# The diversity of horticulture in Japan – nursery production

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Within Japan, ornamental trees and shrubs are produced for cut flowers, cut branches, potted plants and for amenity horticulture, where trees and shrubs are planted in parks and gardens and roadside verges for aesthetic purposes.

## Ornamental tree production as cut flowers

Roses, hydrangeas, flowering cherries, peaches and apricots, camellias and mimosa are widely produced as cut flowers in Japan. While cut flowers of herbaceous plants such as chrysanthemums, carnations and roses are produced all year round, cut flowers of flowering trees and shrubs are mostly seasonal items. This is due to the large plant size and their flowering characteristics such as vernalization, which makes it difficult to establish year-round production.

Within Japan, cherry blossoms, flowering peaches, Japanese apricots and camellias have a long history as ornamental trees dating back to the 8th century. They have each become enshrined in Japanese culture and have an important role as floral materials that express the seasons. This is yet another reason why year-round production does not take place.

Cut branches, which include flowering trees and shrubs and ornamental foliage, accounted for approximately 6% of the value of cut flower shipments in 2023 (Ministry of Agriculture, Forestry and Fisheries, 2024). They are important materials for enhancing floral arrangements and bouquets, where natural designs with soothing colors have become increasingly popular in recent years. In addition, sakaki (*Cleyera japonica*), hisakaki (*Eurya japonica*), and shikimi (*Illicium anisatum*) are widely produced as branches for Buddhist and Shinto altars and graves, although they are classified as forest products rather than cut branches of cut flowers.

## Ornamental tree production as potted flowers

A wide variety of flowering shrubs and trees are also produced as potted plants. While many items have a limited shipping season, perpetual blooming miniature roses are available all year round. Ume and cherry trees, tailored to resemble bonsai in early spring, azaleas and fuchsias in spring, hydrangeas in early summer, hibiscus and bougainvillea in summer, poinsettia at Christmas, and ericas and boronia in winter are all widely available. As potted plants, flowering shrubs and vines are required to be compact. Because long-term cultivation by consumers is not expected, high ornamental value is the priority. Tropical flowering plants that are susceptible to low temperatures and cool climate flowering plants that are susceptible to high temperatures and humidity are also produced extensively.

Flowering trees, shrubs and vines accounted for 16.5% of all potted plant shipments, while ornamental foliage plants accounted for 23.3% (Ministry of Agriculture, Forestry and Fisheries, 2024).

## Ornamental tree production as garden flowers

Shipments of ornamental trees and shrubs for planting in gardens were worth 15.8 billion JPY in 2022, a small market compared to cut flower production (JPY 211.3 billion), potted plants (96.5 billion JPY) and flower seedlings (33.1 billion JPY) (Ministry of Agriculture, Forestry and Fisheries, 2023).

By prefecture, production is particularly high in Chiba and Fukuoka prefectures, followed by Mie and Aichi prefectures. These four prefectures are the main production areas and are all located relatively close to large cities. Within each prefecture, Sosa City (Chiba Prefecture), Kurume City (Fukuoka Prefecture), Suzuka City (Mie Prefecture) and Inazawa City (Aichi Prefecture) are famous garden tree production areas. Kagoshima Prefecture is the second largest producer after the top four prefectures, taking advantage of its warm location in Japan.

For commodities with high distribution volumes, a single commodity is produced in a field, whereas for commodities with lower distribution volumes, multiple commodities are often produced in one field (Figure 1).

The following is a list of the flowering trees and shrubs that are frequently used for garden planting in Japan, arranged according to the flowering season. Because Japan is a long country from north to south and as many of the plants cultivated in Japan are dormant in the cold winter, the flowering season and suitability for cultivation varies significantly from region to region.

Figure 1. Tree nursery. Seedlings of various species and ages are grown in the same plot.

Figure 2. Japanese plum garden established in parks for flower viewing.

Figure 3. Cherry blossoms ("somei-yoshino") planted in public space. People can be seen relaxing and enjoying refreshments under the trees during the blooming season.

Figure 4. Rose garden.

Figure 5. Wisteria vine pergola.

- March: Japanese apricot, magnolia (especially *Magnolia liliiflora*, *Magnolia kobus*, etc.), cherry blossoms, peach flower, mimosa, daphne, *Spiraea thunbergia*, *Forsythia* × *intermedia*, *Pieris japonica*;
- April: dogwood, tsutsusi azalea, rhododendron (especially subgenus *Hymenanthes*), *Spiraea cantoniensis*, Japanese kerria (*Kerria japonica*), *Enkianthus perulatus*, *Cercis chinensis*, *Loropetalum chinense*, peony (especially *Paeonia suffruticosa*, *Paeonia lactiflora*, etc.);
- June: rose, satsuki azalea, Japanese wisteria (*Wisteria floribunda*, etc.), Japanese snowbell, *Rhaphiolepis umbellate*;
- July: hydrangea (especially *Hydrangea macrophylla*, *Hydrangea paniculata*, etc.), gardenia, hypericum (especially *Hypericum monogynum*, *Hypericum patulum*, etc.), abelia;
- Summer: Hibiscus (including *Hibiscus mutabilis* and *Hibiscus syriacus*), *Lagerstroemia indica*;
- Autumn: *Osmanthus fragrans*, *Camellia sasanqua*;
- Winter: *Leptospermum scoparium*, heath (especially *Erica canaliculate*, etc.), *Chimonanthus praecox*, witch hazel (*Hamamelis japonica*), *Camellia japonica*.

