

# perennial fruits

## actinidia

HARDY KIWIS, KIWI BERRIES, BOWER VINE AND SILVER VINE

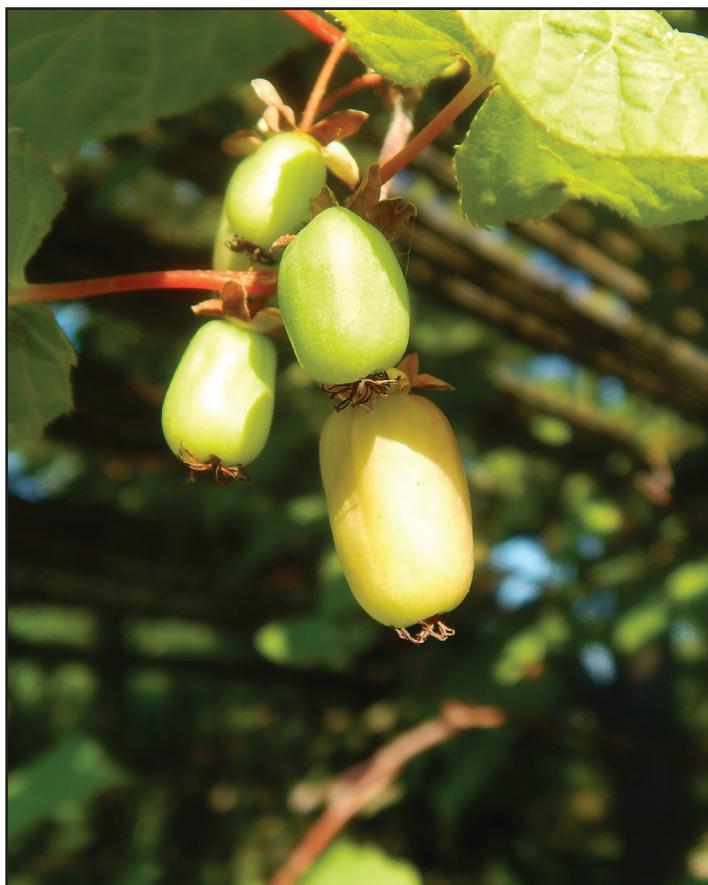
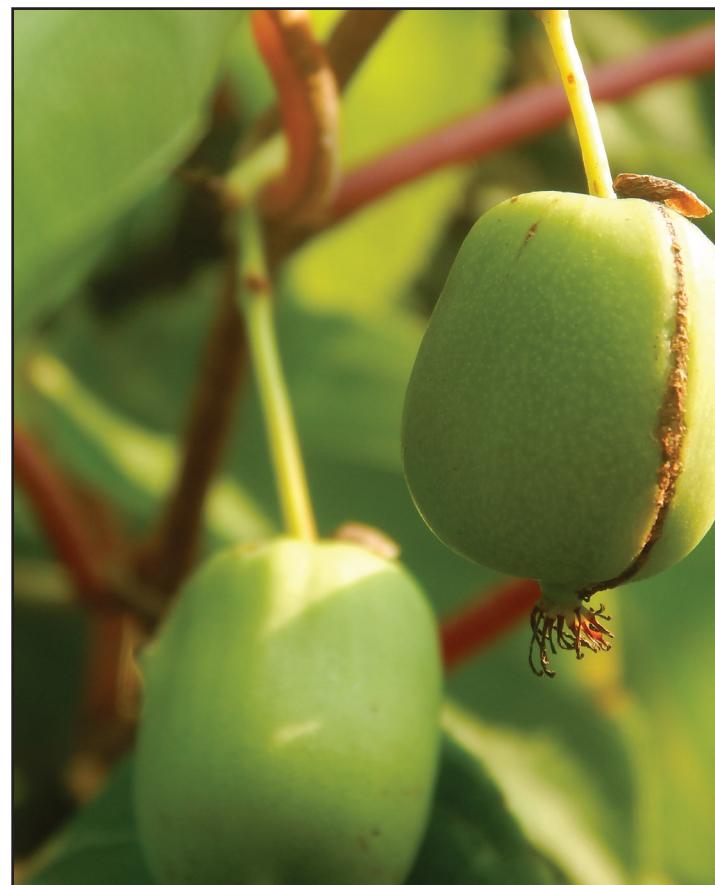
Hardy kiwis are cold hardy vines native to eastern Asia. There are multiple species that grow from southern China to the Russian Far East, including three species hardy enough for USDA Hardiness Zones 3 and 4. As a new crop with multiple species, English names are still being worked out. The original English name for the fruit was Chinese gooseberry. The name "kiwifruit" was given to a large-fruited subtropical *Actinidia* that was native to southern China and developed in New Zealand. After the subtropical kiwifruit became well known in the U.S., the hardy *Actinidia* species were easier to promote with the familiar kiwifruit name. In most cases, the fruit looks and tastes similar to the kiwifruit of the grocery store, only much smaller with smooth, edible skin that does not have to be removed prior to eating. Most hardy kiwis belong to two species, *Actinidia arguta* and *Actinidia kolomikta*. Kiwifruit commonly sold in the grocery stores belong to the subtropical species *Actinidia deliciosa*.

