

Asian Pear

All Asian pears grown today are selected seedlings or crosses made within the species *Pyrus serotina*, a member of the Rosaceae (rose) family.

The term "Asian pear" describes a large group of pear varieties having crisp, juicy fruit. When mature, the fruit are good to eat when harvested or for several months after picking if held in cold storage. The crisp texture of an Asian pear remains unchanged after picking or storage, unlike the flesh of European pears such as Bartlett or Comice.

There are three types of Asian pear: round or flat fruit with green to yellow skin; round or flat fruit with bronze-colored skin and a light bronze-russet; and pear-shaped fruit with green or russet skin.

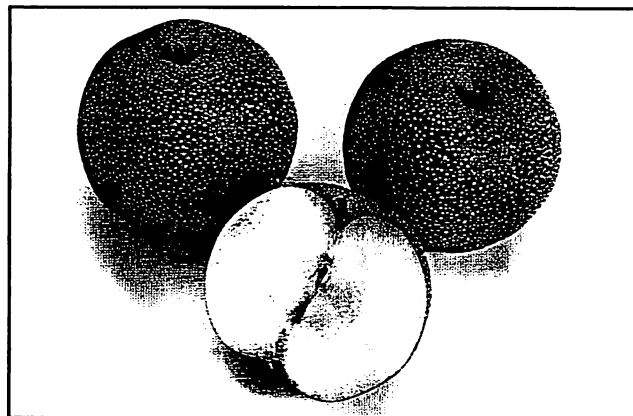
Other names. Asian pears are called apple pears, salad pears, *Nashi* (Japanese for "pear"), Oriental, Chinese, or Japanese pears (*Nihonnashi*).

Market Information

The present market consists of ethnic Asians in the western United States, Vancouver (Canada), and major cities in the United States. In the early 1980s demand stimulated new plantings, and most of these are now in production. Existing plantings probably will fill present demand, but more plantings may be necessary to fill potential demand. The future market includes consumers who want crisp, sweet pears that do not get soft and can be eaten as soon as purchased at the market. Some Asian pears are exported from California.

Current production and yield. Japan exports Asian pears to the United States in October and November. China and Korea also export to the United States and Canada. In recent years, plantings were made in New Zealand, Australia, Chile, France, and the eastern and southeastern United States.

About 4,000 to 5,000 acres have been planted in California, Oregon, and Washington. Production costs are about \$2,500 to \$3,000 per acre. Yields are lower than for Bartlett or Bosc pears because of the heavy thinning necessary to get the large sizes the market demands. Yields in the fifth to seventh years range from 200 to 500 packed boxes per acre. Trees aged 10 to 14 years may yield 800 to 1,000 packed boxes per acre of 30-, 40-, and 50-size fruit.



Ripe Asian pears have crisp, juicy flesh.
(Photo: Suzanne Paisley)

Culture

Climatic requirements. Asian pear trees such as 20th Century are about as winter hardy as Bosc pears, tolerating about -20°F , but are less hardy than Bartlett and Anjou. Asian pear rootstocks' tolerances for winter cold are 10°F for *P. calleryana*, 0° to -10°F for *P. betulaeifolia*, and -30°F for *P. communis* and *P. serotina*.

Propagation and care. There is no standard accepted spacing for Asian pears on the West Coast. Plantings range from $7\frac{1}{2}$ by 15 feet to 15 by 20 feet depending on soil, rootstock, and grower preference. In general, 200 trees per acre spaced 12 feet apart in rows with 17 to 18 feet between rows is a good pattern. Plantings of 145 to 200 trees per acre are recommended for vigorous selections and rootstocks.

Bloom period varies with the variety. Some early blooming Chinese varieties bloom 10 to 14 days before Bartlett. In the San Joaquin and Sacramento valleys of California, these early blooming varieties are at full bloom in early to mid-March. They are the first pears to bloom and are most subject to frost damage. Other early Japanese varieties flower at the same time as Anjou or Winter Nelis. A few late-flowering Japanese varieties reach full bloom with Bartletts.

In California, most Asian pear trees are trained in a vase shape. Head the nursery trees 25 to 30 inches high at planting, and select three or four main limbs the first year. Head these about 50 percent, leaving 12 to 24 inches of growth. This provides six to ten fairly low secondary limbs that are headed 30 to 36 inches long in the second dormant season. After fruit production starts (the third season), limbs are allowed to grow about 18 inches per year and then they are headed in the dormant season. If trees grow excessively, reduce pruning to encourage fruit spur development.

Pears are borne on spurs on 2- to 6-year-old wood, but the best sizes come from 1- to 3-year-old spurs on wood 1 to 2 inches in diameter.

