

Plants of Japanese flora in the greenhouses of the Peter the Great Botanical Garden

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Annotation. A significant number of Japanese plants are grown in the botanical garden of Peter the Great, which safely endure our northern winters. Plants of warmer climates than temperate ones are found in subtropical greenhouses. Japanese flora in greenhouses is represented by about 200 species and varieties.

Key words: subtropical flora of Japan, fruit and spice plants, decorative deciduous and flowering plants

The oldest function of botanical gardens is collecting plants to explore a variety of natural plant forms. It was this function, that later provided the basis, on the one hand, for various kinds of taxonomic work with plants, and on the other, for the purposeful introduction of plants not only of local, but also of foreign flora. The problem of preserving plant biodiversity has now acquired an important role in human life. One of the ways to solve it is their ex-situ cultivation of plants, this makes it possible to study their biological and ecological characteristics, which is important not only for scientific conclusions, but also for the field of applied work, such as, for example, the maintenance and use of plants in landscaping. In temperate and northern latitudes, greenhouse collections are of particular importance, where it becomes possible to show the richness of the flora of the tropics and subtropics.

Japan is located on a long, narrow island archipelago with a wide range of climatic zones. A significant number of Japanese plants are grown in the open ground of the Peter the Great Botanical Gardens, which safely endure our northern winters. Plants of warmer climates than temperate ones are found in subtropical greenhouses.

The subtropical climate zone is the southwestern islands of Japan. Winters are relatively warm, summers are hot. The rainfall is very high, which is reflected in the existence of the monsoon season. The subtropics in Japan can be found on the islands of Kyushu and Ryukyu. The tropical zone appears on the southern side of Ryukyu Island, and on all islands close to this part of Ryukyu. In greenhouses, the Japanese flora is represented by about 200 species and varieties [1].

In the subtropical zone, you can find mangroves, cycas and ferns. Most characteristic for Japan is forests of the subtropical belt, which occupies the lower mountain slopes south of 37-38 ° N. NS.

In the very south (south of Kyushu and Ryukyu), there are subtropical evergreen forests. These forests are multi-tiered, rich in species, among which there are numerous endemics. There are many ferns, lianas, epiphytes. In addition, here you can even find tropical rainforests, in which there are palms (*Chamaerops excelsa*), tree ferns, bananas and even ficuses. In the mountains there are evergreen oaks (*Quercus gilva*, *Q. acuta* and others) and various tropical conifers. Camphor laurel is often found. On the island of Kyushu, in the seacoast zone, there is a tropical forest, and higher - a subtropical one. Also, the subtropical forest is typical for the island of Shikoku and the south of the island of Honshu. Here you can see evergreen oak, endemic pine, cypress, thuja, cryptomeria and polycarp. The undergrowth is occupied by gardenia, azalea, aralia and magnolia. On the island of Honshu, you can see a unique Laurus forest.

Subtropical forests are full in conifers [2]. Japanese pine species with very peculiar crowns, Japanese fir and hemlock grow here, but such endemic conifers as Japanese cypresses (*Chamaecyparis obtusa*), cryptomeria (*Cryptomeria japonica*), thuja, tuiopsis, sciadopitis, podocarpus and tisuga are of the greatest importance. Lots of plantations have replaced natural forests in many parts of Japan. Commonly grown trees include hinoki cypress (*Chamaecyparis obtusa*), Japanese red pine (*Pinus densiflora*), Japanese black pine (*Pinus thunbergii*) and Japanese cryptomeria (*Cryptomeria japonica*). Cryptomeria is Japan's tallest coniferous tree, reaching 40 meters in height. *Cryptomeria japonica* is an endemic plant in Japan and China, where it forms pure forests in the mountains.

The undergrowth includes bamboo, azaleas, aralia, magnolia, gardenia, paulownia, aucuba, plum and cherry, and others. In some places, there are groves of a relic of the Mesozoic era - ginkgo (*Ginkgo biloba*). Its homeland is Eastern China, in the Dian Mu-Shan mountains, along the border between the provinces of Zhejiang and Anhui. From here this plant was exported several centuries ago to different countries of the world. In Japan, it is found in some places in the wild, but mainly these are artificial plantings or temple trees, which are looked after by monks. For science, this plant was first discovered in Japan. In 1690 E. Kempfer, a doctor at the Dutch embassy in Nagasaki, became interested in a tree with unusual original two-lobed leaves that resembled a traditional Japanese fan. Its apricot-sized fruit gave off an unpleasant smell of rancid oil and had a wonderful amber-silvery color. In 1712, E. Kempfer described this tree as Ginkgo, which means "silver fruit" or "silver apricot" in Japanese. Since ancient times, ginkgo seeds have been used in oriental medicine. And recently, drugs based on compounds isolated from ginkgo leaves (*ginkgozides*) have found quite widespread use in the pharmacotherapy of certain vascular diseases. In greenhouses, Ginkgo has been grown for a long time, grows well and bears fruit.

