

A SUPPLEMENT TO THE INTERNATIONAL CENSUS OF THE CONIFERAE, II.

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ABSTRACT

Taxonomic activity in the Coniferae has steadily increased since the preliminary checklist was published by Silba (1984). New species and infraspecific taxa have been described worldwide by a number of authors involved in these groups. A taxonomic assessment of these newly proposed species and a closer look at infraspecific taxa are needed. A summary and description of these new taxa are given in this paper.

KEY WORDS: Coniferae, infraspecific variation, geographic isolation, leaf morphology, cone morphology, juvenile stages, new taxa, range extensions.

Taxonomically, the Coniferae are a fairly stable group of plants. It seems clearly evident that a uniform scheme for conifer taxonomy based on easily accessible data is needed. Field identification is an important component in the taxonomic assessment of the genera and species. Gross field morphology is valuable in many disciplines of botany, including for the biologist, the forester and the horticulturist and is not solely limited to data in the laboratory. Undoubtedly, much field work remains to be done; and in particular, herbarium specimens and field notes are quite sparse for many Asiatic species. I am still impressed with older standards for means of species classification by using gross morphology observable in the field, combined with ecological and geographical data as a solid basis of interpreting taxonomic groups or units.

Taxonomic units of conifer genera and species are reliably distinct in their external leaf anatomy and in external reproductive structures. Juvenile stages, bud and branchlet characteristics as well as bark structure can be highly valuable in field identification. Olfactory analysis of leaves and crushed branchlets are useful characteristics. Ecology, habitats and soil types can be used to distinguish taxa in the field. Certain species are restricted to dry areas and others to humid areas.

Chemotaxonomic and cytological data have been useful in segregating infraspecific varieties. What must be considered however, is how consistent are such chemotaxonomic characteristics of leaf hypodermis and tropolonic

fractions of heartwood, and how practical is it to verify such data in the laboratory. Separation of species solely on a chemotaxonomic basis has little value if no external leaf or reproductive differences can be seen in the field. Several chemotaxonomic studies have revealed new chemical compounds in leaves of various genera and species. Such studies provide new characteristics with which one has nothing to compare. Living organisms are made up of many different characteristics and dried laboratory samples cut into sections under the microscope do not give a complete picture of the plant. Chemotaxonomic and cytological data can be most useful when combined with external field characteristics and ecological data.

Taxonomic research and publications on the Coniferae have done much to increase our knowledge of poorly known species. A preliminary checklist of the Coniferae has been published (Silba 1984). Although this treatment seems satisfactory at the species level, a closer look must be taken at the infraspecific level. New species of *Cupressus* from the Himalaya were published by Silba (1987, 1988). Bailey (1983, 1987) has shed much light on the Mexican pinyon pines and has described some new taxa. Perry (1983, 1987) has done extensive field work in México and Central America and has added much knowledge of taxa in those areas. Carvajal (1986) published an essay on *Pinus* species in the Mexican state of Jalisco and published a few new taxa.

Further, de Laubenfels described a new species of *Agathis* from Vanuatu (1987) and has done much revisionary work in the Podocarpaceae. He has established that *Nageia* is the prior name for the genus *Decussocarpus*.

Jaffre, *et al.* (1987) reported range extensions for Araucariaceae, Cupressaceae and Podocarpaceae in New Caledonia.

Concerning Asiatic taxa, Cheng (1981) raised several infraspecific taxa of the Pinaceae. Also, Cu (1979) raised several infraspecific taxa of *Cephalotaxus* to the species level with new taxonomic combinations. Rushforth (1984, 1986, 1988) is continuing his taxonomic assessment of the Coniferae, particularly in the genus *Abies*, and has added a tremendous in depth study of that genus. Horsman (1981, 1983, 1984, 1988) has added many field notes on habit, growth and distribution of the Pinaceae in North America, Asia and Europe.

Lucznik (1976) made a taxonomic assessment of *Picea obovata* in the Altai Mountains. Further, Kozhevnikov (1981) has made a taxonomic study of *Larix* in the Soviet Union.

A taxonomic assessment of these recent studies is needed and a summary attempt is made here as a supplement to the checklist by Silba (1984) and *Encyclopedia Coniferae* (Silba 1986). Taxa not included in either of these works are described here and significant range extensions are reported for additional taxa. Typical varieties are listed for a number of species that were included in either of the previous treatments, where their inclusion is important to understanding the features of nontypical varieties discussed here. Where the features of typical varieties are not used for comparison in discussions of

nontypical varieties in this work, the typical variety is not listed here although its features may be found in Silba (1984; 1986).

Abies alba Miller var. *alba*

"European Silver Fir"

The type variety is distinguished by its leaves having two marginal resin canals and a discontinuous hypoderm. This species is widespread in central Europe and would therefore tend to have some geographic variation. Field notes and herbarium collections from throughout the range of the species are generally lacking in herbaria other than in Europe. Further field work should clarify geographical or morphological varieties.

Abies alba Miller var. *pardei* (Gaussen) Silba, *stat. nov.* "Parde Fir"

BASIONYM: *Abies pardei* Gaussen, Trav. Lab. Forest. Toulouse 1(2):5, figs. 1928.

A tree 18-25 m tall. Branchlets light purplish-red or gray-brown, with dense blackish or brown pubescence. Buds conical, chestnut-brown, with little resin, 4 mm long by 2.5-3 mm wide, encircled by short leaves, scale apices free. Leaves on sterile branchlets spreading horizontally in 2-3 ranks, 1.5-3 cm long by 2-2.2 mm wide, stomata few or many above, along the groove near the apex, and in 7-9 lines with a glaucous bloom below; resin canals submarginal or median, 2; hypoderm an interrupted band, leaf apex obtuse or bluntly acute. Leaves on fertile branchlets bright glossy green, radially arranged, mostly on upper part of branchlet, 8-16 mm long by 1.6-1.9 mm wide, with two broad white stomatal bands below, margins not recurved, petiole with a sucker like base as in *A. pinsapo* Boiss. Female cones oblong-cylindric, 18-20 cm long by 4-5 cm wide, brown, slightly tinged black at maturity, scales 3.5 cm long by 3 cm wide, bracts long exserted and erect, not usually reflexed, with an acute spine tipped apex 6 mm long. Wing of seeds to 3 cm long, brown tinged violet-purple.

Liu (1972) regarded this taxon as a hybrid, perhaps arising from cultivation at Nogent-Sur-Vernisson in France, and rejected earlier speculation by Gaussen that it may be native to Calabria in Italy.

The leaf morphology of this variety is similar to that of var. *alba*. *Abies alba* var. *pardei* is perhaps now extinct in the wild. It is quite distinct in its cone scales having long exserted bracts. A collection from Romania, Muntenia, Prahova District, Bucegi Alps, near Busteni, 1000 m, *Nyarady 915-a* (BKL) has an immature female cone with long exserted bracts and thick leaves with a blunt apex as in var. *pardei*.

Abies balsamea (L.) Miller var. *phanerolepis* Fernald "Bracted Balsam Fir"
Rhodora 11:203. 1909.

A tree to 20 m tall. Bark with prominent resin blisters. Branchlets with fine short gray-brown pubescence. Leaves flattened, 1-2.5 cm long by 1.5-2 mm wide, few to many stomata along grooves above, resin canals median, apex obtuse or slightly emarginate. Female cone subcylindric, 2.5-5.5 cm long by 1.5-2 cm wide, violet-purple then gray or blackish-brown; scales with 2 margins, auriculate 15-20 mm long by 15-20 mm bracts as long as the scales or long exserted and spreading. Seeds with short broad wings 5 mm long by 6.5 mm wide, light brown.

Distribution: Through the range of var. *balsamea*, in Canada from Labrador and south to the Blue Ridge Mountain range in northern Virginia, United States.

Abies chensiensis Van Tiegh. var. *chensiensis*

The type variety has ash gray branchlets and leaves with stomata in 11 lines below. It has a more northern distribution than the two following varieties.

***Abies chensiensis* Van Tiegh. var. *salouensis* (Borderes-Rey & Gaussen) Silba, *stat. nov.* "Salween Fir"**
BASIONYM: *Abies salouensis* Borderes-Rey & Gaussen, Trav. Lab. For-est. Toulouse 1,4(15):4. 1947.

Seasonal branchlets fawn brown, turning ash gray in the second winter. Buds brown or pale brown. Leaves of sterile branchlets 4-7.5 cm long or longer, noticeably pectinately arranged, stomata in 12-14 lines below. Female cone 10-14 cm long by 5 cm wide.

Distribution: China, Yunnan, Yangtze-Mekong Divide and Mekong-Salween divides and adjacent areas; Tibet, Rongto Valley, Zayul; 2600-3200 m. India, Arunchal Pradesh, gorge of Di Chu.

***Abies chensiensis* Van Tiegh. var. *yulongxueshanensis* (Rushforth) Silba, *stat. nov.* "Yulongxue Fir"**
BASIONYM: *Abies chensiensis* subsp. *yulongxueshanensis* Rushforth. Notes Roy. Bot. Gard. Edinburgh 41(3):539. 1984. TYPE: CHINA. Yunnan: Lijiang Shan. 3000 m. T. T. Yu 15050 (HOLOTYPE: E!; Iso-type: i .). Paratype: CHINA. Lijiang to Yongming, Rock 18487 (E).

This variety differs from var. *chensiensis* by its marginal (not median) resin canals in the leaves of fertile branchlets and the larger female cones 10-14 cm long. Leaves on sterile branchlets shorter than in var. *salouensis*, mostly less than 4.5 cm long.

Abies cilicica (Ant. ex Klotzsch) Carrière var. ***borisii-regis*** (Mattf.) Silba,
stat. nov. "King Boris Fir"

BASIONYM: *Abies borisii-regis* Mattf., Notizbl. Bot. Gart. Berlin Dahlem 9:235. 1925.

Abies alba var. *acutifolia* Turr., Bull. Misc. Inform. 34. 1925.

A broadly conical tree to 25 m tall. Bark dark gray to black, smooth on young trees. Branchlets tan, with dense dark brown or blackish pubescence. Buds ovoid, tan, scarcely covered with yellow resin. Needles densely set, spreading parallel from the branchlet and pointing forward and slightly upward. Leaves 2.8-3 cm long by 1.7 mm wide, flattened, dark glossy green above with few stomata near the rounded or acute apex, with two narrow bright white stomatal bands below, margins not recurved. Female cone cylindrical-conic, 12-15 cm long by 4 cm wide, pale green-purple, bracts exserted slightly beyond the height of the scale and spreading.

Distribution: South Bulgaria, south Yugoslavia, Greece (Pindus, Olympia, Athos and the Isle of Thasos).

Specimen examined: GREECE. Eurytanien: Tymphrestos, near Karpenison, 1500 m, *Mattfeld 2304* (NY).

Abies concolor Hildebr. var. *concolor*

The type variety is distinguished by its thick leaves being upturned and mostly on the upper part of the branchlet. Further, the type has a more northern distribution in the Rocky Mountain region from southeast Idaho to central Arizona, than the following varieties.

Abies concolor Hildebr. var. ***baja-californica*** Silba.

var. nov.

"San Pedro Mártir Fir"

TYPE: MÉXICO. Baja California Norte: San Pedro Mártir, Vallecitos, 2457 m altitude, *Wiggins & Demaree 4979* (HOLOTYPE: NY; Isotype: GH).

Gemmae globosae, obtusae, flavo-brunneae. Ramuli pallide flavo-aurantiaci, brevissime pubescentes. Folia crassiora, spiraliter disposita, erecta, breviora. 1.4-2.2 cm longa et 1.8-2.2 mm lata.

A tree to 3 m tall or more by 45 cm d.b.h. Branchlets pale orange yellow, becoming gray, with sparse pubescence. Buds globular, yellowish-honey brown, with clear resin. Leaves upturned, rather short and thick, 1.4-2.2 cm long by 1.8-2.2 mm wide, stomata above and below, apex bluntly acute.

This variety is morphologically close to the type variety, though differs in its thicker leaves and is widely separated geographically.

Abies concolor Hildebr. var. *martinezii* Silba, var. nov. "Sonoran Fir"
 TYPE: MEXICO. Sonora: Río Bavispe, Rancho de Cruz Diaz, near
 Aserraderos, *Phillips 506* (HOLOTYPE: GH). Paratype: MEXICO. Chi-
 huahua: Arroyo de la Pompa, Madera, *Matuda 32702* (MEXU).

Ramuli glabri, atro-rubentes vel rubentes. Folia pectinatim dis-
 posita, 3-6 cm longa et 2.2 mm lata, longiora et tenuiora.

Branchlets glabrous, dark red. Buds rather small. Foliage spreading
 sideways and pectinately arranged as in *Abies concolor* var. *lowiana* (Gord.)
 Lemm. Leaves slender, 3-6 cm long by 2.2 mm wide, larger and narrower than
 the type, stomata more numerous below. Leaf structure different in having
 distinct numerous guard cells in the cell tissue that are unequal in size.

Also in the Sierra de Los Ajos, Cananea, Sonora (Martínez 1963). Martínez
 (1963, p. 157) well noted the internal leaf structure differences between Mexi-
 can and Rocky Mountain populations, earlier suggested by Rehder.

Abies delavayi (Van Tiegh.) Franchet var. *delavayi* "Delavay Fir"
 TYPE: CHINA. Yunnan: Tsang Chan, near Tali Fu, 3500-4000 m,
Delavay 1210 (HOLOTYPE: P; Phototype: E!).

A tree 10-25 m tall to 1 m in diameter. Bark gray, smooth, fissured at the
 base. Buds globular, orange-green-brown, with transparent resin. Branchlets
 glabrous, maroon, red-brown or orange-brown, dull. Leaves radially arranged
 around the branchlet, upper leaves erect, lower leaves below the branchlet,
 curved in an "s" shape, glossy green to yellowish green, 1.5-3 cm by 0.7-1.4
 mm wide, stomatal bands silvery glaucous below with a waxy covering, wax
 also on midrib above, margins strongly recurved, apex squarish and notched.
 Female cone narrow cylindric, 6-10 cm long by 3-3.5 cm wide, dark bluish
 violet, bracts exserted and spreading, usually reflexed.

Distribution: China in west Yunnan at 3300-4000 m altitude, damp areas.

Topotype: CHINA. Yunnan: Tsan Shan, Dali, near Tali-Fu, 3700-3800 m,
Sino-Rossica Exped. 1565 (NY).

Abies delavayi (Van Tiegh.) Franchet var. *mutoensis* Cheng &
 Fu "Mutoen Fir"
Acta Phytotax. Sin. 13(4):83. 1975.

Buds conical, brown, slightly resinous. Branchlets densely pubescent, tan.
 Leaves longer and narrower than the typical variety, more loosely arranged,
 2-3 cm long, very bright white below.

This variety represents a northwestern variation of the species and occurs
 in drier regions.

Distribution: China, southeast Tibet, Pakshiri District, Nyug La, 94° 00'
 E, 28° 47' N, 3200-3810 m, *Ludlow 3747* (BM, E). India, Kameng District,
 Tawang, 3000 m, *Sahni & Nathani KCS 11745* (A) -tree 10 m tall.

***Abies delavayi* (Van Tiegh.) Franchet var. *nukiangensis* (Cheng & Fu)**Farjon & Silba. *stat. nov.*

"Nukiang Fir"

BASIONYM: *Abies nukiangensis* Cheng & Fu, Acta Phytotax. Sin. 13(4): 83, pl. 13, illustr. 1-7. 1975. TYPE: CHINA. Yunnan: Nukiang region, Gonga Shan, *Fang 8025* (HOLOTYPE: PE!).

A tree to 20 m tall, to 1 m in d.b.h. Branchlets red-brown or brown, with dense short pubescence. Buds globose, brown, with little resin. Leaves longer and wider than the typical variety, 1.8-4.3 cm long by 1.5-2.5 mm wide, dark green above, with two powder white stomatal bands below, apex emarginate. Male strobili 2.5 cm long, pendulous. Female cones cylindrical, slightly narrowed at the apex, 7-10 cm long by 3.7-4.5 cm wide, blackish, resinous; cone scales larger, rectangular and fan-shaped, 1.8-2.2 cm wide; bracts usually hidden within the cone scale. Seeds 1.6-1.9 cm long, wings pale blackish-brown or red-brown.

Distribution: China, NW Yunnan, in Nu River (Nukiang) and Lancangjiang (Lancang River and Mekong River) at 2500-3100 m, in pure stands or mixed with other conifers. Also in northern Burma.

Specimen examined: BURMA. Kachin State, main ridge of Bumpha Bum, 2591 m, *J. Keenan, et al. 3507* (A).

Abies fabri* (Masters) Craib var. *fabri

"Faber or Omei Fir"

Notes Roy. Bot. Gard. Edinburgh 11:278, f. 164. 1919. BASIONYM:

Keteleeria fabri Masters, J. Linn. Soc. Bot. 26:555. 1902. TYPE:

CHINA. Szechuan: Mount Omei, 2800 m, *Faber 982* (Fragment: A!). *A. delavayi* var. *fabri* (Masters) Hunt, J. Roy. Hort. Soc. 92:263. 1967.

A tree to 15 m tall. Bark gray, becoming fissured. Branchlets shiny yellowish-brown. Buds conical, greenish-purple with some white resin. Leaves more pectinately arranged in a "V" like pattern, shiny green, 1.5-2.5 cm long by 2.5 mm wide, with two narrow silvery glaucous stomatal bands below, wax over stomatal bands only, margins strongly recurved, apex notched, square tipped or bluntly rounded. Female cone barrel shaped, 5-9 cm long by 4-4.5 cm wide, bluish-black, bracts exerted and usually reflexed.

Distribution: China, west-central Szechuan, at 2000-4000 m.

Specimen examined: CHINA. Szechuan: west of Kangding, Cheto Shan, 3600-4000 m, *Wilson 4082* (BM).

Abies fabri* (Masters) Craib var. *beshanzensis* (Wu) Silba.stat. nov.*

"Chekiang Fir"

BASIONYM: *A. beshanzensis* M.H. Wu, Acta Phytotax. Sin. 14(2):19, pl. 1, illus. 1. 1976.

A tree to 11 m tall and 40 cm in diameter. Branchlets rigid, glabrous or rarely with pubescence. Buds ovoid-conical, rather large. Leaves spreading on branchlet below, rising above on upper part of branchlet, 1-4 cm long by 2.5-3.5 mm wide, stomata below only, resin canals in subepidermal section of the leaves, leaf margin not recurved as in var. *faberi*, apex bluntly acute and deeply notched. Female cone yellowish-brown or pale-brown, ovoid-conical, apex rounded; scales wider to 2.5-3 cm broad; bract slightly below the full height of the scale, exerted, reflexed slightly at the apex only.

Described by Wu (1976) from Wanli Forest Farm, Chingyuan County, Chekiang and native to Beshanzu, Chekiang at 1700 m altitude. This variety represents an eastern relict population of this generally lower elevation species.

Abies faberi (Masters) Craib var. *minensis* (Borderes-Rey & Gausson)

Silba, *stat. nov.*

"Songpan Fir"

BASIONYM: *A. minensis* Borderes-Rey & Gausson, Trav. Lab. Forest. Toulouse 1,4(15):8, f. 1-12. 1947. *A. faberi* subsp. *minensis* (Borderes-Rey & Gausson) Rushforth, Notes Roy. Bot. Gard. Edinburgh 43(2):273. 1986. TYPE: CHINA. Szechuan: Songpan, 3200 m, Yu 2856 (HOLOTYPE: TL; Fragment: E!).

Branchlets honey brown. Foliage more widely parted above and pectinately arranged than in typical variety, leaves to 3.5 cm long, stomatal bands greenish white below, leaf margin not as strongly recurved as in var. *faberi*, resin canals rather variable.

Distribution: This variety represents a northwestern geographic variant and comes from a drier area than the type.

Specimens examined: CHINA. Szechuan: west of and near Wenchuan, 3000-3600 m, Wilson 4502 (BM,E); Pan lan Shan, west of Guan Xian, 3000-3600 m, Wilson 4069 (BM).

Abies faberi (Masters) Craib var. *ziyuanensis* (Fu & Mo) Silba,

stat. nov.

"Guangxi Fir"

BASIONYM: *Abies ziyuanensis* Fu & Mo, Acta Phytotax. Sin. 18(2):208, pl. 2. 1980. TYPE: CHINA. Guangxi: Ziyuan Xian. Yinzhulao Shan, 1650-1700 m, Fu & Lu 78001 (HOLOTYPE: PE).

Abies yuanbaoshanensis Y.J. Lu & L.K. Fu, l.c., 206, pl. 1. 1980. TYPE: CHINA. Guangxi: Rongshui Xian, Yuanbao Shan, 1700-2050 m, Lu 1001 (HOLOTYPE: PE).

A tree to 30 m tall. Buds distinctly ovoid-conic with little or much resin. Leaves spreading laterally, hump shaped or curved down at the apex, 2-4.8 cm long by 2.5-3.5 mm wide, with white stomatal bands below, margins not

strongly recurved, apex notched. Female cone oblong-cylindric, dark yellow-brown to green-brown or dark brown, 10-11 cm long by 4.2-4.5 cm wide; scales longer and wider than in the typical variety, 2.3-2.5 cm long by 3-3.3 cm wide; bracts about the height of the scale though only partially exposed and reflexed. Seeds pale purple-gray.

Distribution: This variety represents a southern variant of the type and is also recorded in southwest Hunan.

Abies fargesii Franchet var. *fargesii*

"Farges Fir"

TYPE: CHINA. Szechuan: Cheng-kou and north-east of Song Pan, 2600-3800 m, *Farges 908 bis* (Isotype: K!).

Branchlets purple, glabrous or slightly pubescent. Buds conical, purple, 2-2.5 mm long, covered with white resin. Leaves bright glossy green, 1-2.2 cm long by 2.5-3 mm wide, mostly pointing upward and forward on the branchlet, stomatal bands bright glaucous silver below, apex distinctly obtuse and notched. Female cone 2.5-6 cm long, indigo-purplish, ovoid; bracts exserted and reflexed, longer than the ovuliferous scale.

Distribution: China, Kansu, eastern Szechuan and Shaanxi.

Specimens examined: CHINA. Kansu: Archuen, south of Jone, 4100-4500 m. Shaanxi: Teou Mon Kong, *Licent 2862* (BM,K).

Abies fargesii Franchet var. *fanjingshanensis* (Huang, Tu & Fu) Silba, *stat. nov.*

"Fanjing Shan Fir"

BASIONYM: *Abies fanjingshanensis* Huang, Tu & Fu, *Acta Phytotax.* Sin. 22(2):154. 1984.

A tree to 25 m tall. Branchlets dark red, glabrous. Buds globose-ovoid, dark brown with clear resin. Leaves spreading pectinately below and rising above the branchlet, 1-4.3 cm long by 2-3 mm wide, resin canals subepidermal, stomatal bands bright white below, apex notched, leaves rarely recurved as in *Abies recurvata* Masters, margins slightly recurved. Female cones pale brown, maturing blue-brown or purplish brown, 5-6 cm long by 4 cm wide; bracts about half the height of the scales, variable in being short or partially exposed and reflexed.

