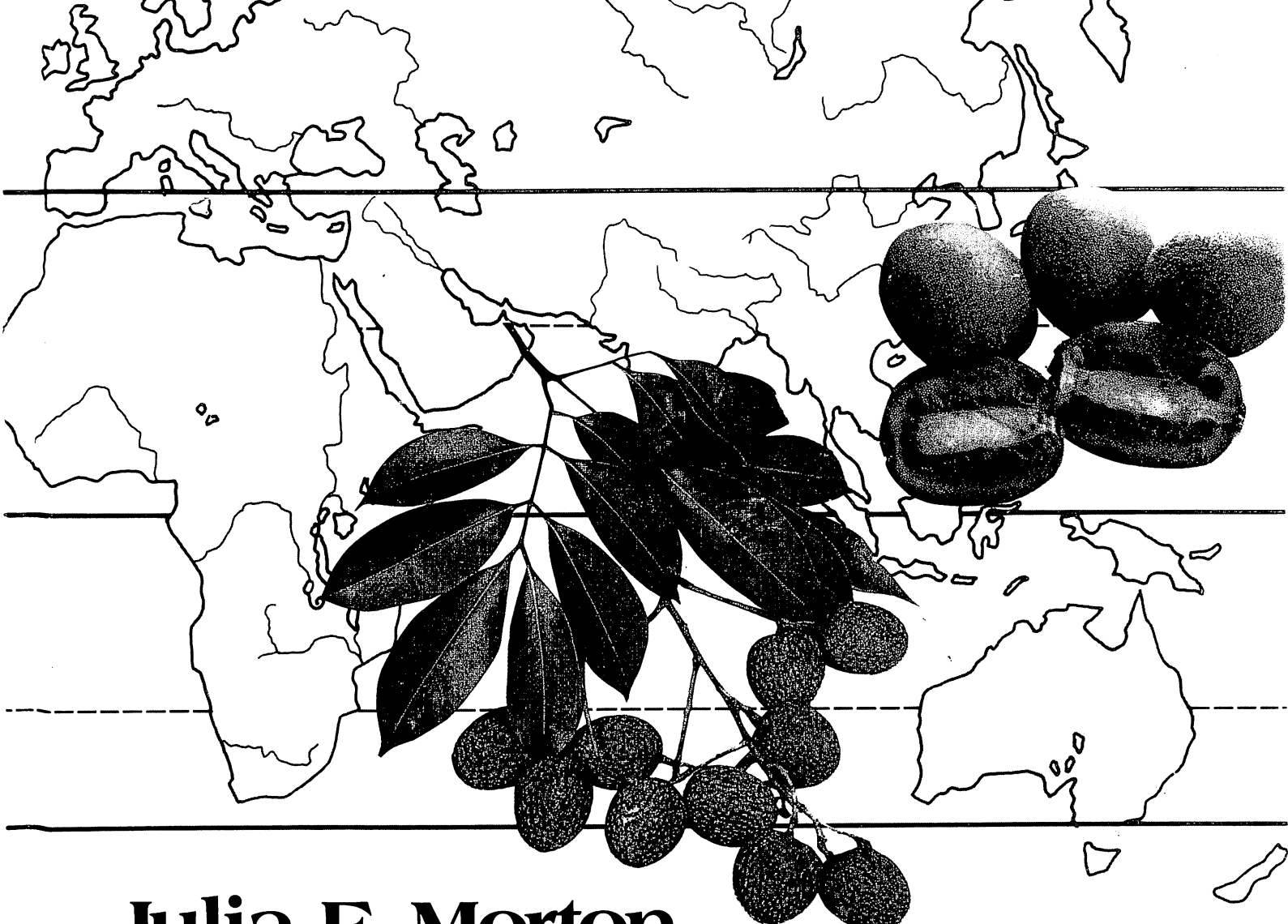


# FRUITS OF WARM CLIMATES



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## Kumquat

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Kumquats have been called “the little gems of the citrus family”. They were included in the genus *Citrus* until about 1915 when Dr. Walter T. Swingle set them apart in the genus *Fortunella*, which embraces six Asiatic species. The common name, which has been spelled cumquat, or comquot, means “gold orange” in China. The Japanese equivalent is *kin kan* or *kin kit* for the round type, *too kin kan*, for the oval type. In Southeast Asia,

the round is called *kin*, *kin kuit*, or *kuit xu*, and the oval, *chu tsu* or *chantu*. In Brazil, the trade name may be kumquat, kunquat, or *laranja de ouro dos orientais*.

