

# ICONES GYMNOSPERMUM FORMOSANARUM

by

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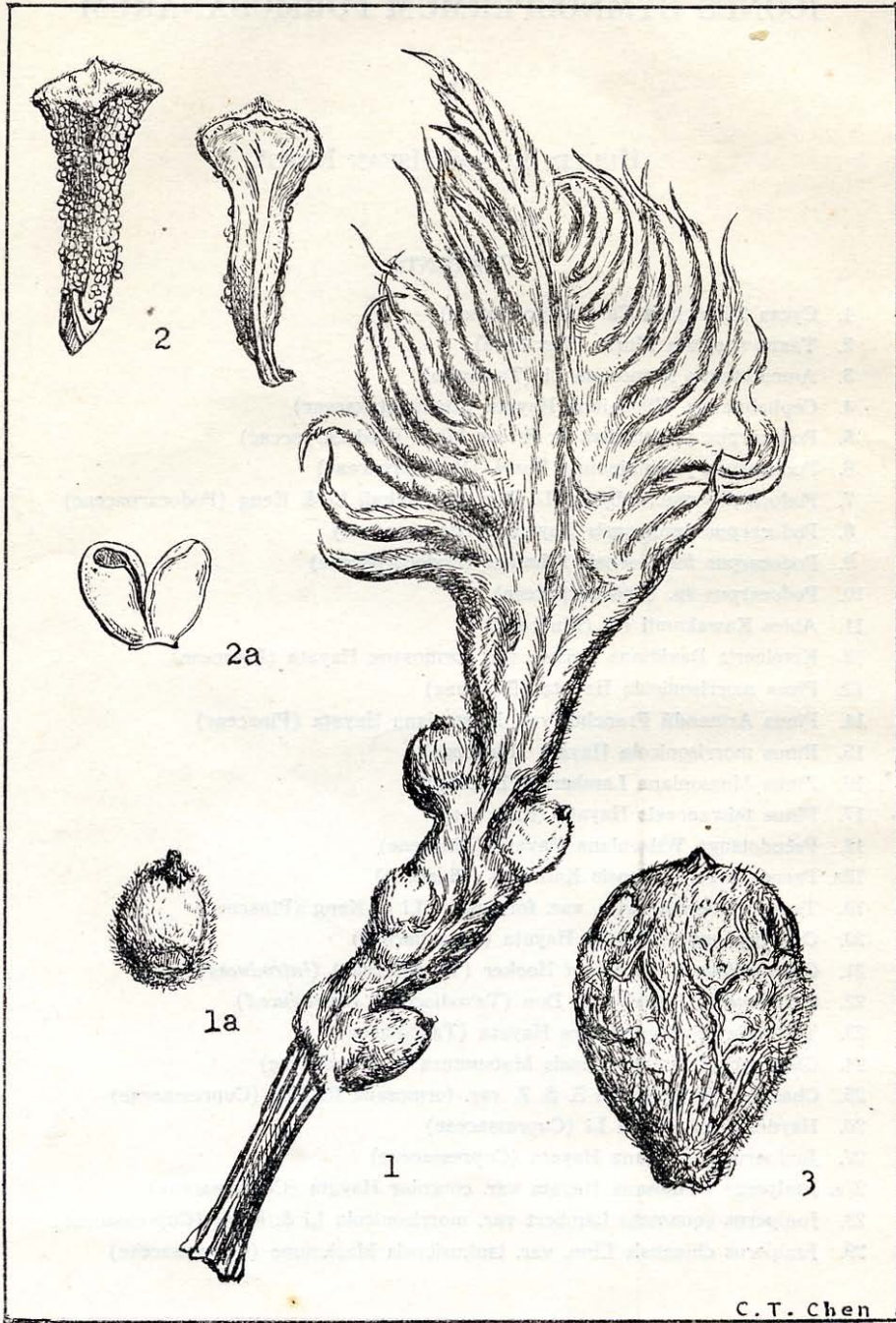


Plate I. *Cycas taiwaniana* Carr. (Cycadaceae)

1. Pistillate scale with 4 ovules; 1a. ovule.
2. Staminate scale (dorsal & ventral views) with numerous anther cells; 2a. anther cells.
3. Seed (immature).

1. *Cycas taiwaniana* Carruthers in Journ. Bot. 31: 2, *t.* 331, 1893; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 560, 1902; Matsum. & Hayata in Journ. Coll. Sci. Tokyo 22: 404, 1906, & 30(1): 308, 1911; Pilger in Engler & Prantl, Pflanzenf. ed. 2, 13: 74, *f.* 2, 1926; Yamamoto, Suppl. Icon. Pl. Formos. 4: 3, *f.* 2 & *t.* 1-4, 1928; Kanehira, Formos. Tr. rev. ed. 30, *pl.* 9, 1936; Masamune, Short. Fl. Formos. 34, 1936.

*Cycas revoluta* Thunb. var. *taiwaniana* (Carr.) Schuster in Engler, Pflanzenr. 99: 84, 1932.

An evergreen, palm-like tree with a simple or rarely branched cylindrical trunk, 1-3.5 m. high, clothed with the woody bases of the petioles. Leaves in terminal crowns, linear oblong, pinnate, 1-1.8 cm. long including the petiole, the apex obtuse, the base acute, leaflets linear, 2.5-6.2 cm. long, 4-8 mm. wide, 1-nerved, entire, the lower ones reduced to spines. Flowers dioecious. Staminate flowers (microsporangiate strobili) apparently terminal, peduncled, subcylindrical, about 50 cm. long, 9-10 cm. in diameter; staminate scales (microsporophylls) numerous, closely imbricate, subcuneate, 2.5-4.5 cm. long, 1.5-1.8 cm. wide, clothed with a brown tomentum externally, glabrous above; anther-cells (microsporangia) ellipsoid, 1 mm. long, 0.7 mm. wide, in groups of 2-4. Pistillate flowers (megasporengiate strobili) terminal, sessile, broad ovoid, 25 cm. long, 20 cm. wide; pistillate scales (megasporengiate strobili) numerous, about 15 cm. long including the stalk, the blade orbicular to ovate, ferruginous-tomentose; ovules (megasporengia) 2-6, usually 4, in notches on either sides of the stalk of the scale, distinct, alternate or opposite, nearly erect. Seeds ellipsoid, compressed, 4-4.5 cm. long, 3 cm. in longer diameter, 2 cm. in shorter diameter.

Southern China—Fukien and Kwangtung. Mountainous valleys, in eastern parts of Taiwan, very scarce.

## 臺灣蘇鐵 *Cycas taiwaniana* Carr.

### 蘇 鐵 科

常綠木本，莖柱狀，單一或罕分岐，高達 1-3.5 m.，密被有葉柄殘留之木質基部。葉簇生於桿頂形成葉冠，線狀長橢圓形，連葉柄長 1-1.8 m.，先端鈍形，基部銳形，由多數小葉集合而成，小葉線形，長 2.5-6.2 cm.，闊 4-8 mm.，具中肋，全緣，基部之小葉退化為針刺狀。花單性異株，小蕊花(小孢子葉穗花)頂生，圓柱狀，長約 50 cm.，直徑 9-10 cm.，小蕊(小孢子葉)多數，密覆瓦狀排列，長 2.5-4.5 cm.，闊 1.5-1.8 cm.，外被棕色茸毛，下面具多數(橢圓形，長 1 mm.，闊 0.7 mm.，2 至 4 成羣)之藥囊(小孢子囊)。大蕊花(大孢子葉穗花)頂生，無柄，潤卵形，長 25 cm.，闊 20 cm.，心皮(大孢子葉)多數，為具長柄之圓形葉狀體，全長約 15 cm.，密被銹褐色之茸毛。胚珠(大孢子囊) 2-6，通常為 4，生於心皮兩側邊之凹處，互生或對生，近於直立。種子核果狀，扁橢圓形，長 4-4.5 cm.，長徑 3 cm.，短徑 2 cm.。

本屬屬名 *Cycas*，原為椰子樹之古希臘名稱，蓋本屬植物全形頗類似椰子樹也。全屬凡十六種，分佈於馬來亞及澳洲。

本屬之特徵為：(一)葉片羽狀，叢簇於基頂，小葉僅具一中肋。(二)小蕊花柱狀，頂生。(三)大蕊花頂生，由多數葉狀分離之心皮疏鬆合成，心皮下部邊緣生胚珠數枚。(四)種子核果狀。

本種分佈於我國南部之閩粵諸省，在臺灣野生狀態者僅限於臺東一隅之山間谷地。

本種與廣泛分佈我國南部之蘇鐵(*C. revoluta* Thunb)極為相似，甚至有人主張臺灣蘇鐵應列為蘇鐵之變種(即 *Cycas revoluta* var. *taiwaniana*)，實則本種較蘇鐵之葉較長，小葉數較多，種子較大，此外心皮之形狀及種子之形狀亦不相同也。

二者之差別如下：

(1) 蘇鐵(*C. revoluta*)——葉長達 1 m.，闊 0.3 m.，小葉長達 15 cm.，每側約 125 枚左右，邊緣卷曲；心皮之上部卵形以至披針形；種子卵形，長 3.5-4 cm.。

(2) 臺灣蘇鐵(*C. taiwaniana*)——葉長達 1.8 m.，闊 0.4 m.，小葉長達 20 cm.，每側約 140 枚以上，邊緣不卷曲；心皮上部潤卵形以至圓形；種子橢圓形，長 4-4.5 cm.。



Plate II. *Taxus speciosa* Florin (Taxaceae)

1. Branch with a seed.
2. Branch with staminate flowers.
3. Pistillate flower.

2. *Taxus speciosa* Florin in Act. Hort. Berg. 14: 382, pl. 6, 1948.

*Taxus chinensis* Rehder in Journ. Arnold Arb. 1: 51, 1919, 4: 119, 1923; Wilson in l.c. 7: 41, 1926; Kanehira, Form. Tr. rev. ed. 31, 1936; Hu & Chun, Icon. Pl. Sinicarum 2: 8, pl. 53, 1929.

"*Taxus cuspidata*" sensu Kanehira, Forms. Tr. 616, 1917; non Sieb. & Succ.

"*Taxus Wallichiana*" sensu Foxw. in Philip. Journ. Sci. 6 (Bot.): 166, 1911; Merr., Enum. Philip. Fl. Pl. 1: 5, 1923; Yamamoto in Journ. Soc. Trop. Agri 10: 182, f. 42, 1938; non Zucc.

A large tree, to 15 m. high and 1 m. in diameter, the bark reddish brown, peeling off in long narrow thin strips, the branchlets short, slender, spreading. Leaves linear-lanceolate, falcate, about 1.2-2.7 cm. long, 2-2.5 mm. wide, the apex abruptly pointed, the base acute and decurrent, dark green above, pale green and with 2 broad tawny yellow bands below. Flowers dioecious. Staminate flowers terminate on branchlets, or axillary, the stamens 8-10 in each flower, with 5-6 pollen-sacs. Pistillate flowers axillary, consisting of several imbricate scales; ovule solitary, terminal, oblong-ovoid, 3 mm. long, 2 mm. wide. Seed compressed, ellipsoid, about 7 mm. long, 3-4 mm. wide, slightly 2-angled, very rarely 3-angled, the helium elliptic, the aril cup-like, reddish in color.

Western China, eastern India and Luzon. Shady, mountainous valleys, in northern and central parts of Taiwan at high altitudes; scarce.

## 臺灣紅豆杉 *Taxus speciosa* Florin

### 紅豆杉科

大喬木，高達 15 m.，直徑達 100 cm.，樹皮赤褐色，成狹長薄片剝落。小枝短柔，向外開展，葉線狀披針形，繖曲，長約 1.2-2.7 cm.，濶約 2-2.5 mm.，先端突尖，基部銳形，下延，上面深綠色，下面淡綠色，且具兩條黃褐色之氣孔帶。花單性異株，小蕊花頂生或腋生於小枝上，每花具 8-18 小蕊，各小蕊具 5-6 花粉囊。大蕊花腋生，胚珠直立單生，長橢圓狀卵形，長 3 mm.，濶 2 mm.。種子橢圓形，稍扁，長約 7 mm.，濶約 3-4 mm.，通常 2 稜，罕 3 稜，種臍橢圓形，假種皮杯狀，紅赤色。

本屬屬名源自古拉丁名，全屬約 8 種，分佈於北溫帶，各種間之差別極微，據德國 Pilger 氏之意見 (Pflanzenreich 18: 110, 1903) 以為全世界所產之此屬植物均當歸併為歐洲紅豆杉 (*Taxus baccata* Linn.) 之亞種，變種或型等，此理論頗堪注意。

本屬之顯著特徵為：(一)葉線形互生而為 2 列狀。(二)種子直立單生，下具杯形之假種皮。

本種廣泛分佈於我國之中部南部，及菲律賓北部。過去所用之學名為 *Taxus chinensis* Rehder；山本由松氏曾以為臺灣所產者應為 *Taxus Wallichiana* Zucc. (即西南紅豆杉)。依據之理由有二端：(一)自蔣英氏自四川峨眉出所採得之 No. 1265 (由 A. Rehder 氏鑑定) 之 *Taxus chinensis* 標本比較，以為臺灣所產者枝較柔，且葉較狹，故當為別種。(二)以為 *Taxus Wallichiana* 為印度東北部、緬甸、馬來亞及菲律賓所產，而臺灣在植物地理上與此等地區 (山本氏所謂“南迴系”) 關係較切，故臺灣所產者當為 *Taxus Wallichiana* 無疑。

關於此 2 種之分類性質及地理分佈迄多極端相異之說法。爰依據 Florin 氏最近之意見綜述如下：(1) *Taxus Wallichiana* Zucc. 產於印度，及馬來亞一帶。(2) *Taxus chinensis* Rehder 宜列為 *Taxus Wallichiana* 之一變種，即 *Taxus Wallichiana* var. *chinensis*，分佈於我國甘肅、四川、廣西及湖北等省。(3) 產於我國中南部 (四川、雲南、貴州、西康、廣東、浙江、安徽等省) 及臺灣、菲律賓諸地者應另立為一新種，即 *Taxus speciosa* Florin。

三者主要差異之點為：

- A. 葉背中部無乳頭狀突起……………*Taxus speciosa* (臺灣紅豆杉)  
 A. 葉背有乳頭狀突起  
   B. 葉長 1.5-3.3 cm.，濶 1.5-2.5 mm.，繖曲度深……………*Taxus Wallichiana* (印度紅豆杉)  
   B. 葉長 1-2.5 cm.，濶 1.5-3.3 mm.，稍繖曲……………*Taxus Wallichiana* var. *chinensis* (華南紅豆杉)



Plate III. *Amentotaxus formosana* Li (Taxaceae)

1. Leafy branch.
2. Staminate-flowering branch; 2a. staminate flower ( $\times 8$ ).
3. Pistillate-flowering branch.
4. Branch with two seeds.

3. *Amentotaxus formosana* Li in Journ. Arnold Arb. 33: 196, 1952.

"*Podocarpus argotaenia*" sensu Matsum. & Hayata in Journ. Coll. Sci. Tokyo 22: 399, 1906; non Hance.

"*Amentotaxus argotaenia*" sensu Yamamoto in Bot. Mag. Tokyo 40: 453, 1926; Suppl. Icon. Pl. Formos. 3: 1, t. 1, 1927, 5: 7, f. 1 & 2, 1932; Kanehira in Trans. Nat. Hist. Soc. Formos. 16: 80, 1926; Formos. Tr. rev. ed. 33, f. 2, pl. 10, 1036; Kudo in Journ. Soc. Trop. Agricul. 3: 110, 1931; non Pilger.

A small to medium sized tree, up to 10 m. high and 30 cm. in diameter, thinly branched, the branches subterete, the branchlets subquadrangular, opposite, spreading. Leaves subopposite, coriaceous, linear, more or less falcate, 5-8.5 cm. long, 7-9.5 mm. wide, dark greenish above, with a prominent midrib and 2 broad white stomatiferous bands beneath (about twice as broad as the marginal bands), the apex acuminate, the base acute or oblique, shortly petioled, the margins revolute. Flowers dioecious. Staminate flowers many in inflorescence; staminate inflorescences terminal, solitary or 3-5 in clusters, slender, 3 cm. long; stamens about 10 in each flower, usually with 5-8 pollen-sac. Pistillate flowers globose, 3 mm. in diameter, solitary in the axil of bracts; pedicels short and thick; ovules globose, 2 mm. long, solitary, erect. Seed solitary, axillary, drupe-like, oblong, 2 cm. long, 1 cm. in diameter, surrounded by reddish-yellow aril open at the apex, becoming dark purple.

Endemic. In southeastern parts of Taiwan, rather scarce, at altitudes of 1,200-1,300 m. in broad-leaved forests at shaded places, near ravines and cliffs.

## 臺灣穗花杉 *Amentotaxus formosana* Li

### 紅豆杉科

中喬木或小喬木，高達 10 m.，直徑達 30 cm.，枝密生，小枝對生，展開，圓形或近於四角形。葉革質，互對生，線形，略鑷曲，長 5-7 cm.，闊 0.5-1 cm.，上面深綠色，下面具顯著之中肋及兩條粉白色之潤氣孔帶（帶之潤度約為邊緣之兩倍），先端漸尖形，基部銳形或歪形，邊緣反卷，葉柄短。花單性異株，小蕊花多數，集成葉叢狀花序，頂生，一花序單生或三數花序簇生，纖柔，長約 3 cm.，每花約 10 枚小蕊，每小蕊具約 10 枚花粉囊左右。大蕊花球形，直徑 3 mm.，單生於苞腋，花柄粗短，胚珠球形，長 2 mm.，直徑 1.5 mm.，直立單生。種子單一，腋生，具長柄，核果狀，長橢圓形，長 2 cm.，直徑 1 cm.，被橙黃色假種皮，先端開口，成熟後呈深紫色。

屬名 *Amentotaxus*，顯示其與紅豆杉屬 (*Taxus*) 相近，而小蕊成為葉叢花序 (*Ament*) 狀也。本屬之主要特徵為：(一) 葉線形近於對生。(二) 小蕊花生於葉叢狀之花穗上。(三) 種子核果狀，腋生。

在 Pilger 氏之裸子植物分類系統中 (in Engler & Prantl, Die Nat. Pflanzenf. 2 Aufl, 13 Band, 1926)，將松柏部 (Coniferales) 植物區分為如下之 7 科 (其中第三科南洋杉科不產於我國)：1. Taxaceae 紅豆杉科，2. Podocarpaceae 羅漢松科，3. Araucariaceae 南洋杉科，4. Cephalotaxaceae 三尖杉科，5. Pinaceae 松科，6. Taxodiaceae 杉科，7. Cupressaceae 柏科。其中 Cephalotaxaceae 計包括三尖杉屬 (*Cephalotaxus*) 及穗花杉屬 (*Amentotaxus*) 兩屬。

1931年，工藤祐舜及山本由松 (Y. Kudo & Y. Yamamoto) 氏自穗花杉之大蕊花之研究結果，復將此屬自三尖杉科分出成立一新科，即穗花杉科 (*Amentotaxaceae*)。其理由為：(一) 穗花杉之小蕊花生於葉叢花序上。(二) 穗花杉之大蕊花之構造與紅豆杉屬相近而與三尖杉屬相差甚遠 (三尖杉屬之大蕊花由數對心皮組成，每心皮下具二枚胚珠，而穗花杉及紅豆杉之大蕊花則均僅具單胚珠)。近時學者多主張列入紅豆杉科。

本屬植物初時以為僅係一種，不連續分佈於：(1) 廣東，(2) 雲南南部，(3) 四川湖北之間及 (4) 臺灣東南部山地四區。

李惠林氏最近研究大批該類植物標本之結果，發現葉之形態性質——主要依據潤氣孔帶之潤度 (與周邊綠色線條之比例)，顏色，葉之長度，潤度等等——之差異，恰與其產地相符合，因之改為四種。

此項依據葉之形態作為分類基本性質之理論，在古植物學上 (如 Florin 學派) 應用頗廣，在分類學上尚未廣泛應用，因之未來如能獲得多量完整之小蕊花穗及種子標本等詳細研究，或可得更為精確之結論也。唯此羣植物絕非如最初想像之單純 (即僅為一種)，似可斷言也。



Plate IV. *Cephalotaxus Wilsoniana* Hayata (Cephalotaxaceae)

1. Leafy branch.
2. Staminate head ( $\times 5$ ).
3. Branch with a seed; 3a. seed in cross section.



4. *Cephalotaxus Wilsoniana* Hayata, Icon. Pl. Formos. 4: 22, 1914; Kanehira, Formos. Tr. 595, 1917, rev. ed. 31, f. I, 1936.

*Cephalotaxus* sp. Hayata in Journ. Coll. Sci. Tokyo, 35(19): 1908.

A medium-sized tree, to 10 m. high and 40 cm. in diameter, the bark dark brown, fissured, the branches horizontal or pendulous, subglabrous. Leaves flat, slightly falcate, spirally arranged, spreading in 2-ranks, 3-4 cm. long, 2.5-3 mm. wide, the apex acute, the base narrow, the midrib prominent above, the margins slightly revolute, with 2 grayish white bands below. Flowers dioecious. Staminate flowers many in a short-stalked head, 3-4 mm. in diameter; stamens 5-8 in each flower, with usually 3 pollen-sacs. Pistillate flowers in oblong, ellipsoid spike, ovate, 5 mm. in diameter, pedicellate; ovules 2 at the inner side of the fleshy scales; scales acute, glabrous. Seed drupe-like, ellipsoid, 18 mm. long, 10 mm. wide, the apex acute, shortly apiculate at the summit, the base obtuse, sessile.

Endemic. Widely distributed in Taiwan, but very scarce, growing under large trees in both broad-leaved and coniferous forests at altitudes of 1,400-2,000 meters.

## 臺灣三尖杉 *Cephalotaxus Wilsoniana* Hayata

### 三尖杉科

中喬木，高達 10 m.，直徑達 40 cm.，樹皮深褐色，平滑或淺縱裂，枝水平開展或懸垂，近於光滑。葉螺旋狀排列，扭曲成二列，線形，扁平，稍瀟曲，長 3-4 cm.，濶 2.5-3 mm.，先端銳形，基部狹，中肋表面顯著，邊緣稍反卷，背面具兩條灰白色之濶氣孔帶。花單性異株，小蕊花約 7-8 朵合成球形頭狀花序，直徑 3-4 mm.，腋生於葉腋，具短柄，每花具 5-8 枚小蕊，每小蕊有 3 枚花粉囊。大蕊花生於橢圓形之短穗狀花序上，每片肉質珠鱗內側著生胚珠兩枚。種子橢圓形，核果狀，長 18 mm.，濶 10 mm.，先端銳形，有短尖突，基部鈍形，近於無柄。

屬名 *Cephalotaxus*，*Cephalo-*(希臘語 *Kephale*)“頭”之義，示其與紅豆杉屬(*Taxus*)相近而小蕊花集成圓球形之頭狀花序也，故此屬亦名圓頭杉屬。

全屬四或五種，分佈印度東北部及我國與日本諸地，我國產三種，其中一種係本種，為臺灣特產，種名蓋為紀念名採集家兼分類學家 E. H. Wilson 氏者。

本屬之主要特徵為：(一)頂芽三枚聯立小枝先端，故有“三尖杉”之名。(二)小蕊花序成頭狀，故有“圓頭杉”之名。(三)大蕊花序果鱗多片，每果鱗內有胚珠二粒。(四)種子核果狀，橢圓形。

本種為臺灣特產，其異於廣泛分佈於我國大陸及日本之三尖杉(*Cephalotaxus drupacea* Sieb. & Zucc.)之點為：

- (1) 三尖杉——葉之先端急尖，種子倒卵形，長 3-3.5 cm.，濶 10-20 mm.，種柄長約 1 cm.。
- (2) 臺灣三尖杉——葉之先端銳形，種子橢圓形，長 1.8-2.5 cm.，濶約 10 mm.，種子近於無柄。



Plate V. *Podocarpus polystachys* R. Br. ex Mirb. (Podocarpaceae)

1. Staminate flowering branch.
2. Stamen (dorsal & ventral views).
3. Portion of seeding branch; 3a. seed with receptacle.

