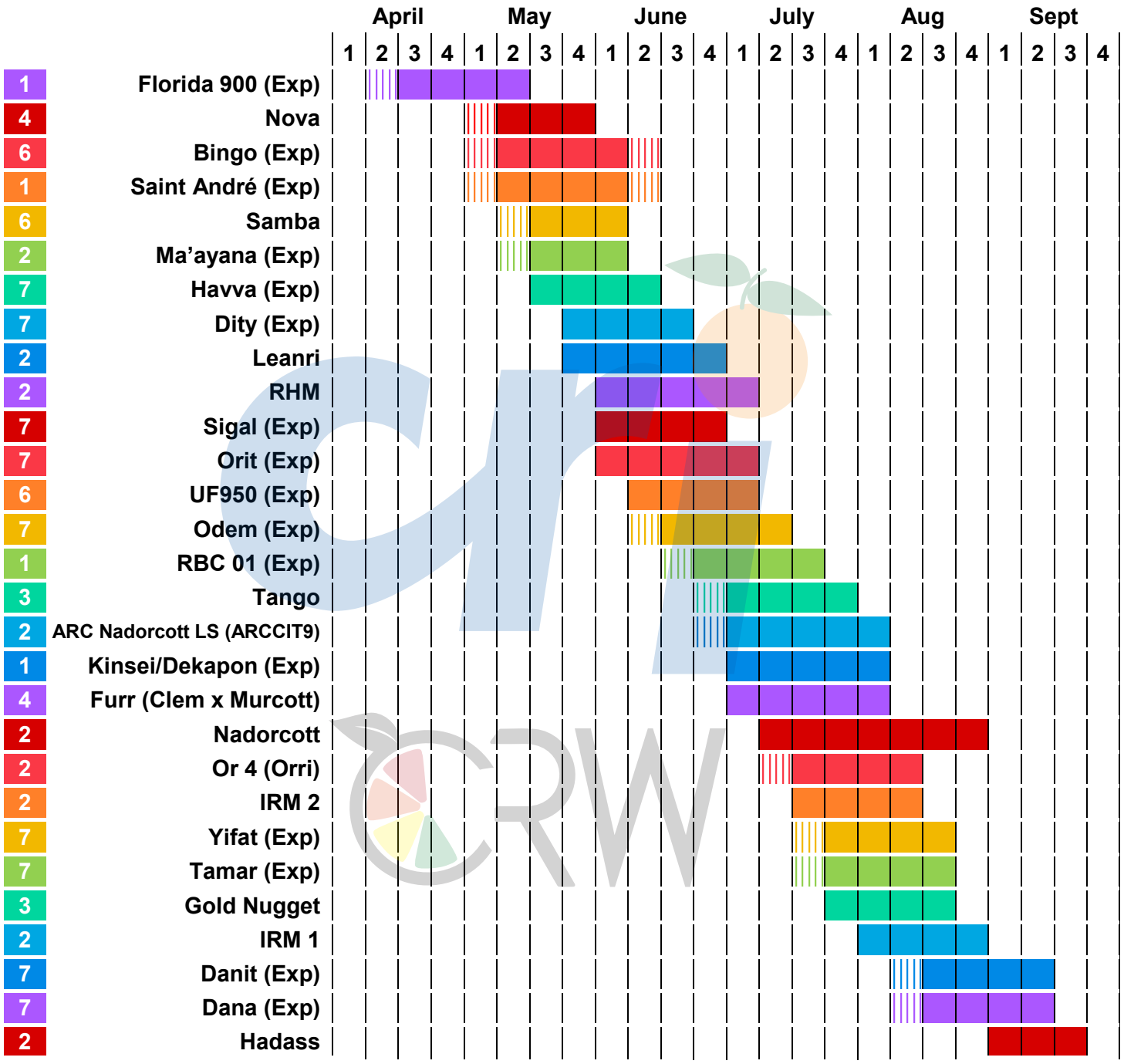
# Mandarin Hybrids

# Mandarin Hybrid Maturity Periods

## Western Cape




**Key:**

| | |
|---|---|
| **Exp** | Experimental Cultivar |
| **1** | CGA Cultivar Company |
| **2** | Citrogold |
| **3** | Eurosemillas |
| **4** | Open |
| **5** | Stargrow |
| **6** | XLnT |
| **7** | Citrus Genesis |

**Updated: July 2024**

# African Sunset (B24) Mandarin Hybrid

**Origin**
A seedling resulting from a cross between Ellendale and Robin, planted out at Addo Research Station, ITSC, Addo, South Africa in 1984. The resulting seeds were irradiated, producing the cultivar that was originally known as B24.

**Ownership**
Patented. Institute for Tropical and Subtropical Crops (ITSC).

**General Description**
A local, large and flat, high quality, well coloured, late maturing seedless mandarin hybrid.

**Tree Characteristics**
The tree is moderately spreading and thornless. The trees are not heavy bearers and there is a possibility of alternate bearing under adverse conditions.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange. Rootstocks inducing large fruit size, lower acid and drier fruit are not advised.

**Fruit Characteristics**
Fruit size is large, 1X – 1XXX (70 – 85mm). The fruit shape is oblate and a small, closed protruding navel sometimes present. Depending on the area, the rind is smooth (Addo) to slightly pebbled (Citrusdal), where there is sometimes slight fluting of the stem end. Rind colour is dark orange to orange red, with a medium thin rind thickness. The fruit peels reasonably easily at maturity

**African Sunset (B24) fruit showing typical flat shape, rind texture and seedlessness.**

maturity, sometimes leaving a little albedo and oily. The flesh is a dark orange and cores slightly open to open. Fruit quality is very good, with high sugars and good acid levels resulting in a good ratio. Young trees can lack flavour. The fruit can be slightly raggy and juice percentages are lower in the Citrusdal area. Maturity in the cold production areas is late June to early July. The fruit is seedless, even in mixed blocks.

**Production**
Production is moderate, although figures are still to be included.

**General**
Manipulating the crop to increase the crop load should improve (reduce) the fruit size. There is sometimes minor fruit split and fruit drop has been noted. Can be

**Six year old African Sunset (B24) tree on Troyer citrange showing typical shape (tree height 3m).**

**Updated: May 2012**

Susceptible to *Diplodia* twig dieback, which can cause tree decline if girdled. Harvest, packing and shipping requirements are as for other mandarin hybrids.

**Status, Area Suitability and Availability**
This cultivar has only been planted in experimental and semi commercial blocks in the cold citrus production areas of South Africa. There are only limited data. Large fruit size and insufficient fruit set may be limiting factors. Commercial quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - African Sunset on Troyer citrange - Count 1XX/1XXX - Eastern Cape | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 26/06/2008 | 59.3 | 10.9 | 1.10 | 9.9 | 0 | 1 |
| 02/07/2008 | 63.6 | 10.6 | 1.07 | 9.9 | 0 | 1 |
| 12/07/2008 | 60.1 | 11.4 | 1.10 | 10.4 | 0.2 | 1 |

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
The African Sunset (B24) is an excellent quality fruit that could be of value to the South African soft citrus industry. However, production is insufficient in existing orchards and fruit set improvement needs to be addressed.

# ARC Nadorcott LS (ARCCIT9)

**Origin**
ARCCIT 9 - also known as ARC Nadorcott LS - is an irradiated Nadorcott mandarin, acknowledged as essentially derived from Nadorcott, and developed by the Agricultural Research Council (ARC) in Addo, Eastern Cape, South Africa.

**Ownership**
The Agricultural Research Council (ARC) is the PBR holder of the variety. Given that the variety is essentially derived from Nadorcott, the ARC shares the commercialisation rights with the Nadorcott Protection Company (NCP), the owner of the Nadorcott variety. Citrogold (Pty) Ltd has been appointed to manage the commercialisation of the ARC Nadorcott LS variety in South Africa.

**General Description**
ARCCIT 9 is a mid to late maturing low seeded mandarin hybrid. Fruit size is medium to large with a deep red-orange rind colour and a deep orange internal colour. The mandarin is prone to alternate bearing. Trees have a vigorous growth pattern.

**Tree Characteristics**
The tree shape is upright with vigorous growth and without thorns, similar to Nadorcott.

Flowering time and intensity is similar to that of Clementine mandarin and is not protracted. Through trials it has been seen that the ARCCIT 9 mandarin has low percentage of viable pollen and is a weak pollinator, the ovules have low fertility which decreases sensitivity to cross-pollination.

Yields should be managed (girdling & Gibberellic acid sprays during flower time), as the selection is prone to alternate bearing. The variety is also very tolerant to Alternaria.

**ARCCIT 9 fruit showing typical shape, colour, rind texture and rind thickness.**

**Rootstock Options**
Carrizo citrange, C35 citrange, Swingle citrumelo, X639 and Sunki 812 citrandarin.

**Fruit Characteristics**
Fruit size is larger than Clementines and Nova; the shape is more oblate. The rind is deep red-orange with a slightly pink albedo, this makes it distinguishable. The fruit have a natural wax or shiny external appearance. Internal fruit colour is a brilliant deep orange.

The rind texture is smoother in humid and coastal production areas compared to drier inland areas. Fruit splitting rarely occurs and ribbing at the stem is a moderate occurrence.

Easy peelability with little to no oil and adhering albedo.

Maturity in the warm areas varied from late May to June and in the cool production areas from late July to August. ARCCIT 9 have high sugars and moderate acids that leads to good quality fruit with a well balanced distinct flavour.

**Production**
ARCCIT 9 are precocious and they should produce an average of 50 t/ha depending on the growing area.

**General**
As ARCCIT 9 trees are quite vigorous, planting density must be appropriate to accommodate the tree size. Harvest, packing and shipping requirements are the same as for other mandarin hybrids. Fruit does well under cold sterilization and cold storage conditions.

**Seven year old ARCCIT 9 trees on Carrizo citrange showing typical fruit size and yield.**

**Updated: July 2018**

**Status, Area Suitability and Availability**
This selection was evaluated in different citrus production areas (cold, intermediate and hot) of South Africa. It is gaining popularity due to the deep orange rind colour, good flavour, low seediness, good crop and favourable fruit size. Propagation material is available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - ARCCIT 9 on Carrizo citrange - Hoedpsruit | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Count** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 29/03/2018 | 1-3 | 50.7 | 14.3 | 2.05 | 7.0 | 0.3 | T3 |
| 01/06/2018 | 2-1X | 62.2 | 14.6 | 1.25 | 11.7 | 0.2 | T1-3 |

| Internal Quality - ARCCIT 9 on Carrizo citrange - Kirkwood | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Count** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 31/05/2017 | 1X | 56.7 | 11.9 | 1.13 | 10.5 | 0.2 | T5 |
| 19/06/2017 | 1XX | 62.0 | 11.8 | 1.16 | 10.2 | 0.0 | T3-4 |
| 05/07/2017 | 1XX | 60.7 | 11.6 | 0.94 | 12.3 | 0.0 | T1 |
| 02/08/2017 | 1 | 64.0 | 11.5 | 0.84 | 13.7 | 0.0 | T1 |

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

# Furr Mandarin Hybrid

**Origin**
A Clementine mandarin X Murcott hybrid developed by J. R. Furr of the U.S. Department of Agriculture at Indio, California and released circa 1953. This cultivar found its way to Florida where it was irradiated to reduce seeds and canker sensitivity. Seed counts were slightly reduced, but its canker tolerance was enhanced substantially. The selection was then included in trials in Florida and has since found its way to a number of citrus producing countries around the world. It was imported from Florida to South Africa during the 1990s.

**Ownership**
Open.

**General Description**
A mid to late maturing Clementine mandarin hybrid. The fruit is high quality, maturing in late June to early July in the Sundays River Valley region of the Eastern Cape. It peels easily and due to its seediness is easy to produce. Orchards observed in South Africa and South America show this cultivar to be a stable cultivar producing good yields of very good quality, medium large well coloured fruit.

