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SEED LEAFLET

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Alnus nepalensis D. Don

Taxonomy and nomenclature

Family: Betulaceae

Synonyms: *Alnus mairei* A. Léveillé, *Clethropsis nepalensis* Spach

Vernacular/common names: Utis (Nepal); maibau (Burma); piak (India); meng-zi-qi-mu, han-dong-gua (China); tong quan su, tong qua mu, tong po mu (Viet.); Indian alder, Nepalese alder (Eng.).

Distribution and habitat

Native to Pakistan, eastern Nepal, Bhutan, northern India, south-western China, upper Myanmar and parts of Indochina. Introduced to various countries in Africa, Central America and South-East Asia. It has been included in species trials in Burundi (Brunck et al., 1990), in Uganda (Okorio et al., 1994), in the highlands of Java (1350 m altitude) (Rostiwati and Suriamihardja, 1987), and in agroforestry trials in Bolivia (Mahboubi et al., 1997).

It prefers moist, cool climates with mean annual temperature of 13-26°C and mature trees are tolerant to frost. It can grow at high altitudes (up to 3000 m) in both temperate and subtropical regions, with annual rainfall 500 to 2500 mm and a dry season up to about 6 months long. It is the most drought tolerant of the *Alnus* species but best growth is obtained in areas where the mean annual rainfall exceeds 800 mm and the relative humidity is higher than 70%.

Prefers soils that are moist and well-drained, but not waterlogged. It does not require high soil fertility but prefers permeable soils. It does poorly on dry, exposed ridge tops.

Mature fruits. Photo: Zeng Dexian.

Uses

As a pioneer, nitrogen-fixing (*Frankia* symbiosis) species it is suitable for soil improvement and rehabilitation of degraded lands. Seeds have been broadcast to stabilise landslides. In Burma it has been used with success to reforest abandoned taungya areas. In agroforestry systems it can be interplanted with a number of crops.

The wood is an important source of firewood and charcoal.

Botanical description

Deciduous or semi-deciduous tree, typically about 30 m tall and with a diameter of 60 cm but on good sites it can reach 35 m and a diameter of 2 m. It is self-pruning, resulting in a good clean bole, which is normally tall and straight. Leaves are simple, alternate, 6-20 cm long, slightly serrate with prominent parallel veins.

The flowers are unisexual, female and male flowers in separate inflorescences called catkins. Male catkins 10-25 cm long, drooping, in terminal panicles. Female catkins 1-2 cm long, 3-8 together in axillary racemes.

Fruit and seed description

Fruit: the fruiting catkins resemble cones. They are dark brown, 1.5-2 cm long, upright on short stalks, elliptical and with woody scales. The empty catkins persist on the tree.

Seed: light brown, circular, flat nut, with membranous wing. More than 2 mm across. Eight kg of catkins contain about one kg of seed. There are typically 2.3-3.5 million clean seeds/kg.

Flowering and fruiting habit

In Nepal, seed is collected between November and March depending on locality. In Yunnan (China) seed ripens in December

Harvest

The catkins are collected directly from the tree when they turn yellowish-brown and begin to open, but before the seeds have been dispersed by the wind. Catkins from previous years can persist on the tree; they are dark brown or black, contain no seeds and should be avoided.

Processing and handling

After harvest the catkins are dried in the sun until they open and release the seed.

Storage and viability

The seeds are orthodox. Most reports state that viability can be retained for at least a year in hermetic storage at 4-5°C with 5-10% moisture content.

Dormancy and pretreatment

The seeds do normally not need pretreatment although some recommend soaking the seed in warm water before sowing.

Sowing and germination

The nursery bed needs to be carefully prepared, incorporating soil collected from mature *A. nepalensis* forests (to ensure suitable symbionts are present), and made level. Seed is broadcast at 15 kg/ha, or sown in lines, and then covered with a thin layer of fine soil with a further covering of rice straw, pine needles, or a plastic film.

Seedlings are thinned out during the rainy season when they have produced 6 leaves and attained a height of 2-3 cm, at which stage they need to be watered and tended regularly. There are different reports on nursery time. According to Napier and Robbins (1989), seedlings reach a planting size of 25-35 cm in 4-5 months below 1200 altitude, while in higher altitudes, they may take as long as 11 months.

Young seedlings are very vulnerable to frost and liable to attack by ants and survival rate is often low. Most tree planting is done with containerised seedlings, although bare-rooted seedlings can be used with success provided they are lifted and handled properly and moisture availability is high at the planting site.

Direct sowing is an alternative, but it is important to use seeds that are fresh and have high germinability. Ample quantities should be used and the seed sown on exposed mineral soils. Good results have been obtained by mixing the seed with soil containing *Frankia*.

Wildings have been used successfully in Nepal, especially on slopes facing north. Regeneration by tissue culture, using the shoot tips, is possible.

Phytosanitary problems

No phytosanitary problems are normally encountered.

Selected readings

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