

LOCAL NAMES

Danish (Stjerneanis, Stjerne Anis); Dutch (Steranijs, Adas china); English (star anise); French (badiane, anis de la Chine); German (Sternanis, Badian); Hindi (Badayan, Anasphal); Indonesian (Adas cina, bunga lawang, Pe ka); Italian (Anice stellato); Khmer (Phka cann, Poch kak lavhak, innish Tähtianis); Portuguese (Anis estrelado); Spanish (anís estrellado); Thai (dok chan, poy kak bua); Vietnamese (vat giac huong, dai hoi, hoi sao, mai, cay hoy)

BOTANIC DESCRIPTION

Illicium verum is an evergreen medium sized tree, 8-15 (-20) m tall and up to 30 cm dbh with a straight rounded trunk and green, glabrous branchlets. The bark is white to bright grey.

Leaves 6-12 cm long, alternate, simple, leathery, often clustered 3-4 together at the end of branches

Flowers large, bisexual, 1-1.5 cm in diameter, white-pink to red or greenish-yellow, axillary and solitary.

Fruit capsule-like, aggregate fruit made up of 6-8 or rarely up to 12-13 boat-shaped, rather woody follicles with a straight beak. Each follicle contains one seed

Seed shiny brown or reddish with high oil content and anise-like smell.

The genus name is derived from Latin 'illicere' (allure), probably because of the sweet and attractive fragrance.

BIOLOGY

Within its area of natural distribution, there are two flowering and fruiting seasons annually. First flowering occurs in June with fruit maturing in May-June the following year. Another flowering follows shortly after the first with mature fruits produced in October-November the following year.

Flowering starts at the age of 5-6 yrs. Seed production usually begins when the tree is 9-10 years old and continues for about 80 years. Good fruit crops are usually encountered every three years.

ECOLOGY

I. verum is a light demander but tolerates shade when young. It should not be planted on soils generated from limestone; deep ravine where light is insufficient, moisture is too much; area in which dominant species are *Imperata cylindrica* and bushes such as *Artemisia annua*, *Rhodomyrtus tomentosa*, *Melastoma candidum* indicators of much deteriorated soil.

BIOPHYSICAL LIMITS

Altitude: up to 2000 m

Mean annual temperature: 12-18°C

Mean annual rainfall: 1 500 - 2 400 mm

Soil type: It grows on feralite soils generated on mica schists, clayish sandstone, soil layer depth 120cm and over, with pH 4-6 and minimum humus content 2%.

DOCUMENTED SPECIES DISTRIBUTION

Native: China, Vietnam

Exotic: Jamaica, Laos, Philippines



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

PRODUCTS

Food: Fruits and seeds are valued as a spice used in cooking.

Timber: The fragrant wood is used for construction and furniture.

Essential oil: Star anise is mainly grown for the essential oil that is extracted from fruits, seeds and leaves. 10 kg of dry fruits yield 1 kg oil. The dried fruits may contain 5 to 8% of essential oil, which dominated by anethole (85 to 90%). The other components, phellandrene, safrole and terpineol, have only small effect on the aroma.

Medicine: The oil of star anise is used worldwide in medicine. It is used as stimulant, eupeptic, carminative, mildly expectorant and diuretic. It is found to be useful in flatulence, spasmodic pains and dysentery. It relieves colic and is a common ingredient of cough lozenges and cattle sprays. The oil is employed as an applicant in rheumatism, as an antiseptic, useful against fevers, scabies, body lice, bedbugs, and highly useful in constipation and insomnia.

SERVICES

Erosion control: *I. verum* is a perennial tree species with good effects on soil and water conservation.

Reclamation: It is widely planted in areas for rehabilitation

Intercropping: It can be planted mixed with some other tree species such as *Canarium album*, Mandarin and Tea

TREE MANAGEMENT

Pure plantation of *I. verum* can be established by planting seedling with a spacing of 4 x 5 m. This gives a density of 420 stems/ha as a final crop. When planted mixed with other species such as *Camellia oleifera*, *Canarium album*, Mandarin and Tea, rows spacing of 3-4m is used, and the remaining density of about 150-200 trees/ha is expected. This mixed planting is commonly used in Vietnam, creating sustainable forest environment in such areas.

GERMPLASM MANAGEMENT

Fruits are harvested directly from the tree when they are still green, dried first in the shade and then in the sun. The fruits are collected in October when they turn brown but before they open. After a short sun drying, the seeds are extracted manually. Dead or damaged seed can be separated from fresh seed by floatation. A mature tree may yield 8-12 kg fresh fruits per season. 4-5 kg fresh fruits give approximately 1 kg dry fruits.

Studies from Vietnam indicate that the seeds do not tolerate desiccation and that best viability is achieved when the seeds are stored at about 40% moisture content. When dried below 30% mc, the seeds begin to lose viability. Cold storage at 5 or 10° C is significantly better than at room temperature. In another study, fresh seeds mixed with moist sand and stored at 10° C for 3 months retained 53% germination. There are 8000 - 11000 seeds per kg.

PESTS AND DISEASES

Because of the high moisture content required for storage, fungal problems are often encountered.

FURTHER READNG

- Agarwal SK, Siddiqui MS, et al. 1999. Chemotaxonomical study of Indian *Illicium griffithii* and *Illicium verum* fruits. *Journal of Medicinal and Aromatic Plant Sciences*. 21(4): 945-946.
- Bernard T, Perineau F, et al. 1989. Extraction of essential oils by refining of plant materials: II. Processing of products in the dry state: *Illicium verum* Hooker (fruit) and *Cinnamomum zeylanicum* Nees (bark). *Flavour and Fragrance Journal*. 4(2): 85-90.
- CFSC. 1995. Technical guidelines for seed and sowing of some forest trees. Agric. Publ. House, Hanoi.
- de Guzman CC and Siemonsma JS. (eds). 1994. Spices. *Plant Resources of South-East Asia* No. 13. PROSEA. Bogor, Indonesia.
- Hendrich S and Bjeldanes LF. 1986. Effects of dietary *Schizandra chinensis*, brussels sprouts and *Illicium verum* extracts on carcinogen metabolism systems in mouse liver. *Food and Chemical Toxicology*. 24(9): 903-912.
- Ho SH, Ma Y, et al. 1997. Anethole, a potential insecticide from *Illicium verum* Hook F., against two stored product insects. *International Pest Control*. 39(2): 50-51.
- Kohda H, Kohjyouma M, et al. 1997. Production of anethole in callus of *Illicium verum* Hooker filius. *Natural Medicines*. 51(6): 519-522.
- Liu H, Yang CS. 1989. Pollen morphology of Illiciaceae and its significance in systematics. *Chinese Journal of Botany*. 1(2): 104-115.
- Okuyama E, Nakamura T, et al. 1993. Convulsants from star anise (*Illicium verum* Hook. F.). *Chemical and Pharmaceutical Bulletin Tokyo*. 41(9): 1670-1671.
- Small E. 1996. Confusion of common names for toxic and edible "star anise" (*Illicium*) species. *Economic Botany*. 50(3): 337-339.
- Sy LK, Brown GD. 1998. A seco-cycloartane from *Illicium verum*. *Phytochemistry Oxford*. 48(7): 1169-1171.
- Tuan DQ, Ilangantileke SG. 1997. Liquid CO-2 extraction of essential oil from star anise fruits (*Illicium verum* H.). *Journal of Food Engineering*. 31(1): 47-57.

SUGGESTED CITATION

Orwa C, A Mutua, Kindt R, Jamnadass R, S Anthony. 2009 *Agroforestry Database: a tree reference and selection guide* version 4.0 (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)