

Outline of Korean vascular plants

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Korean peninsula extended from 33°40' N in the south to 43°2' N in the north; it is bordered on the north by Manchuria and Siberia. The land is mountainous in the north and east, and flat in the west with numerous small islands off its southwest coastline. Because of the long north-south extension of the peninsula and its complicated topography, there are wide range of variations in temperature and rainfalls; the average temperature through the four seasons ranges from 5 to 14°C, and rainfall from 500 to 1,500mm. Such a natural environment makes a diversified flora in the region. Takenoshin Nakai listed 223 families, 968 genera, 3,176 species, 841 varieties, and 174 formae, a total of 4,191 kinds of vascular plants, including 11 endemic genera, 642 endemic species, 402 varieties, and 74 formae. This means that more than 4,000 kinds of native vascular plants from Korean peninsula. The Flora is rich as compared with some 1,500 species in Denmark and some 2,000 species in England. Many northern plants show common elements with those growing in Manchuria, Siberia and Far-east Asia. While in the north and high mountain areas many alpine plants are seen, the central part and the western lowland show the prominent vegetation of the temperate zone such as broad-leaved deciduous trees. The southern coast and the offshore islands of Cheju and Ullung are regions where warm temperate plants grow abundantly. Many herbaceous and evergreen plants taxa growing in the southern parts, are identical or similar to those seen in the southwestern part of Japan. In addition, the unique natural environment has facilitated the emergence of many endemic species. In this review the Korean vascular flora is outlined.

Key words: Korean vascular plants, warm temperate, temperate, cold temperate.

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Korean peninsula extends from 33 degrees 40 minutes N. Lat. in the south to 43 degrees 2 minutes N. Lat. in the north; it is bordered on the north by Manchuria and Siberia. The land is mountainous in the north and east, flat in the west, with numerous small islands on its southwest coastline. The highest mountain, Mt. Paektu, is 2,744 meters above sea level, in the northmost part of the country. In the east, the Taebaek Mountains range from north to south and the heights range from 1,500 to 1,700 meters. In the south, the Chiri Mountains, 1,950 meters, range over three southern provinces of North and South Cholla and South Kyongsang. On Cheju Island Mt. Halla, a dormant volcano, stands 1,950 meters above sea level. On the eastern island of Ullung, rocks of fantastic shapes positioned nearly 1,000 meters above sea level.

Because of the long north-south extent of the peninsula and its complicated topography, there are wide range of variations in temperature and rainfalls; the average temperature through the four seasons ranges from 5 to 14°C and rainfall from 500 to 1,500mm. Such various environmental factors results the diversified flora in the peninsula. *An Enumeration of Korean Plants* (Pak, 1949) listed 201 families, 1,102 genera, 3,347 species, 50 subspecies, 841 varieties and 174 formae, together 4,191 kinds of vascular plants, including naturalized foreign plants. Nakai (1952) listed 223 families, 968 genera, 3,176 species, 841 varieties and 174 formae, together 4,191 kinds of vascular plants, including 11 endemic genera, 642 endemic species, 402 varieties and 74 formae. This means that more than 4,000 kinds of native plants grow in the country as compared with approximately 1,500 species in Denmark and ca. 2,000 species in England.

Many northern plants have common elements with those growing in Manchuria, Siberia and Far East Asia. While in the north and high mountain areas many alpine plants are seen, the central part and the western lowland shows the prominent vegetation of the temperate zone such as broad-leaved deciduous trees. The southern coast and the offshore islands of Cheju and Ullung are regions where warm temperate plants grow abundantly. Many herbaceous and evergreen plant taxa growing in the southern parts, are identical or similar to those seen in the southwestern part of Japan.

Although there are abundant numbers of plant species in Korea countries, the above mentioned unique natural environment has resulted the development of many endemic species.

The study of flora in Korea was initiated by the Russian botanist Palibin (1898) and was almost completed by the Japanese botanist Nakai (1952) with the

assistance of many Korean and Japanese scholars. The study was taken over by a group of Korean botanists after 1945. These young students are now putting comprehensive final touches to the systematic achievements of the past.

A Synopsis of Korean Flora

Warm-temperate Plants

Because of the high average annual temperature(14°C) on the southern part and the offshore islands of Cheju, Sohuksan and Ullung, numerous plant species grow in these areas.

