High Density Pears: Profitable for You not Just for Your Heirs

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Pear Growing Systems Around the World

- New York State - Central leader system at densities of 100-200 trees/acre.
- California - Multiple Leader system at densities from 100-200 trees/acre.
- Oregon/Washington - Central Leader system at densities from 100-350 trees/acre.
- Europe - Tall Spindle and Super Spindle on Quince rootstock at densities from 1,000-4,000 trees/acre
The Challenges with Pears in NY

- Slow to begin production (Plant pears for your heirs)
- Low Mature Yields - Apples have higher yields thus most growers choose to plant apples.
- Small fresh market and unstable processing market.
- Fire blight
- Pear Psylla
Solutions to Problems with Pear in NY

- High Density systems can have higher early yield and higher mature yield.
- New improved rootstocks can improve precocity and reduce tree size.
- New varieties with fire blight resistance or new varieties for high priced market niches.
NY Pear Systems Trial

- A 4 acre field trial was planted at Geneva, NY in 2003.
- 4 Varieties (Bartlett, Bosc, Taylors Gold Comice, Concorde).
- 5 Rootstocks (seedling, OHF97, OHF87, Pyrodwarf, Pyro 2-33, Quince A)
- 4 training systems were used ranging in density from 242-2,178 trees/acre.

<table>
<thead>
<tr>
<th>System</th>
<th>Tree Den. (trees/acre)</th>
<th>Spacing (ft)</th>
<th>Initial Heading Height (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Leader</td>
<td>242</td>
<td>10 x 18</td>
<td>32</td>
</tr>
<tr>
<td>Vertical Axis</td>
<td>519</td>
<td>6 x 14</td>
<td>48</td>
</tr>
<tr>
<td>Tall Spindle</td>
<td>908</td>
<td>4 x 12</td>
<td>60</td>
</tr>
<tr>
<td>Super Spindle</td>
<td>2178</td>
<td>2 x 10</td>
<td>60</td>
</tr>
</tbody>
</table>
Traditional Central Leader

- Spacing 10X18’
- Conduit support pole but no trellis
- Leader headed each year
- Branches tied down to 45° in third year.
Vertical Axis

- Spacing 6 X 14’
- Conduit support pole and single wire trellis.
- Leader headed at planting.
- Branches tied down to 90° at end of second year.
- Large branches removed with a bevel cut.
Tall Spindle

- Spacing 4 X 12’
- Conduit support pole and single wire trellis
- Leader not headed at planting.
- Branches tied down below horizontal (135°) at the end of the second year.
Super Spindle

• Spacing 2 X 10’
• Leader not headed at planting.
• Branches tied to trellis wire in first and second year.
• Large branches removed with a bevel cut.
• Fruitful branches shortened to fit into space.
Effect of Planting Density on Tree Size
Effect of Training System on Yield/tree

**Bartlett**

- **Central Leader (242 trees/acre)**
- **Vertical Axis (519 trees/acre)**
- **Tall Spindle (908 trees/acre)**
- **Super Spindle (2178 trees/acre)**

**Bosc**

- **Central Leader (242 trees/acre)**
- **Vertical Axis (519 trees/acre)**
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Effect of Training System on Yield /acre

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- Central Leader (242 trees/acre)
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- Super Spindle (2178 trees/acre)
Effect of Training System on Yield /acre

Bartlett

Tree Density (trees/acre)
Cumulative Yield (bu/acre)
Series7
Seedling
OHF97
OHF87
Pyrodwarf
Pyro 2-33
Quince A

Bosc

Tree Density (trees/acre)
Cumulative Yield (bu/acre)
Series7
Seedling
OHF97
OHF87
Pyrodwarf
Pyro 2-33
Effect of Planting Density on Yield Efficiency

Bartlett

Tree Density (trees/acre)
Cum. Yield Eff. (kg/TCA)

Bosc

Tree Density (trees/acre)
Cum. Yield Eff. (kg/TCA)
Effect of Planting Density on Average Fruit Size

**Bartlett**

- **Series 7 Seedling**
- **OHF97**
- **OHF87**
- **Pyrodwarf**
- **Pyro 2-33**
- **Quince A**

**Bosc**

- **Series 7 Seedling**
- **OHF97**
- **OHF87**
- **Pyrodwarf**
- **Pyro 2-33**
Conclusions

• Tree density had a mild dwarfing influence on tree size. The highest density systems had trees about 60% the size of the lowest density system after 5 years.
• Tree density had a strong positive influence on yield. The Super Spindle was 5 times as productive as the traditional Central Leader system which was the least productive.
• Increasing tree density resulted in smaller fruit size.
• Long-term manageability with Super Spindle is questionable without root pruning or growth inhibitors
• The best option appears to be the Tall Spindle (4’
Options for NY Pear Growers: Tall Spindle

- Spacing: 4 X 12-14’
- Rootstock: OHF 87
- Trellis: Three wire trellis with stabilizer wire
- Pruning: Leader not headed at planting, then branch renewal.
- Branches tied down below horizontal (135°) early in the second year.
Options for NY Growers: Bi-Axis, Tri-axis

- Spacing: 4 X 12-14’
- Rootstock: OHF 87, Pyro2-3
- Trellis: Four wire trellis
- Two leader tree from nursery or
- Develop second leader in orchard
- Pruning: Leader not headed at planting, then branch renewal.
- Fruiting Wall
- Short fruiting branches.
Options for NY Growers: Bi-Axis, Tri-axis

- Spacing: 4 X 12-14’
- Rootstock: OHF 87 or Sydo Quince
- Trellis: Three wire V-trellis
- Four leader tree from nursery or
- Develop four leader in orchard
- Pruning: Leader not headed at planting, then branch renewal.
- Short fruiting branches.
Options for NY Growers: Traditional Varieties or New Fire blight Resistant Varieties

- Bartlett, Bosc, Anjou, Comice
- Harrow Crisp, Harrow Sweet, Sundown
- Blake Pride, Potomac, Magness
- New USDA varieties