In the south of Kyushu and on the Ryukyu Islands, a depleted version of tropical rainforests is developed, which are characterized by palm trees, ficuses, tree ferns, bamboo, orchids, and from cultivated plants - rice, sweet potatoes, sugarcane, palm trees and bananas. There are representatives of spore plants: Selaginellaceae, Equisetaceae, Psilotaceae, Ophioglossaceae, Osmundaceae, etc. [2]. All these plants can also be seen in greenhouses.

It is more difficult to talk about angiosperms, it is probably more convenient to classify the grown plants not according to systematic characteristics, but according to useful properties. Fruiting plants or plants, fruits, leaves, rhizomes of which can be used as spices, come to the fore.

It's worth starting with Banana (*Musa basjoo*). Unfortunately, Basier's banana is not edible, but it is the only banana that winters in our subtropics, on the Black Sea coast. *Ficus pumila* is undoubtedly worth mentioning, which is often grown in city parks in Japan and its fruits are edible. In wetlands not used for rice fields, grows lotus. Often it is specially bred for the sake of edible rhizomes and seeds that contain oil.

Under the general name «Citrus» botanists and fruit growers unite several dozen plant species. Many of them stand out for the taste and dietary qualities of fruits, such as orange, tangerine, lemon, grapefruit, kinkan. Undoubtedly, all these species are grown in Japan, but only kinkan (*Fortunella japonica*) can claim Japan as a homeland. Kinkan fruits are very small, round or oval, the peel is thick, fragrant, sweet, and the pulp is small, and it is sour, the tree itself is also medium-sized, almost dwarf. The fruits are usually eaten together with the peel. Since the kumquat culture in Southeast Asia is very ancient, there are many hybrids: Calomandin (Mandarin X Kinkan), Limequat, Citrumquat, Citranjquat, etc. Most of these hybrids do well in greenhouses and bear fruit regularly.

Spices are important in human nutrition, we are perfectly familiar with tropical spices, subtropical ones are much less known - for example: Sansho – Japanese or Sichuan pepper – *Zanthoxylum piperitum* (Rutaceae). The fruit is widely used in Japanese cooking: a ripe berry powder known as "Japanese pepper" is a standard seasoning for grilled eel. In Chinese cooking, the dried shells of the fruit of the plant are used as a spice and are known as Sichuan pepper or Chinese coriander. Sansho is a Japanese endemic, one of the oldest Japanese spices, all parts of the plant have aroma: leaves, flowers, fruits and even wood. But only fresh young leaves, which are usually called kinome, or dried fruit powder, are used for food. The natural range is located on the Japanese islands from Kyushu to Hokkaido, in the south of the Korean Peninsula, and on the mainland of China.

Wasabi or *Eutrema japonicum* (*Eutrema japonicum*) is known as "Japanese horseradish", but it is not horseradish. The seasoning made from its rhizome is also called wasabi and is widely used in Japanese cuisine.

Shoga is a Japanese ginger. In Japanese cuisine, exclusively fresh ginger is used, and often only squeezed juice from it. In addition to ginger root, ginger shoot (young, short-stemmed ginger root) can be used. Ginger is highly valued not only by chefs, but also by doctors: it is believed, for example, that it warms, aids digestion and prevents motion sickness. Fresh ginger has a delicate citrus-like aroma. The taste is pungent and sharp, but pleasant.

Bamboo plants are found in abundance throughout Japan with about 400-500 different species, including the dwarf bamboos known as sasa and taller species that can reach 20 meters in height.

The next group of Japanese plants that prevails in greenhouses are decorative deciduous [3] and flowering plants.

Of the decorative deciduous trees, it should be noted Aucuba - a golden tree from the Garryaceae family (*Aucuba japonica* Thunb.). Shrubs with leathery leaves and reddish-brown flowers forming a fairly large bunch. The calyx is four-toothed. Flowers are dioecious, male, with four anthers. Fruits in the form of berries. *Aucuba japonica* is a very common ornamental plant brought to Europe from Japan and China, where it has been cultivated for centuries and therefore presents many varieties with shiny leaves, oval or elongated-lanceolate; reaches growth from 2 to 2.5 m.