Specimen examined: CHINA. Kweichow: Jiangkou Xian, vicinity of Jinding along crest of Fanjing Shan, 2200 m, *Sino-American Exped. 474* (GII).

Abies fargesii Franchet var. *hupenhensis* Silba, *var. nov.* "Fang Xian Fir"

TYPE: CHINA. Hupeh: Fang Xian, 2300-3300 m, *Wilson 2088* (HOLOTYPE: E; Isotypes: BM,K). Paratype: CHINA. Hupeh: Fang Xian, *Wilson 1895* (E,K).

Gemmae parvae, globosae, obtusae, castaneo-brunneae. Ramuli glabri, mellito-brunnea vel brunnea. Folia pectinatim disposita, longiora et tenuiora, 2.1-2.9 cm longa et 2.2-2.5 mm lata, hypodermis imperfectus.

Buds small and globose-conic, chestnut to medium brown, 3.5-4 mm long, with little resin. Branchlets honey brown, glabrous. Leaves more pectinately arranged, longer and narrower, 2.1-2.9 cm long by 2.2-2.5 mm wide, glossy green above, silvery glaucous below, leaf with an incomplete layer of hypoderm, margin slightly recurved, apex more acute and distinctly notched. Female cone to 9 cm long, purplish; bracts as large as the scale, but scarcely exposed or reflexed.

Abies forrestii C.C. Rogers var. *forrestii*

"Forrest Fir"

ex Craib, Notes Roy. Bot. Gard. Edinburgh 11:279, t. 279. 1919. C.C. Rogers in Gard. Chron., ser. 3. 56. 1919. *nom. seminud.* *Abies delavayi* var. *forrestii* (Rogers) Jackson in Chittenden, *Conifers in Cultivation* 245. f. 76. 1932. TYPE: CHINA. Yunnan: Likiang Snow Range, eastern flank, 27° 25' N, 3048-3353 m, *Forrest 6744* (HOLOTYPE: E!).

A tree to 20 m tall, with a conical crown. Bark gray, smooth, fissured at the base. Buds globose, dark red, covered in white resin, to 10 mm long. Branchlets red-brown, usually glabrous. Leaves dull dark green. 1.5-3.5 cm long by 2.5 mm wide, pointing slightly forwards, spreading in a "V" like groove pattern above and parted below, with 2 prominent white or glaucous silver stomatal bands below, margin not prominently recurved, apex blunt and notched but not bifid. Female cones ovoid or barrel shaped. 8-15 cm long by 4-7 cm wide, bluish-black, bracts distinctly lobed. Bracts exerted and reflexed, longer than the ovuliferous scale.

Distribution: Type locality and also in N.W. Yunnan at 2500-3400 m.

Specimen examined: CHINA. Yunnan: slopes of Mt. Gyi-Na Lo-Ko, second peak of Yu-lung Shan. 3658 m, *Rock 24987* (NY).

Abies forrestii C.C. Rogers var. *chayuensis* (Cheng & Fu) Silba,
stat. nov.

"Chayu Fir"

BASIONYM: *Abies chayuensis* Cheng & Fu, *Acta Phytotax. Sin.* 13(4):82. 1975.

A tree to 30 m tall. Branchlets pale gray brown, with pubescence. Leaves arranged in two rows below or nearly erect above, 1.5-2.5 cm long by 3 mm wide, apex slightly emarginate or obtuse, stomata in two powder white bands below, transverse leaf section with two centrally positioned resin ducts, margins slightly recurved. Female cones cylindrical, narrowed at both ends, obtuse at the apex; scales broad, rounded, with an abruptly pointed caudate acute

tip 5 mm long at the center. Bract exerted and reflexed, longer than the ovuliferous scale.

Distribution: China, southeast Tibet, Chayu, to 3800 m, on sunny-side slopes.

Specimen examined: CHINA. Tibet: Chayul to Charme Road. Kyimpu, on northern slopes, 3658-4115 m, *Ludlow & Sherriff 1572* (BM,E).

Abies forrestii* C.C. Rogers var. *chengii (Rushforth) Silba,
stat. nov. "Cheng or Longleaf Forrest Fir"
 BASIONYM: *Abies chengii* Rushforth, Notes Roy. Bot. Gard. Edinburgh
 41(2):333, f. 1. 1983.

A tree to 20 m tall or more. Bark gray, smooth, becoming fissured. Buds conical or ovoid-conical, pale brown, with resin, but buds separate and visible, over 3 mm long. Branchlets glabrous, mahogany then orange-brown. Leaves spreading in a "V" like groove above, dark glossy green, 1.5-6 cm long by 2.5-3 mm wide, stomatal bands pale or whitish green below, apex rounded and bifid, upper surface with a distinct median groove, margin not recurved, petiole twisted. Female cone ovoid-cylindric, violet, becoming brown, 6-9 cm long; scales obdeltoid, 2.2 cm long by 2.6 cm wide. Bracts equal to height of ovuliferous scale, but often hidden or only cusp tips exerted and partially reflexed.

Distribution: western China, specific origin not certain, most likely introduced into England from a collection of G. Forrest, perhaps extinct in the wild. A collection by Joseph Rock has long leaves and a cone with hidden bracts and seems to match this variety: Yunnan: between Likiang and Young-ning, east and west of the Yangtze, 3460 m, *Rock 18527* (GH,US).

Abies forrestii* C.C. Rogers var. *ferreana (Borderes-Rey & Gausson)
 Farjon & Silba, *stat. nov.* "Ferre Fir"
 BASIONYM: *Abies ferreana* Borderes-Rey & Gausson, Trav. Lab. For-
 est. Toulouse 1,4(15):4, f. 1-8. 1947.

Abies rolii Borderes-Rey & Gausson, l.c. 1,4(26):1, f. 1-17. 1948.

Abies yuana Borderes-Rey & Gausson, l.c. 1,4(26):3, f. 1-12. 1948.

A tree to 20 m tall and 1 m in d.b.h. Bark gray brown or grayish black, fissured longitudinally into scaly plates. Branches spreading. Branchlets densely covered with woolly rust brown or dark brown pubescence, seasonal branchlets red brown or dark brown, two and three year old branchlets dark brown or blackish brown. Buds globose, distinctly resinous. Leaves radiating obliquely upward or the lower leaves arranged in two rows, narrowed at the base. 1-2.3 cm long by 2-2.5 mm wide, apex obtuse and emarginate, leaves on terminal or fertile branchlets rarely with an obtuse or bluntly acute apex, dark green above,

with two bright powder like stomatal bands below, with two central resin ducts in the transverse section. Female cone short cylindrical or cylindrical-ovate, to 7 cm long by 3.5-4 cm in diameter, purplish black or bluish black, scales fan shaped and rectangular to 1.6-2 cm long by 1.6-2.2 cm wide, wave like or recurved when dry, with an abrupt or slightly abrupt pointed, acute tip, bracts usually exerted spreading outward and recurved. Seeds 7-10 mm long, wings pale purplish brown, wedge shaped 7-8 mm long.

Distribution: A high altitude variety of *A. forrestii* from China, in Yunnan in Zhongdian. Weixi and Divide between Lancang River and Nu River. In southwest Szechuan, Muli Kingdom, 3300-3800 m, in high montane regions. Type collection from Zhongdian, Yunnan.

Abies georgei ORR var. *georgei*

"George Fir"

Notes Roy. Bot. Gard. Edinburgh 18:1, 146, t. 236. 1933. *A. delavayi* var. *georgei* (Orr) Melv., Kew Bull. 1958 (3):533. 1958. TYPE: CHINA. Yunnan: Chien-Chuan-Mekong Divide, 26° 40' N, 90° 40' E, 3658-4267 m, *Forrest 22547* (HOLOTYPE: E). Paratype: CHINA. Yunnan: Chuiza Shan, Wei Hsi District, *Forrest 30853* (E!).

A tree to 30 m tall. Branchlets grooved, with dense reddish brown or purplish pubescence. Buds globular, with yellowish resin. Leaves distinctly blue-green, 1.5-2.5 cm long by 2-2.5 mm wide, stomata in ten lines below, margin not recurved, apex bluntly acute. Female cones 9 cm long by 4-5 cm wide; scales glaucous blue with a brown erose margin, obovate cuneate, 2 cm long by 2 cm wide. Bracts distinctly erect, cover a greater part of the scale, broadly triangular and not lobed, with a sharply acute non reflexed spine cusp 6-10 mm long.

Distribution: China, mountains east of Yangtze bend in Yunnan, seldom below 3050 m.

Specimen examined: CHINA. Yunnan: western slopes of Sungkwei Range, *Forrest 23205* (E).

Abies georgei ORR var. *smithii* (Viguie & Gaussen) Cheng & Fu "Smith Fir"

Trees of China 1:113. 1961. BASIONYM: *Abies forrestii* var. *smithii* Viguie & Gaussen, Bull. Soc. Hist. Nat. Toulouse 58:355, f. 1-6. 1929. *Abies delavayi* var. *smithii* (Viguie & Gaussen) Liu, *A Monograph of the Genus Abies* 143, t. 88. 1972. TYPE: CHINA. Yunnan: Likiang Snow Range. *Rock 10673* (HOLOTYPE: A!).

Buds globose, 2.9 mm long by 2.6 mm wide. Branchlets strongly pubescent, rather dark, blackish brown in the second year. Leaves 1.45-1.75 cm long (rarely to 2.5 cm long) by 1.6-2 mm thick, stomata in 12 lines below, margins thickened, apex bluntly obtuse, fertile branchlets with acuminate or notched leaf apices, petiole twisted to 1.5 mm long. Female cones smaller, 5.5-7 cm

long by 2.8-3.5 cm wide; scales smaller, 10-15 mm wide by 8-10 mm high, apex 0.5 mm, margins finely serrulate. Bracts erect, smaller, 4.5 mm wide at base by 7 mm long with narrowed cusp spiny apex 5-6 mm long by 0.3 mm wide. Seeds red-violet.

Distribution: A northern variety of the type, occurring in northwest Yunnan, southwest Szechuan and southeast Tibet at 2500-4000 m.

Specimen examined: CHINA. Szechuan: south-west Tachienlu, *Cheng 1825* (NY).

Abies grandis (Douglas ex D. Don) Lindley var. *grandis* "Grand Fir"

Buds conical, 3-3.5 mm long by 2.5 mm wide, with white resin. Branchlets distinctly red-brown for 4-6 years. Leaves distinctly two ranked, inner set distinctly shorter.

Distribution: The type variety occurs mainly along the coast from southern Vancouver Island to northern California to 457 m altitude. The type specimen was collected by Douglas in northern California by river banks, holotype presumably at Kew.

Abies grandis (Douglas ex D. Don) Lindley var. *idahoensis* Silba,
var. *nov.* "Idaho Fir"

TYPE: UNITED STATES. Idaho: Washington County, 16 miles northwest of Mann Creek Store, north of Sprui Spring Creek Camp on Hitt Creek, lower slopes of Hitt Mt., *Christ 18204* (HOLOTYPE: NY). Paratypes: UNITED STATES. Montana: Big Fork, *B.T. Butler 185* (NY); Missoula County, St. Regis National Forest, near St. Regis, *Palmer 37787* (NY).

Gemmae globosae, 2 mm longae, flavae resinosae. Ramuli pallide brunnei, flexi flavo-brunnea, tunc griseo-brunnea. Folia pectinatum disposita, patulis obliquus, acuta, 4-6 cm longa.

Buds globular, 2 mm long, polished, yellow with clear resin. Branchlets brown in first year, yellowish-tan in second and third years and gray-brown in third and fourth years. Leaves spreading distinctly sideways but forward, pectinately arranged, but leaves distinctly spreading vertically rather than horizontally, more acute, to 4.6 cm long, petioles more distinctly twisted. Female cones to 5.5 cm long by 2.5 cm wide.

Distribution: Southeastern British Columbia, Canada to central Idaho, United States. Rocky Mountain region, an inland variety, to 1850 m altitude.

Abies guatemalensis Rehder var. *guatemalensis*

"Guatemala Fir"

The type variety has stomata usually only on the lower leaf surface, and the vascular bundles are distinctly separated.

Abies guatemalensis Rehder var. *jaliscana* Martínez

"Jalisco Fir"

Anal. Inst. Biol. Mex. 19:1. 1948.

A tree to 20-30 m tall, to 1.25 m in diameter. Bark dark blackish, divided into irregular plates. Branches horizontal, forming a conical crown. Branchlets dark brown or red-orange, pubescent. Leaves bright dark green above, glaucous below, apex emarginate, 2.5-6.5 cm long by 1.25 mm wide, stomata in 3-4 discontinuous lines above near the apex, stomata in 10-12 lines below. Female cones cylindrical-elliptical or cylindrical-oblong, acuminate, 6-9 cm long by 2.5-3 cm wide on a short peduncle 10 mm long.

Distribution: Also in Verdura de Javiel and Cumbres de Santa Maria, Jalisco.

Specimen examined: MÉXICO. Jalisco: Arroyo Segundo, near San Sebastián, Y. Mezia 1574 (A).

Abies guatemalensis Rehder var. *tacanensis* (Lundell)

Martínez

"Chiapas Fir"

Las Pinaceas Mexicanas ed. 3 129. 1963. BASIONYM: *Abies tacanensis* Lundell, Amer. Midl. Naturalist 23(1):175. 1940. TYPE: MÉXICO. Chiapas: Tacana. 3500-3800 m, *Matuda 2367* (HOLOTYPE: MEXU: Isotype: A!).

A tree with slender branches, branchlets reddish. Leaves 1.2-3.6 cm long by 1.4 mm wide, mostly curved upward and crowded on the branchlet, stomata rare below sometimes in 3-4 lines above, subepidermal section is interrupted, vascular bundles continuous, margin somewhat recurved, apex pointed and sharply acute to emarginate. Female cones oblong or cylindrical-ovoid, 10 cm long by 4 cm wide; scales cuneate-obovate; bract cuneate-oblong-lanceolate, reflexed, equal to level of the scale though often longer. Seed 10 mm long with an oblique-obovate wing 8 mm long.

Distribution: El Salvador, Chalatenango, near El Aguacatal and near Miramundo, associated with *Pinus nubicola* Perry.

Abies hickelii Flous & Gausson var. *oaxacana* (Martínez)

Farjon & Silba. *stat. nov.*

"Oaxaca Fir"

BASIONYM: *Abies oaxacana* Martínez, Anal. Inst. Biol. Mexico 29:39. 1949.

Branchlets glabrous, orange-brown when young. Leaves broader, 2-4 cm long, dark green above, often notched at the apex, with two glaucous stomatal bands below, resin canals more to 8-10, whereas the type has 4-6 resin canals in the leaves, leaves more erect, less grooved. Female cones larger, 9-12 cm long by 5 cm in diameter, bracts usually hidden, bracts smaller than the type variety.

Specimen examined: MÉXICO. Oaxaca: Ixtlan, 1 km north of Llano de Las Flores, *Martínez 1245* (MEXU).

Abies magnifica A. Murr. var. *shastensis* Lemmon "Shasta Fir"
Lemmon in State Board of Forestry Biennial Report 3:145. 1890.

A tree 17-35 m tall. Bark pale gray or chalky white with some resin blisters, smooth, becoming purplish brown. Buds almost free of resin. Leaves prominently blue-gray, to 4 cm long, stomata on both upper and lower leaf surfaces, leaves distinctly ribbed on both sides. Female cones smaller, to 14 cm long by 7 cm wide, bracts exerted well beyond the ovuliferous scales.

Distribution: United States, southern Oregon to southern Sierra Nevada in Kern County, California, 1500-3050 m altitude.

Specimens examined: UNITED STATES. Oregon: Crater Lake National Park, steep inner slopes, *A. Heller 13038* (NY). California: Mount Shasta, northeast slope, Mount House Range, 1706 m, *W. Dayton 497* (NY); Kern County, Greenhorn Mts., north side of Sunday Peak, 2377 m, *J.T. Howell 38843* (NY).

Liu (1972) considered this variety to be a hybrid of *Abies magnifica* and *A. procera* Rehder. However, Shasta Fir also occurs in areas well to the south of typical *A. magnifica* and is better considered a variety.

Abies nordmanniana (Stev.) Spach var. *bornmuelleriana* (Mattf.) Silba,
stat. nov. "Bornmüller Fir"
BASIONYM: *Abies bornmuelleriana* Mattfeld, Notizbl. Bot. Gart. Berlin-Dahlem 9:235. 1925.

A tree to 25 m tall, with branches often to the ground. Bark blackish or dark gray. Branchlets glabrous, olive-green turning orange-brown or red-brown. Buds usually resinous, ovoid-conic, 8-10 mm long, with ridged scales free at the apices. Leaves spreading forward and rising above the branchlet in a distinct "V" like pattern, dark shiny green with interrupted white stomatal bands above, stomatal bands silvery-white below and more prominent. 2.5-4 cm long, apex bluntly acute and occasionally notched especially in young trees. Female cones ovate-oblong or cylindrical, 12-15 cm long by 4-6 cm wide, dark purplish brown, scales rhomboid-flabellate and 2.5-3 cm wide, bracts exerted and reflexed.

Distribution: Turkey, northwest Anatolia, from Ulu Dag (Olympus) in the west to the Kizil Irmak River valley in the east, 300-2000 m altitude.

Abies nordmanniana (Stev.) Speech var. *equi-trojani* (Aschers. & Sint.) Guin. & Maire "Trojan Fir"
 Bull. Soc. Bot. France 55:186, f. 1908. BASIONYM: *Abies equi-trojani* Aschers. & Sint. in *Sintensis*, Iter. Troj. 523. 1883.

Buds broadly ovoid, chestnut-brown, with little resin. Branchlet shiny red-brown to yellow-brown, glabrous. Leaves more widely spaced, stiffer and larger, spreading forward with a "V" parted groove above, 1.5-3 cm long, apex bluntly acute or apex notched on young trees, petiole not a sucker like base as in *Abies pinsapo*. Female cones to 10 cm long, bracts exserted, similar to *Abies nordmanniana* var. *bornmuelleriana* in cone features.

Distribution: Turkey, northwest, Mount Ida, Kaz Dagi Mts. and in West Anatolia near Aegean Sea, 1000-1700 m.

Abies religiosa (H.B.K.) Schlechtendal & Chamisso var. *emarginata* Loock & Martínez "Michoacán Fir"
 Anal. Inst. Biol. Mex. 19:1. 1948.

Abies sp. Rushforth. Notes Roy. Bot. Gard. Edinburgh 1989 (in press).

A tree 15-45 m tall, with a trunk to 1.2 m in diameter. Bark gray, divided into irregular furrows or plates. Leaves pectinately arranged, linear, spreading sideways, slightly forward, 2.5-5 cm long, rarely 6-7 cm long, apex emarginate, dark green above and glaucous below; stomata in 8 lines above and more numerous toward the apex, in 10 lines below; subepidermis interrupted on the upper leaf surface. Male cones 2 cm long, abundant. Female cones cylindrical-oblong, resinous, 12.5-13.5 cm long by 3-4 cm wide, apex acuminate; scales 24-27 mm high by 3 mm broad, narrower than the type. Bracts exserted and reflexed, 33 mm long. Seed oblong, resinous, wings yellow and 25 mm long by 12 mm wide.

Distribution: México. SW Jalisco and in Michoacán (Mil Cumbres and near El Caracol), 1900-3000 m.

Specimen examined: MÉXICO. Jalisco: northwest slope of Nevado de Colima, above Jasmin, 2500 m, *McVaugh 10120* (NY).

Abies spectabilis (D. Don) Speech var. *langtangensis* Silba.

var. nov.

"Langtang Fir"

TYPE: NEPAL. Bagmati Zone: Rasuwa District, Ghora Tabela, south side of Langtang Khola. 3048 m. associated with *Tsuga dumosa* (Don) Eichl., *H. Van T. Cotter, et al. N94* (HOLOTYPE: A).

Gemmae parvae, ovato-globosae, 2-3 mm longae et 3-4 mm latae, obsкуро-brunneae. Ramuli obsкуро-brunnei, dense lanato-pubescentes, pube auriantiacο-brunnea. Folia parva. 2.1-2.8 cm longa, praedita.

A large tree. Buds small, ovoid-globular, 2-3 mm long by 3-4 mm wide, dark brown with some clear resin, mostly hidden by petioles of apical branchlet leaves. Branchlets dark brown with a dense woolly orange-brown pubescence, pubescence even denser than in *Larix tyalii* Parl. Leaves 2.1-2.8 cm long, noticeably white below, apex notched. Female cone scale bracts hidden.

Distribution: A high altitude variety having branchlets with a dense woolly pubescence.

Abies vejari Martínez var. *macrocarpa* Martínez "Bigcone Vejar Fir"
Anal. Inst. Biol. Mex. 19:1. 1948.

Branchlets with sparse pubescence. Leaves strongly blue, stomata much more numerous, apex of leaves much more obtuse than in the type variety. Female cones larger, 16-20 cm long by 30 mm wide. Seeds dark chestnut-brown, wings brown-violet, with seed 20 mm wide.

Distribution: This variety has a more northern distribution than var. *vejari* in México. Coahuila, Mesa de Las Tablas, near San Antonio (type locality). Also in Nuevo León, 30 km from the Sierra del Potosí.

Agathis macrophylla (Lindley) Masters var. *obtusa* (Lindley) Silba,
stat. nov. "Aneityum Kauri"
BASIONYM: *Dammara obtusa* Lindley, J. Hort. Soc. London 6:270.
1851. *Agathis obtusa* (Lindley) Masters, J. Roy. Hort. Soc. 14:270. 1892.

Aneityum Kauri differs significantly in the non glaucous underside of the leaves, whereas *Agathis macrophylla* var. *macrophylla* is noticeably glaucous below. Page (1980) found differences in SEM leaf data as well. Aneityum Kauri is restricted to southern New Hebrides (Vanuatu) in Erromango to 250 m altitude and in Aneityum on the south slope of Mt. Inrero to 380 m altitude.

Agathis silbae de Laubenfels "Santo Kauri"
Phytologia 61:448, f. 1-2. 1987.

