MICROSCOPICAL PROPERTIES ON THE WOODS OF SEVERAL EXOTIC TREE SPECIES FROM JAPAN

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INTRODUCTION

Many exotic tree species are found growing in all parts of Korean localities after several decades imported from Europe, North America and near asian countries such as Japan and India. Some of trees among these imported species have a gradual increasing tendency of economical importance because not only they are aleady utilizing in many uses, but come up to cutting ages. In Korea, wood qualities and properties of these ones however were not studied satisfactorily except several commercially important indigenous species and at present are kept on to inspect only the slight partial data of some tree species.

Accordingly this experiment was carried out to investigate the microscopical properties on the woods of exotic tree species imported from Japan as a part of the study on the wood properties of exotic tree species grown in Korea. The test trees used in this study were selected 7 species and 15 individuals among the 35 to 48 years old sound trees growing in Kwangyang, Chollanam-do and, Suwon, Kyonggi-do, Korea. The microscopical properties on the characteristic features observable in the elements and their compositions such as fibers, vessels, ray and longitudinal parenchyma cells, and intercellular cannals were observed and measured. The results investigated were synthesized and described briefly by the species.

The important studies on the anatomical properties and identification of wood grown in Korea were carried out the most part by Japanese Yamahayashi (1928, 1929, 1933, 1933, 1936, 1938 and 1958). These laborious works were introduced extensively within and outside the country. Author (1961 and 1965) also reported on the anatomical properties of Populus Woods grown in Korea and several exotic tree species come from the North America.

DESCRIPTIONS OF WOOD BY THE SPECIES

1. Red Pine (Yiwadae-juksong; Pinus densiflora S. et Z.)

Diameters of springwood tracheids 22 to 68 microns in radial and 20 to 50 microns in tangential; diameters of summerwood tracheids 10 to 28 microns in radial and 24 to 46 microns in tangential; wall thickness 1.5 to 6.5 microns; tracheid length 1454.40 to 6726.60 microns, average 3611.92 microns. Pit arrangement on tracheid wall one row, irregular or rarely two rows in springwood zone and pit diameters 7 to 18 microns in vertical and horizontal directions.

Longitudinal parenchyma cells wanting. Vertical and horizontal resin cannals present; vertical resin cannals encircle by thin walled epithelial cells and inclined to appear usually in summerwood zone; vertical cannal diameters 43 to 152 microns in radial and 40 to 160 microns in tangential; horizontal cannal diameters much smaller than vertical ones. Pits leading to ray parenchyma windowlike pitting. Nondentate ray tracheids observable in the above and below several rows of wood ray composed by ray parenchyma cells. Rays uniseriate and fusiform; uniseriate rays numerous, 1 to 21 pius cells height, maximum height 420 microns

and diameters 10 to 24 microns; fusiform rays with horizontal cannal, scatter. Ray numbers appearing in the tissue of one milimeter width of cross 5 to 13.

2. Black Pine (Ibraragi-gomsol; Pinus Thunbergii Parl.)

Diameters of springwood tracheids 26 to 68 microns in radial and 20 to 44 microns in tangential; diameters of summerwood tracheids 12 to 46 microns in radial and 16 to 44 microns in tangential; wall thickness 3 to 8 microns ; tracheid length 1363.50 to 4635.90 microns, average 3034.02 microns. Pit arrangement on tracheid wall one row or irregular and pit diameters 5 to 21 microns in vertical and 10 to 22 microns in horizontal directions.

Longitudinal parenchyma cells wanting. Vertical and horizontal resin cannals present; vertical resin cannals inclined to appear usually in summer wood zone and, cannal diameters 48 to 152 microns in radial and 40 to 160 microns in tangential; horizontal cannal diameters much smaller than vertical ones. Pits leading to ray parenchyma windowlike pitting. One and two storied ray tracheids observable in the above and below several rows of wood ray composed by ray parenchyma cells. Rays uniseriate and fusiform; uniseriate rays numerous, 1 to 19 plus cells height, maximum height 399.84 microns and diameters 12 to 26 microns fusiform rays with horizontal cannal, scatter. Ray numbers appearing in the tissue of one milimeter width of cross 5 to 13.

3. Japanese Larch (Ilbon-ipgalnamoo; Larix leptolepis Sarg.)

Diameters of springwood tracheids 20 to 78 microns in radial and 16 to 56 microns in tangential; diameters of summerwood tracheids 8 to 34 microns in radial and 16 to 44 microns in tangential; wall thickness 1 to 4 microns; tracheid length 772.05 to 527 2.20 microns, average 3032.60 microns. Pit arrangement on tracheid wall one row or ordinary two rows in springwood zone and, pit diameters 5 to 20 microns in vertical and 5 to 18 microns in horizontal directions.

