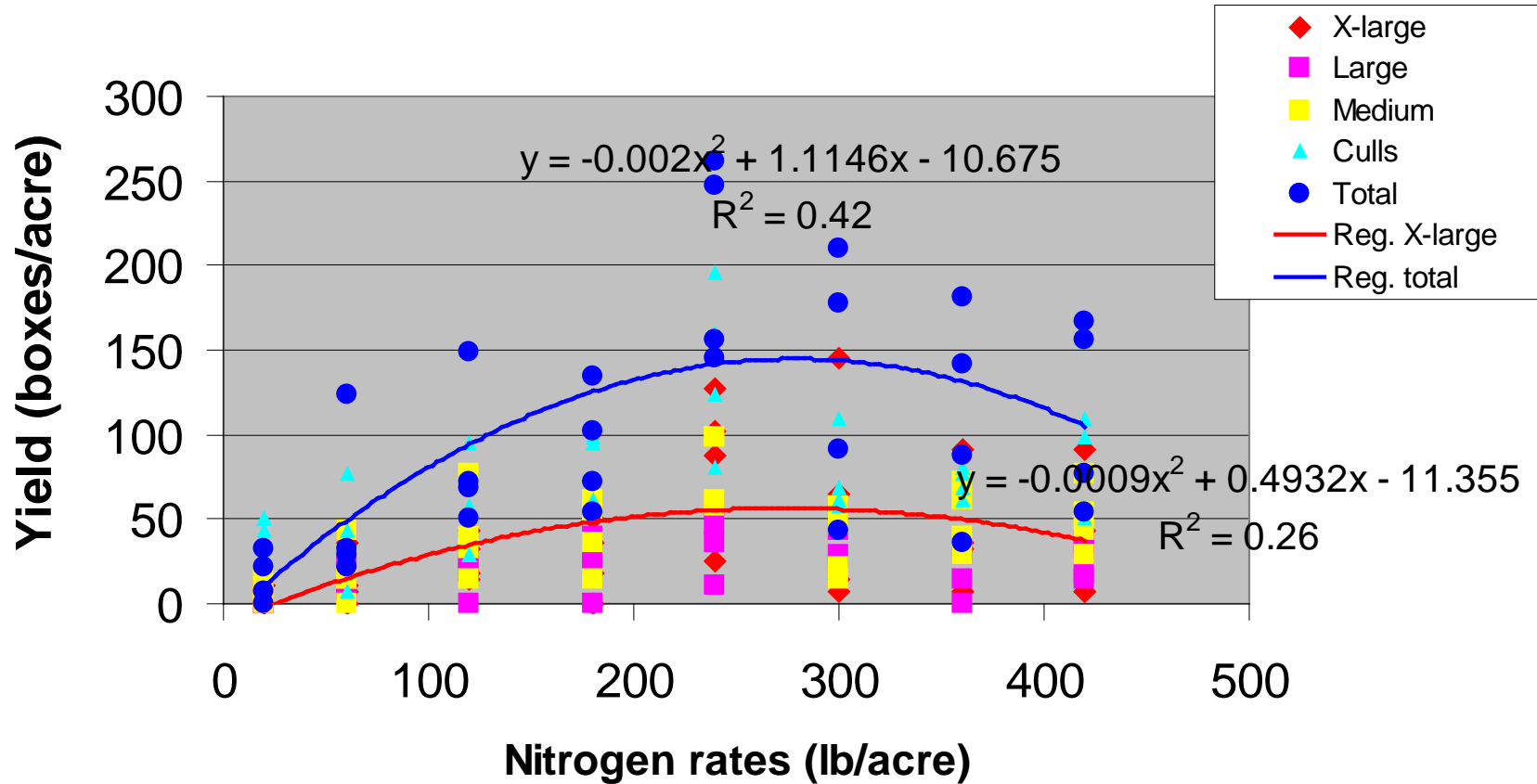
Harvest	N rate (lb/acre)	No Boxes/acre
Total	253	2,610
X-large	248	2,318

Second Harvest (May 29, 2007)