5. *Podocarpus polystachys* R. Br. ex Mirb. in Mem. Mus. Paris 13: 75, 1825; Merr., Enum. Philippine Fl. Pl. 1: 4, 1925.

"*Podocarpus costalis*" sensu Yamamoto, Suppl. Pl. Formos. 2: 15, 1927; Kanehira Formos. Tr. rev. ed. 35, 1936; non Presl.

A dwarf tree or shrub, the branches short and spreading, densely clustered on the apex. Leaves coriaceous, narrow or linear-lanceolate, 5-7 cm. long, 8-12 mm. wide, the apex shortly rounded or obtuse, the margins somewhat revolute. Flowers dioecious. Staminate flowers catkin-like, solitary, sessile, cylindrical, 3 cm. long, with few bracts at the base, the bracts subrounded; stamens numerous, spirally arranged, the anthers 2-celled. Pistillate flowers solitary, axillary, the peduncles about 2 mm. long; receptacles fleshy; scales 2, subequal, connate at the apex, about 7 mm. long. Seed elliptic, dark black when dry, 9-10 mm. long.

Malasia, Philippine Islands (Palawan to Batan Islands), Botel Tobago, along coasts among the rocks. The identify of the species is verified with numerous collections of the genus from neighbouring regions of Formosa.

### 蘭嶼羅漢松 *Podocarpus polystachys* R. Brown ex Mirb.

#### 羅漢松科

小喬木或灌木，枝短而開展。葉叢生於枝端，線形或線狀披針形，長 5-7 cm.，闊 8-12 mm.，先端圓形或鈍形，邊緣稍反卷。花單性異株，小蕊花葉莖狀，圓柱形，單生，無柄，長 3 cm.，基部有苞片數枚，苞片短而剛硬，近於圓形，小蕊極多，螺旋狀排列，每小蕊具 2 花粉囊。大蕊花單生，腋生，花柄長約 2 mm.，花托具鱗片二枚，近於相等，先端連結，長約 7 mm.。種子橢圓形，核果狀，熟時深黑色，長 9-10 mm.。

本屬之屬名 *Podocarpus* 意為足-果，蓋示其核果狀之種子下部常有足狀之膨大肉質之種托也（屬中一部份種類如蘭嶼羅漢松，埔里羅漢松及菲律賓羅漢松之種子下均具此種肉質膨大之種托，而臺灣竹柏，南港竹柏等則無之。由此項性質可區別此屬為羅漢松及竹柏兩亞屬也）。全屬約 60 餘種。主要分佈於南半球熱帶及亞熱帶。

本屬之顯著特徵：（一）葉形多變化，自披針形，橢圓形，線形以至鱗片形。（二）種子核果狀，具柄，通常著生於成熟時鮮艷肉質之種托上。

本種僅產於臺灣東南部之小島（蘭嶼）及菲律賓，其分佈頗堪注意，蓋菲律賓之北部與臺灣島之極南端（恆春半島、蘭嶼及火燒島），在植物地理上親緣關係頗為密切也。

又本種之葉片革質，表面被厚角質層，顯為適應生長於海岸藥礫乾燥之岩石上之結果。

本種過去所用之學名，均為 *Podocarpus costalis* Presl，唯依據佐佐木舜一氏在馬尼刺標本館中研究結果，應為 *Podoc. polystachys* R. Brown，李惠林氏核對之結果亦然。



Plate VI. *Podocarpus philippinensis* Foxworthy (Podocarpaceae)

1. Branch with foliage leaves.
2. Branch with seeds.

6. *Podocarpus philippinensis* Foxworthy in Philip. Journ. Sci. (Bot) 6: 163, 1911; Sasaki, List Pl. Formos. 49, 1928; Kanehira, Formos. Tr. rev. ed. 39, f. 6, 1936.

A large or meidum-sized tree, to 20-30 m. high, the bark smooth, reddish-brown, flaky. Leaves linear-lanceolate, 13-17 cm. long, 9-10 mm. wide, the apex acute, the base more or less abruptly narrowed. Seed globose, fleshy, 6-8(-15)mm. in diameter, glaucescent with a thin hard shell; receptacle swollen, fleshy, bright-red when fresh, 8-10 mm. long, of a dull brownish or dark-blue color when dry; peduncle 2-3 cm. long, with 2 minute bracts at the base of receptacle.

Philippine Islands. Taiwan, in Hungchuen Peninsula, scattered in forests at medium altitudes.

## 菲律賓羅漢松 *Podocarpus philippinensis* Foxw.

### 羅漢松科

大喬木，高可達 20-30 m.，樹皮平滑，紅褐色。葉線形披針形，長 13-17 cm.，闊 9-18 mm.，先端銳形，基部急尖。種子球形，肉質，直徑 6-8(-15)mm.，灰白色，具薄硬之壳；種托膨大，肉質，新鮮時亮赤色，長 8-10 mm.，乾燥後暗褐色。種柄細長，長達 2-3 cm.，先端具兩枚小苞片。

本種分佈於菲律賓北部及臺灣恆春半島北面之山地，菲律賓與恆春半島在植物親緣上之關係緊密，又可獲一明證。

本種與埔里羅漢松 (*Podocarpus macrophyllus* var. *Nakaii*) 頗為相似，分別之點為：

- (1) 菲律賓羅漢松——葉長 13-17 cm.，種子球形，先端圓形，種柄長約 2-3 cm.。
- (2) 埔里羅漢松——葉長 6-8 cm.，種子歪球形，先端斜尖，種柄長約 2 mm.。

羅漢松屬 (*Podocarpus*) 通常分為 5 組 (Sections)，臺灣所產之本屬植物 5 種，則分隸於下列 2 組者。

(1) 羅漢松組 (Section *Eupodocarpus* Enchl.) 葉互生至輪生，通常極狹，具中肋，種子生於肉質種托上。蘭嶼羅漢松、埔里羅漢松、及菲律賓羅漢松均屬於此組。

(2) 竹柏組 (Section *Nageia* Enchl.) 葉對生或亞對生，通常較闊，有平行脈多條，種子腋生，種托肉質或乾燥，小蕊花常分枝。南港竹柏、恆春竹柏屬於此組。

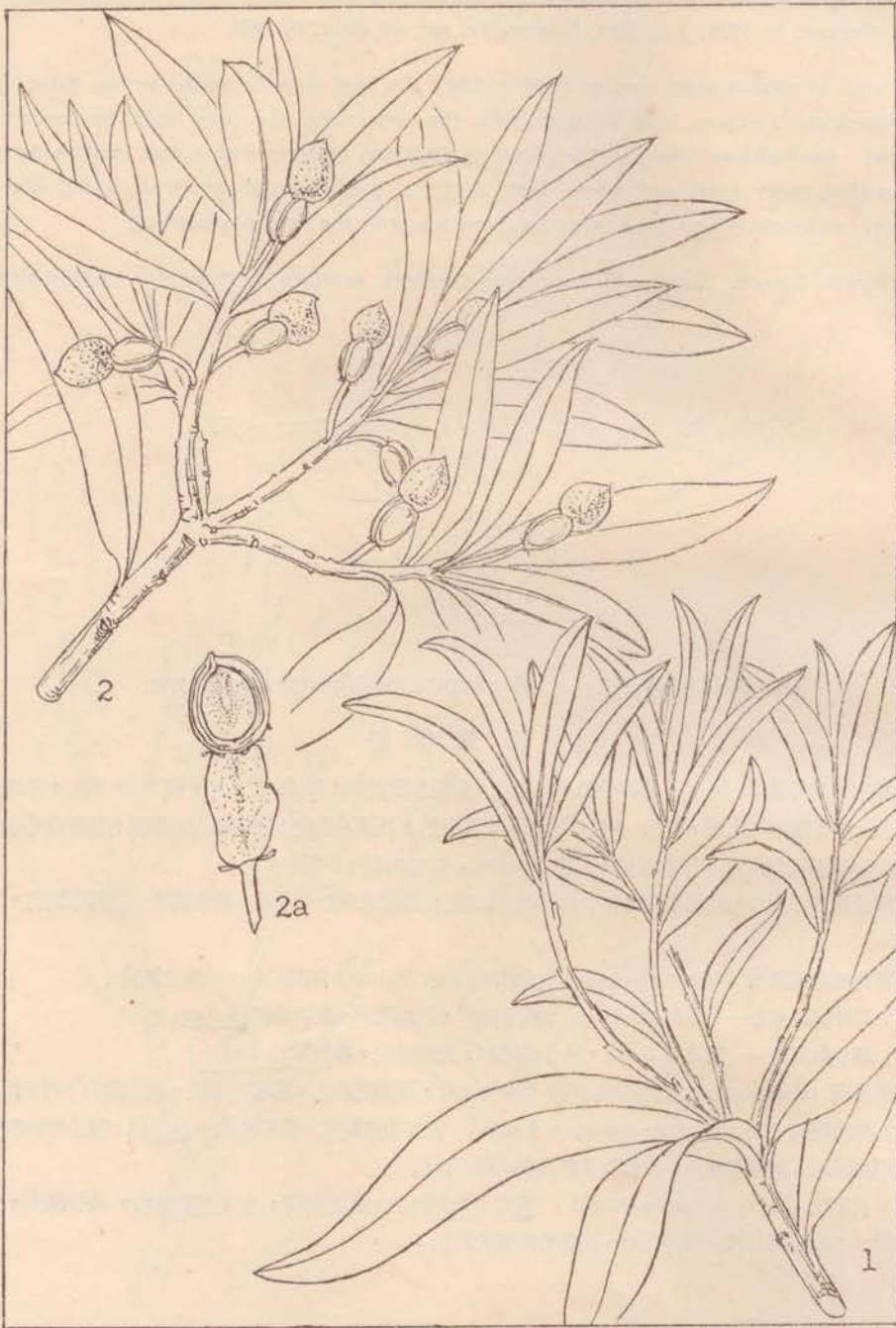


Plate VII. *Podocarpus macrophylla* D. Don var. *Nakaii* Li & Keng (Podocarpaceae)

1. Branch with foliage leaves.
2. Branch with seeds; 2a. seed with its receptacle in longi-section ( $\times 2$ ).

7. *Podocarpus macrophyllus* D. Don var. *Nakaii* (Hayata) *comb. nov.*

"*Podocarpus macrophyllus*" *sensu* Matsum. & Hayata in Journ. Coll. Sci. Tokyo 22: 398, 1916; Kanehira, Formos. Tr. 612, 1917; *non* D. Don.

"*Podocarpus nerifolius*" *sensu* Hayata in Journ. Coll. Sci. Tokyo 30(1): 307, 1917; Masamune, Short. Fl. Formos. 34, 1936; *non* D. Don.

*Podocarpus Nakaii* Hayata, Icon. Pl. Formos. 6: 66, 1916; Kanehira, Formos. Tr. 6.3, 1917, rev. ed. 36, f. 5, 1936; Sasaki in Trans. Nat. Soc. Formos. 112: 167, 1930.

A medium-sized or large tree, to 60 cm. in diameter, the bark grayish, fibrous, the branches terete, glabrous. Leaves coriaceous, alternate, lanceolate to linear-lanceolate, 6-8 cm. long, 8-12 mm. wide, straight or slightly falcate, the apex obtuse, the base acute or shortly attenuate, the margins entire, the midribs prominent on both surfaces; petioles very short, about 5 mm. long. Seed solitary, axillary, oblique ovoid, 1 cm. long, 8 mm. wide, the apex apiculate-acute, glabrous; receptacle fleshy, oblique obconical-globose, 2-lobed, 5-1.2 cm. long; peduncle 2-12 mm. long, erect, the apex with 2 triangular bracts.

Endemic in Taiwan, in the northern and central parts of the island, scattered in forests. The variety is very variable like the typical form of the species of the mainland China, differing in the more acutely pointed leaves and in the ovoid and acute seed.

埔里羅漢松 *Podocarpus macrophyllus* D. Don var.  
*Nakaii* (Hayata) Li & Keng

羅漢松科

中型或大喬木，直徑達 60 cm.，樹皮灰色，纖維質，枝圓形，光滑。葉革質互生，披針形至線狀披針形，長 6-8 cm.，闊 8-12 mm.，直或微作瀾曲，先端鈍形，基部銳形，全緣，中肋兩面顯著。葉柄極短，約 0.5 cm. 長。種子單立，腋生，斜卵圓形，長 1 cm.，闊 8 mm.，先端尖銳形，光滑，種托肉質，斜倒圓錐狀球形，二裂，長 0.5-1.2 cm.，種柄長 2 mm.，直立，先端，具兩片三角形之苞片。

本變種為臺灣之特產，分佈於中部森林內，其原種則產於我國大陸南部及日本，本變種之模式標本係採自南投埔里，變種名蓋為紀念原採集者中井宗三 (S. Nakai) 也。

本變種與廣泛分佈於中國本土及日本之原種——羅漢松 (*P. macrophylla* D. Don) (此種在臺灣栽培極為廣泛之公園庭園內常見到) 頗為相似，本變種之種子之先端斜銳形，而羅漢松之種子亦為卵圓形，但先端略呈圓形，無尖銳之斜突，葉之先端亦較為尖銳，最易分辨也。

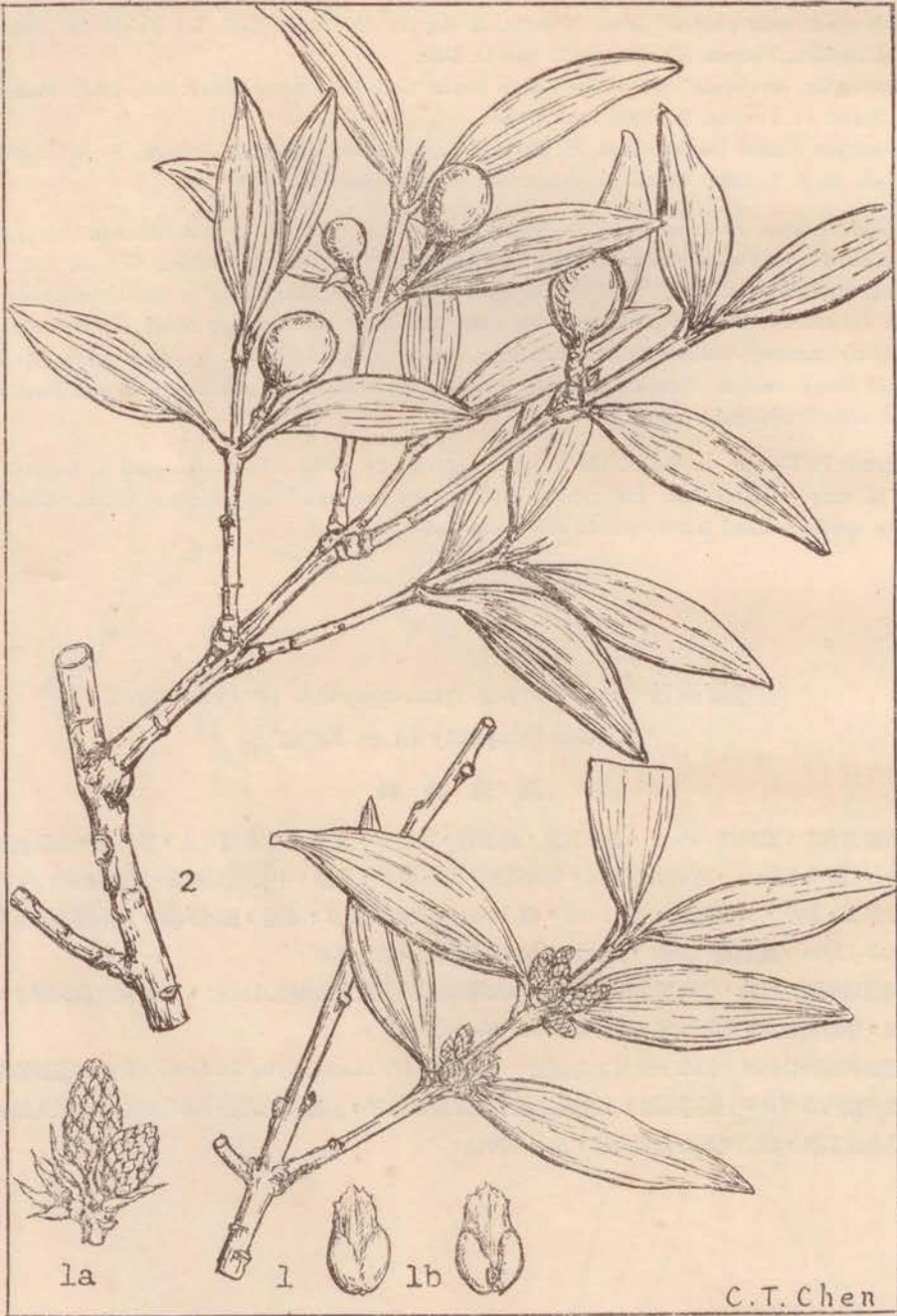


Plate VIII. *Podocarpus nankoensis* Hayata (Podocarpaceae)

1. Branch with ataminate flowers; 1a. two staminate flowers; 1b. stamen (dorsal and ventral views).
2. Branch with seeds.



8. *Podocarpus nankoensis* Hayata, Icon. Pl. Formos. 7: 39, 1918; Kanehira, Formos. Tr. 613, 1917, rev. ed., 707, pl. 50, 1936; Merr. in Lingnan Sci. Journ. 5: 21, 1927; Sasaki, List. Pl. Formos. 49, 1928; Yamamoto in Journ. Soc. Trop. Agr. 7: 147, 1935.

"*Podocarpus nagi*" *sensu* Kanehira, Formos. Tr. 612, f. 1919, rev. ed. 35, 1936; Masamune, Short. Fl. Formos. 34, 1936; *non* Zoll. & Moritzi.

A medium-sized tree, to 50 cm. in diameter, the branches and branchlets slender, ascending or spreading, more or less pendulous. Leaves opposite, lanceolate or ovate-lanceolate, 6-9 cm. long, 13-25 mm. wide, multinerved, the apex acute or acuminate, the base cuneate-attenuate, sessile. Flowers dioecious. Staminate flowers axillary, cylindrical, 4-5 in clusters, 5-7 mm. long, glabrous; stamens 70-100, spirally arranged, the anthers 2-celled. Seed globose, 1-1.2 cm. in diameter; receptacle obsolete; peduncle scarred. 1 cm. long, glabrous.

Hainan. Taiwan, in the northern part of the island.

## 南港竹柏 *Podocarpus nankoensis* Hayata

### 羅漢松科

中型喬木，直徑達 50 cm.；枝及小枝柔長，斜出展開，通常下垂。葉對生，披針形或卵狀披針形，長 6-9 cm.，闊 13-25 mm.，具多數平行葉脈，先端銳形或漸尖形，基部楔形，無葉柄。小蕊腋生，圓柱形，4-5 枚簇生，長 5-7 mm.，光滑，每花有小蕊 70-100 枚螺旋狀著生，每小蕊有藥室二枚。種子球形，直徑 1.2 cm.，種托不著，種柄多苞痕，光滑，長約 1 cm.。

本種產於臺灣北部，分佈達及海南島，實為一堪注意之事實。

本種極易與竹柏 (*Podocarpus nagi* Pilger) 相混淆，後者產於日本及我國東南部，臺灣公私園庭中栽培極多，但非臺灣原產，而係自日本引種者。二者區別之點：

- (1) 竹柏 (*P. nagi*)——小蕊花長約 1-1.5 cm.，鱗片亦較潤，種子直徑 1.3-1.6 cm.，枝通常向上開展。
- (2) 南港竹柏——小蕊花長約 5-7 mm.，鱗片較狹，種子直徑 1 cm.，枝通常下垂。



Plate IX. *Podocarpus formosensis* Dümmer (Podocarpaceae)

1. Staminate-flowering branch; 1a. staminate flowers; 1b. staminate flower; 1c. stamen (dorsal & ventral views).
2. Seed-bearing branch.

9. *Podocarpus formosensis* Dümmer, Gard. Chron. 52: 295, f. 132, 1912; Sasaki, List Pl. Formos. 49, 1928; Yamamoto in Journ. Soc. Trop. Agr. 7: 146, f. 18, 1935; Kanehira, Formos. Tr. rev. ed. 707, 1936.  
 "*Podocarpus nageia*" sensu Henry, List Pl. Formos. 91, 1896; *p. p. non* R. Br  
 "*Podocarpus nagi* var. *angustifolia*" sensu Sasaki, List Pl. Formos. 49, 1928; Cat. Govern. Herb. Formos. 53, 1930; *non* Makino.  
*Podocarpus koshunensis* Kanehira, Formos. Tr. rev. ed. 36, f. 4, 1936.  
*Podocarpus nagi* var. *koshunensis* Kanehira in Trans. Nat. Hist. Soc. Formos. 21: 145, 1931.  
*Podocarpus formosensis* Dummer var. *koshunensis* Merr. & Yamamoto ex Yamamoto in Journ. Soc. Trop. Agr. 7: 146, 1935.

A tree, the bark purplish brown, the branches stout, semiterete, dark brown or grayish, the branchlets subopposite, erect, densely leafy. Leaves opposite, decussate, narrowly elliptic-lanceolate, the apex obtuse, the base narrowly into a broadened and flattened pseudopetiole, 2.5-3.5 cm. long, 0.7-1.5 cm. wide, thick and rigid in texture, apparently nerveless and smooth on both surfaces, the dorsal stomatiferous lines scarcely visible; margin scariosus and slightly recurved. Flowers dioecious. Staminate flowers axillary, elliptic to globose, sessile, 8-10 in clusters; stamens many, spirally arranged, the anthers 2-celled. Seed globose, 1.2-1.4 cm. in diameter, thickly fleshy; receptacle obsolete; peduncle stout, scarred, 7 mm. long, glabrous.

Endemic. Confined to the southernmost part of the island.