Longitudinal parenchyma cells wanting. Vertical and horizontal cannals present; vertical cannals smaller than Pinus ones, ocasionally with tylosoid, encircled by thick walled epithelium; vertical cannal diameters 20 to 120 microns in radial and 20 to 95 microns in tangential; horizontal cannals much smaller than vertical ones. Pits leading to ray parenchyma piciform pitting, 1 to 6 per ray crossing. Ray tracheids observable in the above and below constructions of wood ray composed by ray parenchyma cells. Rays uniseriate and fusiform; uniseriate rays numorous, 1 to 22 plus cells height, maximum height 533.12 microns and diameters 12 to 20 microns; fusiform rays with horizontal cannal, 2 to 3 seriates through central thickend portion, scatter. Ray numbers appearing in the tissue of one milimeter width of cross 5 to 9.

4. Japanese Fir (Ilbon-jiotnamoo; Abies firma S. et Z.)

Diameters of springwood tracheids 24 to 66 microns in radial and 28 to 54 microns in tangential; diameters of summerwood tracheids 8 to 36 microns in radial and 20 to 44 microns in tangential; wall thickness 3 to 6 microns; tracheid length 2045.25 to 6363.00 microns, average 4037.33 microns. Pit arrangement on tracheid wall one row or irregular and, diameters 4 to 20 microns in vertical and horizontal directions.

Longitudinal parenchyma cells wanting. Vertical and horizontal resin cannals wanting. Pits leading to ray parenchyma taxodioid pitting, 1 to 5 but usually 2 to 3 per ray crossing. Rays uniseriate, numorous, 1 to 31 plus cells height, maximum height 699.72 microns and diameters 14 to 22 microns. Ray numbers appearing in the tissue of one milimeter width of cross 6 to 14.

5. Japanese Cypress (Pyonback; Chamaecyparis obtusa S. et Z.)

Diameters of springwood tracheids 14 to 42 microns in radial and 16 to 38 microns in tangential; diameters of summerwood tracheids 6 to 20 microns in radial and 20 to 30 microns in tangential; wall thickness 2 to 8 microns; tracheid length 1227.15 to 3836.90 microns, average 2236.90 microns. Pit arrangement on tarcheid wall one row or irregular and, pit diame-

ters 6 to 14 microns in vertical and horizontal directions.

Longitudinal parenchyma cells present; arrangement on cross usually metatracheal. Vertical and horizontal resin cannals wanting. Pits leading to ray parenchyma cuppresoid pitting, 1 to 4 per ray crossing. Rays uniseriate, numorous, 1 to 26 plus cells height, maximum height 416.50 microns and diameters 12 to 20 microns. Ray numbers appearing in the tissue of one milimeter width of cross 4 to 13.

6. Criptomeria (Sam-namoo; Criptomeria japonica D. Don.)

Diameters of springwood tracheids 20 to 60 microns in radial and 16 to 52 microns in tangential; diameters of summerwood tracheids 8 to 24 microns in radial and 16 to 36 microns in tangential; wall thickness 2 to 6 microns; tracheid length 1408.95 to 3681.45 microns, average 2332.11 microns. Pits arrangement on tracheid wall one row or irregular and, pit diameters 7 to 18 microns in vertical and 8 to 20 microns in horizontal directions.

Longitudinal parenchyma cells present; arrangement on cross usually diffuse. Vertical and horizontal resin cannals wanting. Pits leading to ray parenchyma cuppresoid pitting, 1 to 3 per ray crossing. Rays uniseriate, numorous, 1 to 13 plus cells height, maximum height 249.88 microns and diameters 10 to 20 microns. Ray numbers appearing in the tissue of one milimeter width of cross 5 to 9.

7. Japanese Magnolia (Ilbon-mognyon; Magnolia ovovata Thunb.)

Diameters of single largest pore 127 microns in radial and 92 microns in tangential; vessel element length 1090.80 to 2363.40 microns. Vessel arrangement on cross diffuse. Radial and multiple pores numerous and multiplying numbers 2 to 5. Perforation plates simple or scalariform. Pit arrangement on vessel wall opposite or scalariform.