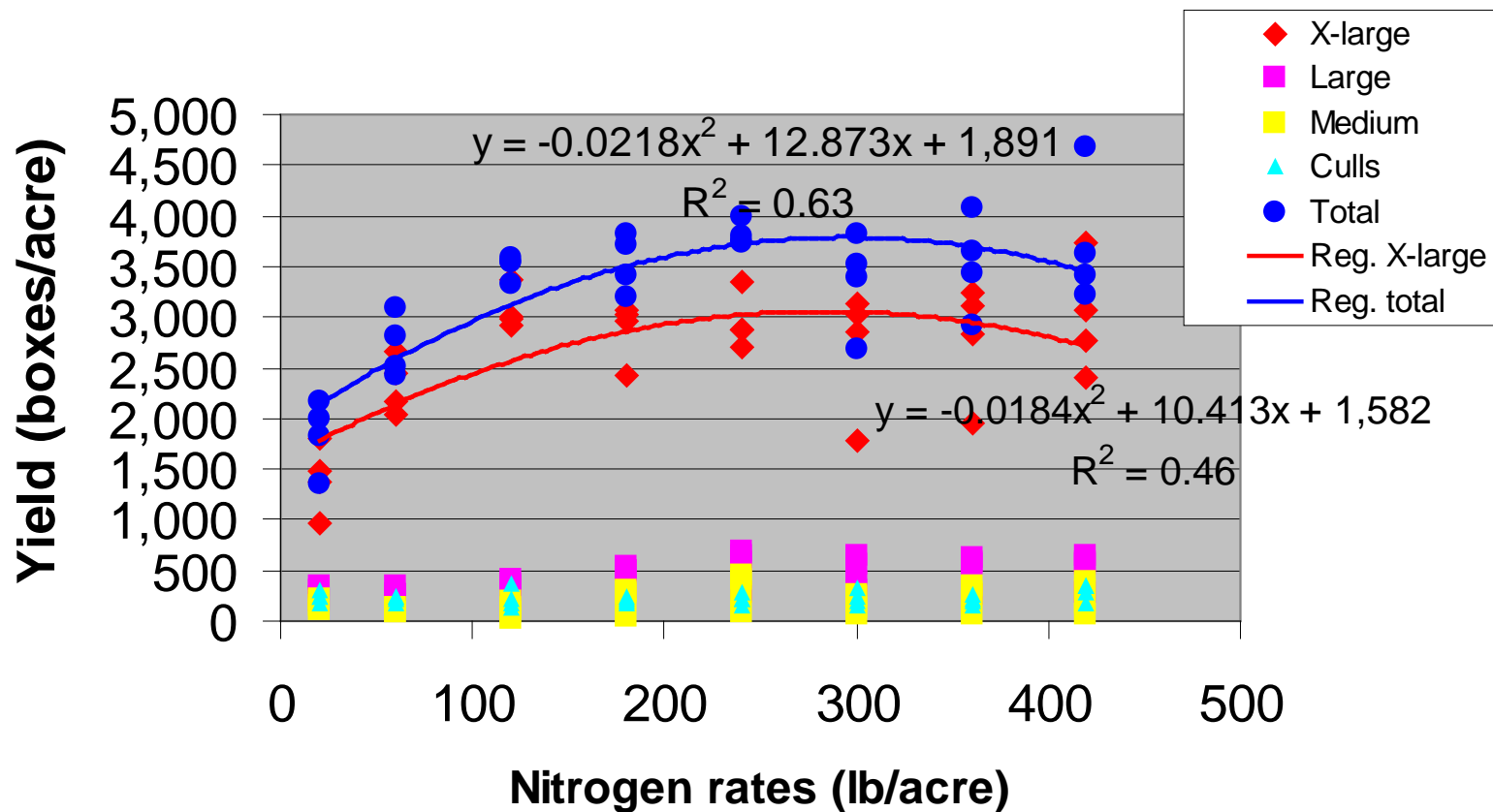
Harvest	N rate (lb/acre)	No Boxes/acre
Total	362	1,094
X-large	354	749

Third Harvest (June 12, 2007)



