University of California
Agriculture and Natural Resources

Making a Difference for California

EVALUATING DRIP IRRIGATED TOMATOES ON 80-INCH BEDS

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BACKGROUND

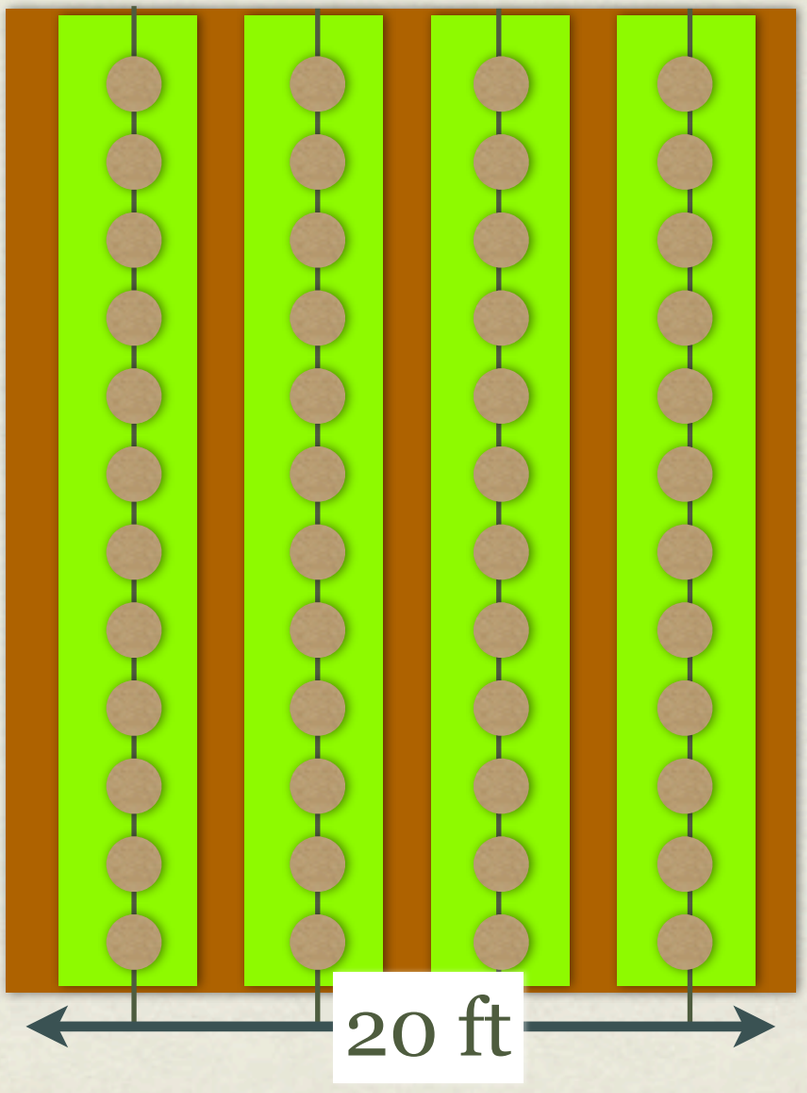
- Drip irrigation has increased substantially in the last 10 years
  - > 90% state acreage
- DR wide beds have also increased.
- Benefits (yield) vs issues (cost, maintenance, and rotation limitations)

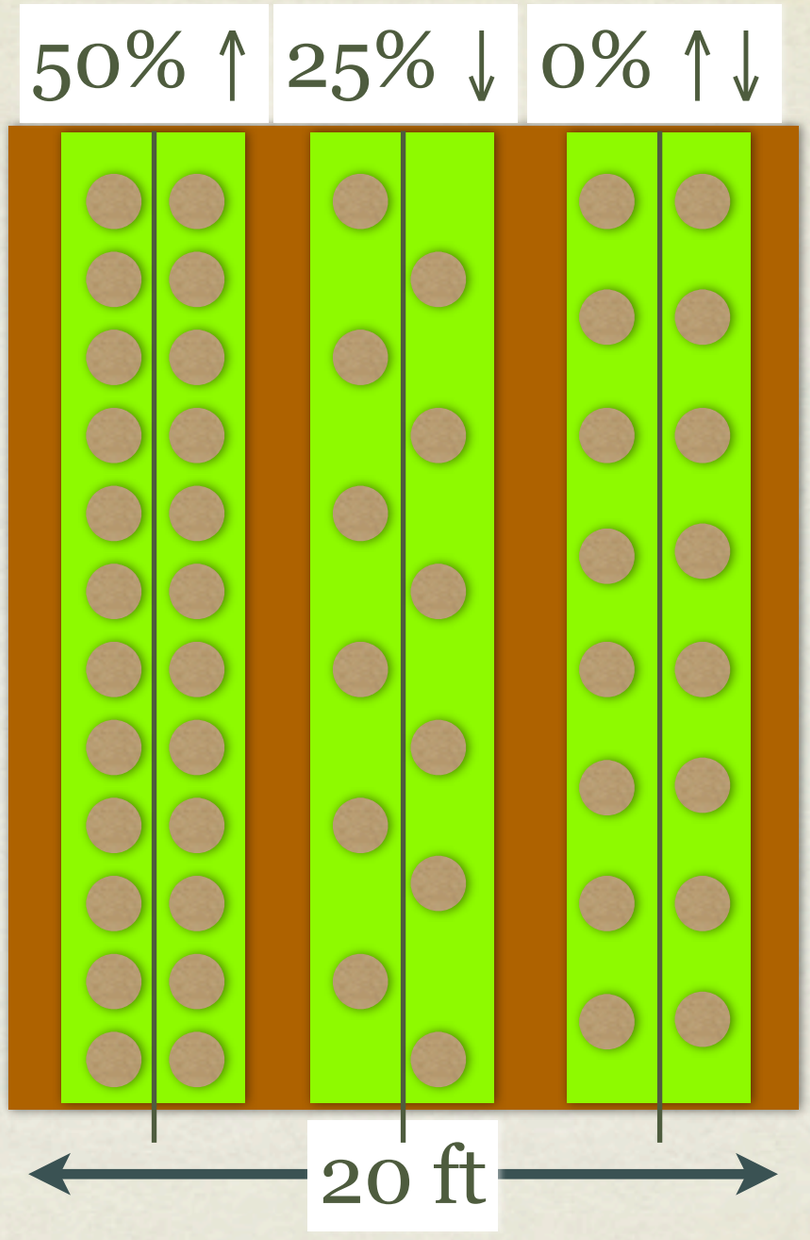
WIDE BEDS FOR LETTUCE

The practice is not new to vegetable producers in the Salinas area as it has been evolving for the past decade as a means toward more efficient use of resources, including land, water, and fertilizer. In recent years the transition has been accelerated with the development of specialized equipment to accommodate planting on 84-inch beds. The growing scheme has revolutionized spinach production in the Yuma area, allowing growers to produce consistent quality spinach along the entire bed. Growers plant high rates of seed, over 1.9 million seeds per acre, but can increase production by 25 percent to 50 percent while using the same amount of land and water.

http://cals.arizona.edu/fps/node/30

PLANT SPACING





OBJECTIVE:

Evaluate 80” double-row processing tomatoes with different plant populations, drip systems, and rotations.