Pollination. Asian pear varieties are partially self-fruitful, but better crops are set where two or more varieties are planted together. Cross-pollination usually gives better fruit size. Many varieties pollinate each other, but not all will do so. In Fresno and Tulare counties, 20th Century or Shinseiki are known to set good crops when planted alone in large, one-variety blocks. In areas with cooler temperatures at bloom-time, cross-pollination by European or Asian pear varieties will be necessary. Cross-pollinated fruit with seed tend to be larger and more uniformly round than inadequately pollinated fruit with few seeds.

There are no proven guidelines on the nearness of pollenizers or the use of bees in California. It is suggested that every four to eight rows of single-variety planting have a pollenizer row, or that growers plant a block or four to eight rows of a second variety adjacent to the first variety. Bees may be used at a density of one or two hives per acre. Too much pollination will require more thinning to achieve desired fruit sizes.

Fruit thinning. Asian pear varieties require heavy thinning, which is done manually since chemical thinning is not safe or reasonably effective. Some growers blossom-thin by hand. Most growers wait for fruit to set and then cut off all but one or two fruit per spur. This first fruit thinning is best done before the first codling moth spray, and can be accomplished by cutting the fruit off with clipper or small hand shears. A second follow-up thinning before the second codling moth spray is necessary for hard-to-size varieties and to remove pears not properly thinned the first time. For the best thinning, it usually takes two rounds to effectively leave no more than one fruit per spur;

if spurs are close together, well-thinned fruit are spaced 4 to 6 inches apart. Thinning as close as 30 days before harvest can benefit size, but early thinning is essential for annual bearing and good fruit sizes. Thinning will require up to one-half hour per tree on younger trees and one hour or more on older trees.

Trees 4 to 5 years old size fruit easily if they have only 100 fruit per tree after thinning. Crop loads of 200-plus fruit per tree are common on 8- to 10-year-old trees. In Japan, 500 to 700 fruit are recommended on large bearing trees, yielding 70,000 fruit per acre.

Irrigation. Trees require frequent irrigation to produce large fruit sizes. High vigor, however, makes fireblight harder to control and makes fruit tender to pick.

Harvest and postharvest practices. In general, harvest in California runs from mid-July through September. In Washington and Japan, harvest time is from August to October. Harvest date is determined by color, sugar content, and fruit pressure. At least three color picks are necessary to get mature, quality fruit from most varieties in the Central Valley of California.

Fruit must be harvested carefully into padded picking buckets or boxes and handled gently in the packing house to minimize handling injury. Overmature fruit quickly shows roller bruises, fingerprints, and other signs of handling at harvest. Many growers believe Asian pears are harder to handle than firm peaches and are not suited to large, fast-moving packinghouse lines. Fruit is best packed in the field from picking containers directly into packing boxes or trays. Use boxes with "bubble pads" or paper-covered excelsior pads to prevent rolling in transit.

Some varieties can be stored at 32°F for one to three months without problems. At room temperature (70°F), the fruit begins to soften after 14 to 21 days. Benefits of controlled-atmosphere storage of Asian pears are unknown.

Diseases and pests. Asian pears are susceptible to fireblight and bacterial canker, codling moth, pear psylla, stink bugs, plant bugs, and two-spotted spider mites. When trees are planted too deep in the soil they may die of crown rot. Scab is a problem in Japan, but it is not the same scab species found in California on Bartlett pears and apples.

Rootstocks. There are several rootstocks that can be used in California and the warmer-winter areas of Oregon. All Asian pear varieties will grow on *Pyrus betulaefolia*, *P. calleryana*, *P. serotina*, *P. ussuriensis* and *P. communis* (Bartlett, Old Home × Farmingdale, or Winter Nelis seedling) rootstocks.

Pyrus betulaefolia is preferred for its vigor, large fruit and tolerance of wet soils. In Washington, special cold-hardy *P. betulaefolia* strains are needed. Most Japanese pear varieties are dwarfed about 50 percent on *P. communis* rootstock, so California growers and nurseries prefer *P. betulaefolia* because they like vigorous trees that size fruit easily. Chinese Asian pear varieties like Ya Li are compatible and grow well on either *P. communis* or *P. betulaefolia* rootstock.

Varieties. Asian pear varieties are numerous, with more than 25 known in California and hundreds of varieties known in Asia. Here is a listing of some important varieties available in California, listed from early to late ripening date. Ripening dates given are for Davis, California. In Fresno, ripening will be 7 days earlier; in Oregon and Washington, about 21 to 30 days later.

Ichiban Nashi: An early-maturing, large, brown fruit ripening in mid-July ahead of Shinseiki, Shinsui, and Kosui.