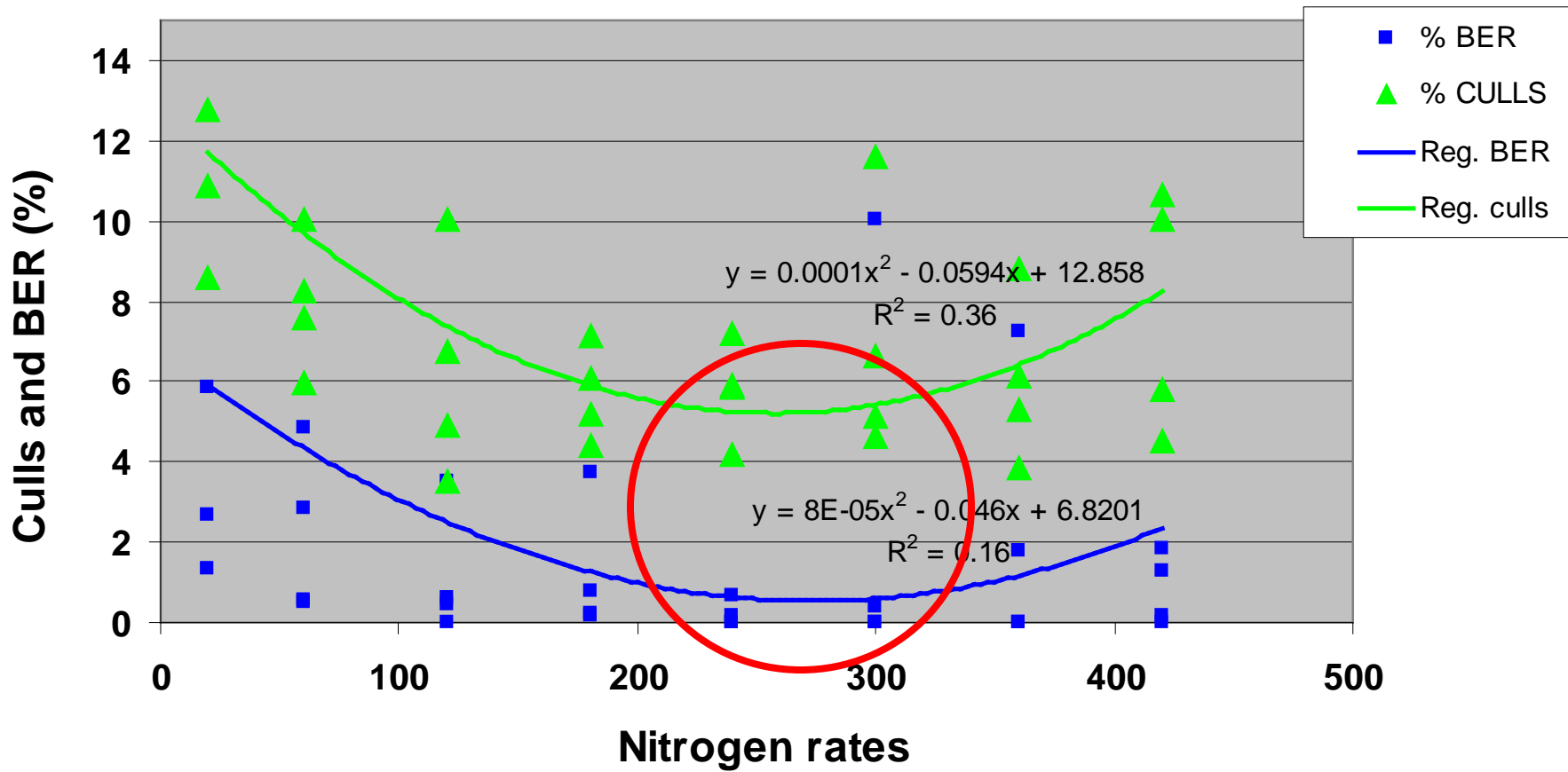
Harvest	N rate (lb/acre)	No Boxes/acre
Total	279	166
X-large	274	79