METHODS

1. Std 60” bed w/buried drip, single row plants
2. 80” bed w/single buried drip, double row plants
3. 80” bed w/two buried drip lines, double row plants
4. 80” bed w/single drip, with rotation (fallow, tomatoes, tomatoes melons)

A. Same amount of water for trts 1 - 3 (110% Et).
   a. lower flow rate for double row tape
   b. similar cut-off date
B. Plant spacing split plots of 4, 6, 8, 10,000 plants per acre
C. Measure yield, PTAB fruit quality, economic analysis

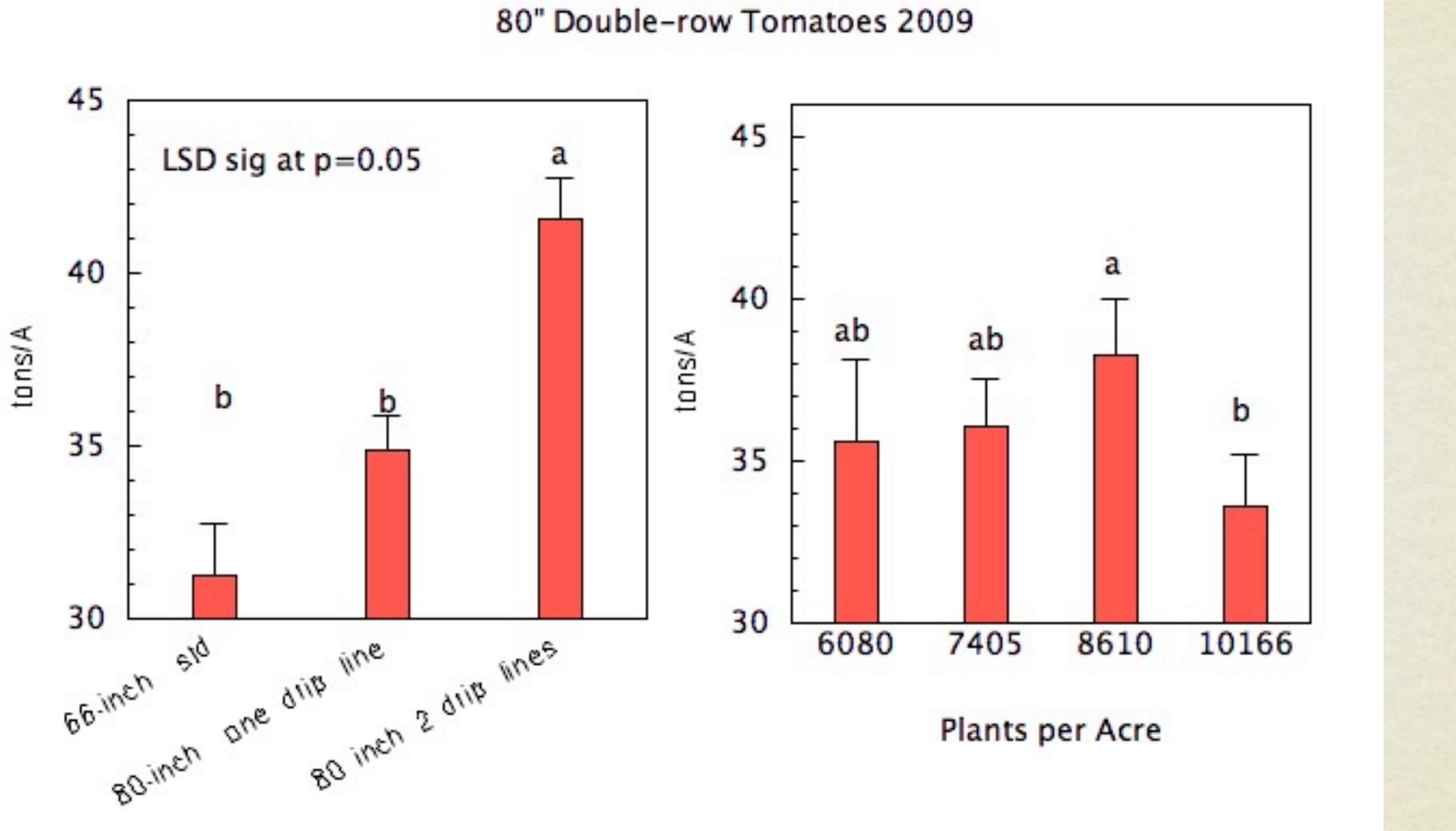
METHODS

- Location WSREC.
- RCB split plot, 3 beds x 300 ft. ~ 2.0 acres
- Mechanically transplanted, good stand numbers
- TSWV resistant varieties (2011, 2012)
- Machine harvest middle bed

