

THE GENUS ILEX IN CHINA, III

SHIU-YING HU

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SERIES 4. HOOKERIANAE, SER. NOV.

Arbor vel frutex; foliis chartaceis vel subcoriaceis, brunneis vel raro brunneo-olivaceis, nervis supra impressis; inflorescentiis fasciculatis, pseudopaniculatis vel pseudoracemosis; floribus 4-meris; pyrenis 4, dorso palmatim striatis, lateralibus striatis et rugosis, endocarpio lignescente.

KEY TO THE SPECIES

- A. Branchlets smooth, glabrous; leaves 5-14 cm. long, the apex acuminate.
 - B. Branchlets cinereous; calyx and bracts eciliate; fruiting pedicels equaling or longer than the diameter of the fruit; terminal buds unfolding at anthesis. (India and W. Yunnan)...59. *I. hookeri*.
 - BB. Branchlets castaneous or nigrescent; calyx ciliate; fruiting pedicels shorter than the diameter of the fruit (except in *I. melanotricha*); terminal buds unfolding after anthesis.
 - C. Leaves elliptic; lateral nerves 10-15 pairs (except in *I. franchetiana* var. *parvifolia*); stigma on fruit thinly discoid.
 - D. Staminate inflorescences sessile; fruiting pedicels glabrous, shorter than the diameter of the fruit. (Szechuan and N. Yunnan).....60. *I. franchetiana*.
 - DD. Staminate inflorescences pedunculate; fruiting pedicels pubescent, longer than the diameter of the fruit. (W. Yunnan and Upper Burma).....61. *I. melanotricha*.
 - CC. Leaves oblanceolate or linear; lateral nerves 8-10 pairs; stigma on fruit capitate. (Hupei and Szechuan)....62. *I. fargesii*.
- AA. Branchlets verruculose; leaves 1-5 rarely up to 8 cm. long, the apex acute or obtuse.
 - B. Leaves elliptic-lanceolate or linear, average 4-5 cm., sometimes up to 7 or 8 cm. long; fruit fasciculate. (Yunnan).....63. *I. delavayi*.
 - BB. Leaves broadly elliptic or obovate-elliptic, less than 2 cm. long; fruit usually solitary or paired.
 - C. Plant erect; small trees up to 6 m. high; leaves chartaceous, broadly elliptic, the apex cuspidate; petioles 4-5 mm. long, one-half the length of the lamina. (Yunnan, Upper Burma).....64. *I. nothofagifolia*.
 - CC. Plant prostrate; shrub less than 1 m. high; leaves coriaceous or subcoriaceous, obovate, the apex obtuse or acute; petioles 1-2 mm. long, one-seventh to one-fourth the length of the lamina. (India, Yunnan).....65. *I. intricata*.

59. *Ilex hookeri* King in Jour. Asiat. Soc. Beng. 55(2): 266. *pl.* 14. 1886; Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 287 (Monog. Aquif. 1: 287). 1901; Comber in Notes Bot. Gard. Edinb. 18: 53. 1933.

An entirely glabrous evergreen tree up to 18 m. high with cinereous branchlets, elliptic serrate leaves, fasciculate inflorescences and eciliate bracts and calyx.

Branchlets stout, cinereous, plicate rugose; third year's growth 5 mm. in diameter, the lenticels lacking, the leaf-scars broadly deltoid-elliptic; second year's growth of like nature, but thinner; current year's growth brown, turning ochraceous cinereous, the terminal bud unfolding late in the flowering season, the scales serrate. Leaves occurring even on the third year's growth, 2–10 mm. apart; stipules minute, broadly deltoid, acute, persistent; petioles 12–20 mm. long, one-seventh to one-fourth the length of the lamina, glabrous, slightly impressed above; lamina thickly coriaceous, castaneous or brunneous-olivaceous, opaque on both surfaces, elliptic or obovate-elliptic, 5–10 cm. long, 2–4.5 cm. wide; base obtuse or rounded; apex acute or very shortly acuminate, the acumen 5 mm. long, broadly deltoid, often serrate; margin very finely serrate, the teeth apiculate; midrib impressed above, elevated beneath; lateral nerves 11–15 pairs, impressed above, elevated beneath. Inflorescences fasciculate, axillary on last year's growth, the bracts ovate-orbicular, glabrous and eciliate; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 1–3-flowered, the 3-flowered ones cymose with peduncles 1 mm. long; pedicels 2–3 mm. long, glabrous, with 2 large (2 mm. long) sub-basal eciliate prophylla; calyx patelliform, 2.5 mm. broad, deeply 4-lobed, the lobes deltoid-ovate, 1.25 mm. long, 1.5 mm. wide, obtuse, eciliate; corolla rotate, 6 mm. broad, the petals oblong-ovate, 2.5 mm. long, 2 mm. wide, eciliate, one-eighth connate at the base; stamens slightly shorter than the petals, the anthers oblong, 1 mm. long, rudimentary ovary sub-globose, 1 mm. in diameter, papillose, the apex truncate, inconspicuously 4-lobed. Pistillate inflorescence: individual branches of the fascicles uniflorous; pedicels 6–8 mm. long with 2 broadly deltoid sub-basal prophylla; calyx and corolla as in the staminate flowers; petals one-tenth connate at the base; staminodes one-half the length of the petals, the sterile anthers sagittate; ovary ovoid, 2 mm. long, 1.5 mm. wide, truncate at the apex, the stigma discoid, 4-lobed. Fruit (only immature seen) globose, 6 mm. in diameter, the stigma thin-discoid, 4-lobed, the persistent calyx explanate, 4 mm. across. Pyrenes 4, elliptic in outline, 5 mm. long, 2 mm. wide, palmately striate and deeply sulcate on the back, striate and deeply sulcate on the sides, endocarp coriaceous.

CHINA: Yunnan: *G. Forrest* 17987 (A), 18251 (A).

UPPER BURMA: *Kingdon Ward* 12980 (B).

INDIA: Darjeeling (Dehra Dun Herbarium no. 20 D/10347) (A).

Ilex hookeri was originally described as an entirely glabrous plant from Sikkim and said to grow as a tree up to 18 m. high. A similar plant has

been collected from northwestern Yunnan by *George Forrest* 17987. This collector, however, also got another specimen, 18251, that presents a puzzling combination of characters. Its cinereous branchlets are like the Sikkim specimen. The base of the leaves varies from cuneate to obtuse or round. Some leaves have 10 lateral nerves, impressed above, while others have 15, elevated above. In leaf form and venation *Forrest* 18251 seems to resemble the Sikkim species, *Ilex hookeri* King, the Chinese species, *Ilex franchetiana* Loes., and the Upper Burman species, *Ilex melanotricha* Merr. There is a distinct possibility that these three may be no more than ecological forms of a single very variable species. However, since I have not seen King's type, it seems best to maintain them, provisionally, as separate species. *Ilex hookeri* is especially characterized by its cinereous branchlets, impressed lateral nerves, glabrous inflorescences, and eciliate calyx.

Ilex hookeri is closely related to *Ilex franchetiana* and *Ilex melanotricha*. The latter two species can easily be distinguished by their castaneous branchlets and ciliate calyx.

60. *Ilex franchetiana* Loes. in Sarg. Pl. Wils. 1: 77. 1911; Comber in Notes Bot. Gard. Edinb. 18: 48. 1933, in part; S. Y. Hu in Ic. Pl. Omei. 2: pl. 160. 1946.

An evergreen, entirely glabrous shrub or small tree up to 6 m. high, with subcoriaceous or chartaceous oblong-elliptic or oblanceolate leaves, fasciculate globose fruits, and prominently striate and deeply sulcate pyrenes.

Branchlets stout, glabrous; third year's growth 6–7 mm. in diameter, castaneous, longitudinally plicate-rugose, the lenticels lacking, the leaf-scars broadly deltoid; the second year's growth 4–5 mm. in diameter, plicate and rugose; current year's growth subterete, slightly angular, longitudinally plicate-sulcate, entirely glabrous, 3–4 mm. in diameter, castaneous or rarely straw-colored, terminal buds conic, acute, glabrous, the scales coarsely ciliate, unfolding after anthesis, the axillary buds subglobose, glabrous. Leaves occurring also on second year's growth, 2–20 mm. apart; stipules minute, deltoid, acute, persistent; petioles subterete, rather long, 10–20 mm. long, one-eighth to one-fifth the length of the lamina, narrowly canaliculate above, rugose beneath; lamina subcoriaceous, brunneous, rarely brunneous-olivaceous, opaque on both surfaces, oblanceolate, oblong-lanceolate, rarely broadly elliptic, 6–12 cm. long, 2–4 mm. wide; base cuneate, obtuse, rarely rounded; apex acuminate, the acumen 5–12 mm. long, acute, often with teeth; margin finely serrate, the teeth nigrescent, apiculate; midrib narrowly impressed above, elevated beneath, the lateral nerves 10–15 on each side, evident, slightly elevated or impressed above, prominent beneath, often branched near the base, the reticulations evident beneath. Inflorescences fasciculate, axillary on last year's growth, the bracts oval, 4 mm. long, sparsely ciliate or erose, caducous; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 3-flowered, cymose, peduncles 1–1.5 mm. long, pedicels 2–5 mm. long, with 2 basal prophylla; the calyx patelliform, 2 mm. broad,

deeply 4-lobed, the lobes deltoid, 0.75–1 mm. wide, obtuse or rounded, minutely ciliate; corolla rotate, 5 mm. broad, the petals oblong, 2 mm. long, 1.5 mm. wide, one-tenth connate at the base; stamens slightly shorter than the petals, the anthers oblong, 0.75 mm. long; rudimentary ovary conic, papillose, the apex obtuse, 4-lobed. Pistillate inflorescence: individual branches of the fascicles uniflorous, the pedicels 3–4 mm. long, with 2 submedian prophylla; calyx as in the staminate flowers; corolla choripetalous, the petals ovate, 2 mm. long; staminodes three-quarters the length of the petals, the sterile anthers cordate; ovary glabrous, ovate, 2 mm. long, 1.5 mm. wide, the apex truncate, the stigma discoid. Fruits globose, 6–7 mm. in diameter, with the fruiting pedicel 5–6 mm. long, the persistent calyx explanate, quadrangular in outline, 2–3 mm. in diameter, the stigma thinly discoid. Pyrenes 4, oblong in outline, 5–6 mm. long, 2.5–3 mm. wide, palmately striate and sulcate on the back, striate and rugose on the sides, the endocarp woody.

CHINA: Hupei (Hupeh): Chang-yang-hsien, *E. H. Wilson* 148 (A). Szechuan: Nan-chuan-hsien, *W. P. Fang* 635 (A), 641 (A, SS), 1200 (A); Kwan-hsien, *W. P. Fang* 2222 (A, NY, SS); *E. H. Wilson* 4316 (A, US); Mt. Omei, *W. P. Fang* 7664 (A); *E. H. Wilson* 4794 (A, SS), 4796 (A, SS); Opieh-hsien, *T. S. Chao* 185 (SS), 594 (SS), 636 (SS); *W. C. Cheng* 6525 (SS); *C. L. Sun* 840 (Sz), 847 (Sz); *C. W. Yao* 2770 (SS), 2774 (SS), 4331 (SS); Wen-chuan-hsien, *F. T. Wang* 21004 (A); Ma-pien-hsien, *F. T. Wang* 22893 (A); Hung-ya-hsien, Wa-wu-shan, *C. W. Yao* 2209 (SS), 3826 (SS). Sikang: Pao-hsing-hsien (Mupin), *K. L. Chu* 3301 (SS); Ta-chien-lu, *E. H. Wilson* 1257 (isotype, A, SS, US). Yunnan: Chao-tung-hsien, *H. T. Tsai* 50861 (A); Yong-shan-hsien, *H. T. Tsai* 51088 (A); without precise locality, *H. T. Tsai* 57802 (A); *T. T. Yu* 20137 (A). Western China, *E. H. Wilson* (for Veitch) 3318 (A, SS).

When Loesener first described *Ilex franchetiana*, he used two sheets of specimens (*Wilson* 148, 1257), collected at two different places over 600 miles apart and at four different times over a period of two years. This material represents two species. *Wilson* 148 is apparently a broad-leaf form of *Ilex fargesii* Franch. It is essentially similar to *Wilson* 231, which Loesener named *Ilex fargesii* Franch. Part of *Wilson* 1257 has elliptic leaves. Its fruits are smaller and so are the pyrenes. It is to this part of the complex that I limit the name *Ilex franchetiana* Loes. It is a small tree growing in mixed forests on the high mountains around the Szechuan Basin. There it flowers in May or early June, and its fruits turn red in October.

The texture of the leaves, the nature of the inflorescences, the shape and size of the fruits, and the striate, sulcate pyrenes of *Ilex franchetiana* are very similar to those of *Ilex hookeri* King, which differs, however, in having cinereous branchlets and eciliate bracts and calyx-lobes.

60a. *Ilex franchetiana* var. *parvifolia* S. Y. Hu in *Ic. Pl. Omei*. 2: pl. 160. 1946.

Leaves obovate or elliptic, 3–6 cm. long, 1.2–2.6 cm. wide, cuneate at

the base, shortly acuminate at the apex, the margin serrate, the lateral nerves 6–7 pairs; fruits globose, 3–5 mm. in diameter; pyrenes 4 or 5, 2–4 mm. long, palmately striate and sulcate on the back, the endocarp woody.

CHINA: Szechuan: Mt. Omei, *T. H. Tu* 303 (SS); Opien-hsien, *C. W. Yao* 2824 (SS), 4306 (SS); Hung-ya-hsien, Wa-wu-shan, *C. W. Yao* 2380 (SS); western China, *E. H. Wilson* 3322 (K).

The variety differs from the typical form of the species in having smaller, subcoriaceous leaves.

61. *Ilex melanotricha* Merr. in *Brittonia* 4: 101. 1941.

Ilex franchetiana sensu Comb. in *Notes Bot. Gard. Edinb.* 18: 48. 1933, in part; sensu Merr. in *Brittonia* 4: 100. 1941, non Loes.

An evergreen tree up to 10 m. high with brown or castaneous branchlets, large subcoriaceous elliptic or oblanceolate serrate leaves, pubescent inflorescences, globose fruits and striate, sulcate pyrenes 4 mm. long.

Branchlets straight, glabrous, rather stout, castaneous or brunneous; second year's growth plicate rugose, 5 mm. in diameter, the lenticels lacking, the leaf-scars deltoid-semiorbicular; current year's growth 4–5 mm. in diameter, plicate-rugose, the terminal buds thinly conic, acute, glabrous, the scales ciliate. Leaves occurring also on second year's growth, 3–15 mm. apart; stipules minute, hidden; petioles 10–15 mm. long, one-tenth to one-sixth the length of the lamina, the distal end winged by the decurrent leaf-base, canaliculate above, glabrous; lamina subcoriaceous, castaneous or brunneous, opaque on both surfaces, oblanceolate or oblong-elliptic, 7–14 cm. long, 2.2–4.2 cm. wide; base obtuse, rarely cuneate; apex shortly acuminate, the acumen 3–10 mm. long, often serrate; margin finely serrate down to near the base; midrib impressed above, glabrous, elevated beneath, the lateral nerves 12–14 on each side, slightly elevated, rather obscure above, evident beneath, the reticulation of the veinlets loose, indistinct above, evident beneath. Staminate inflorescence: pseudopaniculate, axillary on second year's growth, the peduncles of the pseudopanicles 3 mm. long, glabrous, the rachis 5–7 mm. long; individual branches cymose, the bracts ovate, caducous, ciliate, the upper ones sheath-like, the basal appendage stipule-like, deltoid, eciliate, persistent, the peduncles 2–3 mm. long, the pedicels 3–4 mm. long, both puberulent, the prophylla 0–2, median or submedian when present, ciliate; flowers 4-merous; calyx 3 mm. in diameter, deeply 4-lobed, the lobes deltoid, obtuse or rounded, 1 mm. wide at the base, ciliate; corolla rotate, 6 mm. in diameter, the petals obovate-oblong, 3 mm. long, sparsely and shortly ciliate, one-eighth connate at the base; stamens slightly shorter than the petals, the anthers ovate-oblong, 1 mm. long; rudimentary ovary subglobose, 0.75 mm. in diameter, apical end truncate, inconspicuously 4-lobed, surface papillose. Pistillate flowers not seen. Infructescences pseudoracemose, subsessile, the axis 3–5 mm. long, the fruiting pedicels 4–7 mm. long with 2 submedian prophylla; persistent calyx 2.5 mm. across, explanate and reflexed. Fruit globose, 4–5 mm. in diameter, the

stigma plane-discoïd, 4-lobed. Pyrenes 4, oblong-elliptic in outline, 3.5–4.5 mm. long, 2.5–3 mm. wide, palmately striate, sulcate on the back, striate-sulcate along the sides, the endocarp woody.

CHINA: Yunnan: Li-kiang, *R. C. Ching* 21932 (A); *K. M. Feng* 2628 (A); Shwelin-Salwin Divide, *G. Forrest* 9046 (A), 17504 (A); without precise locality, *G. Forrest* 16074 (A), 17762 (A); Mt. Kenyichunpo and region of Champutong, *J. F. Rock* 10144 (A); without precise locality, *H. T. Tsai* 57608A (A); Wei-si, *C. W. Wang* 64454 (A), 67742 (A); Champutung, *C. W. Wang* 67166 (A).

UPPER BURMA: Adung Valley, *F. K. Ward* 9331 (A, TYPE), 9507 (A, material for the description of staminate inflorescence); Nyetmo Pass, *F. K. Ward* 217 (A).

Ilex melanotricha was first recorded from Upper Burma. Its distribution is limited to Long. 97–101°E., Lat. 25–28°N., and it grows as a small tree up to 10 m. high in mixed forests at an altitude of 2700–3200 m. The flowers, which appear in May, are pale green and fragrant. The red fruits persist on the tree for a long period (until March of the following year).

Ilex melanotricha is very closely related to, and perhaps only a variety of *Ilex franchetiana* Loes. The latter differs in having glabrous pedicels, which are shorter than the diameter of the fruits, and staminate inflorescences which are usually pedunculate rather than sessile.

