

King mandarin rated as a super fruit in southern Vietnam by the introduction of tree training and pruning

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Citrus industry in Vietnam

Mandarin and orange production: 740 000 tons

Cultivation area: 68 800 ha

(Vietnam General Statistics Office, 2011)

- King mandarin (*Citrus nobilis*)



Traditional cultivation techniques

Traditionally, trees are planted in **1 to 1.5m**.
(Plant density: about 5000 trees per hectare)

Farmers expect to gain early yield.
But they do not expand branches.



1. Low yield
(4 to 10 kg per tree)



2. Trees grow tall
(3 to 4 m)



3. Huanglongbing
rapid expansion
(20 to 50% in 2 yr.)

JICA-SOFRI project

(Japan International
Cooperation Agency)



(National Institute of
Forestry)

Appropriate cultivation



Local governments in 5 provinces



Planting and neonicotinoid application



Planting distance



Soil drench for first year



Open center form



Foliar spray for second year

Data collection and HLB detection

◆ Farm location

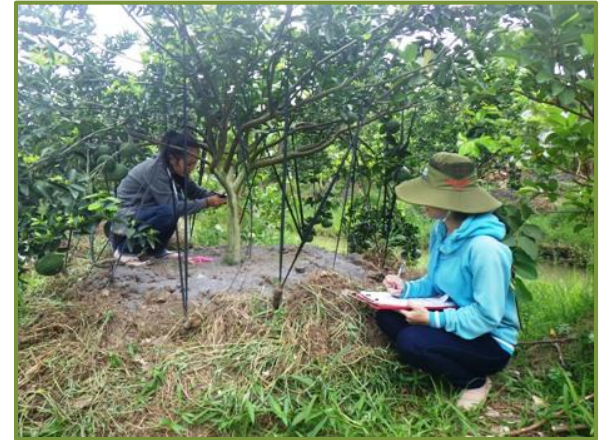
- Vinh Long, Ben Tre, Soc Trang province in southern Vietnam

◆ Tree growth measurements

- Tree height (H)
- Canopy major (Mj) and minor (Mi) axes
- Trunk diameter
- Canopy volume

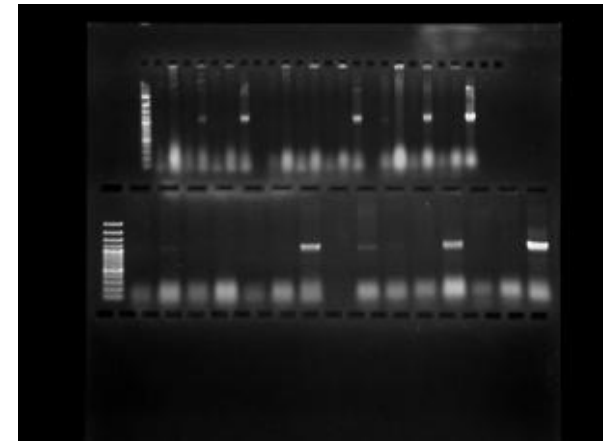
$$\text{Volume} = 0.7 \times H \times Mj \times Mi$$

(Institute of Fruit Tree Science, 1987)



◆ HLB infection proportion

- Every 6 months sample collection
- Tested by PCR (Kawabe et al. 2006)