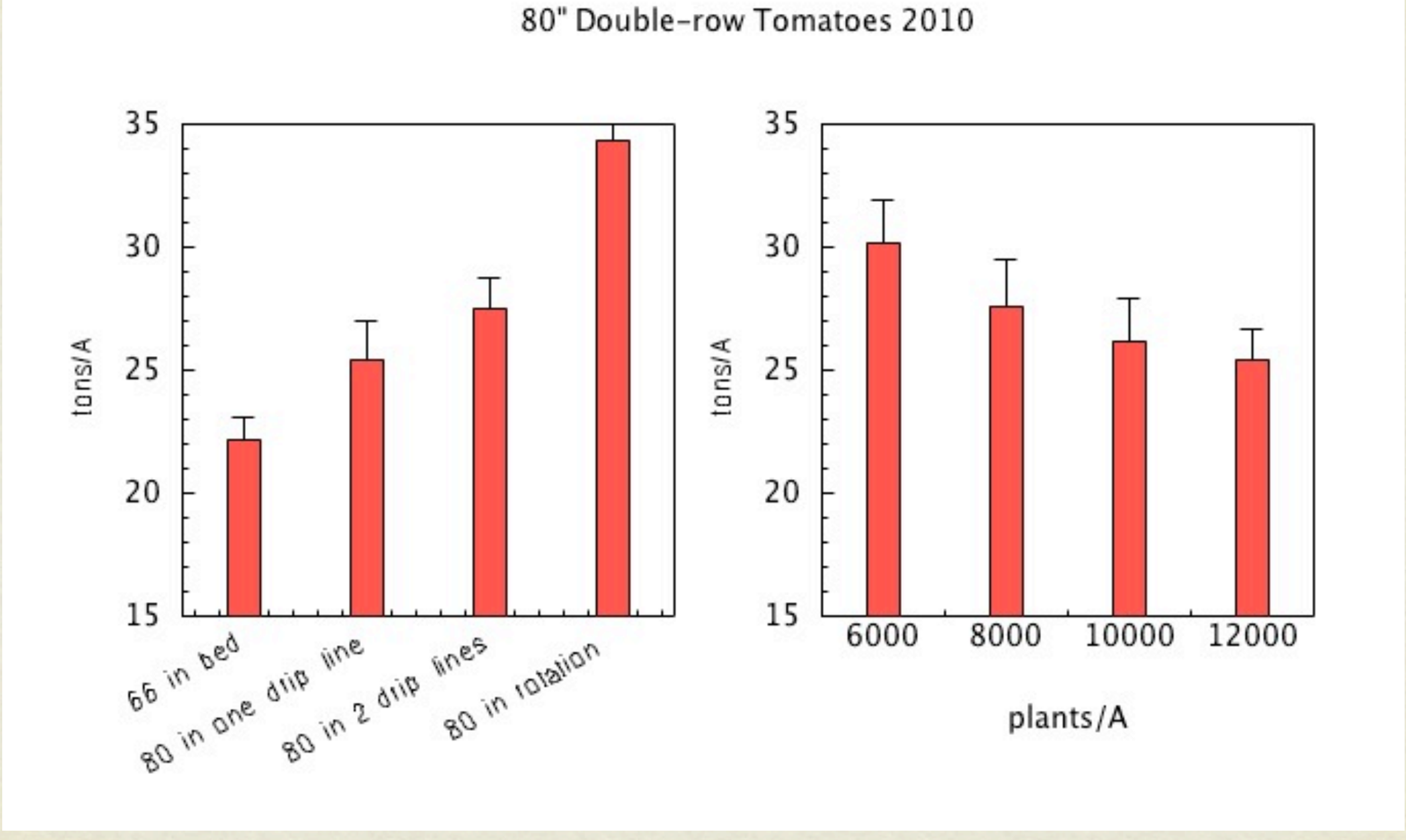
TRANSPLANTING

RESULTS

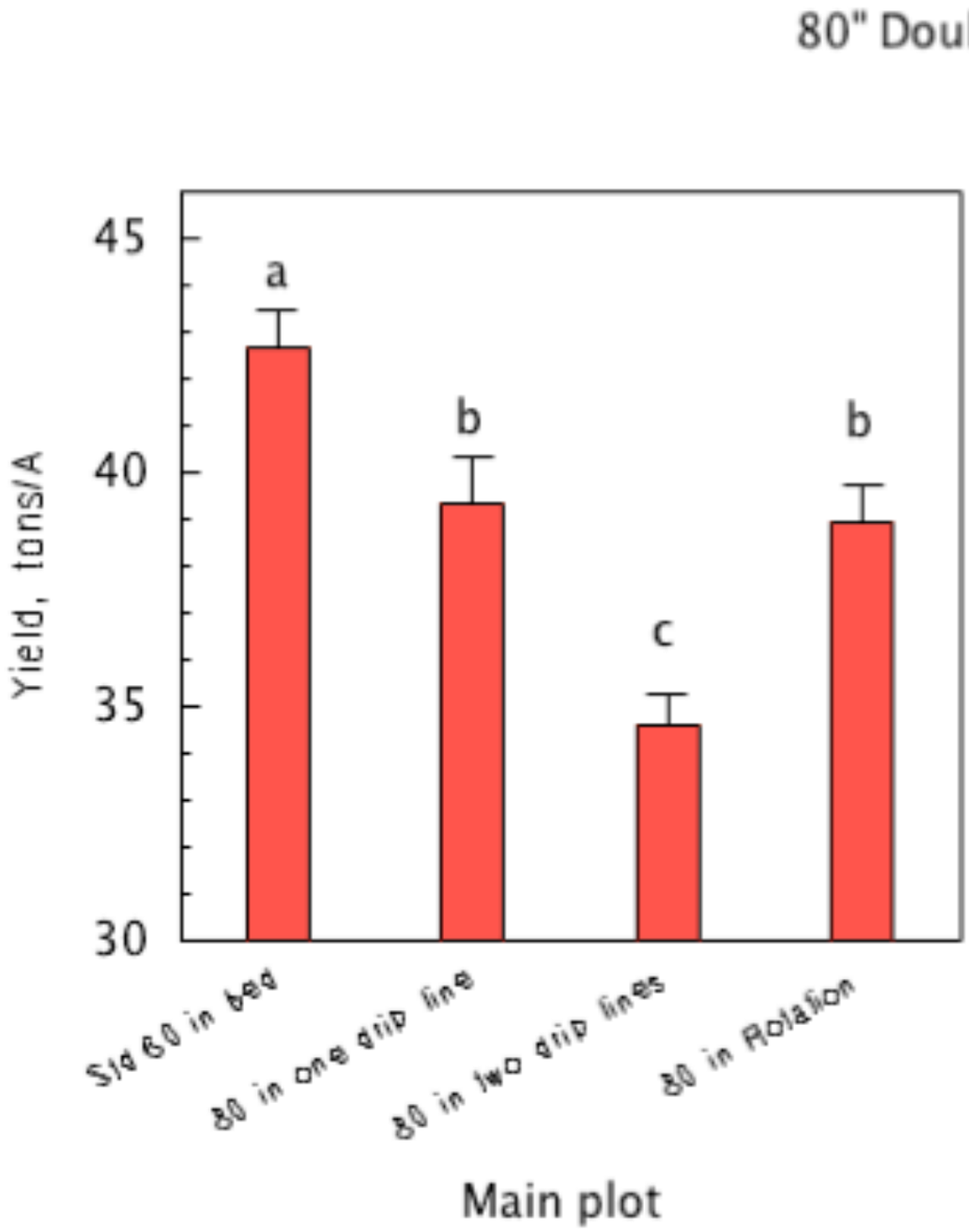
2009 YIELD

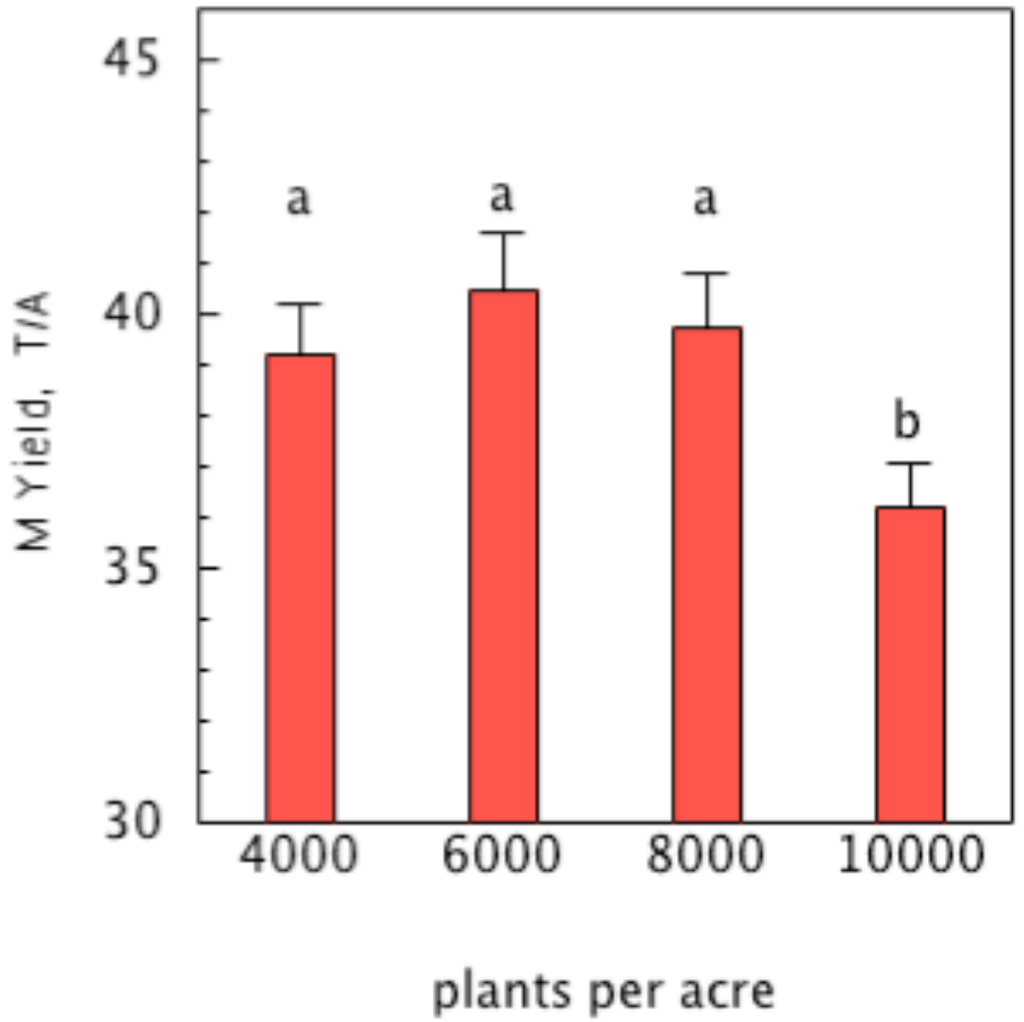

80" Double-row Tomatoes 2009
LSD sig at p=0.05
tons/A
45
40
35
30
a
b
b
66-inch std
80-inch one drip line
80 inch 2 drip lines
ab
ab
a
b
6080
7405
8610
10166
Plants per Acre

