

Cornell University Cooperative Extension



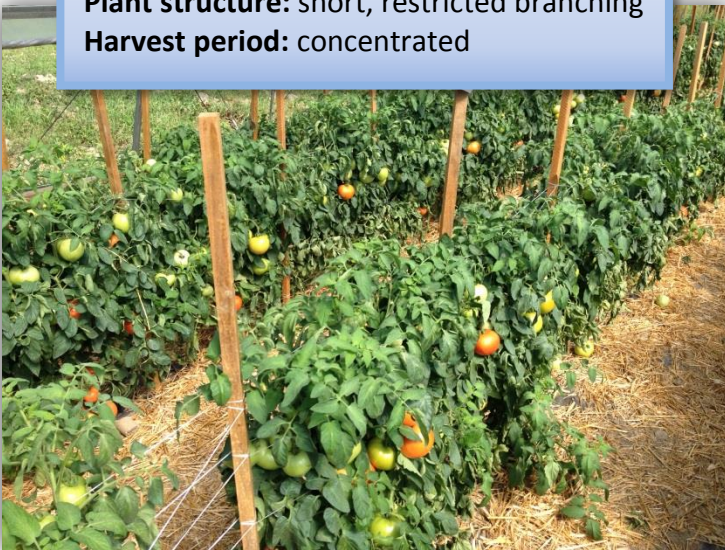
Tomatoes for the High Tunnel

Determinate versus Indeterminate

One of the first choices when beginning high tunnel tomato production is variety. Tomato varieties fall into one of two categories: determinate or indeterminate. Both types of tomatoes can be grown successfully in a high tunnel. Differences in the growth habits, nutritional needs, disease resistance, and fruit attributes of determinate and indeterminate tomatoes will influence the varieties a grower will choose. The following comparison guide will help with this decision.

Determinate Tomatoes:

Plant structure: short, restricted branching
Harvest period: concentrated



Indeterminate Tomatoes:

Plant structure: tall, vining
Harvest period: extended



Management Considerations *Trellising*

Determinate Varieties

- 4-6' wooden stakes are placed in-row with twine strung horizontally on either side of the row to guide plant growth upward.
- This method may require 6-8 applications of twine to trellis plants adequately.
- Trellising labor ends mid-season due to the determinate growth pattern.

Indeterminate Varieties:

- Can also be trellised with stakes and twine, but are often grown 'greenhouse style' in high tunnels.
- Plants are pruned to one or two leaders (see pruning section) and attached to vertically suspended twine with plastic clips.
- Small spools allow lowering of the twine as plants grow.
- Indeterminate plants will continue to grow upward and require trellising throughout the season.

Management Considerations

Pruning Techniques

Determinate varieties:

- Require dramatically less pruning than indeterminate tomatoes.
- Approaches vary, but the Cornell Vegetable Program recommends pruning all but the last secondary shoot (suckers) below the first flower, forming a “Y” structure.
- This requires a one-time removal of approximately five suckers.

Indeterminate varieties:

- All suckers are pruned to create a single dominant growing point, which in turn facilitates vertical trellising.
- Some growers allow two growing points, which are treated as separate plants and pruned of all suckers.
- Pruning is a season long task.



Strong Y pruning of a determinate plant.

Harvest & Yield

Yield varies by variety, but there are high yielding varieties in both categories. While we have achieved yields of 30 lbs. per plant with both types in our trials, the timing of harvest is dramatically different. Determinate plants have a more concentrated early harvest of fruit, while indeterminate varieties will yield more evenly over the harvest season. Indeterminate varieties are likely to provide more high quality fruit in the late season than determinate varieties.