## 恒春竹柏 *Podocarpus formosensis* Dümmer

### 羅漢松科

喬木，樹皮紫褐色，枝粗壯，半圓形暗褐色或灰色，小枝亞對生，方形，平滑，密生多數葉片。葉十字形對生，狹橢圓形或橢圓狀披針形，長 2.5-3.5 cm.，闊 0.7-1.5 cm.，先端鈍形，基部漸狹成爲假葉柄。小蕊花腋生，橢圓形至圓形，無柄，8-10 枚簇生，小蕊多數，螺旋狀著生，每小蕊具藥室二枚。種子圓形，直徑 1.2-1.5 cm.，肉質，種托不著，種柄多鱗痕，粗壯，長 7 mm.，光滑。

據 Dümmer 氏之原記載，模式標本爲 *Henry 1857*，係 Henry 氏之同僚 Schmüser 氏採自恒春半島者。

本種爲臺灣極南端恒春半島之特產，與竹柏 (*P. Nagi* Pilger) 及南港竹柏 (*P. nankoensis* Hayata) 相比較，其特異之點爲：(一)葉厚，狹窄而小，其先端且常爲烙黑色。(二)小蕊花近於球形。

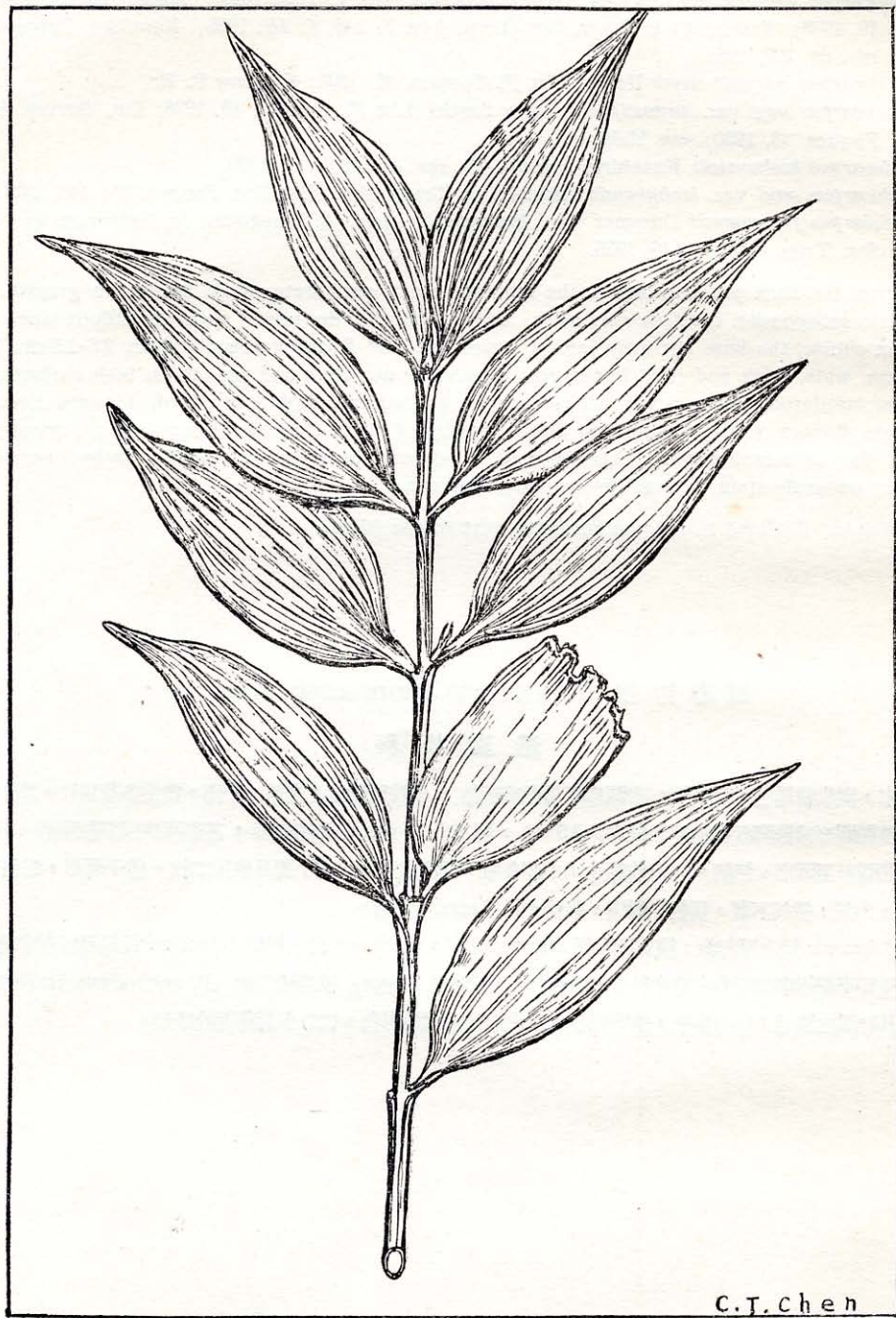


Plate X. *Podocarpus* sp. (Podocarpaceae)

A foliage branchlet.

10. *Podocarpus* sp.

"*Podocarpus nageia*" sensu Henry, List Pl. Formos. 91, 1896; *p. p.* non Brown.

"*Podocarpus latifolius*" sensu Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 547, 1902; Matsum. & Hayata in Journ. Coll. Sci. Tokyo 22: 398, 1906; Kanehira, Formos. Tr. 611, 1917; Masamune, Short Fl. Formos. 34, 1936; non Wallich.

"*Podocarpus Wallichianus*" sensu Yamamoto in Journ. Soc. Trop. Agr. 7: 147, f. 19, 1935; Kanehira, Formos. Tr. rev. ed. 707, 1936; non Presl.

Leaves opposite or nearly opposite, coriaceous, without prominent midrib, ovate to ovate-lanceolate, about 7.5-10 cm. long, 2-3 cm. wide, the apex caudate-acuminate.

The species originally referred to *P. nageia* by A. Henry came from both the northern and the southern parts of Formosa. The southern collection, *Henry 1357* (from Hungchuen Peninsula), was made the type of a distinct species *P. formosensis* Dümmer. Whereas the northern collection, *Henry 1446* (from Tamsui), was identified by Yamamoto as *P. Wallichianus*. Upon actual examination, this collection is apparently closer to *P. Blumei* Endl. of the Philippines than *P. Wallichianus*. Additional specimens collected from the northern part of the island indicate that perhaps a species distinct from either one is represented. Unfortunately, the specimens are all sterile. It is also possible that this is an early introduced plant originate in more southern regions.

竹柏之一種 *Podocarpus* sp.

## 羅漢松科

此為臺灣所產羅漢松屬竹柏亞屬中之未定種。

較早之標本為英人 A. Henry 氏採自淡水者，初時以為即係分佈於日本之竹柏 (*Podocarpus Nageia* Brown)。其後山本由松氏研究結果，以為即係分佈於印度支那半島之瓦氏竹柏 (*Podocarpus Wallichianus* Presl)。唯依據葉形比較之結果，本種似近於新畿內亞以迄菲律賓一帶之布氏竹柏 (*Podocarpus Blumei* Endl.)，所惜者自臺灣北部(如淡水、文山、乾溝等地)所採得之標本，均無毬花及種子。

爰將本種葉之性質記載如下：

葉對生或亞對生，革質，無主脈而有平行縱脈多條，卵形至卵狀披針形，長 7.5-10 cm.，闊 2-3 cm.，先端尾尖狀漸尖形。

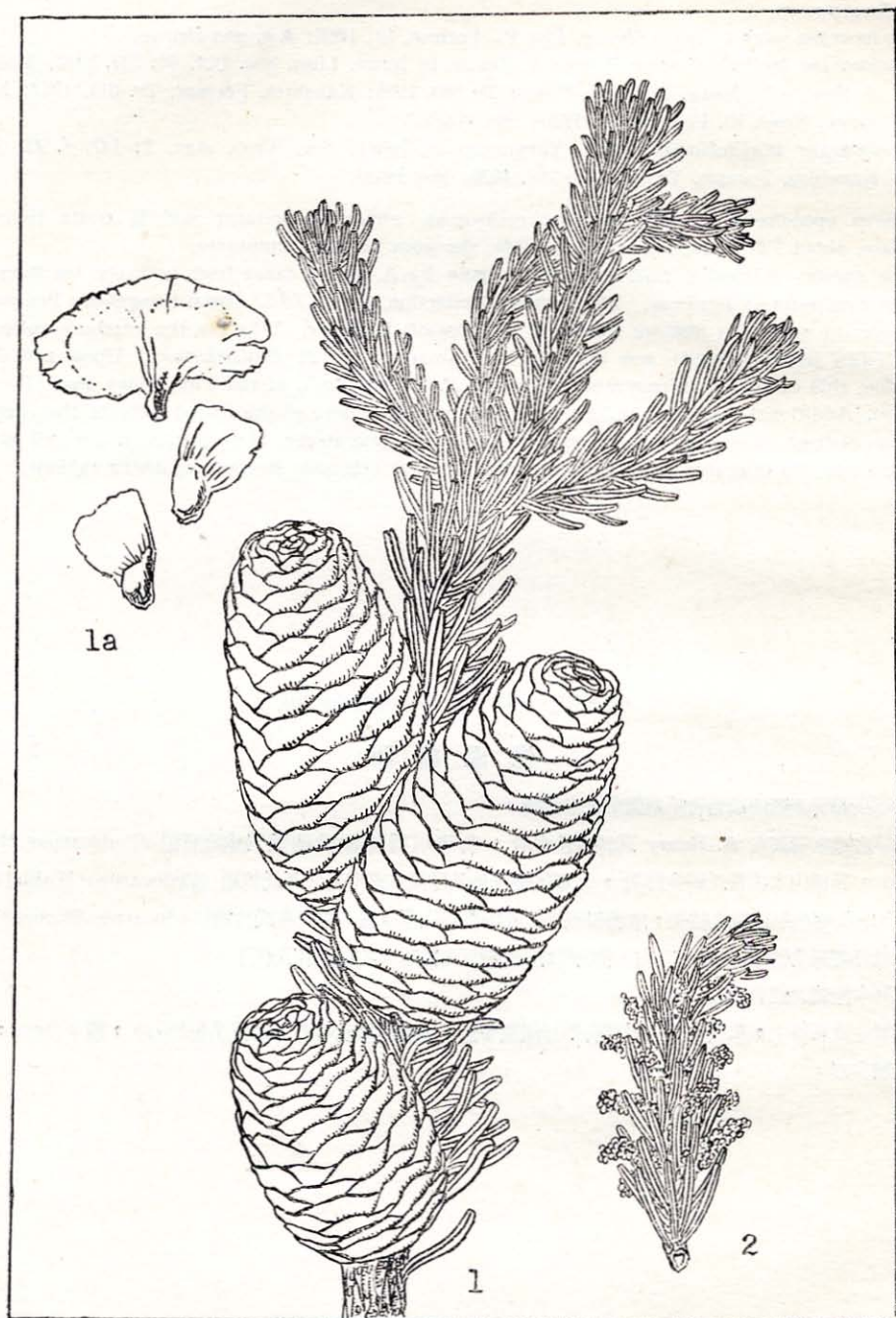


Plate XI. *Abies Kawakamii* Ito (Pinaceae)

1. Branch with cones; 1a. cone-scale & seeds ( $\times 2$ ).
2. Branch with staminate strobili.

11. *Abies Kawakamii* (Hayata) Ito in *Encycl. Jap.* 2: 167, 1909; Kanehira, *Formos. Tr.* 594, *f.* 1917, ed. rev. 39, *f.* 7, 1936; Hayata, *Icon. Pl. Formos.* 9: 108, 1920; Masamune, *Short. Fl. Formos.* 35, 1936.

*Abies Mariesii* Mast. var. *Kawakamii* Hayata in *Journ. Coll. Sci. Tokyo* 35(19): 223, *f.* 14, 1908; non Masters.

"*Abies Mariesii*" *sensu*, Hayata in *Matsum. & Hayata in Journ. Coll. Sci. Tokyo* 22: 400, 1906.

A large tree of pyramidal shape, to 16 m. tall and 100 cm. in diameter, the bark grayish brown, scaly, the branches whorled, horizontally spreading, the branchlets covering with brown hairs when young. Leaves broadly linear, flat, 10-15 mm. long, with 2 white stomatiferous bands below, and with 2 lateral resin ducts, the midrib grooved above, elevated below, the apex rounded-obtuse, emarginate at the extremity. Staminate strobili pendulous on the under side of the branchlets, cylindrical, 1.5 cm. long. Cones erect, cylindrical or oblong, the apex truncate or retuse, 7.5 cm. long, 4 cm. in diameter, purplish at maturity; cone-scales fan-shaped, 15-18 mm. long, 20-25 mm. wide, the margins irregularly serrate; bracts narrowly obovate, 12-14 mm. long, 5-6 mm. wide, the upper portion subrounded, serrulate, the base cuneate. Seeds angled, winged, 15-18 mm. long including the wing.

Endemic. Occuring extensively at high altitudes of 2,800-3,300 meters along central ranges usually forming pure stands.

## 臺灣冷杉 *Abies Kawakamii* (Hayata) Ito

### 松 科

圓錐形大喬木，高達 16 m.，直徑達 100 cm.，樹皮灰褐色，鱗片狀，枝輪生，水平開展。小枝幼時被褐色茸毛。葉闊線形，扁平，長 10-15 mm.，下面具二條白色氣孔帶，截面具二側生脂管，中肋上面凹下，下面隆起，先端圓形，頂部凹入。小蕊毬花懸垂於小枝下側，圓柱形，長 1.5 cm.，毬果直立，圓柱形或長橢圓形，先端截形，微凹入，長 7.5 cm.，直徑 4 cm.，成熟時紫褐色，果鱗扇形，長 15-18 mm.，闊 20-25 mm.，邊緣有不規則之鋸齒；苞鱗狹倒卵形，長 12-14 mm.，闊 5-6 mm.，上部近於圓形，有不規則鋸齒緣，基部截形。種子連翅長 15-18 mm.。

本屬之特徵爲：(一) 葉扁平，中肋凹下，葉基膨大如吸盤狀。(二) 毬果直立於小枝上部，種子成熟時果鱗即脫落，殘存果軸於枝上。

全屬 40 餘種，主要分佈於北半球之溫帶，稍南之區域生於高山上，偏北之區域則生於平原上，我國約產 10 種，臺灣產 1 種，生於中央山脈 2,800-3,300 m. 高處，常成純林。

本屬之屬名依古拉丁名，本種之種名則爲紀念日本採集家川上瀧彌 (T. Kawakami) 氏著。

本種初經早田文藏氏命名爲日本產馬氏冷杉 (*Abies Mariesii* Masters) 之變種，後經伊藤篤太郎 (A. Ito) 氏改爲獨立之種，二者重要區別之點在於其毬果及種子之性質：

(1) 馬氏冷杉 (*A. Mariesii*)——毬果長 10 cm.，直徑 5 cm.，苞鱗先端有尖突，種子連翅長 2.2 cm.。

(2) 臺灣冷杉 (*A. Kawakamii*)——毬果長 7.5 cm.，直徑 4 cm.，苞鱗先端近於圓形，種子連翅長 1.5-1.8 cm.。



Plate XII. *Keteleeria Davidiana* Beissn. var. *formosana* Hayata (Pinaceae)  
A branch with a cone; 1a. cone-scales (dorsal & ventral views) and seeds ( $\times 1.5$ ).



12. *Keteleeria Davidiana* (Franchet) Beissner var. *formosana* Hayata in Gard. Chron., Ser. 3, 43: 194, 1908, in Journ. Coll. Sci. Tokyo 35(19): 221, f. 1, 1908; Flous in Bull. Soc. Hist. Nat. Toulouse 70: 334, f. 1936.  
 “*Keteleeria Davidiana*” *sensu* Matsumura & Hayata in Journ. Coll. Sci. Tokyo 22: 397, 1906; Kanehira, Formosa Tr. 602, f. 1917, rev. ed. 39, f. 8, 1936; *non* Beissner.

A very large tree, to 40 m. tall, pyramidal when young, flat-topped in old age, the bark dark gray, irregularly furrowed, the branches whorled spreading; the young branchlets tomentose or glabrous. Leaves appearing 2-ranked, 2-5 cm. long, 3-4 mm. wide, the midrib keeled on both surfaces, lustrous above, pale below, the margins slightly revolute, the apex obtuse, rounded or emarginate, on young trees and vigorous shoots mostly acute and spinescent, narrowed into a short compressed, slightly twisted petioles. Staminate strobili clustered, the individual cylindric, obtuse, about 1 cm. long. Cones solitary, erect on a short lateral spur serving as a peduncle, cylindric, obtuse, variable in size, 5-15 cm. long, 4-4.5 cm. in diameter, greenish when young, pale chestnut brown at maturity; cone-scales orbicular-ovate, slightly longer than broad, attenuate at the apex, which is rounded and slightly reflexed, with a thin gnawed margin all around; bracts about half as long as the scale, ovate-lanceolate, thin, the apex 3-lobed and with a slightly thickened sharp acumen in the middle. Seeds 20-25 mm. long, the wing narrowly knife-shaped.

The species in central and western China. The variety in Taiwan, occurring at the extreme northern parts at 300-600 m. and the extreme southern parts at 500-900 m., usually in association with broad-leaved trees in open places; now scarce in both parts.

## 變種德氏油杉 *Keteleeria Davidiana* Beissner var. *formosana* Hayata

### 松 科

大喬木，高達 40 m.，幼樹塔形，老樹樹冠扁平，樹皮暗褐色，不規則裂開。枝輪生，展開。葉線狀扁平，中肋兩面均隆起，長 2-5 cm.，濶 3-4 mm.，先端鈍圓或微凹，基部漸狹。小蕊毬花簇生，每毬花圓柱形，長 1 cm.。毬果單生、直立於短枝上，圓柱狀長橢圓形，長 5-15 cm.，濶 4-4.5 cm.，淡栗褐色。果鱗圓卵形，先端近於圓形，微反曲；苞鱗長約當果鱗之半，卵狀披針形，先端三裂，中裂特尖。種子連翅長 20-25 cm.。

本屬屬名為紀念法國園藝學家 J. B. Keteleer 氏者。

本屬為自冷杉屬 (*Abies*) 分出，二者之毬果均直立於枝上，為顯著之特徵，相異之點為：

(1) 冷杉屬 (*Abies*)——葉面中肋凹下，葉背肋隆起，小蕊毬花生於小枝下側之葉腋內，種子成熟後果鱗即脫落。

(2) 油杉屬 (*Keteleeria*)——中肋在葉兩面均隆起，小蕊毬花頂生或側生於小枝上，聚生成束狀或繖形 (tuft or umbels)，種子成熟後果鱗宿存，不立即脫落。

本屬僅兩種，為我國特產，油杉 (*K. Fortunei* Carr.) 產於閩粵一帶，本種——德氏油杉 (*K. Davidiana*) 則廣泛分佈於川陝鄂與雲南西南部及臺灣等地，其形態上變異頗大。因之若干學者主張析為三數獨立之種 (species)。即如臺灣以所產者與國內標本比較其毬果顯然較小 (國內產者，長 10-20 cm.，濶 5-6 cm.，而臺灣產者其長罕逾 15 cm.，其濶則在 4-4.5 cm. 之間)；果鱗及種子亦較小，形狀亦微異。因之如認德氏油杉 (*K. Davidiana*) 為一廣泛分佈形態上富於變異之種，則臺灣所產者當隸本種，然如側重於其相異之點，則當如早田文藏氏之意見，立為該種之變種 (var. *formosana* Hayata) 為妥。

本種之種名為紀念法國採集家大衛 (David) 神父，彼初在四川發現此種植物。

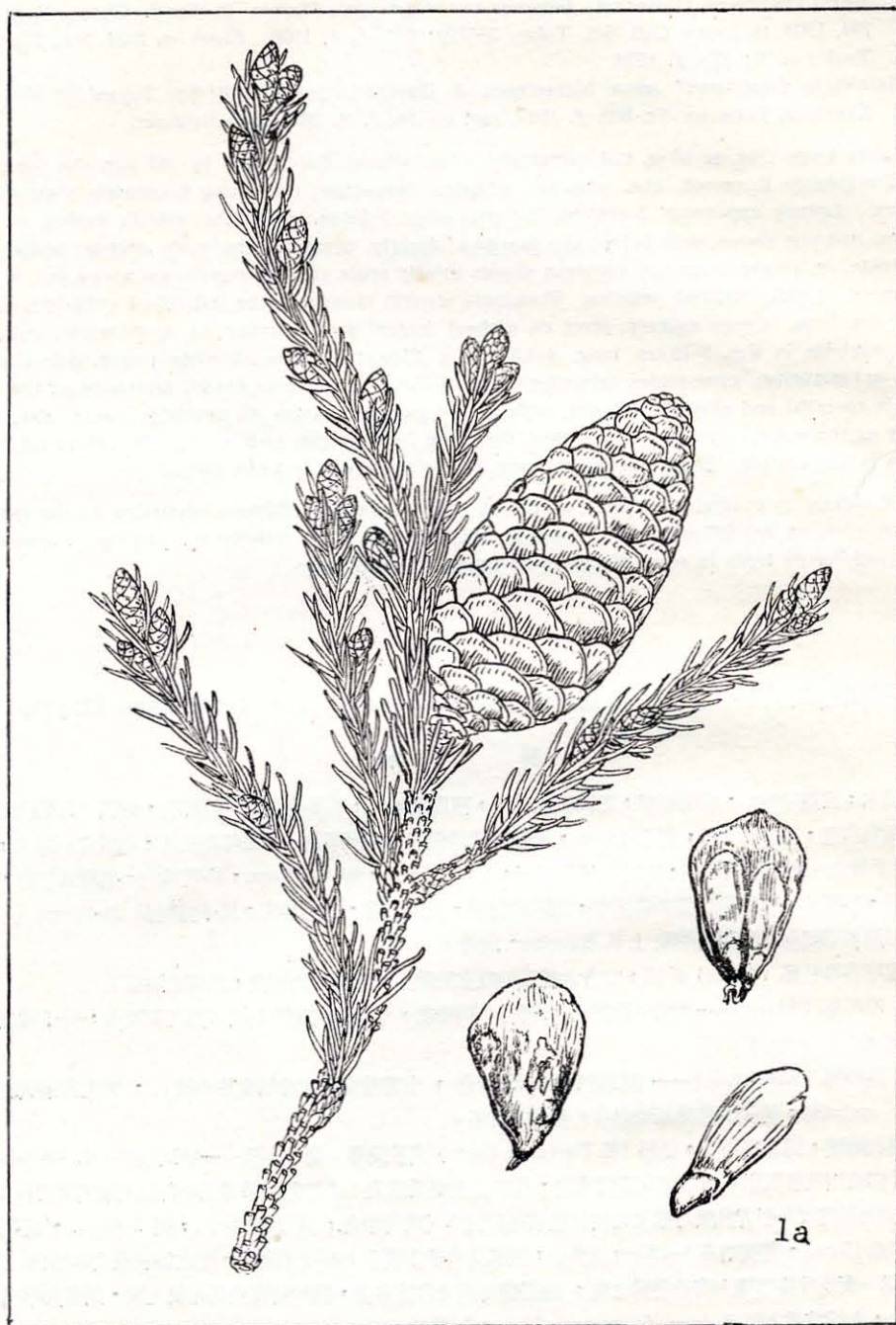


Plate XIII. *Picea morrisonicola* Hayata (Pinaceae)

A coning branch; 1a. cone-scales (dorsal & ventral views) and seeds.

13. *Picea morrisonicola* Hayata in Journ. Coll. Sci. Tokyo 35(19): 220, f. 10, 1908; Kanehira Formos. Tr. 604, f. 1917, rev. ed. 41, f. 9, 1936; Masamune, short Fl. Formos. 35, 1946.

"*Picea Glehnii*" sensu, Matsum. & Hayata in Journ. Coll. Sci. Tokyo 22: 400, 1906; non Masters.

A large tree, to 50 m. tall and 1.5 m. in diameter, of pyramidal habit, the bark brown, fissured into thin flakes, the branches densely whorled, horizontal, the branchlets glabrous. Leaves linear, 4-angled, 10-15 mm. long, 2-3 mm. wide, the apex acute, quadrangular in section, with 2 marginal resin ducts. Staminate strobili axillary, ovoid or cylindrical, erect or drooping. Cones pendulous, cylindric-oblong, dark purplish brown, 6-7 cm. long, 2-2.3 mm. wide; cone-scales orbicular-obovate, 15 mm. long, 12 mm. wide, the apex rounded, the margins wavy to subentire, cuneate at the base; bracts ovate-lanceolate, 5 mm. long, 2.5 mm. wide, the apex acute. Seeds 2 under each scales, compressed, winged, 10-12 mm. long including the wing.

Endemic. At high altitudes of about 2,500-3,000 meters in the central ranges, of scattered occurrence in ravines and mountain slopes, usually mixing with other trees.