A tree 10-30 m tall, 5-40 dm in diameter or more (reported to reach 90 dm in diameter). Bark gray on the surface, the more weathered parts nearly white. Straw colored or cinnamon-brown interior and slightly fibrous, on young trees with numerous, shallow, more or less horizontal branches. Cut tree yields an aromatic white resin which later turns somewhat yellowish. Some trees reported bearing pink resin due to coloration of branches (pink branches), but also bear white resin upon checking. Buds globular, 2-3 mm long by 3 mm wide, scales obtuse. Leaves on young trees lanceolate, not at all acuminate or glaucous. Juvenile leaves dull light green, 7.6-11.8 cm long by 2.1-3.7 cm wide, spreading sideways and somewhat forward, petiole 1.5-3 mm long. Adult leaves ovate-lanceolate, non glaucous, 5.8-8.5 cm long by 1.1-2.1 cm

wide, narrowing at the apex, margins slightly recurved. petiole 2-3 mm long. Male strobili cylindrical, oblong, 37-55 mm long by 15-18 mm wide, somewhat broadened on the upper half, coppery brown to red brown, peduncle 3.5-4 mm long by 3.5-4 mm wide. Pollen cones with the upper expanded part of the microsporophyll 2-2.5 mm long and wide, with a 5-6 sided raised boss at the apical end. Between the raised area, which crowds against those of the surrounding microsporophylls on immature pollen cones, and the pendent pollen sacs is a broad unraised area with a ridge along the center. Mature female cone glaucous brown, notably globular, 8-9.5 cm long by 9-9.5 cm wide, apex blunt or with a small obtuse tip 1.5 mm tall, peduncle 1.4-5.5 cm long by 11 mm wide. Scales of female cone scallop shaped, somewhat rounded, 4.5-4.8 cm wide by 3.2-3.3 cm long, broadest near the apex, with a small raised lip in the center to 2 mm tall. Seed an oblong or rounded nut, 16-18.5 mm long by 7.5-8.5 mm wide; fertile wing triangular or spear shaped, 21-24 mm long by 14-17 mm wide, dark brown with a purplish tint; non fertile wing an oblong obtuse stub 5-6 mm long by 3 mm wide or more.

Distribution: Vanuatu, Espiritu Santo, on the lower slopes of Santo Peak near the Navaka River at 800-1000 m, occurring at Nobsarsari, Kereyer and other areas on ridges, locally common. Cultivated in the villages along south-west Espiritu Santo.

Range Extension: VANUATU. Espiritu Santo: on path to Santo Peak, Kereyer, 800-1000 m, *G. Bourdy 368* (NY); on path to Santo Peak, Nobsarsari, 1000 m, *G. Bourdy 371* (NY).

Amentotaxus argoentia (Hance) Pilger var. *brevifolia* Lan & Zhang "Dongjiang Flowering Yew"
Acta Phytotax. Sin. 22(6):492. f. 1. 1984. TYPE: CHINA. Guizhou: Libo. Mogan, Dongjiang Shan, 900 m altitude, *K.M. Lan & F.H. Zhang 82-002* (HOLOTYPE: Guizhou Arg. coll.).

Leaves shorter and narrower, 2-3.7 cm long by 5-7 mm wide. Male strobili shorter. 1.5-5.5 cm long. Female cone shorter, 1.9 cm long by 1 cm in diameter.

Amentotaxus yunnanensis Li var. *yunnanensis* "Yunnan Flowering Yew"
J. Arnold Arbor. 33:197. 1952. TYPE: CHINA. Yunnan: Makwan, rocky hill, 1000-1600 m, *Tsai 51887* (HOLOTYPE: US!).

A tree to 15 m tall and 25 cm in diameter. Leaves falcate, acute, 3.5-10 cm long by 8-15 mm wide, brownish or yellowish white underneath, fibers present not only in the spongy mesophyll, but also under the epidermis as well, larger resin ducts than in var. *assamica*. Male strobili in groups of 4-6, 10-15 cm long, stamens with 4-6 or rarely 8 pollen sacs. Female cones oblong, 2.2-3 cm long by 1.4 cm wide on a peduncle 1.5 cm long.

Amentotaxus yunnanensis Li var. *assamica* (Ferguson) Silba,
stat. nov. "Assam Flowering Yew"
 BASIONYM: *Amentotaxus assamica* Ferguson, Kew Bull. 40(1):115, f.
 1. 1985.

A tree to 20 m tall. Bark whitish gray, hard. Branchlets whorled, persistent on lower parts of the trunk, pendent. Buds ovoid, 8.5-17 mm long by 4-8 mm wide, bud scales decussate. Leaves falcate or "S" shaped, 7-15 cm long, persistent for 3 years or more, white or silvery gray below, with a total absence of sclereids in the leaf blade, stomatal bands as broad as the marginal bands, margins slightly revolute, apex acute. Male strobili in groups of 4, 4-5.5 cm long, stamens with 2-4 pollen sacs, stamens 1-2 mm in diameter. Female strobili not recorded to date.

Distribution: India, Arunchal Pradesh, Daffa Hills and in Delei Valley near Chibaon, in temperate rainforest on precipitous north facing slopes.

Amentotaxus yunnanensis Li var. *formosana* (Li) Silba.
stat. nov. "Formosan Flowering Yew"
 BASIONYM: *Amentotaxus formosana* Li, J. Arnold Arbor. 33:196.
 1952.

A tree to 10 m tall, diameter to 30 cm. Leaves acute, slightly falcate, 5-8.5 cm long by 5-10 mm wide; fibers in the spongy mesophyll of the leaves and resin ducts smaller than in var. *yunnanensis*, but larger than in var. *assamica*; with 2 broad silver-white stomatal bands below. Male strobili in groups of 2-4, 3-5 cm long, stamens bearing 5-8 pollen sacs. Female cones oblong-ellipsoid, narrowed at the base and swollen at the apex, 2-2.5 cm long by 0.9-1.1 cm wide on a peduncle 1.5-2 cm long.

Specimens examined: TAIWAN: northwest of Tawu, 500 m, *C. Page 10068* (E); Tawu, Hengchun Peninsula, *Ching & Chang 5244* (L).

Amentotaxus yunnanensis Li var. *poilanei* de Ferre &
 Rouane "Poilane Flowering Yew"
 Trav. Lab. Forest. Toulouse, Tome I, vol. 9, art. 12:3, f. 1-2. 1978. TYPE:
 VIETNAM. Annam: Koudium Province, Massif du Ngok Pan, 2300 m,
Poilane 32686 (HOLOTYPE: P; Isotype: L!).

Buds 1.5 mm wide, triangular, scale apices free. Leaves shorter and narrower, bluntly acute, very thick and distinctly ribbed above, 4.5-8.5 cm long by 7-8 mm wide.

Specimen examined: VIETNAM. Tonkin: Chapa, 1500 m, *Petelot 3897* (L).

Araucaria hunsteinii Schum. & Hollr. var. *klinkii* (Lauterb.) Silba. *stat. nov.* "Blue Hunstein Araucaria"

BASIONYM: *Araucaria klinkii* Lauterb. *ex Engl.*, Bot. Jahrb. Syst. 1:48. 1913.

A large tree with red-brown bark, wood yellowish. Young leaves distinctly glaucous, 5-10 cm long by 1-1.2 cm wide. Male cones 20 cm long by 2.5 cm wide. Female cones distinctly gray-blue due to a white exudate resin on the surface, 19-25 cm long by 13 cm wide.

Distribution: Northeast Papua New Guinea, 600-2000 m, in alluvial soils, sometimes associated with *A. cunninghamii* var. *papuaea*, in mountains of upper Waria River and in the Bulolo Valley and in the hills above upper Ramu River.

Specimen examined: PAPUA NEW GUINEA. East Highlands District: Kassam-Water Rice Road, 1280 m, *Brass 32322* (NY).

Araucaria schmidii de Laubenfels "Schmid Araucaria"
Trav. Lab. Forest. Toulouse 1,8(5):1. 1969.

A tree to 12 m tall. Adult leaves imbricate, incurved at the apex. Male strobili 3 cm long by 8 mm in diameter, subtended by a cluster of lanceolate bracts at the base; upper part of the microsporophyll triangular to acuminate with denticulate margins, about 5 pollen sacs. Seed bract 26 mm long by 24 mm wide, nut triangular and 16 mm long, wings narrow and 4.5 mm wide, umbo of scale bract 10-12 mm long, lanceolate. Cotyledons 3, 1.8 cm long by 1.5 mm wide, apex bluntly acute, germinating above the ground.

Specimen examined: NEW CALEDONIA: Mount Panie. summit Plateau. 1540 m, *de Laubenfels P584* (A,K,L) fertile specimen.

Cephalotaxus fortunei Hooker f. var. *alpina* Li "Alpine Plum-Yew"
Lloydia 16(3):164. 1953.

A shrub or small tree 2-13 m tall. Leaves narrower, 3-3.5 mm wide by 4-9 cm long, with 2 stomatal bands below, in 10-15 lines. Male strobili subsessile. less than 2 cm long. Seed 4-6 mm wide, on a recurved peduncle.

Distribution: China, northwest Yunnan, western Szechuan and south Kansu at 2300-3700 m.

Cephalotaxus fortunei Hooker f. var. *concolor* Franchet "Bicolored Plum-Yew"
J. Bot. (Morot) 13:265. 1899.

A shrub to 1 m tall. Leaves shorter to 5 cm long, light green above with two bluish stomatal bands below.

Distribution: China, eastern Szechuan, Guizhou and Jiangxi, 1000-1300 m.

Cephalotaxus fortunei Hooker f. var. *lanceolata* (Feng) Silba,
stat. nov. "Lanceolate Leaf Plum-Yew"
 BASIONYM: *Cephalotaxus lanceolata* K.M. Feng, Acta Phytotax. Sin.
 13(4):86, pl. 50, illus. 1. 1975.

A tree to 20 m tall, to 40 cm in diameter. Leaves distinctly lanceolate, slender, thick, pointing forward, 4.5-10 cm long by 4-7 mm wide, widely spreading, tapering gradually from a broad base to a sharply acute apex. Female cones obovoid, much larger, 3.5-4.5 cm long by 1.5-2 cm wide.

Distribution: China, northwest Yunnan (type locality) and in Kwangtung; to 1900 m altitude.

Specimen examined: CHINA. Kwangtung: Loh Chiang District, Shui Sha Shue, Chong Uen Shan, near Kau Fung, W. Tsang 20711 (I).

Cephalotaxus harringtonia (Knight) Koch var.
harringtonia "Harrington Plum-Yew"

According to Hu (1964) the type variety was based on material from Panang Hill, Malaysia.

Cephalotaxus harringtonia (Knight) Koch var. *sinensis* (Rehder & Wilson)
 Rehder "Chinese Plum-Yew"
 J. Arnold Arbor. 22:571. 1941. BASIONYM: *Cephalotaxus drupacea*
 Sieb. & Zuccarini var. *sinensis* Rehder & Wilson ex Sarg., Pl. Wil-
 son. 2:3. 1914. *Cephalotaxus sinensis* (Rehder & Wilson) Li, Lloydia
 16(3):162. 1953.

A shrub to 5 m tall or a small tree to 15 m tall. Branchlets yellow-green. Leaves linear, spreading in a "V" like pattern on upper part of the branchlet, very closely set to each other, 4-5 cm long by 3-4 mm wide, shiny mid-green above, yellow-green below with two faint pale stomatal bands, apex sharply acuminate. Male strobili sessile, to 3 mm in diameter. Female cones obovoid, 2.5 cm long and mucronate at the obtuse apex.

Distribution: Central China south to Yunnan and Hainan, 600-2200 m.

Cupressus arizonica Greene var. *montana* (Wiggins)
 Little "San Pedro Mártir Cypress"
 Madroño 18:163. 1966.

The leaves are distinctly dark olive-green in color and covered with numerous white resin glands. Notes by earlier authors that some material had glaucous leaves are most likely errors and such specimens were probably collected further north in Baja California and not actually in the San Pedro Mártir. Female cones open upon maturity. seeds are distinctly flattened.

Distribution: México, Baja California Norte: Sierra San Pedro Mártir, La Encantada, 2300 m.

Cupressus austro-tibetica Silba

"Yigrong Cypress"

Phytologia 65(5):334-335. 1988.

A tree 20-60 m tall. Branchlets divided into thin, thread like segments and somewhat flattened. Leaves bluntly acute, 1.2-1.5 mm long; glands apparent but obscure, with a small pit less deep than *Cupressus duclouxiana*. Female cones globose or subglobose, dark brown, 1.2-1.6 cm long with 10-12 scales. inner scales dark brown. umbos inconspicuous. Seeds dark brown, subglobose. with rounded wings, ending in an acuminate point at the end opposite the hilum.

Distribution: China, southeast Tibet, Trulung, Pome, near the junction of the Po Tsangpo and Yigrong Chu, 1981-2134 m. Also on upper part of Tsangpo Tsangden. Yigung, 2286 m, to eastern Tibet possibly as high as 4000 m or more. Possibly the highest altitude species of the genus.

Cupressus chengiana Hu var. *jiangeensis* Silba

"Jiange Cypress"

Phytologia 49(4):391. f. 2. 1981. TYPE: CHINA. Szechuan: Jiange Xian, 840 m. *Cai & Min 101-104* (HOLOTYPE: Szechuan Plant Tax. Lab., Chengdu).

A tree to 27 m tall. Bark furrowed. Leaves green. Females cones ovoid. smaller than the type, only 12 mm long, with 12 scales, seeds yellowish brown.

Jiang & Wang (1986) noted differences in peroxidase isoenzymes of this and other Chinese *Cupressus* species.

Cupressus duclouxiana Hickel

"Yunnan Cypress"

Range extension: Known from Yunnan in middle and northwestern parts on dry and warm slopes, also in small pure stands in Li-chang and Hsueh-shan and in southwestern Szechuan; 1400-3300 m.

Cupressus goveniana Gord. var. *pygmaea* Lemmon

"Mendocino Cypress"

A Handbook of West-American Cone-Bearers, ed. 3. 77. 1895.

A small shrub to a huge tree 50 m tall or more. Bark pinkish brown. Leaves dark green or dark blackish green. Differs from the type in cone morphology, these sometimes approaching *Cupressus macrocarpa* Hartweg in size. Seeds distinctly dull to shiny black as opposed to dark brown as in the type.

Distribution: United States. California. Mendocino County, ashy plains along the coast and in adjacent Sonoma County, at Miller Gulch near Plantation, to 300 m or more.

Cupressus himalaica Silba

"Norbding Cypress"

Phytologia 64(1):80. 1987. TYPE: BHUTAN. Norbding: below Pele La. 2250 m. *Grierson & Long 1079* (HOLOTYPE: E!).

A graceful tree 20-45 m tall. Branchlets drooping, divided into long flattened chain like segments. Foliage polymorphic, non glandular; juvenile leaves acuminate and somewhat glaucous. Adult leaves bluntly acute, 1-1.5 mm long, light or grassy green. Male cones oblong-cylindric, 3-5 mm long by 2-2.5 mm wide with 14-18 scales. Female cones dark brown, subglobose, 12-20 mm long by 15-17 mm wide, scales 8-10, scales with a blunt inconspicuous umbo in the center. Seeds with small wings.

Distribution: To 3000 m altitude in Bhutan.

***Cupressus himalaica* Silba var. *darjeelingensis* Silba,**

var. nov.

“Darjeeling Cypress”

TYPE: INDIA. Bengal: Kalimpong, cultivated, *Trevor s.n.* (HOLOTYPE: K).

Cupressus cashmeriana auct. non Royle ex Carrière, Mitchell in *Conifers in the British Isles* 99. 1972. Paratypes: ITALY. Isola Madre, cultivated, *Henry s.n.* (K); ENGLAND. Devonshire: Killerton, cultivated, *Darland s. n.* (K).

Ramuli longe penduli, ramusculis confertis, plane distichi. Folia glauca, 1.5-3 mm longa, acuta, glandulosa, apicibus liberis. Galbuli globosi vel ovoideo-oblongi, squamis fere umbonatis folio-similibus et prominentibus. Semina in squama quave 10.

Branchlets divided into long chain like segments, flattened. Leaves sharply acute, glaucous, 1.5-3 mm long, free at the apices. Female cones globose or ovoid-oblong, scales with a distinct leaf like, flared umbo in the center. Seeds fewer per cone than in the type, only 10 seeds per scale, whereas the type has 10-20 seeds per scale.

Distribution: This variety may be extinct in the wild, though is widely cultivated near Darjeeling, India (Lahiri 1975). It is less cold tolerant than the type, which suggests it originated from a lower elevation, possibly in Assam. N.L. Bor (1938) describes a *Cupressus* species native to the Aka Hills of Assam and perhaps this is a remnant population of this variety.

The original description of *Cupressus cashmeriana* by Carriere (1855) is rather vague and there is no type specimen. This name appears in fact to be a *nomen confusum* and a neotype cannot be designated with any degree of certainty.

Cupressus lusitanica Miller var. *lusitanica*

“Miller Mexican Cypress”

Seasonal branchlets with short lateral branchlets 10 mm long by at least 1 mm in diameter. Leaves 0.75 mm long, broadly ovate to shortly acuminate, apex acute, blue glaucous.

Distribution: México, rare, growing in shaded habitats only. Perhaps native further south to Guatemala, though this is not yet fully understood.

Jiménez (Thesis, Inst. Politec. Nac., México, D.F. 1975) found a lower percentage of chromatin (50%) in var. *lusitanica* than in var. *lindleyi* (58% chromatin).

Cupressus lusitanica Miller var. *lindleyi* (Klotzsch ex Endlicher)

Carrière

"Lindley Mexican Cypress"

Traité Général des Conifères, ed. 2. 1. 1867.

Seasonal branchlets with longer lateral branchlets 15-20 mm long by 1.5 mm in diameter. Leaves bright green, 1.5-2 mm long, ovate-lanceolate or broadly acuminate, apex obtuse and mucronulate.

Distribution: México, Chihuahua to Chiapas. Also in Guatemala and El Salvador, on sunny slopes and sunny habitats only.

Cupressus lusitanica Miller var. *hondurensis* Silba,

var. nov.

"Honduran Cypress"

TYPE: HONDURAS. Department Intibuca: La Esperanza, 2000 m, humid forest, *Enamorado 100* (HOLOTYPE: NY). Paratype: HONDURAS. Dept. Francisco Morazan: Parque del Cerro, El Picacho, 1350 m, *V. Lorena Ochoa L. 89* (NY).

Ramuli quadrangulares. Galbuli globosi, squamis fere umbonatis folio-similibus et planis, umbone albo basin versus ampliori.

Branchlets distinctly flattened. Female cones distinctly globose, with wide flattened papery umbos that are white and distinctly flared at the base.

Distribution: This variety is native to humid forests, nearly subtropical.

Cupressus sempervirens L. var. *indica* Royle ex

Carrière

"Baluchistan Cypress"

Traité Général des Conifères, ed. 1 128. 1855.

Cupressus roylei Carrière, l.c., 128.

Cupressus whitleyana Carrière, l.c. 128.

A columnar or pyramidal tree to 30 m tall or more. Leaves scale like, glossy green, thickened toward the apex, obtuse. Female cones globose, 1.5-2.5 cm in diameter, with 8-10 scales, scale bract acutely mucronate at the apex.

Distribution: Baluchistan cypress is native to northwest Iran and possibly in Azerbaijan, U.S.S.R. A range extension reported by Bokhari (Notes Roy. Bot. Gard. Edinburgh 33:445-447. 1975) from western Baluchistan in southwestern Iran for *C. sempervirens* var. *horizontalis* Miller, undoubtedly belongs here.

Griffith (1847 & 1848) states that *Cupressus* is native to Afghanistan between Kabul and Jallalabad and in Peshawur. At Utrecht (U) is the specimen Griffith 5001/c from Afghanistan with no location data. However, it is close to *C. sempervirens* L. in leaf morphology.

In 1961 the Arnold Arboretum in Massachusetts obtained cuttings from a *Cupressus* species collected by H. Hosmer from Afghanistan. Unfortunately no herbarium specimens were deposited and the living plants at the Arnold Arboretum died. Mr. H. Hosmer of Carlisle (Massachusetts) made three separate collections of *Cupressus* in Afghanistan: 1) vicinity of Kabul, 1829-2134 m; 2) Kabul, cultivated; 3) Paghman, Kings Garden.

Kitamura (1960) in the *Flora of Afghanistan* listed *Cupressus sempervirens* L. as being cultivated in Afghanistan only in the south near Kandahar.

It seems highly possible that *Cupressus sempervirens* var. *indica* had a much wider distribution in the past and probably extended throughout the range of Baluchistan in southern Afghanistan and into Pakistan. Perhaps urbanization has reduced the original populations considerably.

Dacrydium Soland.

Several new species and name changes were made recently by de Laubenfels and are cited here.

Dacrydium cornwalliana de Laubenfels, Fl. Males. ser. 1, vol. 10(3):366. f. 14. 1988.

Dacrydium gracilis de Laubenfels, l.c., 367. 1988.

Dacrydium cricoides de Laubenfels, l.c., 371. 1988.

Dacrydium leptophyllum (Wassch.) de Laubenfels, l.c., 371. 1988.

Falcatifolium gruezoi de Laubenfels, Fl. Males. ser. 1, vol. 10(3):373. 1988.

This taxon was treated in Silba (1986) and is included here only to list the correct publication citation.

Falcatifolium sleumeri de Laubenfels & Silba "Vogelkop Sickle-Pine"
Phytologia 65(5):329. 1988. TYPE: NEW GUINEA. Irian Jaya: Vogelkop Peninsula, Nettoti Range, south slope of Mt. Nettoti, on path to Andjai-Wekari River, 1920 m, *Van Royen & Sleumer 8203a* (HOLOTYPE: L!).

A low, more or less flattened or prostrate shrub to 20 cm tall or more. Bark scaly, grayish brown. Branches numerous, erect, spreading widely, creating a flattened crown, covering several square meters on the ground. Stems to 0.5

cm in diameter or more. Leaves linear or linear-ovate, falcate, 6-10 mm long by 1.8-2 mm wide, midrib raised above; apex apiculate with a short spine, 0.2 mm long; margins slightly revolute; petiole 0.5-0.7 mm long. Reproductive structures not seen.

Falcatifolium falciforme usan-apuensis de Laubenfels & Silba, *spec. nov.*

"Usan-Apua Sickle-Pine"

TYPE: MALAYSIA. Sarawak: Usan Apua Plateau, high kerangas, 965 m, *Pickles S-3925* (HOLOTYPE: KUCH; Isotypes possibly at OXF, SING).

Arbor ad 24 m alta. Cortex squamosus, rubro-brunneus vel caesio-viridis. Folia falcata, 0.6-1.9 cm longa et 2.5-4.5 mm lata, basi expansa, apice angusta. Strobili fasculi et femenei ignoti.

A young tree seen to reach 24 m tall. Bark scaly, reddish brown to gray-green. Leaves falcate, 0.6-1.9 cm long by 2.5-4.5 mm wide, tapered and broadened at the base, at middle relatively wide, apex narrowed and sharply turned upward parallel to the branch. This variety has leaves similar in form to those of an adult shade tree, however the leaves are uniquely small. Typical *F. falciforme* adult shade leaves are 4-7 cm long by 5-9 mm wide and have a strongly lanceolate apex which curves strongly forward, occasional specimens with markedly curved apices are all in excess of 2.5 cm long (de Laubenfels, pers. comm. 1989).

