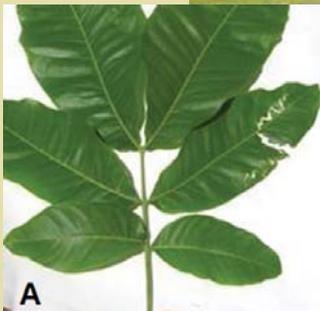


# Kusum

A kusum tree with dense green foliage during rainy season (left) and with newly emerged leaves in the spring (right).



A



B



C



D



E



F

**T**HERE are many trees that are grown for multiple products. They are known as multipurpose trees (MPTs), a term widely used in agro-forestry. While such trees provide shade, habitat for organisms, soil improvement, etc, many useful products are also obtained from them such as fruits, nuts and leaves as well as timber, firewood and variety of metabolic chemicals, which may be used in the form of home remedies and for traditional medicine.

*Left:*

- A) Kusum leaf with three pairs of leaflets. B) An inflorescence raceme. C) A male flower with anthers. D) A hermaphrodite flower with fertilized ovule. E) Bunch of immature kusum fruits. F) A mature seed with brown testa (left) and cotyledon kernel (right).

# Kusum

**Multipurpose Tree,  
Yet Not Popular**

*Despite providing an array of benefits, the Kusum tree has not yet gained the popularity it deserves.*

Thus MPTs fulfill more than one basic need of human beings and have a high impact on food and health security of farmers, especially those living in and around the rural and forest areas.

*Schleichera oleosa* (Lour.) Oken, commonly known as lac tree or *kusum*, is a forest tree species of tropical and subtropical region. The tree is utilized for multifarious purposes and is a boon for a subsistence farmer. The extended foliage and canopy of the *kusum* tree provides good shade and is suitable for mixed farming with other heat susceptible economic plants.

The tree is commonly known to host lac insects (*Kerria lacca* Kerr.) for production of natural, biodegradable and commercially important lac resins that serve as a livelihood support to millions of poor farmers in states like Jharkhand, Chattisgarh, Orissa, Andhra Pradesh and West Bengal. Various plant parts of *kusum* are either a favorite pick of traditional *vaids* for indigenous therapies and medicine or a source of food, animal feed, timber and oil. Oil and timber are utilized in small-scale industries. The *kusum* tree is also grown as an avenue tree or wayside tree.

## Identity

The generic name of *kusum*, *Schleichera* is derived after the Swiss botanist J.C. Schleicher who first described the tree. The species name *oleosa* derives from the Latin word *oleum* meaning oil, as the seed kernels are rich in oil (59-72%). Synonymously the tree is also referred as *Schleichera trijuga* Willd, the word *trijuga* stands for 'three pairs', based on the presence of three pair of leaflets in a leaf. *Kusum* is a dicotyledonous, flowering and seed bearing vascular plant belonging to family *Sapindaceae* (soapberry), the

same family to which the popular fruit 'Litchi' belongs.

## Scientific synonyms

*Cussambium oleosum* O. Kuntze  
*Pistacia oleosa* Lour.

*Schleichera trijuga* Willd.

## Vernacular names

*Kusum*, *Kusam* (Hindi); *Sagada* (Kannada); *Pava*, *puvan* (Tamil); *Pusuku* (Telugu); *Gyo* (Burmese); Lac tree, Macassar oil-tree, Ceylon-oak, Malay lactree; *Pongro* (French, Cambodia); *Macassaölbaum* (German); *kasambi* (Indonesian); *Takhro* (Thai); *claaaly van rao* (Vietnamese); gum-lac tree (Filipino); *Lao* (Sino-Tibetan)

## Distribution and Natural Habitat

*Kusum* is a native of tropical Asian countries and is distributed throughout the foothills of Himalaya from the Sutlej to Chhotanagpur regions covering the states of Jharkhand, Bihar, Chattisgarh, Orissa, Madhya Pradesh and Andhra Pradesh. The tree is also found in a few isolated patches of Gujarat and Tamil Nadu. Other than India the tree is distributed in countries like Nepal, Sri Lanka, Myanmar, Thailand, Indonesia and Malaysia. Generally dry and mixed deciduous forest areas with slightly acidic but well-drained gravel or loamy soil are the favorite place to grow the *kusum* trees. Though *kusum* trees are fire and frost resistant, they are best suited for 35-47°C temperature and 750-2500 mm annual rainfall.

## The Plant

*Kusum* is a slow growing large deciduous tree approximately 20-30 m tall and a crown spread of

approximately 2-4 m diameter. The bark of the tree is usually grey in colour with reddish wood inside. The *kusum* tree sheds leaf during the month of December to February; remains leafless for a short period of time before the new purple to red coloured leaves emerge and gradually turns green with time.

*Kusum* flowers are usually devoid of petals. The shape of the fruit is ellipsoid to sub-globular berry and the base of the fruit is narrowed and apex pointed. The fruits are hard-crustaceous and smooth or slightly spiny. Inside, the fruit contains one seed or sometimes two. The seeds are rich in oil.