Result 1: Tree height

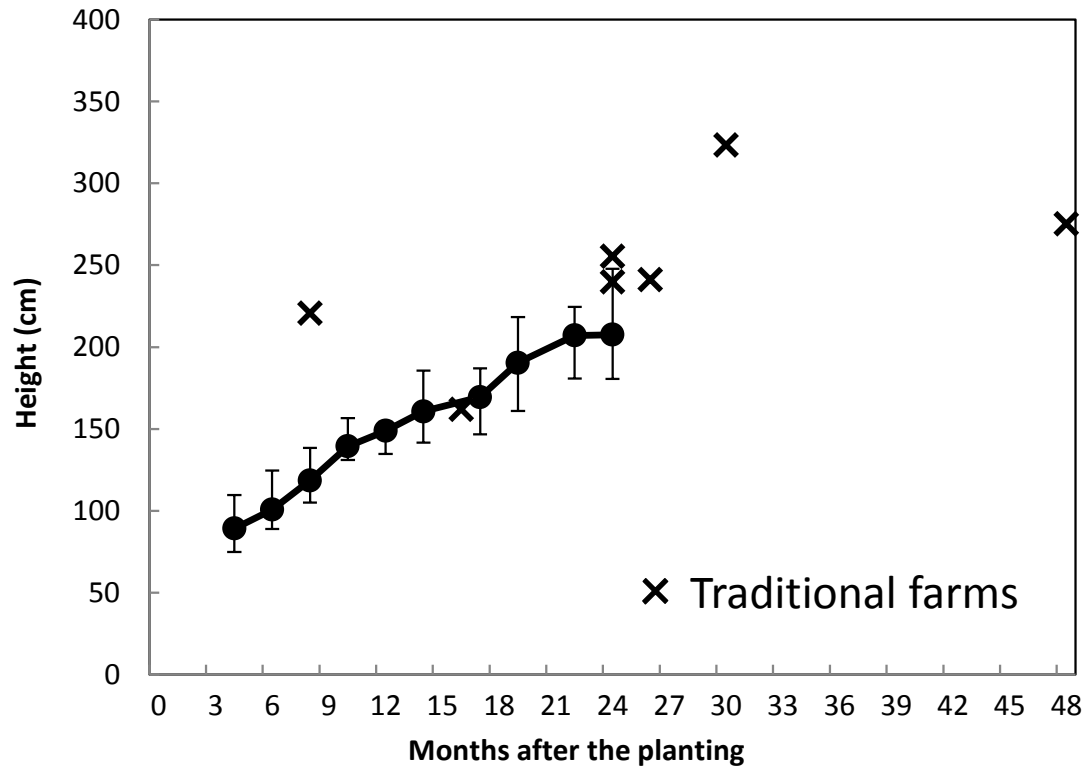


Fig. 1. Means (minimum - maximum) of tree height of King mandarin in the project and traditional farms.