Total Harvest



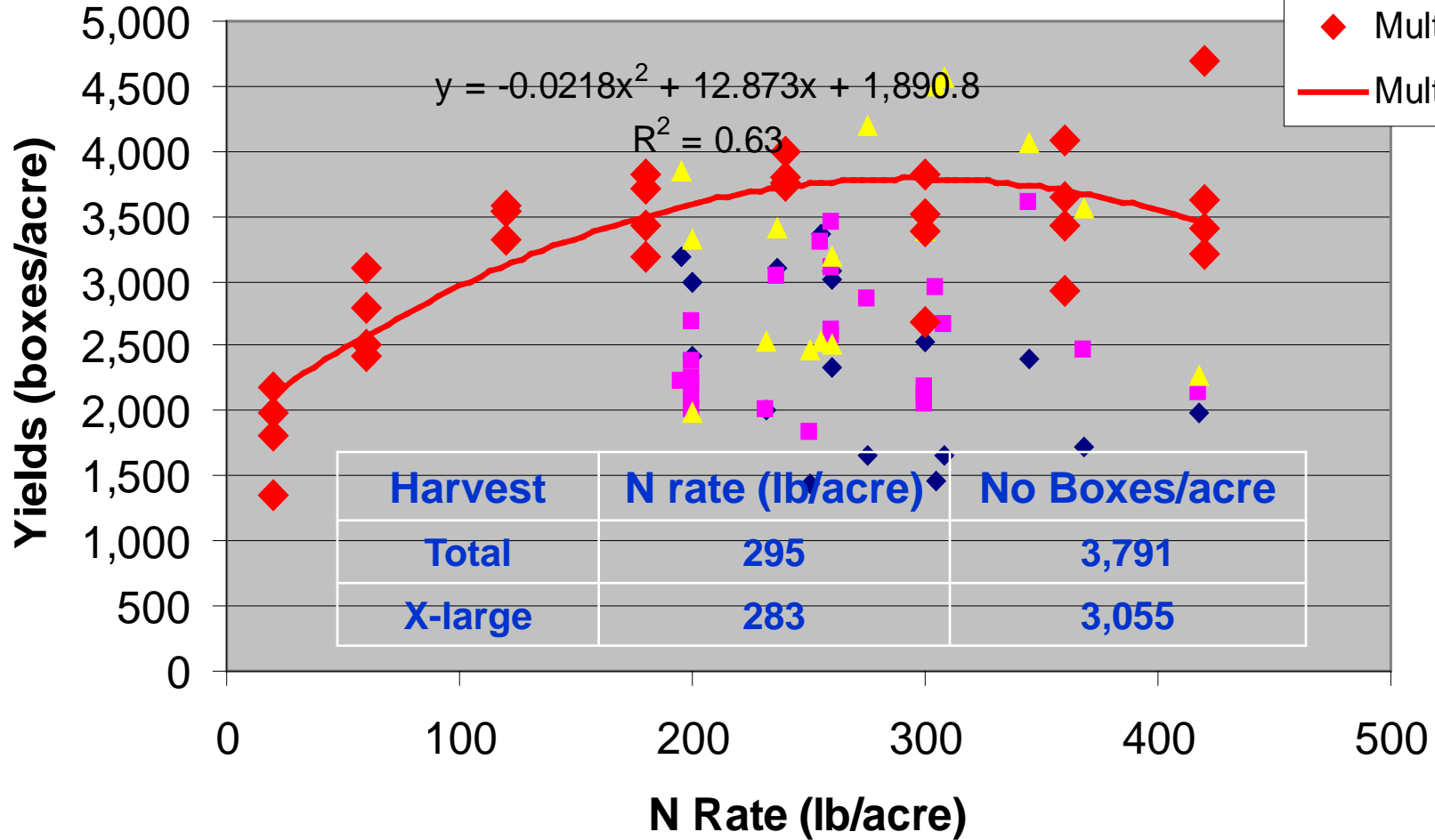
Harvest	N rate (lb/acre)	No Boxes/acre
Total	295	3,791
X-large	283	3,055

Total Percent Culls and Blossom End Rot (BER)



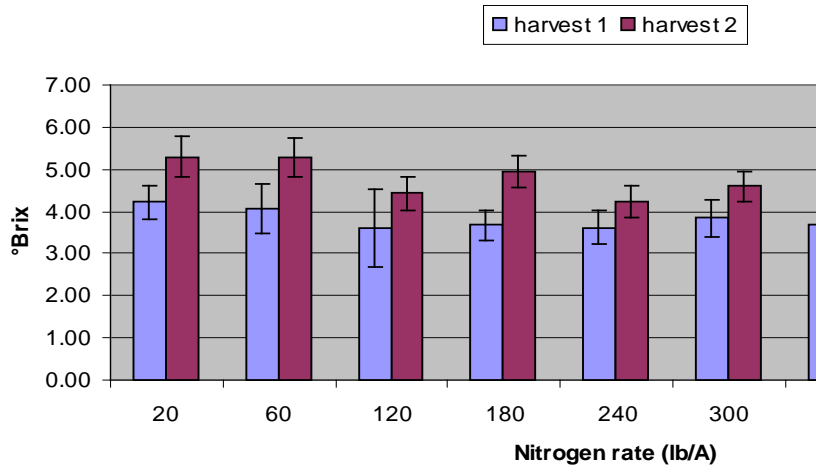
Total Tomato Yields (28 trials 2004-2007)