The specific name *melanotricha* is apparently derived from the seemingly hair-like black sooty mold on the branchlets. A good binocular shows that the branchlets of the uninfected plants or parts are glabrous.

62. *Ilex fargesii* Franch. in Jour. de Bot. 12: 255. 1898; Loes. ex Diels in Bot. Jahrb. Engl. 29: 435. 1900, in Nov. Act. Acad. Leop.-Carol. Nat. Cur. 78: 239 (Monog. Aquif. 1: 239). 1901, et in Sarg. Pl. Wils. 1. 77. 1911; S. Y. Hu in Ic. Pl. Omei. 2: pl. 159. 1946.

Ilex fargesii var. *megalophylla* Loes. in Sarg. Pl. Wils. 1: 77. 1911. *Syn. nov.*

A small entirely glabrous evergreen tree up to 7 m. high with oblanceolate or linear-lanceolate leaves, the basal half cuneate and entire, the apical half serrate and acuminate, globose fruits with thickly discoïd and capitate stigmata and striate, sulcate pyrenes.

Branchlets rather stout, brunneous or castaneous, plicate, rugose and ridged; third year's growth 5–6 mm. in diameter, the lenticels lacking, the leaf-scars semi-orbicular; second year's growth 4–5 mm. in diameter, prominently ridged, the leaf-scars deltoid; current year's growth 3–4 mm. in diameter, glabrous, the terminal buds conic acute, the scales ciliate, unfolding after anthesis. Leaves occurring even on the third year's growth, 3–6 mm. apart; stipules very minute, callose, deltoid, often hidden; petiole 10–18 mm. long, one-eighth to one-sixth the length of the lamina, glabrous, rugose, canaliculate above; lamina subcoriaceous, brunneous-olivaceous, oblanceolate or linear-oblanceolate, 5–13.5 cm. long, 1.2–2.5 cm. wide; base cuneate; apex acuminate, rarely acute, the acumen 5–10

mm. long, sometimes serrate; margin entire on the basal half or two-thirds, serrate on the apical third, the teeth nigrescent-apiculate; midrib impressed above, elevated beneath, the lateral nerves 8–10 pairs, obscure above, evident or sometimes obscure beneath; reticulations of veinlets usually evident beneath. Staminate inflorescences: fasciculate, axillary on last year's growth, the bracts subsemi-orbicular, glabrous, ciliate, the basal appendages not evident; flowers 4-merous; individual branches of the fascicles 3-flowered, cymose; peduncles 1 mm. long, the bracteoles membranous, deltoid, glabrous and ciliate; pedicels 2 mm. long, glabrous, with 2 sub-basal, deltoid or broadly deltoid ciliate prophylla; the calyx patelliform, 2 mm. broad, deeply 4-lobed, lobes suborbicular, 1 mm. long and wide, obtuse, very sparsely ciliate; corolla rotate, 5 mm. across, the petals obovate-oblong, 2 mm. long, 1.25 mm. wide, ciliate, one-tenth connate at the base; stamens three-fourths the length of the petals, the anthers oblong, 0.75 mm. long; the rudimentary ovary ovoid-conical, the apical end obtuse, obscurely 4-lobed. Pistillate flower not seen. Infructescences fasciculate, the individual branches uniflorous, the pedicels 5–7 mm. long, with 2 deltoid ciliate sub-basal prophylla. Fruit globose, 6 mm. in diameter, the stigma capitate, convex, the style evident. Pyrenes 4, oblong in outline, 4 mm. long, 3.5 mm. wide, the back palmately striate-sulcate, convex, the sides striate or sometimes reticulately striate-sulcate, the endocarp woody.

CHINA: Western Hupei: Heh-ya-tze, *W. Y. Chun* 3982 (A); Kan-lu-doong, *W. Y. Chun* 4095 (A); *A. Henry* 6760 (A, G, US), 6899 (NY); Hsing-shan-hsien, *E. H. Wilson* 231 (A, US), (Veitch Exp.) 1827 (A, NY). Szechuan: Tchen-keou-tin, *R. P. Farges* 763 (ISOTYPE, A, P); N. Wu-shan, *A. Henry* 7147 (G, P, US); Kiang-yu-hsien, *F. T. Wang* 22263 (A); Wen-chuan-hsien, *E. H. Wilson* 1034 (HOLOTYPE of *Ilex fargesii* var. *megalophylla*, A). Sikang: Mupin, *E. H. Wilson* 3098 (A); Ta-chien-lu, *E. H. Wilson* 4094 (A, US).

This species was first recorded from northeastern Szechuan. In distribution it is the most northeasterly of the Hookerae group. It is a tree, growing in forests at an altitude of 2000 m. The trunk has been reported to be smooth and gray, and the branchlets green. It flowers in May. The staminate flowers are white and fragrant. The fruit turns red in September (ex Wilson).

At the Arnold Arboretum there are three specimens bearing *E. H. Wilson's* number 4094. They are all fruiting material, and all look alike, but according to the labels they were collected at three different places, namely: Ta-chien-lu, in October 1910, Pan-lun-shan west of Kuan-hsien in Szechuan, in October 1910, and Wa-ssu country of Wen-chuan-hsien, November 1910. As these localities are more than 300 miles apart, and the only means of transportation between them is by foot, it would have taken Wilson at least a month to visit all three stations. Apparently there is an error in the labels; by studying Wilson's journey and reviewing his field notes I have found that actually all the collections came from Ta-chien-lu, Sikang. This far western locality presents a problem in the

distribution of the species. Geologists have grounds for believing that the present Szechuan Province was formerly a mediterranean sea bordered on the sides by high mountains. The ranges on the east are composed principally of Upper Carboniferous limestone and those of the west largely of shales. As Wilson wrote, "Remarkably few of the plants found in the mountains bordering the eastern limits at 2000 feet altitude and upwards are common to the mountains bordering the western limit. . . . The same is true of the fauna . . ." Now *Ilex fargesii* is not a cultigen as is *Ilex chinensis* Sams. Yet *Wilson* 4094 from the western boundary of the former inland sea is practically identical with *Farges* 763 from the eastern boundary. This fact may lead us to suppose that *Ilex fargesii* may be a very old species originally growing on the shore of the sea before the land was elevated, while the closely related *Ilex franchetiana* may be a more recent, derived species, or perhaps only a broad-leaved form of *Ilex fargesii*.

63. *Ilex delavayi* Franch. in Jour. de Bot. 12: 255. 1898; Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 419, *pl.* 9, *fig.* 4 (Monog. Aquif. 1: 419). 1901; Anon. in Notes Bot. Gard. Edinb. 17: 184. 1930; Hand.-Mzt., Symb. Sin. 7: 658. 1933, in part.

An entirely glabrous evergreen shrub or tree up to 9 m. high with verruculose branchlets, elliptic-lanceolate, crenulate-serrate, acute leaves, fasciculate inflorescences, globose fruits and palmately striate sulcate pyrenes.

Branchlets straight, rather stout, terete, cinereous, glabrous; third and second year's growth similar, 3 mm. in diameter, rugose, with 2 subverruculose or pliciform ridges running down from the insertion of the stipules, the lenticels lacking, the leaf-scars horizontally deltoid-elliptic; current year's growth verruculose, glabrous, ridged-sulcate, 2.5 mm. in diameter, ochraceous-cinereous, the terminal buds glabrous, its scales serrate, unfolding at anthesis. Leaves occurring also on second year's growth, 1–5 mm. apart; stipules narrowly deltoid, often forked, 0.5 mm. long, persistent; petiole slender and elongate, 10–15 mm. long, one-sixth to one-third the length of the lamina, the distal half narrowly winged by the decurrent leaf-base, shallowly canaliculate above; the lamina subcoriaceous, olivaceous or brown above, ochraceous or olivaceous beneath, elliptic-lanceolate, (2.5–)4–5(–7) cm. long, (0.7–)1–2(–2.2) cm. wide; base acute or cuneate; apex obtuse or acute; margin crenulate-serrate, the teeth callose and nigrescent; the midrib impressed and glabrous above, prominent beneath, the lateral nerves 5 or 6 on each side, sulcate above, prominent beneath; reticulations of the veinlets evident beneath. Inflorescences fasciculate, axillary on second year's growth; flowers 4-merous. Staminate inflorescence: fascicles often appearing pseudo-umbelliform, more or less stalked; peduncles up to 3.5 mm. long; bracts of inflorescence ovate, acute, glabrous, the basal appendage minute, eciliate; individual branches of the fascicle 1–3-flowered, cymose; peduncles 1 mm. long; pedicels 1–2 mm. long with 0–2 sub-basal prophylla; the calyx patelliform, ca. 2.5 mm. broad, deeply lobed, the lobes ovate-deltoid, ca. 1 mm. long,

1.25 mm. wide, obtuse or acute, glabrous and eciliate; corolla rotate, 5 mm. broad, the petals obovate, 2 mm. long, 2 mm. wide, one-eighth connate at the base; stamens shorter than the petals, the anthers oval, 0.75 mm. long; the rudimentary ovary globose, 0.75 mm. in diameter, the apical end round. Pistillate inflorescence: fascicles 2-5-flowered, the pedicels 2-4 mm. long; calyx as in the staminate flowers; corolla choripetalous, ovate, 2 mm. long; staminode one-half the length of the petals, the sterile anthers cordate; ovary ovoid, 2 mm. long, 1.5 mm. wide, the apex truncate, the stigma discoid. Fruits globose, 5 mm. in diameter, the persistent calyx explanate, quadrangular in outline, 2-2.5 mm. across, the stigma thickly discoid, 4-lobed. Pyrenes 4, oblong in outline, 3.5-4.5 mm. long, 2-2.5 mm. wide, the back convex or slightly flattened, palmately striate and sulcate, the sides rugosely striate-sulcate, the endocarp woody.

CHINA: Yunnan: Mekong-Salween Divide, Lat. $28^{\circ}12'N.$, *Forrest* 16244 (A); Li-kiang Snow Range, *J. F. Rock* 8358 (material for description of staminate flowers, A, US); Wei-si-hsien, *C. W. Wang* 63812; without precise locality, *T. T. Yu* 5677 (A), 5722 (material for the description of the pistillate flower, A), 14283 (A); Muli Kingdom (on the Yunnan-Sikang border), *J. F. Rock* 18255 (A, US). Sikang: Hui-li, *C. Schneider* 575 (A).

Ilex delavayi Franch. is endemic to the mountains of northwestern Yunnan and southeastern Sikang. As a shrub or small tree it occurs in mixed forests at an altitude of 3540 m. The greenish flowers appear in March, and the fruit turns yellow in September.

The verruculose branchlets, the paucifasciculate infructescences and the striate sulcate pyrenes of *Ilex delavayi* resemble those of *Ilex intricata* Hook. f. The latter species can be distinguished by its smaller (1-2 mm. long) elliptic-oblong leaves.

63a. *Ilex delavayi* var. *exalta* Comber in Notes Bot. Gard. Edinb. 18: 44. 1933.

Branchlets glabrous, non-verruculose, cinereous, shallowly plicate sulcate; leaves ovate-oblong or oblong-elliptic, 3-8 cm. long, 1.5-2.5 cm. wide; the midrib, the lateral nerves and the reticulation of the veinlets deeply impressed above; inflorescences fasciculate, the pedicels glabrous, 4-6 mm. long.

CHINA: Yunnan: N'Maiha-Salwin Divide, *G. Forrest* 18093 (isotype, A); Teng-yueh, *J. F. Rock* 7653 (A, US); Chih-tze-lo, *H. T. Tsai* 54139 (A), 58155 (A); Chen-kang, *T. T. Yu* 17154 (A).

Compared with typical *Ilex delavayi*, this variety has a more southern and western range. It is found in western Yunnan and Upper Burma at an altitude of 2500-3500 m. Its greenish flowers appear in June, and the fruit becomes red in November (ex Rock).

This variety is distinguished by its smooth branchlets, its larger leaves, and longer pedicels. It is intermediate between *Ilex delavayi* and *Ilex hookeri* King.

63b. *Ilex delavayi* var. *comberiana*, var. nov.

Ilex delavayi sensu Anon. in Notes Bot. Gard. Edinb. 17: 147, 242, 311. 1930; sensu Comber in op. cit. 18: 43. 1933; Hand.-Mzt., Symb. Sin. 7: 658. 1933, in part.

Frutex; ramulis verruculosus et pubescentibus; foliis oblongis vel ellipticis, 2–5 raro ad 7 cm. longis, 1–2 cm. latis; inflorescentiis fasciculatis; fructibus globosis, 7 mm. diametro, pedicellis 2–3.5 mm. longis, stigmate crasse discoideo vel subcapitato.

CHINA: Yunnan: N. W. Li-kiang, *R. C. Ching* 20479 (A); Hokin, *K. M. Feng* 775 (A); Hoba Snow Range, *K. M. Feng* 1171 (A); S. Chung-tien, *K. M. Feng* 1807 (A); *G. Forrest* 10237 (A), 15598 (A); Ta-li, *Handel-Mazzetti* 8721 (A); Shi-ku, *J. F. Rock* 8445 (A, US), 9575 (TYPE, A; US); between Li-kiang and Yaung-ming, *J. F. Rock* 17216 (A, NY, US); *C. Schneider* 2799 (A, G), 3143 (A, G); Wei-se-hsien, *H. T. Tsai* 59638 (A), 59650 (A); *C. W. Wang* 63775 (A), 65360 (A); Chung-tien, Haba, *T. T. Yu* 3536 (A).

Geographically this variety occurs within the range of typical *Ilex delavayi*. The flowers appear in May or June, and the fruit becomes red in September.

The variety differs from typical forms of the species in having verruculose and pubescent branchlets. Several of Forrest's numbers cited above have been identified as *Ilex delavayi* by Comber.

63c. *Ilex delavayi* var. *linearifolia*, var. nov.

Frutex; ramulis verruculosus et pubescentibus; foliis lineari-lanceolatis, 2–8 cm. longis, 0.7–1.3 cm. latis, basi cuneatis, apice acutis; inflorescentiis fasciculatis; fructibus solitariis vel binis, depresso-globosis, stigmate crasse discoideo.

CHINA: Yunnan: Li-kiang, *R. C. Ching* 20646 (A), 21989 (TYPE, A); *G. Forrest* 10087 (A), 10394 (A), 21235 (US), 22959 (US); Wei-se-hsien, *H. T. Tsai* 59761 (A); Pe-yen-tsin, *Siméon Ten* 587 (US).

This variety is endemic to northwestern Yunnan. It is a shrub 2.5–4 m. high. It flowers in June and matures red fruit in October.

This variety differs from typical *Ilex delavayi* in having verruculose and pubescent branchlets and linear-lanceolate leaves.

64. *Ilex nothofagifolia* (*nothofagacifolia*) Ward in Gard. Chron. Ser. III, 81: 194. 1927, 92: 232. 1932, in Plant Hunt. Edge World 72, 101, 215, 223. 1930.

Ilex intricata Hook. f. var. *oblata* W. E. Evans in Notes Bot. Gard. Edinb. 13: 163. 1921.

Ilex oblata (Evans) Comber in Notes Bot. Gard. Edinb. 18: 55. 1933.

Ilex intricata sensu Merr. in Brittonia 4: 99. 1941, in part.

An entirely glabrous evergreen tree up to 6 m. high having branchlets densely covered by corky warts, long-petiolate small serrate broadly elliptic leaves, paucifasciculate inflorescences, small subglobose fruits and elliptic striate and almost smooth pyrenes.

Branchlets cinereous or brunneous, the older portion longitudinal plicate-

rugose, occasionally verruculose, the lenticels lacking; second year's growth terete, 2–3 mm. in diameter, covered by longitudinal rows of corky warts; current year's growth 2 mm. in diameter, longitudinally canaliculate and ridged, the ridges verruculose, the terminal buds ovoid, glabrous, the scales shiny, eciliate. Leaves occurring even on the third year's growth, 3–6 mm. apart; stipules minute, hidden by warts; petioles slender, 4–5 mm. long, half as long as the lamina, narrowly canaliculate above; lamina chartaceous, olivaceous, opaque on both surfaces, broadly elliptic, rarely ovate or obovate, 7–14 mm. long, 6–10 mm. wide, obtuse at the base, obtusely cuspidate at the apex, the margin serrate, with 4–7 teeth on each side; midrib impressed above, slightly elevated beneath, the lateral nerves 3 or 4 pairs, impressed above, evident beneath, the reticulation of the veinlets obscure. Inflorescences paucifasciculate, axillary, on second year's growth, the fascicles 1–3-flowered, the individual branches uniflorous. Staminate inflorescence: pedicels 4 mm. long with 2 sub-basal prophylla; calyx patelliform, 2 mm. across, deeply 4-lobed, the lobes suborbicular, glabrous and eciliate; corolla subrotate, 4 mm. across, the petals ovate, 2 mm. long, eciliate, slightly connate at the base; stamens slightly shorter than the petals, the anthers ovoid; rudimentary ovary globose, the apex rounded. Pistillate flowers not seen. Fruits (immature) usually solitary, depressed-globose, 3 mm. long, 4 mm. in diameter, the fruiting pedicels 3 mm. long with 2 minute basal prophylla; the persistent calyx explanate, quadrangular in outline, 2.5 mm. in diameter; stigma discoid, distinctly 4-lobed, the style evident. Pyrenes 4, broadly elliptic in outline, 3 mm. long, 1.5–2 mm. wide, the ends obtuse, the back convex, longitudinally 3–4-striate, almost smooth, the sides smooth, the endocarp thickly coriaceous.

CHINA: Yunnan: Cham-pu-tung, C. W. Wang 67405 (A); Taron-Taru Divide, Lung-nan, T. T. Yu 20040 (A).

UPPER BURMA: Zuklang, F. K. Ward 425 (A).

INDIA: Assam: Tembang, F. K. Ward 12419 (B).

Ilex nothofagifolia was first recorded from Upper Burma. Recently it has also been collected from Yunnan where, as undergrowth, it is found in forests at an altitude of 2300–3000 m. The pale green staminate flowers were collected in late August (Yu 20040) and the fruit was still immature in October.