First year:
139.2cm to 141.7cm
Second year:
171.3cm to 210.6cm

The project farms < Traditional farms

Result 2: Canopy width

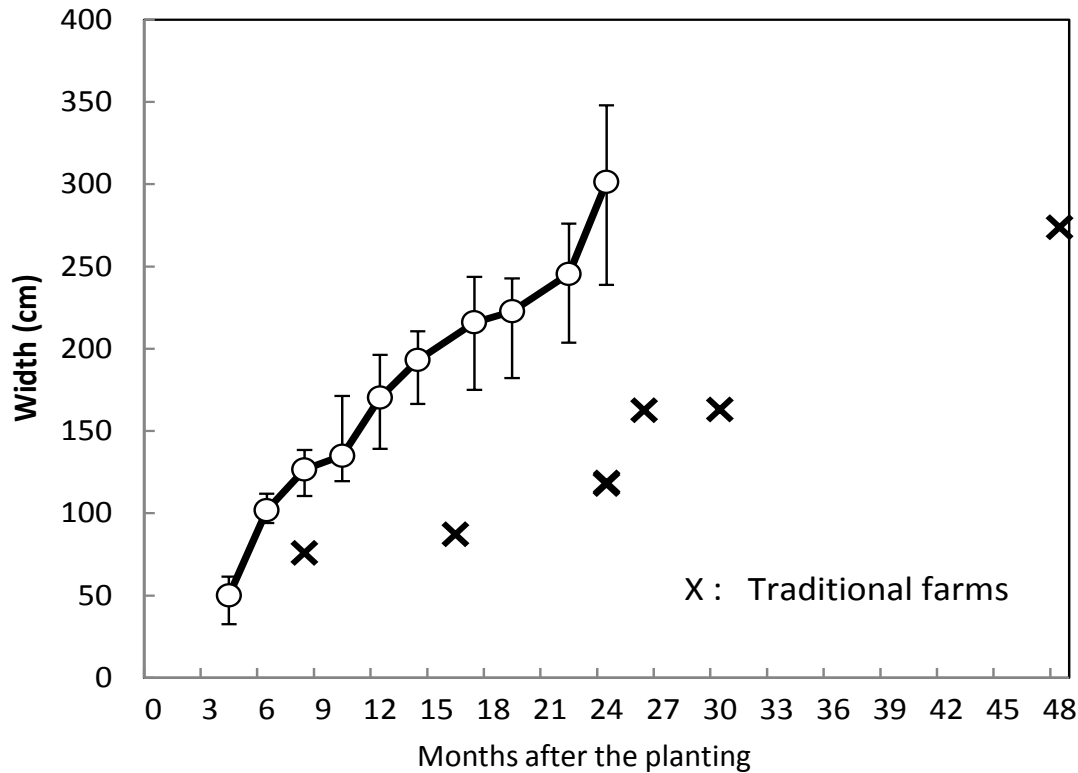


Fig. 1. Means (minimum - maximum) of major axis of canopy of King mandarin tree in the project and traditional farms.



First year:
180.5cm to 203.7cm
Second year:
247.7cm to 348.0cm

The project farms > Traditional farms

Result 3: Tree volume

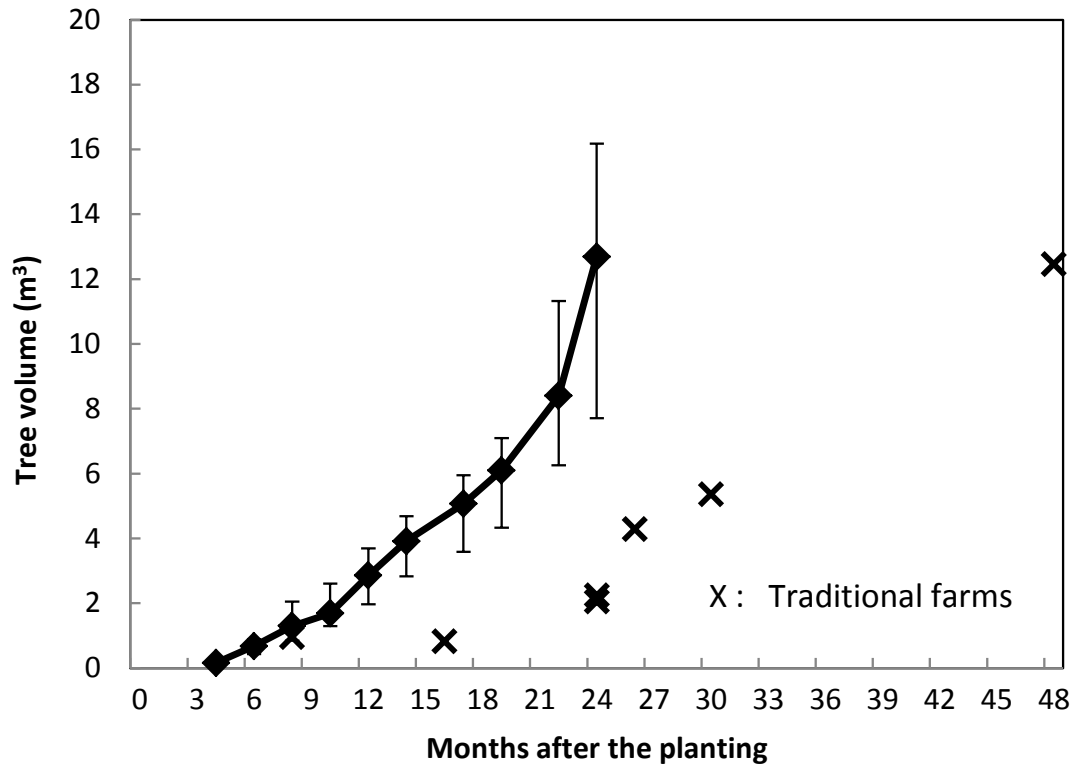


Fig.2. The volume of King mandarin tree in the project and traditional farms.



