

# Mango Cultivars for the Florida Estate Farm

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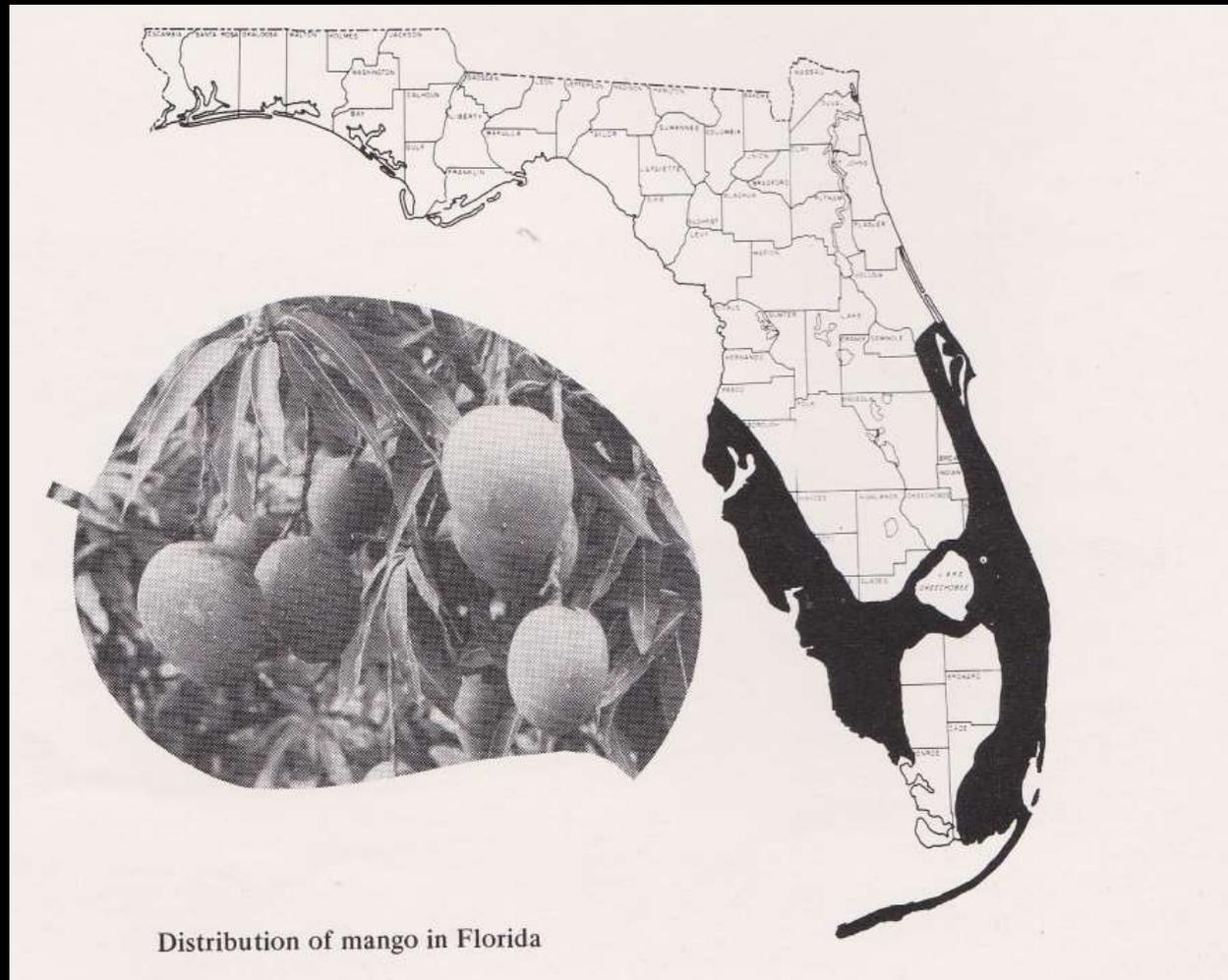
The mango industry started in Florida more than 100 years ago. The earliest plantings of mangos by Dr. Henry Perrine in 1833



Historically, this activity has only been considered viable in Miami-Dade, Monroe, Broward, Collier and Palm Beach Counties and within less than a mile of both coasts up to the center of the state; however, there is increasing interest in commercial mango production in locations further north and the interior of the state.

## Increasing mango orchards in South Florida:

\*Warm winters, opportunities provided by the loss of citrus orchards due to HLB, new cultivars and by more attractive land values in these locations.



Estate orchards can produce high value alternatives to imported fruit and are highly saleable on-farm and through specialty marketing outlets in the state.



Florida is the main mango producer in the United States  
83% of Florida's mango was located in Miami-Dade  
County.

Opportunities continue to increase for estate orchard  
mango production in Florida.





Main Cultivars commonly used in Florida mango:  
**‘Tommy Atkins’**, **‘Keitt’**, **‘Kent’**, **‘Valencia Pride’**



The mango continues to grow in importance in the local market due of the sustainable and community-based food movement and poor quality of imported mangos.



For a small-scale specialty mango orchard in South Florida, growers have to be actively seeking alternatives to increase profitability.

## Specialty Market Model (2 to 5 acres)





**Origin:** 'Angie' is originally from Florida, USA. Seedling of unknown origin, planted in 1988 at Four Fillies Farm at Fairchild Tropical Botanic Garden.

In 2006 Fairchild Tropical Botanic Garden named after Angie Whitman, wife of Mr. Bill Whitman and trustee of the Fairchild Tropical Botanic Garden.





