

BETULACEAE (C. G. G. J. van Steenis, Leyden)

1. ALNUS

EHRH. Oec.-Pfl. Hist. 2 (1753) 211; GAERTN. Fruct. 2 (1791) 54.—Fig. 1.

Monoecious, mostly deciduous shrubs or trees with perular buds. Pith triangular in section. Innovations often resiniferous. *Leaves* simple, (in *Mal. spp.*) spiral, penninerved, crenate or dentate, rarely entire, mostly with domatia in the nerve-axils beneath, in bud mostly folded along the midrib and plicate, often glandular-lepidote beneath. Stipules caducous. Catkins unisexual, at least the pendent ♂ ones in terminal panicles above the ♀ ones, the latter mostly in stiff, axillary, poor racemes or terminal on short-shoots.—♂ *Flowers* in triads, each sustained by a bract. Perianth segments 4 (or less by abortion), mostly connate at the base. Stamens 4, epitepalous; filaments short; anthers glabrous, 2-celled; cells parallel, dehiscing lengthwise. No rudiment of ♀.—♀ *Flowers* in diads sustained by a bract crescent with 4 bracteoles, accrescent and woody in fruit, densely packed and imbricate. Perianth 0. *Ovary* 2-celled, each cell with one anatropous, pendent ovule attached near the apex of the cell; styles 2, free, short, cylindrical. *Fruiting catkins* cone-like. *Nut* small, compressed, 1-seeded, mostly winged and crowned by the styles. Seed without endosperm; embryo straight; cotyledons flat; testa membranous; embryo straight; endosperm 0; cotyledons flat.

Distr. About 20 *spp.* mainly on the N. hemisphere except in the New World, mostly extra-tropical, in SE. Asia southward to Bengal, N. Assam, Tonkin, and Formosa, in *Malaysia* only cultivated.

KEY TO THE SPECIES

1. Leaves shallowly crenate to subentire, intervenium glaucous and rather densely, finely, brown-lepidote. Nerves 12–16 pairs 1. *A. nepalensis*
1. Leaves distinctly dentate, undersurface not glaucous and hardly or laxly lepidote. Nerves 6–7 pairs. 2. *A. maritima*

1. *Alnus nepalensis* D. DON, Prod. Fl. Nep. (1825) 58; WALL. Pl. As. Rar. 2 (1831) 27, t. 131; HOOK. f. Fl. Br. Ind. 5 (1890) 600; HUB. WINKL. Pfl. R. Heft 19 (1904) 108, f. 25; CAMUS, Fl. Gén. I.-C. 5 (1931) 1041, f. 118.

Tree, 8–15 m; timber white; twigs glabrescent, ribbed, hardly triangular. *Leaves* spiral, ovate to oblong, acute or short-acuminate, rounded or cuneate at the base, 7–21 by 4–10 cm; nerves 12–16 pairs, beneath as the prominent crossbar-veins laxly puberulous (glabrescent) and vein-axils bearded; midrib and nerves sulcate and glabrous above; petiole strong, c. 5–10 times as short as the blade, 1½–2 cm. ♂ *Catkins* up to 10 cm by 3–5 mm, in a terminal panicle up to 16 cm. ♀ *Inflorescences* short, axillary, bearing 3–8 oblong, 3–6 mm peduncled catkins 10–17 by 6–7 mm. *Nuts* obtrapezoid, emarginate, incl. the wing 2 mm through, crowned by the style base.

Distr. Himalayan region, Assam, Tonkin and Yunnan, in *Malaysia* locally cultivated in W. Java for trial by the Forestry Service.

Uses. Imported for experiments of reforestation on eroded slopes under everwet climatic conditions, growing well into thick trees between 700 and 1800 m.

Vern. *Nepalese alder*, E.

2. *Alnus maritima* (MARSH.) NUTTALL, North Am. Sylv. 1 (1842) 34, t. 10bis; REGEL, in DC. Prod. 16, 2 (1868) 186, *incl. var.*; BURKILL, J. Linn. Soc. Bot. 26 (1899) 500, *incl. var. formosana*; WINKLER, Pfl. R. Heft 19 (1904) 114.—*Betula alnus* (non L.) THUNB. Fl. Jap. (1784) 76.—*Betula-Alnus maritima* MARSH. Arb. Am. (1785) 20.—*Betula japonica* THUNB. Bot. Act. Soc. Sc. Ups. 6 (1799) 45, t. 4.—*A. japonica* STEUD. Nom. ed. 2, 1 (1841) 55; WINKL. Pfl. R. Heft 19 (1904) 114.—*A. oblongata* WILLD. ex REGEL, Nouv. Mém. Soc. Nat. Mosc. 13, 2 (1861) 171, t. 6 f. 3–9 (repr. 113).—*A. formosana* MAKINO, Bot. Mag. Tokyo 26 (1912) 390.—Fig. 1.

Shrub or small tree, 3–10 m; twig-ends glabrous or subglabrous, rather sharply triangular. *Leaves* spiral, ovate-oblong to elliptic-oblong, rather distinctly acuminate, broadly or obtusely cuneate to subrotundate at the base, soon glabrous, with small, haired domatia in the nerve-axils beneath, 6–9½ by 2¾–5 cm; nerves 6–7 pairs, slightly prominent above, more so beneath, crossbar-veins slightly prominent; petiole slender, c. 2–5 times as short as the blade, 1¼–2¾ cm. ♂ *Catkins* 3–5 cm by 3–5 mm. ♀ *Catkins* in a terminal raceme, on short-shoots, c. 1½ cm peduncled, oblong, 1½–2½ by 1 cm. *Nuts* obovate-orbicular, not emarginate, c. 3 mm diam. incl. the wing c. ½ mm broad.

Distr. Manchuria, Korea, Japan, Formosa, cultivated in Europe and elsewhere, in *Malaysia* introduced in the Philippines (Luzon, Benguet Prov., Mt Santo Tomas km 8 & Baguio-Bontoc road) and ?Java.

Ecol. Planted in secondary forest and on eroded slopes, c. 1000–1500 m, in the Philippines apparently not deciduous, frost-resistant. *Fl. fr.* July–Nov.

Uses. Planted by the Forest Service for Reafforestation purposes.

Vern. *Japanese alder*, E.

Notes. Some authors keep the N. American and E. Asiatic specimens specifically distinct, but already REGEL reduced *A. japonica* and *A. maritima* to varieties of one species and BRITTON & BROWN questioned their specific status. The N. American race is vaguely distinguishable by more elliptic to obovate, acute or very short-acuminate leaves; this leaf-shape is also found, however, among E. Asiatic specimens.

The Luzon material answering to the description given above belongs to the E. Asiatic population.



Fig. 1. *Alnus maritima* (MARSH.) NUTT. a. Habit, $\times 2/3$, b. bract of ♀ fruiting spike, $\times 7$, c-d. nuts, $\times 7$ (B. BRITTON 292).