First year:

2.0m³ to 6.3m³

Second year:

3.7m³ to 16.2m³

The project farms > Traditional farms

Result 4: Trunk diameter

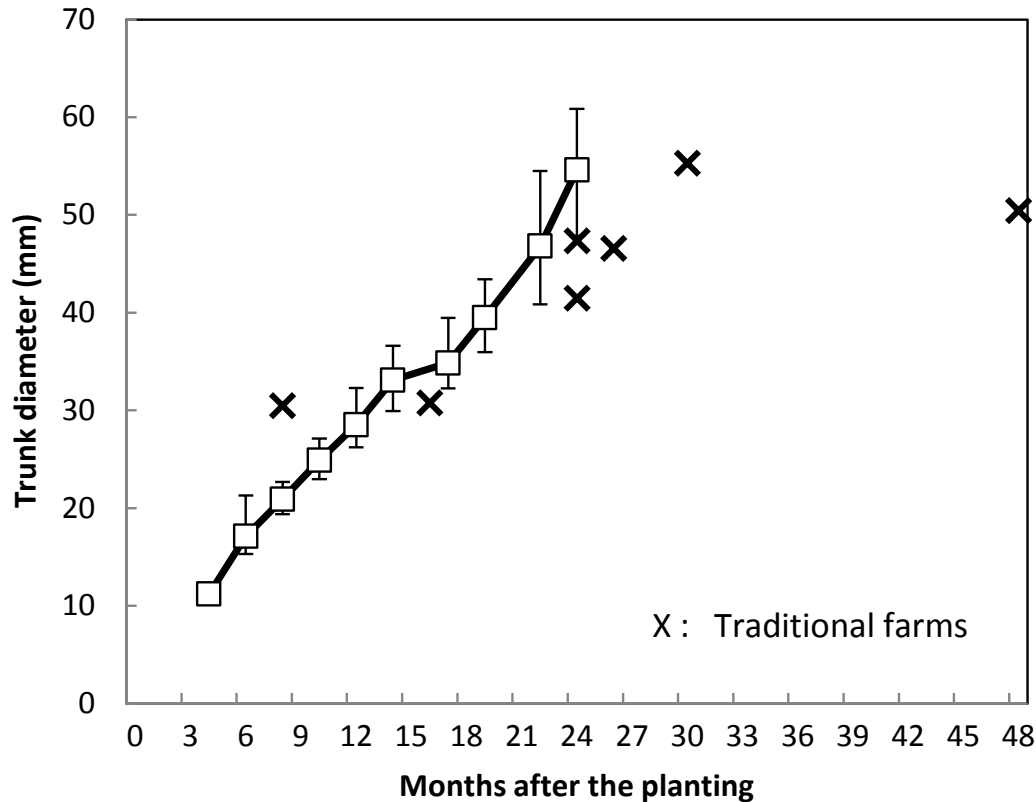
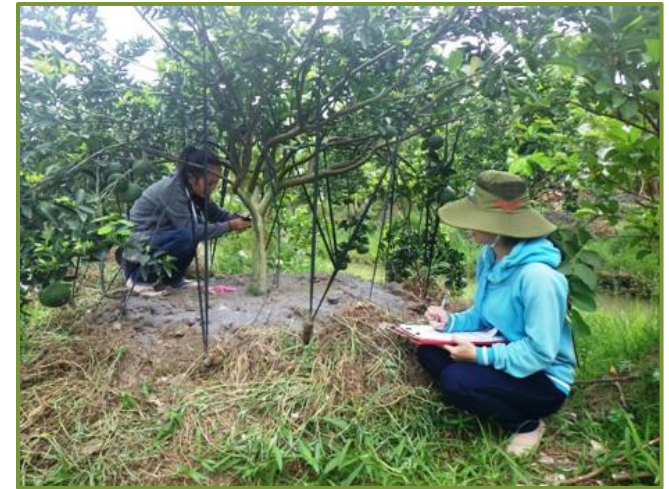


Fig.2. The diameter of tree trunk King mandarin tree in the project and traditional farms.