**Tree Characteristics**
The tree is fairly vigorous with an open growth habit. The leaves are larger than Clementine and more Murcott like in shape and colour. Yields are good and uniformly spread through the fairly open, spreading tree.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange. Rootstocks inducing small fruit size, lower acid and later colour are not advised.

**Furr fruit showing typical shape, colour, rind texture, rind thickness and seediness.**

**Fruit Characteristics**
Fruit size is medium to large and can be too large if over irrigated. The fruit is flattish-round with a smooth rind texture. The fruit is firm and has a medium rind that makes peeling easy. The rind develops a deep orange red colour resulting in an attractive fruit. Fruit quality is very good, with high sugars and good acid levels that are retained and the fruit can hang well on the tree. Maturity in the cold production areas is around late June to early July. The fruit is self compatible and sets medium seeded fruit in solid block plantings. The fruit is sought after by the Far Eastern markets due to its size and firmness and the seed counts have not been a problem to date.

**Production**
Yields are good, although figures are still to be included.

**General**
Light pruning may be necessary to maintain the tree's open structure if it becomes too dense for any reason. Harvest, packing and shipping requirements are as for other mandarin hybrids.

**Six year old Furr tree on Carrizo citrange showing typical open growth habit and yield (tree height 2.4m).**

**Updated: May 2012**

**Status, Area Suitability and Availability**
This selection has been produced successfully in limited quantities in the Sundays River Valley area, a cold citrus production area of South Africa. It is gaining popularity due to successes in the Eastern markets. Limited quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Furr on Carrizo citrange - Count 1XX - Sundays River Valley | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 15/06/2011 | 57.8 | 15.0 | 1.47 | 10.2 | 7.4 | 1 |
| 22/06/2011 | 55.1 | 16.0 | 1.41 | 11.3 | 10.3 | 1 |
| 28/06/2011 | 57.5 | 15.6 | 1.36 | 11.5 | 5.5 | 1 |

**Count Distribution**

| Count | 1XXX | 1XX | 1X | 1 | 2 |
|---|---|---|---|---|---|
| % | 7.7 | 37.5 | 39.5 | 11.6 | 3.7 |

**Production**
15.5 Kg per tree and 8 tons per hectare for 4 year old trees. Spacing not specified.

**Export %**

| Grade | Percentage |
|---|---|
| 1 | 82.9 |
| 2 | 17.1 |
| 3 | |
| 4 | |

**Comments**
The Furr has become of value with the expanding eastern markets where fruit size, firmness, colour and flavour are important and seeds not the problem they are in western markets.

# Fairchild Mandarin Hybrid

**Origin**
A Clementine mandarin X Orlando tangelo hybrid developed by J. R. Furr of the U.S. Department of Agriculture at Indio, California. The cultivar was released in the USA in 1964 and imported into South Africa in 1973.

**Ownership**
Open.

**General Description**
A late maturing Clementine mandarin hybrid. The fruit is high quality, maturing after Clementine selections.

**Tree Characteristics**
The tree is fairly vigorous with an open growth habit but dense foliage. The leaves are Clementine-like and can be paler in colour. High temperatures during fruit set could cause excessive fruit drop and pollination is not desired to avoid high seed counts.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange. However the cultivar is performing well on Rough lemon in sandy soils in the Citrusdal area. Rootstocks inducing small fruit size, lower acid and later colour are not advised.

**Fruit Characteristics**
Fruit size is medium but larger than a Clementine. The fruit is flattish-round with a smooth rind texture. The fruit is firm and has a thin rind making peeling difficult. The peel breaks up resulting in a messy fruit and causing oil contamination of the segments.

**Fairchild showing high seed count in presence of pollinator. Note: Seedless when not pollinated.**

The rind develops a deep orange-red colour resulting in an attractive fruit. Fruit quality is good, with high sugars and good acid levels that are retained and the fruit can hang well on the tree. Maturity in the cold production areas is around mid to late June, after Clementines.

**Production**
Production is good, however figures are still to be included.

**General**
Pruning is necessary to reduce the tree density, let in more light and improve fruit size. Gibberellic acid may be necessary to assist with fruit set. Harvest, packing and shipping requirements are as for Clementines and other mandarin hybrids.

**Status, Area Suitability and Availability**
This selection has only been produced successfully in limited quantities in the Citrusdal area, a cold citrus production area of South Africa. It is produced mainly in desert areas in California and Arizona. Limited quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

**Internal Quality**
Data still to be included.

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
The Fairchild is not likely to play a role in the South African soft citrus industry due to its negative characteristics.

**Updated: May 2012**

# Gold Nugget Mandarin Hybrid

**Origin**
Gold Nugget is a selection that arose from a hybrid of Wilking x Kincy mandarin. It is a seedless diploid. This selection has been imported for evaluation in South Africa.

**Ownership**
Patent pending. Property of the University of California.

**General Description**
Gold Nugget is a late-maturing mandarin hybrid that combines medium fruit size, very rich fruit flavour and excellent production. It is seedless even when planted next to pollinating cultivars and does not cause seeds in other cultivars. The fruit has very good holding ability on the tree.

**Tree Characteristics**
Tree shape is moderately upright, with long vertical branch development. As a result, if trees are not pruned to form a less erect canopy, sunburn can be a problem. Trials have demonstrated that by pruning these vigorous vertical branches to form a more spherical tree, and controlling irrigation carefully, more fruit are borne inside the canopy which serves to limit sun burning and enhance the overall quality of the fruit exterior. Overall trees are vigorous, somewhat more so than most mandarins. Trees are relatively cold hardy and are thornless.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange although Gold Nugget is compatible with the most commonly used rootstock types. Rootstocks inducing low brix low Brix levels, small fruit size and low acid are not advised.

**Fruit Characteristics**
The average fruit size is medium to large in size varying from 72 to 55 mm (counts 1XX to 3). Rind colour is orange and fruit shape is slightly rounded with flattened stem and stylar ends. The rind is pebbly and easy to peel; rind oil is not a problem. Rind colour in California is orange in mid February which should be mid August in a similar climatic region in South Africa. Fruit quality is very good, with high sugars and good acid levels. The fruit have very high Brix levels at maturity with moderate acid (1.0 - 1.6 titratable acid) which leads to very good holding ability on the tree past maturity and good storage capabilities after harvest. This cultivar is a seedless diploid.

**Production**
Production ranges from 70 to 110 kg per tree in 7 to 9 year old trees respectively.

**General**
Light pruning of vigorous, erect branches is necessary to improve fruit size. This coupled with the heavy yields keeps the trees to a manageable size with 10 year old trees in the Ojai region of Ventura County, California being 2 metres in height and diameter at 12 years. Trees can be prone to alternate bearing which can be avoided if pruning and careful fertilization and irrigation practices are applied. Under Californian conditions, it is not sensitive to *Alternaria*. No specific pest and disease problems have been noted under Californian conditions. Harvest, packing and shipping requirements are as for Clementines and other mandarin hybrids.

**Gold Nugget fruit showing typical shape and orange external colour - note pebbling of the rind.**

**Twelve year old Gold Nugget tree (tree height 2m) showing heavy crop of medium to large sized fruit.**

**Updated: May 2012**

**Status, Area Suitability and Availability**
Experimental - Gold Nugget is currently under evaluation by Citrus Research International and only limited quantities are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by UCR.

## Evaluation Data

| Internal Quality - Gold Nugget on Carrizo citrange at sites in Central Valley, California | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| Mid February | 50.0 | 12.8 to 16.5 | 1.00 to 1.60 | 9.2 | Nil | 1 |

**Note:** These data are from the University of California trials in various regions of California.

**Count Distribution**
Data still to be included. No data currently available.

**Production**
110 Kg per tree and 80 tons per hectare at 5.5 x 2.5m spacing.

**Export %**
Data still to be included. No data currently available.

**Note:** These production data are from 12 year old trees on Carrizo citrange in the Ojai region, Ventura County of California, USA.

**Comments**
The Gold Nugget has become popular in California and could prove to be of value to South Africa's late mandarin production and marketing.

# Kiyomi Satsuma Mandarin Hybrid

**Origin**
This cultivar was bred in Japan from a cross between Miyagawa Wase and Trovita orange; Trovita is most probably a seedling Washington navel. Kiyomi was released in South African in 1993.

**Ownership**
Open.

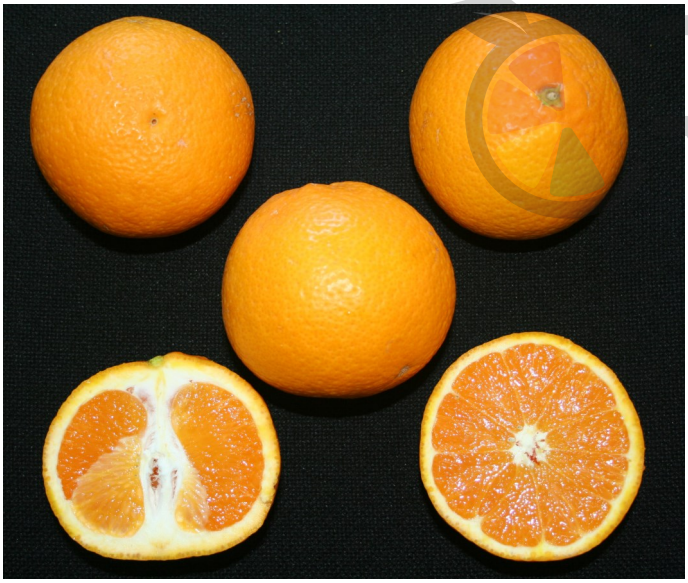
**General description**
A late maturing Satsuma mandarin hybrid. A good producer of large fruit size and sometimes slightly coarse fruit with high acid levels.

**Tree characteristics**
The tree is fairly spreading, fairly vigorous and similar but not identical to Satsuma in appearance. Yields are generally good with some tendency to alternate bearing. Leaves have a semi-curled, wavy shape and pale leaf colour. There are some thorns. It is reported to be cold hardy, like a Satsuma.

**Rootstock options**
There is limited experience regarding rootstock choice in South Africa. Carrizo and Troyer citrange are suggested, depending on soil type and whether plantings are on new or replant ground. Poor quality inducing rootstocks should be avoided as well as Swingle citrumelo as this may delay rind colour.

**Fruit characteristics**
Fruit size is good, sometimes too large, especially in hotter areas. Fruit size varies between 65 to 85 mm (Count 1 to 1XXX). The fruit shape is generally round, sometimes high shoulders and small navels, with a smooth to pebbly rind depending on the area. Fruit colour is initially pale, colour transparency 3 -5 in June in the cooler areas and T1-3 in July. The fruit is fairly soft. The rind is thicker than a Satsuma and peelability is reasonably easy and improves with maturity but is oily. However, as the pulp is soft it results in messy peeling with albedo adhering to the rind. Flesh colour is initially pale, watery and juicy. Flavour in all areas is generally poor, with acid levels mostly exceeding 1.0% giving the fruit a sharp taste. This is evident in all areas, even though the tests may be good. Commercial plantings are seedless. Maturity in all areas is about late June to early July, thereafter all flavour is lost. The fruit is over mature in late July and picks off the tree very easily.

**Production**
Yields are good, however figures are still to be included.



**Kiyomi fruit showing typical shape, colour, rind texture and rind thickness.**

**Six year old Kiyomi tree on Troyer citrange showing typical tree shape and yield (height 3.5m).**

**Updated: May 2012**

**General**
Deficit irrigation may be necessary to enhance Brix levels. As with all Satsumas and Satsuma hybrids, nitrogen should not be applied too late. No specific pest and disease problems have been noted under South African conditions. The Kiyomi has a short harvest period similar to Satsumas. Harvest, packing and shipping requirements as well as post harvest disorders are as for other Mandarins.