2010 YIELD

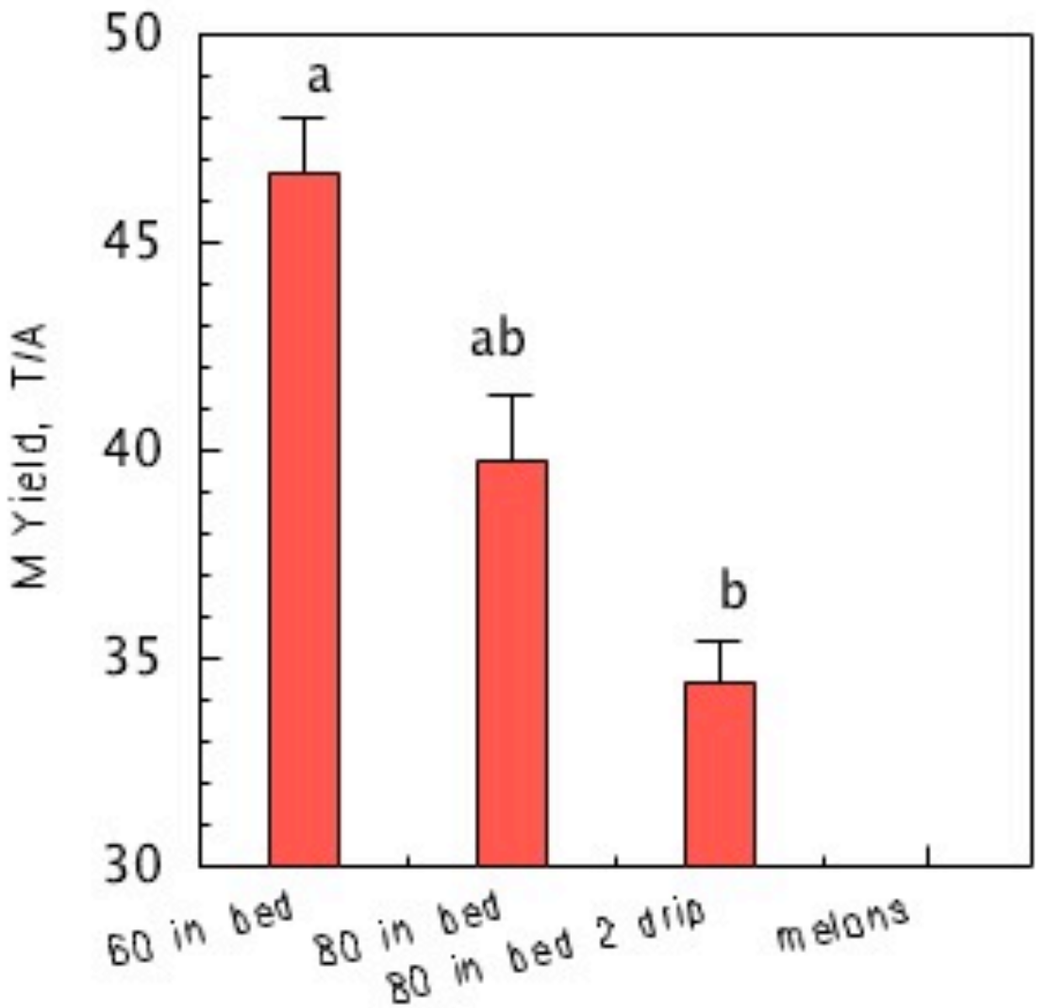

80" Double-row Tomatoes 2010
35
30
25
20
15
tons/A
66 in bed
80 in one drip line
80 in 2 drip lines
80 in rotation
35
30
25
20
15
tons/A
6000
8000
10000
12000
plants/A

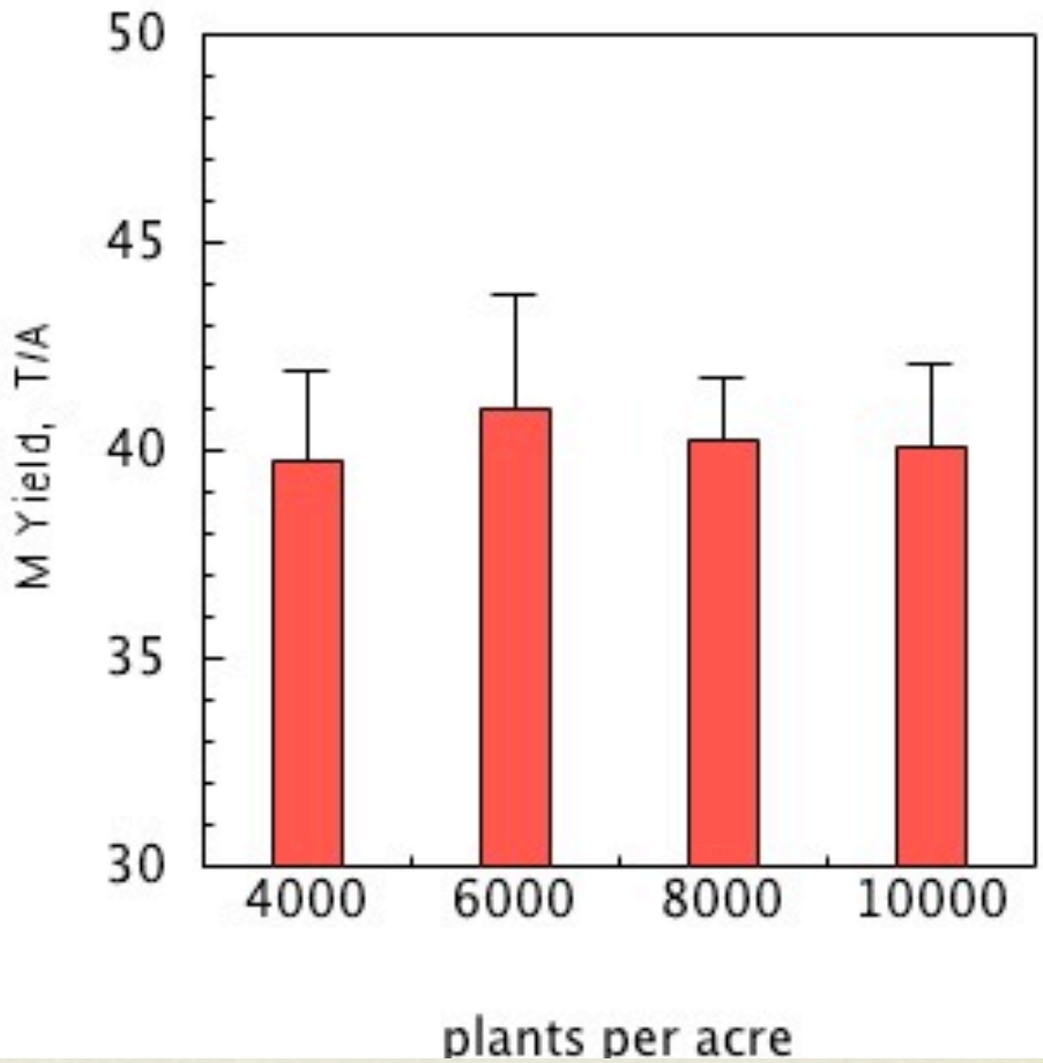
YIELD: 2011


80" Double-Row Tomatoes 2011
45
40
35
30
Yield, tons/A
a
b
c
b
Sq 60 in bed
80 in one drip line
80 in two drip lines
80 in Rotation
Main plot