- ◆ Fall
- Winter
- ▲ Spring
- ◆ Multiple N rate
- Multiple N rate

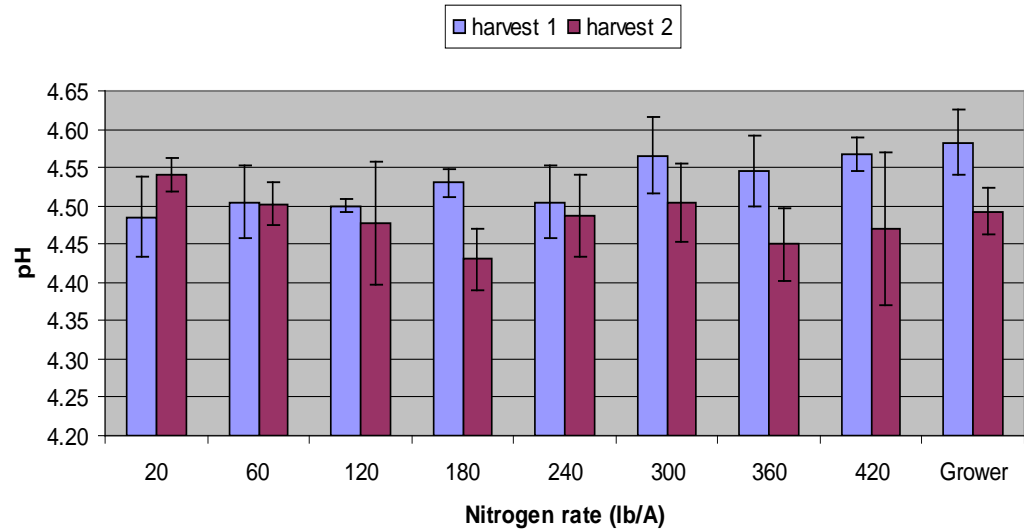


Post-Harvest Fruit Quality

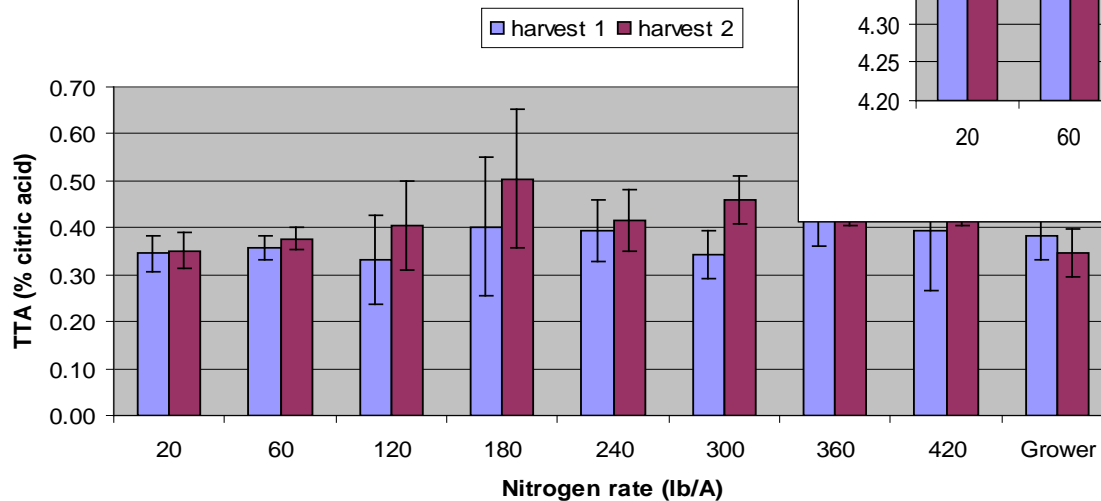
Soluble Solids Content



pH



Total Titratable Acidity



Conclusions

- One year study under dry conditions (no leaching rainfall or frosts) suggested that N rates between 248 and 295 Lb/acre resulted in highest yields of marketable-quality tomatoes in most grades, which is slightly greater than current recommendation when three harvests.



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➤ **Website:**

<http://swfrec.ifas.ufl.edu/bmp/vegetable/>