**Status, Area Suitability and Availability**
The Kiyomi is reported to be cold hardy. It does not appear to have much potential in any area and most plantings have been removed.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Kiyomi Mandarin on Troyer citrange - Count 1XXX - East Cape Midlands | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 03/07/2008 | 53.0 | 8.9 | 1.13 | 7.9 | 0.2 | 1 |
| 17/07/2008 | 52.2 | 11.1 | 0.95 | 11.7 | 0.1 | 1 |
| 29/07/2008 | 59.4 | 12.0 | 0.93 | 12.9 | 1.1 | 1 |

**Count Distribution**
There is insufficient information at this stage to give an accurate count distribution.

**Production**
There is insufficient information at this stage to give accurate production data.

**Export %**
There is insufficient information at this stage to give accurate export data.

**Comments**
The Kiyomi is a fair quality mandarin hybrid and it is unlikely that it would play a substantial role in the soft citrus industry due to a lack in grower interest and climate limitations.

# Leanri Mandarin Hybrid

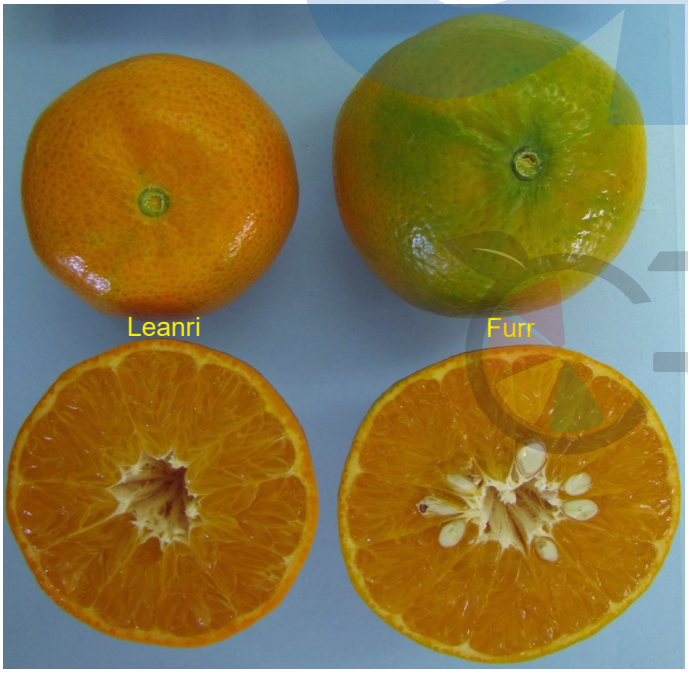
**Origin**
Leanri is an irradiated Furr (Clementine x Murcott).

**Ownership**
Comoset (Pty) Ltd, a company registered in South Africa, is the PBR holder of the variety. Citrogold has been appointed to manage the commercialisation of the Leanri both in South Africa and internationally.

**General Description**
Leanri is an early-mid maturing low seeded mandarin hybrid with high fruit quality maturing from June in the cold production regions. Fruit peelability is easy and production is good with large (cool areas) to extra large (hot areas) fruit size.

**Tree Characteristics**
The trees are initially upright and dense, spreading as they become older and cropping fruit on the bearing branches.

**Rootstock Options**
The oldest trees are on Carrizo citrange and MxT (topworked 2006). Recent plantings were made using Sunki 812 and Swingle citrumelo.




**Leanri and Furr fruit showing typical shape, colour, rind texture and rind thickness.**

**Fruit Characteristics**
The fruit shape varies from slightly flat to round. The fruit is firm with a smooth and thin rind which develops a deep orange colour at maturity. It is easy to peel the fruit and has a low rind oil content. Flavour of the fruit is excellent and the flesh has a deep orange colour at maturity with a open core. The seed count varies from 0 to 5 seeds (avg 2 seeds/fruit) and the average seed count will be lower in a solid block.

Fruit size ranges from calibres 1 to 1XX (64 to 78 mm) in warm production areas and calibres 2 to 1X (62 mm to 72 mm) in cool production regions.

**Production**
Yields are good, although commercial data is still to be included.

**Leanri tree showing typical open growth habit, fruit shape and deep orange colour.**

**Updated: May 2018**

**General**
Light pruning may be necessary to maintain the tree's open structure if it becomes too dense. Harvest, packing and postharvest handling requirements are as for other mandarin hybrids. The selection is prone to alternate bearing, and in an off year it can lead to very large fruit. In warm production regions fruit set manipulation may be required. Leanri is susceptible to alternaria, more so than Nadorcott but less than Nova. Creasing can occur if the selection is harvested after peak maturity.

**Status, Area Suitability and Availability**
The selection is in the semi-commercial stage of development and is planted by citrus growers in South Africa and performs well in the different climatic areas (cool, intermediate and hot production regions). Propagation material is available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Leanri on Carrizo citrange - Letsitele | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Count** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 17/04/2018 | 1X | 55.5 | 10.2 | 1.0 | 10.7 | 1.9 | T4-5 |
| 02/05/2018 | 1XX | 59.1 | 9.9 | 0.8 | 12.4 | 2.4 | T3-4 |
| 17/05/2017 | 1X | 59.2 | 10.4 | 0.9 | 11.7 | 0.9 | T2 |

| Internal Quality - Leanri on Carrizo citrange - Swellendam | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Count** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 17/04/2018 | 2 | 54.6 | 11.5 | 1.29 | 8.9 | 0.1 | T4-5 |
| 13/06/2018 | 1 | 62.6 | 12.4 | 1.16 | 10.7 | 0.0 | T1 |

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
Fruit responds well to cold storage and sterilisation.

# Mor Mandarin Hybrid

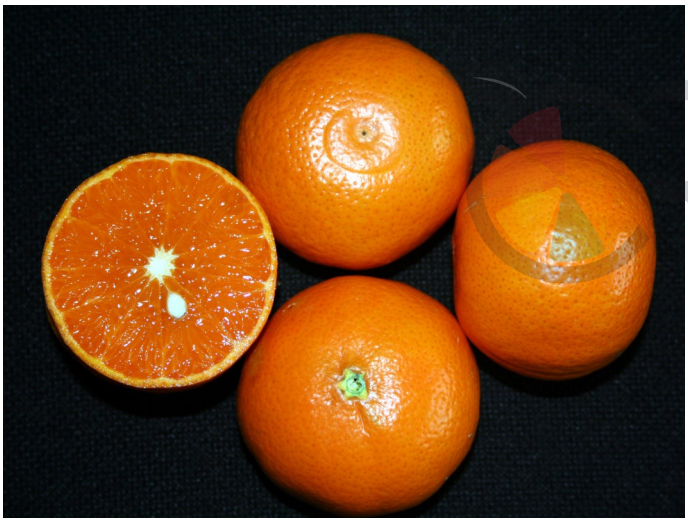
**Origin**
An induced (irradiated) Murcott mutation developed at the Volcani Centre, Israel. There are numerous selections which differ slightly, but are overall very similar. The Mor 22 was the first to be planted commercially, but the Mor 25 is now preferred. The Mor was first introduced into South Africa in 1997.

**Ownership**
Patented - PBR ZA 20043009. Managed by Citrogold.

**General Description**
The Mor has similar characteristics to the Murcott, it is productive but can be prone to alternate bearing if not managed accordingly. It has good fruit size. The fruit is late maturing and attractive with high quality.

**Tree Characteristics**
The tree has an upright, vigorous growth habit, producing long, unproductive shoots in the early years, bearing low down on the tree. Yields are good, although prone to alternate bearing under certain management practices.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange. Swingle has been used, but in vigorous orchards rootstock overgrowth could lead to compaction girdling and tree decline. Low quality inducing rootstocks should be avoided.



**Mor fruit showing typical shape, colour, rind thickness, rind texture and ultra low seed counts.**

**Fruit Characteristics**
Fruit size is medium to medium large with some smaller fruit (counts 1X to 3). Fruit shape is flattish to round, with a smooth rind and slight ribbing at the stem end on terminal fruit. The fruit is attractive, does not blemish easily and develops a deep orange rind colour. The rind is thin, sometimes brittle on peeling and slightly oily. Flesh colour is deep orange with a fine texture. The fruit is of high quality with very high sugars (up to 15.0 Brix) and sufficient acid to give a well balanced flavour. In the cold production areas, maturity is reached from mid to late August. The Mor is self compatible and can set a few seeds in the absence of cross pollination. Mean seed counts in solid plantings well distanced from pollinating cultivars range from 1.5 to 2 seeds per fruit.

**Production**
Yields of 40 to 50 tons per hectare are expected for mature orchards.

**General**
The Mor is prone to alternate bearing which can be corrected if careful fertilisation and irrigation practices are applied. Can be susceptible to Alternaria brown spot

**Four year old Mor tree on Troyer citrange showing typical growth and good crop of medium large fruit (height 2.2m).**

**Updated: May 2012**

in regions with high humidity and summer rainfall areas. Fruit splitting can occur if rinds are too thin. Harvest, packing and shipping requirements are as for Clementines and other mandarin hybrids. The Mor has shown to have minimal stem end ridging under low nitrogen regimes. The Mor is marketed under the Honeygold trademark.

**Status, Area Suitability and Availability**
The Mor is a recent introduction into South Africa with only a short history of production and exports to date. It has shown to be suited to the cold coastal and cool Inland areas. The Mor is managed under the control of the Premium Mandarin Growers club (PMG). Commercial quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Mor on Carrizo citrange - Count 1/2 - Eastern Cape | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 23/07/2008 | 60.1 | 13.0 | 1.46 | 8.9 | 3.1 | 2-5 |
| 08/08/2008 | 61.0 | 16.2 | 1.71 | 9.5 | 3.1 | 2-3 |
| 04/09/2008 | 54.0 | 15.8 | 1.48 | 10.7 | 2.6 | 1 |

**Note:** These data are from 8 year old trees in the Andrieskraal region of the Gamtoos River Valley in the East Cape for the 2008 season.

**Count Distribution**

| Count | 1XX | 1X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| % | 5.5 | 16.5 | 27.2 | 23.8 | 16.6 | 10.4 | 0 |

**Production**
45 Kg per tree and 45 tons per hectare at 5 x 2m spacing.

**Export %**

| Grade | Percentage |
|---|---|
| 1 | 72 |
| 2 | 20 |
| 3 | 8 |
| 4 | |

**Note:** These fruit size and production data are from 4 year old trees on Carrizo citrange in the Sanger region, Fresno County of the Central Valley of California, USA.

**Comment:**
The Mor is a late maturing Mandarin Hybrid and could prove to be of value to South Africa's late mandarin production and marketing.

# Nadorcott Mandarin Hybrid

**Origin**
Thought to be a Murcott x Clementine hybrid, although the exact origin is unknown. First discovered in Afourer, near Beni Mellal, Morocco in 1964 by Mr El Bachir Nadori (hence the cultivar name Nadorcott). It was introduced into South Africa in 1994.

**Ownership**
Patented - PBR ZA 20043008. Managed by Citrogold under the Clemengold trademark.

**General Description**
An attractive, well coloured, late maturing high quality mandarin prone to alternate bearing. Fruit is of medium size and seedless in solid plantings but sensitive to cross pollination.

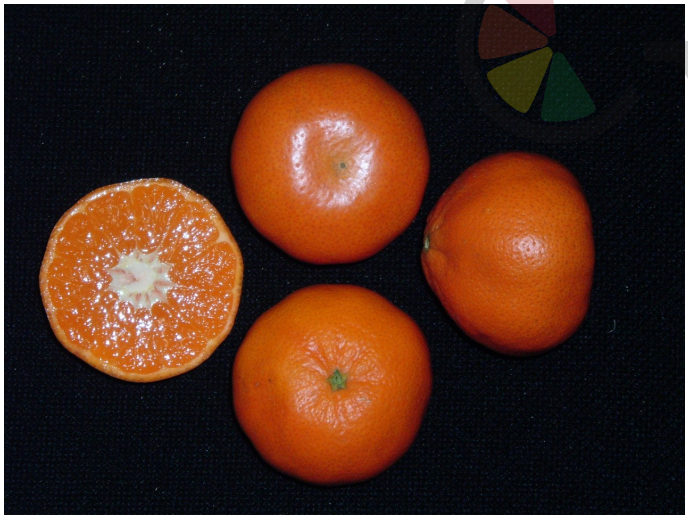
**Tree Characteristics**
Trees are precocious and yield very well but can be prone to alternate bearing under certain conditions. The trees are vigorous with an upright growth habit and spreading under a heavy crop load. The leaves are fairly dark and branches have few to no thorns.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange. Incompatible on trifoliate rootstock. Low quality inducing rootstocks like Rough lemon and Volckameriana should be avoided.