Juniperus chinensis L. var. **gaussenii** (Cheng) Silba,

stat. nov.

"Gaussen Juniper"

BASIONYM: *Juniperus gaussenii* Cheng, Trav. Lab. Forest. Toulouse 1,3(8):139. 1940.

A small tree to 4-8 m tall. Bark on branchlets flaky, pinkish brown. Juvenile leaves needle like, 6-8 mm long, persistent on fertile branchlets as well. Adult leaves scale like, 2-4.5 mm long, being regularly in whorls of 3, more bluntly acute than the type, lacking the clear border of the type variety, bearing a central gland as in the type. Female cones dull brown to black, ovoid-conic to subglobose, with distinct umbos, whereas the type has a blue-purple cone with inconspicuous umbos. Seeds fewer per cone, often 2, sometimes 1-3 per cone, seed coat very thick. Seed dark red-brown, smaller to 4 mm long, but wider to 4.5 mm wide, grooved prominently.

Distribution: China. Yunnan, Tsin-long-se Mountains, 2550 m, and in Vietnam (Annam) near Thang-Tung, 1200-3350 m (Gaussen 1960).

Specimen examined: CHINA. Yunnan: Wutai Shan, above Huadianba, north end of Cang Shan, 3350 m. *Sino-British Exped. 0955* (A,E).

Juniperus conferta Parl.

"Shore Juniper"

Coniferae Novae Species Repertorium 1. 1863.

A procumbent shrub to 30 cm tall or more. Bark brown, in thin strips. Branches short, dense and erect. Leaves crowded, needle like, in whorls of 3, overlapping, deeply grooved above, 1.2-1.6 cm long by 1 mm wide, bluish green, keeled below with a narrow band of white stomata underneath, tapering to a spiny apex. Female cone proliferously produced, globose, 8-13 mm long, black with a glaucous bloom, warty, sutures hidden, umbos inconspicuous. Seeds 3 per cone, ovoid-triangular, with long grooves, apex with two points.

Distribution: U.S.S.R., Sakhalin to northern Japan, along the coast, in Japan on Honshu, Hokkaido and Kyushu.

This species has been erroneously regarded as a hybrid of *J. communis* L. and *J. rigida* Sieb. & Zuccarini or as a variety of the latter. The morphology seems distinctive enough to qualify a separate species.

Juniperus sabina L. var. *jarkendensis* (Komarov) Silba,*stat. nov.*

"Jarkend Juniper"

BASYONYM: *Juniperus jarkendensis* Komarov, Not. Syst. Herb. Hort.Bot. Petrop. 4:181. 1925. *Sabina vulgaris* var. *jarkendensis* (Komarov)

C.Y. Yang, Fl. Reip. Pop. Sin., Tom. 7:361. 1978.

A shrub 2-5 decimeters tall. Leaves scale like, 1-1.5 mm long, dark green. Seeds usually 3-4 per cone, whereas the type variety has 1-3 seeds per cone.

Distribution: U.S.S.R., Kazakhstan and in Tibet and Sinkiang Uighur, China, 2800-3000 m.

Juniperus semiglobosa Regel var. *semiglobosa*

The type variety has rather thick branchlets 1.5-2 mm in diameter and cones usually containing four seeds.

Juniperus semiglobosa Regel var. *drobovii* (Sumnev.) Silba,*stat. nov.*

"Tian Schan Juniper"

BASYONYM: *Juniperus drobovii* Sumnev., Not. Syst. Herb. Inst. et Zool.

Acad. Sci. Uzbek. 10:22. 1948.

J. tianschanica Sumnev., l.c. 1948.

A tree 6-7.6 m tall, with dense branches. Branchlets quadrangular, finer, to 0.5-1 mm in diameter. Leaves scale like, 1.5-2 mm long, bluntly acute or short pointed, glaucous to green, rhomboidal, with an oblong dorsal gland, apex adpressed. Female cones subglobose, 6-9 mm in width, on a peduncle 2-8 mm long, truncate and emarginate, dark violet to blackish with a waxy glaucous bloom and a resinous bitter pulp. Seeds usually 1-3 per cone, to 4-8 mm long, chestnut-brown, ovoid, angled.

Distribution: U.S.S.R., Uzbekistan, Tian Schan mountains.

Juniperus semiglobosa* Regel var. *talassica* (Lipsky) Silba,stat. nov.*

"Talass Juniper"

BASIONYM: *Juniperus talassica* Lipsky, Trudy Esksped. Issl. Kol. Rainov. Azir. Botan. Issl. no. 6:105. 1912.

A tree to 12 m tall. Branchlets finer to 0.5-1 mm in diameter. Leaves scale like, with an oblong dorsal gland. Male strobili borne on short branchlets, scales obtuse. Female cones globose, black with a white waxy bloom, with 4 scales, pulp with a much higher sugar content than the type. Seeds 4 per cone, smaller, 3-5 mm long by 3 mm broad, ribbed and pitted.

Distribution: U.S.S.R., Kazakhstan, mountains of Talass Ala Tau at sources of Kara-goin River, in groups on slopes.

Keteleeria davidiana* (Bert.) Boiss. var. *calcareea* (Cheng & Fu) Silba,stat. nov.*"Yellow-twig *Keteleeria*"BASIONYM: *Keteleeria calcarea* Cheng & Fu, Acta Phytotax. Sin. 13(4):

82, f. 9. 1975.

A tree to 20 m. tall. Buds distinctly globose. Branchlets glabrous, yellow. Leaves very broad and short, 2-3.5 cm long by 3.5-4.5 mm wide, distinctly squarish and notched at the apex. Female cone 11-14 cm long by 4-5.5 cm wide; scales rhombic, bluntly obtuse and reflexed at the apex.

Distribution: China, northern Guangxi and southern Guizhou, 350-900 m altitude.

Keteleeria davidiana* (Bert.) Boiss. var. *pubescens* (Cheng & Fu) Silba,stat. nov.*"Woolly-twig *Keteleeria*"BASIONYM: *Keteleeria pubescens* Cheng & Fu, Acta Phytotax. Sin. 13(4):82, f. 8, 8-14. 1975. TYPE: CHINA. border of Kweichow and Kwangsi: Dar-Siar Pring, Miu Shan, northern Luchan, 1127 m, in riverine habitats, *R.C. Ching 6187* (Isotype: NY!).

A tree with densely pubescent branchlets. Leaves shorter, 1.5-3 cm long by 3-4 mm wide. Female cones 7-11 cm long by 3-3.5 cm wide, scales often notched at the apex and pointing forward.

Keteleeria evelyniana* Masters var. *evelyniana"Evelyn *Keteleeria*"

Gard. Chron., ser. 3 33:194, f. 82. 1903.

A tree to 25 m tall. Bark cork like, gray-corky-brown. The juvenile stage is quite distinct. Juvenile leaves slender and soft, lanceolate, 5-8 cm long, light green, whereas var. *davidiana* has much shorter juvenile leaves that are dark green, sharply acute and spine tipped as in *Torreya*. Adult leaves are mucronate. 2-6 cm long by 2-3 mm wide; stomata more numerous, in 10-20 lines

above and in 10-15 lines below. Branchlets sometimes glaucous purple and slightly pubescent. Female cone narrowly conical; scales more ovate, widely spreading and more reflexed than *K. davidiana* var. *davidiana*.

Distribution: China, Yunnan, southwest Guizhou and southwest Szechuan, 700-2600 m.

Specimen examined: CHINA. Yunnan: Hua Shan, Cheng-Kiang, 1860 m, Wang 41482 (A).

***Keteleeria evelyniana* Masters var. *hainanensis* (Chun & Tsiang) Silba,**
stat. nov. "Hainan *Keteleeria*"

BASIONYM: *Keteleeria hainanensis* Chun & Tsiang, Acta Phytotax. Sin. 8(3):259. 1963.

A tree to 30 m tall. Leaves on young plants narrow and distinctly lanceolate, 5-8 cm long by 3-4 mm wide, widened at the base and tapering to an bluntly acute apex, more spreading and more spaced on the branchlet than the type variety. Female cones 14-18 cm long by 7 cm wide; scales rhombic, erect, notched and free at the apices.

Distribution: China, Hainan Island, Tungfang Hsien, to 1000 m altitude.

***Keteleeria evelyniana* Masters var. *rouletii* (A. Cheval.) Silba,**
stat. nov. "Vietnam *Keteleeria*"

BASIONYM: *Tsuga rouletii* A. Cheval., Bull. Econ. Indo-Chine, n.s. 131:164. 1919. *Keteleeria rouletii* (A. Cheval.) Flous, Trav. Lab. Forest. Toulouse vol. 1,2, art. 14(4):8. 1936.

K. dopiana Flous, l.c. 6. 1936.

A conical tree to 25 m tall. Branchlets red-brown, pubescent when young. Buds oblong-ovate. Leaves on young trees 6-8 cm long. Adult leaves 3.5-5 cm long, apex acute. Female cones 12-18 cm long by 6-7 cm wide, scales rhombic with a triangular apex.

Distribution: Southern Vietnam, Annam, Massif du Lang-Bian, between Dran and Dalat, 800-1500 m. In southern Laos, Province Saravane, north east of Pakson, Bolaven Plateau, to 1000 m altitude.

***Keteleeria fortunei* (Murr.) Carrière var. *cyclolepis* (Flous) Silba,**
stat. nov. "Kwangsi *Keteleeria*"

BASIONYM: *Keteleeria cyclolepis* Flous, Bull. Soc. Hist. Nat. Toulouse 69:4. f. 1-11. 1936.

Keteleeria oblonga Cheng & Fu, Acta Phytotax. Sin. 13(4):82, f. 8,1-7. 1975.

A tree to 20 m tall. Branchlets pubescent, dark. Leaves 1.5-4 mm long by 2-4 mm wide, stomata in 6-8 lines above and in 12-20 lines below. Female cones 7-15 cm long by 3.5-6 cm wide, oblong-cylindric; scales rounded, less denticulate on the margins; bracts more cuspidate or nearly triangular, not as markedly lobed.

Distribution: China, southeast Yunnan, Guizhou, Guangxi, Jianxi, Hunan, northern Guangdong and southwest Chekiang, 340-1400 m.

Keteleeria fortunei (Murr.) Carrière var. ***xerophila*** (Hsueh & Hao) Silba,
stat. nov. "Xinping *Keteleeria*"

BASIONYM: *Keteleeria xerophila* Hsueh & Hao, Acta Bot. Yunn. 3(2):
249. 1981. TYPE: CHINA. Yunnan: Xinping Hsien, 1000 m, *Hsueh*
1290 (Isotype: PE).

A tree to 20 m tall or more. Leaves on young trees and on sterile branchlets 4.5-8.2 cm long by 2-3.5 mm wide, linear-lanceolate. Leaves on fertile branchlets with mucronate apices. Branchlets glabrous. Female cones 7-11 cm long by 3.5-4 cm wide, scales rhombic-orbicular, apex slightly recurved.

Distribution: Type locality and possibly also near Kunming, Yunnan at 2400 m (Rushforth 1987).

Larix gmelini (Rupr.) Rupr. var. ***cajanderii*** (Mayr.) Silba,
stat. nov. "Cajander Larch"

BASIONYM: *Larix cajanderii* Mayr. in Fremdl., *Wald-und Parkbaume*
Europa 297, f. 88. 1906.

A tree to 20 m tall, or dwarfed in humid regions and only 3-6 m tall in those climates. Branchlets yellowish brown, slightly pubescent. Buds covered by tufts of white-yellow pubescence. Leaves on sterile branchlets and young trees 4-5 cm long, leaves on adult and fertile branchlets 2-3 cm long. Female cones 2 cm long, bright brown, with 20 scales, scales incurved at the apex.

Distribution: U.S.S.R., northern Siberia, Bay of Aldan at 63° N and on Jit-Ary Island at 72° N.

Larix gmelini (Rupr.) Rupr. var. ***olgensis*** (Henry) Ostenf. &
Syrach L. "Olga Bay Larch"

Pflanzenr. 2:7. 1930. BASIONYM: *Larix olgensis* Henry, Gard. Chron.,
ser. 3 57:109, f. 31-32. 1915.

A tree to 30 m tall. Branchlets pale brown, densely covered with red-brown pubescence. Leaves 1.5-2.5 cm long by 1 mm wide. Female cones ovoid-oblong, smaller, 1.5-2.5 cm long by 1-2 cm wide; scales are nearly round, squarish and finely notched at the apex.

Distribution: U.S.S.R., Olga Bay Region, swampy areas, 500-1800 m, and in Heilungkiang in northeast China.

Larix griffithiana Hooker var. *speciosa* (Cheng & Law) Silba,
stat. nov. "Burma Larch"

BASIONYM: *Larix speciosa* Cheng & Law, Acta Phytotax. Sin. 13(4):84,
f. 25, 1-6. 1975.

Branchlets glabrous, red-brown to pale purple-brown. Leaves wider, 1.5-2 mm wide, 2.5-5.5 cm long. Female cones more cylindrical, 7-9 cm long by 2-3 cm wide, ovuliferous scales obovoid with a truncate apex, exerted portion of bract narrower than in the type.

Distribution: China, northwest Yunnan to northeast upper Burma, at 2600-4000 m.

Larix potaninii Batalin var. *himalaica* (Cheng & Fu)

Farjon & Silba, *stat. nov.* "Langtang Larch"

BASIONYM: *Larix himalaica* Cheng & Fu, Acta Phytotax. Sin. 13(4):84,
pl. 26, f. 1-6. 1975.

A small tree 5-8 m tall or more. Branchlets glabrous, yellowish gray to pale yellowish brown, pulvini gray. Buds glabrous. Leaves 1.5-2.5 cm long by 1-1.5 mm wide. Female cones cylindrical to subglobose, 4-6.5 cm long, ripening light brown; scales huge and rounded, 1.1-1.2 cm long by 1.1 cm wide. Bracts shorter, erect, about as long as the ovuliferous scale, abruptly narrowed to a rigid tooth.

Distribution: Central Nepal and southeast Tibet, 3000-3500 m.

Specimen examined: NEPAL. Bagmati Zone: Rasuwa District, Ghora Tabela, south side of Langtang Khola, 3048 m, *H. Van T. & I.S. Cotter N92* (A).

Larix potaninii Batalin var. *macrocarpa* Law "Bigcone Potanin Larch"

Acta Phytotax. Sin. 13(4):84, f. 25, no. 7-12. 1975.

Branchlets reddish brown, shiny, nearly glabrous. Female cones larger, 5-7.5 cm long by 2.5-3.5 cm wide, scales erect and somewhat spreading; scales more rounded and 1.4-1.6 cm long by 1.2-1.4 cm wide, about 75 scales per cone, bracts narrower and longer.

Distribution: China, southwest Szechuan, southeast Tibet and northwest Yunnan, 2700-4000 m.

Libocedrus papuana Mueller var. *arfakensis* (Gibbs) de

Laubenfels

"Arfak Libocedar"

Fl. Males. ser. 1, vol. 10(3):446. 1988.

Distribution: New Guinea, Irian Jaya from 37° (Wissel Lakes region) to Vogelkop Peninsula and the islands of Batjan and Ternate in the Moluccas, at 840-2500 m (de Laubenfels 1988).

Nageia Gaertn.

Nageia Gaertn., De Fruct. et Sen. 1:191. 1788.

The generic name *Nageia* was published earlier than *Decussocarpus* de Laubenfels. Therefore, changes in species names are necessary (de Laubenfels 1987).

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|---|--------------------------------|
| <i>Nageia comptonii</i> (Buchholz) de Laubenfels
Blumea 32:211. 1987. | “Compton <i>Nageia</i> ” |
| <i>Nageia falcatus</i> (Thunb.) O. Kuntze
Rev. Gen. Pl. 2:800. 1891. | “South African <i>Nageia</i> ” |
| <i>Nageia fleuryi</i> (Hickel) de Laubenfels
l.c. 210. 1987. | “Fleury <i>Nageia</i> ” |
| <i>Nageia mannii</i> (Hooker f.) O. Kuntze
Rev. Gen. Pl. 2:800. 1891. | “Mann <i>Nageia</i> ” |
| <i>Nageia mazimus</i> (de Laubenfels) de Laubenfels
l.c. 210. 1987. | “Big-leaf <i>Nageia</i> ” |
| <i>Nageia minor</i> Carriere
<i>Traité Général des Conifères</i> , ed. 2 641. 1867. | “Arnaud <i>Nageia</i> ” |
| <i>Nageia motleyi</i> (Parl.) de Laubenfels
l.c. 210. 1987. | “Motley <i>Nageia</i> ” |
| <i>Nageia nagi</i> (Thunb.) O. Kuntze
Rev. Gen. Pl. 2:798. 1891. | “Japanese <i>Nageia</i> ” |
| <i>Nageia nagi</i> var. <i>formosensis</i> (Dummer) Silba, <i>stat. nov.</i> “Xankao <i>Nageia</i> ”
BASIONYM: <i>Podocarpus formosensis</i> Dummer, Gard. Chron., ser. 3
52:295. 1918. | |
| <i>Nageia piresii</i> (Silba) de Laubenfels
l.c. 211. 1987. | “Pires <i>Nageia</i> ” |
| <i>Nageia rospigliosi</i> (Pilger) de Laubenfels
l.c. 211. 1987. | “Rospiglios <i>Nageia</i> ” |
| <i>Nageia vitiensis</i> (Seeman) O. Kuntze
Rev. Gen. Pl. 2:800. 1891. | “Fijian <i>Nageia</i> ” |
| <i>Nageia wallichiana</i> (Presl.) O. Kuntze
l.c. 800. 1891. | “Wallich <i>Nageia</i> ” |

Picea asperata Masters var. *aurantiaca* (Masters)

Boom "Cheto Shan or Orange Spruce"
Manual of Cultivated Conifers 253. 1965. BASIONYM: *Picea auriantica* Masters, J. Linn. Soc., Bot. 37:420. 1906. TYPE: CHINA. Szechuan: Cheto Shan, 3000-4000 m, *Wilson 3029* (Isotype: K!).

Adult trees spire like with sparse branching. Bark distinctly pale gray, nearly white, exfoliating in thin, irregular, oblong plates. Buds distinctly oblong-globular, purplish gray, scales imbricate, polished with clear dull resin. Leaves distinctly dull, dusty, gray-green, rather long in young trees. Female cones 11-12 cm long, very symmetrical, dull cinnamon brown to shiny chestnut brown, soon falling off the tree after shedding seeds; cone scales broad and rounded.

Distribution: China, western Szechuan, west and southwest of Tachien-lu, Cheto Shan, 2600-4000 m.

Picea asperata Masters var. *heterolepis* (Rehder & Wilson) Cheng *ex*

Chen "Mao Chou Spruce"
Taxonomy of Chinese Trees 38. 1937. BASIONYM: *Picea heterolepis* Rehder & Wilson in Sargent, Pl. Wils. 1:24. 1914. TYPE: CHINA. Szechuan: Mao-Chou, 1600-2500 m, *Wilson 4064* (HOLOTYPE: A!).

A tree 6-25 m tall, with horizontally spreading branches. Branchlets bright orange-brown, glabrous. Buds elongated with loosely imbricated reflexed scales. Leaves bright grassy green or glaucous-green, acute and very sharply pointed, extremely stiff, apex a sharp spine as in *Picea polita* (Sieb. & Zuccarini) Carrière but more flattened. Female cone oblong-cylindric, yellowish brown, 9-14 cm long by 3-4 cm in diameter; scales bilobed and nearly rhombic-obovate.

Picea brachytyla (Franchet) Pritzl var. *pachyclada* (Patschke) Silba, *stat. nov.*

"Hsing Shan Spruce"
 BASIONYM: *Picea pachyclada* W. Patschke, Bot. Jahrb. Syst. 48:630-631. 1913. TYPE: China. Hupeh: Hsing-shan Hsien, *Wilson 1896* (HOLOTYPE: K!; Isotypes: E,NY!).

Buds sharply acute, 5-5.5 mm long by 2 mm wide, scales acute-ovate with darkened margins, apex acuminate. Leaves shorter, more pointed, 11 mm long by 1.2 mm wide, with a distinct ridge on back, apex an acuminate spine. Leaves with paired resin canals (Orr 1933). Female cones scales softer and somewhat like *Picea engelmannii* (Parry) Engelmann, scales notched at the apex.

Specimen examined: Type locality, 1600-2500 m, *Wilson 2052* (A).

Picea jezoensis (Sieb. & Zuccarini) Carrière var. *ajanensis* (Fischer) Cheng & Fu

"Ajan or Kamchatka Spruce"
 Fl. Reip. Pop. Sin. 7:162. 1978.

Picea kamtchatkensis Lacassagne, Bull. Soc. Hist. Nat. Toulouse 58:637. 1929.

Branchlets usually turning pale gray after 1-2 years; pulvini somewhat angled, pointing forward and slightly downward. Leaves bluntly acute to acute. Female cones to 5 cm long, with broadly ovate or nearly rounded and denticulate scales; scale bract rather broad and nearly obtuse.

Distribution: China, in extreme northwest Heilungkiang, to Amgun River, U.S.S.R., and in northern Sakhalin Island. Also in the southern Kamchatka Peninsula.

Picea jezoensis (Sieb. & Zuccarini) Carrière var. *komarovii* (V. Vassil.) Cheng & Fu "Komarov Spruce"
Fl. Reip. Pop. Sin. 7:161. 1978. BASIONYM: *Picea komarovii* Vassil., Bot. Zhurn. 35(5):504, f. 5,7. 1950.

Pulvini on branchlets mostly erect. Leaves 1-2 cm long by 1.5 mm wide, blue-gray, sharply acute to acuminate, margins relatively thin and bluntly acute. Female cones 3-4 cm long by 2-2.2 cm wide; scales obovate or subconical, margins strongly denticulate; scale bract ovate and finely denticulate.

Distribution: China, central and eastern Jilin and eastern Liaoning to extreme southern Sik-hote Alin Range, U.S.S.R. Also in north and south Korea at 600-1800 m.

Picea jezoensis (Sieb. & Zuccarini) Carrière var. *microsperma* (Lindley) Cheng & Fu "Sak-halin or Small-seed Yezo Spruce"
Fl. Reip. Pop. Sin. 7:159. 1978. BASIONYM: *Picea microsperma* Lindley, Gard. Chron. 22. 1861.

A tree to 50 m tall. Pulvini erect and rather broad at the apex, leaving an enlarged oval leaf scar on the branchlet. Leaves 1-2 cm long by 1.5-2 mm wide, notably glaucous, straight and not as curved as in other *Picea jezoensis* varieties, stomata in 6-7 silvery lines below, apex bluntly acute to obtuse. Female cones 4-6 cm long by 2-2.6 cm wide, pale cinnamon-brown; scales oblong with an obtuse or truncate apex, only the apex of the scale is serrulate, whereas other varieties have the entire scale serrulate; scale bract broad and rounded with an acuminate apex. Seed 2.5 mm long, pale cinnamon-brown, with an ovate wing to 5 mm long.