On the shorelines of Cheju Island, more than 70 species of broad-leaved evergreen trees and shrubs can be seen including *Camellia japonica* Linn., *Cinnamomum camphora* Sieb., *Ardisia pusilla* DC., *Quercus mysinaefolia* Blume, *Ligustrum japonicum* Thunb., *Litsea japonica* (Thunb.) Jussieu, *Rhaphiolepis umbellata* Makino, *Neolitsea sericea* (Blume) Koidzumi, *Actinodaphne lancifolia* (Sieb. et Zucc.) Meiss., *Euonymus japonicus* Thunb., *Euonymus fortunei* (Turcz.) Hand.-Mazz. var. *radicans* (Sieb. et Miq.) Rehder, *Trachelospermum asiaticum* Nakai, *Ficus pumila* Linné, *Machilus japonica* Sieb. et Zucc., *Daphniphyllum glaucescens* Blume, *Pittosporum tobira* (Thunb.) Aiton. fil, *Citrus unshiu* Markovich, etc., such herbal plants as *Farfugium japonicum* (L.) Kitam., *Polia japonica* Thunb. and *Crinum asiaticum* Linne var. *japonica* Sieb. et Zucc., *Celtis sinensis* Pers. var. *japonica* (Planch.) Nakai and *Elaeagnus macrophylla* Thunb.

The warm-temperate plants are more abundant in the southeast than the northern side of slope Mt. Halla on Cheju Island. The warm-temperate plants gradually diminish the number of species as approached to the Peninsula via Komun, Sohuksan and many other islands. Near Pusan and Mokpo, the number of broad-leaved evergreen plants are limited to less than 20 species, and these areas are the northern most limits of the distribution of *Farfugium japonicum* (L.) Kitam.

Although Ullung Island, located at 37 degrees 30 minutes N. Lat., is the distribution range of many plants of the warm zone such as *Daphniphyllum glaucescens* Blume, *Camellia japonica* Linné, *Ilex integra* Thunb., *Aucuba japonica* Thunb., *Neolitsea sericea* (Blume) Koidzumi and *Elaeagnus macrophyll* Thunb. Because of the high contour of the temperate zone, *Camellia japonica* Linné and *Neolitsea sericea* (Blume) Koidzumi are distributed as far north as Taechong Island of Hwanghae Province by the effects of warm sea currents. Migrated

taxa, *Canavalia lieata* (Thunberg) DC. and *Crinum asiatica* L. var. *japonicum* Baker, grow at Todo of Cheju Island.

The *Koelreuteria paniculata* Laxm. grows at west and south sea coast of peninsula.

Temperate Plants

The Korean peninsula, except for the high terrains of Mt. Halla on Cheju Island and of the Taebaek Mountains, many temperate plants grow on the mountains and fields. The average temperate ranges from 5 to 14°C over the land, which lies between 35 degrees and 43 degrees 2 minutes N. Lat.

This temperate zone shows an abundant pine species, *Pinus densiflora* Sieb. et Zucc, also has rich vegetation of deciduous broad-leaved trees including *Quercus aliena* Blume, *Quercus acutissima* Carr., *Quercus serrata* Thunb., *Carpinus laxiflora* Blume, *Betula platyphylla* Sukat. var. *japonica* (Miq.) Hara, *Carpinus tschonoskii* Maxim., *Fraxinus rhynchophylla* Hance, *Salix gracilistyla* Miq., *Tilia amurensis* Komarov, *Styrax japonica* Sieb. et Zucc., *Forsythia koreana* Nakai, *Lepedeza bicolor* Turcz. var. *japonica* Nakai, *Rhododendron mucronulatum* Turcz., *Rhododendron yedoense* Maxim. var. *poukhanense* Nakai, *Rhododendron schlippenbachii* Maxim., *Miscanthus sinensis* Ander, *Miscanthus sacchariflorus* (Maxim.) Benth., *Calamagrostis arundinaceae* (L.) Roth., *Chrysanthemum zawadskii* complex, *Hylomecon vernale* Maxim., *Primula sieboldii* E. Morr., *Platycodon grandiflorum* (Jacq.) A. DC., *Adenophora triphylla* A. DC. var. *japonica* (Regel) Hara, *Codonopsis lanceolata* (Sieb. et Zucc.) Trautv., *Melampyrum roseum* Maxim. and *Elsholtzia splendens* Nakai.

Endemic species in this region include *Abeliophyllum distichum* Nakai, *Hylomecon hylomeconoides* (Nakai) T. Lee and *Aconitum chiisanense* Nakai, *Iris odnesanensis* Y. Lee, *Sedum latiovalifolium* Y. Lee, and *Sedum orbiculatum* D. Lee.