**Fruit Characteristics**
Fruit size is medium, sometimes large, between 50 – 59 mm in diameter. The fruit is flat, with an uneven shape and a furrowed stem end. The rind is very smooth and shiny with a large open core. Vigorous branches can have pebbly fruit. The rind develops an excellent orange/red colour, with a pink albedo. The fruit is easily peeled, sometimes oily and deep orange flesh colour. The quality is generally good with high sugars and moderate acid with a well balanced flavour, although young trees tend to have an acidic taste. Maturity in the cold production areas is from mid to late July and earlier in the warmer areas. It is sensitive to cross pollination and seedless in solid blocks. It is an effective pollinator, especially to Clementines.

**Production**
Yields of 40 to 50 tons per hectare are expected for mature orchards.

**General**
No crop manipulation considered necessary at present. Harvest, packing and shipping requirements are as for Clementines and other mandarin hybrids. Exposed fruit are subject to sunburn.



**Nadorcott fruit showing typical deep orange colour, rind texture,**

**Eight year old Nadorcott tree on Carrizo citrange showing excellent crop of medium large fruit and high growth vigour (height 3.5m).**

**Updated: May 2012**

**Status, Area Suitability and Availability**
The Nadorcott is a recent introduction to South Africa with only a short history of production and exports to date. It currently constitutes approximately 8% of the hectarage of mandarins in South Africa. It appears to be suited to all but the hottest production areas. The Nadorcott is managed under the Premium Mandarin Group (PMG). Commercial quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

| Internal Quality - Nadorcott on Carrizo citrange - Count 2 - Eastern Cape | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 10/07/2008 | 59.2 | 12.6 | 1.46 | 8.8 | 0.1 | 1-2 |
| 17/07/2008 | 57.8 | 14.7 | 1.39 | 10.6 | 0.8 | 1 |
| 29/07/2008 | 59.2 | 15.4 | 1.34 | 11.5 | 0.3 | 1 |

# Evaluation Data
**Note:** These data are from 6 year old trees in the Cookhouse region of the East Cape Midlands for the 2008 season.

**Count Distribution**

| Count | 1XX | 1X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| % | 2.2 | 7.3 | 2.8 | 12.4 | 40.8 | 16.6 | 13.5 |

**Note:** These data are from 4 year old trees in the Patensie region of the Gamtoos River Valley of the East Cape for the 2008 season.

**Production**
40 Kg per tree and 49 tons per hectare at 5.5 x 1.5 m spacing - planted in 2004.

**Export %**

| Grade | Percentage |
|---|---|
| **1** | 64 |
| **2** | 13 |
| **3** | 23 |
| **4** | |

**Note:** These data are from 15 year old trees in the Patensie region of the Gamtoos River Valley of the East Cape for the 2008 season.

**Comments:**
The Nadorcott is an excellent quality fruit that has become extremely popular in quality mandarin producing regions world wide. Its late maturity, very good eating quality and deep orange red external colour make it a popular option for growers and consumers. Over production with associated reduction in fruit size may require crop manipulation as production increases and markets demand less small fruit. It is a relatively new cultivar and is anticipated to become an important part of the mandarin and mandarin hybrid range. To date production has been controlled by a grower 'club' that decides on quantities of trees to be planted.

# Nectar Mandarin Hybrid

**Origin**
A cross between Wilking and Wilking from Israel. The selection was released in South Africa in 1996.

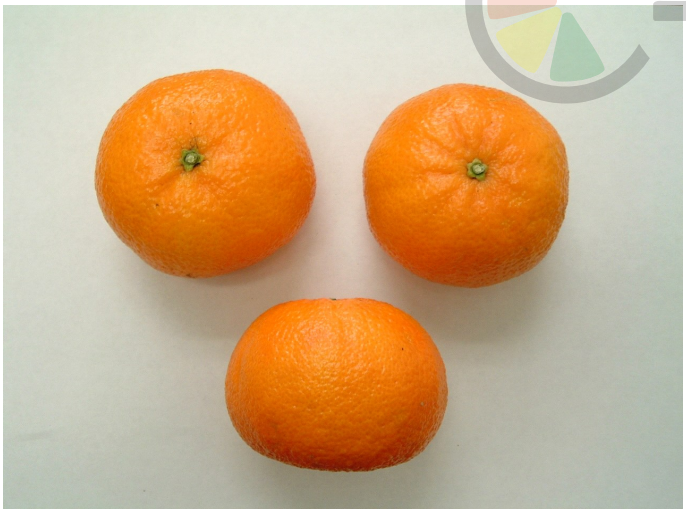
**Ownership**
Patented. Managed by Citrus Genesis.

**General Description**
A mid to late maturing mandarin selection. The fruit is high quality with an orange rind colour. The trees are vigorous.

**Tree Characteristics**
The tree is vigorous with Clementine like leaves. There is variation in performance between different observation sites in South Africa as yields have been variable. This can probably be attributed to young tree age.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange. Rootstocks inducing small fruit size and lower acid are not advised.

**Fruit Characteristics**
Fruit size has also been variable, from medium small to medium large (counts 1XX to 4). The fruit shape is fairly flat and sometimes has a slight neck on the stem end on the larger fruit. The rind is smooth to slightly pebbly. The fruit is fairly easily peeled but oily. Colour break in the cold areas is late May to early June, developing an orange colour in July. Fruit quality is very good, with high sugars and good acid levels. Maturity in the cold production areas is around early to mid July and mid June in cooler inland areas. There is the odd seed under cross pollination, but in solid plantings this diploid is seedless.



**Nectar fruit showing typical shape and orange external colour - note slight pebbling of the rind.**

**Production**
Yields of 25 to 30 tons per hectare are expected for mature orchards.

**General**
Pruning may be necessary to improve fruit size. Prone to alternate bearing which can be corrected if careful fertilization and irrigation practices are applied. Under Israeli conditions, not sensitive to Alternaria. No specific pest and disease problems have been noted under South African conditions. The Nectar has shown to have very thin rinds under low nitrogen regimes, which leads to fruit splitting. Harvest, packing and shipping requirements are as for Clementines and other mandarin hybrids.

**Nectar tree under pulse drip fertigation showing high production in early years - trees 3 years after planting.**

**Updated: May 2012**

**Status, Area Suitability and Availability**
This selection has only been planted in experimental blocks in the cold coastal and cool inland production areas of South Africa. There is only limited data in South Africa. Propagation material is not currently available from the Citrus Foundation Block due to lack of demand.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Nectar on Troyer citrange - Count 3/4 - Citrus Foundation Block | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 02/07/2008 | 53.9 | 14.2 | 1.55 | 9.2 | 0 | 2-3 |
| 21/07/2008 | 58.9 | 16.4 | 1.69 | 9.7 | 0.3 | 1-2 |
| 28/07/2008 | 53.9 | 18.1 | 1.39 | 13.0 | 0.1 | 1 |

**Note:** These data are from the 12 year old trees at the CFB for the 2008 season; maturity is 2 to 3 weeks later than the commercial East Cape Citrus Regions where estimated peak maturity is early July.

**Count Distribution**

| Count | 1XX | 1X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| % | 2.5 | 10.5 | 17.2 | 23.8 | 26.6 | 12.4 | 7.0 |

**Production**
24 kg per tree and 27 tons per hectare at 4.9 x 1.8 m spacing.

**Export %**

| Grade | Percentage |
|---|---|
| 1 | 68 |
| 2 | 22 |
| 3 | 10 |
| 4 | |

**Note:** These fruit size and production data are from 3 year old trees on Carrizo citrange in the Sanger region, Fresno County of the Central Valley of California, USA.


**Waxed and labelled Nectar fruit showing attractive orange colour and typical shape and rind texture.**

# Nova Mandarin Hybrid

**Origin**
A cross between the Fina Clementine and Orlando tangelo (Duncan grapefruit x Dancy tangerine), bred in 1942 at Orlando, Florida, U.S.A. The Nova was first planted experimentally in various trial blocks in South Africa during the 1970s.

**Ownership**
Open.

**General Description**
An early maturing, commercially grown, mostly seedless mandarin hybrid. The tree size is smaller than a Clementine. The fruit has high quality and is more suited to the colder citrus production areas. Granulation (riciness) can be a problem in young trees, but this disappears with older trees and is not a problem under controlled irrigation and fertilization practices.

**Tree Characteristics**
The trees are not as vigorous as their parents, being round and compact in shape, with narrow, tapered leaves. Yields are very good, but over setting should be avoided to prevent alternate bearing becoming a problem.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange and Swingle citrumelo, while Cleopatra mandarin and X639 show potential to be used as rootstocks. Rootstocks inducing small fruit size, lower acid, drier fruit and later colour are not advised.

**Fruit Characteristics**
Fruit size is medium to medium large and generally slightly larger than Clementines. The size varies from 75 to 55 mm (Count 1XX to Count 1). The fruit is fairly flat to round in shape. It develops a deep orange rind colour in the colder production areas of South Africa and yellowish orange in the warmer regions. It is not as easily peeled as a Clementine and can be oily. Internal flesh colour is deep orange and the flavour very good with high sugars and a good acid level. The acid tends to drop fairly quickly if left to hang on the trees. Maturity in the cold production areas is end of May to early June; the end of April to the first three weeks of May in the cool, inland areas and the last three weeks in April to early May in the intermediate areas. The Nova is self incompatible and is seedless in the absence of cross pollination.

**Production**
Yields of 50 to 60 tons per hectare are expected for mature orchards.

**General**
Over production in one season can lead to alternate bearing so pruning and fruit thinning may be options to reduce fruit set in an ‘on’ year. No specific pest problems have been noted under South African conditions. It is susceptible to Alternaria brown spot. Stylar end splitting can be problematic with losses of up to 30%; this can be avoided by using correct fertilization and irrigation practices. Fruit left to hang on the tree tend not to go puffy, but can develop creasing. As the Nova can be prone to granulation, harvesting should not be delayed. Harvest, packing and shipping requirements are as for other mandarin hybrids.

**Nova fruit showing typical colour, rind texture, shape and low seed counts.**

**Sixteen year old, top-worked Nova trees on Carrizo citrange showing typical shape and good crop of large fruit (tree height 4.5m).**

**Updated: May 2012**

**Status, Area Suitability and Availability**
Nova hectarage constitutes approximately 8% of mandarin plantings in South Africa with new plantings taking place. It is grown commercially in the cold citrus production areas, shows potential in the cool, inland areas and is marginal in the intermediate areas. Commercial quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Nova Mandarin on Troyer citrange - Count 1 | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 05/05/2009 | 60.7 | 11.5 | 0.89 | 12.5 | 0.7 | 4-5 |
| 20/05/2009 | 59.6 | 11.3 | 0.83 | 13.6 | 0.3 | 1-2 |
| 02/06/2009 | 58.8 | 10.1 | 0.75 | 13.5 | 0.2 | 1 |

**Count Distribution**

| Count | 1XX | 1X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| % | 2.3 | 6.8 | 25.7 | 41.0 | 20.9 | 3.3 | 0 |

**Production**
110 Kg per tree and 57 tons per hectare at 5.5 x 3.5m spacing.

**Export %**

| Grade | Percentage |
|---|---|
| 1 | 72 |
| 2 | 16 |
| 3 | 12 |
| 4 | |

**Note:** These data are from 15 year old trees in the Patensie region of the Gamtoos River Valley of the East Cape for the 2008 season.