The specific epithet of this plant first appeared as “nothofagacifolia” Ward (1927). But according to the derivation it should be “nothofagifolia.” This correction was made in 1930 by F. Kingdon Ward himself.

This species is closely related to *Ilex intricata* Hook. f., which differs in having shortly petiolate leaves and striate and sulcate pyrenes with woody endocarp. Moreover, the latter can also be readily differentiated by its low, prostrate, shrubby habit.

65. *Ilex intricata* Hook. f. Fl. Brit. Ind. 1: 602. 1875; Maxim. in Mém. Acad. Sci. St. Pétersb. VII, 29(3): 23. 1881; Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 417 (Monog. Aquif. 1: 417). 1901; Anon. in Notes Bot. Gard. Edinb. 17: 291. 1903;

Comber in Notes Bot. Gard. Edinb. 18: 53. 1933. Hand.-Mzt. Symb. Sin. 7: 658. 1933; Merr. in Brittonia 4: 99. 1941, in part.

Ilex intricata Hook. f. forma *macrophylla* Comb. in Notes Bot. Gard. Edinb. 18: 53. 1933.

A small, low, prostrate, entirely glabrous evergreen shrub forming matted masses on rocky slopes, with verruculose branchlets, small obovate-elliptic leaves, paucifasciculate inflorescences, paired fruits, and striate, sulcate pyrenes.

Branchlets cinereous, the old growth plicate-rugose, occasionally verruculose, third year's growth 3 mm. in diameter, brunneous-fuscous, verruculose, the current year's growth 1–2 mm. in diameter, canaliculate and ridged, the ridges verruculose. Leaves small, crowded, occurring even on the fourth year's growth, 1–8 mm., usually 2–4 mm. apart; stipules minute, subulate, 0.5 mm. long, persistent; petioles 1–2 mm. long, about one-sixth the length of the lamina, narrowly impressed above, winged by the decurrent leaf-base; lamina coriaceous or subcoriaceous, brunneous-olivaceous, shiny above, opaque beneath, obovate-elliptic, 5–15 mm. long, 3–8 mm. wide; base cuneate, the apex obtuse or rounded; margin serrate, 3–6 teeth on each side; midrib deeply impressed above, prominent beneath, lateral nerves 2–4 pairs, anastomosing near the margin, impressed above, slightly elevated beneath, the reticulation of the veinlets evident above. Inflorescences paucifasciculate, axillary on the second year's growth, fascicles with 1–3 flowers only, the individual branches uniflorous, the bracts chartaceous, suborbicular; flowers 4-merous. Staminate inflorescence: pedicels 2 mm. long, glabrous, with 2 basal prophylla; calyx glabrous, patelliform, 2 mm. in diameter, deeply 4-lobed, the lobes ovate-deltoid, eciliate; corolla rotate, 5 mm. in diameter, the petals oblong, 2 mm. long, one-eighth connate at the base; stamens slightly shorter than the petals, the anthers broadly ovoid, 0.5 mm. long; rudimentary ovary subglobose, the apex rounded. Pistillate inflorescence: pedicels 1 mm. long, glabrous; calyx patelliform, 2.5 mm. in diameter, the lobes almost free, ovate-deltoid, obtuse; corolla rotate, choripetalous, the petals ovate, 2 mm. long; staminodes two-thirds as long as the petals, the sterile anthers cordate; ovary ovoid, 2 mm. long, 1.5 mm. in diameter, the style evident, the stigma capitate, distinctly 4-lobed. Fruits globose, 5 mm. in diameter, when fresh red, when dry brownish red, the stigma thickly discoid, 4-lobed, the persistent calyx explanate, quadrangular in outline. Pyrenes 4, oblong in outline, 4 mm. long, 2 mm. wide, the back palmately striate and sulcate, the sides striate and slightly rugose, the endocarp woody.

CHINA: Sikang (S. E. Tibet): Tsarong, G. Forrest 22811 (ISOTYPE of *Ilex intricata* forma *macrophylla*, A), Ludlow, Sherrieff & Taylor 4924 (B); Zayul, F. K. Ward 10501 (B), 11008 (B). Yunnan: Salween-Irrawadi Divide, Handel-Mazzetti 9217 (A); Mekong-Salween watershed, J. F. Rock 10069 (A, US); Champutong, J. F. Rock 11220 (A, US), 11639 (A, US); Salwin-Kiukiang Divide, T. T. Yu 20246 (A), 20603 (A); Taron-Taru Divide, T. T. Yu 20930 (A).

INDIA: Sikkim, *J. D. Hooker* (ex Herb. Ind. Or. Hook. f. & Thomson, *Ilex* 10) (A).

UPPER BURMA: Adung Valley, *F. K. Ward* 9624 (A); Nam Tamai Valley, *F. K. Ward* 13400 (B).

Forrest 22811, the isotype of *Ilex intricata* forma *macrophylla* Comber, is obviously a shoot of a robust luxuriant plant probably from a very favorable moist habitat. Some of the leaves, especially those on the lower twigs, are as small as are those of the other numbers cited above.

Ilex intricata was first described from material collected in North India. Subsequently similar plants have been collected in northwestern Yunnan and southeastern Sikang. There, at an altitude of approximately 3200 m. the plant grows as a low, prostrate shrub forming extensive cushion-like masses. Its pale chocolate flowers appear in late June and by October the fruit turns red, persisting on the plant until the flowering season of the following year.

Ilex intricata is closely related to *Ilex delavayi* Franch. and *Ilex nothofagifolia* Ward, but is readily distinguished from them by its prostrate habit and its small, shortly petiolate obovate leaves.

SERIES 5. REPANDAE (Loes.), STAT. NOV.

Ilex, subgen. *Euilex*, ser. *C. Aquifolium*, sect. *Microdonta*, subsect. *Repandae* Loes. in Engler & Prantl, Nat. Pflanzenfam. Nachträge 219. 1897, et in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 299 (Monog. Aquif. 1: 299). 1901.

Leaves coriaceous or subcoriaceous, crenulate or serrate, olivaceous, rarely brownish-olivaceous or cinnamomeous; inflorescences fasciculate, or rarely pseudopaniculate in the staminate and pseudoracemose in the pistillate ones; flowers 4-merous, the petals usually ciliate; fruiting pedicels usually short, less than 4 mm. long (except in some forms of *I. cyrtura*, *I. intermedia*, and *I. chieniana*); fruits 4-8 mm. in diameter; pyrenes small, palmately striate and usually sulcate on the back, wrinkled and pitted on the sides, the endocarp stony (except in *I. cinerea*).

KEY TO THE SPECIES

- A. Ovary and fruits puberulous; leaves coriaceous, ovate-elliptic, sparsely puberulous beneath; petioles 5-7 mm. long, 8-11 times shorter than the lamina.66. *I. wangiana*.
- AA. Ovary and fruits glabrous.
 - B. Fruits 7-8 mm. in diameter; pyrenes 6-7 mm. long, 4-5 mm. wide; (Kwangsi and southward to Malaysia)67. *I. glomerata*.
 - BB. Fruits less than 6 mm. in diameter; pyrenes less than 5 mm. long.
 - C. Leaves oblanceolate; petioles 2-3 mm. long (20-35 times shorter than the lamina); pyrenes hairy. (Hongkong)68. *I. cinerea*.
 - CC. Leaves elliptic, oblong (very rarely ovate or oblanceolate), petioles over 3 mm. long; pyrenes glabrous.
 - D. Branchlets densely pubescent; the staminate fascicles with uniflorous branches.

- E. Fruiting pedicels 2–3 mm. long; pyrenes oblong or suborbicular in outline, the ends obtuse.
- F. Leaves ovate-elliptic, 5–8 cm. long; pyrenes suborbicular in outline, 3 mm. in diameter. (Japan, E. China).....69. *I. buergeri*.
- FF. Leaves oblong, up to 12 cm. long; pyrenes oblong, 4–4.5 mm. long, 2–2.5 mm. wide. (Kwangsi).....70. *I. pingnanensis*.
- EE. Fruiting pedicels 4–6 mm. long; pyrenes obovate in outline, 3.5 mm. long, 2 mm. wide, the small ends pointed. (W. China).....71. *I. subrugosa*.
- DD. Branchlets glabrous; staminate fascicles with 1–3-flowered branches.
 - E. Rudimentary ovary pubescent. (Hunan).....72. *I. brachyphylla*.
 - EE. Rudimentary ovary glabrous.
 - F. Leaves linear-lanceolate, up to 2 cm. wide, the lower surface punctate. (China-Indo-China border).....73. *I. peiradena*.
 - FF. Leaves ovate, oblong or elliptic, over 2 cm. wide, the lower surface not punctate.
 - G. Fruiting pedicels 1–3 mm. long, always shorter than the diameter of the fruit.
 - H. Petioles 4–9 mm. long, 12–22 times shorter than the lamina.
 - I. Leaves subcoriaceous or coriaceous; veinlets evident beneath.
 - J. Stigma of the fruit navel-like, very minute and plane (except in *I. corallina* var. *macrocarpa*); infructescence fasciculate.
 - K. Fruits subglobose, 3–4 mm. in diameter (except in *I. corallina* var. *macrocarpa*); persistent prophylla basal, extending to the calyx; leaves coriaceous, shiny above, the margin often armed with weak spines. (W-SW China).74. *I. corallina*.
 - KK. Fruits globose, 5–6 mm. in diameter; persistent prophylla minute, not extending over half of the fruiting pedicel; leaves subcoriaceous, opaque on both surfaces, the margin subentire or indistinctly crenate. (Yunnan, Kwangsi)75. *I. tephrophylla*.

- JJ. Stigma of the fruit thickly discoid or capitate; infructescence pseudoracemose (occasionally fasciculate). (East China and Taiwan).....76. *I. formosana*.
- II. Leaves thickly coriaceous; veinlets obsolete beneath. (Kwangtung)...77. *I. confertiflora*.
- HH. Petioles 8-16 mm. long, 5-12 times shorter than the lamina.
 - I. Leaves coriaceous, the veinlets usually obscure on both surfaces.
 - J. Leaves ovate or oblong elliptic, coriaceous but not rigid; margin crenulate or repand. (SE China and Islands in the China Sea)...78. *I. ficoidea*.
 - JJ. Leaves oblanceolate or lanceolate, coriaceous and rigid; margin prominently serrate. (Yunnan).....79. *I. subodorata*.
 - II. Leaves subcoriaceous or even chartaceous, the reticulation of the veinlets evident on both surfaces. (Yunnan).....80. *I. wattii*.
- GG. Fruiting pedicels 5-9 mm. long, usually equaling or longer than the diameter of the fruit.
 - H. Leaves subcoriaceous, when dry opaque on both surfaces; pyrenes palmately striate, more or less smooth.
 - I. Apex of the leaf caudate, the acumen 15-22 mm. long, often falcate, reticulation of the veinlets evident; stigma thinly discoid. (SW China and Upper Burma).....81. *I. cyrtura*.
 - II. Apex of the leaf obtuse, acute or shortly acuminate, the acumen 3-5 mm. long; veinlets obscure on both surfaces; stigma thickly discoid. (Hupei).....82. *I. intermedia*.
 - HH. Leaves coriaceous; pyrenes palmately striate and sulcate. (Szechuan).....83. *I. chieniana*.

Loesener placed the series Repandae as a subsection of the section Microdontae. Since the margins of the leaves of this section are crenate or serrate, the name "Microdontae" is very appropriate. However, although the species *Ilex microdonta* Reiss. from Brazil, from which this section derives its name, has serrulate leaves, its pyrenes are smooth and coriaceous. The name should not be used for the numerous Chinese

species with palmately striate and sulcate stony pyrenes; a new series name is here established for them.

66. *Ilex wangiana*, sp. nov.

Ilex corollina sensu Anon. Not. Bot. Gard. Edinb. 17: 137. 1929, non Franch.

Frutex; ramulis pubescentibus; foliis ovato-ellipticis, 4–7 cm. longis, 1.4–2.5 cm. latis, basi obtusis vel rotundatis, apice acuminatis, acuminibus 4–7 mm. longis, serratis vel crenulato-serratis, costa supra impressa, subtus elevatis, pubescente, nervis lateralibus utrinque 7–8, subtus evidentibus; infructescentiis fasciculatis, axillaribus, unifloribus, pedicellis 2–3 mm. longis, pubescentibus, fructibus globosis, 3–4 mm. diametro, pubescentibus, stigmate crasse discoideo vel capitato; pyrenis 4, 2–2.25 mm. longis, 1.5–1.75 mm. latis, dorso depressis, palmatim striatis, lateribus rugosis et sulcatis.

A very pubescent evergreen shrub up to 3 m. high with ovate-elliptic, serrate or crenate-serrate leaves, fasciculate infructescences, and pubescent ovary and fruit.

Branchlets rather slender, nigrescent; second year's growth 3 mm. in diameter, subterete, plicate-striate, pubescent; current year's growth 1.5–2 mm. in diameter, angular, ridged and sulcate, pubescent, the terminal bud conic, very pubescent. Leaves occurring even on the third year's growth, 5–13 mm. apart; stipules very minute, callose; petioles 5–7 mm. long, 8–11 times shorter than the lamina, pubescent above, rugose beneath; lamina coriaceous, dark olivaceous or brunneous, sparsely pubescent beneath, ovate-elliptic, 4–7 cm. long, 1.4–2.5 cm. wide; base obtuse or rounded; apex shortly acuminate, the acumen 4–7 mm. long, the tip obtuse; margin serrate or crenate-serrate, the teeth nigrescent; midrib impressed above, elevated beneath, pubescent on both surfaces, the lateral nerves 7 or 8 on each side, obscure above, evident beneath, the reticulations obscure. Infructescences fasciculate, axillary on second year's growth; bracts ovate-deltoid, pubescent and ciliate; pedicels 2–3 mm. long, pubescent; prophylla 2, sub-basal, lanceolate, pubescent and ciliate. Fruits globose, 3–4 mm. in diameter, pubescent; the persistent calyx explanate, quadrangular in outline, 1.5–2 mm. in diameter, the stigma thick-discoïd or capitate. Pyrenes 4, suborbicular in outline, 2–2.25 mm. long, 1.5–1.75 mm. wide, the back flattened or slightly depressed, obscurely palmately striate, the sides rugose and sulcate, the endocarp stony.

CHINA: Yunnan: Mekong valley, Lat. 27°50'N, *Forrest 15437* (A); *Wei-se, C. W. Wang 64164* (TYPE, A); without precise locality, *H. T. Tsai 57052* (A).

Ilex wangiana is endemic to the Mekong Valley of northwestern Yunnan on the western limit of the area occupied by the closely related *Ilex corallina* Franch. It is a shrub or small tree growing at an altitude of 1900–2100 m. The fruit is red in October.

The species is closely related to *Ilex corallina*. So far as the shape and

texture of the foliage and the size of the fruits are concerned, they are alike. But it can be easily distinguished from the latter by its pubescent fruits and its pubescent branchlets and lower leaf-surfaces.

This species is named after the collector, a fellow-student at the Arnold Arboretum, Mr. C. W. Wang.

67. *Ilex glomerata* King in Jour. As. Soc. Bengal. 64(2): 135 (Mater. Fl. Malay. Penin. 2: 623). 1895; Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 325 (Monog. Aquif. 1: 325). 1901; Val. in Meded. Depart. Landb. 18: 20. 1914 (Koord. & Val. Bijdr. Booms. Java 13: 20); Koord. & Val. Atlas. Baumart. Java, fig. 787, I.K. 1918; Ridl. Fl. Malay. Penin. 1: 439. 1922; Tardieu-Blot in Fl. Gén. Indo-Chine Suppl. 1: 777. 1948.

An evergreen tree up to 12 m. high with glabrous or glabrescent branchlets, subcoriaceous oblong-elliptic leaves, serrate margins, prominent lateral nerves and veinlets, slender canaliculate petioles, fasciculate inflorescences, short fruiting pedicels, rather large globose fruits, thinly discoid stigmata and palmately striate sulcate large pyrenes.

Branchlets rather slender, castaneous; third year's growth 3 mm. in diameter, the lenticels lacking; second year's growth 2.5 mm. in diameter, plicate-rugose; current year's growth 1.5 mm. in diameter, longitudinally ridged and canaliculate, glabrescent, the terminal buds narrowly conic, the scales glabrous, ciliate. Leaves occurring also on second year's growth, 1–1.5 cm. apart; stipules very minute, often obscure; petioles 8–15 mm. long, 6–14-times shorter than the lamina, narrowly canaliculate above; lamina subcoriaceous, olivaceous or brownish-olivaceous, shiny above, opaque beneath, oblong, oblong-elliptic or rarely ovate-elliptic, 6–12 cm. long, 2–3.5 cm. wide; obtuse, cuneate or rarely rounded at the base; acuminate at the apex, the acumen 8–15 mm. long, the very tips acute or mucronate; margin serrate; midrib impressed and glabrous above, elevated beneath, the lateral nerves 8–10 pairs, evident above, prominent beneath, the reticulation of the veinlets evident beneath. Inflorescences fasciculate, axillary, on second year's growth, the bracts ovate, ciliate; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 1–3-flowered, when 3-flowered the peduncles 1 mm. long; pedicels 1–2 mm. long, with 2 ciliate deltoid basal prophylla; calyx patelliform, 2 mm. in diameter, deeply 4-lobed, the lobes deltoid, suborbicular, ciliate; corolla rotate, 7–8 mm. in diameter, the petals oblong, 3.5 mm. long, 2 mm. wide, eciliate, one-eighth connate at the base; stamens equaling the petals in length, the anthers oblong, 1 mm. long; rudimentary ovary subglobose, the apex obtuse or roundish. Pistillate flowers not seen. Infructescence fasciculate, the fruiting pedicels 1–3 mm. long. Fruits globose, 7–8 mm. in diameter, the persistent calyx explanate, 2 mm. in diameter, ciliate, the stigma plane, discoid or navel-like. Pyrenes 4, oblong or suborbicular in outline, the ends obtuse or rounded, 5.5–7 mm. long, 4–5 mm. wide, the dorsal surface palmately striate, sulcate and slightly impressed, the sides reticulately wrinkled and pitted, the endocarp stony.