While a limited variety of flowering trees and shrubs are used for street trees and public parks and gardens, a wide variety of flowering trees and shrubs are used for planting in private gardens. *Rhododendron* section Tsutsusi and *Camellia sasanqua* have a particularly high consumer demand. Both species respond well to pruning and flower well, making it easy to control the shape of the tree or to form low-height hedges. In addition, because they are bred from wild species in Japan, they have adapted to the Japanese environment and are easy to cultivate and manage. Plum trees, cherry trees, roses, wisteria (*Wisteria floribunda*) and hydrangeas are sometimes planted on a large scale with multiple varieties of each by themselves, and many of these have become major tourist attractions (Figures 2-5).

Due to the small size of the market and the difficulties experienced in breeding woody plants, only a few people are engaged in breeding new varieties and cultivars. Therefore, the introduction of novel plants from abroad is an important means of enhancing the diversity of flowering trees and shrubs in Japan. In recent years, there has been growing interest in Australian native tree species such as *Melaleuca*, *Westringia*, *Protea*, *Serruria* and *Leucadendron*. However, when introducing flowering trees and shrubs from overseas, adaptation to the Japanese environment, which is hot and humid in summer and below freezing in winter, is a very important consideration.

## Camellia

Camellia is one of the most familiar flowering trees in Japan. The group of horticultural varieties derived mainly from hybrids of *Camellia hiemalis* and *Camellia japonica*, which are both native to Japan, are called Tsubaki in Japan. Breeding of this group began in the Muromachi period (1336-1573) and many garden varieties appeared during the Edo period (1603-1867) and were used as cut flowers for traditional Japanese tea ceremonies and as garden plants.

The group of horticultural varieties derived mainly from *Camellia sasanqua* or hybrids of *Camellia sasanqua* and related species, which are also native to Japan, are called Sasanqua (Hakoda, 1987). Sasanqua is often used as a hedge because of its tolerance to pruning, its robustness, the flowering season (fall to winter when flowering plants are scarce), scent, short plant height, and small evergreen leaves (Figure 6). Kan-tsubaki (*Camellia* × *hiemalis*), a group of sasanqua varieties, are often used for short hedges because its flowering season is from November to March when few other plants are in bloom, and because its trees are lower in height and have strong horizontal growth. Because these plants tolerate pruning, they can be pruned and trimmed into various shapes.

## Cherry blossom

Cherry blossoms are perhaps the most famous flowering trees in Japan. Although it is a tall tree with a short flowering season, the entire crown of the tree is covered with pale pink or white flowers. It is a special tree in Japan because it blooms from the end of March to the beginning of April. After the cold winter, cherry blossoms signify the beginning of spring, the coming of the new financial year and the new school year in Japan.

Approximately 10 species grow wild in Japan, and many natural hybrids have been recognized. Horticultural varieties are mostly interspecific hybrids derived from *Cerasus itosakura* and *Cerasus speciosa*. The most representative cultivar, *Cerasus* × *yedoensis* 'Somei-yoshino', probably originated from the hybridization of cultivars derived from *C. pendula* and *C. lannesiana* (Nakamura et al., 2015).

Because many varieties are tall trees, the choice of varieties differs depending on their use. *Cerasus* × *yedoensis* ('Somei-yoshino') is a tall tree that is frequently planted in parks, public spaces and roadsides, but is not widely used as a cut flower, potted plant, or garden plant in private homes. *Cerasus* 'Keio-zakura' is the main cultivar used for cut flower production (Figure 7). This cultivar is more suitable because it produces many straight branches with few lateral branches, making it easy to harvest and adjust the branches as cut flowers.

Potted cherry trees are usually produced in a bonsai style in ceramic pots with a diameter of approximately 10 cm. In this application, varieties must be compact and well balanced with the size of the pot and have early flowering ability after cutting. *Cerasus* 'Asahiyama' and *Cerasus* 'Gotenba' are the main cultivars used to produce potted plants. As *Cerasus* 'Asahiyama' flowers at a very early age and with low tree height, it is widely used for potted plant production.

For planting in private homes, the limited size of most gardens makes it difficult to plant tall plants, including *Cerasus* × *yedoensis* 'Somei-yoshino'. For this reason, *Cerasus* 'Asahiyama' and a few other low tree varieties are mostly planted in private gardens. However, cherry blossoms are not always popular as garden trees because of their height and perceived difficulty in pruning.

Figure 6. Example of planting with sasanqua.

Figure 7. Cut flowers of cherry blossom.