**Comments**
The Nova was for many years not considered to be an ideal ‘easy peeler’ due to the fairly tightly adhering rind. External rind colour and very good internal quality however resulted in limited interest in commercial plantings in the 1990s after which the development of the eastern markets caused a surge in the popularity of this cultivar. It currently makes up over 7% of total soft citrus plantings and is second only to Satsuma and Clementine soft citrus production.

# Or Mandarin Hybrid

**Origin**
The Or is an induced (irradiated) mutation of the seedy Orah which was bred and developed at the Volcani Centre, Israel, from a Temple x Dancy hybrid. There are various numbered selections. The superior Or 4 selection is referred to as the Orri. The first Or was imported into South Africa in 1997.

**Ownership**
Patented. PBR No. ZA 20084101 - Managed by Citrogold.

**General Description**
A late maturing mandarin of excellent internal quality.

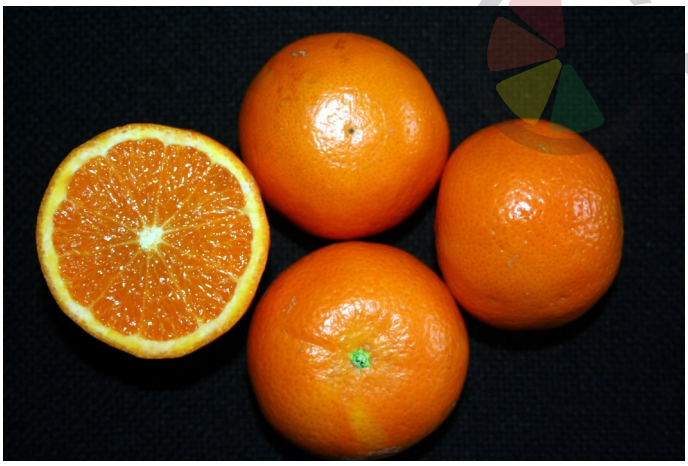
**Tree Characteristics**
The trees are vigorous with an upright growth habit, producing long, unproductive, thorny shoots in the early years, bearing low down on the tree. Yields are good although alternate bearing can be a problem under certain management practices.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer and C35 citrange. There is delayed incompatibility on Swingle citrumelo. Low quality inducing rootstocks should be avoided.

**Fruit Characteristics**
Fruit size is large and the fruit is round to slightly oblate in shape with furrowing at the stem end and an occasional navel. The rind texture is smooth to slightly pebbled, depending on the area. The rind colour is initially yellowish orange, later turning orange, with orange flesh. The fruit is easily peeled but oily. The internal quality is very good and consistent with high sugars (14 - 15° Brix) and a good acid level, sometimes over 1.0%, resulting in a good flavour. Riciness has been observed, but this is usually a young tree problem. Matures during early to mid July in the cold production areas. In solid plantings, Or seed counts are lower than the Mor at a mean of approximately 1 per fruit. In pollinated situations seed counts can be over 2 per fruit.

**Production**
In Israel average yields for mature trees are in the region of 40 tons per hectare of good size, superior quality fruit with high export percentages.

**General**
Prone to alternate bearing which can be corrected if careful fertilization and irrigation practices are applied. Can be creasing prone under adverse conditions. Harvest, packing and shipping requirements are as for other mandarin hybrids except that acidity can drop rapidly in transit.



**Or fruit showing typical shape, colour, rind texture and ultra low seed counts.**

**Seven year old Or tree on Carrizo citrange showing typical shape, spreading dense growth and crop (tree height 3.5m).**

**Updated: May 2012**

**Status, Area Suitability and Availability**
The Or is a recent introduction into South Africa with only a short history of production and exports to date. It has shown to be suited to the cold, coastal areas and cool inland areas.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Or on Carrizo citrange - Count 2 - Eastern Cape Midlands | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 17/07/2008 | 64.5 | 16.2 | 1.54 | 10.5 | 1.1 | 2 |
| 29/07/2008 | 60.5 | 15.9 | 1.39 | 11.4 | 1.7 | 1 |
| 20/08/2008 | 58.2 | 18.5 | 1.51 | 12.3 | 1.3 | 1 |
| 03/09/2008 | 56.1 | 17.7 | 1.32 | 13.4 | 1.1 | 1 |

**Count Distribution**

| Count | 1XX | 1X | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| % | 8 | 12 | 18 | 26 | 22 | 14 |

**Note:** Based on results from Israel, California and South Africa.

**Production**
36 Kg per tree and 32 tons per hectare at 5.5 x 2.0 m spacing (6 years) in the East Cape Midlands.

**Export %**

| Grade | Percentage |
|---|---|
| **1** | 94.6 |
| **2,3 & 4** | 5.4 |

**Note:** These data are from 6 year old trees in the East Cape Midlands.

**Comments**
The Or is an excellent quality cultivar that is a valuable addition to South Africa's soft citrus industry.

**Two year old Or trees under pulse drip fertigation on 2 metre trellises showing typical dense growth with 20 to 30 fruit per tree.**

# Primosole Satsuma Mandarin Hybrid

**Origin**
A hybrid of Miho Wase Satsuma and Carvalhais mandarin, a mandarin of Portuguese origin, developed in Italy. Released in South Africa around 1999.

**Ownership**
Patented cultivar managed by Citrogold. Known as Clemensole in Spain. PBR # ZA 20063543

**General Description**
An early maturing Satsuma hybrid in terms of colour and internal quality with medium to large fruit size. Matures early to mid April in the cool citrus production areas.

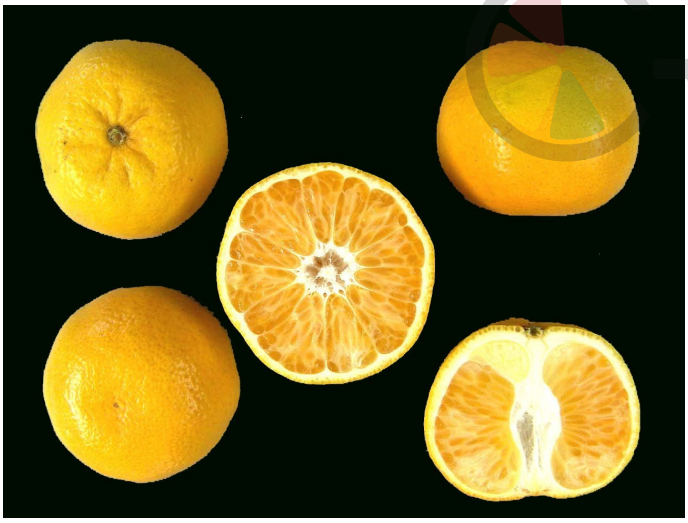
**Tree Characteristics**
The tree is reasonably vigorous, with a drooping growth habit and long, slightly curled leaves, not unlike its Satsuma parent.

**Rootstock Options**
There is limited experience regarding rootstock choice in South Africa. Carrizo and Troyer citrange are suggested, while poor quality inducing rootstocks should be avoided as well as Swingle citrumelo as this may delay rind colour. Choice of rootstock also depends on soil type and whether plantings are on new or replant ground.

**Fruit Characteristics**
Trees in South Africa are still young so little information is available at present. Fruit size to date has been too large. This is due to the juvenile vigour of young trees that need careful attention to ensure good fruit quality SSS and acceptable fruit size. Rind colour is similar to Satsumas in the cool to cold areas, but has been variable with orange and green spots in the warmer areas. The fruit is attractive when well coloured. The fruit is fairly flat and smoother in the coastal areas, coarse in the hot areas. Peelability is easy to moderate with some oil contamination. Flavour is unusual but not outstanding. Maturity is early and in Spain has matured before their Satsuma selections. The fruit is seedless and of good quality in suitable areas.

**Production**
Yields are excellent with up to 100 tons per hectare being reported from Spain.

**General**
Deficit irrigation is necessary to enhance sugar levels. Degreening is also necessary for the first harvest. Satsumas and Satsuma hybrids are degreened successfully. As with all Satsuma types, nitrogen should not be applied too late. No specific pest and disease problems have been noted under South African conditions. Sunburn can be a problem in dry climates with terminal fruit being the worst affected. Primosole has a short harvest period which usually lasts 2 - 3 weeks, although selective picking can extend this period. Harvest, packing and shipping requirements as well as post harvest disorders are as for other Mandarins.



**Primosole fruit showing typical shape, colour, rind texture and rind thickness.**

**Primosole tree showing typical drooping growth pattern and yield (tree height 2.0m).**

**Updated: May 2012**

**Status, Area Suitability and Availability**
It appears to be more suited to southern Africa's cooler coastal climatic zones. Evaluations are limited and the Primosole is not yet in commercial production in South Africa. No propagation material is currently available at the Citrus Foundation Block due to lack in grower interest.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International

## Evaluation Data

| Internal Quality - Primosole on Carrizo citrange - Count 1/2 | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 18/03/2010 | 49.6 | 11.1 | 2.11 | 5.3 | 0 | 2-3 |
| 25/03/2010 | 47.4 | 11.3 | 1.68 | 6.7 | 0 | 1-2 |
| 31/03/2010 | 60.6 | 11.4 | 1.44 | 7.9 | 0 | 1 |
| 07/04/2010 | 62.7 | 12.4 | 1.47 | 8.4 | 0 | 1 |

**Count Distribution**
There is insufficient information at this stage to give an accurate count distribution.

**Production**
There is insufficient information at this stage to give accurate production data.

**Export %**
There is insufficient information at this stage to give accurate export data.

**Comments**
Although the Primosole may have the potential to play a valuable role in the early soft citrus industry, incorrect practices and poor quality fruit on young trees has damaged the reputation of this cultivar and as a result the potential of this cultivar may never be realised in Southern Africa.

# Samba Mandarin

**Origin**
An open-pollinated seedling of mandarin; possibly with a Clementine and a tangelo as parents. The exact origin is uncertain.

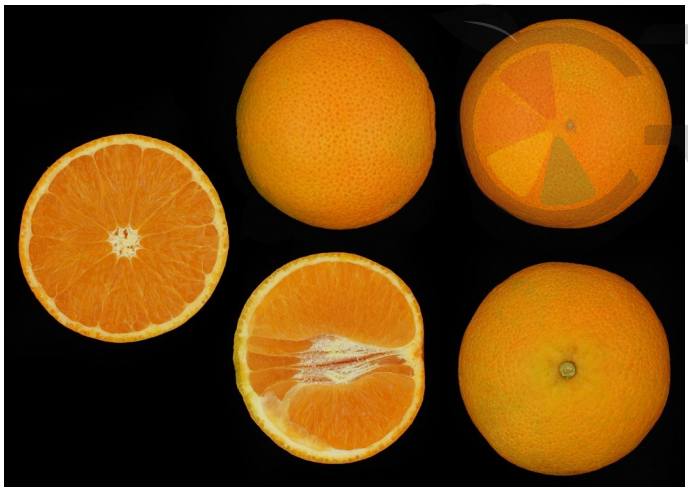
**Ownership**
XLnT Citrus company, Somerset West, South Africa.

**General Description**
Favourable growth habit making pruning relatively simple in addition to being thornless. Samba Mandarin is early-to-mid maturing, with harvest starting towards the end of the Nova season (late May to early June in the Western Cape and early April in the Northern Cape).

**Tree Characteristics**
The trees are vigorous with slightly upright branches and an open canopy as the branches hang open with a crop. No thorns on the bearing branches.

**Rootstock Options**
Currently Carrizo and X639 show no incompatibility. Alternative rootstocks are being tested. Rough lemon and Volk (vigorous rootstocks) should be avoided.

**Fruit Characteristics**
Samba Mandarin fruit are round in shape with no ribbing at the stem-end and a slight stylar-end ring. The rind is slightly pebbly and spongy. It peels easily (easier than Nova) but leaves a small amount of oil residue on your hand. Samba has low seed numbers, varying from seedless to 2 seeds per fruit (no cross-pollination), but will have up to 6 seeds per fruit when cross-pollinated.



**Samba fruit showing typical shape, colour, rind texture, rind thickness and low seed content.**

Fruit size ranges from 50 to 64 mm (counts 2, 3 and 4; ±100 to 110 grams per fruit).