CHINA: Kwangsi: Me-kon, Seh-feng-dar-shan, *R. C. Ching* 8399 (NY); Ta-mien-shan, Sup-man-ta-shan, *H. Y. Liang* 69650 (A); Shang-sze-hsien, Shap-man-tai-shan, *W. T. Tsang* 22253 (A), 22572 (A, LU), 23988 (A, NY), 24178 (A, NY), 24710A (A).

INDO-CHINA: Tonkin: *A. Pételot* 4240 (A); *W. T. Tsang* 26911 (A), 26969 (A).

Ilex glomerata was originally described from a Perak specimen. Koor- ders and Valetton recorded it from Java while Ridley extended its range to Tenasserim, and Tardieu-Blot to Tonkin. In Kwangsi it attains a height of 13 m. and develops a trunk 30 cm. in diameter. Its white flowers appear in April and by November its fruit turns yellow and red.

In leaf-size and texture, *Ilex glomerata* is closely related to *Ilex subfi-coidea* S. Y. Hu. The latter, however, has larger fruit (10–12 mm. in diameter) and irregularly wrinkled and pitted ovate-elliptic pyrenes 8–9 mm. long, 5–7 mm. wide.

68. *Ilex cinerea* Champ. in Hook. Jour. Bot. Kew Gard. Miscel. 4: 327. 1852; Walp. Ann. 4: 430. 1857; Benth. Fl. Hongk. 64. 1861; Maxim. in Mém. Acad. St. Pétersb. VII, 29(3): 28, 46. 1881; Forbes & Hemsl. in Jour. Linn. Soc. Bot. 23: 115. 1886; Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 333 (Monog. Aquif. 1: 333). 1901; Dunn & Tutcher in Kew Bull. Misc. Inf. Add. Ser. 10: 59. 1912; Chung in Mem. Sci. Soc. China 1: 139. 1924.

Ilex cinerea var. *faberi* Loes. in op. cit. 335.

An evergreen shrub or small tree up to 6 m. high, with oblanceolate, obtusely acuminate, serrate leaves, obtuse or rounded at the base, very short (2–4 mm.) petioles, fasciculate inflorescences, globose fruits and palmately striate sulcate pyrenes.

Branchlets straight, cinereous or brown when dry, striate plicate, the second year's growth 5–6 mm. in diameter, minutely rimulose, the leaf-scars semi-orbicular, slightly elevated, the lenticels lacking, the current year's growth minutely pubescent when young, glabrescent, striate, canaliculate, 2–3 mm. in diameter, the terminal buds conical, 3 mm. long, the scales pubescent. Leaves occurring also on second year's growth, 2–12 mm. apart; stipules reduced; petiole very short, 2–4 mm. long, 20–35 times shorter than the lamina, rugose, minutely pubescent above; lamina cinereous-olivaceous when dry, opaque on both surfaces, oblong-oblanceolate, 7–15 cm. long, 2–4 cm. wide; base rounded or obtuse; apex acute or shortly acuminate, the acumen 4–8 mm. long; margin minutely crenate or serrate with nigrescent teeth; midrib canaliculate and minutely puberulent above, elevated below; lateral nerves 9–11 on each side, obscure above, prominent beneath with obvious reticulation. Inflorescence fasciculate, axillary on last year's growth, the scales of flowering buds persistent during anthesis, cartilaginous, pubescent, deltoid, 1 mm. wide at the base; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 3–9-flowered, 1–2 trichotomous, cymose, pubescent, the bracts deltoid-ovate, with ciliate stipule-like appendages, acute at the apex, the

peduncles 1–2 mm. long, the secondary axis 1 mm. long, the bracts lanceolate, ciliate, the pedicels 3–4 mm. long, with two sub-basal membranaceous lanceolate prophylla; calyx patelliform, 2.5 mm. across, the lobes sparsely pubescent, rounded, ciliate; corolla rotate, 7 mm. across, the petals oblong, 3 mm. long, 2.25 mm. wide, one-eighth connate at the base, the apical halves ciliate; stamens equal or shorter than the petals, the anthers ovate-oblong, 1.25 mm. long; rudimentary ovary globose, glabrous, 1 mm. in diameter. Pistillate inflorescence: individual branches of the fascicles uniflorous, the bracts roundish, with ciliate stipule-like basal appendages, the pedicels 2–3 mm. long; calyx subcupulate, 2 mm. in diameter, pubescent, shallowly 4-lobed, the lobes rounded, ciliate; petals 3 mm. long, free nearly to the base; staminodes one-half the length of the petals, the sterile anthers sagittate; ovary pubescent, large, oblong-ellipsoid, 2 mm. long, 1.5 mm. in diameter, truncate at the apex, the stigma discoid. Fruit globose, 7 mm. in diameter, the stigma discoid, 4-lobed; persistent calyx explanate, 2.5 mm. across, ciliate. Pyrenes 4, obovate in outline, 4 mm. long, 3 mm. wide, palmately striate and sulcate on the dorsal surface, rugose and wrinkled along the sides, the endocarp stony.

CHINA: Hongkong: Victoria, *E. Bodinier* 1409 (P), 1073 (P); *N. K. Chun* 40233 (NY); Wu-kau-tin, *W. Y. Chun* 6204 & 6219 (A); *Faber* (HOLOTYPE of *Ilex cinerea* var. *Faberi*, A); *C. Ford* (ex Herb. HK Bot. Gard. no. 1104, TOPOTYPE, A), *C. Ford* (staminate flower, NY); *L. Gibbs* (ex Herb. HK no. 7434, A); *A. Henry* 84 (NY); *J. Lamont* 129 (B); *T. N. Liou* 753 (NY); Pok-fu-lam Reservoir and vicinity, *Y. W. Taam* 1155 (mature fruit, A), 1156 (staminate flowers, A); Lu-kai-dau, *Y. Tsiang* 245 (pistillate flowers, A).

Ilex cinerea is endemic to Hongkong. It has been erroneously reported from various provinces in South China and from Indo-China. However, the specimens from the latter regions lack the characteristic short petioles of this species. Also they have longer pedicels and larger fruits. In Hongkong, the greenish yellow staminate flowers of *Ilex cinerea* appear in March. The pistillate flowers usually appear two weeks later. The red fruits persist on the branches for a long period of time, even into the next flowering season.

69. *Ilex buergeri* Miq. in Versl. Med. Kon. Akad. Wet. II, 2: 84. 1868 [1866] (Repr. 19. 1866), et in Ann. Mus. Bot. Lugd.-Bat. 3: 106. 1867; Franch. & Sav. Enum. Pl. Jap. 1: 78. 1873; Maxim. in Mém. Acad. St. Pétersb. VII, 29(3): 28, 45, *pl. 1, fig. 1*. 1881; Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 1: 329 (Monog. Aquif. 1: 329). 1901; Belval in Mus. Heud. Not. Bot. Chin. 2: 21. 1933.

Ilex subpuberula Miq. l. c. 1866; Hand.-Mzt. Symb. Sin. 7: 658. 1933.

Ilex buergeri var. *subpuberula* (Miq.) Loes. op. cit. 311. 1901; Hand.-Mzt. l.c. *Syn. Nov.*

Ilex ficoidea sensu Rehd. in Jour. Arnold Arb. 14: 345. 1933, in part; non Hemsl.

A large evergreen tree up to 15 m. high (ex Ching) with a smooth gray

trunk up to 30 cm. in diameter, pubescent branchlets, shiny green ovate oblong irregularly crenate-serrate acuminate leaves, fasciculate inflorescences, choripetalous pistillate flowers, very shortly pedicellate globose fruits and 4 irregularly wrinkled stony pyrenes.

Branchlets slender, third year's growth 3.5 mm. in diameter, puberulent, slightly plicate-striate, the lenticels lacking, the leaf-scars crescent-shaped, inconspicuous; current year's growth 1.75–2.5 mm. in diameter, shortly but densely puberulent, angular, when dry plicate-striate and canaliculate, the terminal buds ovate-lanceolate, scales pubescent. Leaves occurring also on second year's growth, 5–15 mm. apart; stipules lacking or obscure; petioles short, 6–12 mm. long, 6–10 times shorter than the lamina, canaliculate and pubescent above, cylindrical, puberulent and rugose below; lamina coriaceous, olivaceous when dry, somewhat shiny above, opaque below, ovate, oblong or lanceolate, 5–8 cm. long, 1.5–2.5 cm. wide; base rounded, obtuse, or rarely cuneate; apex gradually acuminate, very rarely acute, the acumen 7–12 mm. long, the very apex obtuse and nigrescent; margin loosely and irregularly serrate, recurvate when dry, appearing sub-entire; midrib narrowly sulcate above, elevated below, the lateral nerves 7–11 pairs, straight, parallel, obscure. Inflorescences fasciculate, axillary on last year's growth, the fascicle 4–10-flowered, the individual branches of the fascicle uniflorous; bracts of the inflorescence reniform, pubescent and ciliate, 1 mm. long, 2 mm. wide, the bracts of the individual flowers ovate, acute, 1.5–2 mm. long, 1.5 mm. wide, pubescent and ciliate; pedicels very short, 2–3 mm. long, pubescent, with 2 submedian, acute, ciliate, ovate-lanceolate prophylla; flowers 4-merous. Staminate inflorescence: calyx patelliform, 2 mm. in diameter, the lobes deltoid, rounded at the apex, pubescent or subglabrous, the margin ciliate; corolla rotate, 6–7 mm. across, the petals oblong-obovate, 3 mm. long, 1.75 mm. wide, one-tenth connate at the base, ciliate at the apex; stamens one-third longer than the petals, the anthers oblong, 0.75 mm. long; rudimentary ovary conical, 0.75 mm. long, 1 mm. wide at the base, the apex acute and 4-lobed. Pistillate inflorescence: calyx as in the staminate flowers; corolla choripetalous, erect, the petals as long as or slightly shorter than the ovary, ciliate; staminodes equaling or slightly shorter than the petals, the sterile anthers ovate, very minute; ovary large, ovoid, 2.5 mm. long, 1.75 mm. in diameter. Fruits red, globose or subglobose, 4.5–6 mm. in diameter, when dry reddish brown or cinereous, the exocarp rather thick, tuberculate, the mesocarp fleshy; stigma discoid, distinctly 4-lobed; persistent calyx explanate, 2–2.5 mm. in diameter, the lobes deltoid, ciliate; pedicels very short, 2.5 mm. long, shorter than the diameter of the fruit. Pyrenes 4, suborbicular in outline, 3 mm. long, 3 mm. wide at the back, obliquely wrinkled and sulcate on the dorsal surface, reticulately wrinkled and sulcate on the sides, the endocarp stony.

CHINA: Chekiang: Hang-chow, *T. Tang & W. Y. Hsia* 365 (A); Wenchow, *R. C. Ching* 1848 (A, LU, US); Tai-swan, *R. C. Ching* 2206 (A, US); Tai-pai-shan, *Y. L. Keng* 1145 (A). Fukien: *R. C. Ching* 2228

(NY), (LU), 2231, 2230 (A, US). Hunan: Chang-sa, *Handel-Mazzetti* 11414 (A, LU, US), 11546 (A).

JAPAN: Nagasaki, *Maximowicz* in 1863 (G, NY); *R. Oldham* 148 (ISOTYPE for *Ilex subpuberula*, G); Kyushu, X. *Tashira* for Wilson in 1917 (A).

Ilex buergeri, though first recorded from Japan, is now known from various temperate coastal and central provinces of China. It is a large tree growing at altitudes of 250–600 m. The yellowish green fragrant flowers are seen from late April to early June. *Ching* 1848 and 2231, and *Handel-Mazzetti* 11414 and 11546 were first recorded as *Ilex buergeri* var. *subpuberula* (Miq.) Loes., the author basing the variety on the pubescence of the calyx-lobes in the staminate flowers. This character is rather unstable. *Handel-Mazzetti* 11414 comprises specimens collected at different times of the year. One part is a fruiting branch and another a branch with pistillate flowers. The calyx of the pistillate flowers is pubescent. *Handel-Mazzetti* 11546 is a flowering staminate branch with calyx-lobes that are partly glabrous and partly pubescent. The leaves of *Handel-Mazzetti*'s specimens are as a whole larger than those of the Japanese *Ilex buergeri* var. *subpuberula* (Miq.) Loes.

This species is closely related to *Ilex ficoidea* Hemsl., which differs in having glabrous stems as well as larger leaves abruptly caudate at the apex.

70. *Ilex pingnanensis*, sp. nov.

Arbor parva; ramulis dense pubescentibus; foliis oblongis vel oblongo-ellipticis, 5–12 cm. longis, 2.3–3.2 cm. latis, basi obtusis, apice acuminatis, acuminibus 8–14 mm. longis, subintegerrimis vel crenulato-serrulatis, costa supra impressa, pubescente, subtus prominente, nervis lateralibus utrinque 6–8, supra et subtus prominentibus; inflorescentiis fructiferis fasciculatis axillaribus, uniflorous, pedicellis 2 mm. longis (floribus ignotis); fructibus globosis, 6 mm. diametro, stigmate discoideo; pyrenis 4, 4–4.5 mm. longis, 2–2.5 mm. latis, dorso palmatim striato-sulcatis, lateribus rugosis.

A small evergreen tree with densely pubescent branchlets, oblong or oblong-elliptic, subentire or minutely crenulate-serrulate leaves with acuminate apices, and small globose fruits with thickly discoid stigmata.

Branchlets cinereous; third year's growth 3 mm. in diameter, pubescent, longitudinally rimulose, the lenticels lacking, the leaf-scars semi-orbicular, with acute persistent stipules; axillary buds globose; second year's growth thinner, longitudinally striate, densely pubescent; current year's growth striate and canaliculate, 2 mm. in diameter; terminal bud naked, very densely pilose. Leaves found also on second year's growth, 5–15 mm. apart; stipules minute, deltoid, acute, usually covered by hairs, persistent; petioles 5–7 mm. long, ca. 15 times shorter than the lamina, densely pubescent, canaliculate above; lamina coriaceous, when dry olivaceous, slightly shiny above, opaque, and pilose underneath, oblong or oblong-elliptic, 5–12 cm. long, 2.2–3.2 cm. wide; base obtuse; apex acuminate, the acumen 8–14 mm. long, the very apex acute; margin subentire or

inconspicuously minutely crenulate-serrulate; midrib impressed and pubescent above, prominently elevated below, the lateral nerves 6–8 pairs, conspicuous on both surfaces, the reticulation of the veinlets evident above, obscure below. Flowers not seen. Infructescences fasciculate, axillary on last year's growth, the bracts thick-coriaceous, deltoid, acuminate, pubescent, ciliate; basal appendage stipule-like; individual branches uniflorous, the pedicels 2 mm. long, the prophylla 2, basal. Fruits globose, 6 mm. in diameter, the persistent calyx orbicular in outline, 2 mm. in diameter, the lobes very shallow, rounded, ciliate; stigma thickly discoid, convex, on a very short style. Pyrenes 4, oblong in outline, 4–4.5 mm. long, 2–2.5 mm. wide, palmately striate and sulcate on the dorsal surface and longitudinally impressed along the median line, the sides wrinkled, pitted and rugose, the endocarp stony.

CHINA: Kwangsi: Ping-nan-hsien, C. Wang 40428 (TYPE, A).

A species endemic to eastern Kwangsi, where it grows as a tree in mixed forest. In November its fruits are still green, while the closely related *Ilex nanningensis* Hand.-Mzt. has red fruit as early as October. *Ilex pingnanensis* appears to be a late-blooming species.

Because of its thick indumentum, *Ilex pingnanensis* has been mistaken for *Ilex nanningensis* Hand.-Mzt. However, its small fruits, prominent stigma, short pedicels, and larger leaves with prominent lateral nerves on both surfaces readily distinguish it from the latter. The fruit and pyrene characters of the species indicate a close relationship with *Ilex formosana* Maxim. The latter, however, has glabrous stems and leaves and its persistent explanate calyx is square in outline.

71. *Ilex subrugosa* Loes. in Sarg. Pl. Wils. 1: 80. 1911; Chung in Mem. Sci. Soc. China 1: 141. 1924; S. Y. Hu in Ic. Pl. Omei. 2: pl. 166. 1946.

Ilex latifolia Thunb. var. *subrugosa* (Loes.) Hu & Tang in Bull. Fan. Mem. Bot. 9: 253. 1940. *Syn nov.*

An evergreen tree up to 10 m. high with pubescent branchlets, coriaceous lanceolate or elliptic-lanceolate long-acuminate serrate leaves, fasciculate or pseudoracemose inflorescences, globose tuberculate fruits, and 4 palmately rugose pyrenes.

Branchlets subterete, 3 years' growth pubescent, 3 mm. in diameter, the lenticels lacking, the second year's growth 2.75 mm. in diameter, longitudinally striate, pubescent; current year's growth 2 mm. in diameter densely pubescent; terminal buds well developed, conical, puberulous, scales ciliate, outer ones serrate. Leaves occurring also on second year's growth, 6–10 mm. apart; stipules very minute, callose; petioles 4–10 mm. long, 7–10 times shorter than the lamina, pubescent, narrowly and deeply sulcate above, the lamina coriaceous, olivaceous when dry, shiny above, opaque beneath or on both surfaces, pubescent at the bases and along the midribs above, sparsely puberulous beneath, lanceolate- or oblong-elliptic, 4–10 cm. long, 2–3 cm. wide; obtuse or acute at the base; acuminate at the apex, the acumen 7–20 mm. long, serrate, the very tip obtuse; the

margin serrate, the midrib impressed and puberulous above, elevated and glabrous beneath, the lateral nerves 5–8 on each side, obscure on both surfaces, the reticulation of the veinlets sometimes evident beneath. Inflorescence fasciculate or pseudoracemose, axillary, on second year's growth only, central axis up to 7 mm. long, puberulous, the bracts ovate, 2–3 mm. long, puberulous; individual branches of the fascicles uniflorous, rarely 2–3-flowered in the staminate inflorescence; flowers 4-merous. Staminate inflorescence: pedicels 2–3 mm. long, pubescent, with 2 large median prophylla 2 mm. long; calyx patelliform, 2 mm. across, puberulous, shallowly 4-lobed, the lobes rounded, ciliate; corolla rotate, 6–7 mm. across, the petals oblong, 3 mm. long, one-tenth connate at the base, stamens equaling the petals in length, the anthers ovate-oblong; rudimentary ovary globose-ovoid, apex obtuse, inconspicuously lobed. Pistillate inflorescence: pedicels 4–6 mm. long, pubescent with 2 pubescent, lanceolate basal prophylla; calyx patelliform, shallowly 4-lobed, the lobes deltoid, ciliate; corolla choripetalous, the petals obovate, 3 mm. long, 1.75 mm. wide, eciliate; staminodes one-third shorter than the petals, the sterile anthers sagittate; ovary ovoid, 2 mm. long, the style evident, the stigma thickly discoid or capitate. Fruits globose-ellipsoid, 5–6 mm. long, 4–5 mm. in diameter, the persistent calyx explanate, quadrangular in outline, ciliate; stigma conspicuous, thick-discoid, 4-lobed. Pyrenes 4, obovate, the smaller end pointed, 3.5 mm. long, 2 mm. wide, the dorsal surface palmately striate, sulcate, and slightly impressed at the larger end, shallowly striate-sulcate, the endocarp woody.