## 臺灣雲杉 *Picea morrisonicola* Hayata

### 松 科

大喬木，高達 15 m.，直徑達 1.5 m.，樹皮褐色，開裂，成片狀剝落，枝輪生，水平開展，小枝平滑。葉線形，略成四棱，長 10-15 mm.，闊 2-3 mm.，先端銳形，截面方形，具側生脂管二枚。小蕊毬花腋生，圓柱形，直生或下垂。毬果下垂，圓柱狀長橢圓形，深紫褐色，長 6-7 cm.，闊 2-2.3 cm.。果鱗圓倒卵形，長 15 mm.，闊 12 mm.，先端圓形，邊緣波狀或全緣，基部楔狀鈍形，苞鱗卵形，長約 5 mm.。每果鱗下種子兩枚，扁平，連翅長 10-12 mm.。

本屬屬名源自古拉丁名，主要特徵爲：(一)葉扁平或四棱形，脫落後遺留葉枕 (leaf cushions or pulvini) 於小枝上。(二)毬果下垂，果鱗永存。

全屬 50 餘種，分佈於北半球寒帶及溫帶區域內，我國產 20 餘種，幾達全世界總數之半，多集中於川康一帶。臺灣僅於中央山脈 2,300-3,000 m. 高處產一種，多生於山坡及谷地，蓋此屬植物之習性喜生於寒冷而濕潤之地區也。

本種之種名 *morrisonicola* 係「玉山產」之意，玉山之英名爲 Mt. Morrison，蓋紀念英艦長 W. Morrison 氏也。

早田文藏以爲此種與我國所產之瓦氏雲杉 (*P. Watsoniana* Masters) 相近，唯果鱗異形而已 (後者之果鱗近於截形)。E. H. Wilson 氏 (in Conif. & Tax. Jap. 53, 1916) 直以爲此二者即係一種。唯瓦氏雲杉之學名殊待商榷 (Dallimore & Jackson 氏以爲係分佈川鄂間之威氏雲杉 *Picea Wilsoni* Masters 之同義名；而鄭萬鈞則將此二者，即瓦氏雲杉及威氏雲杉均歸併爲分佈於華北一帶之 *P. Neoveitchii* Masters 之同義名也)，誌此待考。

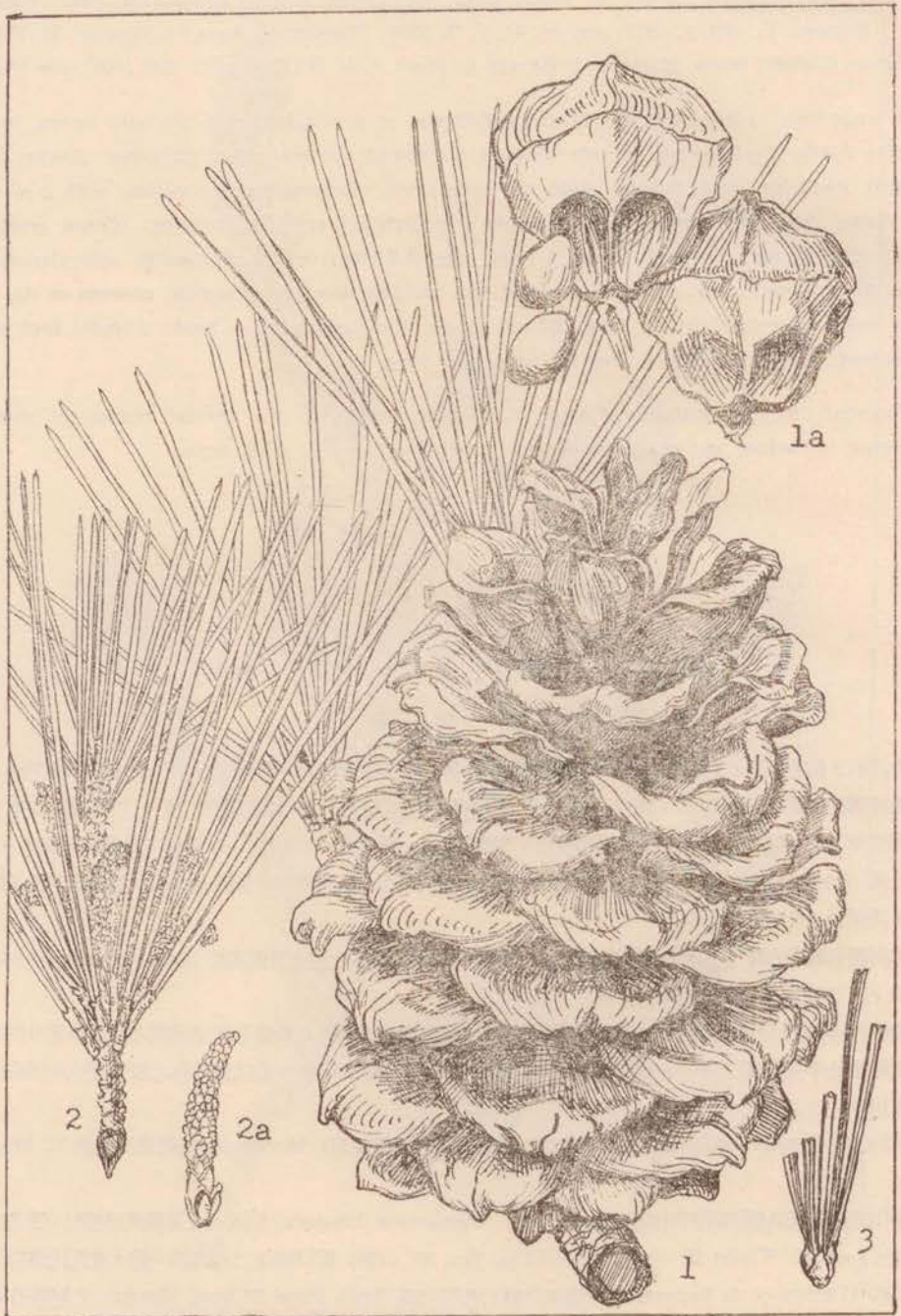


Plate XIV. *Pinus Armandi* Franchet var. *Masteriana* Hayata (Pinaceae)

1. Branch with a cone; 1a. cone-scales (dorsal & ventral views) and seeds.
2. Branch with staminate strobili; 2a. Staminate strobilus.
3. Basical portion of the needle-bundle.

14. *Pinus Armandi* Franchet var. *Masteriana* Hayata in Journ. Coll. Sci. Tokyo 35(19): 215, f. 8, 1908.

"*Pinus Armandi*" sensu Kanehira, Formos. Tr. 605, f. 1917, rev. ed. 42, f. 10, 1936; Masamune in Journ. Soc. Trop. Agric. 2: 31, 1930; short Fl. Formos. 34, 1936; Makino & Nemoto, Fl. Jap. ed. 2, 147, 1931; non Franchet.

A large tree up to 25 m. in height and 100 cm. in diameter, the bark pale gray, smooth and glabrous, the branches wide-spread, horizontal, the branchlets glabrous. Leaves 5 in a bundle, slender and spreading, 8-15 cm. long, the edges serrulate, triangular in cross section, with (2-)3 medial resin ducts, the sheath deciduous. Staminate strobili cylindrical, yellow, 2 cm. long, with spatulate bracts at the base. Cones oblong-cylindric to ovoid, 10-20 cm. long, 8 cm. in diameter, yellowish-brown; cone scales rhombic-orbicular, 3 cm. long and wide, the apophyses yellowish brown, dull or sublustrous, tapering to a slightly thickened umbo, sometimes reflexed, the umbo prominent; bracts minute. Seeds wingless, reddish-brown, ovoid, compressed, sharp-margined, 8-12 mm. long.

The species in Central and western China to southernmost Japan. The variety occurs in Taiwan, in the northern and central parts at altitudes of 2,300-3,300 meters.

### 變種華山松 *Pinus Armandi* Franchet var. *Masteriana* Hayata

#### 松 科

大喬木，高達 25 m.，直徑達 100 cm.，樹皮平滑，灰白色，枝水平開展，小枝光滑。葉五針成束，纖柔，長 8-15 cm.，邊緣有細鋸齒，截面三角形，具脂管三枚(罕二枚)，葉鞘早落。小蕊雄花長 2 cm.，圓柱形，黃色，基部有鱗片，毬果長橢圓狀圓柱形至卵形，長 10-20 cm.，直徑 8 cm.，先端圓形或截形而微尖，黃褐色，果鱗菱狀圓形，長潤約 3 cm.，鱗背(果鱗之外露部份)黃褐色，先端漸尖成爲微厚之鱗臍，通常微向外曲，鱗臍顯著，苞鱗極小。種子黑褐色無翅，卵形而扁，邊緣稜起，長 8-12 mm.。

本屬屬名源出古拉丁名，全屬八十種以上，分佈於北半球之各處。

本屬之主要特徵爲：(一)葉針狀，2, 3 或 5 枚簇生成束，下有葉鞘包圍之。(二)毬果木質，果鱗永存，鱗背通常加厚。

本種之分佈頗爲零落，散見於我國之中部(川陝鄂)及西南部(滇)，日本南部(九州南端之屋久島及種子島，據 Wilson 及正宗)及本省之中北部 2,300-3,300 m. 之高山上，顯示其往昔之分佈極爲廣泛也。

早田文藏氏初以爲臺灣所產者，爲一新種，命名爲 *Pinus Mastersiana*，繼乃改爲華山松之變種 (*P. Armandi* var. *Mastersiana*)，以爲臺灣所產者與我國本土所產者之異點爲毬果較大而果鱗彎曲，實則根據實際材料及多種參考文獻比較之結果，其毬果之大小二者均富變化(約在 10-20 cm. 之間，通常爲 10-14 cm.)，唯臺灣所產者其毬果之果鱗成熟後向外彎曲之程度較烈也。

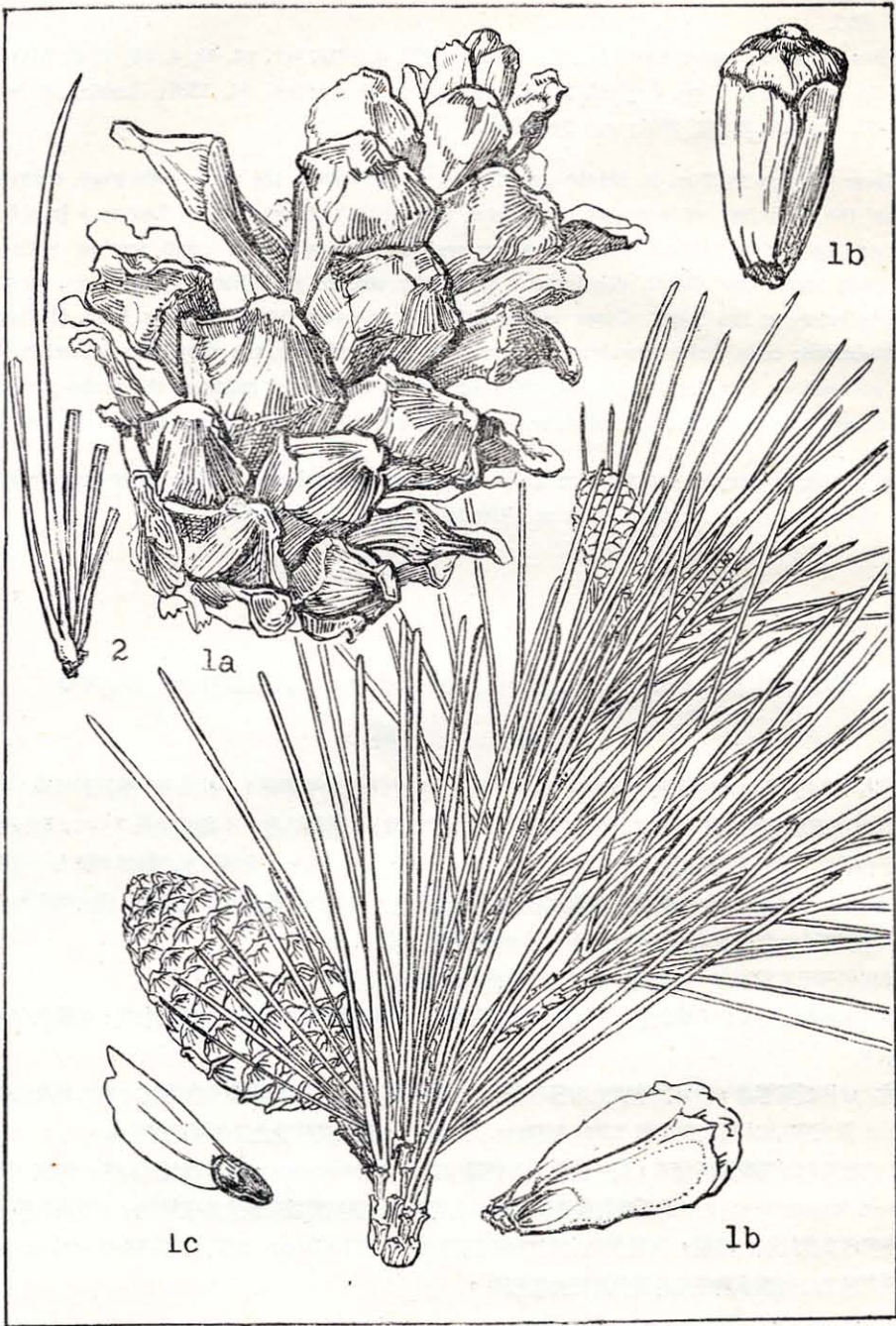


Plate XV. *Pinus morrisonicola* Hayata (Pinaceae)

1. Coning branch; 1a. fully opened cone; 1b. cone-scale (dorsal & ventral views); 1c. seed.  
 2. Basical portion of the needle-bundle.

15. *Pinus morrisonicola* Hayata in Gard. Chron., ser. 3, 43: 1908; Merr. in Enum. Hainan Pl. 22, 1924; Chung in Contrib. Biol. Lab. Sci. Soc. China (Bot.) 6: 11, 1930; Makino & Nemoto, Fl. Jap. ed. 2, 147, 1931, Li in Taiwania 1: 298, 1950.

*Pinus formosana* Hayata in Journ. Coll. Sci. Tokyo, 35(19): 217, f. 9, 1908; Kanehira, Formos. Tr. 607, f. 1917, rev. ed. 44, f. 11, pl. 15, 1936; Masamune, Short Fl. Formos. 35, 1936.

*Pinus Uyematsui* Hayata, Icon. Pl. Formos 3: 192, t. 35, 1913; Kanehira, Formos. Tr. 610, f. 1917.

"*Pinus parviflora*" sensu Matsum. & Hayata in Journ. Coll. Sci. Tokyo 22: 397, 1906; non Sieb. & Zucc.

A large tree, up to 15-25 m. high and 120 cm. in diameter, the trunk often crooked, the bark smooth on young trees, fissured on old ones, the branchlets pubescent when young. Leaves 5 in a fascicle, 6-8 cm. long, the margins remotely serrulate, triangular in cross section, with 2 marginal resin ducts. Cones erect, ovoid to oblong-ovoid, 7-10 cm. long, 4-5 cm. in diameter; cone-scales oblong ovate, 3 cm. long, 1.2 cm. wide, the apex rounded, slightly reflexed, the base cuneate, the apophyses thickened, lustrous, tapering to a umbo, the umbo prominent; bracts very minute. Seeds ovate, 10 mm. long, 6 mm. wide, winged, the wing knife-shaped, about 1 cm. long.

Endemic. At altitudes of 300-2,300 meters throughout the island, usually scattered and associated with broad-leaved trees, mostly present at higher elevations.

## 臺灣五葉松 *Pinus Morrisonicola* Hayata

### 松 科

大喬木，高達 15-25 m.，直徑達 120 cm.，樹幹常彎曲，幼樹樹皮通常綠色，平滑，老樹樹皮厚，深裂，小枝幼時有柔毛。葉五針成束，長 6-8 cm.，邊緣有疏細鋸齒，截面有側生油脂管二枚。毬果直立，卵形至長橢圓狀卵形，長 7-10 cm.，直徑 4-5 cm.，果鱗長橢圓狀卵形，長 3 cm.，闊 1.5 cm.，先端圓形微反曲，基部楔形，鱗背加厚，有光澤，菱形，先端漸尖或為鱗脊，苞鱗極小。種子卵圓形，連翅長約 2 cm.。

本種為臺灣特產，分佈於全島低地闊葉樹林內以迄高山上。

本種與變種華山松 (*P. Armandi* var. *Masteriana*) 為臺灣所僅產之五葉松 (葉五針成束考) 二者極易區別：

(1) 變種華山松——冬芽黑褐色，長 7 mm.，芽鱗先端銳尖形；葉長 8-15 cm.，截面有脂管 3 枚，在葉肉以內；毬果長 10-20 cm.，果鱗菱圓形，種子無翅，長 12 mm.。

(2) 臺灣五葉松——冬芽栗褐色，長 1.5 cm.，芽鱗先端漸尖形；葉長 6-8 cm.，截面有脂管 2 枚，貼近表皮；毬果長 7-10 cm.，果鱗長橢圓形，種子有長翅，連翅長 20 mm.。

本種之種名早田文藏初時發表為 *Pinus morrisonicola*，其後發覺此種名不甚恰當〔蓋其分佈幾遍全島，以中部最普遍，而玉山 (日名新高山，英名 Mt. Morrison) 則殊罕見也。〕故更名為 *Pinus formosana*，前一名正式發表在先，後一名發表在同年稍後 (參閱 Fl. Mont. Formos. 217, 1908)，按之過去植物學命名規則 (Internat. Rul. Bot. Nomen. Art 17, 68, 1934)，殊有未合，故仍當以應用前一種名為妥當也。

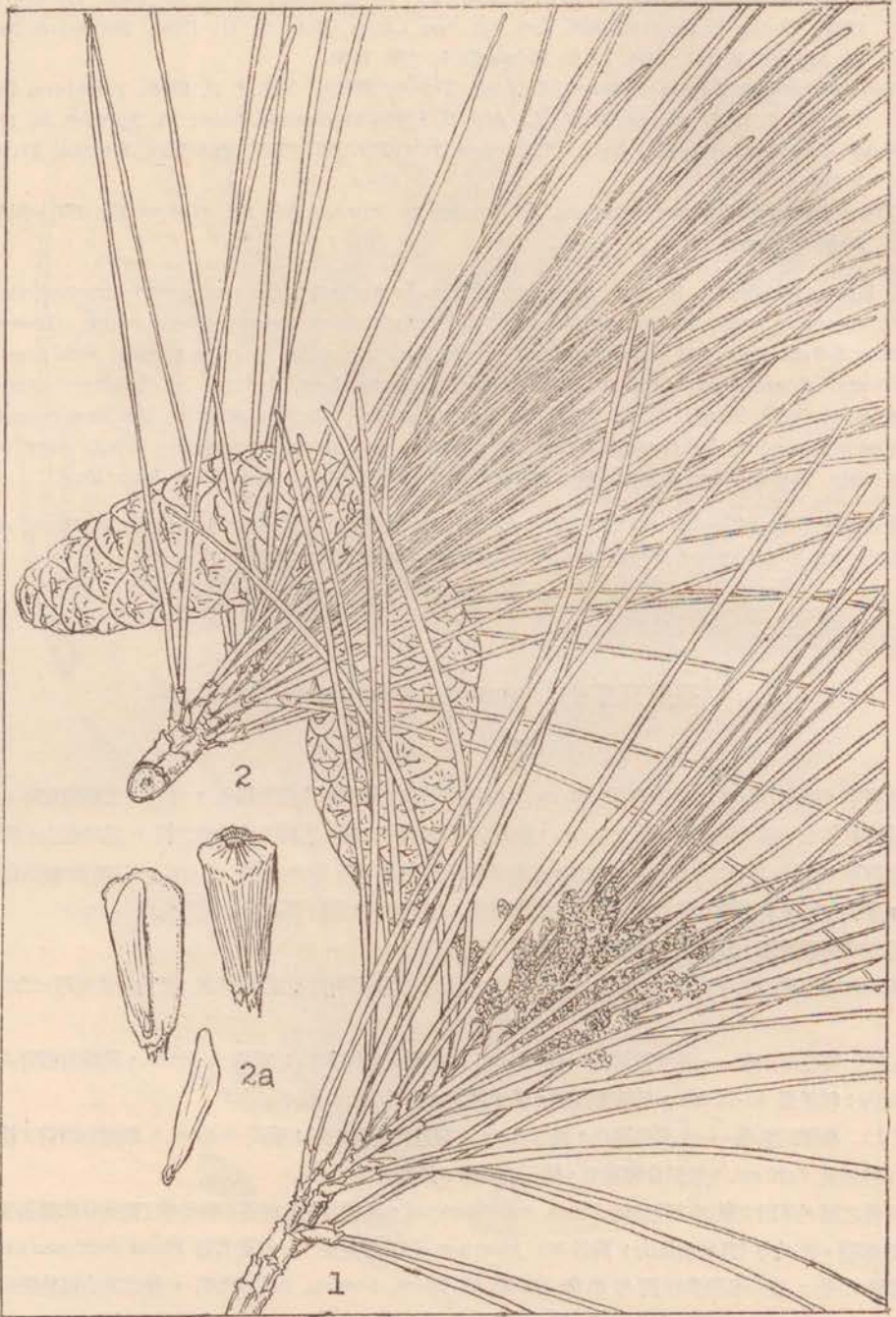


Plate XVI. *Pinus Massoniana* Lambert (Pinaceae)

1. Branch with staminate strobili.
2. Branch with cones; 2a. cone-scales and seeds.



16. *Pinus Massoniana* Lambert, Desc. *Pinus* 1: 17, *t. 12*, 1803, ed 2, 1: 16, *t. 8*, 1828; Matsum. & Hayata in Journ. Coll. Sci. Tokyo, 22: 396, 1906; Kanehira, Formos. Tr. 608, *f.* 1917, rev. ed. 44, *f. 12*, 1936; Makino & Nemoto, Fl. Jap. ed. 2, 149, 1931; Masamune, Short Fl. Formos. 36, 1936.

A large tree, 20-30 m. tall, and 80 cm. in diameter, the trunk crooked, forming an irregular usually broad head, the bark reddish to grayish brown, fissured into thin scales on the upper parts; irregularly furrowed on the lower; branchlets whorled, yellowish brown, slender, roughened by decurrent leaf-base. Leaves 2, very rarely 3, in a bundle, 12-20 cm. long, slender and flexible, light green with serrulate margins, semicircular in cross section, with 5-9 marginal resin ducts. Staminate strobili often in long, dense clusters, ellipsoid-oblong or cylindric, with 3 bracts at the base. Cones oblong-ovate to ovate-conical, 4-7 cm. long, dull brown, early dehiscent and deciduous, short-peduncled; cone scale elliptic-rectangular, 20-25 mm. long, 8-12 mm. wide, the apophyses flattened, sublustrous, chestnut brown, slightly ridged, the umbo rhombic-rounded, small. Seeds articulately winged, together with the wing 18 mm. long.

Widely distributed in southern China. In Taiwan mostly in the northern parts, also along the eastern coastal hills.