The tree flushes ones a year, small internodes and stems compare with most cultivars.

The leaves are often twisted in a characteristic manner.



The tree is highly productive and trees in Florida begin to bloom and produce fruit in 3 years after planting.

**The flowering occurs during continuous moments in the winter, which can allow multiple crops.**

**Date of bloom — Mid December to early February in South Florida.**





The trees in South Florida often times present yellowish leaf due to nutritional deficiency which is easy to control with additional applications of iron chelate.



Angie is disease tolerance and given its **early season** it often can be harvested before the rainy season in South Florida.

The tree is easy to grow if nitrogen is kept low and the tree is not over-watered or grown in soils prone to flooding or with a high water table.

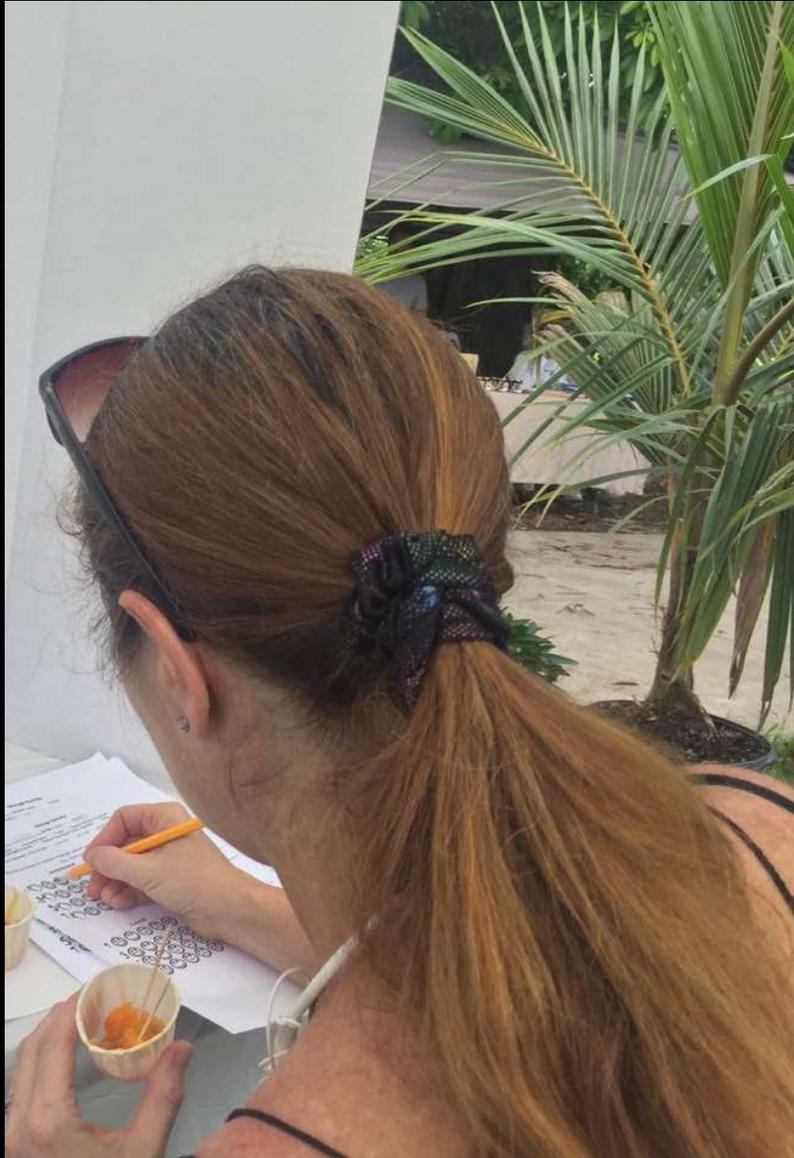


- The fruit which are 400 g. average weight, have a rounded base, stool stem inserted obliquely in level manner, apex rounded with a small lateral beak; surface slightly undulating. The fruit is firm, with a soft texture and few lenticels.
- It is a **polyembrionic cultivar**.



The flesh is orange yellow, firm and melting, with very little fiber and juice. It has a creamy smooth texture.

Angie has resemble flavor as 'Alphonso' and now very popular in our local community.



**This fruit aromas:** contains spices with a slight smell of peach; cucumber, wood, honey suckles flower and pineapple.

**Flavor is excellent:** rich and aromatic; with a strong component of peach and some cantaloupe and Cucurbitaceous relatives, with strong accents of pineapple and papaya.

**The sensations of aftertaste:** very low in acidity, astringency and bitterness.



Very resistant to **anthracnose** (*Colletotricum gloeosporioides*)

Moderate susceptibility to **powdery mildew** (*Oidium mangiferae*).

The best flavor is obtained when the fruit is tree ripened.

***Maturity date for harvesting:***  
The production of fruit happened between **May to July** in **South Florida**.



Long flavor-life in storage.

**After harvest:** good tolerance to anthracnose (*Colletotricum gloeosporioides*)

It can be qualified as a fruit with high overall quality.

Preliminary data suggest over 14 days shelve life (Untreated)

A calendar for July 2012 is shown, with red 'X' marks indicating storage duration. The marks are present on the following dates: 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, and 31. The 'X' marks are absent on the 1st, 2nd, 3rd, 4th, and 5th of the month.

July 2012						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

'Angie' (14 days)



The best flavor is obtained when the fruit is tree ripened, but keep good flavor after proper storage. (No refrigeration below 55F).

### **It Ships well!**

It has a creamy smooth texture with, a brix of 22% and a long flavor-life in storage.

it can be qualified as a fruit with high overall quality.



