Comparison among orchard systems for Abbé Fétel cultivar: Fruit size: % over 70 mm

fruit % > 70mm (mean 2008–’11)

<table>
<thead>
<tr>
<th>System</th>
<th>Fruit % &gt; 70mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXIS-BH/MC</td>
<td>33.3</td>
</tr>
<tr>
<td>V-MC</td>
<td>37.8</td>
</tr>
<tr>
<td>AX-MC</td>
<td>38.8</td>
</tr>
<tr>
<td>V-BH/MC</td>
<td>39.9</td>
</tr>
<tr>
<td>SPINDLE-BH/MC</td>
<td>45.7</td>
</tr>
<tr>
<td>AXIS-Adams</td>
<td>48.6</td>
</tr>
<tr>
<td>SPINDLE-MC</td>
<td>50.5</td>
</tr>
<tr>
<td>INT. V-MC</td>
<td>54.0</td>
</tr>
<tr>
<td>V-Adams</td>
<td>54.8</td>
</tr>
<tr>
<td>AXIS-MH®</td>
<td>60.2</td>
</tr>
<tr>
<td>BI-AXIS-Adams</td>
<td>61.2</td>
</tr>
<tr>
<td>BI-AXIS-MH®</td>
<td>66.0</td>
</tr>
<tr>
<td>V-MH®</td>
<td>68.4</td>
</tr>
<tr>
<td>V-Sydo®</td>
<td>70.8</td>
</tr>
<tr>
<td>SPINDLE-MH®</td>
<td>70.9</td>
</tr>
<tr>
<td>SPINDLE-Sydo®</td>
<td>71.0</td>
</tr>
<tr>
<td>BL-AXIS-BA29</td>
<td>71.0</td>
</tr>
<tr>
<td></td>
<td>74.0</td>
</tr>
</tbody>
</table>

Density: 2,857 ÷ 4,082 trees/ha
## Value of the production

<table>
<thead>
<tr>
<th>Year</th>
<th>-60</th>
<th>60/65</th>
<th>65/70</th>
<th>70/75</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0.05</td>
<td>0.45</td>
<td>0.68</td>
<td>0.87</td>
<td>0.93</td>
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<tr>
<td>2009</td>
<td>0.05</td>
<td>0.35</td>
<td>0.55</td>
<td>0.70</td>
<td>0.80</td>
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<tr>
<td>2010</td>
<td>0.05</td>
<td>0.55</td>
<td>0.75</td>
<td>0.92</td>
<td>1.00</td>
</tr>
<tr>
<td>2011</td>
<td>0.05</td>
<td>0.15</td>
<td>0.20</td>
<td>0.40</td>
<td>0.52</td>
</tr>
</tbody>
</table>

### Prices per size

**Source:** Fondazione F.lli Navarra

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**Graphs and Data**

- **PLV (€/ha)**
- **∑ PLV '08-'11 (€)**
- **∑ Prod. '08-'11 (t/ha)**
- **Calc. prod. (t/ha)**

- **Prices per size**
- **Source:** Fondazione F.lli Navarra

- **9524 trees/ha**
- **7143 trees/ha**
- **2857 trees/ha**
- **7143 trees/ha**
- **129 trees/ha**
- **124 trees/ha**

**Prices**

- **€ 35,000**
- **€ 45,000**
- **€ 55,000**
- **€ 65,000**
- **€ 75,000**
- **€ 85,000**

**Calc. prod. (t/ha)**

- **€ 35,000**
- **€ 45,000**
- **€ 55,000**
- **€ 65,000**
- **€ 75,000**
- **€ 85,000**

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Comparison among orchard systems for Abbé Fétel cultivar

- Vigor reduction
- Early fruit bearing
- Increase of yield per hectare
- Fruit size reduction

- Slow fruit bearing
- Good fruit size

MC - BH/MC - ADAMS - MH® - Sydo® - BA29

“V” system → 80% of fruits located in the low part of the canopy

Gross income → Equilibrium between production and fruit size

MC - BH/MC

ADAMS - MH® - Sydo®
Pruning
Bi-axis
Bibaum® - First year early spring (left) second year (right)
Bi-axis system

• If the trunk presents blind areas in the second year, it is possible to girdle the trunk or notch over the dormant buds to induce bud break. In the third year, the tree should completely fill the space.
Girdling, notching and Promalin application can help to promote shoot growth.
Notching and girdling effects on blind wood

Girdling, notching and Promalin application can help to promote shoot growth
Notching and girdling effects on blind wood
Notching and girdling effects on blind wood
Girdling effects on Fuji
How to minimize the effect of the apical dominance and the blind wood in apple and pear?
Tree with feathers
Tree without feathers
Bi-axis system - Pruning

• Click pruning help to maintain the cropping zone close to the stem

• Pruning is simple and is required to eliminate the shoots that are too vigorous and remove branches oriented towards the inside.

• In the basal zone a good rule is to eliminate all the shoots that have a diameter 30% greater than that of the trunk where they are inserted.

• It is strongly recommended to leave a stub to avoid producing blind wood.

• It is recommended to renew 20% of the structure annually to minimize branches aging.
Click = Tira savia
Click effect on shoot growth
Click pruning effects on buds swelling
Effect of the flat cut
Effect of “Dutch cut”
HOW TO MANAGE BRANCHES IN SPINDLE?
Spindle before winter pruning

- **Planting**
- **End of the first year**
- **End of the 2nd year**
- **End of the 3rd year**
- **End of the 4th year**
Spindle after winter pruning

End of the first year

End of the 2nd year

End of the 3rd year

End of the 4th year

Planting
Tira savia effect on flower bud and blind wood
Pruning of the top part of the branches in spindle
Branches pruning in spindle 1
Branches pruning in spindle 2
Tira savia = click pruning
Modify Tira savia when only flower buds are present on the 1-years old wood
Short pruning with 1-years old shoot cut to maintain branches efficient
PRUNING MODEL: ABBE’ FETEL
HOW TO MANAGE THE TOP ?
Cut back on lateral 1-year-old shoot with a flower bud

Cut back of the top on 1-year-old shoot
Effect of tira savia in the top part of the tree
Root pruning
Effect of root pruning on tree vigour
Parameters that we have to evaluate before root cutting:

Root density and distribution

After we can determine:

• distance from the trunk
• deepness
• crotch angle
Abbé Fétel: winter cut end of February in medium-high planting density orchards

- 20 cm
- 60 cm
- 4-5°
Vertical root pruning
Abbé Fétel: winter cut end of February in very and ultra high planting density orchards
Angled root pruning
ROOT PRUNING EFFECTS

Control

Cutted two sides in winter
EFFECT OF ROOT PRUNING ON FLOWER BUDS FORMATION
What does root pruning do?

- If the strong roots are pruned
  - less uptake of water
- If the fine roots are pruned
  - less uptake of nutrients
- Changing the hormonal balance
  - less cytokinines  reduced shoot growth

Vercammen, 2005
Decision scheme

**Flower buds**
- Good
- Bad

**Spring**
- Do nothing
- 1-sided

**Fruit set**
- Good
- Bad
- Good
- Bad

- **TAKE CARE!**
- After June drop
- Do nothing
- Possibly June

Source: Vercammen et al., 2005
Trunk cut

- Saw
- Two level of cut distant 30 cm (1 feet)
Trunk cut

• Saw
• We have to cut almost the 50% of the trunk on both side distant 30cm
• Injured trunk can be close with foam poliuretano to avoid stability problems
• Increase of problems linked with iron uptake
• Do not use herbicides after cut
• In Italy this technique is not utilised due to problems with VALSA CANCER
Mechanical pruning