CHINA: Szechuan: Mt. Omei, S. S. Chien 5556 (A); H. C. Chow 7802 (Sz), 8184 (Sz); W. P. Fang 3199 (A), 3213 (A, SS), 14698 (Sz), 14669 (Sz), 14816 (Sz), 15186 (Sz), 15231 (Sz), 15304 (Sz), 16063 (Sz), 16147 (Sz), 16828 (Sz), 17193 (Sz), 18316 (Sz), 18321 (Sz), 18334 (Sz), 18389 (Sz), 18426 (Sz), 18660 (Sz), 18962 (Sz); S. N. Hsu 605 (SS); T. C. Lee 2708 (Sz), 3738 (Sz); C. L. Sun 318 (Sz), 338 (Sz), 511 (Sz), 1439 (Sz), 1545 (Sz), 1606 (Sz), 1624 (Sz), 1996 (Sz); C. W. Yao 3222 (SS); Hung-yah, Wa-wu-shan, E. H. Wilson 3099 (A, TYPE; SS, photo); C. W. Yao 3637 (SS), 4112 (SS). Sikang: Lu-shan-hsien, K. L. Chu 4087 (SS).

Ilex subrugosa is closely related to *Ilex chieniana* S. Y. Hu, but the latter has 1–3-flowered individual branches of staminate fascicles, glabrous branchlets and leaves. It is also closely related to *Ilex intermedia* Loes., but that is separable by its smaller fruit, large elliptic remotely crenulate or coarsely serrate leaves and small orbicular, almost smooth pyrenes.

72. *Ilex brachyphylla* (Hand.-Mzt.), comb. nov.

Ilex ficoidea Hemsl. var. *brachyphylla* Hand.-Mzt. Symb. Sin. 7: 658, pl. 10, fig. 23. 1933.

A small evergreen tree up to 4 m. high with glabrous branchlets, oblong-ovate, serrate, acuminate leaves, rather large flowers and puberulent rudimentary ovaries.

Branchlets straight, second year's growth terete, 3 mm. in diameter, castaneous, glabrous, the lenticels lacking, the current year's growth sub-

angular, 1.75–2.5 mm. in diameter, somewhat sulcate; terminal buds lanceolate, the scales glabrous, sparsely ciliate. Leaves found on last year's growth, 10–15 mm. distant from one another; stipules obscure; petioles 6–9 mm. long, one-tenth to one-seventh the length of the lamina, deeply canaliculate above, plicate-rugose below, entirely glabrous; lamina oblong-ovate, 5–9 cm. long, 2–3.5 cm. wide; base rounded or obtuse; apex abruptly acuminate, the acumen 10–12 mm. long, the very apex obtuse; midrib narrowly sulcate above, elevated below, glabrous, lateral nerves 6–7 pairs, obscure above, evident below, the reticulations of the veinlets evident beneath. Inflorescences fasciculate, axillary, on the second or even the third year's growth; bud-scales of the inflorescences persistent, ovate, 2 mm. long and wide, obtuse at the apex; individual branches of the fascicles usually uniflorous, rarely 3-flowered, the bracts membranous, ovate-deltoid, obtuse, 2 mm. long, ciliate, with 2 ciliate stipule-like appendages, when 3-flowered the peduncle 1 mm. long, the pedicel 1–2 mm. long, both puberulent, when uniflorous the pedicel 2–3 mm. long, the prophylla 2, median, submedian or rarely close to the calyx, ovate, strongly keeled, ciliate, obtuse at the apex; flower 4-merous; calyx patelliform, 2.5 mm. across, glabrous, deeply 4-lobed, the lobes suborbicular or broad-ovate, 1 mm. long and wide, glabrous, ciliate at the margin; corolla rotate, 8–9 mm. across, the petals oblong, 3.5 mm. long, sparsely ciliate at the apical ends, one-ninth connate at the base; stamens 4, equal or slightly longer than the petals, the anthers oblong, 1 mm. long; rudimentary ovary globose, 1 mm. in diameter, densely puberulent on the apical half; female flowers and fruits not seen.

CHINA: Hunan: Yün-san near Wukang, *Wang Te-hui* collected for Handel-Mazzetti, 12810 (ISOTYPE for *I. ficoidea* var. *brachyphylla*, A).

A species endemic to the great lake region of Hunan Province. It grows at an altitude of 1250–1300 m. and its yellowish flowers appear in April.

This species is closely related to *Ilex ficoidea* Hemsl., which it resembles in having oblong leaves with caudate apices and appendaged floral bracts. *Ilex ficoidea* has glabrous rudimentary ovaries, puberulent calyx-lobes, and 3-flowered individual branches of the staminate fascicles, while *Ilex brachyphylla* has densely puberulent rudimentary ovaries, glabrous calyx, and the staminate fascicles with uniflorous individual branches. The puberulent rudimentary ovary is unique in *Ilex*. This character alone is sufficient to raise Handel-Mazzetti's variety to specific rank.

73. *Ilex peiradena*, sp. nov.

Frutex glaber; foliis coriaceis, lanceolatis, 4–7.5 cm. longis, 1.2–2 cm. latis, basi cuneatis, apice acuminatis, acuminibus 5–8 mm. longis, subintegris vel glanduloso-crenulatis, subtus punctatis, costa supra impressa, subtus elevata, nervis lateralibus utrinque 5–6, supra obscuris, subtus evidentibus; inflorescentiis fasciculatis, axillaribus, unifloris, floribus 4-meris; pedicellis 2–3 mm. longis, calycibus ciliatis; corolla rotata, 6–7 mm. diametro, petalis 3 mm. longis, basi connatis, staminibus 4, ovario abortu subgloboso-pulvinato, apice truncato; pedicellis 3–5 mm. longis; corolla

erecta, choripetala, staminodiis quam petalis $\frac{1}{3}$ brevioribus, ovario globoso; fructibus subglobosis, 3 mm. longis, 4 mm. diametro, stigmatibus crasse discoideo; pyrenis 4, 2.5 mm. longis, 2 mm. latis, dorso palmatim striato-sulcatis, depressis, lateribus rugosis.

An entirely glabrous shrub up to 2 m. high with rather slender cinereous branchlets, lanceolate subentire minutely crenulate narrow leaves with unevenly punctate lower surfaces, fasciculate inflorescences, and globose fruits with 4 suborbicular, wrinkled-pitted rugose stony pyrenes.

Branchlets straight, longitudinally striate-rugose, cinereous when dry; third year's growth subterete, 3 mm. in diameter, irregularly wrinkled-rugose, the lenticels lacking, the leaf-scars obovate, deltoid; second year's growth of like nature, 2.5 mm. in diameter; current year's growth angular, longitudinally striate-ridged, cinnamon-cinereous when dry, 2 mm. in diameter; terminal buds thinly conical, acute, glabrous. Leaves found even on third year's growth, 5–15 mm. apart; stipules obscure; petioles 6–10 mm. long, 7–8 times shorter than the lamina, glabrous, narrowly canaliculate above, broadly winged toward the end by the decurrent base; lamina coriaceous, uniformly fuscous when dry, slightly shiny or opaque on both surfaces, unevenly punctate beneath, lanceolate, 4–7.5 cm. long, 1.2–2 cm. wide; apex short-acuminate, the acumen 5–8 mm. long; cuneate at the base; margin subentire or minutely glandular-crenulate; midrib impressed above, elevated beneath, the lateral nerves 5–6 pairs, obscure above, evident beneath, the reticulation of the veinlets obscure on both surfaces. Inflorescences fasciculate, axillary on second year's growth, the individual branches of the fascicles uniformly uniflorous; the scales of the flower-bud persistent, cartilaginous, glabrous, ciliate; the bracts acute, deltoid, keeled, ciliate; all flowers 4-merous. Staminate inflorescence: pedicels 2–3 mm. long, with 2 basal prophylla; calyx patelliform, 2 mm. across, the lobes minute, ciliate; corolla rotate, 6–7 mm. across, the petals 3 mm. long, connate only at the very base, ciliate; stamens equaling the petals in length, the anthers ovate, 0.75 mm. long; the rudimentary ovary minute, subglobose-pulvinate, truncate at the apex. Pistillate inflorescence: pedicels up to 5 mm. long after fruiting (the prophylla and calyx as in the staminate flowers); corolla choripetalous, the petals 2.5 mm. long; the staminodes two-thirds the length of the petals, the sterile anthers ovate; the ovary globose, the stigma thick-discoid. Fruit subglobose, 3 mm. long, 4 mm. in diameter, when dry longitudinally sulcate; persistent calyx quadrangular in outline, explanate, 2 mm. across, ciliate; stigma thick-discoid, distinctly 4-lobed. Pyrenes 4, suborbicular in outline, 2.5 mm. long, 2 mm. wide, palmately striate on the dorsal surface, sulcate and slightly depressed, the sides wrinkled and pitted, rugose, the endocarp stony.

CHINA: Kwangsi: South of Nan-ning, Seh-feng-dar-shan, *R. C. Ching* 8091 (NY), 8092 (NY); Shang-sze-hsien, Shap-nan-tai-shan, *W. T. Tsang* 21964 (A), 22645 (TYPE, A), 23919 (NY).

This species is endemic to the high mountains on the border of Kwangsi-Kwangtung and Indo-China. There it grows as a shrub in swamps or

thickets. The flowers appear in March and by July the fruits become yellow.

In the glabrous branchlets, the fasciculate inflorescences, the small calyx of the fruit and the suborbicular, rugose and palmately striate pyrenes, *Ilex peiradena* resembles *Ilex ficoidea* Hemsl., but the latter has oblong or ovate-elliptic leaves, epunctate on the lower surface, and 1-3-flowered branches in the staminate fascicle. Superficially the leaves of this species resemble those of *Ilex metabaptista* Loes., which belongs to a different section, as shown by its prominently pedunculate staminate cymes and reticulate striate pyrenes with smooth coriaceous endocarps.

74. *Ilex corallina* Franch. in Bull. Soc. Bot. Fr. 33: 452. 1886, Pl. Delav. 2: 127. 1889; Loes. ex Diels in Bot. Jahrb. 29: 436. 1900, in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 327 (Monog. Aquif. 1: 327). 1901, et in Sarg. Pl. Wils. 1: 80. 1911; Chung in Mem. Sci. Soc. China 1: 139. 1924; Anon. in Notes Bot. Gard. Edinb. 17: 114. 1929; Hand.-Mzt. Symb. Sin. 7: 656. 1933; Rehd. in Jour. Arnold Arb. 14: 241. 1933; S. Y. Hu in Ic. Pl. Omei. 2: pl. 168. 1946.

Ilex corallina var. *aberrans* Hand.-Mzt. Symb. Sin. 7: 657. 1933. *Syn. nov.*

Ilex corallina var. *loeseneri* H. Lévl. Fl. Kouy-Tchéou 200. 1914, *nomen*; Rehd. in Jour. Arnold Arb. 14: 242. 1933. *Syn. nov.*

An entirely glabrous tree up to 10 m. high with slender branchlets, coriaceous, ovate, ovate-elliptic or ovate-lanceolate leaves, undulate, irregularly crenulate, serrate or often weakly spinose margins, fasciculate inflorescences, glabrous ovary, small globose fruits and minute rugose palmately striate almost esulcate pyrenes.

Branchlets slender, straight; third year's growth 4 mm. in diameter, the lenticels minute, inconspicuous, circular, the leaf-scars narrow-deltoid, slightly elevated; second year's growth subterete, rugose when dry, the lenticels lacking; current year's growth 1.5-2 mm. in diameter, angular, longitudinally striate, the terminal buds minute, oblique, glabrous or sparsely puberulent, the scales ciliate. Leaves occurring even on third year's growth, 6-20 mm. apart; stipules minute, deltoid, callose; petiole 4-9 mm. long, 11-12 times (in the juvenile form up to 20 times) shorter than the lamina, when dry often rufous, deeply canaliculate above; lamina coriaceous, when dry olivaceous or cinnamomeous-shiny above, opaque underneath, ovate, ovate-elliptic or ovate-lanceolate; 5-13 cm. long, 1.5-5 cm. wide; rounded or obtuse at the base; acute or very shortly acuminate at the apex, the acumen up to 1 cm. long, broadly deltoid; margin crenate-serrate or in the juvenile form spinosely toothed, the teeth nigrescent, apiculate; midrib sulcate, glabrous or rarely puberulent above, elevated beneath, the lateral nerves 7-10 pairs, evident on both surfaces, the reticulation of the veinlets obscure on both surfaces. Inflorescences fasciculate, subsessile, axillary, on the second year's growth, the bracts ovate-deltoid, glabrous or puberulent, ciliate; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 1-3-flowered, the peduncles of the

3-flowered cymes 1 mm. long, the pedicels 2 mm. long, with 0–2 basal, very sparsely ciliate prophylla; calyx patelliform, 2 mm. across, deeply 4-lobed, the lobes ovate-deltoid, 0.75 mm. long, obtuse, ciliate; corolla 6–7 mm. across, rotate, the petals oblong, 3 mm. long, eciliate, one-eighth connate at the base; stamens equaling the petals in length, the anthers oblong, 1 mm. long; rudimentary ovary subglobose, the apex rounded, inconspicuously 4-lobed. Pistillate inflorescence: individual branches of the fascicles uniflorous, the pedicels 1–2 mm. long, with 2 large basal prophylla reaching the calyx; calyx-lobes rounded, ciliate; corolla erect, choripetalous, the petals ovate, 2 mm. long; staminodes one-third shorter than the petals, the sterile anthers caudate; ovary ovoid, 1.5 mm. long, 1 mm. in diameter, the apical end truncate, the stigma thinly discoid. Fruit small, subglobose, 3 mm. long, 4 mm. in diameter, when dry rugose, purplish red, subsessile, the persistent prophylla reaching the calyx, the stigma plane, discoid, nigrescent. Pyrenes 4, orbicular-trigonous in outline, 2–2.5 mm. long, 1.5 mm. wide on the dorsal surface, rugose, obscurely palmately striate-sulcate, endocarp lignified.

CHINA: Hupei: *H. C. Chow* 1755 (NY); I-chang, *A. Henry* 3344 (A, US), 2276 (A, NY, US), 7600 (NY), 7847 (US); *E. H. Wilson* 6 (A, US), 46 (A, US), 107 (A, NY, US). Kweichow: Tung-tze, *Y. Tsiang* 4964 (NY); Yin-kiang, *Y. Tsiang* 7715 (NY). Szechuan: Kwang-yun, *W. P. Fang* 5562 (A, SS); Mt. Omei and Kia-ting, *C. Y. Chiao* & *S. C. Fan* 348 (A); *C. L. Chow* 4866 (Sz), 5457 (Sz), 5568 (Sz), 5601 (Sz), 6368 (Sz), 7077 (Sz); *H. C. Chow* 8145 (A), 8574 (A), 8776 (A), 9070 (A), 9224 (A), 9284 (A), 9346A (A), 9612 (A), 12049 (A), 12063 (A); *H. H. Chung* 93 (A); *W. P. Fang* 12170 (A), 12579 (SS), 13807 (Sz), 15004 (Sz), 15278 (Sz), 15363 (Sz), 15615 (Sz), 15745 (Sz), 15824 (Sz), 15883 (Sz), 15994 (Sz), 16939 (Sz), 17414 (Sz), 17613 (Sz), 18137 (Sz), 18188 (Sz), 18249 (Sz); *T. C. Lee* 2802 (Sz), 3022 (Sz), 4504 (Sz), 4557 (Sz), 4558 (Sz), 5882 (Sz), 4634 (Sz); *Y. L. Liu* 1278 (A), 1843 (A); *C. L. Sun* 2040 (Sz), 5058 (Sz); *L. Y. Tai* 625 (A), 700 (A), 1164 (A), 1181 (A), 1189 (A), 1444 (A), 1486 (A); *T. H. Tu* 823 (SS), 833 (SS), 967 (SS), 985 (SS); *E. H. Wilson* 3320 (A, P); *C. W. Yao* 3257 (SS), 5059 (SS), 5096 (SS); *T. T. Yu* 283 (A); Nan-chuan-hsien, *K. L. Chu* 870 (SS); *S. C. Yang* 3001; *W. P. Fang* 5831 (SS); western Szechuan, *E. H. Wilson* 1269 (US), 4222 (US). Sikang: Pao-hsien (Mu-ping), *C. Pei* 8248 (SS); Lu-shan-hsien, *K. L. Chu* 4018 (SS). Yunnan: Li-kiang, *R. C. Ching* 21654 (A); *F. Ducloux* 118 (NY); *K. M. Feng* 406 (A), 2597 (A), 2959 (A); *Handel-Mazzetti* 7582 (PARATYPE of *Ilex corallina* var. *aberrans*, A); *C. Schneider* 3204 (A); Yong-pè, *F. Ducloux* 4713 (P); Ta-pin-tze, Ta-li, *Delavay* in 1885 (P); Chung-tien, *K. M. Feng* 873 (A), 3129 (A); *G. Forrest* 10513 (A), 11232 (A), 13731 (A), 15378 (A), 16601 (A), 20670 (A), 20680 (US); Mi-ne, *A. Henry* 10024 (NY); Meng-tze, *A. Henry* 10024A (NY, US); Yun-nan-fu, *C. Schneider* 274 (A, K, P), 309 (A, K, P), 4034 (A); *Siméon Tén* 572 (A); *H. T. Tsai* 57086 (A). Kweichow: *E. Bodinier* 2242 (SYNTYPE of *Ilex corallina* var. *loeseneri*, fragments & photo, A); *J. Cavalerie* 580 (SYNTYPE of *Ilex corallina* var. *loeseneri*, fragments & photo, A); *S. W. Teng* 90017 (A), 90611 (A); *Y. Tsiang* 7367 (NY).