Distribution: China, central and eastern Heilungkiang at 300-800 m. Also in the Sik-hote Alin Range and on central and southern Sakhalin Island, U.S.S.R. and on Hokkaido, Japan.

Picea korianensis Nakai var. *korianensis* "Korean Spruce"

Leaves bright grass green, distinctly pectinately arranged, pointing forward and slightly downward on the branchlet, relatively thin, 0.5-1 mm wide, sharply acute and spine tipped.

Picea korianensis Nakai var. *intercedens* (Nakai) Lee "Tonai Spruce"

Buds large, conical. Leaves distinctly curved upward on the branchlet not pectinately, dark green to gray-green, relatively thick, 1.2-1.7 mm wide, apex bluntly acute to obtuse. Branchlets thick, orange-brown or sulphur-yellow-orange.

Picea likiangensis (Franchet) Pritzl var. *bhutanica* Silba,
var. *nov.* "Bhutan Likiang Spruce"

TYPE: BHUTAN. valley above Gyetsa, west of Bumtang, 3040 m, 27° 31' N, 90° 37' E. *Grierson & Long 2602* (HOLOTYPE: E). Paratype: BHUTAN. valley above Gyetsa, west of Bumtang, 3040 m, *Grierson & Long 2601* (E).

Arbor ad 10-15 m alta. Folia longiora et tenuiora, obscurae-viridia, 1-2 cm longa et 1.2-1.5 mm lata. apice acuminata vel acuta. Strobili feminei squamae obtusiusculae vel rhombico-orbiculare.

A tree 10-15 m tall. Leaves dark green, paler below, longer and narrower than the type, 1-2 cm long or more by 1.2-1.5 mm wide, apex acuminate with an elongated spine. Female cone oblong-cylindric, somewhat fatter and shorter than the type; scales obtuse or rhombic-orbicular.

Specimen examined: INDIA. Assam: Lohit Valley, near Rima, 1981 m, *Kingdon-Ward 19270* (BM), may belong here.

Picea likiangensis (Franchet) Pritzl var. *forrestii* Silba,
var. *nov.* "Forrest Spruce"

TYPE: CHINA. Yunnan: on eastern flank of Likiang Snow Range, 2743-3353 m, 27° 35' N. *Forrest 6750* (HOLOTYPE: E).

Picea yunnanensis auct., non de Vilmorin: Mitchell in *Conif. Brit. Isles* 164. 1972.

Cortex fissuratus, purpureus. Ramuli glabri. Folia argenteo-glaucous vel argenteo-caesia, 15-20 mm longa et 1 mm lata, stomata infra quinque-lineata.

A tree to 17 m. Bark purplish, deeply fissured. Branchlets glabrous or with little pubescence, gray-green, 2.5 mm in diameter. Buds conical, 6 mm long by 3 mm wide, chestnut-brown with little resin. Leaves silvery-blue-gray, 15-20 mm long, by 1 mm wide, stomata in 5 lines below and in one line above, not as flattened. Female cone cylindrical, to 8 cm long by 2.5-3.5 cm wide, scales finely denticulate.

The protologue of *Picea yunnanensis* Ph. de Vilmorin in Bull. Soc. Dendr. France, pages 60-61 (Jan. 1923) lists Wisley seed number 1590 as the type. As this was cultivated material and cannot be equated with *Forrest 6750* with certainty, the name is here regarded as a *nomen dubium*, and does not belong to *P. likiangensis* var. *forrestii*. Cultivated material of *Forrest 6750* at Borde Hill and Lamellan Arboretum in the United Kingdom have been referred to *P. yunnanensis* by various authors. This material actually represents *P. likiangensis* var. *forrestii*.

Picea likiangensis (Franchet) Pritzell var. *linzhiensis* Cheng &

Fu

"Linzhi Spruce"

Acta Phytotax. Sin. 13(4):83. 1975.

Leaves shiny green above, usually without stomata above or sometimes in 1-2 rows on the upper surface, leaves relatively thick.

Distribution: China, Tibet, southeast, Linzhi (type locality) and northwest Yunnan and Szechuan, 2900-3700 m.

Picea martinezii Patterson

"Martínez Spruce"

Sida 13(2):131-135, f. 1988. TYPE: MÉXICO. Nuevo León: Mun. Montemorelos, 6 km southeast of La Trinidad on a northeast slope below the precipice "El Butano," 2200 m, 25° 11' N, 100° 07' W, *Patterson 5629* (Isotypes: MO,US!).

A tree 12-30 m tall, with an open, irregular crown. Bark thin, scaly, gray. Branchlets glabrous, yellowish, turning reddish brown then gray later, pulvini rounded. Buds conical, reddish brown, 8-10 mm long, apex acute. Leaves pectinately arranged and pointing forward on the branchlet, dark green, relatively straight, flexible, 1.6-2.7 cm long by 1-2 mm wide, distinctly flat, sharp pointed, stomata in 4-10 rows above and below, resin canals absent. Female cones oblong-cylindric, reddish brown, 8.5-16.1 cm long by 4-6.2 cm wide; scales thick, obovate, 1.9-3 cm long by 1.8-2.5 cm wide, denticulate, reflexed at the apex, margins erose-denticulate. Seeds brown, nut 5-8 mm long with a rounded apex; base acute, wings 1.6-2.3 cm long.

Specimens examined: MÉXICO. Nuevo León: Mun. Zaragoza, Ejido La Encantada, in Cañada Las Tinajas, 2500 m, *Rushforth 551* (E); same location, population about one dozen trees, *Rushforth 552* (E).

Picea meyeri Rehder & Wilson var. *mongolica* H.Q. Wu "Mongolian Spruce"
Bull. Bot. Res. Northeast Forest. Inst. 6(2):154. 1986.

Branchlets with more prominent pulvini. Branchlets yellowish first and second years. Buds more prominent. Shade leaves sharply acute, whereas leaves exposed to the sun are flat and pungent.

Distribution: China, Inner Mongolia, Baiyinaobao, 1300 m, near 43° N by 117° E.

Picea neveitchii Masters

"Flat-leaf Spruce"

Leaves relatively wide, 2-3.5 mm wide or more and distinctly flattened, even flatter than *Picea brachytyla*.

Distribution: This species has been much confused with *Picea wilsonii*. Cheng & Fu (1978) seem to be the only modern authors that have the correct distribution. It is listed in west Hubei, southern Shanxi and in Tienshuei and Beilong River Valley in Kansu at 1300-2000 m, scattered in forest or in steep crevices. The distribution given by Liu (1982) is in error and I have not seen any herbarium material from northeast China which would correspond with this species.

Picea obovata Ledeb. var. *krylovii* Lucznik

"Seminskij Spruce"

Nov. Sist. Vyssh. Rast. 13:5. 1976. TYPE: U.S.S.R. Altai Range on Seminskii ridge mountains, *Z. Lucznik 171* (HOLOTYPE: LE).

Picea obovata var. *argentea* Lucz., l.c. 6. 1976.

Picea densiflora Lucz., l.c. 6. 1976.

Picea lutescens Lucz., l.c. 6. 1976.

Picea lucifera Lucz., l.c. 7. 1976.

Picea seminskiensis Lucz., l.c. 5. 1976.

Leaves acicular, 1.7-2.5 cm long, rigid, distinct bright glaucous white to glaucous. Female cones 6.5-7.5 cm long by 2.8-3.2 cm in diameter, greenish brown, scales slenderer and finer than the type.

Picea obovata Ledeb. var. *tschiketamanica* Lucznik

"Tschiket Spruce"

Novosti Sist. Vyssh. Rast., 13:5. 1976.

Leaves longer, 2.2-3 cm long, acicular, dark green, erect on the branchlet. Female cones 7-10 cm long, scales pale brown.

Distribution: U.S.S.R.. Altai Range, in Tschiket-Aman mountain range.

According to Lucznik (1976) the above names are the only valid names for varieties of *Picea obovata* in the Altai mountains. The following names are *nomina nuda*:

Picea excelsa var. *altaica* Tepl., Bull. Soc. Nat. Moscou 3. 1969.

Picea obovata var. *coerulea* Malysch., Bot. Mat. 20. 1960.

Picea obovata var. *coerulea* Tigerstedt., in Krussman, Handb. Nadelgh., ed. 4. 1972.

Picea purpurea Masters var. *purpurea* "Purple-cone Spruce"

Branchlets pale orange-yellowish, densely pubescent. Female cones distinctly purplish.

Distribution: *Picea purpurea* var. *purpurea* is the northern variety, occurring in northwest Szechuan, southern Kansu and Quinghai in China.

Picea purpurea Masters var. *balfouriana* (Rehder & Wilson) Silba, *stat. nov.* "Balfour Spruce"

BASIONYM: *Picea balfouriana* Rehder & Wilson in Sarg., Pl. Wils. 2:30. 1914.

Picea likiangensis var. *rubescens* Rehder & Wilson, l.c., 31. 1914.

Branchlets usually with pinkish pubescence.

Distribution: China, a southwestern variety, in Tibet and Szechuan.

Picea purpurea Masters var. *hirtella* (Rehder & Wilson) Silba, *stat. nov.* "Pan-lan Shan Spruce"

BASIONYM: *Picea hirtella* Rehder & Wilson in Sarg., Pl. Wils. 2:32. 1914. TYPE: CHINA. Szechuan: west of Kuan Hsien, Pan-lan Shan, 3600-4100 m, *Wilson 2084* (HOLOTYPE: A!). Paratype: CHINA. Szechuan: northeast of Tachien-lu, Ta-Pao Shan, 3000-3300 m, *Wilson 2082* (A).

A tree 8-16 m tall. Branchlets with dense yellowish pubescence, pulvini less prominent than in var. *purpurea*. Foliage dense and gray-blue. Leaves erect, curved, keeled, 1-2 cm long by 1-2 mm side, with two glaucous white stomatal bands below in 4-6 lines. Female cones ovate-oblong or ovoid-cylindric, shiny yellow-brown, 5.5-8 cm long, cone scale bracts cuspidate to nearly triangular to 3-4 mm long.

Distribution: China, a south southeastern variety of the type.

Picea smithiana (Wall.) Boiss. var. *nepalensis* Franco "Dillikot Spruce"

ex Hara. Stearns & Williams. Enum. Fl. Pl. Nepal 1:26. 1978. TYPE: NEPAL. Dillikot, 2400 m, *Polunin, Sykes & Williams 3920* (HOLOTYPE: BM!; Isotype: E!). Paratype: NEPAL. western Nepal, 2400-2900 m, *Polunin, Sykes & Williams 1889* (BM).

This taxon differs in the strongly pubescent branchlets. Horsman (1983) noted Nepal plants as having stiffer foliage and bluish leaves and perhaps this observation refers to this variety.

Picea spinulosa (Griffiths) Henry var. *pseudobrachytyla* Silba.

var. nov. "Byakar Spruce"

TYPE: BHUTAN. forest slopes east of Ura, southeast of Byakar, 3000 m, 27° 25' N by 90° 56' E, *Grierson & Long 1893* (HOLOTYPE: E). Paratypes: CHINA. Yunnan: Mekong-Salwin divide, 2134-2743 m, 27° 30' N by 98° 56' E. *Forrest 20030* (E); BHUTAN. west side of Ura La, southeast of Byakar, 3500 m, 27° 27' N by 90° 51' E, *Grierson & Long 1871*; INDIA. Arunchal Pradesh: Kameng District, Tawang, 3000 m, *Bennet & Nathani 3110* (A).

Arbor ad 15 m alta. Ramuli dense fulvo-aurantiaci pubescentes. Gemmae globosae, squamis apice acuminatis et spinosis. Folia 10-20 mm longa et 1.5 mm lata, infra lineis stomatiferis 2 notata. Strobili femeni immaturi atro-glaucopurpurei, squamis maturis rhombico-deltaeideis et apice profunde retusis.

A tree to 15 m tall. Branchlets with dense yellowish orange pubescence; pulvini orange, prominent, to 0.5 mm long. Buds globular, apical scales with extended spiny apices. Leaves strongly glaucous below with two white stomatal bands underneath, apex with a projected acuminate spine. Young female cones dark bluish purple. Scales of mature female cones rhombic-deltoid, conical, deeply notched at the apex.

Picea spinulosa (Griffiths) Henry var. *yatungensis* Silba,

var. nov. "Yatung Spruce"

TYPE: CHINA. Tibet: Yatung, 1981 m, 27° 28' N by 80° 54' E, *Ludlow, Sherriff & Taylor 4055* (HOLOTYPE: BM; Isotype: A); Paratype: CHINA. Tibet: Langpe-Gyala, 2835 m, 27° 28' N by 94° 55' E, *Ludlow, Sherriff & Taylor 4055* (A, BM).

Gemmae majusculae, squamis papyraceis, puniceis. Ramuli parce pubescentes. Folia patula, 10-10 mm longa, apice acuminata. Strobili femeni obesi, puniceo-brunnei, squamis apice intus flexi.

Buds rather large with thin pinkish brown papery scales. Branchlets sparsely pubescent. Leaves more loosely arranged, apex with a blunt short spine. Female cones short and broad, pinkish brown; scales broadly rounded and apices somewhat incurved.

Picea wilsonii Masters var. *wilsonii*

"Wilson Spruce"

Branchlets dull gray-white, with bark exfoliating in thin strips. Buds conical, 4-5 mm long. Leaves dull dusty-gray-green, curved upwards on the branchlet, distinctly quadrangular, apex bluntly acute or obtuse, 0.7-1.5 mm wide. Female cones cylindrical, 6-9 cm long, remaining on the tree long after ripening.

***Picea wilsonii* Masters var. *shanxiensis* Silba, var. nov.** "Shanxi Spruce"

TYPE: CHINA. Shansi: Chia-Cheng District, Pa-Shui-Ko Shan, 2100 m. *H. Smith 8051* (HOLOTYPE: E). Paratypes: CHINA. Shansi: Wutai-Shan, "Pei-santse" temple, 2000-2300 m, *Meyer 2267* (A); Yuan-Chu, Wang-Ping, 2500 m. *H. Smith 6588* (E).

Arbor ad 12 m alta. Folia crassiora et parva, 5.5-7 mm longa et 0.8-1.2 mm lata, cinereo-viridia, apice obtusa. Strobili feminei parvi, ovoidei, 1.5-2.5 cm longi et 1.3-1.5 cm lati.

A tree to 12 m tall. Leaves very thick and curved, short, 5.5-7 mm long by 0.8-1.2 mm wide, gray-green, bluntly acute. Female cones ovoid-conic, 1.5-2.5 cm long by 1.3-1.5 cm wide.

Distribution: China, a reduced northern variety of the species, native to Shansi, 2000-2500 m.

The name published as *Picea mastersii* Mayr., in Fremdl., *Wald-und Parkbaume* 328. f. 105-106 (not f. 107). 1906, is illegitimate because the type description includes material and photographs of both *P. wilsonii* and *P. meyeri* Rehder & Wilson.

***Picea wilsonii* Masters var. *watsoniana* Silba, stat. nov.** "Watson Spruce"

BASIONYM: *Picea watsoniana* Masters, J. Linn. Soc., Bot. 37:419. 1906. TYPE: CHINA. Szechuan: Sung Pan Ting, 1981 m, *Wilson 3023* (HOLOTYPE: K!).

A tree to 12 m tall, with short, even horizontal branches. Buds nearly globose, 2.5-3.5 mm long. Branchlets yellowish white, glabrous, shiny, relative thin. Leaves more pectinately arranged, pointing forward and slightly downward, distinctly flattened, shiny grassy green, pungent, narrower, 1-1.5 cm long, sharply acute. Female cones smaller, 4-6 cm long, orange-brown, scales smaller to 1.3-1.4 cm long, cones shed from tree soon after dropping their seeds.

Specimens examined: CHINA. Kansu: upper Mayaku Valley, 2743 m. *Rock 14756* (NY); Hupeh: Hsing-Shan, 1600-2300 m, *Wilson 2051* (A).

Pinus armandi Franchet var. *amamiana* (Koidzu)

Hatusima

"Yakushima Pine"

Mem. Fac. Agric. Kugos. Univ. 10:37. 1974. BASIONYM: *Pinus amamiana* Koidzu, Bot. Mag. Tokyo 38:113. 1924.

Branchlets dark brownish, with scattered brownish pubescence. Needles shorter and more rigid, 5-8 cm long, dark glossy green, with indistinct stomatal lines on the inner faces only. Female cones ovoid or ovoid-elliptic, smaller, 4.5-6 cm long, glossy orange-brown, scales moderately thick. Seeds 10 mm long with a rudimentary wing 1 mm long.

Distribution: South Japan, on two islands off southern Kyushu, at Yakushima, 30° 22' N, 130° 27' E, 600-700 m and Tanegashima.

Pinus armandii Franchet var. *dabeshanensis* (Cheng & Law) Silba,*stat. nov.*

"Dabie Shan Pine"

BASIONYM: *Pinus dabeshanensis* Cheng & Law, Acta Phytotax. Sin. 13(4):85, pl. 26. 6-10. 1975.

A tree to 20 m tall. Leaves shorter, 5-14 cm long by 1 mm wide. Female cones ellipsoidal, 14 cm long by 4.5 cm wide, apex of scales slightly reflexed. Seeds larger, 1.4-1.8 cm long by 8-9 mm wide.

Distribution: China, between Anhui and Hubei in the Dabie Shan mountains, 900-1400 m.

Pinus ayacahuite Ehrenberg var. *loudoniana* (Gordon) Silba,*stat. nov.*

"Longleaf White Pine"

BASIONYM: *Pinus loudoniana* Gordon, *The Pinetum*, ed. 1 230. 1858; et in *Pinetum*. ed. 2 311. 1875.

Needles notably longer, 15.5-20 cm long, with up to seven resin canals. Female cones larger than the type variety, seed wings also larger than the type variety.

Distribution: México. Puebla, Popocatepetl Mt., near border of México, D.F. (type locality).

Specimen examined: MÉXICO. Puebla: Mun. Yaonahua, near Atotocoyan, 880 m, *Marquez 714* (NY).

Pinus ayacahuite Ehrenberg var. *oaxacana* Silba,*var. nov.*

"Oaxaca White Pine"

TYPE: MÉXICO. Oaxaca: between San Miguel and Tres Cruces, *J. Alexander 641* (HOLOTYPE: NY). Paratypes: MÉXICO. Oaxaca: Cerro de Humo, Sierra Juárez. *Alexander 848* (NY); EL SALVADOR: east of Los Esesmiles, 2250 m. *Tucker 1067* (NY).

Folia 3 in fasciculo, longiora, 14-16 cm longa, tenuiora.

Needles mostly three per bundle, longer and more slender than the type, 14-16 cm long. Female cone scales relatively thin and slender.

Pinus ayacahuite Ehrenb. var. *veitchii* (Roetzl.) Shaw "Veitch Pine"
Pines of Mexico 10, pl. 5. 1909.

A tree 20-30 m tall. Buds ovoid-conic, sharply acute, to 1 cm long, with adpressed, erect or slightly free chestnut-brown scales. Sheath 12-17 mm long, yellowish. Needles usually five per fascicle, occasionally six or seven per bundle, especially on young trees, dark green, 11-13 cm long; resin canals external, mostly 2-3; hypoderm uniform. Female cones 22-28 cm long, very resinous, on a peduncle 15-20 mm long; scales broader and thick, strongly reflexed, somewhat rounded triangular. Seeds with large nuts 15-20 mm long by 6-10 mm wide, wings shorter and broader to 2 cm long. The type variety differs in having seed wings 3-3.5 cm long.

Distribution: Central México, Hidalgo, Puebla, Morelos, Michoacán and Veracruz, a northern variety of the species.

Pinus cembroides Zuccarini var. *juarezensis* (Lanner) Silba,
stat. nov. "Juárez Pine"
 BASIONYM: *Pinus juarezensis* Lanner, Southw. Nat. 19:75, f. 2. 1974.

Needles mostly five per bundle, glossy green on outer surfaces, bright white on inner surfaces with dense stomata. Female cones red-brown, 3-4 cm long by 5-7 cm wide when open, flattish, bun shaped, apophyses of scales with a protuberant umbo that is elongated.

Distribution: México, Baja California Norte, Sierra Juárez mountains. Also reported from southwest California.

Pinus cembroides Zuccarini var. *lagunae* Robert-
 Passini "Laguna Pinyon Pine"
 Bull. Mus. Hist. Nat. (Paris), ser. 4, 3:64. 1981.

A tree 12-15 m tall. Needles mostly two per bundle, narrower, 6.75 cm long by 1.2 mm wide, with two resin canals. Female cones globular, on longer peduncles. Seeds thinner walled, 10-16 mm long. Cotyledons 5-17.

Distribution: México, Baja California Sur, Sierra de la Laguna, Delegación of Todos Santos, 1600-2200 m.

Pinus cembroides Zuccarini var. *orizabensis* (Bailey) Silba,
stat. nov. "Orizaba Pinyon Pine"
 BASIONYM: *Pinus cembroides* subsp. *orizabensis* Bailey, *Phytologia*
 54(2):89. 1983. TYPE: MÉXICO. Puebla: Mun. Soltepec, along high-
 way Mex. 140, 10 km southwest of San Salvador el Seco, 2370 m, *Bailey*
 83-01 (Isotypes: E.K,US!).

Tree 8-10 m tall. Bark longitudinally furrowed, inner bark yellowish-orange. Needles mostly three per bundle, 4-6 cm long by 1.3-2 mm wide, dorsal surfaces dark green, ventral surfaces glaucous, stomata on both surfaces, fascicle bracts soon turn black and are conspicuous. Female cones larger, 5-6 cm long by 6-7 cm wide, relatively thinner scales. Seeds larger, to 20 cm long.

Distribution: Mexico (country), Puebla, Tlaxcala and Veracruz.

Pinus contorta Douglas var. *bolanderi* Lemmon "Bolander Pine"
Erythea 2:176. 1894.

This variety was not accepted by Silba (1984). A reexamination of herbarium material and the literature has revealed both growth habit and internal leaf anatomy as consistent characteristics of value at the varietal level. Individuals of this variety are shrubs or small trees. Bark black-brown. Needles short, less than 5 cm long, narrower than 1.5 mm wide, without resin canals. In contrast, other varieties of *Pinus contorta* lack resin canals in some leaves only. Female cone asymmetrical, opening late and very persistent.

Distribution: United States, California, Mendocino County, Fort Bragg, plains on podzol soils.

Pinus densa (Little & Dorm.) de Laubenfels & Silba var. *austro-keysensis*
Silba, var. *nov.* "Keys Pine"

TYPE: UNITED STATES. Florida: Monroe County, Little Pine Key, pinelands, *Small, Carter & Small 3655* (HOLOTYPE: NY). Paratypes: UNITED STATES. Florida: Florida Keys, Big Pine Key, *Brizicky & Stern 378* (NY); Big Pine Key, *R.F. Martin 1417* (NY).