First year:
26.2mm to 32.3mm
Second year:
47.9mm to 60.9mm

The project farms > Traditional farms

Result 5: HLB proportion

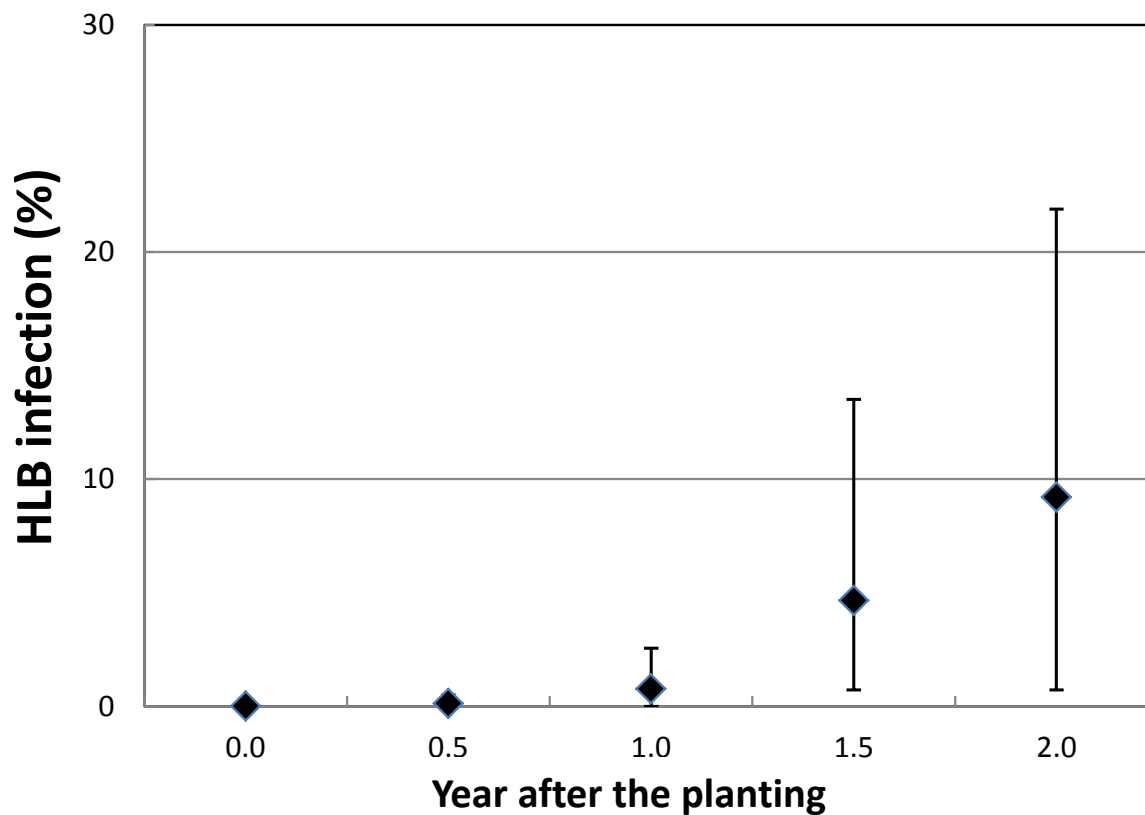


Fig. 3. The mean (minimum to maximum) of the proportion of infested trees in the project farms.

First year: < 2% (0% to 2.6%)

Second year: < 10% (0.7% to 21.9%)

Reported yield

First harvest

Some farmers attained

- 17.3kg / tree (still progress)
and < 10% HLB infestation
- 14.7kg / tree (still progress)
and < 20% HLB infestation



Yield for second harvest can achieve 30 to 40kg/tree.

The project farms > **Traditional farms**

Conclusion

Tree training for King mandarin seems to provide

- ✓ a long-lasting tree life under the severe HLB conditions,
- ✓ and the increase of yield.



King mandarin can be one of a superfruit
in southern Vietnam !

Extension work in southern Vietnam 1



Extension work in southern Vietnam 2



Acknowledgements



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Enjoy
Vietnam !!