Left: *determinate trellis & fruit load.*



Right: *Indeterminate trellis & yield.*

Management Considerations

Fertility

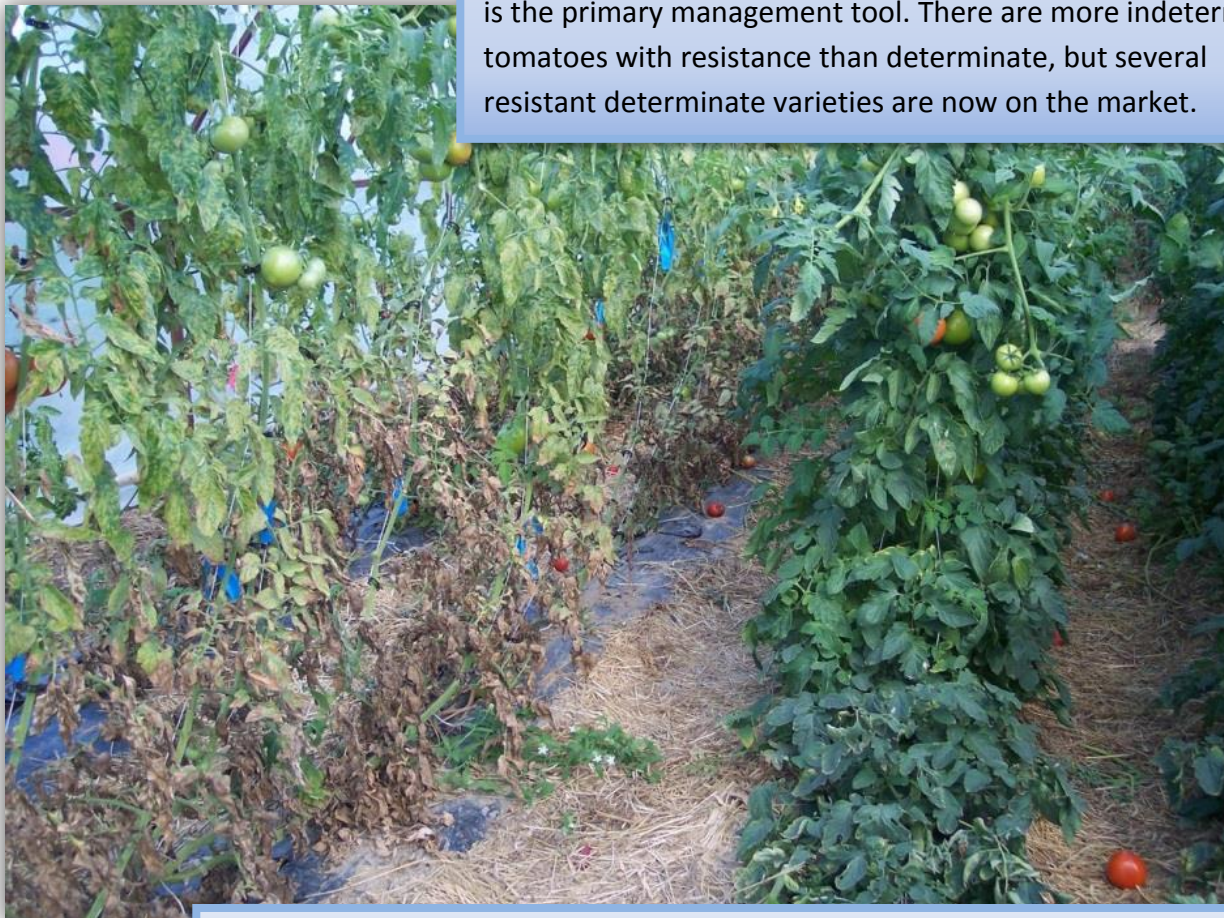
As total yields can be similar between determinate and indeterminate varieties, their fertility needs are quite similar. However, with concentrated fruit maturation on determinate varieties deficiencies in potassium, magnesium and phosphorus may develop more quickly than in indeterminate varieties. Indeterminate varieties, on the other hand, may require more evenly spaced nitrogen applications as their vegetative growth will continue throughout the season. Based on fertility needs, growers should consider their ability to deliver soluble nutrients such as nitrogen and potassium in both scenarios.

Labor

Indeterminate varieties require ongoing pruning, clipping and harvesting, while determinate varieties are trellised and harvested over shorter periods. However, the upright open canopy of indeterminate varieties facilitates easier harvest. Harvest of determinate varieties requires kneeling and searching for ripe fruit within a dense canopy.

Disease resistance

The foliar disease of primary concern in high tunnels is Brown Leaf Mold, caused by the fungus *Passalora fulva*. This disease is more severe in tunnels than in the field and varietal resistance is the primary management tool. There are more indeterminate tomatoes with resistance than determinate, but several resistant determinate varieties are now on the market.



A susceptible variety (left) compared with a resistant variety (right)

For more on information on *Passalora fulva* and a list of resistant varieties by Amy Ivy visit: <http://www.nnyagdev.org/wp-content/uploads/2011/12/Leaf-Mold-on-Tomatoes-final.pdf>

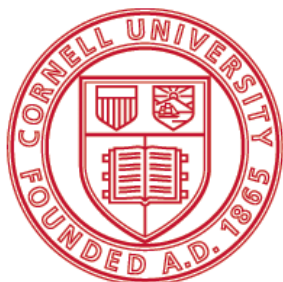
Marketing considerations

Fruit

The physical and sensory qualities of the tomato fruit may be the most important factor in varietal selection. Growers who seek firm fruit suitable for wholesale packing and shipping can find satisfactory varieties in both categories. Heirloom tomatoes, renowned for their taste and unique colors, are nearly all indeterminate. Satisfying the demands of the market is critical to success. Once the desired fruit attributes have been determined, a suitable variety can then be selected in either the indeterminate or the determinate category.



Varieties to Consider for the High Tunnel		Determinate	Indeterminate
Primo Red	<i>disease resistant hybrid for packing or direct sales</i>	✓	
Red Mountain	<i>disease resistant hybrid for packing or direct sales</i>	✓	
Red Deuce	<i>disease resistant hybrid for packing or direct sales</i>	✓	
Geronimo	<i>disease resistant hybrid for packing or direct sales</i>		✓
Rebelski	<i>disease resistant hybrid for packing or direct sales</i>		✓
Panzer	<i>disease resistant hybrid for packing or direct sales</i>		✓
Rose de Berne	<i>pink, medium sized heirloom</i>		✓
Nyagous	<i>'black', medium sized heirloom</i>		✓
Arkansas Traveler	<i>red, medium sized heirloom</i>		✓
Pike County Yellow	<i>yellow, large sized heirloom</i>		✓



Cornell University

Project Coordinator: Judson Reid, Extension Vegetable Specialist
417 Liberty Street, Penn Yan, NY 14727 jer11@cornell.edu

More details of our on-farm work on high tunnel tomatoes are online. Visit http://cvp.cce.cornell.edu/greenhouse_tunnels.php and <http://www.hort.cornell.edu/hightunnel/>

This publication was supported by the Specialty Crop Block Grant Program at the U.S. Department of Agriculture through a grant from the New York State Department of Agriculture and Markets. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA or NYS DAM.