Arbor ad 10 m alta. Vaginae 12 mm longae. Folia 2 in fasciculo, longiora, 30.2-34.2 cm longa. Strobili femenei parvi, 4.4-7 cm longi, squamis umbone prominentis provis.

A tree to 10 m tall. Sheath 12 mm long. Needles mostly two per bundle, 30.2-34.2 cm long, longer than the type. Female cones smaller, 4.4-7 cm long, scales reflexed, apophyses swollen with a spiny central umbo 1-1.5 mm long.

Pinus douglasiana Martínez var. *martinezii* (Larson) Silba.
stat. nov. "Martinez Pine"
BASYONYM: *Pinus martinezii* Larson. Madroño 17:217. 1964.

A tree to 25 m tall. Bark rough. Buds non resinous. Needles usually six per bundle, 20-28 cm long, more glaucous on internal face. Female cone on a peduncle 25 mm long, which remains attached to the tree after cones fall off. Seeds 1.2-1.9 cm long.

Distribution: México, Michoacán, Paracho, between Carapan and Uruapan, 2377 m. 19° 17' N, 102° 04' W.

Pinus douglasiana Martínez var. *maximinoi* (Moore) Silba,
stat. nov. "Moore Pine"
 BASIONYM: *Pinus maximinoi* E.H. Moore, *Baileya* 14:8. 1966.

A tree 15-30 m tall. Sheath 15-18 mm long. Needles finer, 15-28 cm long by only 0.5-0.7 mm wide, flexible, green with a yellowish tint; resin canals median, three; hypoderm irregular; fibro-vascular bundles two, continuous. Female cones 7-9 cm long; borne in groups of 4-5; oblong, attenuate at the base, apophysis quadrangular, thin and flat, umbo flat and unarmed, dark red; peduncle 15 mm, no basal scales left on branchlet after cone falls off the tree. Seeds blackish nuts 6-7 mm long, triangular in shape, and with a yellowish wing 18-20 mm long by 6-7 mm wide.

Distribution: México, Sinaloa, Las Cruces and San Ignacio and in Coapilla and Copainala, Chiapas. Also in Guatemala, Belize, Honduras and Nicaragua.

Pinus engelmannii Carrière var. *blancoi* (Mart.) Martínez "Blanco Pine"
Las Pinacaeas Mexicanas 288. 1948.

A tree 15-25 m tall, with horizontal branches. Sheath 30-35 mm long, persistent, chestnut-brown. Needles mostly three per bundle, rarely 4-5 per bundle, 21-38 cm long, spreading widely and pendent, thick, green and tinted yellow; resin canals median, 3-9. Female cones curved, 11-16 cm long, ovoid-oblong, scales 30-45 mm long by 15-25 mm wide; apophysis prominent, with a persistent recurved mucronate spine. Seed dark brown, nut 6-7 mm long, wing 30-40 mm long.

Distribution: México. Durango, San Dimas and also in Arroyo de los Choros, mun. de Durango, and in Bocoyna, Chihuahua where it is called "Pino Real" by the local people.

Pinus hartwegii Lindley var. *rudis* (Endlicher) Silba,
stat. nov. "Black-cone Hartweg Pine"
 BASIONYM: *Pinus rudis* Endlicher, *A Synopsis of the Coniferae* 151. 1847.

A tree to 20 m tall, with a high rounded umbrella like crown. Trunk loses lower branches early. Bark dark gray, rough, deeply fissured. Branchlets stout or slender, purple-brown, pruinose. Buds cylindrical, light brown, acute or apex bluntly conical, scales free at the apices. Sheath 5-25 mm long, dark brown. Needles spreading out and around the branchlet, non pendent, in fascicles of five, rarely 4-6 per fascicle, blue-green, gray-green or yellow-green, 10-16 cm long, rarely to 25 cm long by 1 mm wide, moderately stout or slender; resin canals median, 3-6, hypoderm uniform. Female cone long-ovoid, dark brown or blackish red, 7-13 cm long, slightly curved, base rounded, tapered

to the apex; apophyses slightly swollen with a transverse keel and a recurved spiny umbo.

Distribution: México in Coahuila, Nuevo León at Sierra del Potosí, 3333-3500 m; in Sierra Madre in Zacatecas and in Tancitaro, Michoacán at 2833-3786 m, to Puebla.

Pinus insularis Endlicher var. *insularis*

“Philippine Pine”

Female cones gray-brown. scales not decurved at maturity, interior part of scales light brown, apex of cone scale an acuminate point, apophysis relatively thick and swollen, umbos very prominent. Seed wings longer than all the other geographic varieties.

Distribution: The type variety is restricted to the northern part of Luzon in the Philippines.

Pinus insularis Endlicher var. *khasyana* (Griffiths) Silba, *stat.*

nov.

“Khasi Pine”

BASIONYM: *Pinus khasyana* Griffiths, Notul. Pl. Asiat. 4:18, t. 367. 1854.

Female cones on longer peduncles, interior part of cone scales blackish, cone scales distinctly decurved at maturity, apophysis distinctly rounded and swollen.

Distribution: India to Burma and perhaps further south in Indo-China. Mirov (*The Genus Pinus* 295. 1967) noted chemical distinctions between the Indian and Philippine populations.

Pinus insularis Endlicher var. *langbianensis* (Cheval.) Silba,

stat. nov.

“Langbian Pine”

BASIONYM: *Pinus langbianensis* A. Cheval., Rev. Bot. Appl. Agr. Trop. nos. 269-271:25. 1944.

Needles 18-22 cm long, finer than the type variety. Female cone larger, 7-9 cm long by 4-5.5 cm wide, on a peduncle 5-8 mm long, shiny brown, scales more rounded and not decurved after cone opens, scales relatively thin, apophysis more flattened, umbos indented in the center.

Distribution: Native to Laos and Vietnam.

Pinus insularis Endlicher var. *tenuifolia* (Cheng & Law) Silba, *stat. nov.*

BASIONYM: *Pinus yunnanensis* var. *tenuifolia* Cheng & Law. Acta Phytotax. Sin. 13(4):85. 1975.

Leaves longer and narrower, pendulous, 20-30 cm long by 1 mm wide. Female cones 5-10 cm long by 4-5 cm wide.

Distribution: China, western Kweichow, to 400-1200 m altitude.

Pinus jeffreyi* Greville & Balfour var. *baja-californica* Silba,var. nov.*

"Baja Jeffrey Pine"

TYPE: MÉXICO. Baja California Norte: Yellow Pine belt between Ojos Negros and Neji Rancho, *Wiggins & Gillespie 4123* (HOLOTYPE: NY). Paratype: MÉXICO. Baja California Norte: Sierra San Pedro Mártir, margins of meadow and adjacent slopes at La Encantada, 2200 m, *Wiggins & Demaree 4920* (NY).

Ramuli juvenilium glauca. Vaginae 11-13 mm longae. Folia 2 in fasciculo, longiora et crassiora, 10.5-24 cm longa, apice acutis. Strobili femenei 13 cm longi, squamis umbonatis angusta.

Young branchlets glaucous. Sheath 11-13 mm long. Needles mostly two per fascicle, thicker longer, 10.5-24 cm long, apex sharply acute. Female cone 13 cm long, sometimes leaving a few basal scales on the branchlet after falling off the tree. Scale umbos less prominent, narrower and less decurved than in the type, whereas the type variety usually has strongly decurved umbos.

Pinus lambertiana* Douglas var. *martirensis* Silba,var. nov.*

"Mártir Sugar Pine"

TYPE: MÉXICO. Baja California Norte: Sierra San Pedro Mártir, La Encantada, upper ends of flats, dry hillside, 2210 m, *Wiggins & Demaree 5013* (HOLOTYPE: NY). Paratype: MÉXICO. Baja California Norte: about 9 miles west of San Pedro Observatory, *McGill, et al. P12325* (NY).

Ramuli cinearia-brunneae vel flavo-brunneae. Vaginae nigrans, brevioribus. Folia pectinatum disposita, crassiora, 41-67 mm longa et 0.9 mm lata.

Branchlets grayish brown or yellowish brown. Sheath deciduous but leaving an elongated blackish stubby base 1.5-2 mm long which is pulvini like. Needles more pectinately arranged, thicker, curved, 41-67 mm long by 0.9 mm wide.

***Pinus luchuensis* Mayr. var. *hwangshanensis* (Hsia ex Tsoong)**

Wu

"Hwang Shan Pine"

Acta Phytotax. Sin. 5(3):158. 1956.

Branchlets yellow-brown with a pinkish tinge. Buds cylindrical, with an abrupt sharp conical apex, scales chestnut-brown. Needles yellow-green or fresh green. Female cone scales have umbos that are depressed and bear an abrupt mucronate spine.

Distribution: China, western Hupeh to Chekiang.

Pinus lumholtzi Robinson & Fernald var. *microphylla* S.

Carvajal

"Small-leaf Lumholtz Pine"

Phytologia 59(2):135. 1986.

Branchlets persistent many years. Needles usually four per bundle. 8-13 cm long, pendulous. Female cones symmetrical, 3-5 cm long.

Distribution: México (country), Jalisco, Mun. de San Martín de Hidalgo, Rancho El Cobre, 2100 m (type locality). Also in Sierra de Quila, Mun. Tecolotlan, Jalisco at 2100 m and near Batopilas, Chihuahua. In Nayarit near Jala and in Aguascalientes near Cavillo.

Pinus massoniana Lambert var. *hainanensis* Cheng &

Fu

"Hainan Masson Pine"

Acta Phytotax. Sin. 13(4):85. 1975.

Bark pale red-brown with irregular fissures. Branches horizontal, ascending branches blackish brown. Female cones longer, ovoid-cylindric.

Distribution: China, Hainan.

Pinus merkusii Jungh. & de Vr. var. *latteri* (Mason) Silba,

stat. nov.

"Laos Pine"

BASIONYM: *Pinus latteri* Mason, J. Asiat. Soc. Bengal. Sci. 5(18):73-75. 1849.

Needles longer, 19-27 cm long by 1.5 mm wide. Main branchlets or central leaders are uninodal in growth. Female cone more tapered in shape, 5-10 cm long; apophysis distinctly wider than high, umbos distinctly raised. Seeds nearly twice the weight of the type variety. Seed nut 5-8 mm long by 4 mm wide, wings to 2.5 cm long. Seedlings go through a distinct grass like stage.

Distribution: Southeast Asia, Hainan, Vietnam and Laos, dry areas only, 50-1200 m.

Pinus merkusii Jungh. & de Vr. var. *merkusii*

"Laos Pine"

The type variety differs in having the main branchlets or central leaders with multinodal growth. The female cones are more cylindrical.

It is native to Sumatra and the Philippines only.

Pinus merkusii Jungh. & de Vr. var. *tonkinensis* A. Cheval. "Tonkin Pine"

Rev. Bot. Appl. Ag. Trop. 21:7. 1944.

Trees are slender with somewhat ascending branches, bark very thin and smooth.

Distribution: This is an upland variety in southeast Asia and on Sumatra at Tapanuli at 1000 m altitude.

Pinus michoacana Martínez var. *cornuta* Martínez "Tecolotlan Pine"
Anal. Inst. Biol. Mex. 15:1. 1944.

Pinus wincesteriana auct. non Gordon, Rushforth in *Conifers* 180.
1987.

A tree 20-30 m tall. Bark dark gray. Needles five per fascicle, rarely 4-6 per fascicle, 20-47 cm long, dark green, flexible, margins serrulate; resin canals 3, rarely 4-5, median, occasionally internal. Female cones long conic, 20-35 cm long by 9 cm wide when closed, curved, scales 1.5 cm wide; apophysis greatly thickened with a strong transverse ridge, often broader than long; umbos stout with a straight or reflexed spine. Cone peduncle 10-15 mm long. Seeds dark, triangular, 6-7 mm long, wing 25-30 mm long by 8-10 mm wide.

Distribution: México, in Cerro del Tecolote and Cerro Gordo, Michoacán. In Nochistlan, Oaxaca, in Tonila, Jalisco and in Xichu, Guanajuato.

Earlier names of Mexican pines published by European botanists cannot be assigned without full certainty as to types and locations. With the wide diversity of *Pinus* species in México, it is best to accept Martínez's names which have definite type specimens and precise locality data. The names *Pinus devoniana* Lindley (referred by some to typical *P. michoacana*) and *P. wincesteriana* Gordon (applicable by some to *P. michoacana* var. *cornuta*) are here rejected as *nomina confusa*.

Pinus monophylla Torrey & Fremont var. *californiarum* (Bailey) Silba,
stat. nov. "San Diego Pinyon Pine"

BASIONYM: *Pinus californiarum* Bailey, Notes Roy. Bot. Gard. Edinburgh 44(2):278. 1987. TYPE: UNITED STATES. California: San Diego County, Anza-Borrego Desert State Park, northwest base of Whale Peak, Vallecito Mts., 1280 m. 33° 03' N by 116° 20' W, *Bailey 81-08* (Isotypes: MO,US!).

Leaves narrower, usually dark green and less glaucous, longer, 4-5.75 cm long by 1.5-2.3 mm wide, with fewer stomatal lines than the type. Fascicle sheath shorter, 5-11 mm long, partly deciduous very early. Female cones smaller with less protuberant basal apophysis and more flattened at the base. Seeds slightly smaller and with slightly thinner seed walls. the endosperm is very oily.

Distribution: United States, California, Riverside County, Coxcomb Range; Nevada, Clark County, Spring Mountains. México, Baja California, Ensenada, Sierra la Asamblea; 1100-1600 m.

Pinus monophylla Torrey & Fremont var. *fallax* (Little) Silba,
stat. nov. "Ancha Pinyon Pine"

BASIONYM: *Pinus edulis* var. *fallax* Little, *Phytologia* 17:331. 1968.

TYPE: UNITED STATES. Arizona: Gila County, Tonto National Forest, Sierra Ancha Experim. Forest, *E.L. Little, Jr. 18581* (HOLOTYPE: US!).

Fascicle sheath smaller, only 4-7 mm long. Leaves dark green with fewer stomata, stomata in 12-20 lines. Female cone axis length often less than width, base of cone flatter with much less protuberant apophysis. Seeds smaller, with slightly thinner shells and oily endosperms.

Distribution: A lower elevation variety, at 1200-1800 m. In southeast Nevada, north of Grand Washington Cliffs. In northwest Arizona, Cerbat Mts., Hualapai Mts. and Mohave Mts. In southwest Arizona and California, San Bernardino County, in New York Mountains.

Pinus montezumae Lambert var. *gordoniana* (Hartweg) Silba, *stat.*

nov.

"Gordon Pine"

BASIONYM: *Pinus gordoniana* Hartweg, J. Hort. Soc. London 2:79. 1847.

A tree 18-24 m tall. Branches numerous, with fine foliage. Buds with little or no resin, very scaly. Sheaths persistent, 31 mm long, rough, scaly. Needles rather slender, five per bundle, very long, to 40 cm long, light green, serrulate, dense. Female cones mostly solitary, slightly curved, tapered from the base to the apex, 10.1-12.7 cm long by 3.8 cm wide at the base, non resinous, with fourteen or fifteen rows of scales; scales 1.3 cm broad; apophyses slightly swollen, though flattened at base of cone; cone on a peduncle 1.3 cm long. Seeds small, angular, with narrow wings about 3.2 cm long. Cotyledons mostly 7, rather short. Cones proliferous.

Distribution: México, Nayarit, Cerro de San Juan or Saddle Mountain, near Tepic. Also in northwest Jalisco.

Pinus montezumae Lambert var. *lindleyi* Loud.

"Lindley Pine"

Encyclopedia of Trees and Shrubs 1004. 1883.

Branches dark brown. Sheath persistent, 25-35 mm long, chestnut-gray. Needles slender, drooping, apple green, 27-35 cm long, hypoderm irregular; resin canals median. 4-6. Female cone more cylindrical, pale brown, ovoid, attenuate at the apex, 12-14 cm long, peduncle 10-12 mm long, scales more numerous and smaller, apophysis rather broad with an obscure cusp.

Distribution: México, Michoacán, Hidalgo, Puebla, Morelos. Guerrero and Veracruz, 2438-3109 m. In Los Mazos, Tuxpan, Jalisco, in San Felipe, near Uruapan. Michoacan. Also in Tlaltengo, Chautzingo, Puebla and near Chilpan-

cingo, Guerrero.

Pinus montezumae Lambert var. *mezambrana* Carvajal "Nevado Pine"
Phytologia 59(2):138-139. 1986.

Sheath 2-3 cm long, chestnut-gray. Needles mostly four per bundle, 22-25 cm long by 1-1.7 mm wide; resin ducts median, 4-8; hypoderm nearly continuous. Female cones on a short peduncle 1-1.2 cm long, oblique, 13-15 cm long, bright chestnut-brown.

Distribution: México, Jalisco, La Media Luna, Ladera north of Volcán Nevado, mun. de Venustiano Carranza (type locality). Also on Volcán de Colima and Volcán de Fuego, Jalisco, to 2850 m. In Distr. Federal at Cerro del Guarda to 2600 m, and in Michoacán at Ladera del Cerro Angahuan at 2350 m.

Pinus muricata D. Don var. *borealis* Axelrod "Sonoma Bishop Pine"
Univ. California Geol. Sci. Publ. 127. 1983. TYPE: UNITED STATES.
California: Sonoma County, vicinity of Salt Point, State Highway 1, 76 m altitude, on Eocene marine sandstone, *Axelrod E-3* (Isotype: GH!).

Trees 15-18 m tall, with dense luxuriant foliage. Needles two per bundle, dark green, 6-11.5 cm long. Sheath 1.2-1.5 cm long. Female cone subglobose or nearly globose, 4-5.5 cm long; apophysis rounded and swollen with a sharp central umbo 2 mm long, apophysis mostly protuberant and blunt at the base of the cone.

Pinus muricata D. Don var. *remorata* (Mason) Silba,
stat. nov. "Smooth-cone Bishop Pine"
BASYNYM: *Pinus remorata* Mason, Madroño 2:9. 1930.

A slender tree 10-20 m tall, seldom 2-3 dm in diameter. Crown flat topped at maturity. Bark furrowed. Sheath persistent, gray, 10-15 mm long. Needles dark green, two per bundle, 8-20 cm long by 2 mm wide, resin ducts 6-12. Female cones almost at right angles to the branches, not reflexed as in the type, ovoid-conic, almost symmetrical, 5-8 cm long by 4-5 cm wide; apophysis smooth, non protuberant, with a small central spiny umbo. Seeds black, obliquely truncate with a rather stout wing.

Distribution: United States, California. Santa Rosa Island, Santa Cruz Island (type locality). Also on Burton Mesa, Santa Barbara County, perhaps growing on a different soil type than the type variety, and also in Marin County.

Pinus muricata D. Don var. *stantoni* Axelrod "Stanton Bishop Pine"
Univ. California Geol. Sci. Publ. 127. 1983. TYPE: UNITED STATES.
California: Santa Barbara County, Santa Cruz Island, above Chinese Harbor, 305 m altitude, on Monterey siliceous shale soil type, *Axelrod E-1* (Isotype: GH!).

Sheath 3-10 mm long. Leaves grassy green, 4-7 cm long. Female cone oblong, 4-5 cm long; apophysis strongly protruding and triangular, mostly on upper half of cone on one side only; umbo sharply upcurved and 1.5-2 mm long.

Pinus nubicola Perry

"Nubes Pine"

J. Arnold Arbor. 6B:447-448, f. 1-4. 1987. TYPE: GUATEMALA. Depto. Guatemala: ca 40 km east of San José Pinula on dirt road toward Las Nubes. 2000 m. 90° 20' W by 14° 33' 30" N, *Perry Gua 32-79* (HOLOTYPE: GH!; Isotypes: E,K!).

A tree 25-30 m tall, with an open rounded crown at maturity. Young trees with notably smooth bark. Branchlets slender, pruinose. Sheath persistent. 20-30 mm long, pale brown, resinous. Needles drooping, mostly five or six per bundle, rarely as many as 8 per bundle. 25-43 cm long by 0.6-1 mm wide, flexible, stomata present on all surfaces, margins serrulate; resin canals medial and 3 or 4. Female cones in groups of 1-4, asymmetrically ovoid to long ovoid, 10-15 cm long by 8-10 cm wide when open at maturity; leaving a few basal scales and peduncle on branchlet after shedding seeds or not long after maturity. Cone scales with an obtusely angled apex, with a ashy gray umbo 2-3 mm long and curved upwards. Cone scale apophysis swollen with unequal marginal projections. Seeds brown to mottled black, 5-7 mm long by 4-5 mm wide, with a detachable pale brown wing 20-25 mm long by 8-11 mm wide. Cotyledons 7-13.

Distribution: México. Veracruz, west of Jalapa; in Chiapas south of San Cristobal de Las Casas. In Honduras, vicinity of Las Trancas. In El Salvador, near Miramundo and near El Aguacatal. On cool, moist mountain slopes at 1800-2400 m altitude.

Pinus occidentalis Swartz var. *maestraensis* (Bisse) Silba.

stat. nov.

"Maestrae Pine"

BASIONYM: *Pinus maestraensis* Bisse, *Ciencias Bot.* (Cuba) 2:2. 1975.

A tree to 30 m tall. Needles mostly 2-3 per bundle, acicular, 10-22 cm long, thinner than the type and only 0.5-0.7 mm wide. Female cones 4-7 cm long, gray-brown, umbos distinctly decurved with a spine 1.5 mm long.

Distribution: CUBA. Oriente Province, Sierra Maestra, pinar, cerca near La Francia. 600-1200 m and in Loma del Gato, Cobre Range.

Pinus oocarpa Scheide var. *macvaughii* (Carvajal) Silba.

stat. nov.

"MacVaugh Pine"

BASIONYM: *Pinus macvaughii* Carvajal, *Phytologia* 59(2):139-140. 1986.

A tree 12-15 m tall, with horizontal branches. Bark divided into dark gray plates. Needles shorter, 15-20 cm long, usually five per bundle, bright green, clustered at end of branchlet; resin canals three, septal. Female cones on a peduncle 6-8 mm long, cone 8-9 cm long by 3 cm wide, conical, apex attenuate. Cone remains on tree for a long time, though when it falls off, it supposedly leaves a few basal scales on the branchlet. Seeds small, 3-5 mm long, wings 10-12 mm long.

Distribution: México, Jalisco, El Salto del Rincón, mun. de Villa de Purificación, 800-1200 m. Also in Sierra de El Tuito and near el Refugio, Jalisco, to 980 m.

Pinus oocarpa Scheide var. *manzanoi* Martínez "Manzano Pine"
An. Inst. Biol. Mex. 11(1):70, f. 11-13. 1940.

Needles usually 4-5 per fascicle, sometimes 3-5 per fascicle, 18-26 cm long, dark green, shiny; resin canals three, sometimes 1-6, median, occasionally septal or rarely internal. Female cones curved at the apex, apophysis more prominent and swollen. Seeds 6 mm long, coffee brown, wings dark, to 20 mm long by 13 mm wide.

