

RUTGERS
New Jersey Agricultural
Experiment Station

STRAWBERRIES IN HIGH TUNNELS

Wesley Kline, Andrew Wyenandt,
Dan Ward and June Sudal

RUTGERS
New Jersey Agricultural
Experiment Station

- What are High Tunnels
 - Single layer of plastic
 - No additional heat
 - Ability to use equipment to prepare beds
- Reasons to Use High Tunnel
 - Season extension
 - Protect from rain
 - Less disease problems
 - Warmer inside

RUTGERS
New Jersey Agricultural
Experiment Station

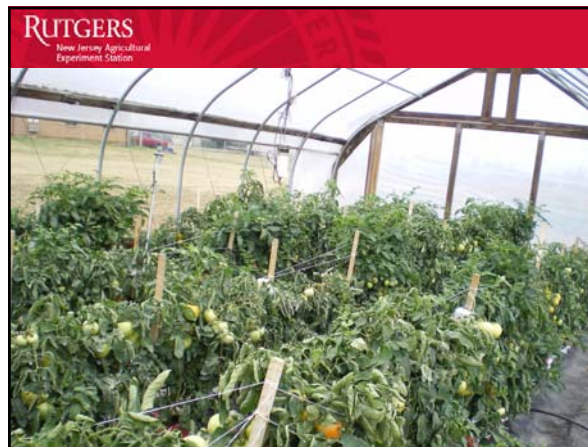
Types of High Tunnels

- Single bays
 - 14 to 30 ft wide and 36 to 150 ft long
 - Kept closed all winter
 - Row cover may not be necessary in winter
- Multi-bay
 - 24 to 28 ft wide and 100 to 1400 ft long
 - Not covered during winter
 - Row cover must be used in multi-bay houses if the plastic is removed over winter



RUTGERS
New Jersey Agricultural
Experiment Station

Determine how late we could plant strawberries to make a tomato/strawberry rotation successful and whether rowcover is needed in the tunnels.



RUTGERS
New Jersey Agricultural
Experiment Station

- Plugs planted on four dates:
 - 28 August
 - 5 September
 - 11 September
 - 19 September
- Row covers applied to half of each row

RUTGERS
New Jersey Agricultural
Experiment Station

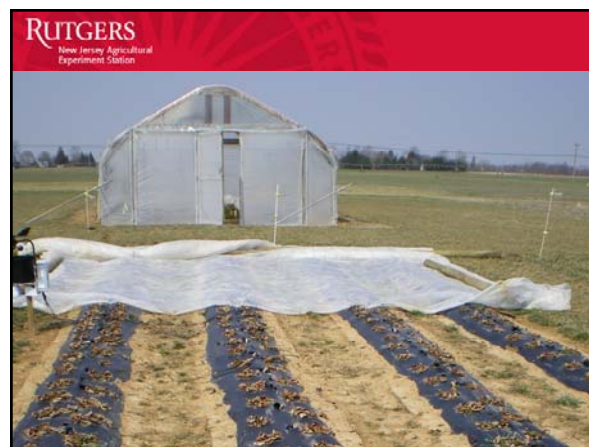
Culture and Management

- 'Chandler'
- Double rows on black plastic-mulched beds
 - Plants 14 inches apart in row
 - Rows 12 inches apart in beds
 - Beds spaced 42 inches center-to-center
- Drip irrigation
- Rows covered from 20 November to 27 March
 - 1¼ oz/yd, 70% transparent spun-bonded polypropylene

RUTGERS
New Jersey Agricultural
Experiment Station

Fertilization

- **Total Fertilizer applied 105 lbs/A 20-20-20**
 - 1st application – 55 lbs/A 20-20-20 plus solubor
 - 2nd application – 25 lbs/A plus solubor (March)
 - 3rd application – 25 lbs/A plus solubor (April)



RUTGERS
New Jersey Agricultural
Experiment Station

Harvest

- First Harvest
 - 30 April in High tunnels
 - 18 May outside
- Final Harvest
 - June 22



RUTGERS
New Jersey Agricultural
Experiment Station

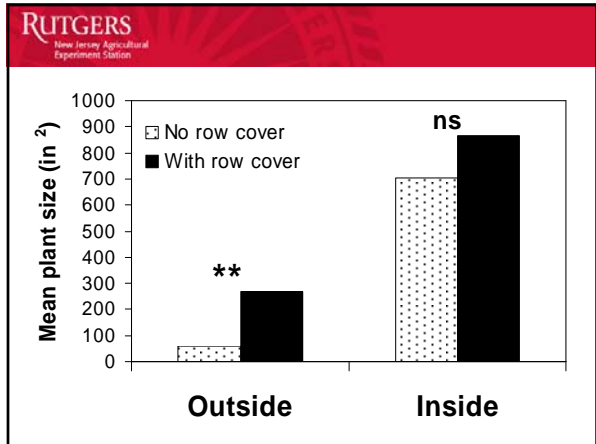
Results

- How did they grow?
- How did they bloom?
- How did they yield?

