**Kiwifruit (aka Kiwi)** *Actinidia deliciosa*

Kiwifruit are produced by a large, deciduous vine. Plants are either male or female, so both types of plants are needed at a ratio of 8 females to 1 male to ensure adequate cross-pollination and fruit set. Bees are necessary for good pollination, so plant other blooming plants nearby for the best pollination possible.

Kiwifruit is native to China where it is called Yang tao. The first commercial kiwifruit vineyard was planted in New Zealand about 1940. Now kiwifruit are grown in many districts on the north island of New Zealand and in the Nelson area on the south island. Fruit was exported from New Zealand to the United States as early as 1958 and was featured first as Chinese gooseberries and later as kiwifruit.

For best flavor, fresh kiwifruit should be allowed to soften like avocados and Bartlett pears. Hard kiwifruit are very acid in taste and not palatable. Freshly picked kiwifruit will soften and be ready to eat in a few days if put in a plastic bag with apples or bananas and stores in a warm room (68°-70°F). Kiwifruit stored in a refrigerator for 4 or more weeks will soften without apples if taken out and left at temperatures over 60°F. The fruit is high in vitamin C (100 mg per large fruit) and potassium (340 mg per large fruit) and contains 50-60 calories.

Kiwifruit in California can be store for 4-6 months, sometimes longer in New Zealand. New Zealand picks fruit in May and June and sells stored fruit worldwide through December. California sells kiwifruit November through April. Thus, in major markets of the world, good fresh kiwifruit are available year-round.

**Climate and Production Areas**

A frost-free season of 225-240 days is needed for kiwifruit since vines leaf out in March, bloom in May, and are harvested in October or early November. Temperatures below 10°F (-12°(C ) in mid-winter will kill all young vines and some old bearing vines. Frost below 30°F (-1°C) in spring will kill shoots and ruin crop. In mid-November, frosts below 27°F (-2.5°C) can damage trunks of young vines.. Cold hardy kiwifruit species (*A. arguta and A. kolomikta* ) with very small fruit can be grown in cold climates like the eastern U.S. and they will tolerate about -10°F (-24°C).

Kiwifruit vies need frequent irrigation or rainfall to grow well so they can be grown in areas of heavy summer rainfall or hot dry summer areas when given irrigation. Soils must have reasonable drainage, contain minimum salts, not be too alkaline (less than pH 7.3).

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Irrigation is extremely important for optimum plant growth and good production. Irrigating daily or every two days in the summer is usually advisable for the first 3 years after planting, and three to four times per week for bearing plants. Excessive irrigation or poor drainage can cause crown rot, yellow vines, and plant death. Under-irrigation reduces growth, causes some sunburned leaves, produces small fruit, and stunts plant growth. Severely deficient irrigation causes leaf burn and will ultimately result in plant death. Kiwifruit vines need more irrigation than grapes or fruit trees under similar soil and weather conditions.

**Pests, Diseases and Chemicals**

Pests and diseases are not serious. However, spraying is necessary in most older vineyards and in established kiwifruit districts. Looper worms, especially Omnivorous Leaf Roller (O.L.R.), and small white scale (Greedy, Latania, Ivy, and Oleander scales) are increasing problems to California growers. These pests require 1-3 sprays per year. Soil diseases such as *Armillaria mellea* (oak root fungus) and *Phytophthora sp.* (crown rot) are fatal to kiwifruit vines. Vines growing in low spots, in saturated soils, or in standing water are likely to be killed by crown rot. Too much wetting of the trunk and crown by frequent irrigations increases *Phytopthora.* Saturated soils will kill vines during any time of the year.

**Fertilizer**

Fertilization is important in kiwifruit culture and consists mostly of nitrogen fertilizer applied two or more times per year. Growers should avoid using too much, too close to plants, and should use minimum fertilizer the first year after planting. Young plants that grow vigorously late in the fall from heavy use of nitrogen and water in September and October are very prone to winter frost damage.

Use of potassium fertilizer may be necessary in older vines. Zinc and iron are sometimes needed by plants where deficiency symptoms appear or pH needs to be lowered by sulfur applied to the soil or acid in the irrigation water.