### Description

The kumquat tree is slow-growing, shrubby, compact, 8 to 15 ft (2.4–4.5 m) tall, the branches light-green and angled when young, thornless or with a few spines.

The apparently simple leaves are alternate, lanceolate,  $1\frac{1}{4}$  to  $3\frac{3}{8}$  in (3.25–8.6 cm) long, finely toothed from the apex to the middle, dark-green, glossy above, lighter beneath. Sweetly fragrant, 5-parted, white flowers are borne singly or 1 to 4 together in the leaf axils. The fruit is oval-oblong or round,  $\frac{5}{8}$  to  $1\frac{1}{2}$  in (1.6–4 cm) wide; peel is golden-yellow to reddish-orange, with large, conspicuous oil glands, fleshy, thick, tightly clinging, edible, the outer layer spicy, the inner layer sweet; the pulp is scant, in 3 to 6 segments, not very juicy, acid to subacid; contains small, pointed seeds or sometimes none; they are green within.

### Origin and Distribution

Kumquats are believed native to China. They were described in Chinese literature in 1178 A.D. A European writer in 1646 mentioned the fruit as having been described to him by a Portuguese missionary who had labored 22 years in China. In 1712, kumquats were included in a list of plants cultivated in Japan. They have been grown in Europe and North America since the mid-19th Century, mainly as ornamental dooryard trees and as potted specimens in patios and greenhouses. They are grown mainly in California, Florida and Texas; to a lesser extent in Puerto Rico, Guatemala, Surinam, Colombia and Brazil. In South India, they can be grown only at high elevations. There is limited cultivation in Australia and South Africa.

### Varieties

The various kumquats are distinguished as botanical species rather than as cultivars. The following are those most utilized for food:

'Hong Kong', or Hong Kong Wild (*F. Hindsii* Swing.), called *chin chü*, *shan chin kan*, and *chin tou* by the Chinese—native to Hong Kong and adjacent hilly and mountainous regions of Kwantung and Chekiang Provinces of China; nearly round,  $\frac{5}{8}$  to  $\frac{3}{4}$  in (1.6–2 cm) wide; peel orange or scarlet when ripe, thin, not very fleshy; pulp in only 3 or 4 small segments; seeds plump. Chinese people flock to the foothills to gather the fruits in season. In the western world, the very thorny shrub is grown only as an ornamental pot plant.

'Marumi', or Round Kumquat (*F. japonica* Swing., syn. *Citrus madurensis* Lour.)—fully described for the first time in 1784; introduced into Florida from Japan by Glen St. Mary and Royal Palm nurseries in 1885; fruit is round, slightly oblate or obovate; to  $1\frac{1}{4}$  in (3.2 cm) long; peel is golden-yellow, smooth, with large oil glands, thin, aromatic and spicy; pulp, in 4 to 7 segments, is scant and acid, with 1 to 3 seeds which are smaller than those of 'Nagami'. The tree reaches 9 ft (2.75 m); is otherwise similar to that of 'Nagami' except that it is slightly thorny, has somewhat smaller leaves and is considerably more cold-tolerant; bears at the same season.

'Meiwa', or Large Round Kumquat (*F. crassifolia* Swing.), called *ninpo* or *neha kinkan* in Japan—possibly a hybrid between 'Nagami' and 'Marumi'; introduced from Japan by the United States Department of Agriculture between 1910 and 1912; short-oblong to round, about  $1\frac{1}{2}$  in (4 cm) wide; peel orange-yellow, very thick, sweet; pulp usually in 7 segments, relatively sweet or subacid; often seedless or with few seeds. The tree is a dwarf, frequently thornless or having short, stout spines; the leaves differ from those of other kumquats in being

very thick and rigid and partly folded lengthwise; they are pitted with numerous dark-green oil glands. Extensively grown in Chekiang Province, China, and less commonly in Fukuoka Prefecture, Japan. There is an ornamental form with variegated fruits in Japan. This kumquat is the best for eating fresh; is still somewhat rare in the United States.