Today trees have been propagated by graft from the mother tree at the Fairchild Farm in Homestead Florida. 'Angie' trees are available in local nurseries.

## ‘Rosigold’



‘Rosigold’ progeny from a ‘Saigon’ seed . It was selected and propagated by Dr. Robert J. Knight of the United States Department of Agriculture and given an accession number of MIA – 13269.

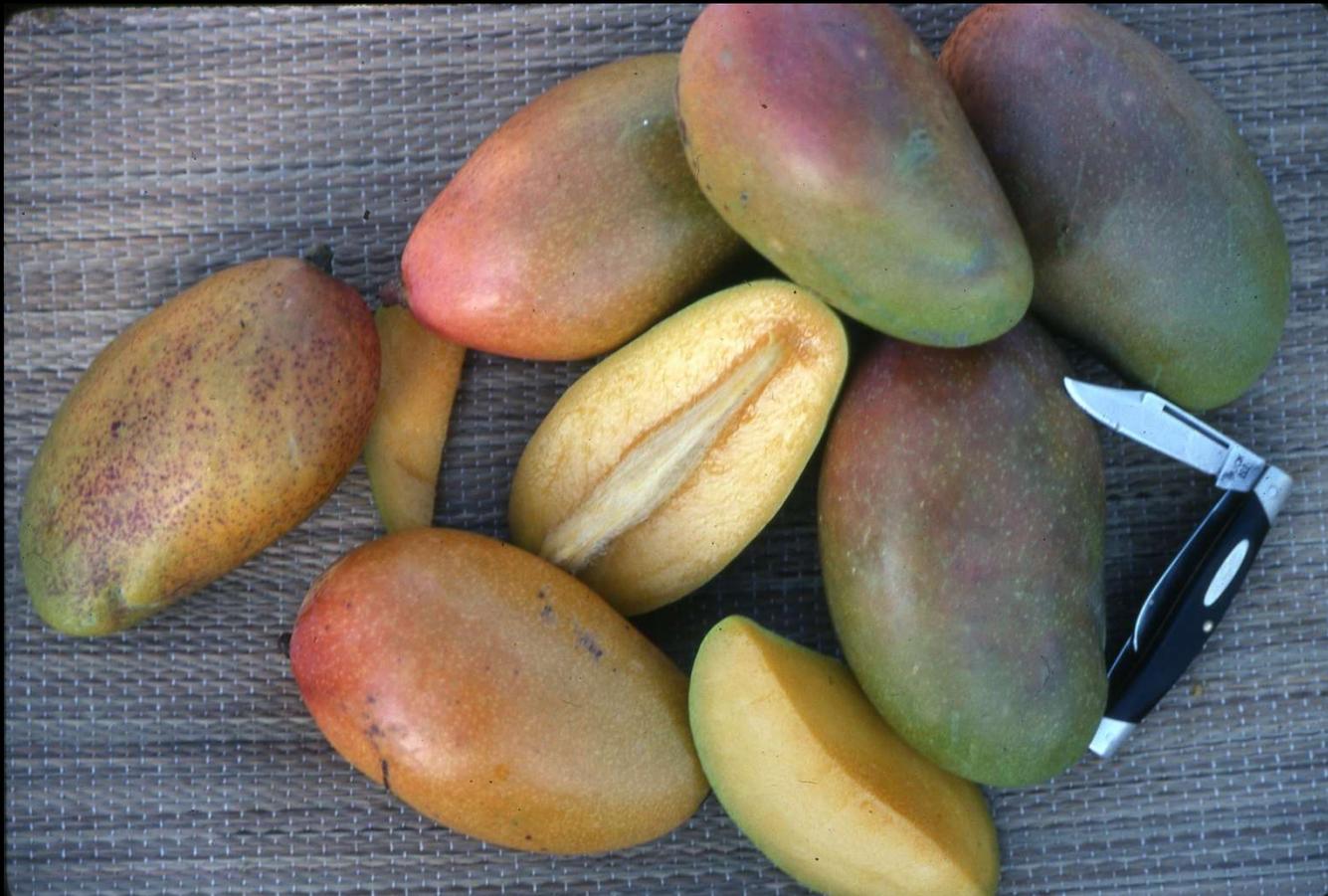
Propagation material (budwood) was distributed to the Univ. of Florida Tropical Research and Education Center in 1972, but was killed by Hurricane Andrew in 1992.



‘Rosigold’ was not officially released by the USDA and the original tree died in the 1980s at the Chapman Field station.

‘Rosigold’ was later recollected on Miami Beach in the early 1990s by Dr. Carl W. Campbell and given to Fairchild Tropical Botanic Garden, where it has been promoted for nearly 30 years.

‘Rosigold’ weight 400 g. The skin is yellow-orange with a pastel red blush and soft and melting flesh a deep orange color. The flavor is rich, aromatic and sweet with no fiber. The fruit are mostly polyembryonic. Overall the quality is good to excellent.



The disease tolerance of the tree is good for anthracnose, powdery mildew and moderate for bacterial diseases. The fruit are moderately tolerant of powdery mildew, but are highly susceptible to anthracnose infection as the fruit ripen.



The fruit are moderately tolerant of powdery mildew, but are **highly susceptible to anthracnose infection as the fruit ripen.**



The tree blooms easily with **little cold induction** and is semi-dwarf in nature , slow growth habit. Production is good, particularly when the tree is grown with lower nitrogen levels that enhance flowering and are conducive to multiple crops. **Yield average of 15 tn/ha**



**'Mallika'**

Hybrid: 'Neelum' X 'Dusehri'



Origin: India

*Reliance Global Management Services*

*Dr. R. T. Gunjate*

## Season Florida (June-July)

- 425 g
- Yield average of 15 tn/ha



Compact tree

Very Resistance  
Diseases



Post-harvest handling techniques have been developed over centuries in India for local cultivars.