Distribution: México, Hidalgo, Huasca and Ocotillos.

Pinus oocarpa Scheide var. *microphylla* Shaw "Short-leaf Oocarpa Pine"
Pines of Mexico 27. 1909.

Branchlets fragile, foliage sparse. Sheath fine, 5-10 mm long, Needles five per fascicle, 9-16 cm long, slender, pointing forward. Cones ovoid-conic, shiny, ochre-greenish, 3-3.5 cm long, on a long peduncle.

Distribution: México, near La Rosa, Nayaritana; in Montes de Batel, Concordia, Sinaloa and in Cerca de Colomas, Nochistlan, Zacatecas, to 1300 m or more.

Pinus oocarpa Scheide var. *ochoterenai* Martínez "Ochoterena Pine"
An. Inst. Biol. Mex. 11(1):65, f. 9-11,13. 1940.

Branchlets reddish, scaly, tinted glaucous. Needles mostly 4-5 per fascicle, sometimes three per fascicle, yellow-green, 15-23 cm long, usually 18 cm long; resin canals median, 2 or 3, sometimes four, whereas the type variety has septal resin ducts. Female cones ovoid, rounded at the base, whereas the type is flattened at the base, weak and light, scales more numerous.

Distribution: México, Chiapas, in Montanas de Zjala and in San Martín, Ocosingo, Chiapas. Also in Guatemala and Belize.

Pinus patula Scheide & Deppe var. *longepedunculata* Loock ex
Martínez "Oaxaca Weeping Pine"
Las Pinaceas Mexicanas, ed. 2 334, f. 276-280. 1948.

A tree 12-18 m tall with a very straight trunk. Bud 4.5 mm long, conical, dark brown, non resinous. Sheath 6.5-8 mm long, thin, dark brown. Needles to 17.5 cm long, more slender, sharply acute at the apex. Inner leaf structure markedly different than the type; resin ducts usually two, medial, sometimes three with one internal, hypoderm fairly uniform. Needles mostly four per fascicle, rarely five per fascicle. Female cones very persistent, on a peduncle 4 mm long, cone smaller and from 3.5-5.5 cm long by 2.1-2.4 cm wide, scales smaller, apophysis swollen with a prickly central umbo. Seeds with a nut 3.5 mm long by 1.6 mm wide and a light brown wing 9-11 mm long by 2.3 mm wide. Distribution: México, Oaxaca, at cool temperate altitudes. Noted from the mountains west and south of Rancho Benito Juárez, Teotitlan del Valle, Oaxaca, at 1900-2000 m.

Specimen examined: MÉXICO. Oaxaca: Vivero Rancho Teja, 2 km east of Ixtlan de Juárez, Departamento Ixtlan, 2195 m, *S.R. Hill 1815* (NY).

Pinus pinaster Ait. var. *mesogeensis* (Fiesch. & Gaussen) Silba,
stat. nov. "Moroccan Maritime Pine"
 BASIONYM: *Pinus mesogeensis* Fiesch. & Gaussen, Bull. Soc. Hist. Nat.
 Toulouse 64:440. 1932.

Leaves longer, 18-25 cm long, dark green. Female cones larger, to 20 cm long, scales twice as wide as they are high, apophysis pyramidal. Pollen grains larger.

Distribution: Western Mediterranean, Morocco.

Pinus ponderosa Douglas var. *stormiae* (Martínez) Silba,
stat. nov. "Longleaf Ponderosa Pine"
 BASIONYM: *Pinus arizonica* var. *stormiae* Martínez, *Las Pinaceas*
Mezicanos 295. f. 241-243. 1948.

Branchlets dark brown. Sheath 13-20 mm long, chestnut-brown. Needles very stiff, coarse, longer, 17-30 cm long and 1.5-2 mm wide, thicker than the type, in fascicles of 3-5. resin ducts fewer, usually 3-8, median; leaves dark green. Female cones larger, 8-14 cm long, on short thick peduncles 10 mm long, cone ovoid, persistent, curved, dark brown.

Specimen examined: MÉXICO. Nuevo León: Miquihuana, Cañon del Aseradera, *Martínez 3455* (NY).

Distribution: México, in eastern Coahuila, Arteaga, Las Margaritas, 1300-2300 m. and in Tamaulipas. Possibly also in Chisos Mountains, Texas, United States.

Pinus pseudostrobus Lindley var. *coatepecensis* Martínez "Coatepec Pine"
 An. Inst. Biol. Mex. 16:187, f. 155-157. 1945.

Branchlets brown-gray. Buds cylindrical-conic. Sheath 15 mm long. Needles five per fascicle, 20-23 cm long, flexible, dark green, with 2-3 median resin canals. Hypoderm uniform. Female cones ovoid, 5.5-8.5 cm long, dark brown, asymmetrical and oblique, on a peduncle 10-12 mm long; apophysis prominent with a decurved spine.

Distribution: México, Veracruz, Coatepec and near Xico.

Pinus pseudostrobus Lindley var. *estevii* Martínez

"Estev Pine"

Las Pinacaeas Mexicanos 196, f. 158-159. 1958.

A smaller tree, 10-20 m tall, with a dense broadly rounded crown. Trunk often limby, not smooth. Needles stiff, erect, non flexible, five per bundle, 20-30 cm long by 1 mm wide, whereas needles of the type are thinner and only 0.7 mm wide. Hypoderm of leaves irregular with many shallow penetrations into the chlorenchyma, resin canals three and medial. Female cone asymmetrical, 10-13 cm long by 7-8 cm wide, usually reflexed, scales smaller, only 12-15 mm wide, whereas the type has scales 15-18 mm wide, apophysis raised to subpyramidal, umbo raised with a persistent upcurved spine.

Distribution: México, southern Nuevo León, southeastern Coahuila and southwestern Tamaulipas, 800-1800 m.

Pinus pseudostrobus Lindley var. *laubenfelsii* Silba,

var. *nov.*

"Laubenfels Pine"

TYPE: MÉXICO. Sinaloa: mountains east of Mazatlan, *de Laubenfels 663* (HOLOTYPE: SYR; Isotype: NY). Paratype: MÉXICO. Sinaloa: mountains east of Mazatlan, *de Laubenfels 665* (SYR, NY).

Cortex in laminas divisus. Vaginae 2.7 cm longae. Folia pendula, 30.2-32.7 cm longa et 1.5 mm lata, crassiora, 5 in quoque fasciculo. Strobili feminei 7.5-12.7 cm longi, squamis basalibus ramulo affixis. Semina nigra, 7 mm longa, alis 2.8 cm longis.

Bark divided into plates. Sheath 2.7 cm long. Needles somewhat drooping, 30.2-32.7 cm long by 1.5 mm wide, stomata present. five needles per bundle. Male cones 4 cm long. Female cones 7.5-12.7 cm long, leaving a few basal scales behind after dehiscing. Seeds with a spotted black nut 7 mm long and a wing 2.8 cm long. Seedlings apparently without a grass like stage.

Pinus radiata D. Don var. *cedrosensis* Silba, *stat. nov.*

"Cedros Pine"

BASIONYM: *Pinus muricata* D. Don var. *cedrosensis* J.T. Howell, Leaflet W. Bot. 3:7. 1941. *Pinus radiata* var. *cedrosensis* (J.T. Howell) Axelrod, Univ. California Geol. Sci. Publ. 120:1-143. 1980 (*nom. illegit.*, basionym not fully cited).

Bark dark ash brown, divided into plates. Sheath chestnut-brown, 6.5 mm long. Needles dark green, two per bundle, 4.4-8.2 cm long. Female cones yellow-gray, ovoid-conic, 6-7 cm long by 2.6 cm wide, scales rounded or somewhat oblong to 2.5 cm long, apophysis smooth and slightly swollen, umbos inconspicuous.

Distribution: México, Baja California Norte, Cedros Island, northeast end, 275-300 m, 28° 20' N by 115° 14' W.

Pinus sibirica Du Tour var. *hingganensis* (Zhang) Silba,

stat. nov.

"Hinggan Pine"

BASIONYM: *Pinus hingganensis* Zhang, Bull. Bot. Res. North-East For. Inst. 5(1):151. f. 1985.

A tree to 20 m tall. Bark gray-brown, fissured. Branchlets yellow-brown, densely pubescent. Buds brown, conical, apex acute. Sheath not persistent. Needles five per bundle, 8-10 cm long by 1-1.2 mm wide, relatively thin, margins finely serrulate, resin canals fewer, only two and median. Female cones ovoid-conical, 5-8 cm long by 3-4.5 cm in diameter; apophysis blackish purple, rhombic or deltoid semi-globose. Seed obovate, 8-10 mm long by 5-8 mm wide.

Distribution: China, Nei Monggol, Angelin, 1300 m, 120° 53' E by 51° 22' N and in Heilongjiang at 122° 20' E by 52° 25' N at 840 m altitude.

Pinus strobiformis Engelmann var. *carvajalii* Silba, *var.*

nov.

"Carvajal White Pine"

TYPE: MÉXICO. Jalisco: Sierra del Cuale, *Lamas R. 49* (HOLOTYPE: MÉXU). Paratypes: MÉXICO. Jalisco: Sierra del Cuale, en La Mina, mun. el Tuito, 2350 m, *Carvajal 4703* (CREG); Jalisco: Cerro San Juan, *Carvajal 4651* (CREG).

Pinus novo-galiciana Carvajal, *Phytologia* 59(2):131, f. 2, a-e. 1986
(*nomen nudum*, without Latin description).

Arbor ad 25 m alta. Ramuli ascendentes. Vaginae caducae. Folia 5 in quoque fasciculo, 18-23 cm longa; canalis resiniferi 2, medii; hypodermis tenuis. Strobili feminei 36-59 cm longi et 4.8-5.6 cm lati, squamis fragilibus et tenuiora. Cotyledones 15-17.

A tree to 25 m tall with ascending branches. Sheath straw colored, quickly deciduous. Needles five per bundle, 18-23 cm long; resin canals two, mediar; hypoderm thin and uniform. Female cones subcylindrical with an attenuate apex, 36-59 cm long by 4.8-5.6 cm wide, on a peduncle 18-33 mm long, scales fragile and strongly reflexed, apophysis rather thin. Seeds ovoid. 12-15 mm long. Cotyledons 15-17.

Pinus strobiformis* Engelmann var. *potosiensis* Silba,var. nov.*

"Cerro Potosí White Pine"

TYPE: MÉXICO. Nuevo León: Sierra Madre Oriental, ascent of Sierra Potosí, northeast of Galeana, 3200 m, *C.H. Mueller & M.T. Mueller 1244* (HOLOTYPE: NY).

Pinus reflexa auct. non Engelmann, Rushforth, *Conifers* 164. 1987.

Arbor ad 20 m alta, habitu columnari vel pyramidali. Cortex glaber, glauco-cinereus in laminas divisus. Gemmae parvae, ovatae. Folia 5 in fasciculo, flexilia, tenuiora, glauco-viridia, 6-11 cm longa, solum in inferiori latere stomatifera. Strobili feminei 13-23 cm longi, squamis patulis, apophysi longiori. Semina atro-brunnea, 1.5-2 cm longa, alis 2 mm longis.

A tree to 20 m tall, with a columnar conical crown. Bark thin, scaly, shallowly furrowed into square plates on old trees or smooth and bluish gray on young trees. Buds cylindrical, small, resinous, light brown. Needles slender, flexible, glaucous green. 6-11 cm long, stomata only on the two inner faces. margins finely serrulate. Female cones bright green becoming yellow-brown, 13-23 cm long; scales usually spreading or somewhat reflexed with an elongated apophysis, but occasionally adpressed with apophysis rounded on the same tree, thick. Seed dark brown or black, 1.5-2 cm long by 8-10 mm wide, wing to 2 mm long.

The name *Pinus reflexa* Engelmann (Bot. Gaz. 7:4. 1882) cannot be applied here as the type is from the Santa Rita Mountains of Arizona (United States).

Distribution: This variety is native to the Sierra Potosí in Nuevo León, México. It may be native in nearby localities also, though this is not fully understood at the present time.

***Pinus sylvestris* L. var. *sibirica* Ledebour**

"Siberian Scotch Pine"

Fl. Altaica 5:15. 1833.

Pinus sylvestris var. *syvestriiformis* (Taken.) Cheng & Fu, Fl. Reip. Pop. Sin., tom. 7:246-247. 1978.

A tree 25-30 m tall, longevity to 400 years or more. Bark thick and dark. Needles green to dark green, becoming chlorotic or golden-yellow in the winter, 4.3-6.2 cm long, persist for five years. 8-10 resin ducts per leaf. Female cones 2.5-4.5 cm long by 3-4.5 cm wide.

Distribution: Asian part of the U.S.S.R. between 52° and 62° N, central Russia to the East Coast, 800-1600 m.

This variety was recognized by Pravdin (1969) as one of the five infraspecific main groups of *Pinus sylvestris*, though it is closer to the typical variety than the others.

Pinus tabulaeformis Carrière var. *pygmaea* (Hsueh) Silba,
stat. nov. "Scrub Chinese Pine"
 BASIONYM: *Pinus densata* var. *pygmaea* Hsueh, Acta Phytotax. Sin.
 13(4):85. 1975.

A multi-stemmed shrub. Needles 2-3 per bundle, rigid, 7-13 cm long. Female cones dehiscent, serotinous scales.

Distribution: China, Yunnan, at 2200-2800 m and in Szechuan at 3000-3250 m.

Pinus tecunumanii (Schwerstf.) Eguluz & Perry "Tecunuman Pine"
 Ciencia Forestal-Rev. Inst. Nac. Invest. Forestales 8(41):4, f. 1-8. 1983.
 TYPE: GUATEMALA. Depto. Baja Verapaz: mun. de San Jerónimo,
 1780 m, 90° 15' W, 15° 04' N, T. Eguluz 3786-2 (HOLOTYPE: A!;
 Isotype: F!).

A straight upright tree 30-50 m tall and 40-80 cm in diameter. Lower branches on trunk deciduous. Bark fissured, red-orange, divided into many thin plates. Branches horizontal, forming a conical or rounded crown. Seasonal branchlets glaucous then red-brown. Buds ovoid-cylindrical, 1-2 cm long by 5-8 mm wide, rather resinous. Sheath persistent, 13-23 mm long. Foliage pointing forward, densely set on erect branchlets. Needles mostly four per bundle, rarely three or five per bundle, 14-21 cm long by 0.5-0.8 mm wide, flexible, twisted, margins finely serrulate, hypoderm uniform; resin ducts median, 2-5; stomata in 4-6 lines on dorsal side and in 2-4 lines on the ventral surfaces. Female cones non serotinous, on long peduncles, cylindrical-oblong, 5-6 cm long by 2.5-3.5 cm wide, peduncle 1-2 cm long; apophysis subpyramidal, 7-11.5 mm long by 5.5-9 mm wide; umbos mucronate and depressed. Seeds dark, 4.5-6.7 mm long by 2.2-3.5 mm wide with brown wings 8-12.5 mm long by 4-6.3 mm wide. Cotyledons 4-7, hypocotyl 2-5 cm long.

Distribution: South-central Guatemala, northwest El Salvador near El Aguacatal and Metapan, and southwest Honduras near Nueva Ocotepeque, 1500-2550 m altitude.

Pinus teocote Schiede & Deppe var. *herrerae* (Martínez) Silba,
stat. nov. "Herrera Pine"
 BASIONYM: *Pinus herrerae* Martínez, An. Inst. Biol. Mex. 11(1):76.
 1940.

Branchlets red-brown. Buds cylindrical, with little or no resin. Needles longer, three per fascicle, soft, very slender, flexible, 11-20 cm long; resin canals 1-4, internal or occasionally one septal. Female cones smaller, 2.5-4.5 cm long, long ovate; scales smaller and numerous, less rigid, 10-12 mm long

by 6-7 mm wide, apex rounded. Seeds blackish, nut 4 mm long, wing oblique, to 8 mm long.

Distribution: México, in Sinaloa and in Cerro de Llalo, Tecalitlan, Jalisco to Guerrero, subtropical regions, to 3500 m. An important resin producer in its native habitat.

Specimen examined: MÉXICO. Michoacán: Cerca de Dos Aguas, mun. de Aguilla, 2300 m, Nuñez, *et al.* 8144 (NY).

***Pinus torreyana* Parry var. *insularis* (Haller) Silba,**

stat. nov.

"Santa Rosa Torrey Pine"

BASIONYM: *Pinus torreyana* subsp. *insularis* Haller, Syst. Bot. 11(1):45.

1986. TYPE: UNITED STATES. California: Santa Barbara County, Santa Rosa Island, Haller 10448 (Isotypes: NY,US!).

A tree 10-15 m tall, mature trees with a broad crown wider than tall. Needles strongly glaucous, grayish blue-green. Female cones often more than 13.5 cm wide, notably wider than long. Umbo of female cone scale mostly over 6 mm long. Seeds 11-14 mm wide, brown to nearly black.

***Pinus wangii* Hu & Cheng var. *kwangtungensis* (Chun ex Tsiang) Silba**

stat. nov.

"Kwangtung White Pine"

BASIONYM: *Pinus kwangtungensis* Chun & Tsiang, Sunyatsenia 7:111. 1948.

A tree to 30 m tall. Branchlets glabrous, olive-brown then gray-brown. Buds cylindrical, conic at the apex; scales free at the apices, 2-4 mm long, resinous. Sheath 7 mm long by 2 mm wide, soon deciduous. Needles pointing forward on the branchlet, twisted, stout, distinctly flattened, retained for three years or more. 4-8 cm long by 1-1.5 mm wide, shiny mid-green or yellow-green, stomata absent above, inner faces whitish or bluish with fewer stomatal lines (only 4-5), whereas the type has 5-7 stomatal lines, margins regularly and sharply serrulate, apex bluntly acute. Female cone cylindrical-conic, obtuse at both ends, 4-9 cm long by 3 cm wide, on a peduncle 1.5-2 cm long. Seeds 8-12 mm long, wings short and fat.

Distribution: China, Hunan, Guizhou, Guangxi and Guangdong, 700-1600 m.

***Podocarpus aracensis* de Laubenfels & Silba**

Araca

"Acaca Podoberry"

Phytologia 65(5):330. 1988. TYPE: BRAZIL. Terr. Amazonas: margins of Rio Aracá, Rosa & Lira 2317 (HOLOTYPE: MG; Isotype: NY!). Paratype: BRAZIL. Terr. Amazonas: plateau of north massif of Serra Aracá, along stream margin, 1200 m, 00° 51-57' N, 63° 21-22' W, Prance, *et al.* 29121 (MG,NY) (sterile, probably juvenile).

A shrub or tree 4-6 m tall, with a trunk 10-20 cm in diameter or more. Buds erect, scales elongated and 4-9 mm long by 0.5 mm wide, free at the apex. Foliage densely arranged. Leaves linear, narrow, 2.8-8 cm long by 4.5-7 mm wide, midrib a sunken groove, margins recurved, apex bluntly acute, narrowed at the base to a petiole 2-3 mm long. Male cone on a scaly peduncle 9 mm long, bracts to 2 mm long and acute; pollen cone oblong-cylindric, 17-20 mm long by 2-2.5 mm wide, solitary or in small groups. Female cones not seen.

Possibly in southern Venezuela, Amazonas Terr., Dept. Atures, Cerro Yavi, headwaters of Paracito River, eastern tributary, Mona Piari River, 5° 43' N, 65° 52' W, *0. Huber 11873* (MO) seems close to this species.

Podocarpus aristulatus Parl.

This species is close to *Podocarpus angustifolius* Griseb., but differs in its shorter, wider leaves. Leaves only 3.5-4 cm long by 5-7 mm wide, narrowed at the base and widened at the apex, apex of leaves with a long sharp spine 1-2 mm long. Pollen grains smaller than in *P. angustifolius*.

Podocarpus barretoii de Laubenfels & Silba, *spec.*

nov.

"Barreto Podoberry"

TYPE: BRAZIL. Mun. Santa Luzia: Cerro do Cipó, km 127 Alto do Palacio, margins of streams, 3-9-1933, collected for Jardim Botânico de Belo Horizonte, *Mello Barreto 8878* (HOLOTYPE: BNMH; Isotype: F). Paratype: BRAZIL. Estado de Goiás: Chapada dos Veadeiros, *Irwin, et al. 9345* (NY,UB,Inst. Pesq. Exper. Agric. do Norte).

Arbor parva, ad 8 m alta. Gemmae parvae, squamis erecti. Folia linearia vel lineari-elliptica, 2.8-5.2 cm longa et 6-8 mm lata, costa supra elevata et canaliculata, apice subacuta vel obtusa et expansa, basi angusta. Strobili masculi et feminei ignoti.

A small tree to 8 m tall. Buds small, scales erect. Leaves linear, 2.8-5.2 cm long by 6-8 mm wide, leaf relatively flat with no noticeable midrib or groove above, narrowly blunt, tapered at both ends, apex bluntly acute to slightly acuminate, petiole 2-3 mm long.

In *Podocarpus barretoii* the leaf is slightly grooved along the midrib only near the base, whereas *Podocarpus brasiliensis* has a more prominent groove throughout the length of the midrib. This species has a more blunt leaf than *P. brasiliensis* de Laubenfels has.

Buchholz & Gray (1948) had referred this specimen to *Podocarpus sellowii* var. *angustifolius* Pilger. However, the type specimen (*Glaziou 8957* [K,P!]) of Pilger's variety has acute leaves typical of *P. sellowii* and is here regarded as a synonym of that species.

The following specimens probably belong to *Podocarpus barretoii* as they also have a blunt leaf and come from the same general area as *M. Barreto 8878*. BRAZIL. Estado de Goiás: 3 km east of Alto Paraiso, 1350 m, *W.R. Anderson 6602* (NY); Planalto do Brasil, Chapada dos Veadeiros, 20 km north of Alto do Paraiso, 1250 m, a tree 5 m tall by 12 cm girth, *Irwin, et al. 32840* (NY); Chapada dos Veadeiros, 1000 m, 14° S, 47° W, a tree 4 m tall by 8 cm in girth, specimen with a short and fat male pollen cone 11.5 mm long by 3.5-4 mm wide, *Irwin, et al. 12432* (NY).

***Podocarpus buchholzii* de Laubenfels var. *neblinensis* Silba,**

var. nov.

"Neblina Podoberry"

TYPE: VENEZUELA. Cerro de la Neblina, Río Yatua, Upper Cañon Grande. 1200-2200 m, *Maguire, Wurdack & Maguire 42336* (HOLOTYPE: NY; Isotypes: MG,US). Paratypes: BRAZIL. Río Negro, Río Cauaburi, Serra de Neblina, 2200 m, *Maguire, Pires & Maguire 60529* (NY,US); VENEZUELA. Cerro de la Neblina, northeast of Pico Phelps, 00° 50' 12" N, 65° 58' 50" W, 2100 m, *M. Nee 30623* (NY).