'Nagami', or Oval, Kumquat (*F. margarita* Swing.)—plants introduced from China into London in 1846 by Robert Fortune, plant explorer for the Royal Horticultural Society; was reported in North America in 1850; introduced into Florida from Japan by Glen St. Mary and Royal Palm nurseries in 1885; obovate or oblong; up to  $1\frac{3}{4}$  in (4.5 cm) long and  $1\frac{3}{16}$  in (3 cm) wide; pulp divided into 4 or 5 segments, contains 2 to 5 seeds. In season October to January. Tree to 15 ft (4.5 m) tall. A mature specimen on rough lemon rootstock at Oneco, Florida, in 1901, bore a crop of 3,000 to 3,500 fruits. This is the most often cultivated kumquat in the United States.

### Climate

Robert Fortune reported that the 'Nagami' kumquat required a hot summer, ranging from 80° to 100°F (26.67°–37.78°C), but could withstand 10 to 15 degrees of frost without injury. It grows in the tea regions of China where the climate is too cold for other citrus fruits, even the Satsuma orange. The trees differ also from other *Citrus* species in that they enter into a period of winter dormancy so profound that they will remain through several weeks of subsequent warm weather without putting out new shoots or blossoms. Despite their ability to survive low temperatures, as in the vicinity of San Francisco, California, the kumquat trees grow better and produce larger and sweeter fruits in warmer regions.

### Propagation

Kumquats are rarely grown from seed as they do not do well on their own roots. In China and Japan they are grafted onto the trifoliate orange (*Poncirus trifoliata*). This has been found the best rootstock for kumquats in northern Florida and California and for dwarfing for pot culture. Sour orange and grapefruit are suitable rootstocks for southern Florida. Rough lemon is unsatisfactory in moist soils and tends to be too vigorous for the slow-growing kumquats.

### Culture

In orchard plantings, kumquats on trifoliate orange can be set 8 to 12 ft (2.4–3.65 m) apart, or they may be spaced at 5 ft (1.5 m) in hedged rows 12 ft (3.65 m) apart. For pot culture, they must be dwarfed; must not be allowed to become pot-bound, and need faithful watering to avoid dehydration and also need regular feeding.

### Harvesting

For the fresh fruit market, it has been customary to clip the fruits individually with 2 or 3 leaves attached to the stem. For decorating gift packs of other citrus fruits, or for use as table decorations, leafy branches bearing several fruits are clipped. This practice has been common in Florida but in cooler California the tree is not sufficiently vigorous to stand much depletion.