## 馬尾松 *Pinus Massoniana* Lamb.

### 松 科

大喬木，高 20-30 m.，直徑達 80 cm.，樹皮下部灰黑色，上部赤褐色，鱗片狀剝落。小枝黃褐色，細柔。葉 2 針(罕 3 針)成束，長 12-20 cm.，柔而易折，淡綠色，具細鋸齒緣，截面半圓形，具 5-9 油脂管。小蕊毬花圓柱狀，黃色，多數簇生。毬果長橢圓狀卵形，長 4-7 cm.，暗褐色，成熟後即行開裂。果鱗橢圓狀矩形，鱗背扁平，栗褐色，微隆起中央有菱圓形之鱗臍，苞鱗微小。種子連翅長 18 mm.。

本種為我國特產之松樹之一，廣泛分佈於我國長江、珠江流域及臺灣，在臺灣以北部中部之平原及東部之海岸山邱上較為普遍。

松屬 (*Pinus*) 植物自其葉之截面上葉脈內之維管束之數目為一個或兩個之性質而分為二亞屬 (Subgenera):

亞屬 1: 單維管束亞屬 (*Haploxyton*)——(a) 葉表面無氣孔線，葉鞘早落。(b) 葉脈中僅有維管束一條。(c) 果鱗上之鱗臍在鱗背之頂端(或近中央處)。臺灣所產之華山松及臺灣五葉松均屬於此亞屬。

亞屬 2: 複維管束亞屬 (*Diploxyton*)——(a) 葉表背面均有氣孔線，葉鞘通常永存。(b) 葉脈中有維管束兩條。(c) 毬果果鱗上之鱗臍在鱗背之近中央處。臺灣所產之馬尾松及臺灣二葉松均屬於此亞屬。

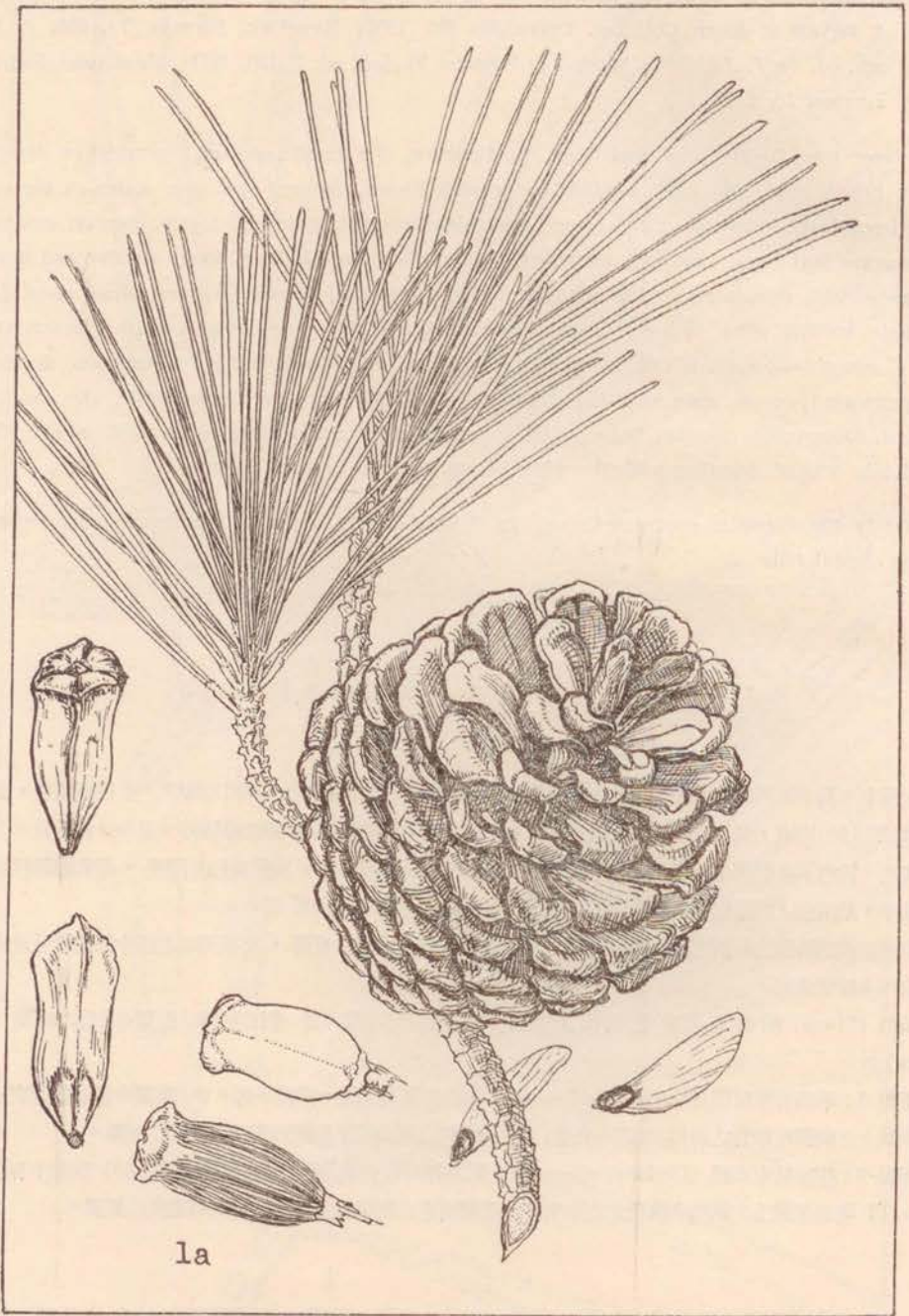


Plate XVII. *Pinus taiwanensis* Hayata (Pinaceae)

A coning branch; 1a. cone-scales and seeds.

17. *Pinus taiwanensis* Hayata in Journ. Coll. Sci. Tokyo 30(1): 309, 1911; Icon. Pl. Formos. 3: 192, 1913; Kanehira, Formos. Tr. 609, f. 1917, rev. ed. 48, f. 13, 1936; Masamune, Short Fl. Formos. 36, 1936.

*Pinus sp.* Hayata in Journ. Coll. Sci. Tokyo 35(19): 219, 1908.

*Pinus brevispina* Hayata, Icon. Pl. Formos. 3: 191, 1913; Kanehira, Formos. Tr. 608, f. 1917.

A large tree, up to 35 m. in height and 80 cm. in diameter, the trunk straight, the bark fissured into small scales; branchlets whorled. Leaves 2 in a fascicled, more or less rigid, 8-11 cm. long, the margins serrulate, semicircular in cross section with 4-5 medial resin ducts. Staminate strobili often in dense clusters. Cones oblong-ovoid, 5-7 cm. long, 3.5-4 cm. wide; cone scales elliptic-rectangular, 20-25 mm. long, 7-8 mm. wide, the apophyses much thickened, ridged, the horizontal ridges very prominent, the umbo rhomboid, variously elevated. Seeds winged, 15-18 mm. long including the wing.

Endemic. Occurs in central ranges, at altitudes of 750-3,000 meters, often forming large pure stands.

### 臺灣二葉松 *Pinus taiwanensis* Hayata

#### 松 科

大喬木，高達 35 m.，直徑達 80 cm.，樹幹通直，樹皮成小片剝落。枝水平開展。葉 2 針成束，稍剛硬，長 8-11 cm.，有細鋸齒緣，截面具 4-5 (通常為 4) 枚脂管。小蕊毳花通常密簇生。毳果長橢圓狀卵形，長 5-7 cm.，闊 3.5-4 cm.。果鱗長橢圓狀矩形，長 2-2.5 mm.，闊 7-8 mm.。鱗背四方形，上方加厚，水平稜線脊起甚烈，鱗背隆起，苞鱗極小。種子連翅長 15-18 mm.。

本種為臺灣特產之種，分佈於中央山脈 750-3,000 m. 之高處，常形成廣大之純林。

本種與馬尾松為臺灣原產之兩種二葉松樹全隸於複雜管屬亞屬，其外形頗為相似，差異之點如下：

(1) 馬尾松 (*P. Massoniana*)——冬芽赤褐色，葉長 12-20 cm.，稍柔軟，截面有脂管 5-9 枚 (通常為 7-8 枚) 貼近表皮而生，果鱗之鱗背上半隆起稍高，鱗背隆起亦高。

(2) 臺灣二葉松 (*P. taiwanensis*)——冬芽栗褐色，葉長 8-11 cm.，稍剛硬，截面有脂管 4-5 枚 (通常為 4 枚) 在葉肉中部，果鱗之鱗背隆起通常平均，鱗背隆起亦稍低。

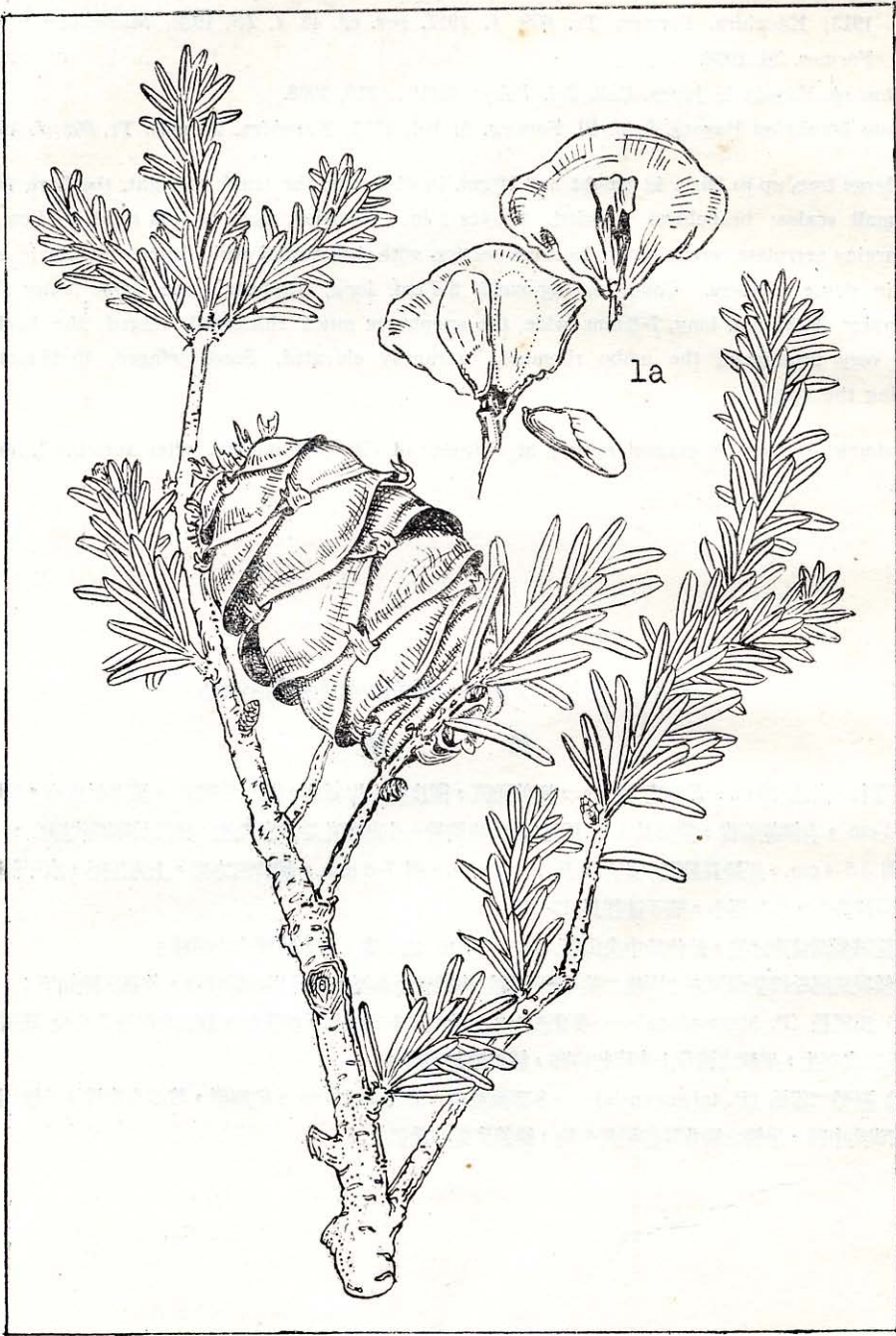


Plate XVIII. *Pseudotsuga Wilsoniana* Hayata (Pinaceae)

A coning branch; 1a. Cone-scale (dorsal & ventral views) and seeds.

18. *Pseudotsuga Wilsoniana* Hayata, Icon. Pl. Formos. 5: 204, t. 15, 1915; Kanehira, Formos. Tr. 614, 1917, rev. ed. 48, f. 14, 1936; Masamune, Short Fl. Formos. 36, 1936.  
 "*Pseudotsuga japonica*" sensu Matsum. & Hayata in Journ. Coll. Sci. Tokyo 22: 223, 1906; non Beissner.

A large tree, to 30 m. tall and 2 m. in diameter, the bark thick, corky, deeply fissured into scaly ridges, the branches irregularly whorled, pubescent or glabrous. Leaves spirally arranged, spreading in 2 opposite rows, flat, linear, slightly curved, 15-25(-45) mm. long, 1-1.5 mm. wide, shining green and grooved above, keeled and with 2 whitish bands below, the apex emarginate, in section with 2 marginal resin-ducts. Staminate strobili terminate on short branchlets. Cone ovoid-ellipsoid, 6 cm. long, 3-3.5 cm. wide, the margins entire; bracts 1.3-1.7 cm. long, exserted, reflexed, 3-lobed at the apex with middle lobe long and narrow. Seeds 2 under each scale, winged, 1.5-2 cm. long including the wing.

Endemic. A scarce tree, scattered in the island at altitudes of 800-2,500 meters, usually mixing with other trees.

Kanehira described very briefly another *Pseudotsuga* from Taitung (Taito), that is, *Pseudotsuga taitoensis* Kanehira, (Formos. Tr. rev. ed. 51, 1936, *n. n. seminud.*, also Li in Taiwania 1:300, 1950), which he cannot fully differentiate from *P. Wilsoniana* on account of incomplete material.

According to Kanehira, in this species the leaves are 3 cm. long, the winter buds are ovate, with white and pubescent margined scales, and the heart wood is purplish-brown. In *P. Wilsoniana*, the leaves are 1.5-2 cm. long, the winter buds are elliptic and with slightly pubescent scales and the heart wood is pale yellowish-brown.

## 威氏黃杉 *Pseudotsuga Wilsoniana* Hayata

### 松 科

大喬木，高達 30 m.，直徑達 200 cm.，樹皮厚，深裂成鱗狀，脊起，枝不規則輪生。葉螺旋狀著生，扭曲成二列，扁平，線形，微曲，長 15-25(-45) mm.，濶 1-1.5 mm.，上面亮綠色有縱溝，下面中肋隆起，有白色氣孔帶兩條，先端微凹，截面具側生脂管兩條。小蕊穗花頂生於小枝先端。毬果卵狀橢圓形，垂生於小枝上，長 6 cm.，濶 3-3.5 cm.，先端鈍形，果鱗木質，永存，濶而薄，長 1.5-2 cm.，全緣，苞鱗長 1.3-1.7 cm.，外露反曲，先端三裂，中央裂片長而狹。種子每果鱗二枚，連翅長 1.5-2 cm.。

本屬屬名 *Pseudo-tsuga*，*Pseudo* 為「偽」之意，示此屬之性質與鐵杉屬 (*Tsuga*，為日本音之拉丁化) 相近也。

本屬之特徵為：(一) 毬果垂生於枝上，果鱗永存。(二) 苞鱗三裂，長曲而外露。

本屬約六種，三種產北美西部，日本產一種 (*P. japonica* Beissner)，我國產二種，黃杉 (*P. sinensis* Dode) 分佈於浙、皖、川、滇一帶，一種即為本種 (*P. Wilsoniana* Hayata) 分佈於雲南西南部<sup>(註一)</sup>及臺灣之高山上<sup>(註二)</sup>，黃杉與本種差異之點為：

(1) 黃杉 (*P. sinensis*)——毬果長 4-5.5 cm.，直徑 2-2.5 cm.，種子連翅長 1-1.5 cm.。

(2) 威氏黃杉 (*P. Wilsoniana*)——毬果長 5-6 cm.，直徑 3-4 cm.，種子連翅長 1.5-2 cm.。

此外本種之果鱗為亮栗褐色，芽鱗多毛及葉之解剖性質等均易與他種分別。

本種之種名蓋為紀念英國名採集家兼分類學家 E. H. Wilson 氏者。

(註一) 雲南所產者 Craib 氏訂名為 *P. Forrestii*，其葉形較臺灣所產者為長 (臺灣所產者葉長約為 1.5-2.5 cm.，雲南產者約為 4-4.5 cm. 長)。據 Wilson 氏研究其毬果、種子及葉之解剖性質之結果，認為二者即係一種。

(註二) 臺灣所產者除本種 (威氏黃杉) 而外，尚有金平亮三氏所記載之臺東黃杉 (*Pseudotsuga taitoensis*) 一種。針葉長 3 cm.，冬芽卵形，芽鱗，邊緣多毛，心材紫色。惜原記載過於簡單，亦無標本可資研究，爰備載於此。

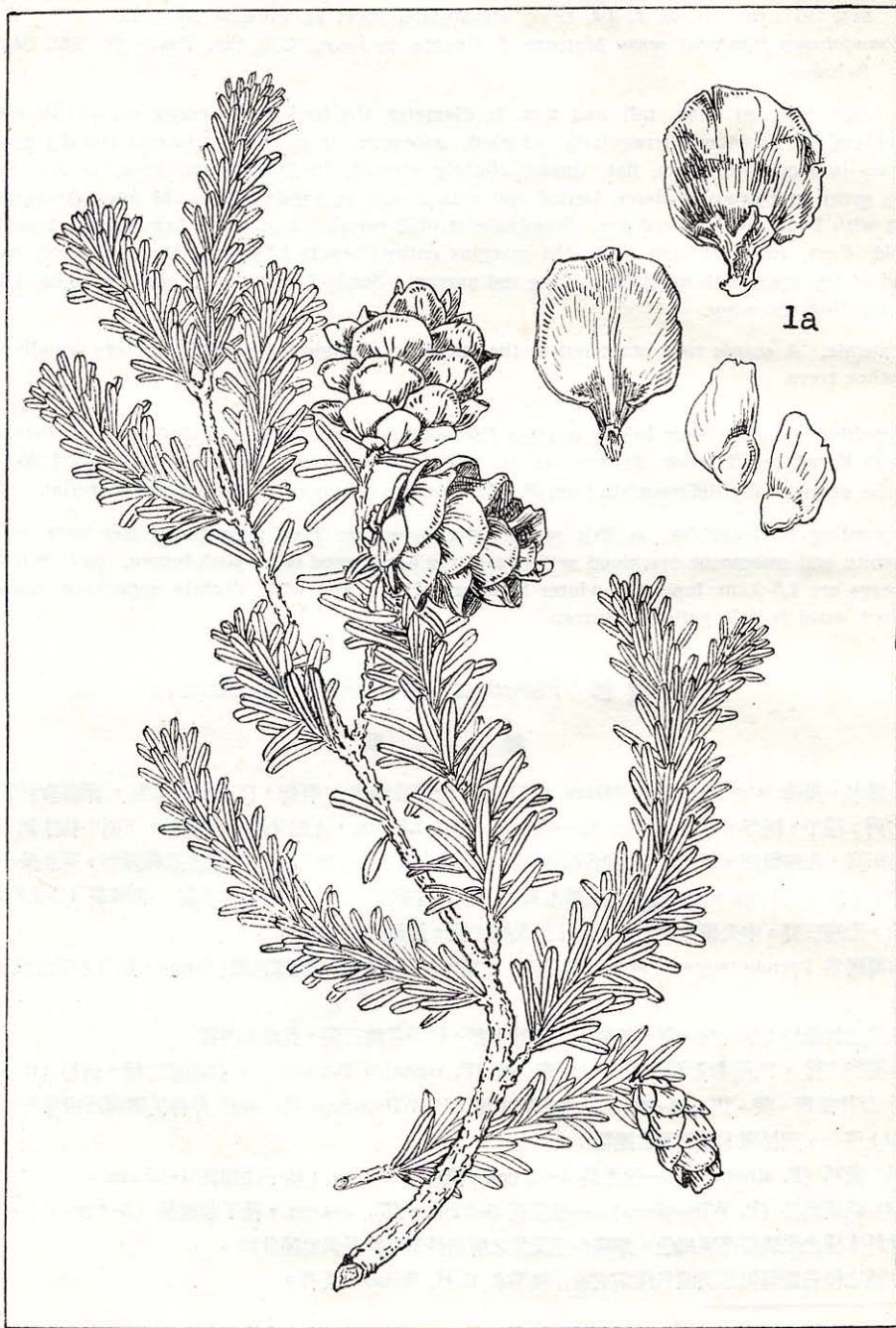


Plate XIX. *Tsuga chinensis* Pritz. var. *formosana* Li & Keng (Pinaceae)

A coning branch; 1a. cone-scale (dorsal & ventral views) and seeds

19. *Tsuga chinensis* (Franch.) Pritz. ex Diels var. *formosana* (Hayata) *comb. nov.*  
*Tsuga formosana* Hayata in Gard. Chron. 43: 194, 1908, in Journ. Coll. Sci. Tokyo 35(19): 222,  
 f. 12, 1908; Icon. Pl. Formos. 5: 206, 1915; Kanehira Formos. Tr. 617, 1917.  
*Tsuga chinensis* Pritz. ex Diels subsp. *formosana* (Hayata) Li in Taiwania 1: 301, 1950.  
 “*Tsuga chinensis*” *sensu* Wilson in Journ. Arnold Arb. 7: 50, 1926; Kanehira, Formos. Tr. rev.  
 ed. 51, f. 15, 1936; Masamune, Short Formos. 36, 1936; *non* Pritz.

A large tree, to 50 m. tall and 2 m. in diameter, the bark dark gray, furrowed, the branches slender, horizontal, often pendulous, the branchlets yellow, later pale yellowish gray, hairy in grooves, with prominent pulvini. Leaves spirally arranged, more or less 2 ranked, linear, flat, 1.5-2.5 cm. long, 2-3 mm. wide, the apex rounded or emarginate, grooved above, with 2 white stomatiferous bands below, in section with a solitary medium resin duct below the vascular bundle. Staminate strobili solitary, axillary, subglobose. Cones pendulous, ovoid, 1.5-2.5 cm. long, 1.3 cm. wide, cone scales persistent, suborbicular, 1.5 cm. long, 1-1.5 cm. wide, lustrous yellowish brown, the margins slightly irregularly serrate; bracts shortly rhomboid, 5 mm. long and wide, the apex shortly 2-lobed, dentate. Seeds 2 under each scale, winged, 7 mm. long including the wing.

Endemic. In forests at high altitudes of 2,000-3,000 meters, in associate with other trees or forming pure stands on cliffs and ridges. The Formosan plant, although close to the mainland species, which is widely distributed in south-western, central and eastern China, is clearly distinct.

