

Mandalate mandarin

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Figure 1. A Mandalate mandarin tree.



Figure 2. Mandalate mandarins.

Estimated maturity period

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Riverina												
Sunraysia												

Origin

The Mandalate mandarin is a triploid hybrid of the Fortune mandarin and Avana mandarin developed in Italy. Mandalate has Plant Breeder's Rights (PBR) protection and is managed in Australia by the Australian Nurserymen's Fruit Improvement Company (ANFIC).

Fruit quality

Table 1. Mandalate mandarin fruit quality* characteristics.

Skin	Easy peel, orange colour, slightly pebbled.
Average rind thickness (mm)	3.3
Internal quality	High sugar and acid content. Generally juicy but dryness can develop in large fruit.
Average number of seeds	<1
Juice per cent (%)	43
°Brix	14
Acid per cent (%)	1.3
Brix:acid ratio	10.8
Average fruit weight (g)	125
Average fruit diameter (mm)	67

*Juice quality levels considered adequate for harvest and developed by sequential analysis of fruit from top-worked evaluation trees.

Comments

- The Mandalate mandarin is late-maturing.
- The fruit needs to be retained on the tree in good condition to allow the juice acid level to decline.
- Stop-Drop®/Cit-tite® sprays and Gibberellic Acid (GA) application is required to hold fruit on the tree and maintain skin condition.
- Trees also need crop load manipulation to increase fruit size and reduce alternate bearing.
- Trifoliata rootstock should not be used for Mandalate due to its tendency to elevate the acid content of the fruit.
- Fruitlet thinning in 2009 resulted from a combination of hand removal and an unexpected late fruit drop in early February related to extreme temperature conditions at the site. For example, trees on C35 citrange rootstock had a 60% fruit removal level (31% by hand thinning, 29% from fruit drop in February). A similar feature of heat-related, late fruit drop has been noted with Fortune mandarin, which is one of the parents of Mandalate.

Table 2. Average yield per tree* on seedling trees, Sunraysia.

Rootstock	Average yield per tree (kg)	
	2009 (4-y-old trees)	2011 (6-y-old trees)
C35 Citrange	27	77
Citrange	28	59
Cleopatra	–	30
Swingle	44	107
Trifoliata	–	70
Volkameriana	–	79

Mandalate has a dense, drooping, almost 'bush-like' canopy, with the majority of the fruit produced within the canopy. Pruning to manipulate the canopy for ease of spray access and harvest will be required as part of the management program.

- In October 2009 at the Sunraysia evaluation site, there was light flowering on Mandalate on both top-worked and seedling trees. The crop load in 2010 was therefore low. All evaluation trees were pruned to shape the canopy for future management activities and harvests.
- In 2010, the yield was very low on trees top-worked to Valencia and field planted trees.
- In October 2010, flower production was heavy and there was a strong crop set for 2011. The heaviest individual tree yield was 225 kg (Cleopatra rootstock). Fruit thinning was done on all trees: on citrange rootstock, 19% of young fruit was hand removed, on trifoliata 29% and Cleopatra 24%.
- The heavy fruit load greatly reduced flower production in October 2011, and thus the 2012 crop.
- The 2012 yields on 7-year-old field-planted seedling trees on a range of rootstocks was not recorded due to lack of fruit. Low yields were also recorded on trees top-worked to Valencia orange.

A high level of management would be required to lower the tendency for this variety to alternate bear. Rind condition was enhanced by a Tangelo Gibberellic Acid (GA) program to hold fruit on the trees for an extended period and allow fruit acid content to decline. The use of several GA sprays on Mandalate needs to be timed correctly to reduce the suppression effects of GA on flower bud development.

Table 3. Average yield per tree* on trees top-worked to Valencia orange in 2005.

Rootstock	Average yield per tree (kg)				
	2009	2010	2011	2012	2013
Citrange	24	No harvest	121	10	24
Cleopatra	27	No harvest	117	4	42
Trifoliata	36	No harvest	102	13	32

*Average yield per tree results are from a small number of evaluation trees and should only be used as a general indication of the variety's potential yield.

Mandalate has similarities to Imperial mandarin. There may be a market niche in Australia if the cultural requirements can be met. Some commercial plantings have occurred.

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The information contained in this publication is based on knowledge and understanding at the time of writing (December 2019) and was generated from field and nursery trees at Dareton Primary Industry Institute, Sunraysia, NSW, unless otherwise stated. Where quantitative data are presented (e.g. % Juice or rind thickness) they are based on measured properties. Where qualitative data are presented (e.g. thorniness or tendency to split), they are based on observations or brief notes recorded in the field.

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