Ilex corallina was first described from Yunnan. It grows as a shrub or small tree in mixed forest at an altitude of 2100–3000 m., where it flowers in May and the fruit turns red in September. Additional material has been collected from Szechuan, Kweichow, and Hupei (Hupeh). Many specimens have been collected from Mt. Omei, where it grows as a tree in mixed forest at an altitude varying from 600 m. up to 1950 m. One specimen is recorded as having been collected at Kwang-yun in Szechuan Province, Lat. $32^{\circ}45'N$. If this record is correct, it marks the most northerly limit for *Ilex* in China, not counting cultivated species such as *Ilex chinensis* Sims, *I. crenata* Thunb., *I. corallina* and *I. pernyi* Franch. The plants from Hupei, Kweichow, and Szechuan generally have larger and more sharply toothed leaves than those from Yunnan.

Wilson 6 is a mixture of fruiting, staminate, and pistillate specimens. For the sake of convenience I have distinguished these on the sheet at the Arnold Arboretum as follows: *6A*, specimens with pistillate flowers, material upon which the description of the pistillate flower is drawn; *6B*, specimens with staminate flowers; and *6C*, the fruiting specimen.

As regards the size and dentation of the leaf, *Ilex corallina* is a very variable species. When the plant is young or vigorous, the leaves tend to elongate and to have spinose teeth. Certain specimens at the Arnold Arboretum are from juvenile forms of the plants raised from seeds of normal spineless plants collected by E. H. Wilson. Their leaves are 10–14 cm. long, 3.5 cm. wide, and bear 15–20 spines up to 3 mm. long. The petioles are 13–20 times shorter than the lamina. Various varieties of *Ilex corallina* are founded on juvenile forms such as these. In nature, when *Ilex corallina* is cut by fuel gatherers, the shoots that spring from the stump are more vigorous than a normal plant. They may even bear flowers and fruits when only a year old. Such abnormal forms appear to be represented in *Ilex corallina* var. *aberrans* Hand.-Mzt. and *I. corallina* var. *loeseneri* H. Lévl. ex Rehd.

74a. *Ilex corallina* var. *pubescens*, var. nov.

Arbor parva, ramulis pubescentibus; foliis ovato-ellipticis vel ovato-lanceolatis, 3–9 cm. longis, 1.5–3.5 cm. latis, basi rotundatis, apice acutis vel acuminatis, costa supra subtusque pubescente; inflorescentibus fasciculatis, fructibus 3 mm. diametro; pyrenis 2–2.5 mm. longis.

CHINA: Hupei: En-shih-hsien, H. C. Chow 1755 (A). Szechuan: Chengtu Plain, F. T. Wang 22163 (A). Yunnan: Wei-hsi, J. F. Rock 11577 (A); Li-kiang, C. Schneider 3195 (A); Kou-ty, Siméon Tén 436 (A); H. T. Tsai 57125 (A), 57276 (A), 57526 (A); La-tsa, T. T. Yu 10918 (A), 22890 (TYPE, A).

This variety seems to occur wherever typical *Ilex corallina* Franch. grows, except that it is usually found at lower altitudes. In Yunnan, it flowers in early February, while the red fruit matures in October.

This variety differs from typical *Ilex corallina* Franch. in having pubescent branchlets, terminal buds, and midrib.

74b. *Ilex corallina* var. *macrocarpa*, var. nov.

Arbor parva, ramulis glabris, foliis ovato-lanceolatis, arguto-serratis, apice acuminatis; infructescentibus fasciculatis, fructibus ellipsoideis, 6 mm. longis, 5 mm. diametro, stigmatibus crasse discoideo; pyrenis 4, 3.5–5 mm. longis, 1.5–2 mm. latis, dorso palmatim striatis sulcatisque, lateralibus striatis.

CHINA: Hupei (Hupeh): Chien-shih-hsien, *H. C. Chow* 155 (TYPE, A). Szechuan: Nan-chuan-hsien, *W. P. Fang* 5831 (A). Yunnan: Mi-lê, *A. Henry* 10024 (A).

This variety is found in the southeastern section of the range of *Ilex corallina*. There it grows in thickets as a small tree or shrub up to 4 m. high. Its fruits are still green in September.

The variety differs from typical *Ilex corallina* Franch. in having larger fruits (6 mm. in diameter) and larger pyrenes (3.5–5 mm. long).

75. *Ilex tephrophylla* (Loes.), comb. nov.

Ilex odorata Ham. ex D. Don var. *tephrophylla* Loes. in Nov. Act. Acad.

Caes. Leop.-Carol. Nat. Cur. 89: 286 (Monog. Aquif. 2: 286). 1908;

Chung in Mem. Sci. Soc. China 1: 141. 1924.

Symplocos tetramera Rehd. in Sarg. Pl. Wils. 3: 598. 1916.

An evergreen tree up to 10 m. high with glabrous or glabrescent branchlets, chartaceous or subcoriaceous subentire or crenulate oblong-elliptic leaves, fasciculate inflorescences, pea-sized globose drupes with minute navel-like stigma, small explanate suborbicular ciliate calyx and 4 palmately striate-sulcate pyrenes.

Branchlets subterete, griseous-coriaceous; second year's growth 2.5 mm. in diameter, longitudinally rimulose, rugose, the lenticels lacking, the leaf-scars suborbicular; current year's growth 2 mm. in diameter, angular, puberulous below the terminal buds or in the grooves, otherwise glabrous, the terminal buds naked, pubescent. Leaves occurring even on the third year's growth, 10–16 mm. apart; stipules deltoid, callose; petioles 4–8 mm. long, 12–15 times shorter than the lamina, puberulous and broadly and shallowly canaliculate above, the distal end winged by decurrent leaf-base; lamina subcoriaceous or chartaceous, when dry griseous-olivaceous, opaque on both surfaces, oblong-elliptic, 6–9.5 cm. long, 1.5–3.5 cm. wide; obtuse or rounded at the base; acuminate at the apex, the acumen 8–12 mm. long; margin minutely crenulate or subentire; midribs shallowly impressed and glabrescent or puberulous above, elevated and glabrous beneath, the lateral nerves 7–9 pairs, evident or obscure above, prominent or elevated beneath, anastomosing near the margin, the reticulation of the veinlets obscure above, evident beneath. Staminate inflorescences: fasciculate, axillary, on second year's growth, the individual branches of the fascicles 3-flowered, the bracts ovate, acute, ciliate, each with two stipule-like and ciliate basal appendages; peduncles very short, 0.5–1 mm. long, the pedicels 1–2 mm. long, both puberulous; prophylla 2, basal; flowers 4-merous; calyx patelliform, 1.5–2 mm. across, shallowly 4-lobed, lobes ciliate; corolla rotate, 5–6 mm. across, the petals one-eighth connate, the lobes obovate-oblong, 2 mm.

long, ciliate; stamens slightly longer than the petals, the anthers ovoid, 0.8 mm. long; rudimentary ovary subglobose-ovoid, abruptly acute at the apex, inconspicuously lobed. Pistillate flower not seen. Infructescence subracemose or fasciculate, the central axis up to 6 mm. long, the pedicels 1–3 mm. long, puberulous, the prophylla 2, basal. Fruit globose, 5–6 mm. in diameter, exocarp thin, the persistent calyx explanate, 1.5 mm. across, quadrangular in outline, ciliate, the stigma minute, navel-like, 0.8–1 mm. in diameter. Pyrenes 4, oval in outline, 3.5 mm. long, 2.5 mm. wide, acute at the ends, palmately striate, sulcate on the dorsal surface, flattened, and slightly impressed at one end, the sides wrinkled and pitted, endocarp bony.

CHINA: Kwangsi: Ling-wun, S. K. Lau 28630 (A), 28657 (A); Kwei-lin, W. T. Tsang 28292 (A, US). Yunnan: Szemao, A. Henry 12597 (ISOTYPE of *Ilex odorata* var. *tephrophylla*, in fruit, A, NY, US), 12597A (A, NY), 13273 (TYPE of *Symplocos tetramera*, A; ISOTYPE, NY); J. F. Rock 2740 (A, TYPE of staminate flower; US).

Ilex tephrophylla was first described by Loesener as a variety of *I. odorata* Ham. ex D. Don from Szemao, southeastern Yunnan. There it grows as a tree in the forests. The yellowish flowers appear in March, and the fruits turn red in October. Specimens from northern Kwangsi agree well with those from Yunnan.

I have studied authentic specimens (*Griffith 2007* and *Hooker & Thomson Ilex* (12) *odorata* Ham. ex D. Don) of *Ilex odorata*. The difference between the Yunnan and Indian material is too great for varietal differentiation only. *Ilex odorata* Ham. ex D. Don is very closely related to *Ilex denticulata* Wall. ex Wight, with which it agrees in having (1) small (3–6 cm. long, 1.5–2 cm. wide) coriaceous leaves, (2) discoid stigmata, and (3) pubescent pedicels up to 5 mm. long. The Chinese plant has chartaceous, large (7–9 cm. long) leaves, the small, navel-like stigma, and the very short (1–3 mm. long) pedicellate fruits. These characters are strong enough to set off the Yunnan entity as a species.

Ilex tephrophylla is closely related to *Ilex formosana* Maxim., but the latter has a discoid stigma and lanceolate leaves with cuneate base.

76. *Ilex formosana* Maxim. in Mém. Acad. Sci. St. Pétersb. VII, 29(3): 28, 46. 1881; Forbes & Hemsl. in Jour. Linn. Soc. Bot. 23: 116. 1886; Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 332 (Monog. Aquif. 1: 332). 1901; Hayata, Mat. Fl. Form. 54. 1911, et Ic. Pl. Form. 1: 131. 1911; Kanehira, Form. Trees 272, fig. 326. 1936.

Ilex ficoidea sensu Rehd. in Jour. Arnold Arb. 8: 157. 1927; sensu Hand.-Mzt. Symb. Sin. 7: 675. 1933, in part, non Hemsl.

Ilex kelungensis Loes. op. cit. 335; Kaneh. & Hatus. in Trans. Nat. Hist. Soc. Form. 29: 156. 1939. *Syn. nov.*

Ilex mutchagara sensu Kaneh. Form. Trees 378, fig. 335. 1936, non Makino. *Lindera glauca* sensu H. Lévl. Fl. Kouy-Tchéou 219. 1914, non Blume.

An evergreen tree up to 12 m. high (ex Tsang), with glabrous or glabrescent branchlets, elliptic or oblong-lanceolate acuminate leaves, cuneate at

the base, irregularly and minutely crenulate-serrulate at the margin, short petioles (5–9 mm. long), fasciculate pubescent inflorescences and thick-discoid or capitate stigmata.

Branchlets straight, cinereous when dry; fourth and third year's growth subterete, 3–4 mm. in diameter, minutely rimulose, the lenticels lacking, the leaf-scars semi-orbicular; current year's growth 1–2.5 mm. in diameter, shiny and cinereous when dry, angular, plicate-rugose, glabrous or glabrescent, the terminal buds well developed, conic, the scales pubescent. Leaves occurring also on second year's growth, 2–10 rarely up to 15 mm. apart; stipules minute, callose, deltoid, acute; petioles short, 5–9 mm. long, 12–17 times shorter than the lamina, plane or shallowly canaliculate above, narrowly winged by the decurrent leaf-base; lamina coriaceous or subcoriaceous, when dry griseous-olivaceous, opaque on both surfaces or slightly shiny above, elliptic or oblong-lanceolate, rarely oblanceolate, 6–9.8 cm. long, 1.9–3.3 cm. wide; base cuneate or very rarely obtuse; apex acuminate, the acumen 7–12 mm. long; margin remotely and minutely crenulate-serrulate or rarely only undulate; midrib slightly impressed above, elevated and prominent beneath, the lateral nerves 6–8 pairs, obscure above, evident beneath, the reticulation of the veinlets usually evident beneath. Inflorescences fasciculate (rarely the pistillate pseudoracemose with an axis 6–10 mm. long), axillary, on second year's growth; persistent bud-scales cartilaginous, glossy, glabrous, deltoid, 1 mm. long, 1.5 mm. wide, acute; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 3-flowered, cymose, the bracts broad ovate, 1.5–2 mm. long, pubescent, ciliate, mucronate, often with 2 stipule-like appendages; the peduncles 1 mm. long, minutely puberulent, the pedicels 2–3 mm. long, puberulous, with 2 basal prophylla; calyx patelliform, 2 mm. across, puberulent, broadly deltoid, ciliate, the apex rounded, rarely obtuse; corolla rotate, 6 mm. across, the petals 3 mm. long, 1.5 mm. wide, the apical half ciliate; stamens equaling the petals in length, the anthers ovate-oblong, 0.75 mm. long; rudimentary ovary globose, 1 mm. in diameter. Pistillate inflorescence: individual branches of the fascicles uniflorous, the bracts coriaceous, often caducous, deltoid, 0.75 mm. long, 2 mm. wide, the pedicels 2–3 mm. long, densely puberulent, with 2 basal prophylla; calyx as in the staminate flowers; corolla choripetalous, the petals ovate, 2.5 mm. long, ciliate; staminode one-third shorter than the petals, the sterile anthers ovate; ovary subglobose-ovoid, 1.5 mm. in diameter, the stigma thickly discoid, approaching capitate, 1 mm. in diameter. Fruit subglobose, 4 mm. long, 5 mm. across, the persistent calyx 2 mm. across, the stigma capitate, 4-lobed. Pyrenes 4, oblong or suborbicular in outline, 2.5 mm. long, 2.25 mm. wide, palmately striate and sulcate on the dorsal surface, rugose and deeply wrinkled along the sides, the endocarp stony.

CHINA: Anhwei: Wu-yuen, *K. Ling* (ex Herb. Univ. Nank. no. 7858) (A, US). Chekiang: S. Ping-Yung, *R. C. Ching 2046* (A, LU, NY, US). Kiangsi: Kien-nan, *S. K. Lau 2926* (A, US); Tsoong-jen, *Y. Tsiang 10185* (NY). Hunan: Chang-ning, *C. S. Fan & Y. Y. Li 157* (A); Chang-sa, Yo-lu-san, *Handel-Mazzetti 11609* (A, US); Yi-chang,

W. T. Tsang 23553 (A, US), 23637 (A, US). Kweichow: *J. Cavalerie* 1961 (fruiting fragment, A). Fukien: Shao-ning, *R. C. Ching* 2227¹ (A), 2228 (LU, US). Kwangtung: N. River, *W. Y. Chun* 7334 (A); *S. S. Sin* 11023 (NY); Kook-kiang, *S. P. Ko* 20223 (NY), 50207 (NY); Wung-yuen, *S. K. Lau* 2273 (A), 2312 (A); *To & Tsang* (LU 12368) (NY, US); Sing-fung, *Y. W. Taam* 518 (A), 794 (A); Lung-chuon, *C. L. Tso* 21611 (NY). Kwangsi: Ling-yun, *Steward & Cheo* 201 (A, NY); Pai-shou, *Y. W. Taam* 42 (A); Kwe-lin, *W. T. Tsang* 28292 (US); without precise locality, *C. Wang* 39337 (A). Taiwan: Bankinsing, *A. Henry* 440 (NY), 445 (NY), 830 (A, NY), 1852 (US); Taihoku, *G. Masamune* in 1938 (TU); *E. Matuda* 1209 (TU); *E. H. Wilson* 10147 (A, US); *R. Oldham* in 1864 (fragment of TYPE, A; ISOTYPE, G); *Y. Simada* 1276C (TU); *T. Suzuki* 19084 (TU); Urai, *T. Tanaka & Y. Shimada* (ex Herb. Taiwan Univ. no. 13562) (A, G, NY, US); *Y. Yamamoto* in 1929; Kelung, *O. Warburg* (ISOTYPE of *Ilex kalungensis*) (A).

PHILIPPINE ISLANDS: Luzon: Benguet, *A. D. E. Elmer* 8522 (G); *R. S. Williams* 922 (G).

Among all the Taiwanese specimens before me there is none that matches Maximowicz's type exactly. Those that possess the essential characters of *Ilex formosana* are very similar to the specimens collected from various parts of China. It seems likely that Oldham collected his specimen from a vigorously growing twig with larger, prominently toothed leaves. Warburg's specimen from Kelung, the type of *Ilex kelungensis* Loes., is clearly a form of the variable *Ilex formosana*.

This species is very closely related to *Ilex ficoidea* Hemsl. The two agree in having glabrous branchlets, leaves with caudate apices, fasciculate inflorescences, and 3-flowered staminate cymes subtended by appendaged bracts. *Ilex ficoidea*, however, has long canaliculate petioles (10–15 mm. long, 5–8 times shorter than the lamina), ovate-oblong lamina, and fruits with plane discoid stigmata, while *I. formosana* Maxim. has very short flat petioles (4–9 mm. long, 12–17 times shorter than the lamina), elliptic or oblong-lanceolate leaves, and thick-discoid or almost capitate stigmata.

76a. *Ilex formosana* var. *macropyrena*, var. nov.

Arbor; foliis elliptico-lanceolatis, 3.5–6.5 cm. longis, 1.5–2.2 cm. latis, subintegris, basi acutis, apice acuminatis; fructibus fasciculatis, globosis, 5–6 mm. diametro, stigmate prominente, capitato; pedicellis 2–3.5 mm. longis, prophyllis ciliatis, calycibus pubescentibus ciliatisque; pyrenis 4, oblongis, 4 mm. longis, 2.75 mm. latis, dorso palmatim striatis sulcatisque, lateralibus rugosis.