Cold-temperature Plants

Cold temperature plants grow in northern Korea and on high mountains, including Mt. Sorak (more than 1,000m high), Mt. Chiri (over 1,300m) and Mt. Halla (over 1,500m) where the average temperature is 5°C. Typical plants in this region include needle-shaped trees such as *Abies nephrolepis* Maxim., *Larix olgensis* Henry var. *koreana* Nakai, *Thuja koraiensis* Nakai, *Picea jezoensis* (Sieb. et Zucc.) Carr., *Pinus pumila* Regel, *Juniperus chinensis* Linné var. *sargentii* Henry, *Picea koraiensis* Nakai, *Abies koreana* Wilson and *Taxus cuspidata* Sieb. et Zucc. and broad-

leaved deciduous trees such as *Quercus mongolica* Fisher, *Quercus dentata* Thunb., *Chosenia arbutifolia* (Pallas) Skvortsav, *Betula costata* Trautv., *Salix myrtilloides* Linné, *Vaccinium uliginosum* Linne and *Syringa wolfii* Schneid.

An endemic plant, *Echinosophora koreensis* Nakai, is wide spreaded in North Hamgyong Province and also near Yanggu, Kangwon Province. Myonch' on-gun, North Hamgyong Province is the habitat of *Sasa coreana* Nakai and shows the northern boundary for distribution of bamboo. Endemic herbal plants, *Megaleranthis saniculifolia* Ohwi, *Chrysanthemum zawadskii* Herb. ssp. *coreanum* (Nakai) Y. Lee and *Hanabusaya asiatica* Nakai, also grow on higt mountain areas of the country. *Rheum coreanum* Nakai is distributed in the range of Changbaek Mountains.

Many kinds of plants share common elements with those growing in Manchuria. *Astilboides tabularis* Engler (*Rodgersia tabularis* Kom.), *Aceriphyllum acanthifolium* (Nakai) T. Lee, *Semiaquilegia adoxoides* (DC.) Makino and *Jeffersonia dubia* Bentham & Hooker are the representative of the northern elements. *Pinus pumila* Regel commonly occurs in the northttern mountains such as Mt. Sorak. *Thuja koraiensis* Nakai, which grows on the northern mountains, and also can be seen on the hight part of the Taebaek mountain. *Vaccinium uliginosum* Linné, a plant of the northern element, grows on the summit of Mt. Sorak and Mt. Halla. This is regarded as a relic species of the climatic change, which is presumed to have been occurred in the tertiary period.

Empetrum nigrum Linné var. *japonicum* K. Kock. is distributed between the far north in the northernmost region and the far south on Mt. Halla, while *Diapensia lapponica* L. var. *obovata* Fr. Schm. is seen at the top of Mt. Halla and on Japanese Alps. It is presumed that the Korean peninsula, Cheju Island and Japanese archipelago were once a connected land mass on the basis of such distribution factors.

Major flora in the cool temterature elements of the northern forest are *Larix olgensis* Henry, *Picea jezoensis* Sieb. et Zucc., *Picea koraiensis* Nakai and *Abies holophylla* Maxim.

The important needle-leaved trees, growing on Mt. Kumgang (Diamond), are *Pinus koraiensis* Sieb. et Zucc., *Abies holophylla* Maxim., *Picea jezoensis* Carr., *Larix olgensis* Henry and *Thuja koraiensis* Nakai.

The dominant species growing on Mt. Chiri are *Juniperus chinensis* Linné var. *sargentii* Henry, *Pinus koraiensis* Sieb. et Zucc., *Abies koreana* Wilson, and *Picea jezoensis* Carr. Near the summit of Mt. Halla of Cheju-do, *Abies koreana* Wilson and *Juniperus chinensis* Linne var. *sargentii* Henry, and *Betula ermanii* Chamisso var. *saitoana* Hatsusima commonly occur.

Literature cited

- Nakai, T. 1952. A synoptical sketch of Korean Flora. *Bull. Natl. Sci. Mus.* 31: 1–152.
- Palibin, J. 1898. *Conspectus florum Koreae. Pars. secunda.* *Trudy Imp. S.-Peterbursk. Bot. Sada* 17: 1–128.
- Park, M. K. 1949. *An enumeration of Korean Plant.* Ministry of Education, Seoul. Pp. 340.