

'Gold Nugget' Mandarin

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'Gold Nugget' is a late-maturing mandarin hybrid that combines good fruit size, excellent productivity, outstanding storage characteristics on the tree, extremely rich and sweet fruit flavor and the absence of seeds even in mixed plantings. Few other mandarins currently available combines this set of characteristics. It may be successful in a late-season marketing window that has few seedless cultivars. The pedigree of Gold Nugget is 'Wilking' ('King' tangor x 'Willowleaf' mandarin) x 'Kincy' ('King' tangor x 'Dancy' mandarin). The variety is diploid. The name 'Gold Nugget' was chosen to reflect the color and appearance of the fruit

Fruit Characteristics: Gold Nugget fruit are deeply oblate (slightly flattened) in shape, with little or no neck. The fruit base (stem end) is slightly concave while the apex (blossom end) is truncate with a slight depression and a very small (2 mm), occasionally open stylar scar. The average fruit size is medium for a mandarin (classed as Jumbo by California state standards) with a mean width of 68mm (2.68 in.) and a height of 58 mm (2.28 in.), giving a height to width aspect ratio of 0.85, and a mean weight per fruit of 130 grams (4.6 oz.). Rind color is pale orange for fruit harvested in Riverside in mid-February, with similar values for fruit from the San Joaquin Valley, Ventura and north San Diego County. The rind texture is variable, depending on tree age, crop, but especially on the amount of pruning the tree has received. For older trees with a moderate to heavy crop, regularly pruned to maintain a smaller more rounded crown, rind texture is pitted to slightly bumpy, with depressed oil glands. Fruit rinds from non-pruned trees with heavy crops can be rather coarse and bumpy. The rind of fruit from trees with very light crops is often excessively rough or bumpy. The rind is fairly easy to peel when fruit are mature, but can be more adherent early in the season. Rind oil is evident when peeling fresh fruit. Fruit splitting on the stylar end of the fruit can occur and in some years can be significant. The fruit is juicy averaging 49% juice content. Flesh is deep orange in color with a moderately fine texture. The taste is extremely sweet when mature with a very rich flavor, considered by professional taste panels to be one of the very best flavored citrus in the world.

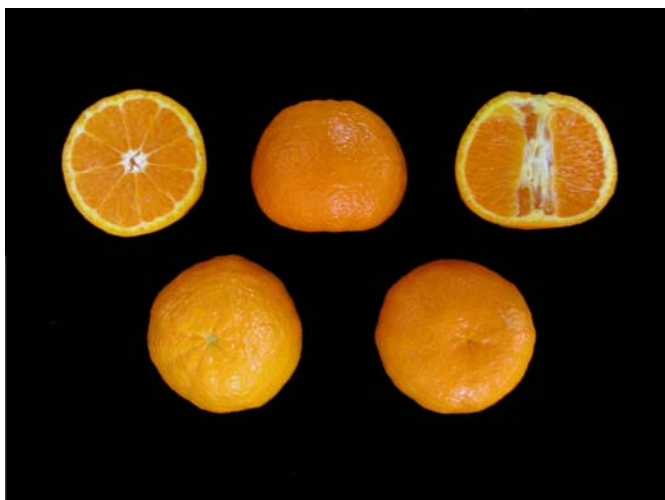


Figure 1: Fruit of 'Gold Nugget' from Riverside



Figure 2: Nine-year-old non-pruned 'Gold Nugget' tree on Carrizo at Lindcove REC (San Joaquin Valley)



Figure 3: Pruned 'Gold Nugget' tree (9 years) at Santa Paula



Figures 4&5: Branch bending on non-pruned 'Gold Nugget'

Tree Characteristics: Tree shape and growth (Figures 2 & 3) is moderately vertical especially in young and medium age trees with long vertical branches giving way to longer drooping branches in older, non-pruned trees bearing fruit. Leaves are of normal mandarin size and shape. Canopy density is good with fruit borne on the outer parts of the canopy on long branches. Sun-bleaching of exposed fruit is not a problem with this variety except in desert areas where sunburn can be severe. Overall non-pruned trees are moderately vigorous with long branches that bend excessively with heavy fruit loads. Branch breakage is a regular problem in these trees and branches must be supported if such a cultural condition is maintained. Like most mandarins ‘Gold Nugget’ is not thorny.