CHINA: Kwangtung: Wung-yuen, *S. K. Lau* 2269 (TYPE, A). Kwangsi: Chuen-yuen, *T. S. Tsoong* (= *Z. S. Chung*) 82068 (A).

This variety differs from the typical *Ilex formosana* in having smaller leaves and larger fruits and pyrenes.

77. *Ilex confertiflora* Merr. in Lingnan Sci. Jour. 13: 35. 1934.

A small evergreen tree or shrub up to 3.5 m. high with glabrous branch-

¹ *R. C. Ching* 2227 in Herb. Lingnan University is not an *Ilex*. It is *Buxus microphylla* S. & Z. var. *sinica* R. & W.

lets, thickly coriaceous oblong minutely serrate leaves, rounded at the base, very shortly acuminate at the apex, fasciculate globose fruits, and very short pedicels (1–2 mm. long).

Branchlets stout, straight, cinereous when dry; third year's growth 5 mm. in diameter, longitudinally rimulose, slightly plicate, the lenticels lacking, the leaf-scars semi-orbicular; second year's growth slightly thinner, rimulose; current year's growth subterete, plicate, angular, 3–4 mm. in diameter, glabrous; terminal buds thingly conical, acute, the axillary buds obtuse, conical or semi-orbicular, both minutely puberulent. Leaves occurring also on the second year's growth, 4–12 mm. apart; stipules callose or obscure, persistent; petioles thick, 7–10 mm. long, 10–12 times shorter than the lamina, 3 mm. wide, very narrowly canaliculate above, glabrous or very sparsely and minutely puberulent, rugose beneath; lamina very thickly coriaceous, when dry alutaceous-olivaceous, opaque or very slightly shiny above, opaque and straw-color beneath; rounded at the base, rarely obtuse; the apex abruptly and very shortly acuminate, the acumen deltoid, 3–5 mm. long; margin finely serrate, when dry narrowly recurvate, appearing subentire, the apices of the teeth nigrescent; midrib narrowly impressed, glabrous or very minutely and sparsely puberulent above, elevated and keeled near the apex beneath; lateral nerves 6–8 pairs, slightly elevated and sulcate above, obscure beneath, the reticulation loose, obscure. Inflorescence fasciculate, axillary on second year's growth; bracts deltoid, acute or cuspidate, puberulent, the basal appendage cuspidate, ciliate; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 3-flowered, peduncles 1 mm. long, the pedicels 1–2 mm. long, both puberulent; calyx patelliform, 2–2.5 mm. across, deeply lobed, the lobes deltoid, obtuse, glabrous, ciliate; corolla rotate, 7 mm. across, the petals oblong, 3 mm. long, ciliate at the apex; stamens one-third longer than the petals, anthers ovoid, 0.75 mm. long; rudimentary ovary subglobose, 0.5 mm. in diameter, apex rounded, inconspicuously lobed. Pistillate inflorescence: individual branches of the fascicles uniflorous, the pedicels 1.5–2 mm. long, puberulent, with 2 puberulent submedian prophylla; calyx patelliform, puberulent, ciliate; corolla choripetalous, 6 mm. across, the petals oblong, 2.5 mm. long, ciliate; staminodes two-thirds as long as the petals, the sterile anthers sagittate; ovary ovate-subglobose, glabrous, 2 mm. long, 1.5 mm. wide, stigma thickly discoid, quite convex and reflexed. Fruits globose, 5 mm. in diameter, the stigma thickly discoid, rectangular in outline; persistent calyx explanate, 2 mm. across, the lobes rounded, the pedicels 1–2 mm. long, puberulent, the prophylla submedian. Pyrenes 4, oblong in outline, 3.5–4 mm. long, 2.5 mm. wide, palmately striate, sulcate and broadly impressed on the dorsal surface, rugose and wrinkled along the side, the endocarp bony.

CHINA: Kwangtung: Loh-fou-shan, *C. O. Levine* (CCC 1567) (A, US), *E. D. Merrill* 11007 (A, NY); Tseng-shing, *W. T. Tsang* 20340 (material used for the description of the staminate flowers, A, K, LU, NY), 20347 (TYPE, NY; ISOTYPES, A, NY); Tsung-fa, *W. T. Tsang* 20468 (A, K, LU, NY, US), 25083 (A). Kwangsi: Shang-sze, *W. T. Tsang*

24305 (A). Lantau Island: Y. W. Taam 1749 (material used for description of the fruit, A). Hainan: Po-ting, F. C. How 73708 (A).

This species has been reported only from Kwangtung and its coastal islands. There it grows in forest borders as a small tree or shrub. The yellowish flowers appear in April.

The stout habit, the cinereous (when dry) branchlets, the rough texture of the foliage and the rounded base of the leaf of *Ilex confertiflora* are similar to those of *Ilex cinerea* Champ. The latter species differs, however, in its oblanceolate leaves with very short (2–3 mm. long) petioles. The fasciculate inflorescences, the short fruiting pedicels, and the globose fruit of *Ilex confertiflora* are like those of *I. ficoidea* Hemsl., but the latter has leaves with long-caudate apex and branchlets that are slender and castaneous when dry. It is an intermediate form between *I. cinerea* and *I. ficoidea*.

77a. *Ilex confertiflora* var. *kwangsiensis*, var. nov.

Arbor parva, ramulis glabris, cinereis; foliis oblanceolatis vel ellipticis, 10–13 cm. longis, 3–4.5 cm. latis, serratis, basi obtusis, apice acuminatis, acuminibus 5–10 mm. longis, costa supra impressa, nervis lateralibus supra et subtus evidentibus; infructescentibus pseudoracemosis, rhachibus prominentibus, 5–22 mm. longis, pubescentibus, pedicellis 1–2 mm. longis, pubescentibus; fructibus globosis, 5 mm. diametro, calycibus explanatis, 2 mm. diametro, stigmatibus discoideo, pyrenis 4.3 mm. longis, 2.24 mm. latis, dorso impressis, palmatim striatis et sulcatis.

CHINA: Kwangsi: Wai-tsap, W. T. Tsang 22723 (A); Yao-shan, C. Wang 40173 and 40512 (TYPE, A).

This variety is found in the eastern part of Kwangsi. There it grows as a small tree up to 12 m. high. The fruits are red in October.

This variety differs from the typical *Ilex confertiflora* in having larger leaves, longer acumens, and a prominent rachis (up to 22 mm. long) on the infructescence.

78. *Ilex ficoidea* Hemsl. in Jour. Linn. Soc. Bot. 23: 116. 1886; Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 328 (Monog. Aquif. 1: 328). 1901; Dunn & Tutchter in Kew Bull. Misc. Inf. Add. Ser. 10: 59. 1912; Chung in Mem. Sci. Soc. China 1: 140. 1924; Rehd. in Jour. Arnold Arb. 8: 157. 1927, 14: 345. 1933; Groff in Lingnan Sci. Bull. 2: 64. 1930; Hand.-Mzt. Symb. Sin. 7: 675. 1933; Merr. & Chun in Sunyats. 2: 265. 1935; Masamune Fl. Kain. [Hainan] 174. 1943.

Ilex cinerea sensu Maxim. in Mém. Acad. St. Pétersb. VII, 29(3): 28, 64. 1881, non Champ.

Ilex buergeri Miq. var. *glabra* Loes. op. cit. 89: 286. 1908. *Syn. nov.*

An evergreen tree up to 8 m. high with glabrous branchlets, oblong-ovate or elliptic unevenly crenate-serrate leaves, abruptly caudate apices, fasciculate inflorescences, subglobose red fruit, and palmately striate or irregularly wrinkled bony pyrenes. Branchlets straight, fourth year's growth 4.5 mm.

in diameter, minutely rimulose longitudinally, rather smooth, the lenticels lacking, the leaf-scars semicircular, not elevated, the third and second years' growth thinner, smooth; current year's growth striate-rugose, 2 mm. in diameter, glabrous. Leaves occurring also on the second year's growth, 10–15 mm. apart; stipules lacking or very minute; petioles 10–15 mm. long, 5–8 times shorter than the lamina, glabrous, deeply canaliculate above, cylindrical and rugose beneath; lamina coriaceous, olivaceous when dry, opaque on both surfaces or slightly shiny above, oblong-elliptic, ovate- or rarely obovate-elliptic, 5–9 cm. long, 1.5–3.5 cm. wide; base obtuse or rounded; apex abruptly long-caudate, the acumen up to 15 mm. long, the very tip obtuse; margin irregularly crenate-serrate, the apex of the teeth nigrescent, when dry recurvate appearing subentire; midrib glabrous, narrowly impressed above, prominently elevated beneath, the lateral nerves 7–10, straight, parallel, usually inconspicuous on both surfaces. Inflorescences fasciculate, axillary on the second year's growth, the bracts broadly deltoid, 1 mm. long, 2 mm. wide, ciliate; flowers 4-merous. Staminate inflorescence: the branches of the fascicles 1–3-flowered, cymose, the bracts scaly, keeled, acute, ciliate, ovate, 1 mm. long, with 2 stipule-like basal appendages; peduncles 1–2 mm. long, the pedicels 1–3 mm. long, with 2 ciliate basal or sub-basal or supermedian prophylla; the calyx patelliform, 2–2.5 mm. in diameter, the lobes deltoid, acute, ciliate, membranaceous, glabrous; corolla rotate, 6 mm. across, the petals ovate-oblong, 3 mm. long, 1.5 mm. wide, ciliate along the apical half, slightly connate at the base; stamens one-fifth longer than the petals, the anthers oblong-ovoid; rudimentary ovary minute, conical ovoid, 1 mm. in diameter, obscurely 4-lobed at the apex. Pistillate inflorescence: individual branches of the fascicles uniflorous, the pedicels 2–3 mm. long with 2 ciliate basal prophylla; the calyx patelliform, puberulous or glabrescent, the lobes often keeled; the corolla erect, choripetalous, 3–4 mm. in diameter, the petals ovate, 2.5 mm. long, ciliate; staminodes equaling the petals in length, the sterile anthers minute, ovate; the ovary large, ovoid, 2 mm. long, 1.25 mm. in diameter, the stigma discoid. Fruit globose or subglobose, 5–7 mm. in diameter, tuberculate under a lens, the stigma thin-discoid or navel-like. Pyrenes 4, oblong-elliptic or suborbicular, 2–4 mm. long, 1.75–2.5 mm. wide, palmately striate on the dorsal surface, sulcate and slightly depressed along the median longitudinal line, the striae often branched, the sides rugose, pitted and wrinkled, the endocarp stony.

CHINA: Chekiang: Sia-chu, *R. C. Ching* 1646 (A, US); Wenchow, *R. C. Ching* 1862 (A, LU, US); Sung-yang-hsien, *H. H. Hu* 420 (A). Hupei: Enshih-hsien, *H. C. Chow* 1839 (A, NY). Fukien: Kushan, *H. H. Chung* 8670 (A, LU), 8483 (A, LU, NY). Kwangtung: Tsingyun, *Y. F. Chun* 30503 (NY); Yim-na-san, *J. L. Gressitt* 1367A (A); Loh-fau-shan, *C. O. Levine* (CCC 606) (A, US); *E. D. Merrill* 10250 (A), 10993 (A); Yao-shan, *S. S. Sin* 9080 (NY), 11831 (NY); Sin-fung, *W. Y. Taam* 215 (A), 326 (A), 648 (A); Mei-hsien, *W. T. Tsang* 21382 (A, NY); Tsung-fa, *W. T. Tsang* 20500 (A, NY, US), 24912 (A), 24926 (A), 24986 (A), 25121 (A); Tseng-shing, *W. T. Tsang* 20340 (A, NY, US); Loh-

ch'ang, *W. T. Tsang* 20824 (A, NY); Hwei-yang, *W. T. Tsang* 25481 (A); Jen-hwa, *W. T. Tsang* 26145 (A), 26164 (A), 26268 (A), and 26473 (A). Hongkong: Happy Valley, *Ford* 31 (ISOTYPE, NY; photo of TYPE, A); *Ford* (staminate flower, A, NY); Herb. Hongk. no. 8251 (A); *Y. K. Wang* 3026 (NY), 3040 (NY). Hainan: Fan-yah, *N. K. Chun & C. L. Tso* 44223 (A, NY, US); *C. Wang* 36535 (NY). Taiwan: Mount Okaseki, *U. Faurie* 39 (HOLOTYPE of *Ilex buergeri* var. *glabra*, A); without precise locality, *R. Kanehira* 21147 (A); *E. Matuda* in 1917 (TU); *Nakamura* 3953 (TU), 4279 (TU); Sirin, Taihoku-sju, *K. Odashima* 17739 (A, NY, US); *E. H. Wilson* 9946 (A).

LIUKIU ISLAND: *R. Kanehira* 3367 (NY); *E. H. Wilson* 8106 (A).

Ilex ficoidea is a common tree in the woods and thickets of eastern Asia and has been recorded from the islands as well as the mainland. It grows at an altitude of 150–1880 m. The greenish yellow fragrant flowers appear in March or April. The fruit is red at maturity.

This is a very variable species. The size and shape of the leaves vary from 5 to 9 cm. in length and from ovate to oblong-elliptic. The diameter of the fruit varies from 4 to 7 mm. The prophylla on the same flowering branch vary in position from basal to submedian and even supermedian. The size of the pyrene varies from 2.5–4 mm. long. After a careful study of the isotype, I have restricted the species to those specimens having glabrous branchlets, ovate-elliptic or oblong-elliptic leaves with crenate-serrate margin, caudate apices, globose or subglobose fruits with thin-discoid or navel-like stigmata and palmately striate, sulcate and irregularly wrinkled stony pyrenes with branched striae.

This species is closely related to *Ilex buergeri* Miq., which differs in having pubescent branchlets and staminate fascicles with uniflorous branches.

79. *Ilex subodorata*, sp. nov.

Ilex franchetiana sensu Comber in Notes Bot. Gard. Edinb. 18: 48. 1933, non Loes.

Arbor glabra; foliis coriaceis, elliptico-lanceolatis vel oblanceolatis, 6–9 cm. longis, 2–3 cm. latis, basi cuneatis, apice acuminatis (acuminibus 5–12 mm. longis), margine serratis, costa supra impressa, subtus elevata, nervis lateralibus utrinque 7–9, subtus evidentibus; inflorescentiis fasciculatis vel raro pseudopaniculatis, axillaribus, puberulis, 3-floris, pedunculis 0.5–2 mm. longis, floribus 4-meris, pedicellis 3–4 mm. longis, calycibus ciliatis; corolla 6 mm. diametro, petalis oblongis, eciliatis; staminibus 4; ovario abortu subgloboso-ovoideo, apice obtuso; infructescentiis fasciculatis, unifloris, pedicellis 1–2 mm. longis, pubescentibus; fructibus depresso-globosis, 4 mm. longis, 5 mm. diametro, stigmatibus umbilicatis; pyrenis 4, 3 mm. longis, 2.5 mm. latis, dorso palmatim striatis et sulcatis, lateralibus rugosis.

An evergreen tree up to 12 m. high with glabrous branchlets, coriaceous elliptic-lanceolate or oblanceolate serrate leaves, fasciculate or pseudo-paniculate inflorescences, shortly pedicellate fruits with navel-like 4-lobed stigma and 4 subglobosely trigonous wrinkled and rugose pyrenes.

Branchlets stout, castaneous or brownish or porphyreous; third and sec-

ond years' growth 3–5 mm. in diameter, the lenticels lacking, the leaf-scars prominent; current year's growth longitudinally canaliculate, 2–3 mm. in diameter, glabrous, the terminal buds conical, glabrous with ciliate scales. Leaves occurring also on second year's growth, 8–25 mm. apart; stipules obscure; petioles 8–12 mm. long, 8–10 times shorter than the lamina, narrowly and deeply canaliculate above, puberulous or glabrous; lamina thickly coriaceous, brunneous or cinnamomeous, shiny above, opaque beneath, glabrous, elliptic-lanceolate or oblanceolate, 6–9 cm. long, 2–3 cm. wide; cuneate at the base; acuminate at the apex, the acumen 5–12 mm. long, acute at the tip; margin strongly serrate, the teeth nigrescent-apiculate; midrib glabrous, impressed above, elevated beneath, the lateral nerves 7–9 pairs, obscure above, evident beneath, branched and anastomosing near the margin, the reticulations absent above, obscure beneath. Inflorescence fasciculate (sometimes pseudopaniculate), axillary on the second year's growth only, puberulous, the bracts ovate, ciliate, flowers all 4-merous. Staminate inflorescence: individual branches of the fascicles 3-flowered, the peduncle 0.5–2 mm. long; pedicels 3–4 mm. long, glabrescent with 2 basal prophylla; calyx patelliform, shallowly 4-lobed, the lobes deltoid or rounded, sparsely ciliate; corolla rotate, 6 mm. across, the petals oblong, eciliate, one-tenth connate at the base; stamens equaling the petals in length or slightly shorter, the anthers oblong-ovate; rudimentary ovary subglobose-ovoid, obtuse at the apex. Pistillate flowers not seen. Infructescences fasciculate, individual branches uniflorous, the pedicels 1–2 mm. long, pubescent with 2 basal prophylla. Fruit depressed-globose 4 mm. long, 5 mm. in diameter, the persistent calyx explanate, 2 mm. in diameter, ciliate, the stigma navel-like or very thinly discoid, 4-lobed. Pyrenes 4, suborbicular in outline, 3 mm. long, 2.5 mm. wide, obtuse at the ends, palmately striate-sulcate on the dorsal surface, the sides rugose, the endocarp stony.

CHINA: Yunnan: Shwe-li-Salwin divide, *G. Forrest* 17517 (type of staminate flower, A), 27726 (type of fruit, A); Tsao-kia-lao-lin, Tchen-liong, *F. Ducloux* 5120 (A, P).

Both of Forrest's specimens were identified as *Ilex franchetiana* Loes. by Comber. They are, however, very different from *Ilex franchetiana* in having coriaceous leaves, very short fruiting pedicels, and fewer (7 or 8) lateral nerves. *Ilex franchetiana* has subcoriaceous or chartaceous leaves, the pedicels of the fruits longer than their diameter, and the leaves with more than eight lateral nerves on each side.

