



## Pomegranate

Scientific name: *Punica granatum* L.

Family: Punicaceae

Origin: Iran, Afghanistan, India

One of the earliest cultivated fruits, mentioned in ancient Egyptian mythology, the pomegranate is steeped in history and tradition. Early travelers carried the fruit throughout the Middle East and Northern Africa. The fruit became the symbol of the lands of Armenia. Eating pomegranate was said to “purge the system of envy and hatred.” Recent worldwide popularity of the fruit and its juice is due to the health benefits from antioxidants in the fruit.

Spanish settlers first reported pomegranate in California in 1769. The fruit is commonly referred to as grenade or granada or by the Persian names dulim or dulima. In Japanese the fruit is called zakuro, and it is sometimes sold under that name in Hawai‘i. Dr. F.J.F. Meyen first observed it in Hawai‘i in 1825, and Hiram Bingham reported it for sale in a Honolulu market in 1831.

### Cultivars

There are hundreds of known pomegranate varieties. The USDA germplasm repository in Davis, California, has 189 accessions from many parts of the world. Pomegranates can be divided into four groups based on skin color: dark red, yellow-green, black-violet, and white. Plants do not come true from seed, and therefore seedling trees in Hawai‘i are highly variable in quality. Compared to cultivated varieties, seedling trees often have larger seeds that make up over half of the fruit’s weight. In India, the seeds are used for culinary purposes, and some varieties reflect this by having 70 percent of the fruit weight being seeds. A cultivar from California named ‘Wonderful’ is found in Hawai‘i. ‘Grenada’, a patented variety that matures a month earlier than ‘Wonderful’, is also found here.

### Environment

Pomegranate trees tolerate a wide range of soils and are very tolerant of drought. Irrigation is used to guarantee fruit production, as trees will not flower in extended periods of drought.

Trees are spaced 15–20 feet apart in commercial orchards. Generally, 20-foot spacing is used in large orchards to facilitate weeding and field maintenance. Wide spacing and planting in full sun allows enough light to reach the fruit to ensure coloration.

### Horticulture

Pomegranate requires an active pruning regime for the first 3 years in the field. After planting, the low side shoots should be cut off to leave one or more trunks. The tree is a vigorous grower, with many root shoots and suckers that should be removed, as they generally do not bear fruit, and they grow rapidly at the expense of fruiting wood. Fruit forms only at the tips of new growth. Branches should be shortened to encourage new shoots, and the tree should be kept low to facilitate harvesting. Fertilizer is generally applied in fall or winter, with ½ pound of nitrogen followed by ¼ pound of 6-6-6 organic fertilizer in spring for young trees. The trees reach full production in 5–6 years. Some producing trees in the Middle East are reported to be 200 years old.

### Pests and diseases

Pomegranate can suffer foliar damage from whitefly (*Aleurodicus* sp.), thrips (*Selenothrips* sp.), mealybugs (*Pseudococcus* sp.), and scale (*Ceroplastes* sp.).

Wet fruit rot (*Phomopsis* sp.) can occur at the base of the fruit. Removing and disposing of affected fruit is



**Pomegranate flower**

advisable to prevent spread of the fungus. Fruit rot from *Botrytis cinerea* can occur after harvest from improper storage.

The hard shell of the fruit prevents damage from a number of insects, but the base of the fruit, the calyx, and the stamen cluster can be home to ants, roaches, and other pests. Some growers will cut the stamen cluster off half-way through the growing cycle to prevent infestation. In Asia, it is common to use protective wrapping or fruit bags on pomegranate once the fruit is set. This helps to prevent damage from pests and diseases. It also helps produce even fruit coloration.

### **Propagation**

Pomegranates are commercially propagated from hardwood cuttings 10–20 inches long, treated with a rooting hormone used to ensure development. Air-layers are also possible. Seeds germinate easily but often produce unreliable results. Grafting is seldom successful.

### **Harvesting and yield**

Fruit ripens 6–7 months after flowering but will crack if left too long on the tree. Generally, fruits are harvested once they turn color and before yellowing appears at the base.

The fruit does not continue to ripen once harvested, and timing can be critical in commercial orchards. Growers in Israel and California tap the fruit, listening for a metallic sound that tells them it is time to harvest. Strong stems make it necessary for the fruit to be cut from the



**The red flesh covering the seeds is the edible portion.**

tree and not pulled off by hand. Mature, healthy trees can produce 100–200 fruits. Kona trees at 400 feet elevation produce three to five fruits per week throughout the year when irrigated. An older tree at 1800 feet elevation in South Kona produced more than 200 fruits from July through December.

### **Postharvest quality**

The pomegranate has a long storage life, more than 7 months when held at 32–41°F and 80–85% relative humidity. The fruit is susceptible to chilling injury and browning if stored below freezing.

### **Packaging, pricing, and marketing**

In production areas in California, the fruit is packed in boxes by size with the calyx or stamen end up, often in molded plastic trays to prevent bruising. In Hawai‘i, the fruit is often sold at autumn farmers’ markets in boxes. It is also sold to hotel chefs, who prefer fresh, locally grown pomegranates to treated imports. Wholesale prices run from \$2.00 to \$2.50 per pound. Fruits sold at farmers’ markets on the Big Island sell for \$0.50 to \$2.00 each, based on size.

### **Food uses and nutrition**

Pomegranate juice can help prevent hardening (arteriosclerosis) of the carotid arteries. The seeds, which are used as a spice in India, are high in fiber. The fruit is high in antioxidants including phenolic compounds and anthocyanins.



**Immature fruits**

**Recipe: Pomegranate syrup on  
pineapple banana sorbet**  
*Kalani Adams*

- 24 cups sugar
- 6 split Hawai'i vanilla beans
- 6 pineapples
- 12 ripe bananas
- 6 T pomegranate syrup
- 4 cups water

Peel, core, and trim pineapple. Peel bananas.

In medium saucepan, dissolve sugar in 4 cups of water over moderately high heat. Add vanilla bean and let mixture infuse until cool. Pass through chinois to remove any solids.

Puree pineapple and banana in a food processor. Add sugar mixture and process just until mixed. Stir in pomegranate syrup. Pour mixture into ice cream maker and freeze until firm. Drizzle additional pomegranate syrup before serving.

Makes 48 servings.

**Nutritional value** per 100 g of edible portion\*

Calories .....	63–78
Moisture .....	72.6–86.4 g
Protein .....	0.05–1.6 g
Fat .....	0.9 g
Carbohydrates .....	15.4–19.6 g
Fiber .....	3.4–5.0 g
Ash .....	0.36–0.73 g
Calcium .....	3–12 mg
Phosphorus .....	8–37 mg
Iron .....	0.3–1.2 mg
Sodium .....	3 mg
Potassium .....	259 mg
Carotene .....	None to trace
Thiamine .....	0.003 mg
Riboflavin .....	0.012–0.03 mg
Niacin .....	0.180–0.3 mg
Ascorbic acid .....	4–4.2 mg
Citric acid .....	0.46–3.6 mg
Boric acid .....	0.005 mg

\*Values compiled from various sources