## Reproduction and Propagation

The *kusum* trees generally flowers during the onset of dry season (January-February) and fruiting takes place during the month of March-April. The fruits ripen in the months of July-Aug. The seeds are the major source of propagation and are viable mostly if sown freshly after collection. Proper drying and storage of seeds in airtight containers may allow germination of seeds up to 1-2 years. On prolonged storage the viability of seeds is lost drastically.

Apart from seedlings, *kusum* trees are naturally produced in forests from root suckers (adventitious shoot developed from roots). Artificially *kusum* trees can be propagated through vegetative method of air-layering (artificial induction of roots from the wound on a shoot and detaching the explant from the mother plant to produce a plantlet). The stumps prepared from the 1-2 years old seedlings, root suckers or air-layers are transplanted in the field in the

## The major use of *kusum* tree is for cultivation of lac. However, other uses of *kusum* tree are currently underexploited but hold promise to benefit human life in many spheres.

holes dug approximately 30 cm deep and wide.

### Pests and Diseases

Although biologically lac insect is the natural pest of *kusum*, the economic importance of the lac resin secreted by these insects has turned out to be beneficial to human beings. Thus, lac insects are deliberately inoculated on *kusum* trees and reared with proper management practices. Other insect pests that cause damage to *kusum* tree include leaf defoliators, stem borers and sap suckers.

The seeds are often attacked by a red bug known as *Serinetha augur*. The stem blight, yellow cork rot, white spongy rot and white fibrous rot are few important fungal diseases of *kusum* causing serious damage to the trunk and root. The pests and diseases of *kusum* are managed either through mechanical means or through insecticide/fungicide spray.

### Benefits

**Host plant for lac cultivation:** *Kusum* tree is one of the major host plants commercially exploited for cultivation of the Indian lac insect (*Kerria lacca*). It supports the *kusmi* strain of lac insect, which produces good quality light-coloured resin of demand by the lac industry, thus fetching high remunerative prices to lac growers. Immature lac insects prefer semi-tender twigs of *kusum* trees for sap sucking and start secreting resins surrounding their body. The resinous coatings of closely settled sessile insects eventually coalesce together to form an encrustation in five to six months.

On *kusum* tree, two lac crops—*aghani* and *jethwi*—are produced in a year during the winter and summer season, respectively. About 34–38% of the total lac production of India

is shared by the *kusum* tree as a lac host.

The other conventional tree hosts of lac insects are *Butea monosperma* (*palas*) and *Ziziphus mauritiana* (*ber*), but the best quality lac resin is produced only by the *kusum* tree making it superior to the others.

The *kusum* tree produces on an average 60–70 kg of sticklac (the raw lac obtained after scraping the encrustation from the twigs) per tree and fetching a net profit of about Rs. 3,300 per annum to a lac grower. The dense foliage of the mature *kusum* tree provides an additional advantage of supporting brood lac (inoculum stick lac with emerging larvae from the female resin cells) viability even during the very hot summer season, otherwise summer mortality of lac insects is a common problem with other host plant species.

**Industrial uses of plant parts:** The seeds of *kusum* are a very rich source of oil (60–70%) for industrial applications. The seed oil called '*kusum* oil' is an important component of the Macassar oil used for hairdressing and cooling bath oil. *Kusum* oil is used in textile industry for *batik* applications and also for making soap. Pressed oil cakes from *kusum* are a rich source of crude protein, carbohydrate, fibre and other minerals and serve as nutritive cattle feed. The bark of *kusum* tree produces tannins and dyes that are occasionally used in small-scale industries like tanning in leather industry.

**Medicinal uses:** Different plant parts of *kusum* are used in traditional medicine. The seed oil is used by the local *vaidis* for curing skin diseases like scabies, itching and acne. The bark decoction is also used against skin inflammations and ulcers. The decoction is also infused for curing malaria. The bark of *kusum* is often used to control tissue swelling by

*vaidis*. The bark is known to contain medically important compounds like lupeol used in preparing analgesics and anti-tumorous agents like betulin and betulinic acids. The fine powder obtained by grinding the seeds is applied on the wounds of cattle to prevent flies and maggots.

**Other uses:** The arilloses of the ripened fruits are acidic blended with slight sweetness and are eaten raw, whereas the unripe fruits are used for preparing pickles. The cooked young leaves serve as a culinary dish for poor villagers. Leaves, twigs and seed cakes are excellent source of fodder for cattle. The *kusum* seed oil consists of cyanogenic compounds and is not suitable for human consumption causing giddiness unless the compounds are removed. However, the seed oil is used for lighting purpose by the poor tribal people. The wood is a source of firewood and charcoal while the hard heartwood is used for making cartwheels, axles, ploughs, rollers of sugar mills, oil press and other agricultural implements.

The major use of *kusum* tree is for cultivation of lac. However, other uses of *kusum* tree are currently underexploited but hold promise to benefit human life in many spheres. Planting of *kusum* in suitable areas needs to be promoted in view of its advantages as MPT. There is tendency to prefer quick-growing trees in the afforestation programmes, which may not always be advantageous or even eco-friendly in the long run.

The role of *kusum* plantations can mainly be envisaged in terms of economic benefits to the resource-constrained farmers dwelling around forest areas.

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