Shinsui: An early-maturing, brown fruit with reasonable size, ripening in mid-July after Ichiban Nashi and before Shinseiki.

Kosui: A small, flat, bronze-russet, early-maturing sweet fruit with tender skin that ripens in mid-July. A strong-growing tree with leaves sensitive to two-spotted spider mites and many sprays.

Shinseiki: A round, yellow-skinned, firm fruit that is early maturing (late July) and stores well up to three months. It looks like 20th Century but is less flavorful. Trees are self-fruitful in the San Joaquin Valley.

Hosui: A very large, juicy, sweet, low acid, bronze-skinned pear that ripens in early August. The tree is extremely vigorous on *P. betulaefolia* and has a wild, loose growth habit. This is a very popular variety in Japan and in California. It is usually very susceptible to fireblight and stores for four to six weeks.

Kikusui: A flat, yellow-green, medium-sized fruit with excellent flavor but a reputation for having tender skin. It ripens in mid-August but fruit has preharvest drop problems.

Yoinashi: A large, brown-skinned fruit with excellent flavor. It ripens in mid-August with 20th Century but sizes much better.

20th Century (Nijisseki): The best-flavored and most popular Asian pear in Japan and California. It is round, yellow-skinned, and easily bruised, but it stores well up to six months. The fruit is more difficult to size than other varieties. It should not be grown on *P. communis* rootstock because it is badly dwarfed. The fruit ripens in mid-August. It grows well on *P. betulaefolia*, *P. calleryana*, and *P. serotina*. Old trees need spur removal and rejuvenating pruning to maintain fruit size.

Chojuro: An old, firm, brown- to orange-skinned, flat-shaped, highly productive variety that is losing popularity because it is not as juicy as many newer varieties. It matures in mid-August, and bruises easily but will store for five months. Unless the fruit is picked when first yellow-brown in color, it is subject to severe bruising and skin discoloration.

Shinko: The fruit is large and round to slightly flattened with a beautiful bronze-russet skin. Fruit flavor is excellent in hot climates but the fruit stores poorly. The tree is well shaped and extremely productive. It matures during the first week of September, and appears to be nearly resistant to fireblight.

Niitaka: A very large, firm brown-russet fruit. It is noted for its large size, average flavor, and high production. The tree is dwarfed severely on *P. communis* and vigorous on *P. betulaefolia*. Fruit ripens in early September and stores two months. The flowers are pollen-sterile but it sets well when cross-pollinated with most varieties.

Ya Li: A popular Chinese variety. Ya Li is pear-shaped, has green skin, and is quite tender to bruising. It is an early blooming variety that needs cross-pollination from other early flowering varieties like Tsu Li and Seuri. The flavor is sweet and milder than that of other varieties. This is the most important pear variety in China. The fruit ripens in late August and early September, and the harvested fruit stores well.

Tsu Li: A large, football-shaped, green fruit of only fair quality. It has long storage life (6 to 10 months) and gets better the longer it is stored. The fruit ripens in early to mid-September and develops a greasy feeling on the skin. It must be pollinated by Ya Li.

Dasui Li and Shin Li: New patented UC hybrids, very large fruit, greenish to yellow in color. They ripen in late September and early October and

store well at 32°F. Trees are extremely vigorous and pollinate each other. For good crops, limited pruning is essential. They grow well on *P. betulae-folia* or *P. communis* roots.

Okusankichi: An old variety from Korea and Japan that ripens in October and stores well. The fruit is brown-russet, somewhat elongated, and slightly irregular in shape. At harvest it has only fair flavor, but flavor improves in storage.

Sources

Planting stock

NOTE: Several commercial nurseries sell Asian pear trees, though some will not sell the trees in small lots.

More information

Berkeley, B. 1985. *Asian pears*. Fowler Nursery, Newcastle, CA.

Beutel, J. A. 1985. *Asian pears*. Washington State Hort. Proc., Wenatchee, WA.

Beutel, J. A. 1988. *Asian pears*. Pomology Dept. Publication. University of California, Davis, CA.

Federal-State Market News Service. 1990. *San Francisco Fresh Fruit and Vegetable Wholesale Market Prices 1990*. California Department of Food and Agriculture Bureau of Market News and USDA Marketing Service.

Griggs, W., and B. Iwakiri. 1987. *Asian pear varieties in California*. Publication 4068. UC Division of Agriculture and Natural Resources, Oakland, CA.

Sunset Magazine. 1984. The new crunch pears. *Sunset* 84:72-75.

Van der Zwet, T., and N. F. Childers. 1982. *The pear from varieties to marketing*. Horticultural Publications, Gainesville, FL.

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