

Ailanthus excelsa Roxb.

A Multipurpose Tree



Classification

Ailanthus (derived from ailanto, an Ambonese word probably meaning "tree of the gods" or "tree of heaven") is a tree genus belonging to the family Simaroubaceae. It is naturally distributed from East Asia south to northern Australasia.

Natural Habitat *Ailanthus excelsa* Roxb. Is a lofty deciduous tree, widely distributed in the country, and known to grow in the semi-arid and semi moist regions. The wide distribution and successful naturalization of *Ailanthus* is attributed to its capability to adapt to diverse habitats. It grows in a wide range of soil types, altitudes (0-1500 MSL), precipitation (500 – 1900 mm) and temperature (4°C 47°C). However, it prefers well-aerated soil and thrives best in well-drained alluvium and does not tolerate clayey soil and water logging. It can grow even on shallow dry soils but the growth is poor. *Ailanthus excelsa* has given better performance as compared to other species in lateritic soils. The tree can be seen growing upto an elevation of 900 metres.

Distribution *Ailanthus excelsa* is indigenous to Central regions and the northern parts of Peninsular India. It is common in West Bengal, Bihar, Orissa and Andhra Pradesh. It also occurs in Rajasthan and Maharashtra. It is scarce in the Deccan and Karnataka and absent further in the south. It is generally absent in heavy rainfall areas of the west coast. It occurs in the Southern tropical forest in association with khair, babul, neem, prosopis, etc. It grows in mixed deciduous forests and also in some sal forests. It also occurs in coastal areas of Andhra Pradesh and in dry belts of Tamil Nadu, West Bengal and Karnataka. The species has been raised successfully as a soil conservation species in reserves in Jammu and Kashmir.



Growth characteristics and phenology

Ailanthus excelsa is a strong light demander. The seedlings get suppressed by shade. In places, where winters are damp as well as cold, seedlings do not easily grow. The tree coppices well and produces root suckers freely. *Ailanthus excelsa* is very susceptible to waterlogging or excess of moisture in the soil. It is easily broken by wind due to the brittleness of the stem and branches.



It can attain a height of 18 to 25 m and girth of 2.5 m and has a cylindrical bole. It is a fast growing species with a small whitish trunk. Branches are thick and spreading with a massive spreading crown. The bark is greenish or grey and smooth in young trees while in old trees, the bark is rough having large conspicuous leaf scars. It has large branches starting right from trunk and perpendicular to the trunk which tend to curve upwards.

The leaves are shed during the cold season and the new leaves appear in March-April, 30-90 cm long, pinnate; leaflets 8-14 pairs, 10-15 cm long alternate or sub opposite, coarsely and irregularly serrate, oblique at base; petioles 5-8 cm long.

The flowers, small in size, yellow in colour and arranged in panicles, appear in February – March in Central India and in the month of April in North India. The flowers appear in large open clusters among the leaves; the male, female and bisexual flowers being intermingled on the same tree. The fruits are formed soon after flowering. The fruits ripen in May-June, just before the onset of monsoon.



Natural Regeneration of the Species

Its natural regeneration in the forest is usually poor. The seeds are very light and winged and are dispersed far and wide by the wind. If the seeds fall on bare ground germination takes place early in the first rainy season after the fall of the seed, but the seedlings rarely survive due to the sensitiveness of the seedlings and their intolerance of heavy weed growth. Large proportions of seeds do not germinate and are destroyed. The natural regeneration of *Ailanthus excelsa* can be seen in undisturbed open sites with adequate moisture. The seeds buried deep fail to germinate and seedlings in depression die due to poor drainage, weed competition and attack of pests. Natural regeneration through coppice and root suckers is adequate. Coppice shoots are thinned for better development. The seeds are available in May – June and natural regeneration comes up in July. Within one year the plant establishes itself.



The number of seeds in one kg is 8000-10,000.

Seedlings: Seed beds should be well raised to allow drainage. If the beds are not being prepared the seeds are sown in poly bags. The species is at its best when raised by planting out nursery raised seedlings with ball of earth.



Seed Collection and Storage Sowing

Sowing of seeds in beds is to be carried out in the months of July-August and December-January. Too much moisture will lead to damping off disease in seedlings. Germination starts in 8-10 days and is completed by 40-45 days.

Protective Irrigation

Normally no watering is required in moist areas. In arid and semi arid areas watering should be done if the rains are not received within one week of planting. Planting should be stopped if no rains are expected for a few days afterwards.

Pricking out

Germination percentage is nearly 60-70 percent. 30-45 days old seedlings from mother beds are pricked out into plastic or other containers.

Fertigation

Soil, sand and FYM in the ratio 3:2:1 is used as potting mixture for polypot rising. Urea mixed with water boosts up plant growth. Seedlings require gentle and

light irrigation as they are susceptible to diseases such as damping off with heavy irrigations. Smaller plants survive better than larger ones during transplantation (70-80% survival).