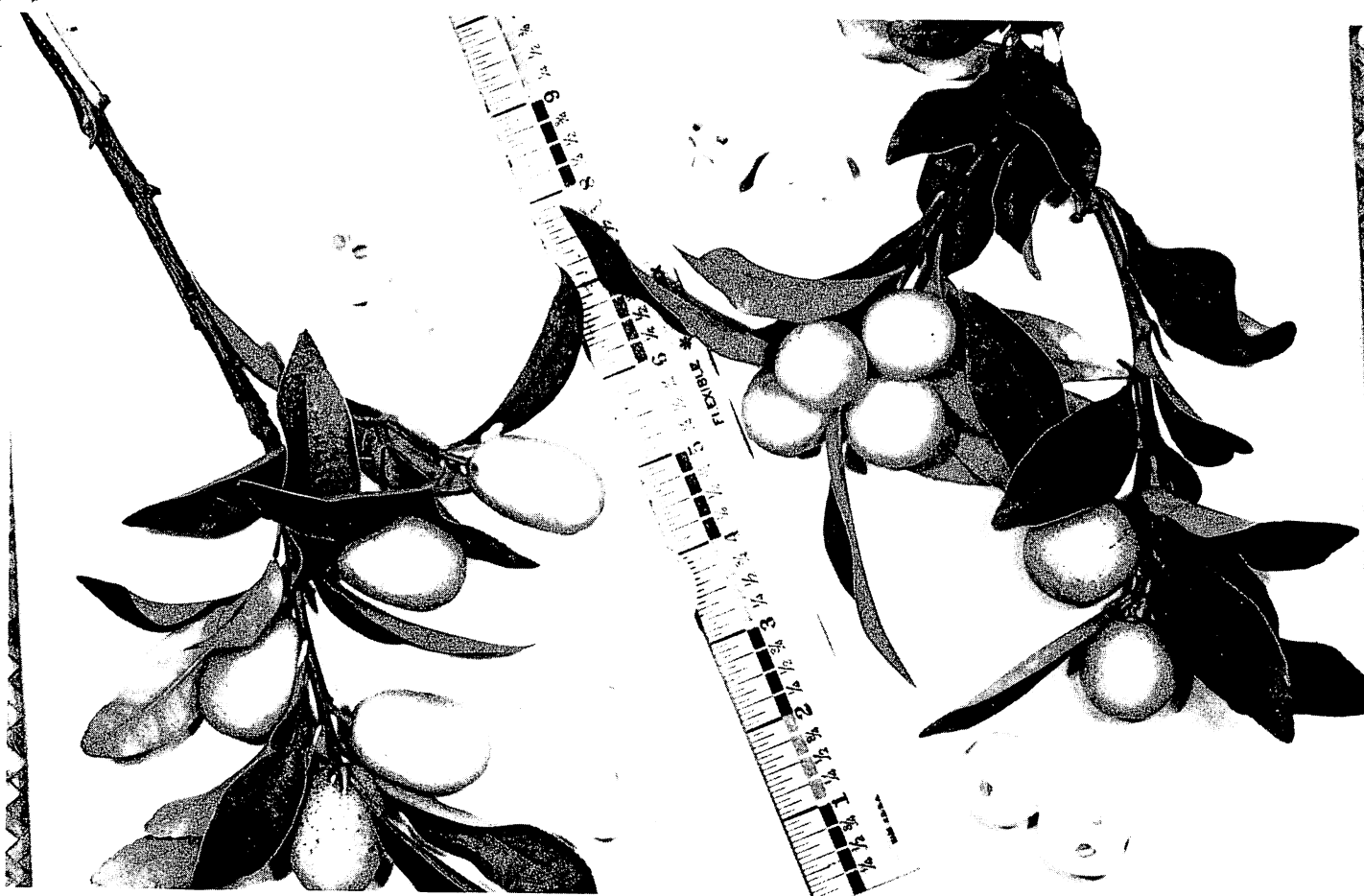


Fig. 45: Nagami, or Oval, kumquat (*Fortunella margarita*) (left); and Marumi, or Round, kumquat (*F. japonica*) (right).

### Keeping Quality

Because of the thick peel, the kumquat has good keeping quality and stands handling and shipment well.

| Food Value Per 100 g of Edible Portion (raw)* |            |
|---|------------|
| Calories                                      | 274        |
| Protein                                       | 3.8 g      |
| Fat   | 0.4 g      |
| Carbohydrates                                 | 72.1 g     |
| Calcium                                       | 266 mg     |
| Phosphorus                                    | 97 mg      |
| Iron  | 1.7 mg     |
| Sodium  | 30 mg      |
| Potassium                                     | 995 mg     |
| Vitamin A                                     | 2,530 I.U. |
| Thiamine                                      | 0.35 mg    |
| Riboflavin                                    | 0.40 mg    |
| Niacin  |            |
| Ascorbic Acid                                 | 151 mg     |

\*According to analyses published by the United States Department of Agriculture.

### Pests and Diseases

Potted kumquats are subject to mealybug infestations. Dooryard and orchard trees may be attacked by most of the common citrus pests. They are highly resistant or even immune to citrus canker. The following diseases are recorded by the Florida Department of Agriculture as observed on kumquats: scab (*Elsinoë fawcetti* and its conidial stage, *Sphaceloma fawcetti*); algal leaf spot, or green scurf (*Cephaleuros virescens*); greasy spot (*Cercospora citri-grisea*); anthracnose (*Colletotrichum gloeosporioides*); fruit rot, melanose (*Diaporthe citri*); stem-end rot and gummosis (*Physalospora rhodina*).

### Food Uses

Fresh kumquats, especially the 'Meiwa', can be eaten raw, whole. For preserving, they should be left until they lose some of their moisture and acquire richer flavor. The fruits are easily preserved whole in sugar sirup. Canned kumquats are exported from Taiwan and often served as dessert in Chinese restaurants. For candying, the fruits are soaked in hot water with baking soda, next day cut open and cooked briefly each day for 3 days in heavy sirup, then dried and sugared. Kumquats are excellent for making marmalade, either alone or half-and-half with calamondins. The fruit may be pickled by merely packing

in jars of water, vinegar, and salt, partially sealing for 4 to 5 days, changing the brine, sealing and letting stand for 6 to 8 weeks. To make sweet pickles, halved fruits are boiled until tender, drained, boiled again in a mixture of corn

sirup, vinegar, water and sugar, with added cloves and cinnamon, and then baked until the product is thick and transparent. Kumquat sauce is made by cooking chopped, seeded fruits with honey, orange juice, salt and butter.