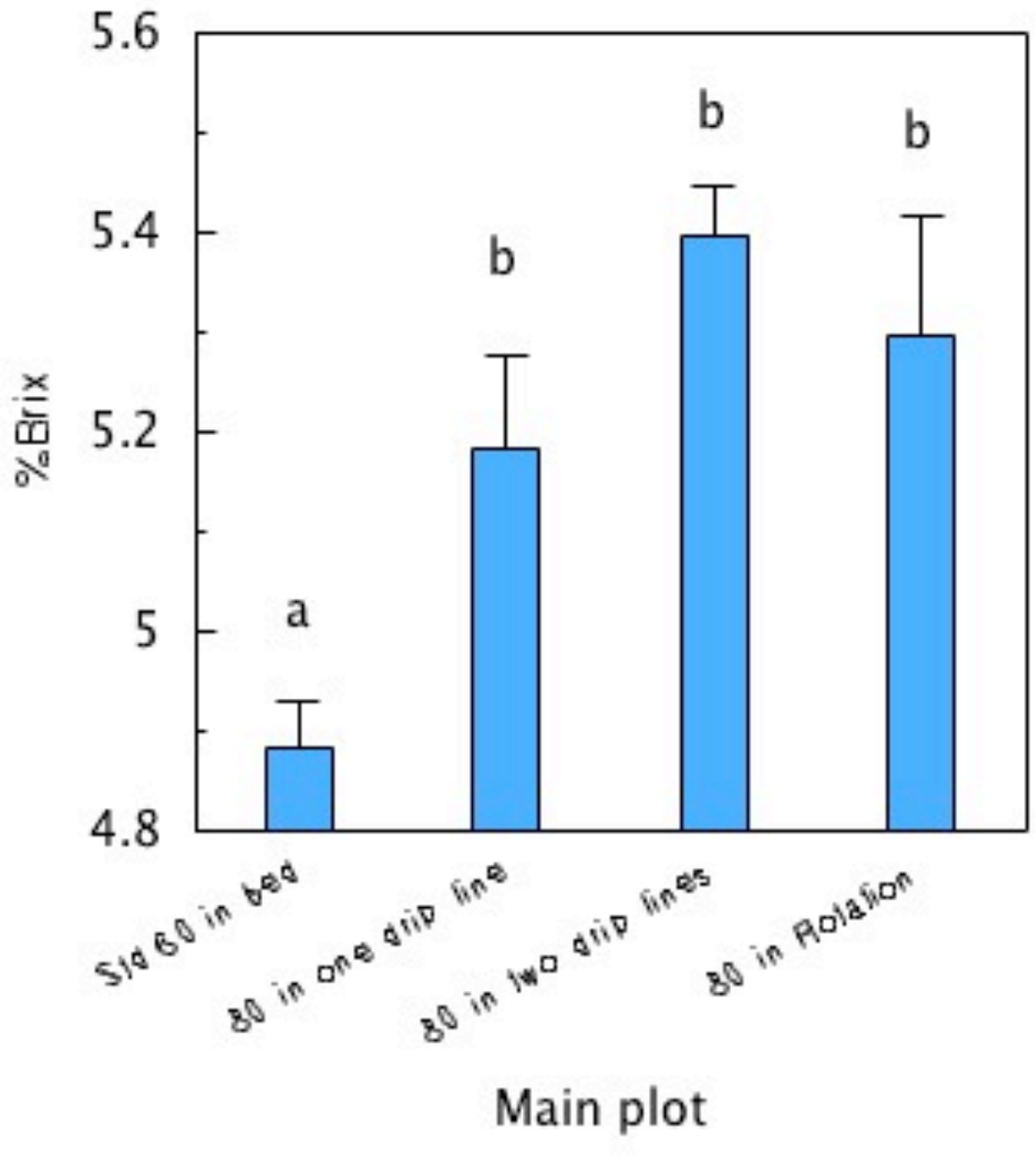

45
40
35
30
M Yield, T/A
a
a
a
b
4000
6000
8000
10000
plants per acre

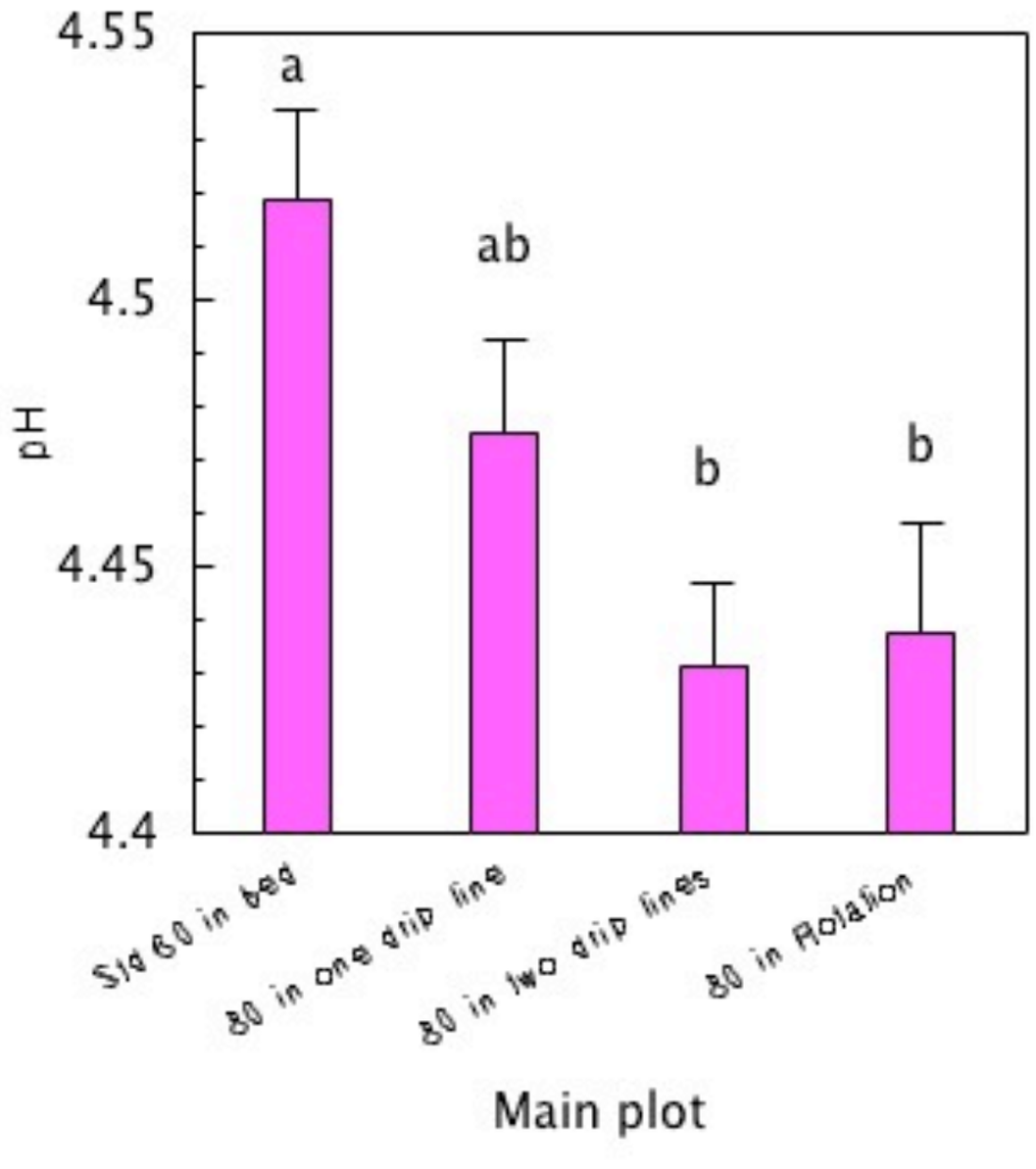
YIELD 2012

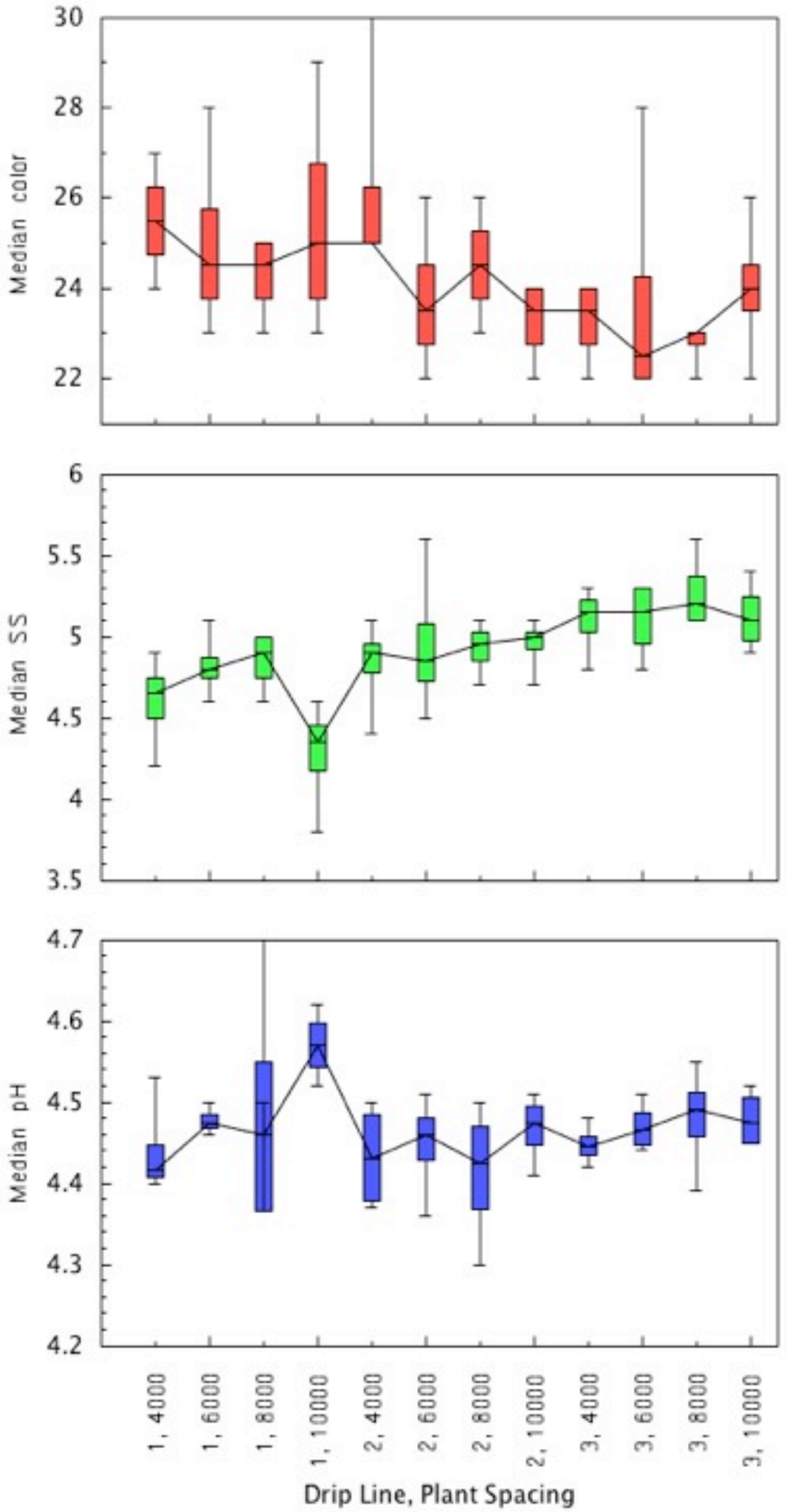

50
45
40
35
30
M Yield, T/A
a
ab
b
60 in bed
80 in bed
80 in bed 2 drip
melons


50
45
40
35
30
M Yield, T/A
4000
6000
8000
10000
plants per acre

FRUIT QUALITY 2011

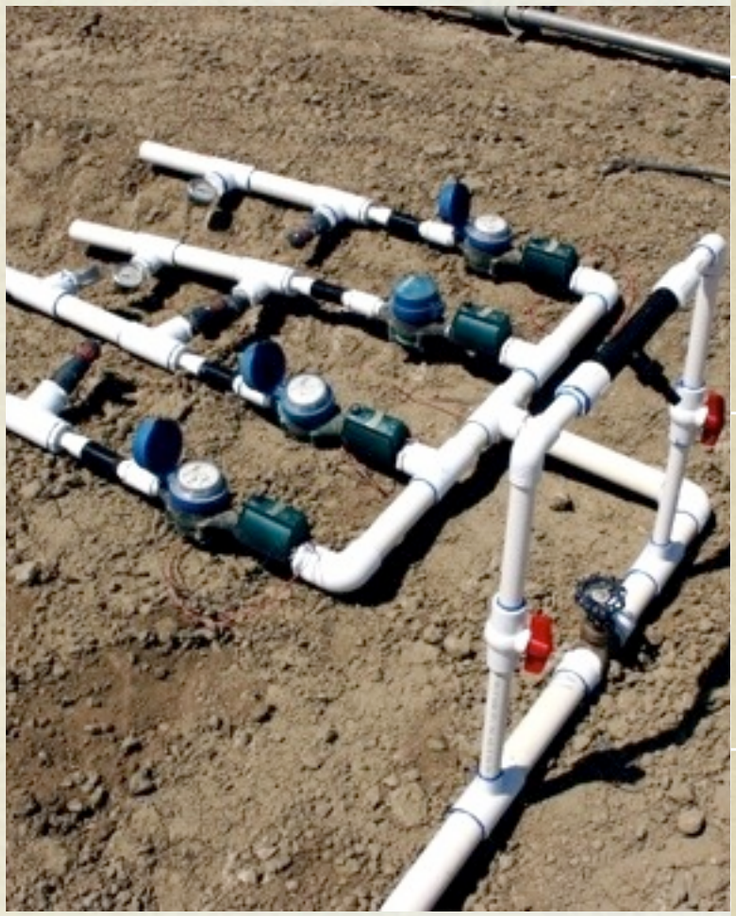






FRUIT QUALITY

2012



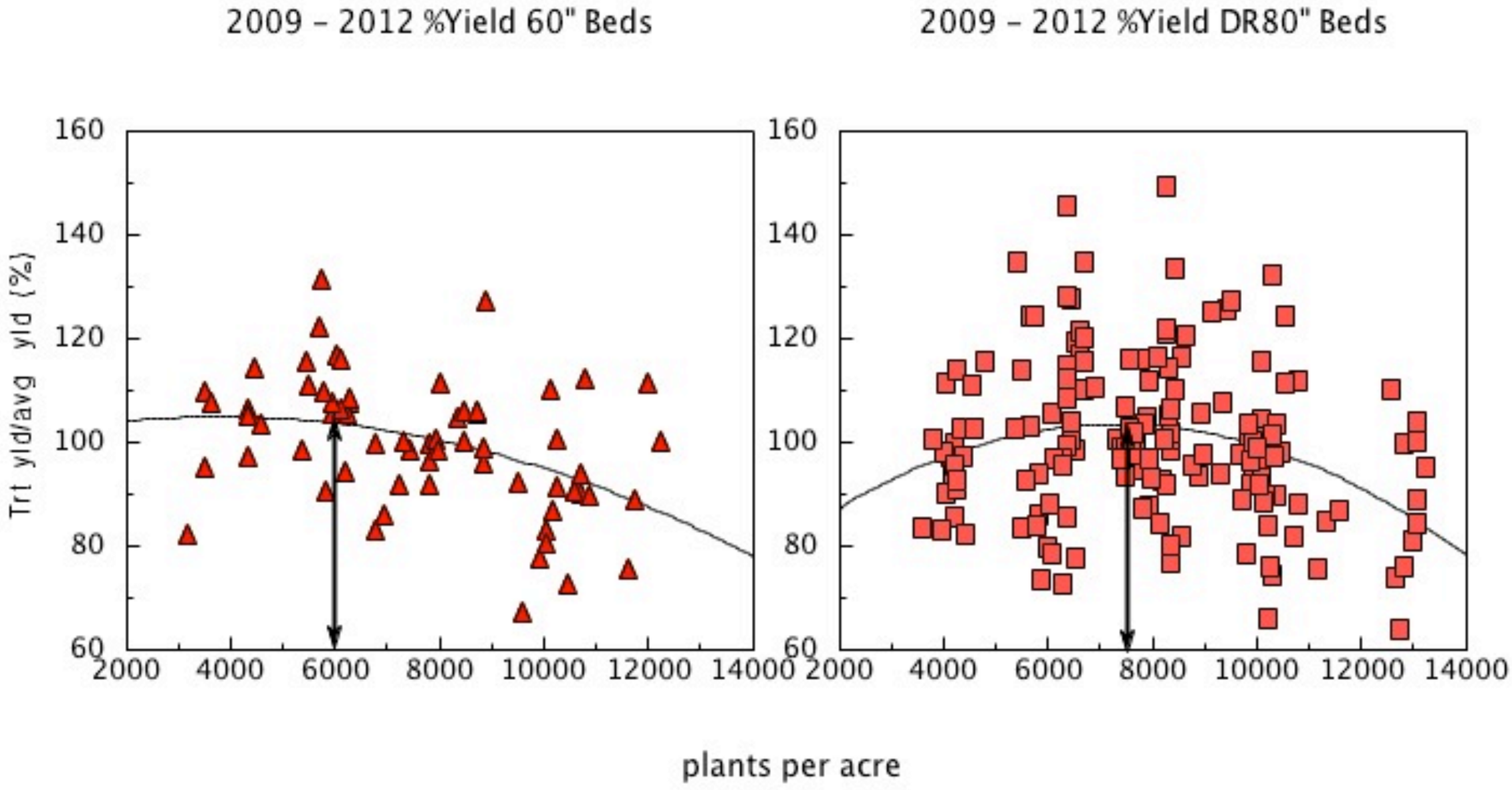
Trt		Applied Water		
	2009	2010	2011	2012
1. 60” beds	23.1	26.9	29	25
2. 80”, one line	21.4	27.2	28	28
3. 80”, two lines	**20.4**	**25.7**	**26**	**18**