**For centuries they develop their own ripening system.**

Mangos are picked when they still green and unwashed they are keep them with their natural wax in the skin.

Mangos are packed in wood boxes and fill it with natural grass.



Traditionally, Indian mangos have been stored at high temperatures than can reach up to 90 to 100 F. They store the mangos in the dark and ventilated structures.

Indian cultivars were not selected for a post-harvest cold chain and exposure of the fruit to standard shipping temperatures and techniques can result in loss of quality.





Working with Indian Mangos  
at Fairchild

Preparing for mango tasting  
for Int Mango Festival

70F night

93F day time

Never cool

10 days storage (Small fruit)

20 days storage (large fruit)

- Fruit were harvested at 70% - 80% maturity stage.
- Color skin: picked with a light green
- Weight: 300 to 450 g.
- Mangos normally reach maturity in 4 to 5 months from flowering





### **Maturity in 'Mallika':**

The fruit develops oblong sigmoid shape and fill their shoulders when rich maturation. 300 to 450 g.

*Ledesma, 2017*

**Cleaning and Packing:** Fruit was moved to facility for cleaning and packing. Fruit was unloaded from the field bins after been washed with rinse water.

**Table 1.** Treatment Fruit category by size.

Small Fruit	Medium size fruit	Large fruit
280-310	310-380	>380



### USPS Flat Rate Shipping Boxes:

**Small Box:** 8 5/8" by 5 3/8" by 1 5/8"

**Medium:** 11" by 8 1/2" by 5 1/2"

**Large:** 12" by 12" by 5 1/2"

*Ledesma, 2017*



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The fruits were graded while they are green, and packed while they are still green or semi-ripe.

There is no formula to ascertain by how much quantity the weight will reduce. The way how the grading is done commercially, using a specially calibrated weighing machine shows the grade of each mango, which then goes into their dedicated baskets. For our experiment we use as a reference commercial standards.



**Table 2.** Fruit Average Evaluation before shipping

Evaluation Day	T1 (A3)			T2 (A2)			T3 (A1+)		
	Weight	Brix	Internal color	Weight	Brix	Internal color	Weight	Brix	Internal color
1	300	13	cream	340	14.5	cream	370	15.00	cream
5	299	14	Pale yellow	339	15.5	Pale yellow	370	15.00	Pale yellow
6	299	15	Pale yellow	339	16.5	Pale yellow	369	15.00	Pale yellow
7	299	16	Pale yellow	339	16.5	Pale yellow	365	16.00	Pale yellow
8	298	17.5	yellow	339	17.5	orange	360	17.00	yellow
9	299	18	orange	338	18.5	orange	356	17.5	orange
10	298	18	orange	338	18.5	orange	350	18.5	orange

*Grade A1+ – Largest: 300 gms average*

*Grade A2 – Medium 310 gms average*

*Grade A3 – Small: 250 gms average*

The weight did reduce by the time the fruits ripen, during transit.

Fruit is normally sold by fruit and in some cases by weight.

*Ledesma, 2017*

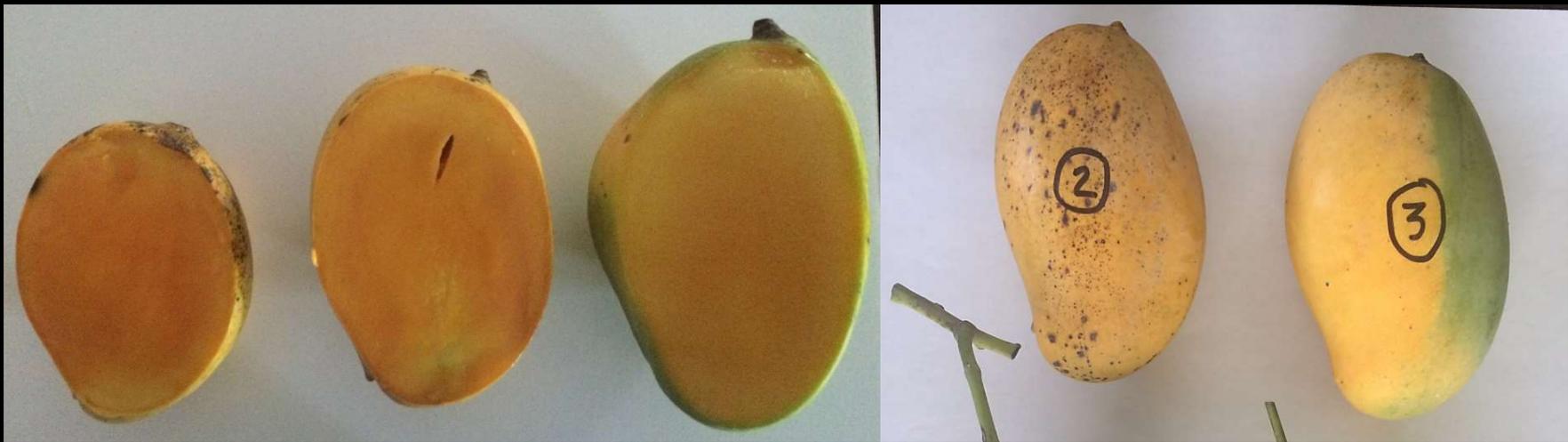


Table 3. Average fruit rating on arrival.<sup>z</sup>

Evaluation Day	T1 (Small)	T2 (Medium)	T3 (Large)
14	2 <sup>y</sup>	2	2
16	2	1	1
18	2	1	1
20	1	1	1
22	1	1	3
24	1	1	3

<sup>z</sup>Physical appearance at arrival 14 days after picking.