The collection contains 11 cultivars of Japanese Aucuba, which differ in the shape, size and color of the leaves. The Aucuba shrub is a shade-tolerant, or rather, shade-loving plant. It develops well and grows in the shade. However, in a place with bright lighting, it can be grown, but only if it is diffused.

Although the Japanese maple is not a flower, but a full-fledged tree, the Japanese consider the time when the plant begins to turn red, nothing more than a flowering. Indeed, a miniature graceful leaf of a Japanese maple really looks like an inflorescence, and the tradition of admiring this plant is called so - "momiji" - "admiring a flowering maple", or "momijigari" - "hunting for red leaves." Unfortunately, Japanese Maple in the conditions of St. Petersburg can only grow in a greenhouse, where a dozen different varieties are presented.

Rohdea japonica is a plant native to Japan and China, grown as an ornamental deciduous. It has broadly lanceolate leaves, opposite on a short stem, and slightly overlapping. Its leaves are often compared to plastic ones, they are quite tough and papery. This plant is used in traditional oriental medicine, although it is quite poisonous. In Japan, this species is called Omoto or Sacred Lily.

Aspidistra elatior - an evergreen plant with broad-lanceolate leaves about 80 cm long, a long stem, which gives this decorative perennial a special value; dirty purple flowers are inconspicuous. The Variegata variety with white stripes on the leaves is beautiful. Homeland - mountain subtropical forests of South China and Japan. In Southeast Asia, 98 species have already been described.

When the real summer warmth comes to Japan, irises bloom in the gardens. Irises are planted along the streams at temples and sanctuaries, while special «angular» bridges are thrown across these streams for walking and admiring flowers. This delicate and exquisite flower is considered a masculine symbol in Japanese culture and heralds «good news».

Lotus flowers can be white, pink, or even red. They glow gently over wide green leaves, usually in ponds or lakes. The lotus blossom season in Japan is July and August. During this period, many lotuses bloom in the reservoirs of Buddhist temples. In our Victoria greenhouse lotuses bloom from May to October.

The Japanese associate the lush hydrangea flowers with the onset of the rainy season in mid-summer. Flowering lasts from mid-June to mid-July. The meaning of this flower in the language of Hanakotoba is "pride". There are 26 varieties of large-leaved hydrangea in the Garden.

All plants that are called azaleas, modern plant taxonomy refer to the genus *Rhododendron*. The taxonomy of this large genus (over 1000 natural species and over 8000 hybrids) is still rather confusing [4]. In the greenhouses of the garden there are more than 90 varieties and about 30 species of these magnificent bushes. Of course, not all of them came to us from Japan, but the main species, from which most varieties subsequently descended, are Japanese [5]. These are Indian *Rhododendron* (*Rhododendron indicum* (L.) Sweet) and Pointed *Rhododendron* (*Rhododendron mucronatum* (Blume) G. Don), which grow on the islands of Kyushu, Honshu and Hokkaido.

Japanese camellias are better known than Chinese ones, but it is southern China that is home to camellias as a biological genus. Only two species originated from Japan (*C. japonica* and *C. sasanqua*), and more than two hundred from China. Japanese camellia is found in mainland China, Taiwan, South Korea and southern Japan, where it grows in forests at altitudes from 300 to 1100 m. above sea level.

Japanese camellia is an evergreen large shrub or small tree from one and a half to six meters in height with leathery shiny leaves and attractive flowers. *Camellia japonica* is one of the most famous species of the genus *Camellia*. The Japanese camellia is native to Japan and southwestern China; it grows wild in Shandong, Taiwan, southern Japan and South Korea at an altitude of 300-1100 meters.

Camellia culture began in Japan and went through several periods of decline and prosperity. In the XI century, camellias are losing popularity, interest in them awakens only during the Muromachi period (1333-1568), the era of the formation of the traditional style of the Japanese garden. In addition to Japanese *Camellia*, *Camellia sasanqua*, an autumn-flowering mountain camellia, was also popular. It is smaller in size, but it blooms more abundantly and has a flower of a more asymmetrical shape, easily tolerates the open sun. In the collection of our garden there are about 70 varieties of Japanese *Camellia*, ten varieties of *sasanqua*.

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