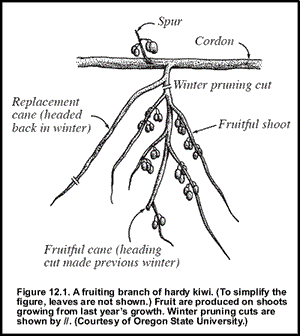
**Harvest and Storage**

Fruit is hand-picked when about 7% sugar and at a hard stage (14-20 lbs pressure) in October or early November. It should be cooled to 32°-40°F (0-4°C) within 12-24 hours after picking and stored at 32°F (0°C). Proper cold storage can keep fruit firm for 3-6 months. Kiwifruit should not be stored with other fruit, especially those that produce ethylene since this will cause fruit softening and drastically limit storage time and sale of fruit.

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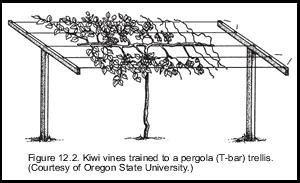
**Pruning and Training**

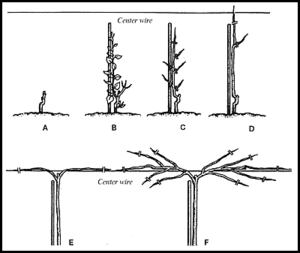
[](http://extension.psu.edu/plants/gardening/fphg/hardy-kiwi/pruning-and-training/leadImage_galleryzoom)

In order to manage the high level of vigor of the hardy kiwi vine, plants must be pruned and trained. Like most perennial fruit plants, they require dormant pruning; however, they also need to be pruned several times during the summer by cutting back the terminal growth to four to six leaves beyond the last flower. Also remove watersprouts (vigorous shoots originating from older wood) and shoots from the trunk, as well as vines that become entangled. This removal may be substantial during the summer.

Dormant pruning should be done sometime from December to March in Pennsylvania. On this species, flowers develop on current-season shoots that come from 1-year-old canes (last year's growth); shoots from older wood rarely produce flowers. As with grapes, a large percentage of the wood--as much as 70 percent--will be removed. New fruiting canes will have developed at the base of last year's growth (Figure 12.1). Replacement canes are left for future fruiting, and fruiting canes should be spaced between 8 and 12 inches on the cordons (permanent horizontal branches).

Training should begin in the first year of planting. Like grapes, these flexible vines can be trained to a number of forms; although in commercial plantings, a pergola (Figure 12.2) is the most common training system since it accommodates the kiwi's high level of vigor. Also, like grapes, establishing the trunks and structure of the vine early in its development will ensure fruit production for many years to come. Figure 12.3 shows a typical hardy kiwi plant training system over the first 2 years of its life. For additional options, see the training systems in [Grapes](http://extension.psu.edu/plants/gardening/fphg/grapes).





**Figure 12.3** The First two years of training a kiwi vine (*courtesy of Oregon State University)*

(A) Prune to two buds at planting.  
(B) Train one shoot as trunk, remove all others (growing season, year 1).  
(C) Head back trunk as shoot growth at terminal loses vigor (growing season, year 1).  
(D) Continue to remove lateral shoots, let trunk grow beyond wire, then head to just below top wire (growing season, year 1).  
(E) Choose two shoots to form cordons (lateral trunks). Head back to 1/4 inch diameter in dormant season (growing season, year 1).  
(F) Shoot growth, year 2. Pruning cuts in dormant season of year 2 also are shown by /

We carry the following varieties when possible.

**Deluxe Kiwi (Actinidia chinensis ‘Tomuri’ and Actinidia chinensis ‘Vincent)** This is a tropical varieties, that come with a male and a female plant, in the pot together. If you eat kiwi, you are familiar with these varieties. Make sure you make note, of which vine is which in your gardening notebook. If one dies, you will know which one to replace.

**Actinidia arguta ‘Issai’** is a hardy, self-pollinating variety and has small, smooth skinned, delicious fruit, plus fragrant flowers in early summer. The skin is edible, unlike other kiwi varieties. This one should produce fruit a year after planting.