## 臺灣鐵杉 *Tsuga chinensis* Pritz. var. *formosana* Li & Keng

### 松 科

大喬木，高達 50 m.，直徑達 200 cm.，樹皮暗褐色，有深裂。枝柔弱，水平或下垂，小枝黃褐色，具顯著之葉枕。葉螺旋狀著生，約成二列，線形，扁平，長 1.5-2.5 cm.，濶 2-3 mm.，先端圓形或凹入，上面具縱溝，下面具兩條白色之氣孔帶，截面中央維管束之下具脂管一條。小蕊毬花單獨腋生，近於圓形。毬果下垂，卵形，長 1.5-2.5 cm.，濶 1.3 cm.，果鱗永存，圓形，長 1.5 cm.，亮黃褐色，邊緣微有不規則鋸齒。苞鱗近於菱形，長濶均約 5 mm.，先端二短裂，邊緣有不規則齒形。種子每果鱗內二枚，連翅長 7 mm.。

本屬屬名係日本名「ツガ」之拉丁化，金屬約有 9 種，其中北美產 4 種，喜馬拉雅山區產一種，日本產 2 種，我國產 3 種即：鐵杉 (*T. chinensis* Pritz.)、雲南鐵杉 (*T. yunnanensis* Masters) 及長苞鐵杉 (*T. longibracteata* Cheng)；其中最後一種係鄭萬鈞教授所發表者，據法國 H. Gaussen 博士之研究，當特立為一新屬即新鐵杉屬 (*Nothatsuga*)。

本屬之特徵為：(一) 葉扁平，截面有單一之脂管，位於葉維管束之下，有葉柄。(二) 毬果卵形下垂，由少數永存性之果鱗組成。

臺灣鐵杉為臺灣特產，昔早田文藏氏以之與日本所產者比較，立為一新種 (*T. formosana* Hayata)，而 Wilson 氏以之與我國大陸所產鐵杉 (*T. chinensis*)<sup>(註一)</sup> 比較，以為二者即係同一種，唯二者實具相異之點：

(1) 鐵杉 (*T. chinensis*) 之毬果、果鱗、種子與翅均較臺灣產者為大 (其毬果長 3-3.5 cm.，濶 1.5-2.2 cm.，果鱗長 1.2-1.5 cm.，濶 1-1.5 cm.，種子連翅長 1 cm.)。

(2) 苞鱗之顏色形狀與大小均不相同 (我國大陸所產之鐵杉苞鱗為黃褐色，扁圓形，長 6mm.，濶 4mm.)。

益以地理之阻隔，似以立為一變種，即 *Tsuga chinensis* Pritz. var. *formosana* (Hayata) Li & Keng 較為適當也。

(註一) 我國所產之鐵杉 (*T. chinensis*) 之形態頗富變化，Downie 氏甚至主張劃分此一種至四、五個獨立之種 (Species) 之多 (見 Notes Bot Gard. Edinburgh 19: 16, fig. 194. 1923.)。

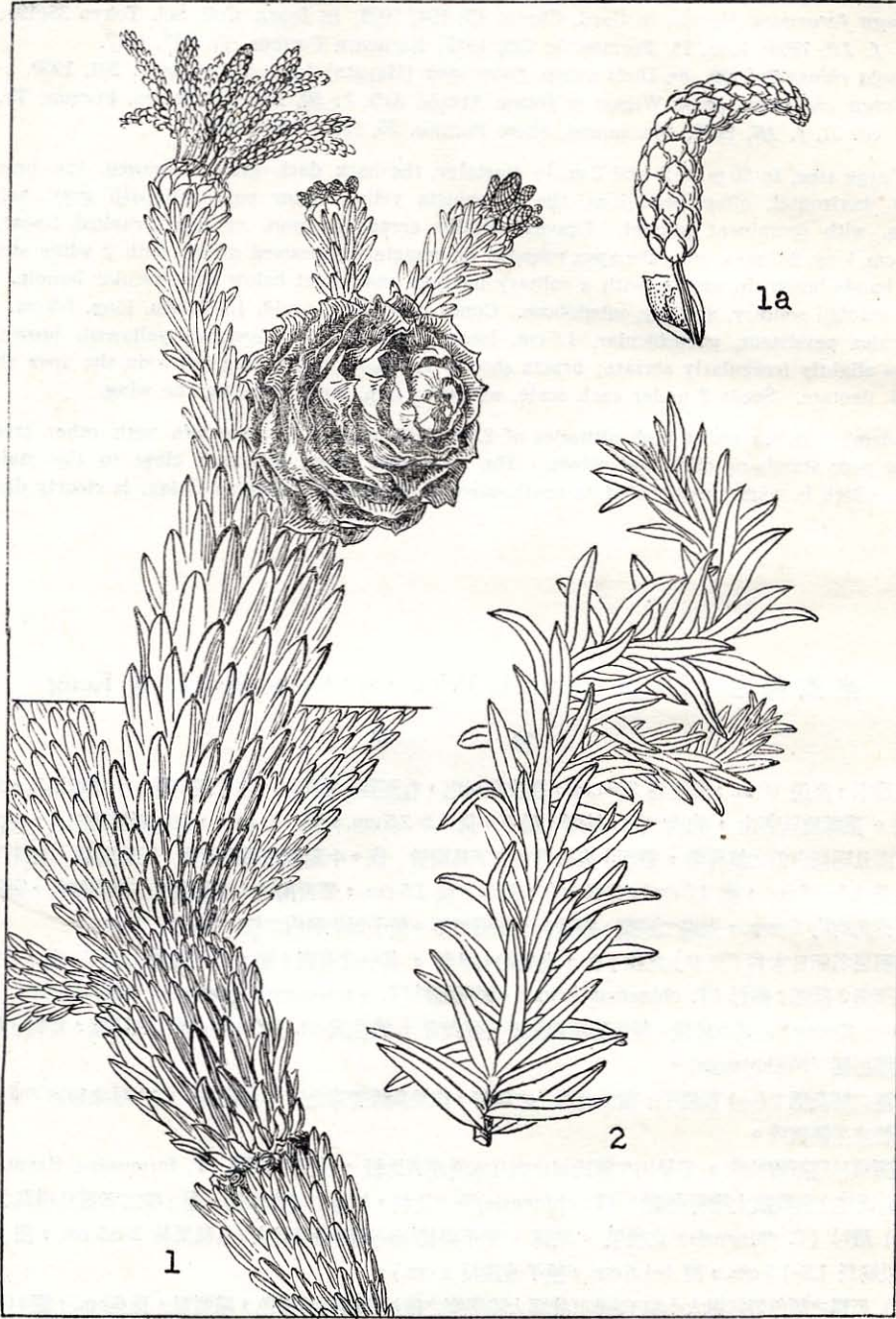


Plate XX. *Cunninghamia Konishii* Hayata (Taxodiaceae)

1. Branch with staminate & pistillate strobili and mature cone; 1a. staminate strobilus.
2. Branchlet with juvenile leaves.



20. *Cunninghamia Konishii* Hayata in Gard. Chron ser. 3, 43: 194, 1908, in Journ. Linn. Soc. Bot. 38: 299, t. 23, 1908, in Journ. Coll. Sci. Tokyo 25(19): 213, 1908; Syst. Bot. vol. 1, 593, f. 317, 1933; Kanehira & Sasaki in Journ. Soc. Trop. Agr. 4: 72, 1932; Kanehira, Formos. Tr. 598, f. 1917, rev. ed. 51, f. 16, 1936, in Trans. Nat. Hist. Soc. Formos. 22: 233, 1932; Masamune, Short Fl. Formos. 36, 1936; Metcalf, Fl. Fukien, fasc. 1, 28, 1942.

*Cunninghamia Kawakamii* Hayata, Icon. Pl. Formos. 5: 207, t. 16, 1916.

*Cunninghamia lanceolata* (Lamb.) Hook. var. *Konishii* (Hayata) Fujita in Trans. Nat. Hist. Soc. Formos. 22: 49 & 476, 1932.

"*Cunninghamia lanceolata*" sensu Sasaki in Trans. Nat. Hist. Soc. Formos. 79-80: 184, 1925, List Pl. Formos. 52, 1928, Cat. Govern. Herb. 56, p. p. 1930, non Hooker.

A large tree, up to 50 m. in height and 1-2.5 m. in diameter, of broad pyramidal habit, the bark brownish, fissured into scales and scaling off in irregular plates and exposing the reddish inner bark; branches whorled, spreading, pendulous at the ends. Leaves densely and spirally arranged, spreading in 2-ranks, linear-lanceolate, about 1.5-2 cm. long, 2.5 mm. wide, the apex acute, the base decurrent. Staminate strobili cylindrical-oblong, in small terminal cluster, with numerous acute bracts at the base, stamens numerous, spirally arranged, the anthers 3-4-celled. Cones globose-ovoid, 2-2.5 cm. long, 1.5-2 cm. in diameter; cone scales woody-coriaceous, triangular, the apex mucronate, irregularly serrate, the base distinctly clawed. Seeds 3, rarely 2, to a scale, flat, ovate-elliptic, narrowly winged, 3-5 mm. in diameter.

Endemic. In the northern and central parts of the island at altitudes of 1,300-2,000 meters, mostly scattered in forest of *Chamaecyparis*, occasionally forming pure stands.

## 欒大杉 *Cunninghamia Konishii* Hayata

### 杉 科

大喬木，高可達 30 m.，直徑可達 1-2.5 m.，呈寬塔形，樹皮褐色，成不規則鱗片狀剝落，露出赤色之內皮。枝輪生，水平開展，先端微下垂。葉螺旋狀密生，扭成二列，線狀披針形，長約 1.5-2 cm.，濶 2.5 mm.，先端銳形，基部下延形。小蕊毬花圓錐狀長橢圓形，常集生於小枝頂部，基部有無數銳形小苞包蔽。小蕊多數，螺旋狀著生，花藥 3-4 室。毬果卵圓形，長 2-2.5 cm.，直徑 1.5-2 cm.，果鱗硬革質，三角形，先端有微凸頭，前部有不規則細鋸齒；基部爪狀。每果鱗下有種子三枚，罕為二枚，扁平，卵圓狀橢圓形，有薄翅，直徑 3-5 mm.。

欒大杉(一名香杉)在分類上之位置，各植物學家之意見頗不一致，或以為與杉木(*Cunn. lanceolata*)為同一種，或以為為其變種，或以為係兩獨立之種。

其一、佐佐木舜一氏依據多數標本研究比較結果：

	葉之長度及濶度(cm.)	小蕊花羣之數(朵)	毬果大小(cm.)
杉木 ( <i>C. Lanceolata</i> )	2.4-8.8 × 0.25-0.5	16-31	2.7-4.2 × 2.7-4.2
欒大杉 ( <i>C. Konishi</i> )	0.8-2.5 × 0.15-0.25	14-16	1.4-2.5 × 1.6-2.7

認為此二者之間，各種外部形態上之差異性質呈連續遞變狀態而無判然之界限，故以為二者係同一種，而生於中國者為栽培型(Cultivated form)，原產於臺灣者為野生型(Natural form)。其實佐佐木氏雖已比較出二者各種性質變異之範圍，然未能再根據更多之材料，以求出其變異之平均數(mean)。蓋二者之平均數無疑相差極遠也。且此二者之差異是否果為栽培之結果，則殊少有力之佐證也。

其二、早田文藏(B. Hayata)、金平亮三(R. Kanehira)二氏認為欒大杉當為一獨立之種。早田氏在其所著裸子植物學(593頁)中列舉三項重要之異點：(1)二者習性差異極大，(2)二者毬果及果鱗之形狀差異，(3)欒大杉小蕊之藥隔(Connectives)之下方有特殊之附屬物，而杉木無之。

其三、藤田安二(Y. Fujita)氏自木材揮發油之化學成份一致，認為二者之生理性質相近，初時併二者為同一種，繼又將欒大杉改為杉木之變種，即 *Cunninghamia lanceolata* var. *Konishii*。

綜言之，欒大杉與杉木之間，其生長習性，木材及葉之解剖性質，葉、毬果、種子之大小，果鱗及小蕊之形狀及大小等，均不無差異，故以立為一種為妥。且此屬中現所知者唯此二種，為我國之特產，故似毋須(如藤田氏所為)立為種及變種，以障著中國本土與臺灣在植物地理上密切之親緣關係也。

(註) 又據 Metcalf 氏福電植物誌(1942)紀載 Price 氏曾在福建廈門北方之 Ho-Khe 地方之山徑中拾得一殘枝(採薪者所遺下者)，據彼及 A. B. Jackson 氏之鑑定以為即係欒大杉(*C. Konishii*)，果爾則此種之分佈當不限於臺灣也。

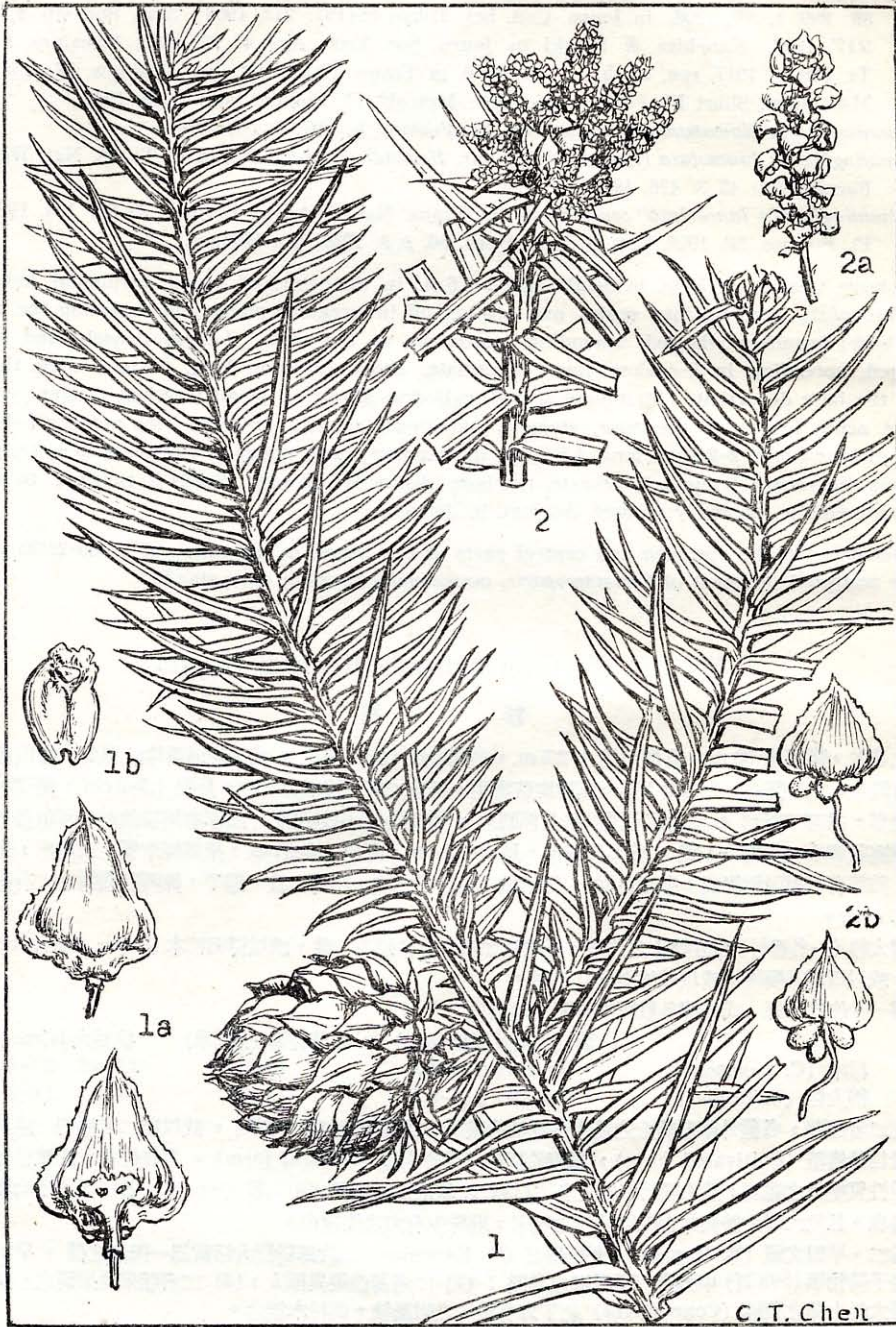


Plate XXI. *Cunninghamia lanceolata* Hooker (Taxodiaceae)

1. Coning branch; 1a. cone-scale (dorsal & ventral views); 1b. seed.  
 2. Branch with staminate strobili; 2a. staminate strobilus; 2b. connective and pollen sacs.

21. *Cunninghamia lanceolata* (Lambert) Hooker in Bot. Mag. 54, t. 2743, 1927; Rehder & Wilson in Sargent, Pl. Wilsoniana 2: 50, 1914.

*Pinus lanceolata* Lambert, Descrip. Pinus, 53, t. 34, 1803.

*Cunninghamia sinensis* R. Brown *apud* Richard, Conif. 80, t. 18, f. 3, 1826; Matsum. & Hayata in Journ. Coll. Sci. Tokyo 22: 399, 1906.

A large tree, up to 20 m. high, the trunk very straight, the bark longitudinally fissured and scaly, the outer bark brownish, the inner red; branches short, whorled, horizontally spreading, green to greenish brown. Leaves spirally arranged, usually twisted at the base into two ranks, linear or linear-lanceolate, 2.5-4 cm. long, 3-4 mm. wide, usually curved, minutely serrulate on the margins, the upper surface deep green, the lower surface pale green, with two broad stomatiferous bands. Staminate strobili short-stalked, cylindrical-oblong, clustered on the apex of branchlets, with numerous acute bracts at their base; stamens spirally arranged, the pollen-sacs 3 or 4. Cone globose or subglobose, 3-4 cm. long, 3 cm. in diameter, short-stalked, pendulous; cone-scales broadly ovate, serrulate, the apex acuminate, with a stiff point of 2 mm. long. Seeds 3 on each scale, flat or ovate-oblong, dark brown, narrowly winged.

Introduced. A native of Southern China.

## 杉 木 *Cunninghamia lanceolata* Hooker (輸入種)

### 杉 科

大喬木，高達 20 m.，樹形端直，樹皮縱裂，成鱗片狀剝落，外皮棕褐色，內皮赤色。枝短，輪生，水平開展，綠色或淡棕色。葉螺旋狀著生，基部扭曲成爲二列，線形或線狀披針形，長 2.5-4 cm.，濶 3-4 mm.，微彎曲，邊緣有細鋸齒，上面深綠色，下面粉綠色，有瀾氣孔帶兩條。小蕊毬花有短柄，圓柱狀長橢圓形，叢生於小枝頂端，基部有多數銳狀苞片。小蕊螺旋狀著生，花粉室 3 或 4 枚。毬果卵狀球形，或近於球形，長 3-4 cm.，直徑 3 cm.，有短柄，熟時常下垂。果鱗調卵形，邊緣有細鋸齒，先端漸尖形，有長約 2 mm. 之尖突，每果鱗下有扁平種子三枚，卵狀長橢圓形，深褐色，有薄翅。

爲臺灣引種最重要針葉樹造林樹種之一，原產於我國大陸南部（種子初由福州輸入，故俗名福州杉），適宜生長於臺灣中北部 1,500 公尺以下之山地。

本屬之屬名蓋爲紀念於 1701 年在浙江舟山舟羣島發現杉木 (*Cunninghamia lanceolata* Hooker) 之名採集家 J. Cunningham 氏也。本屬爲我國之特產，凡二種，一種爲杉木產於我國西部及南部，一種即爲巒大杉產於臺灣中北部 1,300-2,500 m. 之山地，常混生於紅檜 (*Chamaecyparis*) 林中。

本屬之特徵爲：(一) 葉扁平狀披針形。(二) 毬果球形，果鱗永存，邊緣有鋸齒。(三) 每瓣果鱗內有種子 3 枚，具薄翅。



Plate XXII. *Cryptomeria japonica* D. Don (Taxodiaceae)

1. Branch with cones; 1a. cone-scale (dorsal & ventral views); 1b. seed.
2. Branch with staminate strobili; 2a. staminate strobilus; 2b. connective and pollen sacs.

22. *Cryptomeria japonica* D. Don in Trans. Linn. Soc. 18: 166, *t. 13, f. 1*, 1841; Sieb. & Zucc. Fl. Jap. 2: 49, *t. 124*, 1870; Rehder & Wilson in Sargent, Pl. Wilsoniana, 2: 52, 1914; Makino & Nemoto, Fl. Jap. ed. 2, 141, 1931.

A large tree, 10-20 m. high, the bark reddish brown, peeling off in long strips, the branchlets whorled, horizontally spreading or slightly pendulous, tetete. Leaves spirally arranged in 5 vertical ranks, green, awl-shaped, 1-2 cm. long, incurved, tapering or obtuse at the apex, dilated at the base and clasping the branchlets, entire at the margins, keeled and stomatiferous on both surfaces. Staminate strobili in cylindrical clusters from the axils of leaves and terminating on the branchlets, the pollen-sacs 3-5. Cones brown, subglobose, 1-1.5 cm. long and in diameter, terminal on branchlets; cone scales 20-30, brown, wedge-shaped, centrally attached to the axis, with pointed process at the apex. Seeds 2-5 to each scale, brown, triangular-oblong, 4-6 mm. long, 2-3 mm. wide, both edges narrowly winged.

Introduced. A native of southern China and Japan.

## 柳 杉 *Cryptomeria japonica* D. Don (輸入種)

### 杉 科

大喬木，高約 10-20 m.，樹形端直，樹皮棕赤色，成長條剝落。小枝輪生，水平開展或微下垂，圓柱形。葉螺旋狀扭生成爲五縱列，深綠色，鑿形，長 1-2 cm.，微內曲，先端漸尖或微鈍，基部擴張而下延，邊緣平滑，上下側均有氣孔帶及脊起。小蕊毬花圓柱狀，叢生於小枝頂端之葉腋，藥室 3-5 枚。毬果棕褐色，近於球形，直徑約 1-1.5 cm.，生於小枝頂端。果鱗 20-30，楔形，中央著生於毬果軸上，先端有無數刺狀突起。每果鱗下有種子 2-5 枚，褐色，三角狀長橢圓形，長 4-6 mm.，濶 2-3 mm.，兩側有狹翅。

爲臺灣引種最重要之針葉樹造林樹種之一，本省造林所用種子多來自日本吉野一帶，適宜生長於臺灣中北部 1,500 公尺左右之高山地帶。

本屬屬名 *Cryptomeria* 源出希臘文 (*Kryptos-meros* 意即 hidden-part (隱藏部份))，其含義類爲晦澀，僅一種，特產於我國東南部及日本中南部。

本屬之主要特徵爲：(一) 葉鑿狀線形，螺旋狀著生成 5 列。(二) 果鱗楔形，中央著生於毬果軸上，先端有數枚刺狀突起。(三) 每果鱗下有種子 2-5 枚，具薄翅。

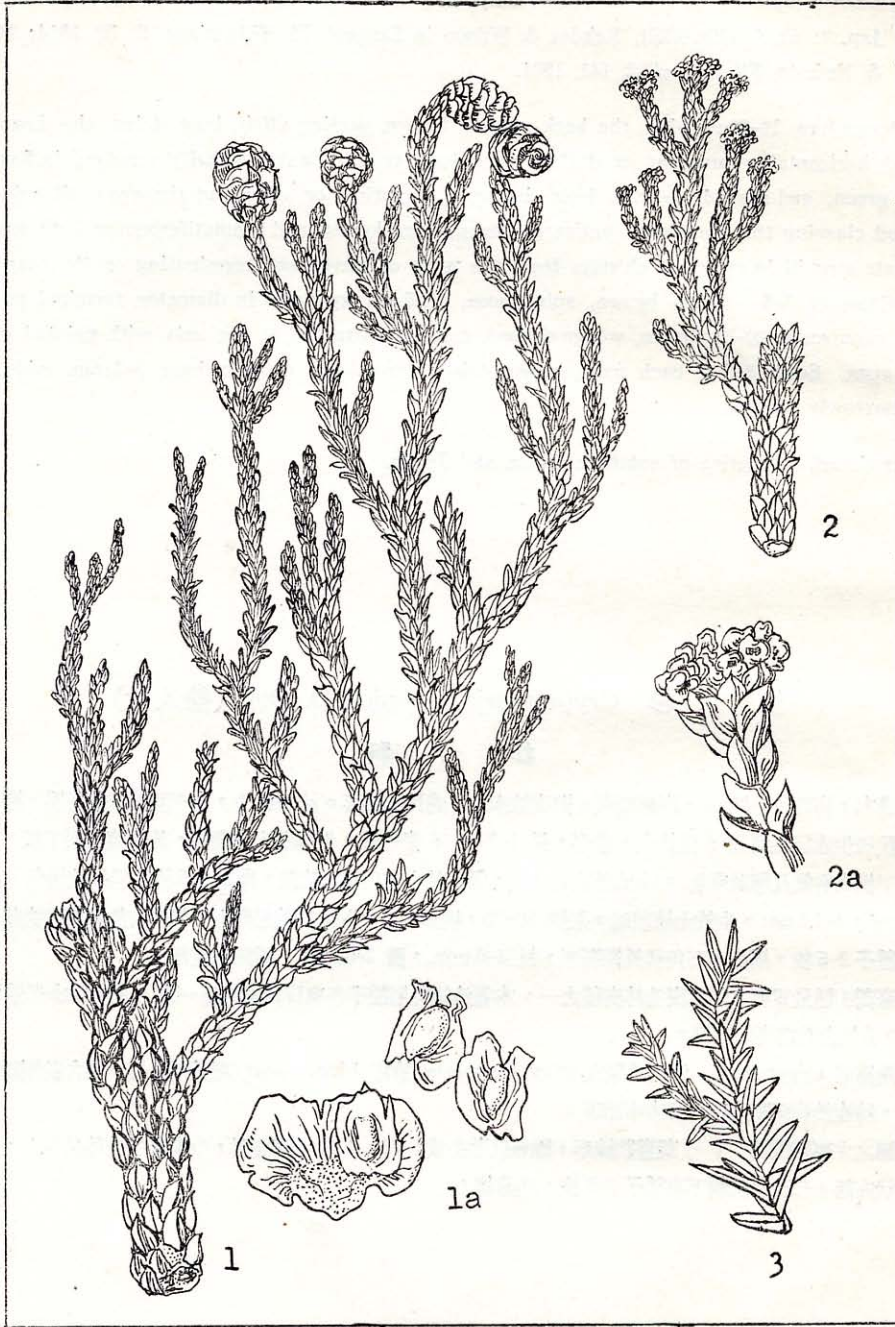


Plate XXIII. *Taiwania cryptomerioides* Hayata (Taxodiaceae)

1. Branch with cones; 1a. cone-scale and seeds.
2. Branch with staminate strobili; 2a. the same, a portion magnified ( $\times 3$ ).
3. Branchlet with juvenile leaves.