Folia longiora et latiora, ad 3.4 cm longa et 8 mm lata, apice latiora. Strobili masculi longiores, ad 2 cm longi. Strobili feminei longius pedunculati, pedunculo ad 1.9 cm longo.

Leaves longer and broader, 3.4-4.2 cm long by 8 mm wide, apex broadened. Male strobili to 2 cm long. Female cone on a peduncle 1.9 cm long.

Podocarpus celatus de Laubenfels

"Moro Podoberry"

Range extension: PERÚ: low elevation Amazon, between Iquitos and Santa Maria de Nanay Mishana, Río Nanay, 03° 50' S by 73° 30' W, 140 m altitude, *Gentry, et al. 36453j* (MO).

Podocarpus chinensis (Roxburgh) Wallich var. *wardii* de Laubenfels & Silba

"Ward Podoberry"

Phytologia 65(5):331. 1988. TYPE: BURMA. Namai Hka Valley, riverbed near high water mark, 160 m altitude, *F. Kingdon-Ward 00521* (HOLOTYPE: BM!; Isotypes: A,NY!).

A small, stout tree. Buds ovoid; scales erect, triangular, 3-5 mm long. Foliage densely arranged. Leaves linear-oblong, narrow, 5.5-11.7 cm long by 3.8-5 mm wide; new growth slightly glaucous below; midrib a distinct raised ridge above, thicker and channeled below; margins revolute, narrowed at the base to a petiole 2.5 mm long. Male pollen cones with distinctly enlarged round bracts at the base of the pollen cone 5 mm long by 3-4 mm wide, apex

of bracts bluntly acute or obtusish. Pollen cone axillary, solitary, 1.4-1.8 cm long by 2-2.5 mm wide or more. Female cones not seen.

Podocarpus chinensis var. *wardii* is closely related to var. *chinensis*, but differs markedly in the pollen cones having distinctly enlarged basal bracts. In typical var. *chinensis*, the pollen cone has much reduced basal bracts.

Podocarpus costaricensis de Laubenfels "San Marcos Podoberry"

→ Costa Rican Nat. Hist. Mus. Publ. 139. 1989. TYPE: COSTA RICA. south of San José, vicinity of San Marcos, 2 km west of Cementario de San Pablo de León Cortes, 1600 m, 09° 40' 50" N, 84° 30' 10" W, Jiménez, de Laubenfels & Chacón 597 (HOLOTYPE: CR!; Isotypes: L,NY!). Paratype: COSTA RICA. Cartago Province: San Marcos de Irazú, 1450 m, Holdridge 6826 (CR).

A large tree 10-15 m tall with a d.b.h. to 35 cm. Bark white-reddish, finely divided into small squares as in *Cupressus lusitanica*, inner bark pinkish. Buds erect, non globular, scales lanceolate. Branches somewhat pendulous. Foliage pointing downward and forward. new growth glaucous below. Leaves linear, 9.3-11.7 cm long by 1.3-1.7 cm wide, tapering to an elongated acuminate apex 5-7 mm long, midrib a sunken groove, petiole 3-5.5 mm long. Male strobili solitary or in groups of 2-3, robust, purplish, 2.4-3.5 cm long by 2-2.5 mm wide, basal bracts 2.5-3 mm long. Male cones prolliferic on tree, but soon fall to the ground. Female not seen, though reported large with a red receptacle.

This species is a middle elevation species, unlike other Costa Rican Podocarpaceae. In bud characteristics it resembles *Podocarpus steyermarkii* or *P. magnifolius*, though not at all in leaf shape.

Also in Panamá. Province Darien, 08° 04.5' N, 77° 14' W, 1300-1400 m, Cuadros, et al. 3963 (MO), as determined by D.J. de Laubenfels (pers. comm. 1989).

Podocarpus epiphyticus de Laubenfels & Silba "Epiphytic Podoberry"

Phytologia 64(4):291. 1988. TYPE: BURMA. Kachin State: Sumprabum sub-division, eastern approaches from Sumprabum to Kumaon Range, Kanang to Mapi-Zup, western slopes, scattered, 1829-2591 m, J. Keenan, et al. 3081 (HOLOTYPE: E!; Isotypes: A,K!).

An epiphytic shrub. Leaves linear-elliptic, 11.3-13.3 cm long by 2.2-2.3 cm wide, narrowed gradually to a bluntly acuminate apex, midrib a distinct broad raised ridge above, base gradually narrowed to a petiole 5-6 mm long. Female cones on a peduncle 9-20 mm long, receptacle 6.5-7 mm long with two bracts, foliola 2-2.5 mm long. Seed globular, 8 mm long by 6-7 mm wide.

Podocarpus indonesiensis de Laubenfels & Silba "Celebes Podoberry"

Phytologia 64(4):292. 1988. TYPE: INDONESIA. Celebes: Massimbo-long, Lati-Madjong, 2700 m, moss forest, Eyma 1034 (HOLOTYPE: L!;

Isotype: BO!). Paratypes: INDONESIA. Celebes: between Kambuno and Tamadu, Masamba, *Eyma 1406* (BO,L); Ambon: Salahutu Bivouac III, around summit, 1000 m, *Eyma 3078* (BO,L).

A tree to 1.5 m or more tall. Buds relatively short, 3 mm long by 5 mm wide acute triangular scales, apex spreading or somewhat recurved. Leaves elliptical, 3.3-5.2 cm long by 5-8 mm wide; midrib a raised ridge above, somewhat broader below; leaves sometimes with continuous upper hypoderm, margins wavy, apex bluntly acute to obtuse, base narrowed to a petiole 3-4 mm long. Male pollen cones solitary, 2 cm long by 4 mm wide.

This species is mostly distributed in the Celebes at 2550-3000 m, and from one locality to the south on Ambon.

Podocarpus magnifolius Buchholz & Gray

"Larecaju Podoberry"

Range extension: PANAMÁ. Coclé Prov: La Mesa, 2 km west of Cerro Pilón, 860 m, *Sullivan 501* (MO); Prov. de Panamá: Cerro Jefe, *Luis Carrasquilla 2182* (MO). COLOMBIA/PANAMÁ border. south peak of Cerro Pirre Massif, 1300-1520 m, *Gentry, et al. 28703* (MO).

Podocarpus matudae Lundell var. *matudae*

Phytologia 1:212. 1937.

The type variety was described from Chiapas, México, but also occurs in Guatemala and El Salvador at 1300-2774 m altitude. McVaugh (1966) noted differences in leaf anatomy of sclereids between the type locality, western and eastern highland populations. Rightly, the species can be split on leaf anatomy into three varieties which are here proposed. The variety *matudae* has only auxiliary sclereids and a somewhat falcate leaf. The leaves are short and broad and unusually oval in var. *matudae*.

Podocarpus matudae Lundell var. *jaliscanus*

) de

Laubenfels & Silba, var. nov.

"Jalisco Podoberry"

TYPE: MÉXICO. Jalisco: Puerto de las Tablas, 40 km southeast of Ciudad Guzman, 1900 m. *Little 17855* (HOLOTYPE: US; Isotype: K). Paratypes: MÉXICO. Jalisco: 3-10 km east on road to Mina del Cuale, from junction 5 km northwest of El Tuito, mun. Cabo Corrientes, 850-1150 m, *McVaugh 26417* (MICH); between Cuale and La Mesa, mun. Talpa, 1800 m. *González 907* (MICH).

Folia augustora et longiora quam in var. *matudae*, falcata. Strobili masculi latiores. 3.7 cm longi et 5 mm lati, pedunculo 1.8 mm longo, microsporophyllae apice elongatae. Strobili feminei longiores pedunculo 1.6 cm usque longo.

The material from Jalisco differs in the longer and narrower leaves to 20 cm long, and in sclereids and hypoderm. The male cone is rather fat, 3.7 cm long by 5 mm wide on a peduncle 1.8 mm long, with longer sterile apices on the microsporophylls. The female cone peduncle is rather long to 1.6 cm long.

Podocarpus matudae Lundell var. **reichei** (Buchholz & Gray) de Laubenfels & Silba, *stat. nov.* "Reiche Podoberry"

BASIONYM: *Podocarpus reichei* Buchholz & Gray, J. Arnold Arbor. 29:132. 1948.

This taxon has longer leaves with only upper vascular sclereids. The female receptacle is red. The type specimen of Buchholz & Gray's species was from Puebla, though the variety also occurs in Veracruz and Tamaulipas at 1450-1510 m. *Rzedowski 23426* (F,MICH,US) from Estado Hidalgo, 9 km west of Huauchinango, 2050 m probably belongs here.

Podocarpus oleifolius D. Don var. **equadorensis** Silba, *var. nov.* "Equadoran Podoberry"

TYPE: ECUADOR. Province Loja: *Dorr 6570* (HOLOTYPE: NY). Paratype: ECUADOR. Prince Loja: 18 km south of Yangana, 79° 8' W, 4° 30' S, 2400 m, *J. Brandbyge 42323* (NY,AAU).

Folia parva, 2.5-3 cm longa et 5.5-6 mm lata, linearia. Strobili masculi 14-17 mm longi et 6.5-7.5 mm lati, in pedunculo lateralo ad 3-7 mm longo, microsporophyllae apice elongatae.

Leaves linear, smaller than the type variety, 2.5-3 cm long or more by 5.5-6 mm wide, ovate. Male strobili on a peduncle 3-7 mm long, pollen cone short and fat, 14-17 mm long by 6.5-7.5 mm wide and with a fairly large apex to the microsporophylls. In contrast, *Podocarpus oleifolius* Don var. *oleifolius* has the apex of the microsporophylls usually smaller than the pollen sacs.

Podocarpus palawanensis de Laubenfels & Silba "Palawan Podoberry"
Phytologia 64(4):291. 1988. TYPE: PHILIPPINES. Palawan: Pagdanan Range, Ibangley Brookside Hill. 40 m altitude, closed broad leaved rain-forest, *Ridsdale SMHI 1502* (HOLOTYPE: L!).

A tree to 7 m tall. Buds globular, 4-6 mm long by 4-5 mm wide, exterior scales spreading triangular. Leaves linear, lanceolate, 10.5-18.4 cm long by 0.8-1.1 cm wide, tapered at both the base and the apex; midrib raised above, sharp and narrow; apex narrowed and acute, petiole 5-7 mm long, leaves relatively thick. Male cones on a peduncle, male strobili relatively fat, 3.5-4.5 cm long by 6.5-8 mm wide, apices of microsporophylls lanceolate and 4 mm long. Female not seen.

Podocarpus polystachyus R. Brown var. *thevetiifolius* (Blume) Silba.
stat. nov. "Blume Podoberry"

BASIONYM: *Podocarpus thevetifolius* Blume, Rumphia 3:213. 1847.

Male cones smaller. Female cones with an orange receptacle.

Distribution: New Guinea, low elevations mainly near the coast.

Pseudotsuga menziesii (Mirbel) Franco var. *caesia* (Schwer.)

Franco

"Fraser River Douglas Fir"

Bol. Soc. Brot. (Coimbra), ser. 2 24:77. 1950.

A tree 30-45 m tall. Bark smoother and grayer than *Pseudotsuga menziesii* var. *glauca*. Leaves gray-green to blackish green, less parted, 1.7-3 cm long by 1.5 mm wide. fewer stomatal lines below, mostly 4-7 stomatal lines, whereas the type variety has 5-8 stomatal lines. Female cones rather small, to 5 cm long by 2.5 cm wide, with erect bracts on the scales.

Distribution: Interior British Columbia, near Shuswap Lake in Alberta. at Lake Beauvert in Jasper Park. Also at Lake Wenatchee, Washington, to 609 m altitude and on Mount Ascension near Helena, Montana. This is a northwest variety of the species.

Pseudotsuga menziesii (Mirbel) Franco var. *flahaultii* (Flous) Silba, *stat. nov.* "Arizona Douglas Fir"

BASIONYM: *Pseudotsuga flahaultii* Flous, Bull. Soc. Hist. Nat. Toulouse 66:1. 1934-f. TYPE: UNITED STATES. New Mexico: White Mountains, 2134 m, *Wooton 653* (Isotype: NY!).

Bark dark gray, divided into plates. Branchlets glaucous brown, finely pubescent. Leaves 1.7-2.7 cm long, glaucous green. Female cone rather broad with huge rounded scales.

Distribution: This taxon is restricted to southern Arizona, southern New Mexico and southwest Texas and virtually absent from México and is chiefly distinguished by its huge rounded cone scales. In Chisos Mts., Texas near Boot Creek, *Cory 30334* (A).

I have seen only one specimen from extreme northern México: extreme northwest Chihuahua, first canyon south of Diablo Canyon, east side of "San Luis" Range, 1981 m, *Tucker 2595* (A), and this appears to be similar to the type collection.

Pseudotsuga gumieri Flous

"Mexican Douglas Fir"

Bull. Soc. Hist. Nat. Toulouse 66:211-218. map, 1934-b. TYPE: MÉXICO. Chihuahua: *Lamic s.n.* (HOLOTYPE: P!).

Pseudotsuga macrolepis Flous, l.c. 224. 1934. TYPE: MÉXICO. near Moran. *Hartweg 439* (Isotype: NY!).

This taxon differs markedly in its densely arranged upturned leaves that point forward and are only 13-17 mm long. Female cones ovoid-cylindric, 5.3-9 cm long, bracts thinner and slightly more transparent as compared with *Pseudotsuga menziesii*.

Distribution: This taxon has been much misunderstood, the only names published and applicable being the two listed above. Other names published by Flous (1936) were based on types from Arizona and New Mexico and are not applicable to *Pseudotsuga guinieri*. The species is restricted to north and central México, 2500-3139 m altitude or more.

Specimens examined: MÉXICO. Zacatecas: southeast of Chalchihuite, 23° 24' 30" N, 103° 45' W, *Diggs & Nee 3016* (NY); Hidalgo: Sierra de Pachuca, ridge ca 5 km northeast of Pachuca, 2900 m, *Beaman 2767* (GH).

The only probable collection from the United States is from Texas: Guadalupe Mountains, Culberson County, moist slopes of ridge above McKittrick Canyon, 2200 m, *Moore & Steyermark 3471* (A).

Pseudotsuga sinensis Dode var. *sinensis*

"Chinese Douglas Fir"

Pseudotsuga shaanziensis Qu, Wang & Lui, Acta Bot. Bor.-Occ. Sin. 8(2):129, 1988. TYPE: CHINA. Shaanxi: Zhenping County, 1100 m.

Pseudotsuga richangensis Kuan & Zhou, Fl. Sichuanica, Tom. 2, Gymnosp. 54, f. 1983. TYPE: CHINA. Szechuan.

The typical variety has a broken distribution with remnant populations from Szechuan eastwards and in Taiwan.

Pseudotsuga sinensis Dode var. *brevifolia* (Cheng & Fu)

Farjon & Silba. *stat. nov.*

"Guangxi Douglas Fir"

BASIONYM: *Pseudotsuga brevifolia* Cheng & Fu, Acta Phytotax. Sin. 13(4):83, f. 16. 1975.

Leaves shorter and broader. 0.7-1.5 cm long by 2-3.2 mm wide, apex bluntly notched. Female cones 3.7-6.5 cm long by 3-4 cm wide, scales rhomboid, bracts relatively short.

Distribution: China, Guangxi, Longzhou, near Vietnam border, 1250 m altitude.

Pseudotsuga sinensis Dode var. *gaussenii* (Flous) Silba.

stat. nov.

"Chekiang Douglas Fir"

BASIONYM: *Pseudotsuga gaussenii* Flous, Bull. Soc. Hist. Nat. Toulouse 69:417, f. 1-11. 1936.

Cone scales very distinct, rather broad, elongated sideways, appearing somewhat triangular, 3.5 cm wide by 2 cm long, with spreading flanges, bracts relatively short.

Distribution: China, southern Anhui and west Chekiang, 600-1500 m.

***Pseudotsuga sinensis* Dode var. *forrestii* (Craib) Silba,**

stat. nov.

"Forrest Douglas Fir"

BASIONYM: *Pseudotsuga forrestii* Craib, Notes Roy. Bot. Gard. Edinburgh 11:189, f. 160. 1919.

Differs in its huge leaves to 5.5 cm long or longer, more pectinately arranged. Female cones with nearly orbicular scales. Bracts rather huge, bracts reflexed but straight downward and nearly twice as long as the type.

Distribution: China, southeast Tibet and northwest Yunnan, 800-2800 m.

Specimens examined: CHINA. Yunnan: Mts. of Londjre, Mekong-Salween watershed adjoining southeastern Tibet, *Rock 10260* (GH); Dokerla, 28° 15' N, 3000-3100 m, *Handd-Mazzetti 8058* (P).

***Torreya grandis* Fortune var. *yunnanensis* (Cheng & Fu) Silba,**

stat. nov.

"Yunnan Torreya"

BASIONYM: *Torreya yunnanensis* Cheng & Fu, Acta Phytotax. Sin. 13(4):87, f. 55. 1975.

Buds 3 mm long, rather large. Leaves very broad, 2-3.6 cm long by 3-4 mm wide, deeply grooved above, somewhat falcate, apex incurved. Female cones apiculate globose, less ruminated than *Torreya grandis* var. *fargesii*, broadened at the apex, to 2 cm long.

Distribution: China, northwest Yunnan, Salouen Valley, 2000-3400 m.

Specimen examined: CHINA. Yunnan: Mekong-Salwin divide, 2134-2438 m, 27° 54' N by 98° 50' E, *Forrest 19558* (E).

***Tsuga chinensis* Pritzell var. *forrestii* (Downie) Silba,**

stat. nov.

"Forrest Hemlock"

BASIONYM: *Tsuga forrestii* Downie, Notes Roy. Bot. Gard. Edinburgh 14:18, f. 194(7). 1923.

A tree to 30 m tall, with a broadly conical crown. Branchlets red-brown, with some pubescence. Leaves elongated, more acute and narrower than the type, 1.5-2.5 cm long by 2 mm wide, white below, margins wider, somewhat square notched at the apex. Female cones 2-4 cm long by 1.5-3 cm wide, more cylindrical; bract of female cone scale narrower and ovate, whereas the typical variety has a bract that is broad and nearly spatulate, cones are yellow-brown in color.

Distribution: China, northern Yunnan, Likiang Snow Range and Zhongdian County in northwest Yunnan and in the Muli Kingdom of southwest Szechuan, 2000-3000 m.

Tsuga chinensis Pritzell var. *oblongisquamata* Cheng &

Fu

"Oblong-scaled Hemlock"

Acta Phytotax. Sin. 13(4):83, pl. 18, f. 16-20. 1975. *Tsuga oblongisquamata* (Cheng & Fu) Cheng & Fu, Scient. Silv. Sin. 17(4):453. 1981.TYPE: CHINA. Hupeh: Patung Hsien, *H.C. Chow 950* (Isotype: A!).Paratype: CHINA. Szechuan: near Wenchuan, *Cheng 3347* (A).

Leaves shorter and wider than the type variety, obtuse, more bluntly notched at the apex. Female cone scales distinctly oblong and longer than broad, exposed part of scale is also longer, bracts more cuspidate and pyramidal.

Distribution: China, Szechuan and west Hubei, 2600-3200 m altitude, also reported in Kansu.

Tsuga chinensis Pritzell var. *robusta* Cheng &

Fu

"Big-cone Chinese Hemlock"

Acta Phytotax. Sin. 13(4):83, f. 18, 11-15. 1975.

Leaves more glaucous below, somewhat shorter and broader. Female cone larger, oblong-cylindric, base rounded; scales thick, orbicular with a larger obdeltoid bract.

Distribution: China, north-east Hubei, to 1830 m altitude.

Tsuga dumosa (Don) Eichler var. *yunnanensis* (Franchet) Silba,*stat. nov.*

"Yunnan Hemlock"

BASIONYM: *Abies yunnanensis* Franchet, J. Bot. (Morot) 13:258. 1899.*Tsuga yunnanensis* (Franchet) Pritzell, Bot. Jahrb. Syst. 29:219. 1901.TYPE: CHINA. Yunnan: Yang-ing Chan, 2800 m, *Delavay s.n.* (HOLOTYPE: P!).

A small tree 9-40 m tall. Buds larger, 3-3.5 mm long by 2.7 mm wide. Leaves shorter and less pointed than the type, 1-2 cm long, with 2 broad vivid chalk white stomatal bands below, in 10 lines, margins serrulate. Female cones ovoid, shorter than the type, 1-2 cm long, scales recurved at the apex.

Specimen examined: CHINA. Szechuan: Ning-yuan-fu, Lo-tieh Shan, 2900-3500 m, *Schneider 3974* (E).

Widdringtonia nodiflora (L.) Powrie var. *nodiflora* "Scrub Widdringtonia"

J. S. African Bot. 38(4):301-304. 1972.

Widdringtonia cupressoides (L.) Endlicher, *A Synopsis of the Coniferae* 32. 1847.

Widdringtonia stipitata Stapf in Hooker, Ic. Pl. 32:3126. 1930. TYPE: SOUTH AFRICA. Transvaal: Zoutpansberg.

The typical variety is often a shrub or rather small tree, reportedly monoecious. The juvenile leaves are 1.5 cm long on seedlings. Female cones are globular and only 1-1.8 cm long with 20-30 seeds per cone. The seeds are *Cupressus* like, round with very short wings to 1.5 mm broad.

It is restricted to the Transvaal and Natal in South Africa.

Widdringtonia nodiflora (L.) Powrie var. **dracomontana** (Stapf) Silba, *stat. nov.* "Drakensberg Widdringtonia"

BASIONYM: *Widdringtonia dracomontana* Stapf, Kew Bull. 206. 1916.

A small tree to 3 m tall. Leaves bluntly acute. Female cones with rough rigid scales that are bumpy, cone only has 12-14 seeds. Seeds have a short wing 2-3 mm broad, unequal on both sides of the nut.

Distribution: South Africa. Natal. Drakensberg Mountains, at Bushman's River between Catkin Mountain and Mont aux Sources, to 2000 m.

Widdringtonia nodiflora (L.) Powrie var. **whytei** (Rendle) Silba, *stat. nov.* "Mlanje Widdringtonia"

BASIONYM: *Widdringtonia whytei* Rendle, Trans. Linn. Soc. London, Bot., ser. 2 4:60. 1894.

A huge tree to 43 m tall, with finer branchlets. Juvenile leaves on seedlings to 2.5 cm long by 2 mm wide, apparently the juvenile stage is much shorter than in the type. Female cones larger, 1.5-3 cm long by 1.2-1.5 cm wide, scales sometimes elongated and narrow, as in *Callitris*. Cones 20-30 seeded. Seeds are blackish with a long wing to 5 mm or more, which projects backward from the nut as in *Calocedrus*.

Distribution: This variety is restricted to the north of the type and on Luchena Plateau on Mount Mlanje.

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