Most *Actinidia* varieties are dioecious, with male and female flowers on separate plants. The sex of a clone stays the same as long as it is vegetatively propagated. A few varieties contain both male and female flowers on the same plant, and are therefore self-fruitful.

*Actinidia kolomikta* is the hardiest species of kiwi, native to the boreal forest regions of the Russian Far East and northeast China, and appears to be hardy to Zone 2. Often called super-hardy kiwi or 'Arctic Beauty,' it is also known as kolomitka, the indigenous name in Asia. Kolomitka flowers are small and somewhat green, while the fruit can be very small. One of the big draws for 'Arctic Beauty' is the variegated leaves, which are primarily found on the male plants, and have made the plant a desirable ornamental. The fruit usually ripens in August.

**Table 4. Species and cultivars of *Actinidia* suitable for testing in Minnesota**

Cultivar	Species	Hardiness	Vines	Fruit
Arctic Beauty	<i>kolomitka</i>	Zone 2	Males have variegated leaves – ornamental	Small, sweet
Issai	<i>arguta x polygama</i>	Zone 4 – 5	M marginally hardy in Minnesota	Male and female flowers on same plant
Anna Hardy ( <i>Ananasnaja</i> )	<i>arguta</i>	Zone 3- 4	Vigorous vines	Pineapple flavor
Michigan State	<i>arguta</i>	Zone 4		Large elongated fruit
Ken's Red	<i>arguta x melenandra</i>	Zone 4		Sweet with red flesh
Hot Pepper	<i>polygama</i>	Zone 4	Large flowers	Yellow, sweet, spicy
Pavel Male	<i>polygama</i>	Zone 4	Large male flowers – used as ornamental and pollinator	None
Vera's Pride	<i>polygama</i>	Zone 4	White frosted leaves	Yellow, sweet

**Figure 1.** Arctic Beauty (*A. kolomitka*)**Figure 2.** *Actinidia arguta* fruit (cultivar unknown)

*Actinidia arguta* holds the greatest promise for fruit production of the hardy species. Originally called bower vine when it was grown as an ornamental, it is usually called hardy kiwi now. It produces fruit that is significantly larger than kolomikta and significantly sweeter than the common kiwifruit of the grocery store. This is an extremely variable species found from Japan to the Himalayas in a wide cultivar of elevations and climate. The fruit is usually green or yellow, but the cultivar purpurea is red. Likewise, petioles are often red, which increase its ornamental value. It is usually listed as hardy to Zone 4 (-25°F), but individual clones may be hardier or less hardy depending on their origin. The fruit generally ripens in September-October.

*Actinidia polygama* has the common name silver vine due to leaves that often are gray towards the tips. The native habitat for silver vine is the mountains of Japan and China, and it appears to be hardy to Zone 4. Silver vine leaves contain compounds attractive to cats and many people report silver vine as being an alternative to catnip. Silver vine has the showiest flowers of any *Actinidia*, but some varieties produce tough, bitter fruit. In addition to 'Issai', which is a hybrid between silver vine and *A. arguta*, there are three named varieties of silervine: 'Hot Pepper', 'Pavel Male' and 'Vera's Pride', which are all hardy in Zone 4 areas of Minnesota. 'Pavel Male' is only used as an ornamental or as a pollinator for female silver vines.



**Figure 3.** Inside of *A. arguta* fruit

## HISTORY

In East Asia, *Actinidia* fruit has been eaten for thousands of years, but people preferred to gather the fruit from wild vines rather than grow it on farms. The species were not truly domesticated when European explorers in the 19th century brought seeds back to Europe and the United States to be used as ornamental plants. At the time, vines that grew up the sides of brick buildings were fashionable, and *Actinidia* vines were hardier and more adaptable than the commonly used English ivy. Bower vines were brought to Minnesota in the late

19th century, where they were planted as ornamental vines. Most plants were seedlings, so only half of the plants were females and produced fruit. People knew that the fruit was edible, and presumably people snacked on the berries of bower vines, but there was no effort to grow the vines for fruit production.<sup>3</sup> In the middle of the century vines that climbed buildings fell out of fashion, bower vines slowly disappeared from ornamental plantings, and Minnesotans lost their knowledge of *Actinidia*.

<sup>3</sup> Sando, L. 1935. Edible fruits from Minnesota wild and cultivated plants. *Minnesota Horticulturist*. March 1935.

Interest in *Actinidia* for commercial fruit production began in New Zealand, where an enterprising farmer began planting seeds of *A. deliciosa* in the early 20th century. By the 1930s he developed large-fruited cultivars, and over the next fifty years New Zealanders developed an export market, which was helped when the growers began calling their fruit kiwifruit. From New Zealand, kiwifruit was introduced to the U.S. and became widely planted in California. As kiwifruit became a staple in grocery

stores, people realized that fruit from hardy species could also be grown in cold climates like Minnesota.

