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Citation	Eurasian Journal of Forest Research, 8(2), 111-126
Issue Date	2005-12
Doc URL	<a href="http://hdl.handle.net/2115/22198">http://hdl.handle.net/2115/22198</a>
Type	bulletin (article)
File Information	8(2)_P111-126.pdf



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## Bibliography on Japanese larch (*Larix kaempferi* (Lamb.) Carr.)

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### Abstract

References related to research on Japanese larch (*Larix kaempferi* (Lamb.) Carr.) are surveyed and compiled. The total of 314 references are divided into five scientific fields as follows: 111 in tree breeding, 81 in mechanical wood property, 33 in anatomical wood property, 76 in mycorrhiza and 13 in ecology, respectively. It is expected that the bibliography will be useful to tree breeder, wood and forest scientists, a wide range of students, and to all everyone interested in Japanese larch.

*Key words:* Ecology, Japanese larch, Mycorrhiza, Tree breeding, Wood properties

### Introduction

Larch (*Larix* Mill.) is one of the most important elements of the boreal forests. Larch forests essentially encircle the Northern Hemisphere, stretching from eastern Siberia westward across Eurasia (absent in Scandinavia presently), resuming in eastern North America and westward across the USA and Canada to Alaska, they essentially reach the starting point back in Siberia. Along the approximate 20,000 km path, larch splits into 12 species (*L. occidentalis* Nuttall, *L. lyallii* Parlature and *L. laricina* (Du Roi) K. Koch in North America, *L. sukaczewii* Dylis, *L. sibirica* Ledeb., and *L. gmelinii* Rupr. and *L. cajanderii* Mayr in Russia, *L. mastersiana* Rehder et Wilson and *L. potaninii* Batalin in China, *L. griffithiana* (Lindl. Et Gord.) Carriere in Nepal, *L. kaempferi* (Lamb.) Carriere in Japan, *L. decidua* Miller in Europe) and numerous varieties and hybrids. These 12 species occupy a wide variety of ecological conditions and zones ranging from lowland boreal to upper sub-alpine conditions and extend south to 25° latitude at high elevations and north to 75° latitude in the boreal lowlands.

Japanese larch is an endemic and the only deciduous coniferous species in Japan. Its common name in Japan is "Karamatsu". Horizontal distribution of natural forests of Japanese larch occupies a small extent of the limited highland regions in the central Honshu, Japan (mainly Nagano, Shizuoka, Yamanashi, Gunma and Tochigi prefectures). The reforestation of this species started in the early 1840's, and it spread widely to sub-frigid zone in the northern part of Honshu (Tohoku region) and Hokkaido. Because of rapid-growing and favorite disease- and cold-resistances compared to other planting species such as Japanese cedar (*Cryptomeria japonica* D. Don) and Japanese cypress (*Chamaecyparis obtusa* S. and Z.), Japanese larch is expensively used for reforestation in northern part of

Japan from 1960-70's.

In the bibliography, references are divided into five sections: Section 1: Tree Breeding, Section 2: Mechanical Wood Properties, Section 3: Anatomical Wood Properties, Section 4: Mycorrhiza and Section 5: Ecology. In Tree Breeding section, references related to seed orchard establishment and management, progeny test and genetic gain, wood quality improvement, resistance breeding for pests and diseases, hybrid breeding and vegetative propagation, and overseas breeding and tree improvement for Japanese larch are listed. Mechanical Wood Properties section are composed of six sub-sections: sub-section 2-1: mechanical properties of standing tree, log and branch, sub-section 2-2: genetic diversity in mechanical properties, sub-section 2-3: environmental effects on mechanical properties, sub-section 2-4: variations in mechanical properties concerning various categories, sub-section 2-5: mechanical properties of structural lumber and engineered wood products, and sub-section 2-6: effects of drying processes on mechanical properties. Anatomical Wood Properties has five different sub-sections: sub-section 3-1: wood formation, sub-section 3-2: wood anatomy, sub-section 3-3: variations in anatomical properties within trees, sub-section 3-4: quality of timbers and sub-section 3-5: genetic diversity in anatomical properties. Mycorrhiza consists of sub-section 4-1: mycorrhizal symbiosis and sub-section 4-2: disease. The last section is Ecology.

In order to review references related to Japanese larch with different scientific area as wider as we can, we have tried to survey not only major international journals but also local proceedings and reports published in Japan. It means that some papers written in Japanese without English summary are included in the bibliography. Possibly, these papers have not been ever checked by foreign scientists, however, we believe their

contents is quite useful and worth reading carefully. So, in the bibliography we listed them with an appropriate English title in order to grasp the objectives of these papers for foreign scientists. It is expected that this bibliography will be of use successfully to tree breeder, wood scientists, forest ecologists, a wide range of students, and to all people interested in Japanese larch.

### Explanatory notes

In the list, the reference appears in alphabetical order, preceded by an Arabic numeral enclosed in square brackets. The authors' names are listed in alphabetical order, and in chronological order for each author (see ex-[9]; ex-[10]; ex-[11]; ex-[12]; ex-[13]). In case there is more than one author, the order is as follows: publications of a single author in chronological order (see ex-[1]; ex-[2]); publications of the same author with one co-author in alphabetical order of the second author, and in chronological order (see ex-[12]; ex-[13]); publications of the author with more than one co-author in chronological order (see ex-[4]; ex-[5]; ex-[6]). Unpublished papers accepted for publication may be included in the list by designating the journal followed by "in press" in parentheses (see ex-[3]). Papers written in Japanese with English summary are described as the style of examples ex-[4]; ex-[5]; ex-[9]; ex-[10]; ex-[11]. For papers written in Japanese without English summary, they are described as the style of example ex-[7].

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## Section 2: Mechanical Wood Properties

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