<sup>y</sup>Scores: 1 = good (ready to eat); 2 = acceptable (not ripe); and 3 = not acceptable (over ripe).



External color, appearance, pulp color are indicators for judging the fruit maturity. The flesh color increases with maturation of fruit, and grades T1, T2 and T3 ripe in the terms of 14 to 24 days from picking time *Ledesma, 2017*



Resistant to anthracnose and powdered mildew  
Flowers and fruit (After and before harvest)



**Nam Doc Mai**



**Origin Thailand.**



## ***Fresh mango export :***

***Japan  
Malaysia, Laos PDR,  
South Korea,  
Indonesia,  
Hong Kong,  
Singapore,  
China, and the USA***

## ***for processed products:***

***Japan, the Netherlands,  
Australia, the USA,  
New Zealand, Russia,  
and South Korea***

## 'Nam Doc Mai # 4'



450 g, yellow  
weigh 340-580 g

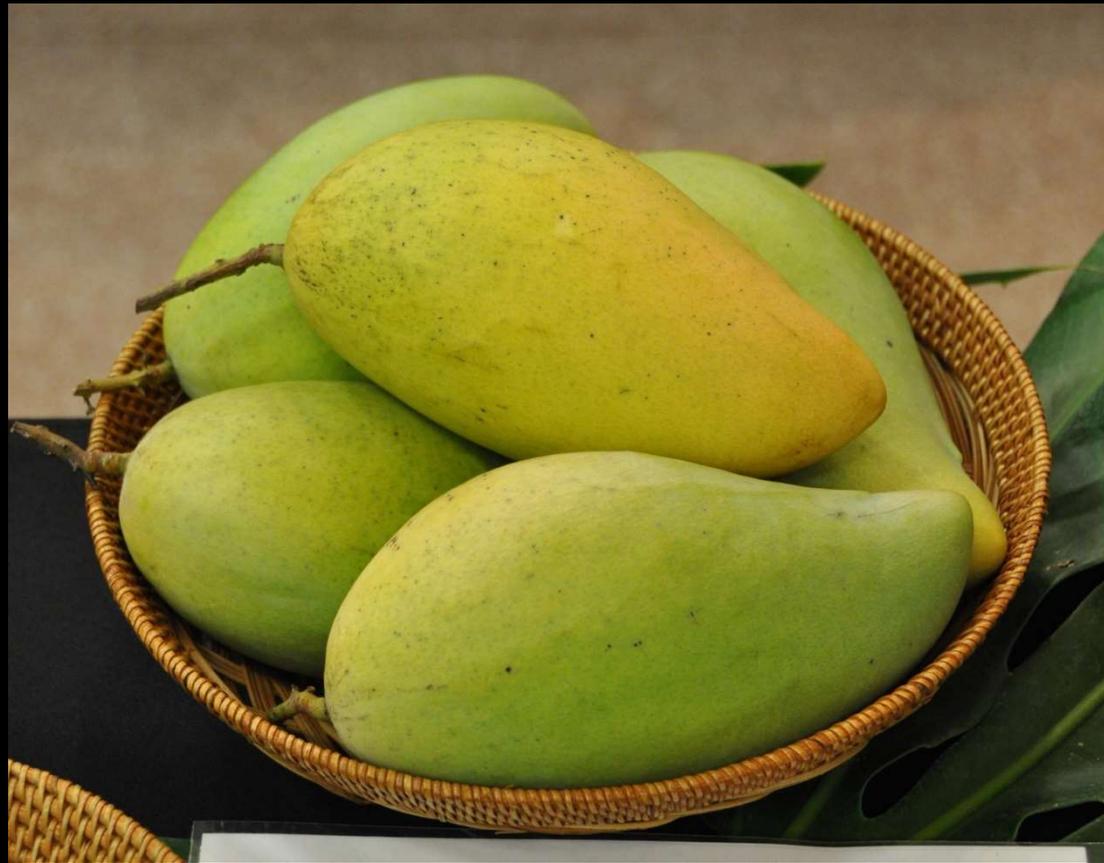
very sweet, highly aromatic fibreless fruit. The fruit has an elongated shape with greenish to canary color skin with smooth, soft, silky textures. Skin easily separated from the flesh. It has a zingy citrus aroma with a juicy, sweet, aromatic flavor.

Excellent flavor

Popular variety and generally eaten when ripe.

It can be eaten both as a ripe fruit and hard green fruit in Asian recipes.

Seed is polyembryonic in a thin, papery stone.  
This cultivar ripens **early midseason**, fruits regularly  
and may have **multiple crops in one season**.



There are small commercial orchards currently in South Florida.



Research is showing consistent irrigation may prevent splitting during a heavy rainfall.

The splitting risk increases if the mango skin loses its elasticity.