At maturity, rind colour is deep orange, between that of Nova and Clementine, and degreening should not be needed. Samba fruit are not prone to sunburn or fruit splitting, but creasing of over-mature fruit can occur.

**Production**
Samba can over-crop in an on-year, resulting in lower flowering levels the following season. Alternative bearing patterns need to be managed by fruit thinning when a too heavy crop is expected. Flowering and fruit set strategies are similar to other mandarin hybrids.

**General**
Well-balanced ratio with outstanding flavour; high Brix and moderate acidity. Samba Mandarin is likely to have low susceptibility to *Alternaria* brown spot.

Samba has low levels of viable pollen and can pollinate other compatible mandarins. However, only a relatively narrow buffer block is required to produce low-seeded fruit.

**Samba tree on Carrizo citrange showing typical upright growth habit.**

**Updated: March 2018**

**Status, Area Suitability and Availability**
Samba is available for commercial plantings and performs well in the hot production areas with good fruit set and fruit quality (acid levels appear to hold well), little or no sunburn, fruit split or granulation. Propagation material is available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Samba on Carrizo citrange - Letsitele | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 25/05/2017 | 52.4 | 10.2 | 0.81 | 12.6 | 0 | T2 |
| 16/03/2018 | 59.9 | 11.0 | 1.00 | 11.1 | 0 | T5-6 |

| Internal Quality - Samba on X639 - Tshipise | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 03/05/2017 | 53.4 | 11.5 | 0.89 | 12.9 | 0.1 | T2 |

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
Samba fruit are juicy with high Brix content, moderate acidity, resulting in a well-balanced ratio with outstanding flavour and fairly low seed counts. Acid levels appear to hold well, even in the hot growing regions of the Northern Cape. Fruit responds well to cold storage.

# Shasta Gold Mandarin Hybrid

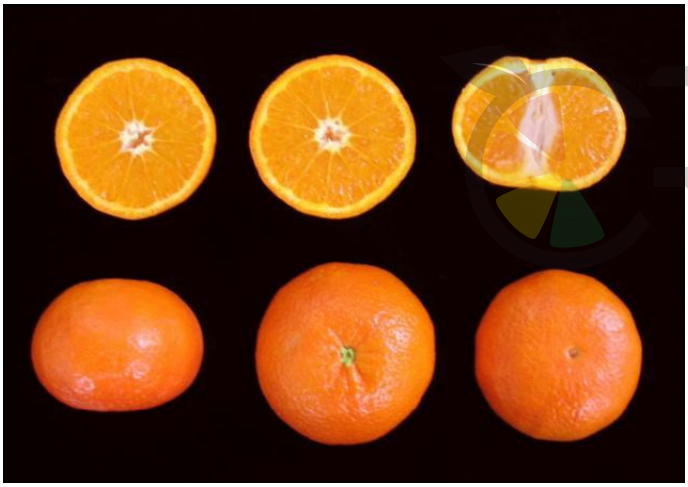
**Origin**
Shasta Gold (TDE 2) is a selection that arose from a hybrid of (Temple x Dancy) x Encore mandarins. It is a seedless triploid. It was bred at the University of California, Riverside (UCR) and after a lengthy evaluation period was released in California during 2002. This selection has been imported from California for evaluation in South Africa.

**Ownership**
Property of the University of California.

**General Description**
Shasta Gold is a late maturing mandarin hybrid and it is estimated that it will mature in cold production areas in South Africa in mid August and 3 to 4 weeks earlier in warm areas.

**Tree Characteristics**
Overall trees are moderately vigorous and tree shape is round, more like a navel than a typical mandarin tree. Trees are relatively cold hardy and are thornless when mature.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange although Shasta Gold is compatible with most commonly used rootstock types. Rootstocks inducing low Brix levels, small fruit size and low acid are not advised.



**Shasta Gold fruit showing typical shape, colour, rind texture and seedlessness.**

**Fruit Characteristics**
Fruit size is large for a mandarin averaging between 70 and 80 mm and internal quality is very good to excellent with a very rich fruit flavour. Rinds are smooth and develop a deep orange to red colour. Flesh colour is a deep orange. Production is good with some alternate bearing which needs to be managed. It is seedless even when planted next to pollinating cultivars and does not cause seeds in other cultivars. The fruit has good holding ability on the tree. This cultivar is a seedless triploid.

**Production**
Production ranges from 80 to 120 kg per tree in mature (8 to 10 years) trees.

**General**
Light pruning of vigorous, erect branches can be necessary to control tree size. This keeps the trees to a manageable size with 10 year old trees in the Lindcove region of Tulare County, California being 2.5 to 3 metres in height and diameter at 12 years. Trees can be prone to alternate bearing which can be avoided if pruning as well as careful fertilization and irrigation practices are applied. Under Californian conditions this cultivar is not sensitive to Alternaria. No specific pest and disease problems have been noted under Californian conditions. Harvest, packing and shipping requirements are as for other mandarin hybrids.

**Status, Area Suitability and Availability**
Experimental - Shasta Gold is currently under evaluation by Citrus Research International and only limited quantities are available from the Citrus Foundation Block.

**Shasta Gold tree showing a more orange like open structure and good crop of large sized fruit..**

**Updated: May 2012**

**Key References**
The information in this fact sheet is based on information supplied by UCR.

## Evaluation Data

| Internal Quality - Shasta Gold on Carrizo citrange at sites in Central Valley, California | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| Mid February | 52.0 | 12.9 to 15.0 | 1.20 to 1.50 | 10.8 to 10.0 | 0 | 1 |

**Note:** These internal quality data are from the University of California trials in various regions of California.

**Count Distribution**
Data still to be included. No detailed data available - mean fruit size is 75 mm.

**Production**
70 Tons per hectare at 5.5 x 2.5m spacing.

**Note:** These production data are from the University of California trials in various regions of California.

**Export %**
Data still to be included. No data currently available.

**Comments**
The Shasta Gold is an excellent quality, late maturing cultivar that could be of considerable value in expanding South Africa's soft citrus industry.

# Sweet Spring Mandarin Hybrid

**Origin**
A selection of Japanese origin resulting from a cross between Uedo and Hassaku, which is a pummelo x mandarin hybrid. It was released in South Africa in 1991.

**Ownership**
Open.

**General Description**
A mid to late maturing Satsuma hybrid. Production is good with large fruit size. Fruit colour is pale, with good sugars and low acid.

**Tree Characteristics**
The tree has moderate vigour, with an upright, slightly spreading growth habit and cold hardy. Yields are good. There are occasional thorns.

**Rootstock Options**
There is limited experience regarding rootstock choice in South Africa. Carrizo and Troyer citrange are suggested, while poor quality inducing rootstocks should be avoided. Swingle citrumelo may improve acid levels.

**Fruit Characteristics**
Fruit size is medium large to large, mainly counts 1X – 1XXX. Rind colour is pale, more yellow, developing a golden yellow colour with maturity. The fruit has a fairly flat shape, sometimes with slight shoulders. The rind is relatively thick, but quite acceptable and generally has large pebbles on a smooth textured rind. Peelability is not always easy and the rind can be oily. Flesh colour is yellow/orange with closed cores; Sweet Spring is seedy under cross pollination. Sugars are good and acid low, depending on the area and the fruit often lacking flavour. Maturity in the coldest production areas is towards the end of July.

**Production**
Production is good to very good, however figures are still to be included.

**General**
Deficit irrigation may be necessary to enhance sugar levels. As with all Satsuma types, nitrogen should not be applied too late. No specific pest and disease problems have been noted under South African conditions. Sunburn can be a problem in warmer dry climates. Satsuma mandarins have a short harvest period which usually lasts 2 - 3 weeks, although selective picking can extend this period. Harvest, packing and shipping requirements as well as post harvest disorders are as for other Mandarins.

**Status, Area Suitability and Availability**
This selection has no potential in the inland nor most coastal areas except the coldest of the coastal climatic zones, where it is looking promising. Limited quantities of propagation material are available from the Citrus Foundation Block.

**Waxed Sweet Spring showing typical shape, colour and rind texture.**

**Sweet Spring mandarin hybrid.**

**Updated: May 2012**

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Sweet Spring on Swingle citrumelo - Count 1X/1XX - Western Cape | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 13/05/2011 | 45.6 | 9.6 | 1.33 | 7.2 | 0.1 | 7 |
| 05/06/2011 | 50.7 | 10.0 | 0.93 | 10.8 | 0.2 | 4-5 |
| 23/06/2011 | 46.6 | 10.9 | 0.84 | 13.0 | 0 | 3-4 |

**Note:** These data are from four year old trees in the Rheenendal region of the Western Cape.

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
The Sweet Spring is not recommended for planting in most citrus growing areas due to poor internal quality levels and availability of better suited cultivars. This cultivar is only suited for the coldest of coastal climatic zones.

# Tahoe Gold Mandarin Hybrid

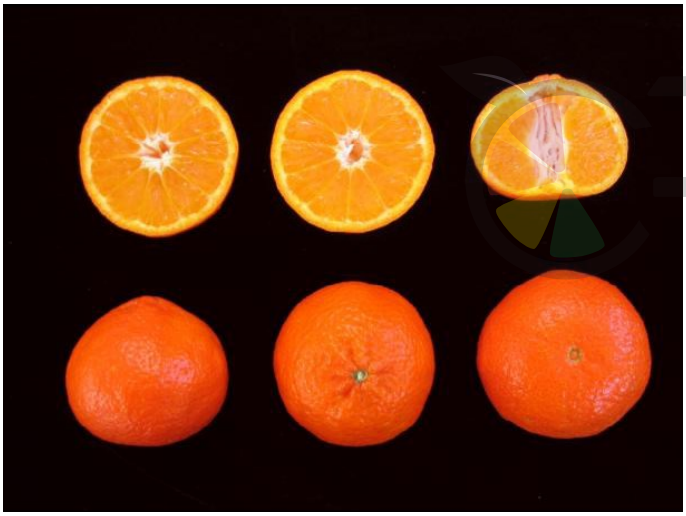
**Origin**
Tahoe Gold (TDE 3) is a selection that arose from a hybrid of (Temple x Dancy) x Encore mandarins - four TDE selections were evaluated. It is a seedless triploid. It was bred at the University of California, Riverside (UCR) and after a lengthy evaluation period was released in California during 2002. This selection has been imported from California for evaluation in South Africa.

**Ownership**
Property of the University of California.

**General Description**
Tahoe Gold is a mid to late maturing mandarin hybrid and it is estimated that it will mature in cold production areas in South Africa towards the end of July and 3 to 4 weeks earlier in warm areas.

**Tree Characteristics**
Overall trees are moderately vigorous, tree shape is round, more like a navel than a typical mandarin tree. Trees are relatively cold hardy and are thornless when mature.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange although Tahoe Gold is compatible with most commonly used rootstock types. Rootstocks inducing low Brix levels, small fruit size and low acid are not advised.



**Tahoe Gold fruit showing typical shape, colour, rind texture and seedlessness.**

**Fruit Characteristics**
Fruit size is medium averaging between 56 and 76 mm and internal quality is very good to excellent with a very rich flavour. Rinds are smooth and develop a deep orange to red colour. Flesh colour is a deep orange. Production is good with some alternate bearing which needs to be managed. It is seedless even when planted next to pollinating cultivars and does not cause seeds in other cultivars. The fruit has good holding ability on the tree. This cultivar is a seedless triploid.

**Production**
Production ranges from 80 to 120 kg per tree in mature (8 to 10 years) trees.

**General**
Light pruning of vigorous, erect branches can be necessary to control tree size. This keeps the trees to a manageable size with 10 year old trees in the Lindcove region of Tulare County, California being 2.5 to 3 metres in height and diameter at 12 years. Trees can be prone to alternate bearing which can be avoided if pruning as well as careful fertilization and irrigation practices are applied. Under Californian conditions this cultivar is not sensitive to Alternaria. No specific pest and disease problems have been noted under Californian conditions. Harvest, packing and shipping requirements are as for other mandarin hybrids.