23. *Taiwania cryptomerioides* Hayata in Journ. Linn. Soc. Bot. 37: 330, *t. 16*, 1906, in Bot. Mag. Tokyo 21: 21, *t. 1, f. 23*, 1907, in Journ. Coll. Sci. Tokyo 25(19): 215, 1908; Icon. Pl. Formos. 2: 149, 1912; Kanehira, Formos. Tr. 615, *f. 1917*, rev. ed. 53, *f. 17, pl. 19*, 1936; Masamune, Short Fl. Formos. 36, 1936.

"*Cryptomeria japonica*" *sensu* Hayata in Bot. Mag. Tokyo 20: 26, 1906; *non* D. Don.

A large tree, up to 60 m. tall and 2-3 m. in diameter, the trunk straight, of pyramidal shape when young, with pendulous branches, when old of a dome-shaped small crown, with few branches; bark brownish, fibrous. Leaves on young tree linear, 15-20 mm. long, rhombic-tetragonial in section, sharply pointed, grooved on both surfaces; on old trees, scale-like, acute, triangular, keeled, about 4-5 mm. long, 3 mm. wide, shortly stalked, laterally grooved. Staminate strobili 5-7, densely arranged at the tip of the short branchlets, cylindric, 5 mm. long, 2.5 mm. wide; stamens 10-15, the anthers 2-3-celled. Cones globose to oblong-ovoid, 1.5-2.5 cm. long, terminating on the branchlets, nearly sessile; cone scales about 12-20, obcordate or obconical, 8 mm. long, 5 mm. wide, the apex mucronate. Seeds 2 under each scale, winged, oblong, 5-6 mm. long including the wing.

Endemic. In the central ranges at altitudes of 1,800-2,600 meters, usually scattered through the forest of *Chamaecyparis*.

## 臺灣杉 *Taiwania cryptomerioides* Hayata

### 杉 科

大喬木，高達 60 m.，直徑達 2-3 m.，樹幹通直，幼樹圓錐形，具柔垂之枝，老樹則具小而圓形之樹冠。枝極稀疏，樹皮為褐色，纖維質。幼樹之葉線形，長 15-20 mm.，先端尖銳，兩面有縱溝，截面菱狀四方形；老樹之葉鱗狀，三角形，有脊，長約 4-5 mm.，闊約 3 mm.。小蕊毬花 5-7 朵，簇生於小枝之頂端，圓柱形，長 5 mm.，闊 2.5 mm.，每花小蕊 10-15 枚，花粉囊 2-3 室。毬果球形至卵形，生於枝端，長 1.5-2.5 cm.，近於無柄，果鱗 12-20 枚，倒心臟形，長 8 mm.，闊 5 mm.。種子 2 枚，生於每片果鱗內方，長橢圓形，連翅長 5-6 mm.。

本種植物係 1904 年小西成章 (N. Konishi) 氏發現於臺中南投烏松坑 2,000 m. 高處，經早田文藏 (B. Hayata) 氏命名者，屬名為「臺灣產」之意，種名蓋示其與柳杉 (*Cryptomeria japonica* D. Don) 之外形極為相似也。

本種幼樹之外形酷似柳杉 (原產中國本土及日本)，而其大蕊毬花及毬果之構造則與杉木屬 (*Cunninghamia*) 相近，二者主要相異之點為臺灣杉屬每果鱗上僅著生有胚珠 2 枚，而在杉木屬則為 3 枚。

本屬植物之主要特徵為：(一) 葉有二型，幼樹為針形，老樹上之葉則為鱗片狀。(二) 毬果卵圓形，果鱗革質，無果鱗及苞鱗之別。(三) 每果鱗內種子 2 枚。

本種之幼苗及雜樹外觀絕似柳杉 (*C. japonica*)，然其小枝多纖弱下垂，且其上之針葉較柳杉為剛硬而尖銳，握之有刺手之感覺，此為臺灣杉幼苗幼樹與柳杉簡易分別之法。

本屬初時以為為臺灣之特產，迨 1916 年 Handel-Mazzetti 氏在雲南伊洛瓦底江及薩爾溫江流域海拔 2,050-3,000 m. 高山上採集到，其後在湖北、湖南諸省亦採到。

法國植物學家 H. Gaussen 氏將我國大陸所產者與臺灣所產者比較後，認為我國大陸上所產者：(一) 每小蕊花毬上具有較多之小蕊 (通常在 30 枚以上) 數。(二) 毬果上具有較多之果鱗 (27-36 片)，故另立一新種，即 *Taiwania floussiana* Gaussen。其餘性質，差異極不顯著也。

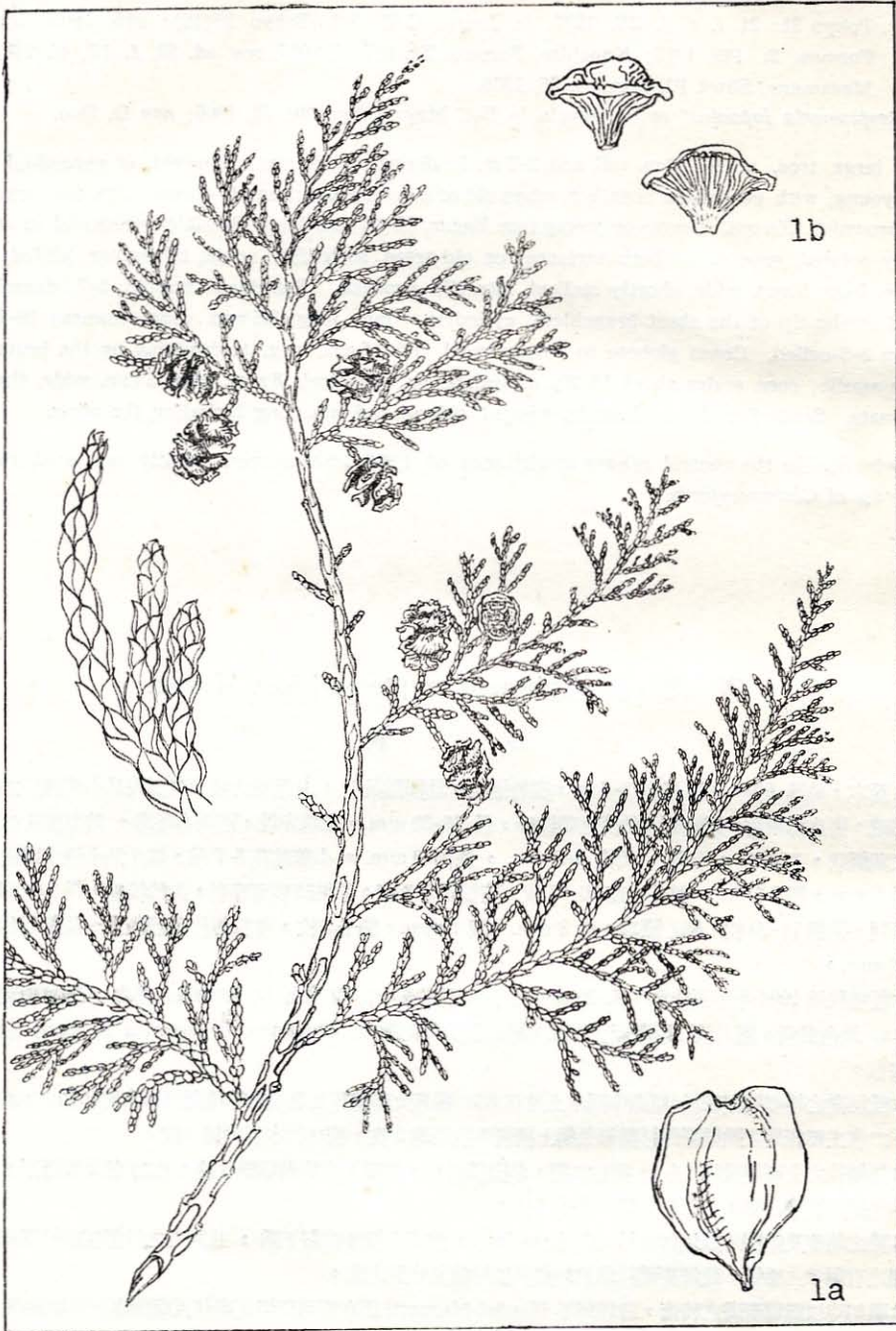


Plate XXIV. *Chamaecyparis formosensis* Matsumura (Cupressaceae)

A coning branch; 1a. seed ( $\times 8$ ); 1b. cone-scale from two different views ( $\times 3$ ).



24. *Chamaecyparis formosensis* Matsum. in Bot. Mag. Tokyo, 15: 137, 1901; Matsum. & Hayata in Journ. Coll. Sci. Tokyo, 22: 402, 1906; Hayata in Journ. Coll. Sci. Tokyo 25(19): 208, 1908; Kanehira, Formos. Tr. 597, f. 1917, rev. ed. 56, f. 19, pl. 21, 1936; Masamune, Short. Fl. Formos. 37, 1936, Li in Taiwania 1: 305, 1950.

*Cupressus formosensis* (Matsum.) Henry in Elwes & Henry, Trees Gr. Brit. & Irel. 5: 1187, 1910; Dallimore & Jackson, Handb. Conif. 195, f. 37, 1923.

A very large tree up to 65 m. high and 6.5 m. in diameter, the bark more or less thin, smooth, light reddish brown, peeling off in strips or scales or fissured into ridges, the branches spreading, the branchlets usually flattened. Leaves opposite, scale-like, triangular, imbricate, green outside, pale whitish inside, closely pressed but free at the incurved and shortly mucronate apex. Staminate strobili ovoid or subglobose. Cones suberect, ellipsoid or oblong-ovoid, 10-12 mm. long, 8-9 mm. in diameter; cone scales 10-13, peltate, with the upper surface wrinkled, brownish, depressed in the center, bearing a conspicuous quadrangular process. Seeds 1 or 2 on each scale, ellipsoid, brown, slightly winged, about 3 mm. in diameter.

Endemic. Mountain regions in the northern and central parts of the island, at altitudes of 1,000-2,900 meters, often forming pure stands or mixed with *Chamaecyparis obtusa* var. *formosana*. This is the largest conifer in Eastern Asia, some trees attaining 20 meters in circumference; and one of the most important timber trees in Taiwan.

## 紅 檜 *Chamaecyparis formosensis* Matsum.

### 柏 科

大喬木，最大之樹可高達 65 m.，直徑達 6.5 m.，樹皮薄而平滑，淡赤褐色，成條狀或片狀剝落，枝開展，小枝扁平。葉覆瓦狀對生，鱗片狀，三角形，先端銳形至漸尖形，外側深綠色，內側粉白色。小蕊毬花卵形或近於球形。毬果橢圓形至長橢圓狀卵形，長 10-12 mm.，直徑 8-9 mm.。果鱗 10-13 枚，盾狀，上面褐色多瘤紋，中央陷入具一顯著之四方形凸起。種子每果鱗內具 1-2 枚，橢圓形，周圍有薄翅，直徑約 3 mm.。

屬名 *Chamaecyparis* 爲 dwarf-cypress 之意 (即矮小之柏木)，示此屬與柏木屬 (*Cupressus*) 有關也。

本屬原爲自柏木屬 (*Cupressus*) 分出，二者之葉均爲鱗片形，毬果均爲圓形，果鱗同爲盾形，二者相異之點爲：

(1) 柏木屬 (*Cupressus*)——小枝通常圓形或四角形，毬果直徑通常在 15 mm. 以上，第二年方成熟，每枚果鱗內種子數爲 6-20 粒。

(2) 紅檜屬 (*Chamaecyparis*)——小枝通常扁平，毬果稍小，直徑通常在 12 mm. 以下，當年成熟，每枚果鱗內種子僅 1-5 枚。

本屬凡 6 種及 1 變種，3 種產於北美，日本產 2 種 (日本花柏 *Chamaecyparis pisifera* Sieb. & Zucc. 及日本扁柏 *Chamaecyparis obtusa* Sieb. & Zucc.)，臺灣則產一種及一變種。

本種爲臺灣特產，分佈於中北部 1,000-2,500 m. 之高山上，著名之阿里山神木 (樹高達 65 m.，樹齡達 3,000 年，爲東亞最大樹木)，即係本種。

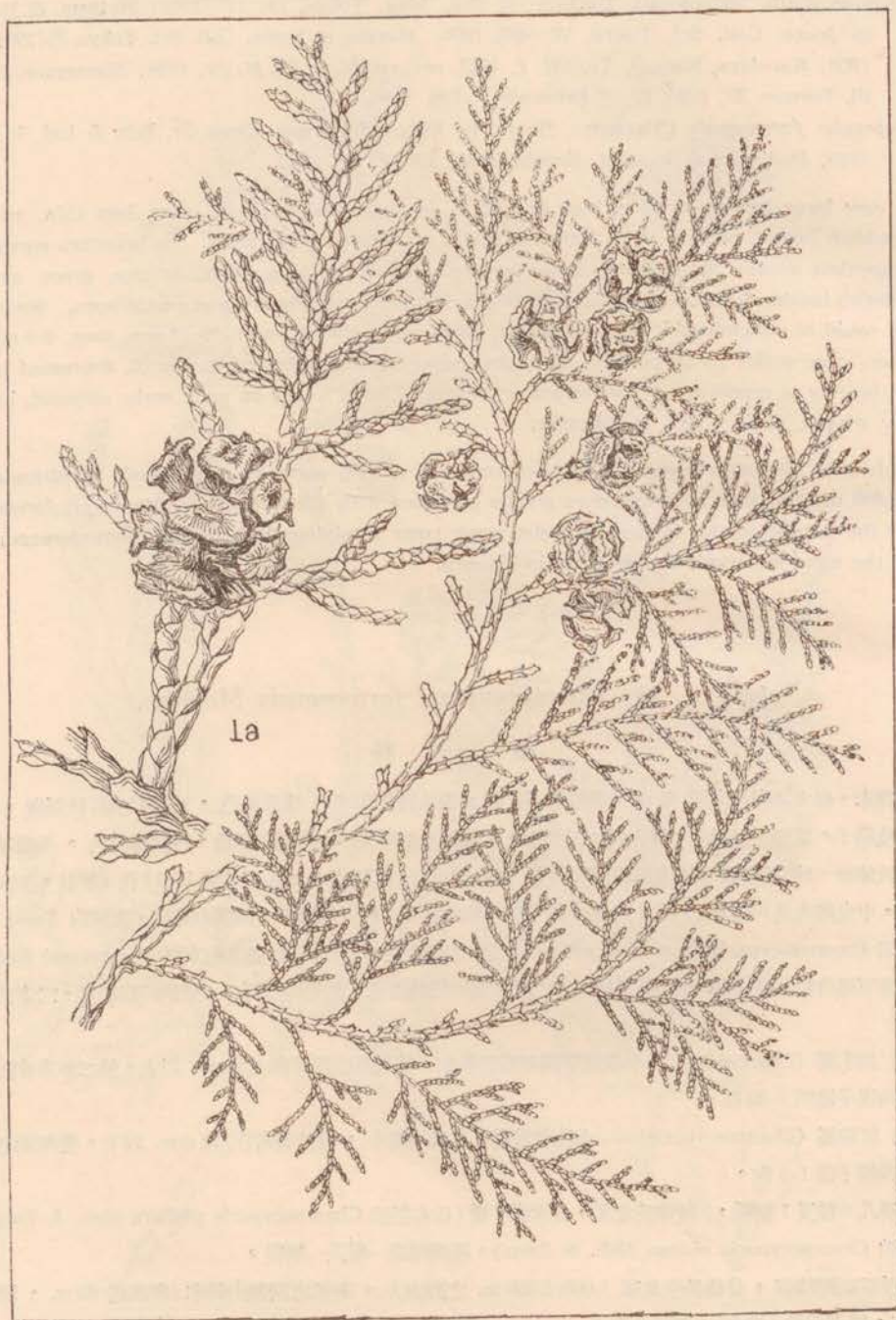


Plate XXV. *Chamaecyparis obtusa* S. & Z. var. *formosana* Rehder (Cupressaceae)  
A coning branch; 1a. the same, a portion magnified ( $\times 3$ ).

25. *Chamaecyparis obtusa* Sieb. & Zucc. var. *formosana* (Hayata) Rehder in Bailey Stand. Cycl. Hort. 2: 731, 1914.  
*Chamaecyparis obtusa* Sieb. & Zucc. f. *formosana* Hayata in Gard. Chron. ser. 3, 43: 194, 1908, in Journ. Coll. Sci. Tokyo 25(19): 208; Wilson, Conif. & Tax. Jap. 77, 1916.  
*Cupressus obtusa* (Sieb. & Zucc.) Koch. var. *formosana* (Hayata) Dallimore & Jack. Handb. Conif. 215, 1923.  
*Chamaecyparis taiwanensis* Masamune & Suzuki in Sylvania 4: 57, 1923; Masamune, Short Fl. Formos. 37, 1936.  
*Chamaecyparis obtusa* Sieb. & Zucc. subsp. *formosana* (Hayata) Li in Taiwania 1: 305, 1950.  
 "Chamaecyparis obtusa" sensu, Sasaki, List Pl. Formos. 53, 1928; Kanehira, Formos. Tr. 597, 1916, rev. ed. 58, f. 20, 1936; non Sieb. & Zucc.

A very large tree, up to 40 cm. high and 3 m. in diameter, the trunk straight, the bark reddish brown, fissured into thin strips; branches closely set, spreading or horizontal, reddish, the branchlets flattened, slightly drooping at the tips. Leaves opposite, scale-like, triangular, densely imbricate and closely appressed, dark green above, with white marks below, the apex obtuse. Cones stalked, orange brown when ripe, globose, 9-10 mm. in diameter; cone-scales 8-10, peltate, the outer surfaces depressed with a minute redge in the center. Seeds 2-5 on each scale, narrowly winged, about 4 mm. in diameter.

The species *Ch. obtusa* is of Japan. This variety differs from the species in the much smaller cones and smaller seeds. As the difference is slight, it seems not worthy of recognition as a distinct species. But as it is geographically distinct from the typical form of the species, it seems more appropriate to treat it as representing a variety, rather than as a form.

臺灣扁柏 *Chamaecyparis obtusa* Sieb. & Zucc.  
 var. *formosana* Rehder

柏 科

大喬木，高達 40 m.，直徑達 3 m.，樹幹通直，樹皮紅褐色，纖維質，成長條剝落。枝密生，水平開展，赤色，小枝扁平。葉覆瓦狀密對生，鱗片狀三角形，上面深綠色，先端鈍形。小蕊毬花卵狀至長橢圓形。毬果球形，直徑 9-10 mm.，成熟時黃褐色。果鱗 8-10 枚，盾狀，外側陷入，中央有一小脊起，每鱗果鱗下具種子 2-5 枚。種子具狹翅，直徑約 4 mm.。

本種與日本原產之日本扁柏 (*Chamaecyparis obtusa* Sieb. & Zucc.) 極為相似，依據多數標本比較後，差異不甚顯著，早田文藏氏亦以為臺灣所產者除較日本所產者毬果及種子稍小而外，幾無其他區別，故彼以為臺灣所產者為日本扁柏之一型，即 *Chamaecyparis obtusa* forma *formosana*，其後正宗嚴敬及鈴木重良二氏將臺灣所產者立為一新種，即 *Chamaecyparis taiwanensis* Masam. & Suzuki，並未加以任何說明(鈴木氏僅謂：此二者之間差異極大，俟異日為文另詳述之)，實未詳其何所依據也。

爰依從 Rehder, Dallimore & Jackson 諸氏之意見，將臺灣所產者立為日本扁柏之變種。

試列東亞所產之紅檜屬 (*Chamaecyparis*) 三種一變種之檢索表如下：

- A. 葉先端銳形，毬果球形或長橢圓形，直徑 0.7-0.9 cm.，每鱗果鱗內種子 1-2 枚  
 B. 毬果長橢圓形，直徑 0.8-0.9 cm.，每毬果果鱗 10-13 片……1. 紅檜 *C. formosensis*  
 BB. 毬果球形，直徑 0.7 cm.，每毬果果鱗 8-10 片……2. 日本花柏 *C. pisifera*  
 AA. 葉先端鈍形，毬果毬形，直徑 9-11 mm.，每鱗果鱗內種子 1-5 枚  
 B. 毬果直徑通常為 10-11 mm.……3. 日本扁柏 *C. obtusa*  
 BB. 毬果直徑通常為 9-10 mm. ……4. 臺灣扁柏 *C. obtusa* var. *formosana*

此屬植物之分佈頗能顯示東亞與北美之植物類緣上關係，唯該屬植物迄未在我國大陸上發現，由其地理分佈觀之，川、鄂、滇、黔諸省似非絕無發現之可能也。

又數十年來臺灣引進日本扁柏 (*C. obtusa*) 之種子造林極多，故與臺灣扁柏 (*C. obtusa* var. *formosana*) 往往不易區別，因之自臺灣所採集之此類植物標本未必純為臺灣扁柏，是不可不辨者也。

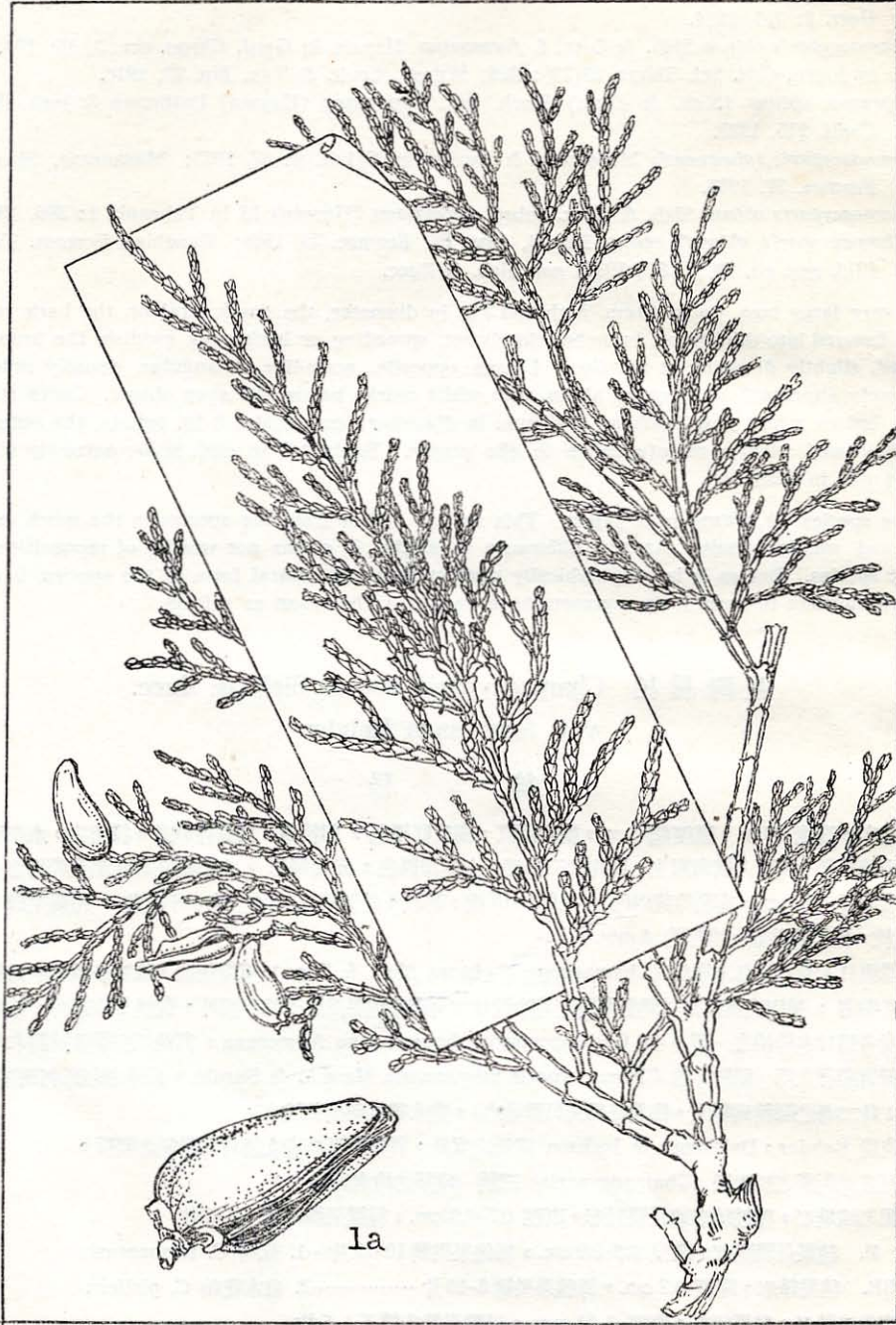


Plate XXVI. *Heyderia formosana* Li (Cupressaceae)

A coning branch; 1a. a cone ( $\times 3$ ).