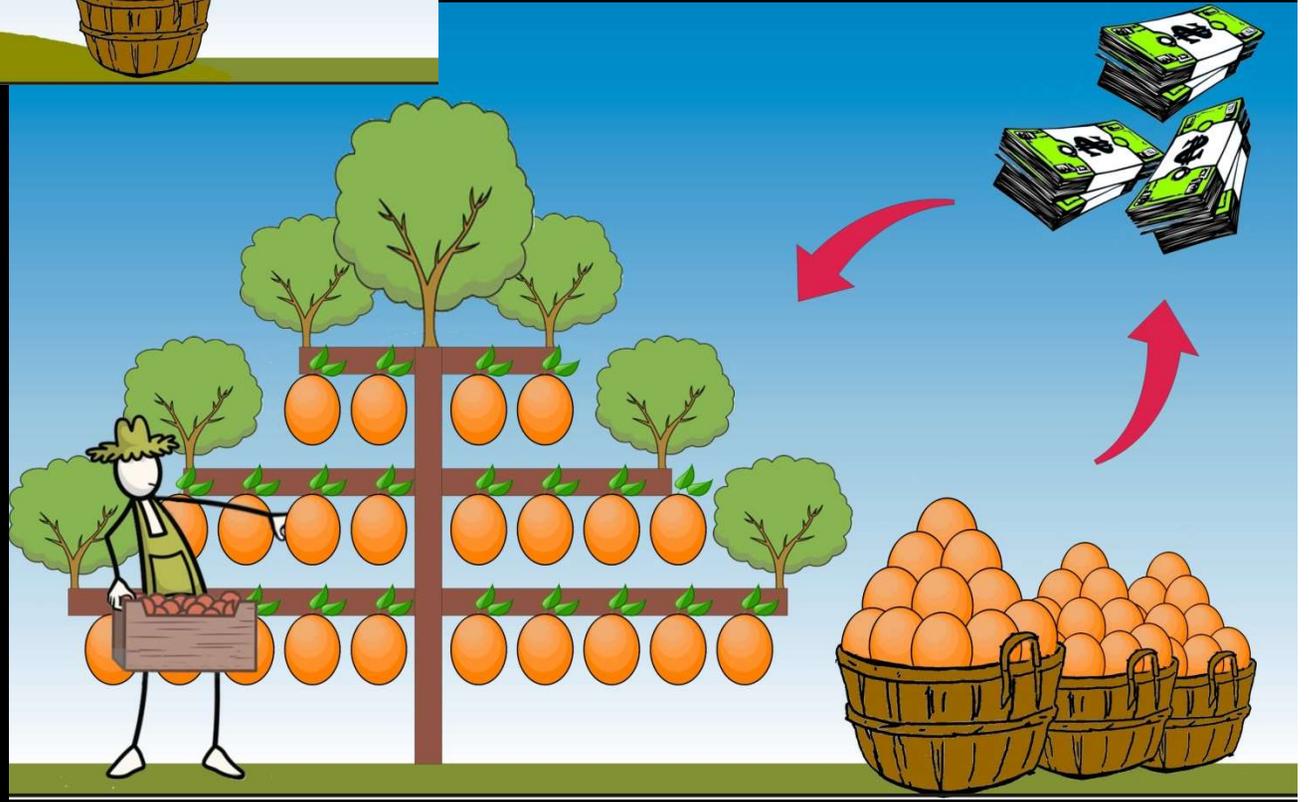
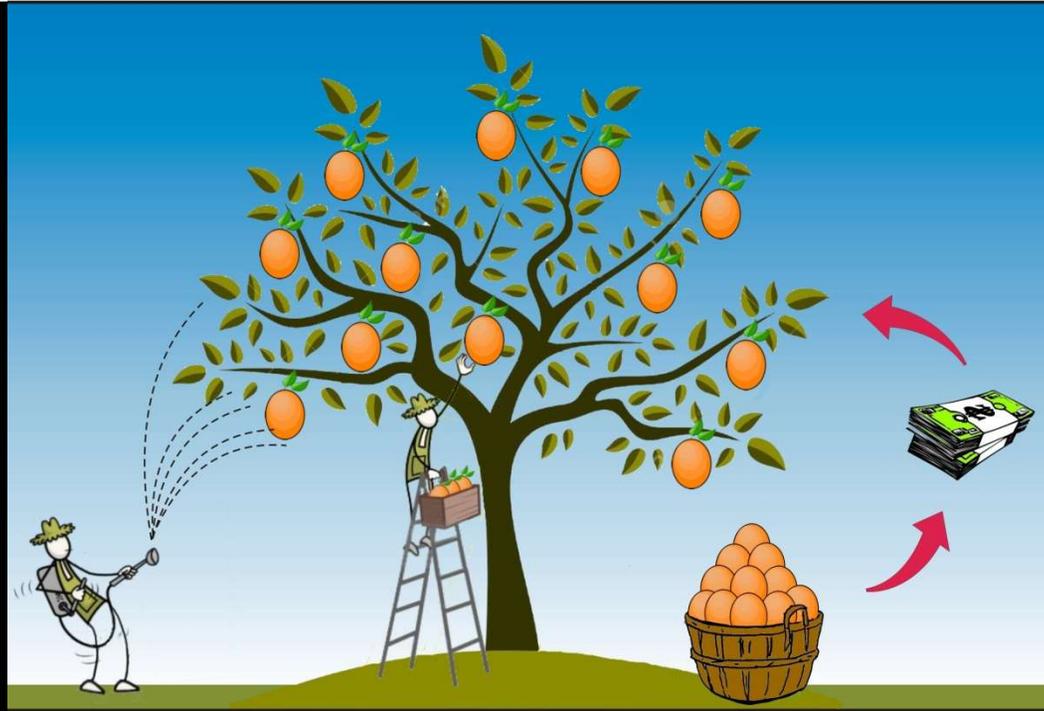
- Productive (15 tn/ha)
- **Resistance diseases**