Rootstocks and Tree Performance: Several different rootstocks were used in ‘Gold Nugget’ evaluations including Carrizo citrange, C-35 citrange, ‘Swingle’ citrumelo, Rubidoux and Rich 16-6 trifoliates, Cleo mandarin, sour and sweet oranges, Schaub rough lemon, and Volkamer lemon (*C. volkameriana*). Overall trees performed well on all rootstocks with no indications of rootstock-scion incompatibility. Tree vigor varies somewhat by location. At southern desert locations (Coachella Valley) trees are quite vigorous with large canopy volumes. In contrast, at the cooler Santa Paula and Ojai (Ventura County) locations trees had significantly less canopy volume. Canopy volumes were greater for topworked trees in north San Diego County. Trees have performed best in locations with more moderate climates such as the coastal and inland valleys of southern California and the San Joaquin Valley but quality and production in desert areas is acceptable. The topworked trees tested were quite vigorous being larger overall than trees on all other rootstocks at the same age. In the desert locations trees on Volkamer lemon and Schaub rough lemon were considerably larger than those on Carrizo or C-35 citrange, trifoliolate, Cleo mandarin or sour orange. Tree spacing in field plantings will depend on vigor of the rootstock and on the pruning practices employed. For regularly pruned trees on Carrizo and C35citranges, and trifoliolate rootstocks, a recommended tree density would be 200 (11’x20’) to 250 (9’x20’) trees per acre. Care of young trees should be similar to that used for other mandarins or oranges. Flowering occurs from early April into May at all locations except the desert where it is earlier. The normal flowering overlaps with many mandarin varieties including Clementinas. Trees that were screened to exclude bees during flowering produced very few fruit for two consecutive years, but it is possible that ‘Gold Nugget’ is self-fertile but requires pollination for fruit set. Pollen viability is low (< 10%), suggesting that ‘Gold Nugget’ will have little effect on seediness of Clementines or other cultivars. Optimal pruning practices include topping the vertical branches at about 1.5-1.7 meters high in the third year after planting, followed by pruning back of vigorous branch growth to maintain a more rounded crown. In this manner branches are suitably short and sturdy enough to support a heavy fruit load. The trees have not been noted as particularly susceptible to any diseases and, based on a freeze in 1999, appear only slightly more cold-hardy than oranges of similar age.

Yields: Yield evaluations of ‘Gold Nugget’ indicate that alternate bearing is common in this cultivar, as in most mandarins, although this problem is alleviated in regularly pruned trees with good crops set generally three out of every four years. Non-pruned trees will eventually go into total alternate bearing without intervening cultural treatments. Using a rating scale ranging from 0 (no crop) to 5 (very heavy crop), a crop rating of 2.5 is considered to be commercially acceptable yield while a crop rating of 5 cannot be sustained over many years by most mandarins. Using this scale data indicate that regularly pruned trees showed the highest and most consistent crops and crop efficiency, ranging between 4.0 and 5.0 for five out of seven years studied. Non-pruned trees consistently exhibited 5.0 crops in ‘on’ years with 0.5 crops in the ensuing ‘off’ year. Trees tend to flower profusely at desert locations, but fruit set and fruitlet retention is not always good in young trees. Mature trees in the desert exhibit significantly less problems.

Fruit Maturity: An important determinant of maturity date for citrus fruit is the solids:acid ratio. The estimated dates on which fruit reached an 8:1 solids:acid ratio were December for the southern deserts, late-January for Riverside and the San Joaquin Valley, and mid-February to March for the Ventura, Santa Paula and Ojai areas. In California, state standards specify a solids:acid ratio of 6.5 for tangerines and mandarins. The 8:1 ratio is used for oranges. We believe that ‘Gold Nugget’ should not be marketed until fruit reach a solids:acid ratio of at least 10:1. Taste panel evaluations support this recommendation. This would delay maturity by about 3 weeks compared with the dates above and would result in a much better tasting and easier to peel fruit. ‘Gold Nugget’ holds especially well on the tree for an extended period. They maintain their marketable fruit qualities well into summer at most locations, except the desert. Fruit from trees on Volkamer lemon and Schaub rough lemon generally have slightly lower solids and acid than those from trees on Carrizo citrange, C-35 citrange, Swingle citrumelo or Rich 16-6 trifoliolate orange, but this effect is less noticeable than with oranges and does not preclude the use of Volk or Schaub as a rootstock with trees used for fresh fruit marketing.

Fruit Storage: Limited data indicate that fruit of ‘Gold Nugget’ store very well after harvest. Trial fruit taken from a late-February harvest at Valley Center which were run over the packline at the University of California Lindcove Research and Extension Center and waxed were evaluated by a taste panel prior to and after storage at three different temperatures, 11 days at 68° F (20.5° C), 12 days at 37° F (3.4° C) followed by 7 days at 55° F (13.3°C), or 12 days at 41° F (5.6° C) followed by 7 days at 55° F (13.3°C). These samples would represent peak maturity fruit of ‘Gold Nugget’. Fruit quality ratings were good for all traits before storage, and were little changed or improved (peelability) by both cold storage treatments. Storage at a continuous 68° F (20.5° C) reduced the scores for visual appeal and peelability. Waxed fruit were similar to unwaxed fruit for nearly all traits in all temperature regimes.

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