Diameters of wood fibers 20 to 42 microns; fiber length 1717.10 to 4817.70 microns, average 3074.24 microns; wall thickness 2 to 6 microns. Longitudinal parenchyma cells present; their arrangement on cross terminal. Rays uni- and be-seriates, homo- or heterogenous; uniseriate rays 1 to 21 plus cells height, maximum height 380 microns and diameters 10 to 16 microns. Ray numbers appearing in the tissue of one milimeter width of cross 7 to 9.

摘 要

韓國產 木材의 解剖學的性質에 關한 硏究는 日政時水原高等農林學校(現 서울大農大의 前身) 敎授인 日本人 山林遲氏에 依하여 이미 數百種이 硏究報告된바 있다. 그러나 現在에는 導入된 外來樹種이 많고 또 이들 外來樹種으로 부터 生産되는 國産材가漸次 經濟的으로 重要性을 加增함에 따라 이들 木材에 關한 基礎的인 性質硏究가 時急하다고 生覺한다.

그러므로 이 試驗에서는 韓國產外來樹種의 木材性質에 關한 硏究의 一部分으로 數十年前에 導入되어 比較的 重要하다고 認定되는 日本原產 外來樹種의 木材에 關한 顯微鏡的性質을 調査하여 報告하고져 한다.

이 試驗에서 使用된 供試材는 京畿道 水原 演習林과 全羅南道 光陽演習林에 生長하고 있는 35~48年生의 소나무, 곰솔, 일본잎갈나무, 일본젓나무, 편백, 삼나무, 및 일본목련등 7個 樹種에서 健全한 15個體가 選定試驗되었으며 結果는 重要한것들만 樹種別로 綜合되었고 原文과 같이 簡略하게 記載되었다.

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PHOTO PLATES

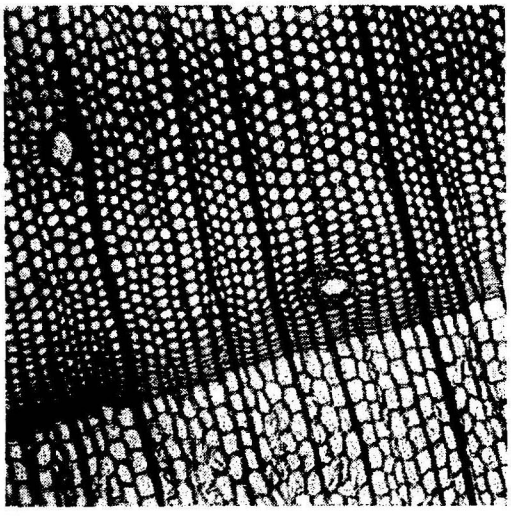

Fig. 1. Larix leptolepis Sarg.
(cross × 50)

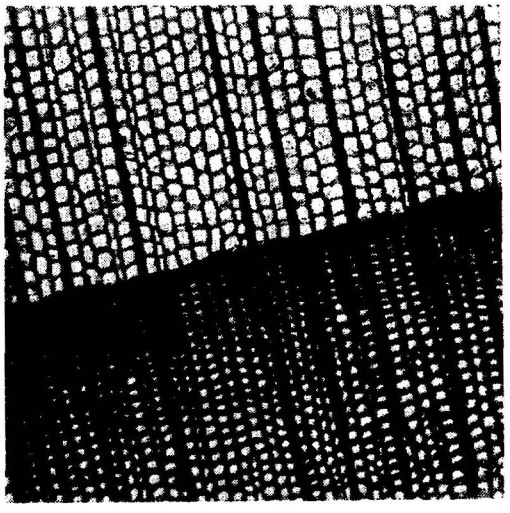

Fig. 3. Abies firma S. et Z.
(cross × 50)

Fig. 2. Larix leptolepis Sarg
(radial × 50)

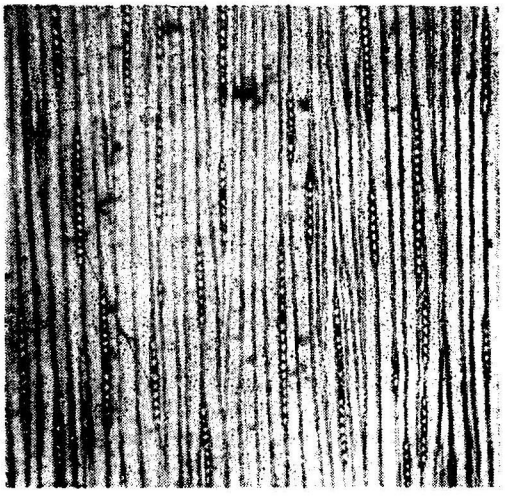

Fig. 4. Abies firma S. et Z.
(tangential × 50)