**Status, Area Suitability and Availability**
Experimental - Tahoe Gold is currently under evaluation by Citrus Research International and only limited quantities are available from the Citrus Foundation Block.

**Tahoe Gold tree showing a more orange like open structure and good crop of medium sized fruit.**

**Updated: May 2012**

**Key References**
The information in this fact sheet is based on information supplied by UCR.

## Evaluation Data

| Internal Quality - Tahoe Gold on Carrizo citrange at sites in Central Valley, California | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| Mid February | 54.0 | 14.1 to 15.4 | 1.20 to 1.50 | 11.8 to 10.3 | 0 | 1 |

**Note:** These internal quality data are from the University of California trials in various regions of California.

**Count Distribution**
Data still to be included. No detailed data available - mean fruit size is 66 mm.

**Production**
65 Tons per hectare at 5.5 x 2.5m spacing.

**Note:** These production data are from the University of California trials in various regions of California.

**Export %**
Data still to be included. No data currently available.

**Comments**
The Tahoe Gold is an excellent quality, later maturing cultivar that could be of considerable value in expanding South Africa's soft citrus industry.

# Tambor Mandarin Hybrid

**Origin**
The origin of the Ortanique is unknown but it was discovered in Jamaica as a chance seedling in 1920. It is considered to be a natural Tangor (mandarin x orange hybrid). The name is a synthesis of or(ange), tan (gerine) and (un)ique. Due to a trademark on the name, it was locally named Tambor – a synthesis of Tamb(uti) or(ange). It has mainly been grown in the hot humid areas. It has various names around the citrus world which include Topaz, Ortaline, Mandora and Ormanda.

**Ownership**
Open.

**General Description**
A late maturing Tangor of medium to large fruit size mainly planted in the hot, humid areas. The fruit has high quality with high sugars and strong flavour and is not easily peeled.

**Tree Characteristics**
The trees are fairly vigorous, growing into fairly large, spreading, dense trees of drooping habit. The branches are slender and virtually thornless with medium sized leaves. The trees are reliable producers with good crops.

**Rootstock Options**
The trees are reported to have performed well on Rough lemon and Minneola x trifoliate hybrid in the Malelane area. High acid inducing rootstocks should not be considered in colder production areas.

**Fruit Characteristics**
Fruit size is medium to large. The fruit is slightly flattened at the stylar end and often has a small navel. Overall the fruit shape is fairly flat, sometimes with a slightly raised shoulder, depending on climate. The rind is smooth, leathery and tightly adhering, becoming coarser in drier climates. It ranges from thin to medium in thickness, depending on the climate. Peelability is initially difficult and very oily. Rind colour is yellow orange with orange flesh. The fruit is juicy with tender pulp and tough segment walls. In suitable climates (warmer) the fruit has a rich, distinctive, sweet flavour with well balanced acid and a strong, rich aroma. In cooler climates, the acid is overbearing. The fruit is seedy in the presence of pollination.

**Production**
Production is good, however figures are still to be included.

**General**
Over production in one season can lead to alternate bearing so pruning and fruit thinning may be options to reduce fruit set in an ‘on’ year. Stylar end splitting can be a problem in years when navel size is excessive, possibly due to high temperatures during the fruit set period. Harvest, packing and shipping requirements are as for other mandarin hybrids. The fruit is reported to hang well on the tree and store well without the juice developing off flavours.

**Status, Area Suitability and Availability**
The Tambor is planted commercially on a limited scale, making up 2% of all mandarin hectarage. It is planted mainly in hot, humid areas. Limited quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

**Internal Quality**
Data still to be included.

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
The Tambor is not likely to play a role in the South African soft citrus industry due to its negative characteristics.

**Updated: May 2012**

# Tango Mandarin Hybrid

**Origin**
Tango is a seedless mandarin that originated from a selection of W. Murcott mandarin irradiated at the University of California`s Citrus Breeding Program located at Riverside, Calofornia, USA.

**Ownership**
University of California is the owner of Tango and Eurosemillas has the foreign licence to manage the selection in South Africa.

**General Description**
Tango is a mid- to late-maturing mandarin selection, easy peeling and low-seeded (0.2 seeds in 25 to 50 fruit). The fruit shape is oblate and fruit size varies from medium (count 2) to large (count 1 to 1X) with a deep orange rind colour. The flesh is also deep orange in colour.

**Tree Characteristics**
The tree shape is upright when young and as the tree gets older and bears fruit, the tree opens up to become more spherical and thornless. Tango's pollen has very low germination (<1%), and as such is unable to cross pollinate. The selection is very tolerant to Alternaria.

**Rootstock Options**
Carrizo citrange, C35 citrange, Swingle citrumelo and X639 citrandarin.

**Tango fruit showing typical shape, colour, rind texture, rind thickness and seedlessness.**

**Fruit Characteristics**
Tango has a medium fruit size compared to other mandarin selections and the fruit shape is flattish-round. The rind is smooth with a natural waxy appearance. The rind develops a deep orange red colour with a light pink albedo. Tango develops a thin rind that peels easily with fairly low oil content. The internal fruit pulp colour is deep orange at peak maturity and fruit splitting rarely occurs.

Maturity in the warm areas is from mid- to late May and in the cool production areas from mid- to late July. The selection has good fruit quality due to high sugar and acid levels in addition to being juicy (> 50%), with a pleasant flavour. The fruit hang well on the tree without rapid loss in quality.

**Production**
Tango trees are precocious and orchards could produce very large crops and this should be controlled/limited to the 60 t/ha range, depending on the growing area and cultural practices.

**General**
The planting density (850-1000 trees/ha in California and no tree removal practices used as the trees mature) must be appropriate to accommodate the tree size (keep tree size relatively small) on the different rootstock options. Pruning practices are crucial to control tree size. Harvest, packing and shipping requirements are the same as for other mandarin hybrids. Fruit does well under cold sterilization and cold storage conditions.

**Tango tree with a very good crop and medium to large fruit size.**

**Updated: August 2018**

**Status, Area Suitability and Availability**
This selection has been produced successfully throughout all production areas of South Africa and is gaining popularity due to successes in all the markets. Propagation material is available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Tango on CC (planted 2010) - Letsitele | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Count** | **Colour** |
| 15/04/2017 | 50.0 | 11.1 | 1.39 | 8.0:1 | 0.0 | 1-1X | T5 |
| 25/05/2017 | 50.0 | 11.3 | 1.10 | 10.3:1 | 0.0 | 2-1 | T3 |
| 22/06/2017 | 55.2 | 11.9 | 1.08 | 11.1:1 | 0.0 | 1-1X | T1-2 |

| Internal Quality - Tango on CC (topworked 2013) - SRV | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Count** | **Colour** |
| 24/05/2017 | 58.2 | 9.2 | 0.8 | 11.8:1 | 0.0 | 1 | T6 |
| 19/06/2017 | 58.6 | 11.2 | 0.8 | 13.5:1 | 0.0 | 1 | T1-3 |

| Internal Quality - Tango on CC (topworked 2012) - GRV | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Count** | **Colour** |
| 20/06/2017 | 59.7 | 10.8 | 0.99 | 10.9:1 | 0.0 | 1 | T4 |
| 04/07/2017 | 62.9 | 10.5 | 0.95 | 11.1:1 | 0.0 | 1 | T3 |
| 17/07/2017 | 59.1 | 10.9 | 0.84 | 13.0:1 | 0.0 | 1 | T1 |

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
Tango will be a high value fruit due to good colour development, easy peelability, very low seeded fruit, optimal fruit size and a distinct flavour.

# Tanor Late Mandarin Hybrid

**Origin**
This mandarin hybrid was discovered in the late 1990's in a triploid breeding project on a farm in the Visalia area, Central Valley California, USA.

**Ownership**
Managed by CGACC (ZA 20176318).

**General Description**
An ultra late maturing triploid mandarin hybrid. In the cold Eastern Cape Midlands area, the fruit mature late August to mid September. Fruit size is large, with deep orange colour at maturity. Tanor Late peels easily and is a virtually seedless cultivar even near pollinators.

**Tree Characteristics**
The trees are compact with a round tree canopy and bear fruit internally. The tree is thorny when juvenile, but thorns recede with maturity. Trial sites have shown no susceptibility to Alternaria to date.

**Rootstock Options**
Suggested rootstocks are Carrizo citrange, Swingle citrumelo and Sunki 812. X639 may be a good alternative to bear slightly smaller fruit and is being included in trials planted. A multi rootstock trial including sweet orange interstock, has also been planted, to evaluate the effect on alternate bearing.

**Fruit Characteristics**
Fruit size is large and peaks at count 1X - 1XXX. The fruit are firm but easy to peel and virtually seedless.


**Tanor Late fruit showing typical shape, colour, rind texture, rind thickness and seedlessness.**

The fruit are attractive, developing a dark attractive deep orange colour. Shape is round to slightly oblate. The rind is slightly pebbly on young trees, but oil is not excessive when peeling. Internal fruit quality is good, with high sugars and good acid levels. The flesh of the fruit have a deep orange, and is soft and tender; flavour and appearance is excellent. In cold production regions, maturity is late August to early September. The fruit hangs well at peak maturity. Due to large fruit size, quality and firmness the fruit is considered suitable for the Far Eastern markets and niche markets for large Mandarins in UK / EU.

**Production**
Tanor Late has borne well in the first years' trial results but consecutive yearly data is still to be evaluated. Like most Mandarins, Tanor Late will probably require management and manipulation to control alternate bearing.

**General**
Harvest, packing and shipping requirements to date are as for other mandarin hybrids. Early trials have shown a tolerance for cold sterilisation treatment.

**Tanor Late tree with a good crop and deep orange colour fruit.**

**Updated: July 2018**

**Status, Area Suitability and Availability**
This selection is still at a semi commercial stage with further evaluations required on post harvest and marketing trails. Due to the large firm fruit size of Tanor Late it is ideal for Middle Eastern and Far Eastern markets. The smaller counts will meet the requirements of the EU, for being seedless. Limited quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Tanor Late on Carrizo citrange - Count 1XXX - Gamtoos River Valley | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 18/07/2016 | 56.1 | 12.8 | 1.44 | 8.9 | 0.9 | 1 |
| 11/08/2016 | 54.2 | 13.4 | 1.20 | 11.2 | 0.8 | 1 |
| 25/08/2016 | 57.4 | 14.4 | 1.15 | 12.5 | 0.9 | 1 |

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
Tanor Late have very good colour development and firm fruit as well as a good Brix:acid ratios that is good for export. Tanor Late is a good selection for the Middle and Far Eastern Markets. If you can get smaller fruit with the correct rootstock selection you will be able to send the fruit to the EU markets as well. By reducing fruit size with rootstock selection and management practices, the fruit could be suitable for all markets.

# Temple Mandarin Hybrid

**Origin**
The Temple is a Tangor (mandarin/orange hybrid) of unknown origin, first found in Jamaica. It was released and named in 1919 after W. C. Temple, who was a former manager of the Florida Citrus Exchange. There are two selections in South Africa, Sue Linda and Thoro, both imported from the USA by the ITSC in the early 1980s. The Thoro is planted commercially in South Africa as it has low seed counts.

**Ownership**
Open.

**General Description**
The Thoro Temple is a late maturing, large sized Tangor of high quality, which produces very good quality fruit in the warmer areas.

**Tree Characteristics**
The trees are moderately vigorous with a dense, bushy growth habit and moderately thorny. Yields are good. Temple trees are cold sensitive.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange in warmer areas. In cooler areas Rough lemon may be considered as it induces lower acid levels. Rootstocks inducing high acid are not advised. Swingle citrumelo is not recommended as there is a question of scion/ rootstock compatibility.

**Fruit Characteristics**
Fruit size is medium large to large, between 60 – 80mm with a mean size of 70mm. The fruit is fairly round to slightly oblate in shape, sometimes having a small navel. The rind texture is smooth to coarse, depending on the climatic area. It develops a deep orange/red rind colour in the colder production areas of South Africa and yellow/orange in the warmer regions.

