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Woodland and Alpine Plants in the Botanic Gardens and Nurseries of Japan

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INTRODUCTION

The Great Britain and Ireland Region's Mary Helliar Travel Scholarship contributed funding towards a study tour of the islands of Hokkaido and northern Honshu, Japan. The overall aims were to broaden my horticultural knowledge and understanding of Japanese Botanic Gardens and horticultural techniques, while working within the Living Collections Department of Hokkaido University Botanic Garden and by visiting several commercial nurseries and National Parks. Throughout these areas are some of the most important locations for eastern Asian alpine and woodland plant species.

The geographical position of the areas studied range from 45° 25' N, in the sub-Arctic zone, to 36°N. Average annual rainfall was between 147 mm to 184 mm and 1170 mm to 2000 mm of snow, with temperatures from an average of -8.1C in winter, to 25C in summer.

These general climatic conditions combined with the varied geological and topographical components of the Japanese archipelago have given rise to a diverse range of environs in which alpine and woodland plant species can thrive, with more subtle variations where altitude gives rise to the vertical zonation of vegetation types.

The topography of many of the areas visited renders them unsuitable or impossible to exploit for commercial purposes, more than 65% of Japan's surface slopes with a gradient in excess of 25%. This, together with the fact that large expanses of the areas visited are government owned, has resulted in large tracts of land being preserved by keeping industry and tourism to the peripheries.

HOKKAIDO UNIVERSITY BOTANIC GARDEN

The scholarship began at Hokkaido University Botanic Garden, Sapporo, where I spent approximately 3 weeks working within the gardens and participating in field work.

The Botanic Garden was established in 1884 by Professor Kingo Miyabe, whose name is commonly found as a specific epithet, e.g. *Acer miyabei* and *Potentilla*

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miyabei. The 13.3-ha garden is located in the centre of Sapporo city and consists of an alpine display area; systematic herbaceous perennial collection; "Natural Woodland" of the Ishikari plain (dominated by *Ulmus japonica* (syn. *U. davidiana* var. *japonica*) and *Acer mono*, with a rich under story of *Petasites japonicus* var. *giganteus* and *Cardiocrinum cordatum* var. *glehnii* (syn. *Lilium cordatum* var. *glehnii*); glasshouses, with several tropical displays; an ethnobotanical garden and a museum dedicated to the aboriginal Ainu and the natural history of Hokkaido.

One of the field expeditions was to Nakayama-toge, a 3-ha high-altitude deep-snow wetland only recently discovered after the electricity company installed power lines near the site. The area was not easily accessible, requiring a 45-min walk through *Sasa* and *Rhus ambigua* to get to it. We measured the site so that the successional growth of the *Sasa* could be monitored, and the species present were recorded. The species that predominated were *Hemerocallis middendorffii* var. *esculenta*, a species of *Iris*, and *Hosta sieboldii* (syn. *H. albomarginata*), with less frequent *Platanthera tipuloides* f. *nipponica, Vaccinium oxycoccos*, and *Drosera rotundifolia*.

We also studied Mt. Yubari (1668 m), in the centre of the Yubari mountain range in central Hokkaido. This mountain is predominately composed of Serpentine rock, (crystalline asbestos), a complex magnesium silicate which has resulted in a large degree of endemism resulting from the adaptation of plants to the high levels of aluminum and magnesium in the soil. They are difficult to maintain in cultivation. Many of these plants have the specific epithet *yuparensis* or *yuparense* to denote their geographical origin, e.g. *Viola yuparensis*, (syn. *Viola brevistipulata* var. *crassifolia*), *Taraxacum yuparense*, *Aconitum yuparense*, and the plant which was the subject of the field work, *Primula yuparensis*.

Primula yuparensis is only found on Mt. Yubari and has only two small populations which in recent years have decreased in size. The objective of the fieldwork was to collect seed from naturally pollinated plants from the two sites and compare them with hand-pollinated plants (the hand pollination had been undertaken one month prior to our visit).

ALPINE NURSERIES IN THE SAPPORO REGION

I visited a number of nurseries to see how plants were produced and what materials were used. All the nurseries used very similar techniques and composts. The standard compost was 100% volcanic rock (pumice), which would be sieved and graded, the fine material being used for seed sowing and the larger for general potting. The only exception to this was the addition of peat or leaf mould for species which required a higher organic matter content, such as primulas. This would be added to the volcanic rock at 10% to 30% depending on the species requirement. Peat is only used when necessary because of its high price compared with volcanic rock. Peat will cost ¥20 [yen] per litre compared with ¥2 to ¥5 per litre for volcanic rock. The volcanic rock is so inexpensive because there are large minable deposits found across Japan. Peat, on the other hand is generally imported from Russia.

In addition to this standard compost mixture a few nurseries added a few grains of controlled release fertiliser to each container at the time of potting. A more common fertiliser was Aburakasu, a pelleted organic compound fertiliser made from Soya bean and brassica waste from the food industry, and fish blood and bone. Two of these pellets are used per 9-cm pot. Liquid feed, usually high in potassium,

was also used by some nurserymen to supplement the Aburakasu and to increase the generally low potassium levels in the predominantly acid composts.

The majority of nurseries produced most of their stock from seed, sown in a fine mixture of volcanic rock and leaf mould. However, certain plants, e.g. *Dicentra peregrina*, were produced in raised beds of volcanic rock, to aid winter drainage, and allowed to seed freely across the beds. These seedlings were then lined-out for the successive year's crop. *Dicentra peregrina* is usually grown in these raised beds for 1 year and then containerised and sold in the second year.

The nurseries of Hokkaido produce very high quality compact alpine plants compared with those produced on the main island Honshu. This is due to the lower summer temperatures and shorter growing season. As a result the plants from Hokkaido are more expensive to produce. However, certain plants, such as *Soldanella* species, can only be successfully grown on Hokkaido.

The majority of nurseries visited are very small compared with similar European establishments. These smaller nurseries, some specialising in only a few genera, then sell to larger wholesale nurseries which in turn exported or sell to retailers throughout Japan.

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