### Harvest must be accurate:

- Do not harvest unripe fruit
- Do not harvest too late
- Recommended time: 24 days from flower
- Storage no more than 14C





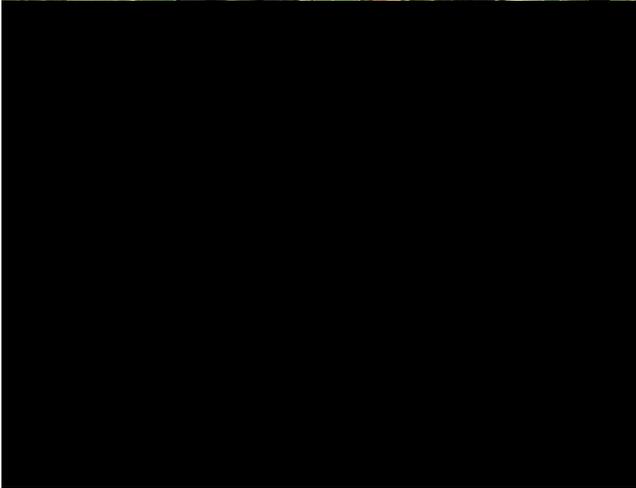
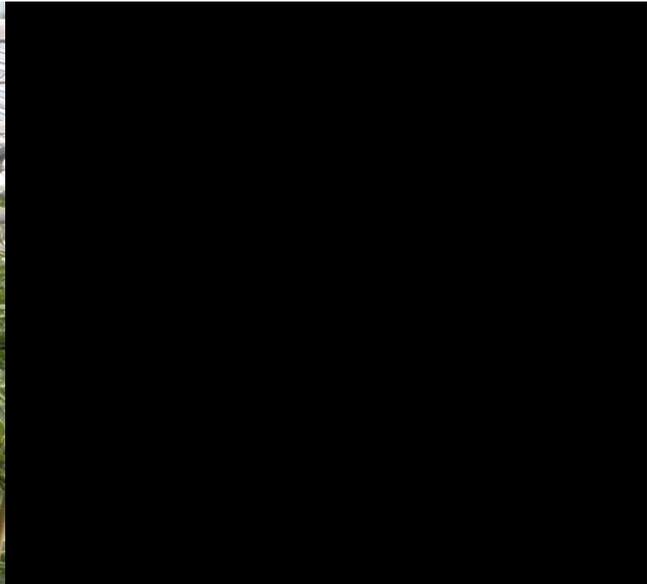
**Philippines**