RUTGERS
New Jersey Agricultural
Experiment Station

One Outstanding Result:

No significant effect of Planting date !





RUTGERS
New Jersey Agricultural Experiment Station

How did they grow ?

- Outside, the row cover increased canopy size but, not in High tunnels where plants were much larger
- In High tunnels plants produced many more Large and Small crowns
- Fresh weight of plants not affected by treatment

RUTGERS
New Jersey Agricultural Experiment Station

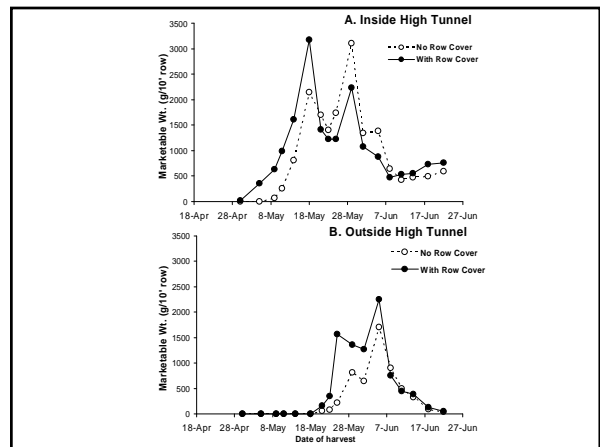
Total Blossoms Counted

Tunnel	Cover	Total Blossoms
Outside	No row cover	177
	With row cover	272
In High Tunnel	No row cover	969
	With row cover	934

RUTGERS
New Jersey Agricultural Experiment Station

How did they Bloom ?

- Much heavier bloom in High tunnels
- Bloomed earlier in High tunnels
 - Row cover hastened bloom both in and out
 - But in tunnels uncovered plants caught up



RUTGERS
New Jersey Agricultural
Experiment Station

Total Marketable Yield Per Plant

- Outside 14 oz/plant
- In High Tunnel 34 oz/plant

RUTGERS
New Jersey Agricultural
Experiment Station

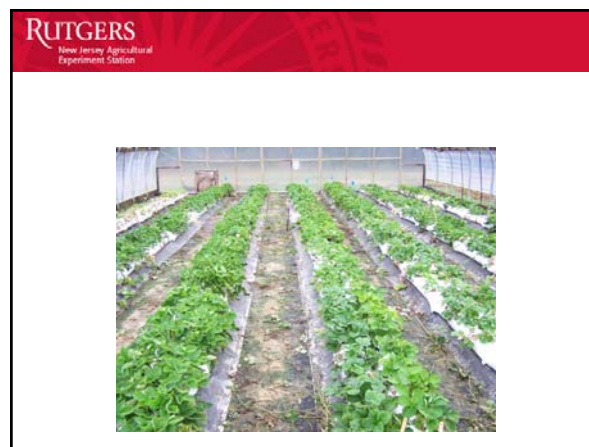
Conclusion

- Planting dates had no effect so later dates will be tried.
- Yield in tunnels was earlier and heavier.
- Row covers increased yield outside but only hastened it in High tunnels.

RUTGERS
New Jersey Agricultural
Experiment Station

Problems in Tunnels

- Powdery mildew is likely to be a problem since it is dry
- Twospotted spider mites develop as it get warmer
 - Predatory mites give good control if released when twospotted mites populations are low (less than 20 mites on a few leaves) *Neoseiulus fallacis*
- Aphids
 - Spiders and praying mantis
- Salt build up can be a problem with manure or chemical fertilizer



RUTGERS
New Jersey Agricultural
Experiment Station

Conclusion

- Yields can be advanced by three weeks over outside plasticulture production
- Yields can be at least 25% higher in tunnels
- Pollinators may be required to get good fruit set
 - Bumble bees or mason bees are the best
 - Honey bees tend to get disoriented in the houses