Figure 8. The famous tsutsusi azalea garden in Nezu shrine in Tokyo.

Figure 9. Various kinds of cultivars of *Vinca*.

## Rhododendron

The genus *Rhododendron* of the family *Rhododendronaceae* includes various flowering trees such as azalea and rhododendron. Two varieties, known as tsutsusi azalea and satsuki azalea, are widely cultivated as garden plants in Japan.

Tsutsusi azalea is mainly composed of two variety groups: kurume azalea hybrids (*Rhododendron* × *obtusum* var. *sakamotoi*) and Hirado azalea (*Rhododendron* × *pulchrum*). Satsuki azalea consists of *Rhododendron indicum* and hybrids of related species. The Japanese name for the month of May is satsuki, thus reflecting the time of the year when the trees bloom.

When comparing tsutsusi azalea and satsuki azalea, tsutsusi azalea has larger flowers and leaves, and blooms in April, while satsuki azalea is generally smaller in height and blooms from May to June. Both tsutsusi azalea and satsuki azalea are often used as short hedges because they flower well, even with strong pruning (Figure 8). Both are hedging plants, with tsutsusi azalea used for hedges approximately 1 m high and satsuki azalea used for hedges of 50 cm or less.

## Rose

Roses are very popular flowering plants in Japan where they are used for cut flowers, potted plants and garden plants. Many public and private rose gardens exist throughout the country. Breeding has been actively conducted in Japan, and many horticultural varieties are in circulation, including varieties introduced from overseas.

The mainstream varieties and seedling propagation methods differ depending on the intended purpose. For cut flower production, varieties are selected and bred for their high production, color, long stems and long-lasting flowers. Miniature roses are the most common type of potted rose because of their compact plant height. However, for garden plants, a wide variety of colors, shapes and fragrances are available to meet various consumer demands. However, in cultivating roses in Japan, given the high incidence of disease and loss of vigor due to high temperatures and humidity, varieties must be carefully selected with these attributes in mind.

With regard to propagation methods, this too is somewhat dependent on the intended use. For cut flower production in rockwool or other media, seedlings are produced from cuttings and simultaneous grafting using *R. odorata* as the rootstock. For potted flower production, propagation by cuttings is common from the standpoint of production efficiency. It also has an advantage in that any branches cut off to shape the plant prior to sale can also be used as cuttings. Seedlings for garden planting are mainly produced by grafting. In terms of adaptability to the growing environment, the most commonly used rootstock is *Rosa multiflora*, a wild rose species native to Japan.

In the production of roses for use as garden plants, rose crown gall disease is a problem in Japan. Crown gall disease causes a cancerous growth from the root to the stem wound near the base of plants through infection with *Rhizobium radiobacter*. Although extreme reductions in growth and death are

Figure 10. Various kinds of cultivars of pansy and Julian type *Primula*.

Figure 11. A personal garden planting white and purple cultivars of the ornamental kale "Habotan".

rare, crown gall disease is frowned upon by consumers. Therefore, seedling growers are required to control this disease to improve seedling quality.

## Bedding plant production

The production of bedding plants in Japan is particularly problematic in the summer months, due to the high heat and humidity. Researchers have noted that *Vinca* and *Pentas* are the most suitable species for urban planting in summer due to their shade and drought tolerance as well as heat tolerance. *Vinca* has been bred in Japan since the 1960s. The color variation has increased to red, pink and purple, each with and without eye pattern (Figure 9). Additionally, many small flowering cultivars can be found today. *Pentas*, on the other hand, is a relatively new species introduced to Japan in the 1990s. It has since become very popular with consumers.

Petunia is the most popular bedding plant planted from spring to summer. Various kinds of cultivars possess disease resistance, double flowers and there is a wide variation in color and form. Even so, petunias are damaged by excessive heat and the high humidity in summer. More recently, cultivars possessing high tolerance to these environmental factors have appeared.

For winter planting, the most popular bedding plants for planting from autumn to spring are pansy and primrose. For both species, there is a rich variety of cultivars, by color, by form, and by size (Figure 10).

Ornamental kale is a group of cabbage (*Brassica oleracea*) cultivars, which have been bred in Japan to express purple or white colors in the leaves. These are called "Habotan" meaning "leafy peony". They are widely used in ornamental winter gardens because of their strong cold tolerance in Japan (Figure 11).

Various kinds of cultivars have been bred, including pale pink cultivars, vivid purple cultivars and black-like dark colors. Additionally for some cultivars, coloration appears only in the central part of the plant, or with the color density gradually changing from the central part to the margins. As for the morphology, some have deep fringed leaves while others have round leaves.

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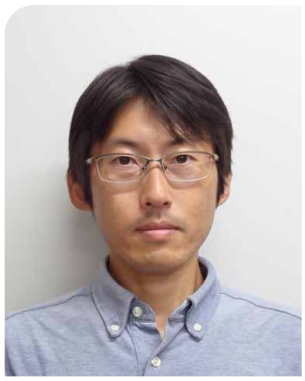

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