Japan















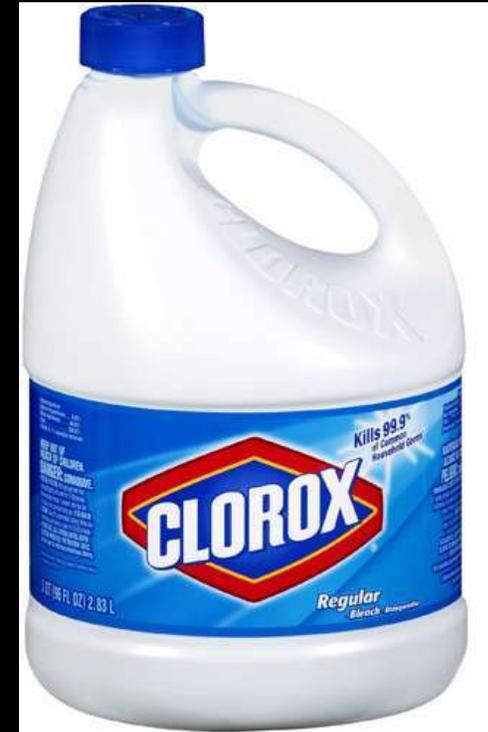




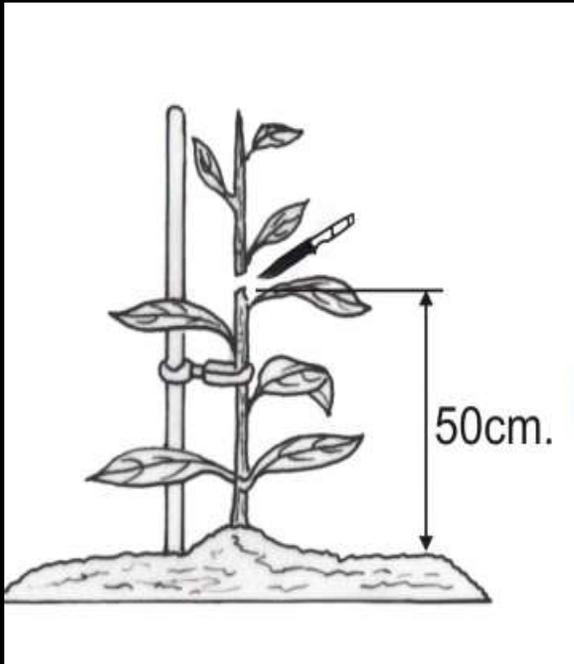
zadores



# Tools: sharp and clean



***Shoot tipping:*** Each central leader shoot of the grafted trees were tipped



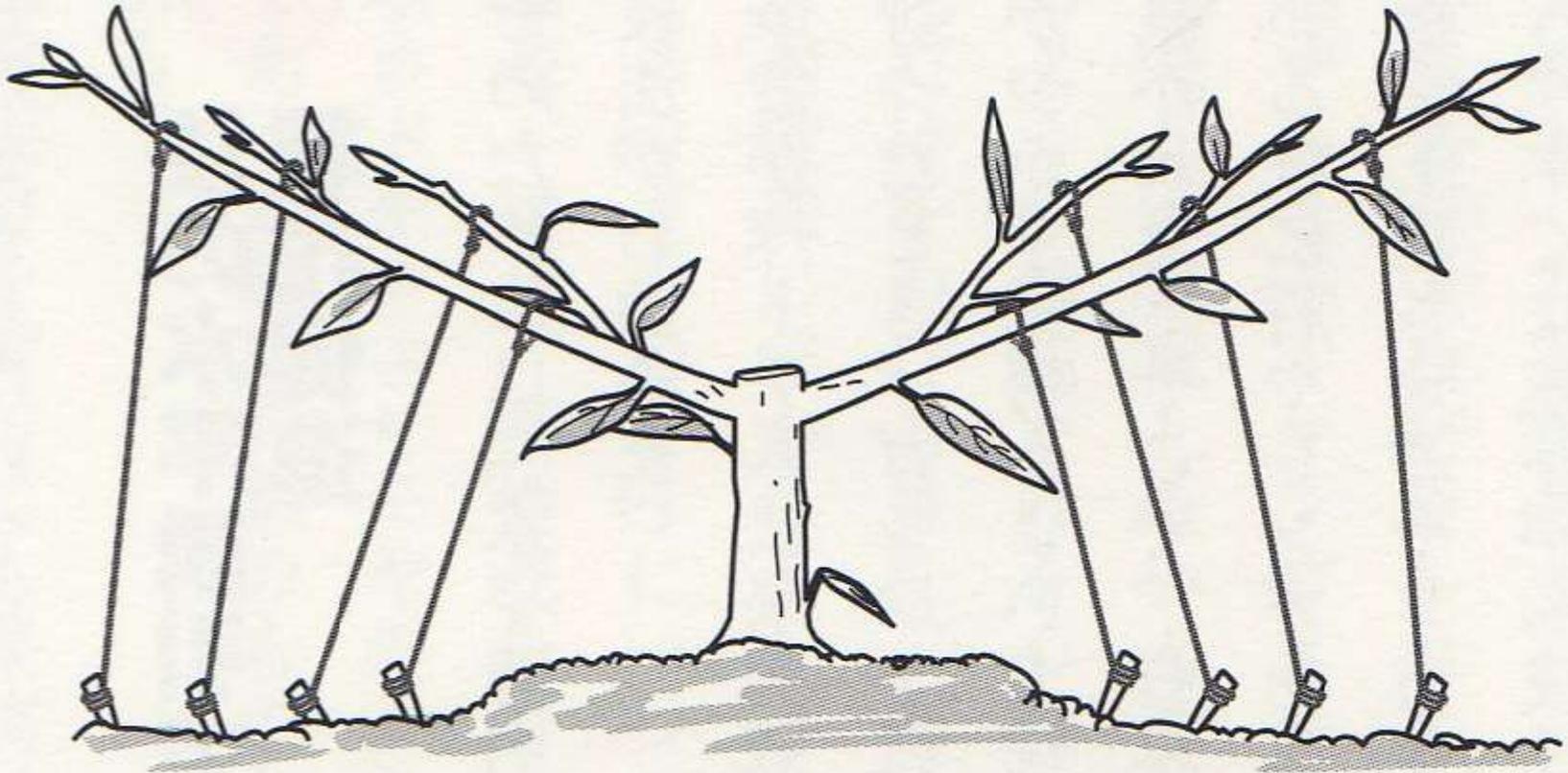
All lateral shoots were maintained and tipped after the second vegetative flush



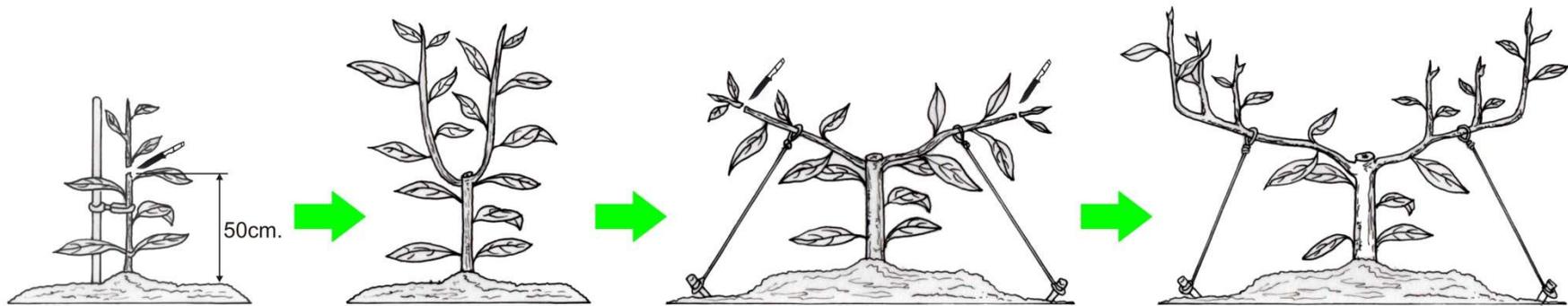
Open the canopy to light and air movement and spray penetration



# Branch arching with weights







Annually thin major limbs within the canopy will improve fruit color, disease and production.





**When to pruned:  
Timing. Generally,  
after harvest.**

**Heavy pruning is best  
done in end March with  
proper conditions.**

The mango continues to grow in importance in the local market due of the sustainable and community-based food movement “Local Food”





Thank you!