The narrow coriaceous serrate leaves and the small suborbicular palmately striate-sulcate pyrenes of *Ilex subodorata* suggest close relationship between this species and the Indian *Ilex odorata* Ham. ex D. Don. The latter has pubescent branchlets and fruits with pedicels 4–5 mm. long. The depressed-globose fruits with minute thin-discoid stigmas suggest close relationship with *Ilex tephrophylla*, but the latter differs in having chartaceous subentire leaves.

Ilex subodorata is endemic to western Yunnan. There it grows as a

shrub in thickets or as a small tree in mixed forests at an altitude of 2200-3000 m. It flowers in July, and the fruit turns red in November.

80. *Ilex wattii* Loes. in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 322 (Monog. Aquif. 1: 322). 1901; Comber in Notes Bot. Gard. Edinb. 18: 60. 1933.

An entirely glabrous tree up to 8 m. high, having chartaceous serrate leaves with elevated lateral nerves and evident reticulations on both surfaces, fasciculate inflorescences, and very short fruiting pedicels (2-3 mm. long).

Branchlets glabrous, brunneous or ochraceous, the third year's growth 4 mm. in diameter, longitudinally rimulose, the lenticels few, inconspicuous, the leaf-scars elevated; second year's growth 2.5-3 mm. in diameter, the lenticels lacking; current year's growth 2 mm. in diameter, angular and longitudinally striate, the terminal buds conic, glabrous. Leaves occurring also on the second year's growth, 1-2 cm. apart; stipules callose, minute, deltoid, often obscure; lamina chartaceous or subcoriaceous, olivaceous, somewhat shiny above, elliptic or elliptic-lanceolate, 6-11 cm. long, 2-3.5 cm. wide; obtuse or rarely rounded at the base; acuminate at the apex, the acumen 1-2 cm. long, serrulate; margin distinctly serrate; midrib glabrous, deeply canaliculate above, elevated beneath, with lateral nerves 10 or 11 on each side, elevated on both surfaces, the reticulation of the veinlets prominent on both surfaces. Inflorescences fasciculate, axillary on last year's growth; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 1-3-flowered, peduncles almost lacking, pedicels short, 1-2 cm. long, glabrous; the calyx glabrous patelliform, 2.5 mm. in diameter, shallowly 4-lobed, lobes ovate-deltoid, acute, ciliate; corolla rotate, 5 mm. across, petals lightly connate, the lobes oblong-obovate, ciliate; stamens equaling the petals in length, the anthers oblong; rudimentary ovary subglobose, distinctly 4-lobed, depressed at the apex. Pistillate flowers not seen. Pistillate fascicles uniflorous, fruiting pedicels 2-3 mm. long, prophylla 1 or 2, attached at the middle. Fruit subglobose, ca. 6 mm. long, 7 mm. in diameter, the persistent calyx explanate, suborbicular in outline, 2.5 mm. broad, ciliate, the stigma discoid, plane or navel-like. Pyrenes 4, obovate-oblong in outline, 4 mm. long, 3 mm. wide, the ends obtuse or rounded, palmately 5-striate and sulcate on the dorsal surface, rugose and striate along the side, endocarp stony.

CHINA: Yunnan: *G. Forrest* 9660 (material for the description of staminate flower, A), 17604 (fragment, A); Mien-ning, *T. T. Yu* 17947 (A).

INDIA: Manipur, *Watt* 6165 (fragment of the type, A).

The species was first described from Manipur, India. It has been found commonly in southwestern Yunnan, where it grows as a tree at an altitude of about 2500 m. The fruit is still green in August.

Ilex wattii is closely related to *Ilex tephrophylla* (Loes.) S. Y. Hu, but the latter has obscure lateral nerves and veinlets on the upper surfaces, puberulous inflorescences and a rudimentary ovary with an acute apex.

81. *Ilex cyrtura* Merr. in Brittonia 4: 101. 1941.

An evergreen tree up to 12 m. high with subcoriaceous elliptic-oblong or obovate-elliptic serrate leaves falcately caudate at the apex, fasciculate inflorescences, fruiting pedicels 5–9 mm. long, globose fruits ca. 6 mm. in diameter, thin-discoïd stigma, and palmately striate (almost esulcate) pyrenes.

Branchlets glabrous or very sparsely pubescent, brunneous-olivaceous, plicate rugose and angular; third year's growth 3.5 mm. in diameter, smooth and glabrous, the lenticels lacking, the leaf-scars crescent-shaped; second year's growth 2.5 mm. in diameter; current year's growth slender, 1.5 mm. in diameter, angular, slightly canaliculate, glabrous or sparsely pubescent in the grooves; terminal buds acutely conical, glabrous, the scales ciliate; axillary buds subglobose, puberulent. Leaves occurring also on second year's growth, 1–2 cm. apart; stipules minute, callose, acute, deltoid, often hidden; petioles slender, 8–12 mm. long, 9–11 times shorter than the lamina, narrowly canaliculate and puberulent above, the distal half narrowly winged by the decurrent leaf-base; lamina subcoriaceous, cinereous or brunneous-olivaceous, elliptic, oblong or obovate-elliptic, 6–11 cm. long, 2–4 cm. wide; base obtuse or cuneate; apex long and often falcately caudate, the acumen 1.5–2.2 cm. long; margin serrate, the apex of the teeth nigrescent; midrib impressed and sparsely puberulous above, elevated beneath, the lateral nerves in 7 or 8 pairs, obscure above, prominent beneath, the reticulation of the veinlets evident beneath. Inflorescences fasciculate, axillary, on the second year's growth, pubescent, the individual branches of the fascicles uniflorous, the bud-scales persistent, cartilaginous, rounded, puberulent; bracts broad-elliptic, ciliate, the basal appendages acute, ciliate; flowers 4-merous. Staminate inflorescence: pedicels very short, 1 mm. long, with 2 rather large ovate ciliate prophylla covering the entire pedicels; calyx patelliform, glabrous, deeply 4-lobed, the lobes deltoid, obtuse, sparsely ciliate; corolla rotate, 6 mm. in diameter, the petals oblong, 3 mm. long, sparsely ciliate, slightly connate at the base. Pistillate inflorescence: pedicels 4 mm. long, pubescent, with 2 ciliate submedian prophylla; calyx patelliform, 2 mm. across, the lobes deep, broad-deltoid, acute or obtuse, ciliate; corolla rotate, 5 mm. across, the petals ovate-oblong, 2 mm. long, 1.5 mm. wide, eciliate, lightly connate at the base; staminodes equaling the petals in length, the sterile anthers sagittate; ovary ovoid, 1.5 mm. long, 1 mm. wide, the stigma discoïd, strongly convex, 4-lobed. Fruits globose, 6 mm. in diameter, the fruiting pedicels 5–9 cm. long, with two median or submedian prophylla, the persistent calyx explanate, 2.5 mm. across, quadrangular in outline, ciliate; stigma thinly discoïd. Pyrenes 4, broadly elliptic in outline, 3.5 mm. long, 2.5–3 mm. wide, rugose, the back palmately striate, almost esulcate, flattened and slightly impressed, the striae often branched at the tip, the endocarp woody.

CHINA: Kweichow: She-won-shan, Hsu-feng, S. W. Teng 90532 (A). Kwangsi: Ling-yun-hsien, Steward & Cheo 75 (material for

the description of the staminate flowers, A, NY); Kwei-ling, *W. T. Tsang* 28455 (US); Chuen-yuen, *T. S. Tsoong* (= *Z. S. Chung*) 82071 (A), 83355 (A); Yao-shan, *C. Wang* 39452 (A), 40022 (A), 40216 (A), 40220 (A). Yunnan: Kiu-kiang Valley, *T. T. Yu* 19486 (A).

UPPER BURMA: *K. Ward* 9427 (TYPE, A).

Ilex cyrtura was first recorded from the Adung Valley of Upper Burma as a bushy shrub with small yellow flowers, in thickets and forests at an altitude of 1800 m. There it flowers in April. Fruiting specimens agreeing with the Burmese material in vegetative characters and inflorescences have been collected in Kweichow and Kwangsi. They were reported as trees reaching 12 m. in height.

This species is closely related to *Ilex ficoidea* Hemsl., but the latter species has obscure reticulations of the veinlets on the lower surfaces of the leaves, shorter (2–4 mm. long) fruiting pedicels, thick-discoïd stigma, and sulcate wrinkled, pitted pyrenes.

82. *Ilex intermedia* Loes. ex Diels, Bot. Jahrb. 29: 435. 1900, nom. nud., in Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 78: 273 (Monog. Aquif. 1: 273). 1901; Pamp. in Nuov. Giorn. Bot. Ital. n. s. 17: 417. 1910; Hand.-Mzt. Symb. Sin. 7: 655. 1933.

An evergreen tree with very sparsely puberulous or glabrescent branchlets, coriaceous, remotely crenulate or serrate leaves, depressed-globose fruits, long pedicels (twice longer than the diameter of the fruits), and small pyrenes less than 3 mm. long.

Branchlets minutely puberulous or glabrescent, castaneous; second year's growth 3–5 mm. in diameter, glabrous, the lenticels lacking, the leaf-scars crescent-shaped, slightly elevated; current year's growth sparsely puberulous or glabrescent, angular, 2.5–3.5 mm. in diameter, the terminal buds conic, its scales ciliate. Leaves found also on second year's growth, 5–30 mm. apart; stipules callose, deltoid; petioles 11–16 mm. long, 6–8 times shorter than the lamina, puberulous or glabrous, shallowly and widely canaliculate above; lamina coriaceous, griseous, opaque on both surfaces, glabrous or puberulous near the base and along the midrib above, oblong-elliptic, ovate-elliptic or obovate elliptic, 6–12.5 cm. long, 2.4–4.5 cm. wide; base cuneate, obtuse or rarely rounded; apex obtuse, acute or very shortly acuminate, the acumen 3–5 mm. long; margin remotely crenulate or coarsely serrate; midrib plane or slightly impressed above, minutely puberulous or glabrous, elevated beneath, the lateral nerves 5–8 on each side, branching and anastomosing near the base, the reticulation of the veinlets obscure on both surfaces. Inflorescences fasciculate or pseudopaniculate in the staminate, pseudoracemose in the pistillate, central axis 3–5 mm. long, puberulous, the bud-scales of the inflorescences persistent at anthesis, cartilaginous, puberulous; flowers 4-merous. Staminate inflorescence: individual branches of the fascicles 1–3-flowered, the peduncles of the 3-flowered branches 1 mm. long, the pedicels 2 mm. long with 1 or 2 basal prophylla; the calyx patelliform, 1.5 mm. in diameter, glabrous, sparsely ciliate; the corolla rotate, 6 mm. in diameter, the petals oblong,

3 mm. long, eciliate, lightly connate at the base; stamens equaling the petals in length, the anthers ovoid; rudimentary ovary subglobose, the apex obtuse. Pistillate flowers not seen. Infructescence pseudoracemose, the fruiting pedicels 8 mm. long, puberulous, with 2 submedian prophylla. Fruits depressed-globose, 4 mm. long, 5 mm. in diameter, tuberculate under a lens; persistent calyx suborbicular in outline, 1.5 mm. broad; stigma thick-discoid. Pyrenes minute, broadly elliptic or suborbicular in outline, 2.5 mm. long, 2 mm. wide, palmately striate, striae reticulate, almost smooth, the endocarp stony.

CHINA: Hupei (Hupei): without precise locality, *A. Henry* 5549 (ISOTYPE, A, G, NY); *Rev. Silvestri* (ex Herb. R. Musei Florentini no. 1331) (A); *E. H. Wilson* 1803A (A, K); Li-chuan, *C. T. Hwa* 87 (A). Kweichow: Tung-tze, *Y. Tsiang* 5175 (NY). Szechuan: Tchen-keou-tin, *R. P. Farges* (ex Herb. Mus. Paris XX, XXI) (A).

Ilex intermedia Loes. is endemic to the Metasequoia area, being known only from the Hupei-Szechuan border. It is closely related to *Ilex cyrtura* Merr., but the latter has leaves 15–22 mm. long, caudate and often falcate at the apex, sharp reticulation of the veinlets, and a thin-discoid stigma.

82a. *Ilex intermedia* var. *fangii* (Rehd.), comb. nov.

Ilex latifolia var. *Fangii* Rehd. in Jour. Arnold Arb. **11**: 163. 1930.

Ilex dunniana H. Lévl. in Fedde Rep. Spec. Nov. **9**: 458. 1911.

Ilex corallina sensu Rehd. in Jour. Arnold Arb. **14**: 241. 1933, non Franch.

Ilex latifolia var. *subrugosa* (Loes.) H. H. Hu & Tang in Bull. Fan. Mem. Inst. Biol. Bot. **9**: 253. 1940.

Ilex fangii (Rehder) S. Y. Hu in Ic. Pl. Omei. **2**: pl. 167. 1946.

Branchlets glabrous, sometimes minutely puberulent at the very tip; leaves usually large, broadly elliptic to lanceolate, 9–13 cm. long, 3–7 cm. wide, the margin coarsely and sharply serrate (apex of teeth nigrescent); base obtuse or cuneate; apex acuminate, the acumen 6–11 mm. long; pedicels slightly puberulent; calyx sparsely or not at all ciliate; drupe depressed-globose, tuberculate; pyrenes 4, trigonously oval, irregularly and reticulately striate, rugose, 2.5 mm. long, 2 mm. wide.

CHINA: Hupei: Chien-shih-hsien, *H. C. Chow* 1437 (S); Ichang(?), *E. H. Wilson* (Veitch Exp.) 1803 (A, K, NY). Patung hsien, *H. C. Chow* 51 (A, NY). Szechuan: Mt. Omei, *W. P. Fang* 3098 (A, NY) and 3144 (type of *Ilex latifolia* var. *fangii*, A, NY); *E. H. Wilson* (Veitch Exp.) 4797 (A, K). Kweichow: Long-ly *J. Cavaleri* 3000 (TYPE of *I. dunniana*, P; ISOTYPE, A).

83. *Ilex chieniana* S. Y. Hu in Ic. Pl. Omei. **2**: pl. 166. 1946.

An evergreen tree up to 10 m. high, having glabrous branchlets, coriaceous oblong-elliptic or ovate-oblong serrate leaves, fasciculate or pseudoracemose inflorescences, globose fruit with a prominent discoid or capitate stigma and 4 palmately striate and sulcate pyrenes.

Branchlets glabrous, castaneous or nigrescent, the older portion with conspicuous often coalescent lenticels; third and second years' growth 3 mm. in diameter, plicate rugose, shiny castaneous, the lenticels lacking,

the leaf-scars deltoid, slightly elevated; current year's growth angular, 2.5 mm. in diameter, glabrous, the terminal buds conic, glabrous, the scales ciliate. Leaves occurring even on the third year's growth, 5–10 mm. apart; stipules callose, often obscure; petioles 10–15 mm. long, 6–7 times shorter than the lamina, glabrous or minutely puberulous above, narrowly and deeply canaliculate; lamina thickly coriaceous or coriaceous, bruneous or cinnamomeous, shiny above, opaque beneath or when young opaque on both surfaces, oblong-elliptic or ovate-oblong, 6–10 cm. long, 2–4 cm. wide; base obtuse or acute; apex acuminate, the acumen 5–10 mm. long, the tip obtuse; margin serrate, the teeth nigrescent; midrib impressed and glabrous above, elevated beneath, the lateral nerves in 9–11 pairs anastomosing near the margin, the reticulations of the veinlets obscure on both surfaces. Inflorescences fasciculate in the staminate and pseudoracemose in the pistillate, on second year's growth only, the central axis 5–10 mm. long, the bracts ovate, ciliate, the basal appendage linear, persistent. Staminate inflorescence: individual branches of the fascicles 1–3-flowered, the peduncles very short, the pedicels 1–2 mm. long, pubescent, with 2 basal prophylla; calyx patelliform, 2 mm. broad, shallowly 4-lobed, the lobes deltoid, obtuse, ciliate; corolla rotate, 6 mm. broad, the petals oblong-elliptic, 3 mm. long, lightly connate at the base; stamens about equaling the petals in length, the anthers ellipsoid; rudimentary ovary subglobose; the apex 4-lobed. Pistillate flowers not seen. Infructescences pseudoracemose, the individual branches uniflorous, 5–6 mm. long with 2 basal prophylla. Fruits globose, 5–6 mm. in diameter, tuberculate (under a lens), the persistent calyx explanate, 2 mm. across, minutely ciliate; stigma prominent, thick-discoïd or capitate. Pyrenes 4, suborbicular in outline, obtuse at the ends, 3 mm. long, 2.5 mm. wide, palmately striate-sulcate on the back, rugose and wrinkled along the sides, the endocarp bony.

CHINA: Szechuan: Mt. Omei, C. Y. Chiao & C. S. Fan 786 (A); W. P. Fang 14669 (Sz); O-pien-hsien, T. S. Chao 102 (SS, TYPE of staminate flower) and 713 (SS); C. L. Sun 633 (Sz) and 900 (Sz); S. C. Sun & K. Chang 1187 (A); L. Y. Tai 520 (A); C. Y. Yao 2845 (SS), 2850 (TYPE of fruit, SS) and 4381 (SS). Yunnan: Yung-jen-hsien, H. T. Tsai 52792 (A).

Ilex chieniana was based on material collected from southwestern Szechuan. It grows there as a tree up to 8 or 10 m. high in forests at an altitude of 1800–2000 m. Flowering is in June.

Ilex chieniana is closely related to *Ilex denticulata* (Wall.) Wight, an Indian species which differs in having larger fruits (6–7 mm. in diameter), eciliate calyx, navel-like stigma, obtuse or very shortly acuminate leaf-apex, and irregularly wrinkled and pitted stony pyrenes.

(To be continued)



Hu, Shiu-Ying. 1950. "The genus *Ilex* in China, III." *Journal of the Arnold Arboretum* 31(1), 39–80. <https://doi.org/10.5962/bhl.part.25567>.

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