26. *Heyderia formosana* (Florin) Li in Journ. Arnold Arb. 34: 23, 1953.

"*Libocedrus macrolepis*" sensu Hayata in Journ. Coll. Sci. Tokyo 25(19): 207, f. 4, 1908; Kanehira, Formos. Tr. 602, 1917; Makino & Nemoto, Fl. Jap. ed. 2, 145, 1931; non Benth.

*Libocedrus formosana* Florin in Svensk. Bot. Tidarkift 24: 126, f. 2, t. 2, 1930; Kanehira, Formos. Tr. rev. ed. 56, f. 18, 1936; Masamune, Short Fl. Formos. 37, 1936; Li in Taiwania 1: 309, 1950.

*Libocedrus macrolepis* Benth. var. *formosana* (Florin) Kudo in Journ. Soc. Trop. Agr. 3: 16, 1931.

A large tree, up to 23 m. high, and 3 m. in diameter at the base, the trunk often crooked, the bark smooth, purplish reddish brown; branches subterete, the branchlets distichous, alternate. Leaves decussate, scale-like, obtuse, 1.5-2.5 mm. broad, dark green outside, pale green inside. Strobili monoecious, the two sexes on different branchlets, rarely dioecious. Staminate strobili terminate on the branchlets, oblong; stamens decussate, 16-18, the anthers 3-, rarely 2-celled. Cones terminal on the branchlets, cylindric-oblong, 1-1.4 cm. long, 4 mm. wide, slightly curved; cone scales 6, decussate, the inferior 2 sterile, recurved, triangular, the intermediate 2 fertile, oblong (ovule 2 per scale), dorsally convexed, the superior 2 sterile, complanate. Seeds 1-2 to each scale, oblong to lanceolate, winged, 8-12 mm. long including the wing.

Endemic. In the northern and central parts of the island, at altitudes of 300-1,900 meters.

## 臺灣肖楠 *Heyderia formosana* Li

### 柏 科

大喬木，高達 23 m.，直徑達 250 cm.，樹幹常彎曲，樹皮光滑，紫褐色。枝近於圓形，小枝二列互生。葉鱗片狀，闊 1.5-2.5 mm.，先端鈍形，外側深綠色，內側粉綠色。小蕊毬花生於枝端，每毬花小蕊 16-18 枚，每小蕊具藥室 3 (罕為 2) 枚。毬果生於小枝頂端，圓柱狀長橢圓形，長 1-1.4 cm.，闊 4 mm.，微彎曲。果鱗 6 枚，十字形對生，最下 2 枚不孕性，彎曲，三角狀卵形，中央 2 枚有孕性，長橢圓形 (每果鱗初有胚珠 2 枚)，背側外凸，頂部 2 枚，不孕性，扁平。種子每果鱗內 1-2 枚，長橢圓形至披針形，連翅長 8-12 mm.。

本種過去通用之學名爲 *Libocedrus formosana* Florin，按過去所謂 *Libocedrus* 屬係分佈於太平洋沿岸各地，可分兩大羣：(一) 產於南半球者，紐西蘭、New Caledonia 各產 2 種，智利一種，新畿內亞產 3 種；(二) 產於北半球者，中國大陸南部、臺灣、北美洲西部各產一種。

根據李惠林氏最近之研究，南北兩半球所產者，其狹長之毬果、扁平之果鱗、具兩翅之種子等基本性質，雖屬相似，實可能係平行演化之結果，未必即顯示其間有緊密之親緣關係存在，且如詳加比較：

性質	北半球種類	南半球種類
1. 果鱗	a. 鑷合狀排列	a. 覆瓦狀排列，中央一對結合成一體
	b. 脊部有微凸起	b. 脊部有尖刺
2. 種子	兩側種翅均發達，其中一枚成爲另一枚長度之二倍	兩側種翅僅一枚發達，另一枚萎縮

此外小蕊數目及枝葉性質等均有差異，故氏主張：(一) 廣義之 *Libocedrus* 屬宜裂開。(二) 北半球之 3 種應列入 *Heyderia* 屬。(三) 南半球之 7 種更爲複雜，應分別列入：*Libocedrus* (狹義)、*Pilgerodendron* 及 *Papuacedrus* 三屬。

本種與滇緬間之肖楠 (*H. macrolepis*) 極爲相似，初時以爲即係同一種，Florin 氏始將其分開爲二種，而工藤祐舜氏則以爲臺灣所產當爲該種之變種 (即 *H. macrolepis* var. *formosana*)，此二者之差異之點如下：

(1) 肖楠 (*H. macrolepis*)——小蕊毬花每花小蕊 14-20 枚，藥室 3-5 室。大蕊花花柄彎曲，毬果長 1.8 cm.，闊 5 mm.，毬果柄長 10-12 mm.，種子長卵狀披針形，長 14 mm.，闊 7 mm.。

(2) 臺灣肖楠 (*H. formosana*)——小蕊毬花每花小蕊 16-18 枚，藥室 3 (罕為 2) 室。大蕊花花柄直立，毬果長 1.2 cm.，闊 4 mm.，毬果柄長 6-8 mm.，種子長橢圓形，長 11 mm.，闊 4 mm.。

臺灣針葉樹中有所謂「臺灣五木」者，即係本種與油杉 (*Keteleeria Davidiana* var. *formosana*)、鬍大杉 (*Cunninghamia Konishii*)、臺灣杉 (*Taiwania cryptomerioides*) 及紅檜 (*Chamaecyparis formosensis*) 五種之總稱也，初時以爲均屬臺灣所特產 (油杉初名爲 *Keteleeria Masteriana*) 之珍異樹種，而足炫耀於世者，其後知油杉及臺灣杉二者，亦產於我國大陸上，餘三者則爲臺灣特產。

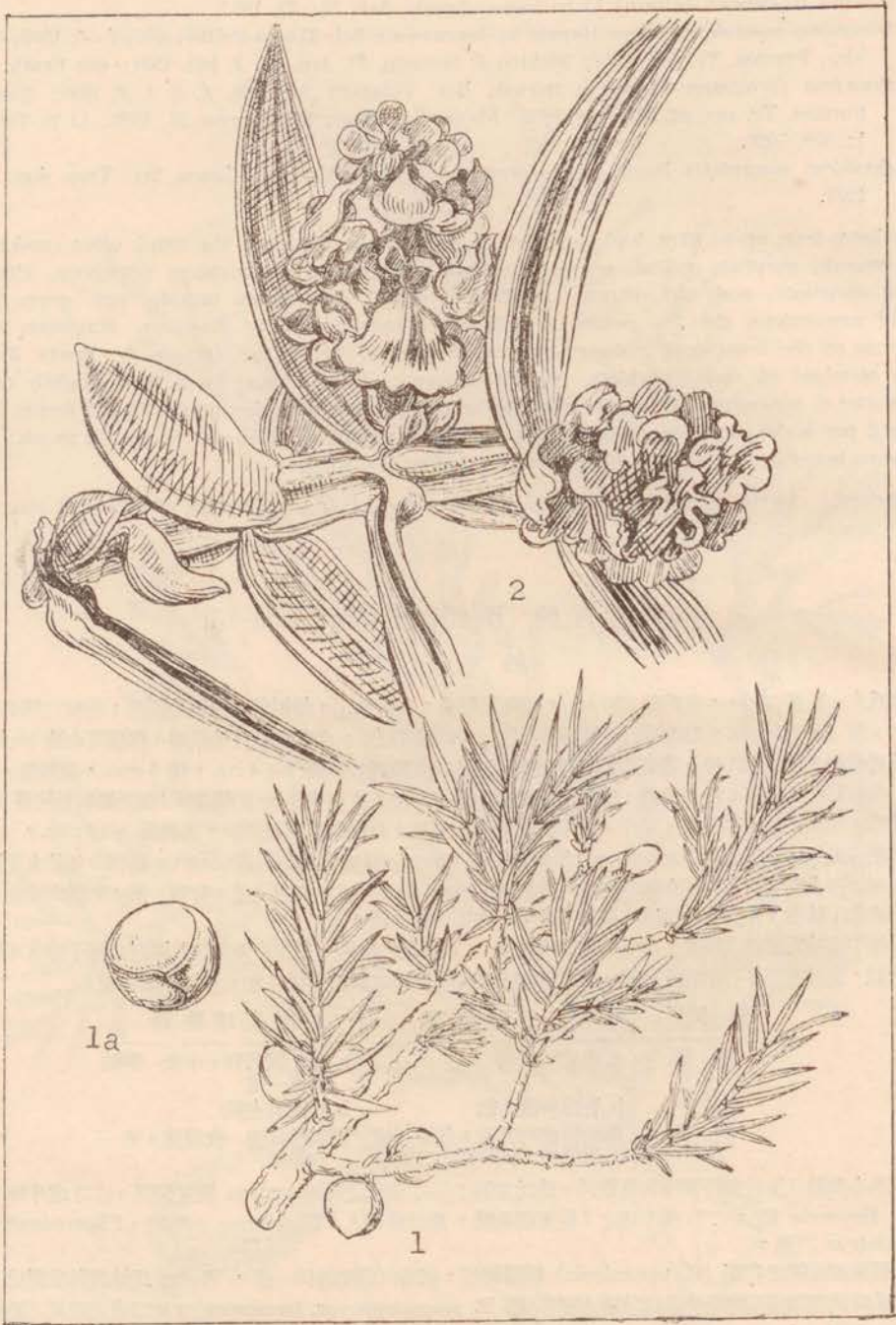


Plate XXVII. *Juniperus formosana* Hayata (Cupressaceae)

1. Branch with cones; 1a. berry-like cone ( $\times 2$ ).
2. Portion of the branch with staminate strobili ( $\times 20$ ).

27. *Juniperus formosana* Hayata in Gard. Chron. ser. 3, 43: 198, 1908, in Journ. Coll. Sci. Tokyo 25(19): 209, t. 38, 1908; Icon. Pl. Formos. 7: 39, 1918; Kanehira, Formos. Tr. 600, f. 1917, rev. ed. 60, f. 21, 1936; Masamune, Short Fl. Formos. 37, 1936.

"*Juniperus taxifolia*" sensu Hayata in Bot. Mag. Tokyo, 20: 19, 1906; Matsum. & Hayata in Journ. Coll. Sci. Tokyo 20: 403, 1906; non Hook. & Arn.

A small tree, about 4-5 m. in height, sometimes to 12 m., with a straight trunk, usually dividing into several stems; branches spreading or ascending, the branchlets pendulous, triangular; bark brownish, peeling off in scales or strips. Leaves verticillately ternate, linear, 1.2-2 cm. long, 1-2 mm. wide, the apex spiny pointed, concave, and with two broad white bands above, glaucous and keeled beneath. Staminate strobili ovoid, axillary; stamens numerous, opposite. Cones berry-like, indehiscent, subglobose, orange-red to reddish brown, consisting of fleshy united scales, subtended by scaly bracts, about 8 mm. in diameter. Seeds 3, triangular-ovoid, angular, brown.

China. Taiwan, in central ranges at altitudes of 2,300-3,000 meters, generally in *Chamaecyparis* forests as an under shrub.

27a. *Juniperus formosana* Hayata var. *concolor* Hayata, Icon. P. Formos. 7: 39, f. 25, 1918; Kanehira, Formos. Tr. rev. ed. 60, 1936; Masamune, Short Fl. Formos. 37, 1936.

A shrub or small tree, about 4 m. high and 20 cm. in diameter, decumbent. Leaves 2 cm. long. Cones orange-red, 10-12 mm. in diameter.

Endemic. Known only from the type collection, along seashore at the base of Busegan, between Kwarenko and Guan. This variety differs from the species in the leaves being not glaucous beneath and in the stomatic bands being broader, and in the cones being larger.

## 刺 柏 *Juniperus formosana* Hayata

### 柏 科

小喬木，高 4-5 m.，偶可達 12 m.，樹幹直，常分為三數主幹，枝斜上開展。小枝下垂，三角形，樹皮褐色，片狀或條狀剝落。葉直生成三列，線形，長 1.2-2 cm.，濶 1-2 mm.，先端刺尖，上側具兩條白色濶氣孔帶，下側灰白色，有脊起。小蕊毬花卵形，腋生，小蕊多數，對生。毬果漿果狀，不開裂，近於圓形，橘紅色至赤褐色，由肉質果鱗組成，直徑約 8 mm.。種子約 3 枚，三角狀卵形，褐色有角稜。

本屬之屬名源於古拉丁名，全屬凡 50 餘種，分佈於北半球各地，我國約產二十餘種。

本屬之特徵為：(一)葉針狀或鱗片狀，或兼有之。(二)毬果多汁呈漿果狀，由 3-6 鱗果鱗合成。

本種為我國特產，廣泛分佈於西北陝甘諸省及長江流域一帶，在臺灣則生長於中央山脈 2,300-3,000 m. 之高處，通常為紅檜 (*Chamaecyparis*) 林之下木 (underwood)。

據早田文藏氏之研究，本種另有一變種，即 var. *concolor* Hayata，產於蘇澳花蓮間之海岸斷崖上，其性質為：

“灌木或小喬木，高達 4 m.，直徑達 20 cm.，常彎曲。葉線形長 1.7 cm.，濶 2 mm.。毬果橙紅色，直徑 9 mm.，近於無柄。種子 3 枚。”

其與本種顯著之相異點為其葉之下面不為灰白色，且其氣孔帶稍濶也(變種名「concolor」意為色澤一致，即示此變種葉之內外顏色相同，非若原種之葉上面為綠色，下面為灰白色也)。



Plate XXVIII. *Juniperus squamata* Lam. var. *morrisonicola* Li & Keng  
(Cupressaceae)

A coning branch; 1a. berry-like cone.



28. *Juniperus squamata* Lambert var. *morrisonicola* (Hayata) comb. nov.

*Juniperus morrisonicola* Hayata in Gard. Chron. ser. 3, 43: 194, 1906, in Journ. Coll. Soc. Tokyo 25(19): 211, f. 7, 1908, in Journ. Linn. Soc. Bot. 37: 298, 1908, in Journ. Coll. Sci. Tokyo 30(1): 307, 1911; Kanehira, Formos. Tr. 600, f. 1917.

"*Juniperus squamata*" sensu Kanehira, Formos. Tr. rev. ed. 60, f. 22, 1936; Masamune, Short Fl. Formos. 37, 1936; non Lambert.

A shrub or tree, procumbent, to 5-10 m. in height and up to 1 m. in diameter, the branches long, decumbent, terete, the branchlets ascending, trigonous. Leaves linear, 3-5 mm. long, 1 mm. wide, densely and ternately arranged, concave and whitish above, convex and grooved below, green, the apex sharply and finely pointed, narrower on young branches. Staminate strobili terminate on branchlets, shortly ovoid, 4 mm. long, 2 mm. wide. Cones globose or ellipsoid, 6-8 mm. long, reddish brown when young, purplish black when mature, subtended by several bracts at the base. Seeds solitary, globose or ovoid, 5 mm. long, 4 mm. wide, brown.

Endemic. In central ranges at high altitudes of over 3,000 meters, the highest growing conifer of the island, forming a dense nearly impenetrable scrub or on open exposed slopes growing as a tree, 5-10 meters high, in ravines and sheltered places.

The Formosan variety differs from the typical form of the species (*J. squamata* Lamb.) on the Asiatic mainland (Himalayas to China proper) in the slightly longer and more slender leaves and the ellipsoidal cones.

### 高山柏 *Juniperus squamata* Lambert var. *morrisonicola* (Hayata) Li & Keng

#### 柏 科

灌木或小喬木，多偃曲，高達 5-10 m.，直徑達 1 m.，樹皮平滑，纖維質。枝圓形，小枝斜上開展。葉線形，長 3-5 mm.，濶 1 mm.，三列密生，內面彎曲，帶白色，外側突出，綠色，有深溝，先端尖銳，幼枝之葉稍狹。小蕊毬花生於小枝頂部，近於球形，長 4 mm.，濶 2 mm.。毬果橢圓形，長 6-8 mm.，幼時紅褐色，成熟時紫黑色，其下有苞片多數。種子單生，球形或卵形，長 5 mm.，濶 4 mm.，褐色。

原種 (*J. squamata*) 分佈於我國西部、西南部及喜馬拉雅山一帶，變種則生長於臺灣中央山脈 3,000 m. 以上，為臺灣針葉樹中垂直分佈最高者，常在其他針葉樹木不能生長之高處，形成蒙密低亞之純灌木林。變種與原種重要相異之點為：稍為長而柔軟之針葉及橢圓形之毬果(原種為球形)。

本變種與刺柏 (*J. formosana*) 分別之點為：

- (1) 刺柏 (*J. formosana*)——葉長 12-20 mm.，毬果紅褐色，通常具三角狀卵形種子 3 枚。
- (2) 高山柏 (*J. squamata* var. *morrisonicola*)——葉長 3-5 mm.，毬果紫黑色，僅有卵圓形種子一枚。

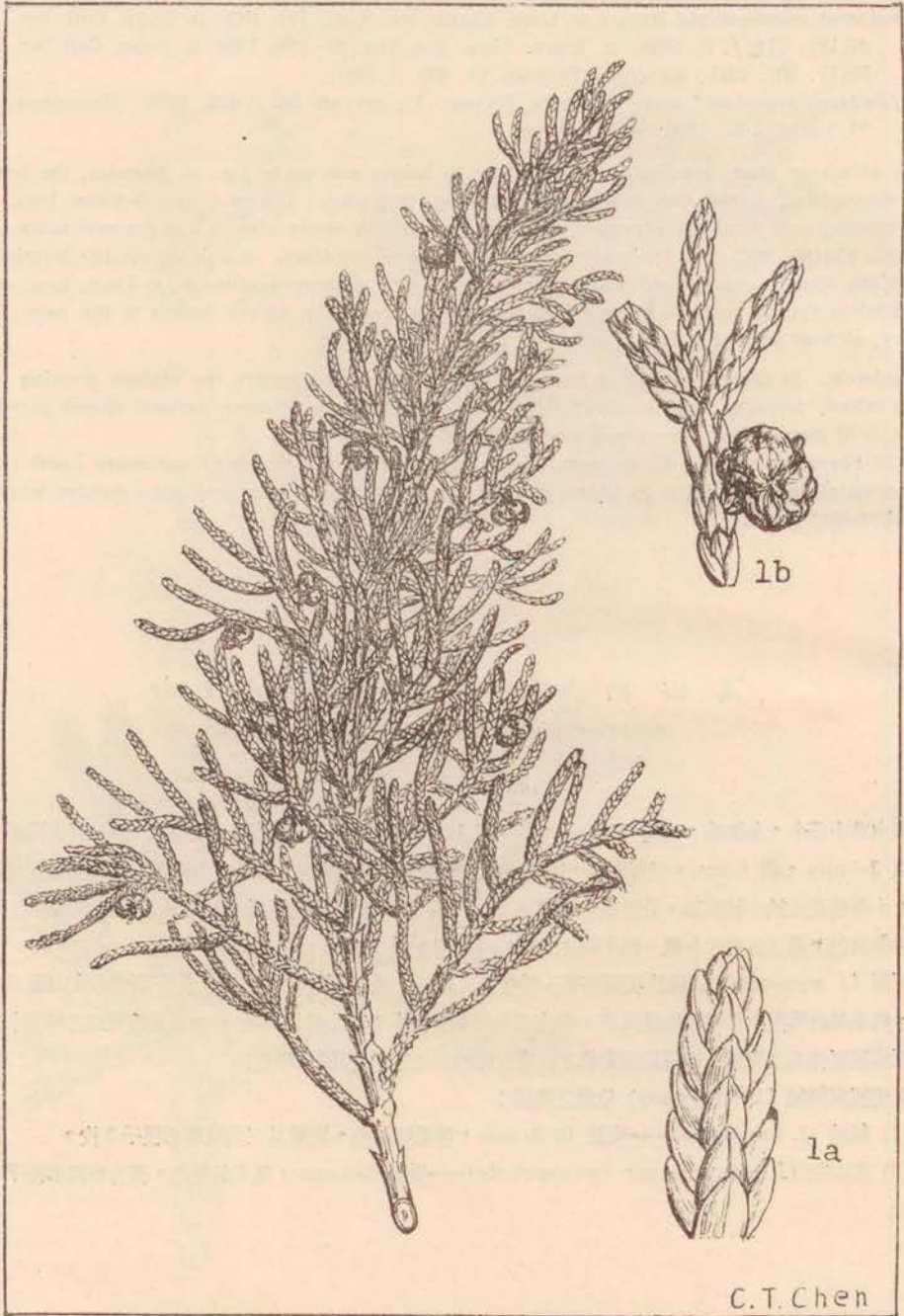


Plate XXIX. *Juniperus chinensis* Linn. var. *tsukusiensis*  
Masam. (Cupressaceae)

A coning branch; 1a. a portion of the branchlet; 1b. a coning branchlet.

29. *Juniperus chinensis* Linn. var. *tsukusiensis* Masamune in Journ. Soc. Trop. Agr. 21: 152, 1930, 3: 20, 1931; Kanehira, Formos. Tr. rev. ed. 60, 1936.

*Juniperus tsukusiensis* Masamune, Prel. Rep. Veg. Yakus. 39, 1929, *nom. nud.* in Bot. Mag. Tokyo 44: 50, 1930, *nom. nud.* in Mem. Fac. Sci. Agr. Taihoku Imp. Univ. 9, Bot. 4: 131, 1934; Shrot Fl. Formos. 37, 1936.

"*Juniperus Sargentii*" *sensu* Sasaki, List. Pl. Formos. 53, 1928, *non* Takada.

"*Juniperus chinensis* Linn. var. *Sargentii*" *sensu* Sasaki, Cat. Govern. Herb. Formos. 57, 1930, *non* Henry.

A procumbent shrub. Leaves dimorphic; linear leaves 6 mm. long, 1 mm. wide, the apex acute, concave above, carinate below; scale leaves about 1.5 mm. long, 1 mm. wide. Cones globose, about 5 mm. in diameter. Seeds 3, erect, trigonal-elliptic, 3 mm. long, 2 mm. wide.

Southernmost Japan—Is. Yakusima. Taiwan, known only from the original collection at Ching-sui-shan (Seisuzan), Hwa-ling-kong, at an altitude of 2,200 meters.

According to Masamune, "It is very near to the typical species but it differs chiefly from the latter in having procumbent character of the stem."

清水圓柏 *Juniperus chinensis* Linn. var.  
*tsukusiensis* Masamune

柏 科

匍匐性灌木，葉兩型：線形葉長約 6 mm.，濶約 1 mm.，先端銳形，上面中肋凹入，下方突出；鱗形葉長濶均爲 1.5 mm.。毬果漿果狀，球形，直徑約 5 mm.。

本種發現於花蓮清水山之斷崖上(約 2,200 m. 處)，此外亦產於日本極南端之屋久島。據正宗嚴敬氏之研究結果，本變種異於原種——即產於我國大陸之圓柏 (*Juniperus chinensis* Linn.)——者，主要爲其匍匐性之莖。