Weeding

The young seedlings in nursery stage are very delicate and unable to compete with weeds. Timely and regular weeding of the nursery beds is necessary to avoid suppression and killing of seedlings. Weeding should be carried out in the month of January-February and April. Regular weeding and hoeing are beneficial in increasing both survival percentage and height growth. Regular weeding is more important than watering.

Planting Practices

Ailanthus excelsa prefers sandy and porous soils. It comes up on slopes and also on stony patches under suitable moisture conditions. Too moist or water logged areas or area prone to frost should not be selected. After selecting the site, the area is cleared and 30 cm³ or 45 cm³ pits are dug out in the month of Feb-Mar and the soil is allowed to weather. The planting in pits is carried out in the month of July. For block planting nursery raised seedlings of 6 to 10 months old are used for planting in pits at a spacing of 3m x 3m or 5m x 5m. The seedlings which attain height of 50-100 cm are suitable for planting. The root shoot ratio of 1:2 is considered good for stump planting. The row and line planting is carried out by planting saplings. Spacing of 5m is maintained in case of row or line planting. Regular watering and protection from animals is required till the saplings get established. Spacing adopted for the species are: Block planting 3m x 3m; row and line planting 5m apart. *Ailanthus* can be raised as mixed plantations. In degraded, denuded and semi arid soils it is able to come up successfully with *Prosopis juliflora*.



Agroforestry

Ailanthus excelsa has no adverse effect on the crops sown as under storey if proper care is taken. For having better results, the spacing adopted should be at least 6x6m. Regular lopping of the leaves should be done to minimize shade effect on the crops and ploughing of the root zone of crops should be done to remove the lateral roots of the tree so that there is no competition between tree and crop. Farm forestry of *Ailanthus excelsa* is more popular and is being practiced by the farmers. Trees are also planted in the boundaries of the field. Hence in farm forestry, the farmers are getting more yield of crops and generating revenue from *Ailanthus excelsa* tree as well.



Protection

Seedlings are susceptible to damping off disease therefore heavy watering should be avoided and only optimum level of moisture should be maintained. The species can not withstand cold and seedling growth is checked below 50°C. The growth is retarded considerably in the month of

January. The seedlings are prone to porcupine damage. The seedlings are susceptible to insect attack and are suppressed by weeds. For controlling insect, spraying or dusting with BHC or endosulphan insecticide is carried out. The seedlings or saplings may be affected by web worm *Atteva fabriciella*. Severe defoliation affects plant growth and may cause death of the plant. The full grown larvae are grey in colour and live gregariously under a silk web spun over the leaves and shoots. They are controlled by application of 0.1 per cent of endosulphan and malathion.



Harvesting procedure

1. Above 15 cm girth of all branches of the grown up tree is utilized for safety matches production.
2. The tree has to be cut by saw slantingly just half feet above the ground. It allows the tree for coppicing for the second harvest.
3. Within three days of harvest the tree has to reach the industry in order to avoid the weight loss. At any cost the harvested material should reach the industry with in 15 days. Further delay will lead to change in colour and misfits for the industry.

S. No.	Details of Operation	1
	Establishment cost	
1	Land preparation	960
2	Pitting and Filling 1m ³ (using JCB)	7680
3	Cost of nutrient & application	8083
4	Planting material and Distribution to the pits	3035
5	Planting and casualty replacement	1200
	Sub total	20958
6	Maintenance cost	
	Ploughing between the plants	500
7	Weeding & soil work (Twice a year)	2400
8	Making water conservation structures	1200
9	Protection and Pruning	500
	Sub total	4600
	Grand total	25558

A comparative estimation of Approximate Yield and

	Year(Rotation)	No of trees
Rain fed	6	997
Irrigated	6	1055

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Uses

Ailanthus species have been identified as one of the multipurpose native tree species used for production of matches, pencil, boxes, crates, poles, fishing floats, tool handles, and drums.

It is also grown for fodder production.

Ailanthus excelsa is also has several medicinal properties, the bark of the tree is bitter, astringent, febrifuge, antispasmodic, antiseptic and as expectorant, is also used in treating asthma and bronchitis.

Cost of cultivation (Approximate) per acre for *Ailanthus excelsa* under Rain fed condition

1. Tree species : *Ailanthus excelsa*
2. Utility : safety matches and Pencil
3. Spacing : 3m x 3m
4. Total No of Trees /acre : 444
5. Expected number of Standing trees at Harvest (90%) survival : 399
6. Type of plantation : Block plantation
7. Wage rate : Rs.120/day(Existing Govt. rate)

2	3	4	5	6	Total
					960
					7680
					8083
					3035
					1070
					20958
500	500	500	500		2500
2400	2400				7200
					1200
1000	1200				2700
3900	4100	500	500		13600
3900	4100	500	500		34558

Net Income /ha under Rainfed and Irrigated condition

Wood yield (Tons)	Sale price/tonne(Rs.)	Income(Rs)
200-250	1600	4,00,000
475-520	1600	8,44,,000