In Minnesota, the development of hardy *Actinidia* for fruit production began in the 1980s. The primary driving force in developing this crop has been Bob Guthrie, who has engaged in several research projects with the University of Minnesota. Bob has been active in breeding and selecting plants as well as developing trellis and training systems.

## USES AND HEALTH BENEFITS

Like their larger relatives, the hardy *Actinidia* are primarily consumed fresh. The fruit have small, edible seeds and can be dried. Flavor varies from identical to the store kiwifruit to intensely sweet. One popular Russian cultivar called 'Ananasnaja' reportedly has

the flavor of pineapples. The fruit is extremely high in Vitamin C. Some cultivars have a high enough sugar content to be made into wine, and some wines are said to resemble the best Rieslings.

## PROPAGATION AND PLANTING

*Actinidia* can be propagated by seeds, grafting or cuttings. Fruit quality of seedlings is less variable than with other species, but since it is a dioecious plant, half of the seedlings will be male. *Actinidia* is usually propagated with cuttings. Softwood cuttings generally work better than hardwood cuttings. For softwood cuttings use green twigs between an eighth and a quarter of an inch in diameter. Dip twigs in a rooting hormone, remove most leaves, and place in sand or peat with a plastic cover until the roots form. When propagating male and female plants, always label the pots, because male and female plants usually cannot be distinguished until they begin to form flowers.

*Actinidia* are best grown as an intensively managed crop. One male plant should be put in for every six female plants. *Actinidia* should be planted in well-drained, slightly acidic soil with full sun. Low, wet areas can result in root rot. Care should be taken when fertilizing the plants, because the roots can be burned. The vines are not drought tolerant, and irrigation should be available. In commercial plantings, the vines are trellised. Growers have experimented with different types of trellises. More about trellis design and construction techniques can be found in the University of Minnesota Extension publication *Growing Hardy Kiwifruit (Kiwiberies) in the Home Garden*.<sup>4</sup>

<sup>4</sup> Hoover, Emily E., James Luby, Emily S. Tepe, with Bob Guthrie. *Growing Hardy Kiwifruit (Kiwiberies) in the Home Garden*. University of Minnesota Extension. Web. 03 March 2017. <http://www.extension.umn.edu/garden/yard-garden/fruit/growing-hardy-kiwifruit/>

# PRODUCTION PROBLEMS

The biggest problems home gardeners have had with hardy *Actinidia* species are plants that are slow to come into production, and inconsistent production. Growers who have put in test plantings have reported waiting eight years before eating their first berries. Production is delayed because vines frequently die to the ground the first few years. The vines regrow after dying to the ground, but there will be no fruit that year. Like most temperate fruit plants, *Actinidia* form flower buds in late summer for spring bloom. Protecting the plants from winter injury and minimizing pruning will often help plants bear earlier in their lifecycle.

Like many plants native to northeast Asia, some *Actinidia* cultivars start growing during warm spells in late winter, leaving them vulnerable to frost. The problem with early sprouting is most common in climates warmer than Minnesota, and does not appear to be a limiting factor here.

The market for hardy *Actinidia* needs to be developed. Most are curiosities sold in small quantities. Nobody knows for sure if they will ever become as popular as the kiwifruit of the wholesale market. The crop is not easy to grow, but could be rewarding for someone with energy and initiative.

## HARVESTING

*Actinidia* are typically harvested by hand, and trellis systems should be designed to keep the fruit accessible to pickers. The most challenging part of harvesting is determining the correct time to harvest fruit. *Actinidia* fruit will ripen after picking, but the ripening only occurs if the fruit is at an acceptable stage of maturity when picked. The challenge is trying to determine when that "acceptable state of maturity" has occurred. Even large commercial kiwifruit growers sometimes pick fruit at

the wrong stage of maturity. If the fruit are picked too green, they will not ripen and will remain, sour, green, and tough. If the fruit are left on the vine too long, they often fall off. In Oregon, growers of the *A. arguta* cultivar 'Ananasnaja' have had some success using the starch iodine test for apples to determine the best time for harvest. For small-fruited Minnesota cultivars, some home gardeners put sheets on the ground and pick up fruit that falls off naturally.

## EDIBLE LANDSCAPING

Just as bower vine became a desired ornamental in the 19th century, any of the three species can be a great choice for certain types of landscaping. The vines grow rapidly, and will cover a large arbor in a few short years. The vines can also be planted along fences. Kolomikta and silvervine have variegated

leaves and flowers in early summer, making them edible alternatives to clematis vines. Most home gardeners who plant *Actinidia* species as an ornamental vine are quite happy with their plants as ornamentals and see the periodic fruit production as an added bonus.

## MINNESOTA EXPERIENCES

Apart from growers in the Victoria/Chanhassen area, few Minnesota growers have had commercial success growing *Actinidia*. Many beginning growers have planted hardy kiwifruit as an experiment without knowing the species or varieties, and few

people have seen enough promise to plant a second time. Yield has been inconsistent, some fruit fall to the ground before ripening, and the fruit is smaller than advertised.