Getting New Orchard Plantings to Perform

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Objective:

To fill the tree canopy volume with efficient fruiting wood rapidly.

60% mid season light interception.

Tree height needs to match between row spacing

TCA/ha > 50,000 cm^2

Tree Row Volumes

Orchard Type	Trees/ha	TRV
Intensive	> 1,900	10,000 to 12,000 m^3/ha
Semi-intensive	1,000 to 1,900	12,000 to 15,000 m^3/ha
Extensive	< 1,000	18,000 to 20,000 +m^3/ha

Individual Tree Size at Various Tree Densities

Tree density/ha	50,000 cm^2	60,000 cm^2
Single Rows		
666 (5 x 3 m)	75 cm^2	90 cm^2
1250 (4 x 2 m)	40 cm^2	48 cm^2
1500 (3.7 x 1.8 m)	33 cm^2	40 cm^2
1900 (3.5 x 1.5 m)	26 cm^2	32 cm^2
2020 (3.3 x 1.5 m)	25 cm^2	30 cm^2
2424 (3.3 x 1.25 m)	21 cm^2	25 cm^2
3030 (3.3 x 1.0 m)	16.5 cm^2	20 cm^2
Double Rows		
2222 6 m x (1.5) twice	22.5 cm^2	27 cm^2
2667 5 m x (1.5) twice	19 cm^2	22 cm^2
3333 6 m x (1) twice	15 cm^2	18 cm^2
4000 5 m x (1) twice	12.5 cm^2	15 cm^2

A poor tree nursery will have to grow its TCA by 15 to 100 fold.
A well grown tree by 6 to 40 fold.

Limiting Factors – Identify and Correct

1 Those needing attention before planting.

2 Those affecting tree growth after planting.

Pre-Planting Preparation

The trees:

- tree health status.
- trueness of type.
- tree size.

The Site:

- Soil surveyed to determine depth, structure, pH and nutrient status, drainage characteristics, previous cropping history, nematode and disease problems.
- Soil related limiting factors can only be dealt with prior to planting.

Replanting Old Orchards

Specific Apple Replant Disease (SARD):

Severity of SARD depends on soil type, previous tree root density, length of fallow.

Causes of SARD are not well understood.

Effective treatments are:

- pre-plant soil fumigation with cloropicrin, formalin drenches or other fungi controlling soil fumigants.
- Removal of apple or pear crop root debris.
- Fallowing the soil.
- Increasing tree density by 50%.
- Maintaining soil fertility in the root zone.
- No water stress.

Planting

- Open friable soil.
- Ridge shallow soils.
- In heavy clays make provision for drainage.
- Do not plant into wet soil.
- Do not allow tree roots to dry out.
- Planting into dry soil, irrigate immediately.
- Avoid scion rooting. Scion rootstock union > 10 cm above soil level.

Once Planted

- Secure trees to support structure.
- Irrigation ready to go before trees leaf out.

The Support Structure

- Support to 0.5 m of final tree height.
- Posts seven to eight trees apart.
- Trees must be firmly attached to their support structure from day one.
- First year trees need three wires for support.
- Alternate wires either side of tree trunk.
- As trees grow, add further wires once tree height passes the new wire height.

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Making the Trees Grow

- Establishing tree height quickly is the key to early/high productivity.

Balancing the Tree

- Remove feathers below 0.8 to 1 metres height.
- Remove strong side branches.
- Where feather development poor, bring the tree back to a rod.

Irrigation Management

- Water stress stops growth.
- Maintain optimum soil moisture in the 0-30 cm soil layer.
- Water requirement 2 to 2.5 times the potential evaporation of the area covered by their mid-day shadows.

Estimated Available Water per m^2 to 30 cm Depth

Soil Texture	Litres
Fine sand	21 – 24
Sandy loam	30
Fine sandy loam	39 – 42
Loam	45 – 48
Silt loam	48 – 50
Light clay loam	50 – 54

Irrigation Management

- Trickle systems are the most efficient and cost effective watering systems.
- Do not position emitters directly over the tree trunk.
- Sprinkler systems management needs to be driven by soil moisture levels within the effective rooting zone.
- Minimise evaporation losses.
- Do not use more often than at four to five day intervals.
- Water requirement will increase as the trees grow.

Mulching

- Thick mulch will conserve moisture, cool the soil down.
- Reduces both water and heat stress with improved tree growth.

Fertilisers

- Young orchards need regular fertiliser applications.
- Fertigation is the most effective.
- Fertiliser programme determined by the natural fertility.
- Side-dressing programme to make the trees grow well.
- Nitrogen is main fertiliser requirement – 100 kg N/ha (about 50 g N per tree).

Fertilisers

- Magnesium, potassium and certain trace elements where deficiencies are known to exist.
- Potassium nitrate, magnesium sulphate.
- Apply trace elements as foliar applications.
- Alternative to fertigation
- Side-dressings monthly 20 to 25 kg N/ha per application.

Weed Control

- Weed free strip of at least one metre width.

Pest and Disease Control

Critical diseases to be controlled include:

- Apple scab *Verturia inaequalis*
- Pear scab *Verturia pirina*
- Powdery mildew
- *Phytophthora* root rots

Insect pests

- Woolly Apple Aphid
- Mites
- Other leaf damaging insects

Mammalian and Avian pests

- Rabbits/hares
- Various Australian indigenous species

Cropping

- Trees on dwarfing rootstocks such as M9 and M26 will make better growth with a light crop, eg, 7 fruit per cm2 TCA, than with no crop at all.