4. 80”, rotation	---	26.8	28	16

Leaf samples	NO3-N ppm	60”	DR80 1-line	DR80 2-lines
2009	early	4.9% N	4.6% N	**4.8% N**
	mid	3.1% N	3.1% N	**2.9% N**
2010	early	1030	967	**680**
	mid	200	83	**240**
2011	early	2268	3042	**2080**
	mid	480	260	**205**

MAIN ISSUES

- flow rate of drip tape
- area of plots
  - 3 rows, 15 ft and 20 ft

PLANT SPACING



ECONOMIC ANALYSIS

trt	plant cost	drip line	yield, 4 yr. avg	gross $ ($70.00)	net $/A
1. 60” std	x ($350)	y ($180)	40.0	$2800	2270
2. 80” one line	1.10x (speed?)	0.75y	41.2	2882	2362
3. 80” two lines	1.10x	1.5y	42.0	2943	2288
4. 80” rotation	1.10x (rotation $)	0.75y	49.2	3446*	2926

4 YR. SUMMARY

- 2009-10 80” system had superior yields, 60” beds better in 2011-12.
- Double row 80” beds seem to need slightly higher plant populations (~ 10%)
- No consistent differences in fruit quality (color, SS, pH, %rot) but trend for more green at harvest in 60” beds.
- Economic analysis complicated: not just inputs, also changes in transplanting and harvest speed (forward speed) and cultivation (lateral speed across field).

SIMILAR TO LETTUCE…

- The new production method has its challenges, however, and some Yuma area producers feel that the, “the jury still hasn’t returned its verdict.”
  - disease pressure
  - weeds


205


206

THANK YOU

This is a CTRI funded project.