**Thoro Temples waxed and packed showing typical shape, colour and slightly coarse rinds.**

The fruit often has a distinct colour difference between the north and south side of the tree with the fruit a deeper colour on the cooler side. There is also a slight difference in the juice colour which is normally orange. The fruit is not too easily peeled, the peel sometimes breaking into small pieces and the rind is oily. The rag is soft. The internal quality is very good with high sugars and high acid, which in cooler areas can be unacceptably high. If one waits too long for the acid level to drop, the flavour can diminish rapidly and there can be fruit drop. Maturity in the cold production areas is July and May/June in the hot areas. In the absence of pollinators, the fruit has from zero to about two seeds per fruit.

**Production**
Production is good, however figures are still to be included.

**General**
Temples are prone to alternate bearing if correct cultural practices are not applied. No specific pest problems have been noted under South African conditions. Harvest, packing and shipping requirements are as for other mandarin hybrids.

**Thoro Temple tree on C35 citrange showing typical shape and good crop of large fruit (tree height 1.8m).**

**Updated: May 2012**

**Status, Area Suitability and Availability**
The Temple is grown commercially on a limited scale in South Africa, making up just over 1% of mandarin plantings. It is more suited to the warmer production areas although plantings do exist in the colder areas. Due to a lack in grower demand for this cultivar, propagation material is not currently available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Thoro Temple Mandarin on Troyer citrange - Count 1 | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 21/07/2008 | 65.6 | 11.9 | 1.63 | 7.3 | 1.8 | 1 |
| 28/07/2008 | 64.8 | 12.0 | 1.53 | 7.8 | 1.8 | 1 |

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
Due to the lack in interest by growers and the availability of new, more favourable cultivars, the Temple is not likely to play a role in the South African soft citrus industry due to its negative characteristics.

# ARCCIT1614 (B17) Mandarin Hybrid

**Origin**
A seedling resulting from a cross between Ellendale and Robin, planted out at Addo Research Station, ITSC, Addo, South Africa in 1984. The resulting seeds were irradiated, producing the cultivar that was known as B17.

**Ownership**
Patented. Institute for Tropical and Subtropical Crops (ITSC).

**General Description**
A local, high quality, well coloured, late maturing mandarin hybrid.

**Tree Characteristics**
The tree is moderately spreading with small thorns, although the bearing branches tend to become thornless. Leaf shape is like a Clementine. Production is variable between the different observation sites in South Africa, but generally good.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange. Rootstocks inducing small fruit size and higher acid are not advised.

**Fruit Characteristics**
Fruit size varies from small to large (50 – 70mm (counts 4 to 1X and larger)). The fruit shape is more flat than round. The rind thickness is medium-thin, firm and slightly pebbled. The fruit is fairly easily peeled and leaves no albedo; the rind can be oily. The flesh is dark orange and juicy (with over 60% juice content). The rind develops an attractive dark orange to orange red colour. The external and internal colour is deeper than a Clementine. Fruit quality is good, with high sugars and tends to have high acid. Maturity in the cold production areas is early July to mid July. The fruit is not entirely seedless, often averaging less than one seed per fruit in a solid block. Fruit holds well in cold storage.

**Valley Gold (B17) fruit showing typical shape, colour rind texture and ultra low seed counts.**

**Production**
Production is very good, however figures are still to be included.

**General**
Minimal hand pruning to open the canopies is the only practice currently applied to this cultivar. This cultivar tends to set very large crops, but fruit splitting results in a ‘natural’ thinning giving the trees a good crop of medium to medium large fruit. Harvest, packing and shipping requirements are as for Clementines and other mandarin hybrids.

**Six year old Valley Gold (B17) tree on Troyer citrange showing typical upward growth shape (height 3.2m)**

**Updated: May 2012**

**Status, Area Suitability and Availability**
This cultivar has been planted in small commercial blocks in the cold citrus production areas of South Africa. Results to date have been so promising that growers in the East Cape are now expanding plantings substantially. Commercial quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Valley Gold (B17) on Troyer citrange - Count 1/2 - Eastern Cape | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 02/07/2008 | 65.6 | 11.7 | 1.35 | 8.6 | 1.5 | 1 |
| 08/07/2008 | 63.2 | 12.4 | 1.20 | 10.3 | 1.8 | 1 |
| 15/07/2008 | 63.3 | 14.2 | 1.35 | 10.5 | 1.5 | 1 |
| 22/07/2008 | 61.9 | 14.6 | 1.26 | 11.7 | 1.3 | 1 |

**Count Distribution**
Data still to be included.

**Production**
Data still to be included.

**Export %**
Data still to be included.

**Comments**
The Valley Gold is a promising mandarin hybrid that should be of value to the South African soft citrus industry.


**Valley Gold (B17) fruit packed for export showing excellent orange/red colour and seedlessness.**

# Winola Mandarin Hybrid

**Origin**
A cross between Wilking and Minneola from Israel developed at the Volcani Centre. The selection was released in South Africa in 1996.

**Ownership**
Patented - PBR ZA 2002280. Managed by Citrogold.

**General Description**
A late maturing mandarin selection. The fruit is of very high quality with a deep orange/red rind colour. The trees are vigorous with a downward growth pattern similar to grapefruit.

**Tree Characteristics**
The tree is vigorous with large dark grapefruit like leaves, but no petioles. Thorniness can be a problem but this can be corrected with careful fertilization and irrigation practices. There is variation in performance between different observation sites in South Africa as yields have been inconsistent. This can probably be attributed to young tree age.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange.

**Fruit Characteristics**
Fruit size has also been variable, from medium to medium large depending upon yields. The fruit shape varies from fairly round fruit on young, vigorous trees to flatter fruit on older less vigorous trees. The rind is smooth and fairly tightly adhering. Colour break in the cold areas is late May to early June, developing a deep orange/red colour in July. Fruit quality and flavour are excellent, with high Brix and acid levels. Maturity in the cold production areas is around late August into September. The fruit is seedless as it is a triploid. There have been some shelf life issues in Israel and South Africa. This has not been experienced in California.

**Winola fruit packed for export showing excellent colour, typical shape, rind texture and uniform fruit size.**

**Production**
Yields of 45 to 50 tons per hectare are expected for mature orchards.

**General**
Pruning may be necessary to open the canopies as a substantial amount of fruit is borne inside the tree. This cultivar is prone to alternate bearing which can be corrected if careful fertilization and irrigation practices are applied. Due to its downward growth pattern it is an ideal cultivar for trellising to give the tree an erect shape, with a substantial amount of fruit then borne on the outside of the canopy (see photo). Under Israeli conditions, it has not been overly sensitive to Alternaria. No specific pest and disease problems have been noted under South African conditions. The Winola has a number of traits in common with the Page, which also a Minneola hybrid, except that Winola is late maturing, has larger fruit and is seedless in the presence of pollinators. Even before full maturity the Winola has an exceptional flavour and colour and is sought after by customers familiar with the Page's excellent flavour. Harvest, packing and shipping requirements are as for Clementines and other mandarin hybrids.

**Trellised 2 Year old Winola's on Carrizo citrange under pulse drip fertigation bearing 100 fruit plus. The trellis is 2 metres in height.**

**Updated: May 2012**

**Current status, Area Suitability and Availability**
This selection has only been planted in experimental blocks in the cold coastal and cool inland production areas of South Africa. There is only limited data in South Africa. Limited quantities of propagation material are available from the Citrus Foundation Block.

**Key References**
The information in this fact sheet is based on evaluations by Citrus Research International.

## Evaluation Data

| Internal Quality - Winola on Carrizo citrange - Count 1 | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| 15/08/2005 | 59.3 | 13.5 | 1.68 | 8.0 | 0 | 1-2 |
| 30/08/2005 | 60.1 | 14.1 | 1.55 | 9.1 | 0 | 1 |
| 15/09/2005 | 60.5 | 14.6 | 1.44 | 10.1 | 0 | 1 |

**Count Distribution**

| Count | 1XX | 1X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| % | 4.2 | 17.7 | 26.7 | 24.8 | 18.5 | 8.1 | 0 |

**Note:** Data from orchards under pulse drip fertigation (PDF) in California.

**Production**
45 Kg per tree and 45 tons per hectare at 5 x 2m spacing.

**Export %**

| Grade | Percentage |
|---|---|
| **1** | 80 |
| **2** | 10 |
| **3** | 10 |
| **4** | |

**Comments**
The Winola is a late maturing Mandarin Hybrid and could prove to be of value to South Africa's late mandarin production and marketing.

**Typical Winola trees (4 years) showing downward growth without trellising.**

# Yosemite Gold Mandarin Hybrid

**Origin**
Yosemite Gold (TDE 4) is a selection that arose from a hybrid of (Temple x Dancy) x Encore mandarins. It is a seedless triploid. It was bred at the University of California, Riverside (UCR) and after a lengthy evaluation period was released in California during 2002. This selection has been imported from California for evaluation in South Africa.

**Ownership**
Property of the University of California.

**General Description**
Yosemite Gold is a late maturing mandarin hybrid and it is estimated that it will mature in cold production areas in South Africa in early August and 3 to 4 weeks earlier in warm areas.

**Tree Characteristics**
Overall trees are moderately vigorous and tree shape is round, more like a navel than a typical mandarin tree. Trees are relatively cold hardy and are thornless when mature.

**Rootstock Options**
Suggested rootstocks are Carrizo/Troyer citrange although Yosemite Gold is compatible with most commonly used rootstock types. Rootstocks inducing low Brix levels, small fruit size and low acid are not advised.

**Yosemite Gold fruit showing typical shape, colour, rind texture and seedlessness.**

**Fruit characteristics**
Fruit size is large for a mandarin averaging between 70 and 80 mm and internal quality is very good to excellent with a very rich fruit flavour. Rinds are smooth and develop a deep orange to red colour. Flesh colour is a deep orange. Production is good with some alternate bearing which needs to be managed. It is seedless even when planted next to pollinating cultivars and does not cause seeds in other cultivars. The fruit has good holding ability on the tree. This cultivar is a seedless triploid.

**Production**
Production ranges from 80 to 120 kg per tree in mature (8 to 10 years) trees.

**General**
Light pruning can be necessary to control tree size. This keeps the trees to a manageable size with 10 year old trees in the Lindcove region of Tulare County, California being 2.5 to 3 metres in height and diameter at 12 years. Trees can be prone to alternate bearing which can be avoided if pruning as well as careful fertilization and irrigation practices are applied. Under Californian conditions this cultivar is not sensitive to Alternaria. No specific pest and disease problems have been noted under Californian conditions. Harvest, packing and shipping requirements are as for other mandarin hybrids.

**Status, Area Suitability and Availability**
Experimental - Yosemite Gold is currently under evaluation by Citrus Research International and only limited quantities are available from the Citrus Foundation Block.

**Yosemite Gold tree showing a more orange like open structure and good crop of large sized fruit.**

**Updated: May 2012**

**Key References**
The information in this fact sheet is based on information supplied by UCR.

## Evaluation Data

| Internal Quality - Yosemite Gold on Carrizo citrange at sites in Central Valley, California | | | | | | |
|---|---|---|---|---|---|---|
| **Date** | **Juice %** | **Brix** | **Acid** | **Ratio** | **Seed** | **Colour** |
| Mid February | 56.0 | 13.2 to 15.0 | 1.20 to 1.40 | 11.0 to 10.7 | 0 | 1 |

**Note:** These internal quality data are from the University of California trials in various regions of California.

**Count Distribution**
Data still to be included. No detailed data available - mean fruit size is 66 mm.

**Production**
70 Tons per hectare at 5.5 x 2.5m spacing.

**Note:** These production data are from the University of California trials in various regions of California.

**Export %**
Data still to be included. No data currently available.

**Comments**
The Yosemite Gold is an excellent quality, later maturing cultivar that could be of considerable value in expanding South Africa's soft citrus industry.