

Ailanthus altissima

Tree of heaven

Introduction

The genus *Ailanthus* consists of approximately ten species, which have a wide distribution ranging from Asia to north Oceania. Five species and two varieties have been found in southwestern, southeastern, central, and northern China.^[64]

Taxonomy:

Family: Simaroubaceae
Genus: *Ailanthus* Desf.



Ailanthus altissima leaves and flowers. (Photo by David J. Moorhead, UGA.)

Species of *Ailanthus* in China

Scientific Name	Scientific Name
<i>A. altissima</i> (Mill.) Swingle	<i>A. triphysa</i> (Dennst.) Alston
<i>A. fordii</i> Nooteboom	<i>A. vilmoriniana</i> Dode
<i>A. giraldii</i> Dode	

Description

Ailanthus altissima is a deciduous woody tree that can reach a height of 20 m. The bark is smooth with vertical streaks. The pithy shoots are initially covered with yellow or yellowish brown hairs, becoming glabrous. The leaves are odd-pinnate, 40-60 cm in length, consisting of 13-27 opposite or nearly opposite leaflets, which are papery, ovate, or lanceolate, 7-13 cm long and 2.5-4 cm wide, acuminate in the apex and suborbicular or cuneate at the base, with one or two glandular tips. The upper side of the leaf is deep green while the underside is grayish



Colorful fruits of *A. altissima*. (Photo by Chuck Barger, UGA.)

green. The inflorescence is a panicle with greenish flowers appearing from April to May. The flowers are about 6 mm long with 5 imbricate sepals and five petals, which are 2-2.5 mm long and hirsute at the base. The staminate flowers have an unpleasant odor; leaves also produce this odor when bruised. The fruit, which appears from August to October, is an oblong samara, 3 - 4.5 cm long and 1-1.2 cm wide, with a single flat seed in the middle of the wings^[64].

Habitat

A. altissima grows well in limestone-rich soils and often occurs in disturbed areas.

Distribution

A. altissima occurs nationwide in China with the exception of Gansu, Heilongjiang, Hainan, Jilin, Ningxia, Qinghai, Tibet and Xinjiang.^[64] The plant is recently reported to be cultivated in Ningxia,^[115] Qinghai,^[107] and Xinjiang.^[175]

Economic Importance

A. altissima is planted in limestone areas for reforestation purposes, but in most cases, the plant is grown as an ornamental. The tree is a source of timber. The leaves serve as forage for *Samia cynthia* (Drury), a species of silk-producing caterpillar. The bark and fruit have medicinal uses^[64].

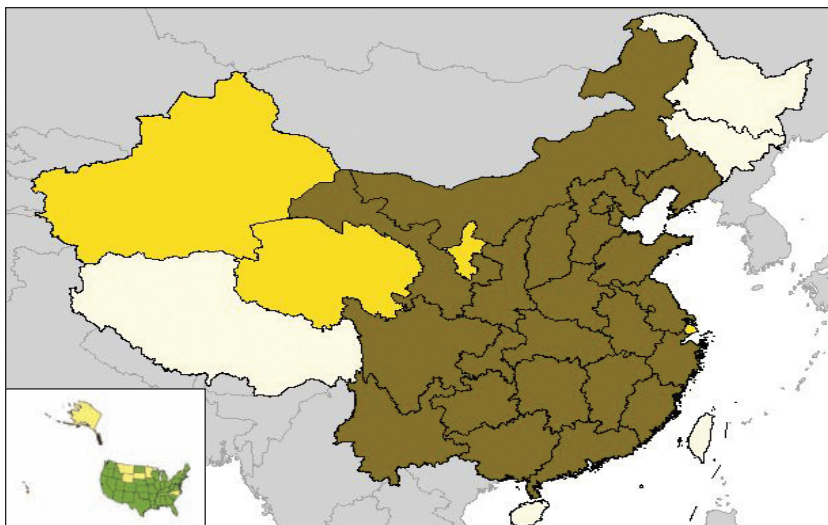
Related Species

Two varieties of *A. altissima* are reported in China. *Ailanthus altissima* var. *tanakai* (Hayata) Kanehira et Sasaki has yellowish-gray bark, scythe-like leaflets and a single-seeded reddish-brown fruit. *Ailanthus altissima* var. *sutchuenensis* (Dode) Rehd. et Wils. can be identified by its red branchlets^[64].

Natural Enemies of *Ailanthus*

At least 32 arthropods and 13 fungi have been recorded in association with the genus *Ailanthus* in China. Four identified fungal species (*Phyllactinia ailanthi* (Golov. et Bunk.), *Cercospora glandulosa* Ell. et Kell., *Phyllosticta ailanthi* Sacc., and *Pseudocercospora ailanthicola* (Patwardhan) Deighton; at least two new taxa (*Alternaria ailanthi* from Shandong and Shaanxi, and *Aecidium ailanthi* from Shaanxi);

along with one as yet unidentified *Coleosporium* sp. from Henan, are reported only from *A. altissima*. *Cytospora ailanthi* Berk. et Curtis, which can cause a symptom of bark canker on tree of heaven, is reported to occur in Xinjiang^[187]. One flexuous filamentous virus has been isolated from a tree of heaven exhibiting mosaic. It has been identified as a member of the potyvirus group^[181]. Witches' broom, caused by a mycoplasma-like organism, is reported from Anhui^[187]. Two weevils, *Eucryptorrhynchus brandti* (Harold) and *Eucryptorrhynchus chinensis* (Olivier), and one bug, *Orthopagus lunulifer* Uhler, may have potential for biological control of this plant based on their reported H. R.s and damage to the plant.



Fungi

Phylum	Family	Species	H.R.	Ref.
Ascomycota	Erysiphaceae	<i>Phyllactinia ailanthi</i> (Golovin & Bunkina) Y.N. Yu & S.J. Han	m	22
			p	23 [†]
		<i>Uncinula delavayi</i> Pat.	o	22
			o	23
Basidiomycota	Coleosporiaceae	<i>Coleosporium</i> sp.	m	187
	Incertae sedis	<i>Aecidium ailanthi</i> J.Y. Zhuang	m	210
	Schizophyllaceae	<i>Schizophyllum multifidum</i> (Batsch) Fr.	oo	23
	Sphaerophragmiaceae	<i>Nyssopsora cedrelae</i> (Hori) Tranzschel	p	23
Anamorphic <i>Guignardia</i>		<i>Phyllosticta ailanthi</i> Sacc.	m	23
Anamorphic <i>Lewia</i>		<i>Alternaria ailanthi</i> T.Y. Zhang & Y.L. Guo	m	nc
Anamorphic <i>Mycosphaerella</i>		<i>Cercospora glandulosa</i> Ellis & Kellerm.	m	23
		<i>Pseudocercospora ailanthicola</i> (Patw.) Deighton	m	110
		<i>Pseudocercospora qinlingensis</i> Y.L. Guo	oo	110
Anamorphic <i>Valsa</i>		<i>Cytospora ailanthi</i> Berk. & M.A. Curtis	m	187

[†] recorded as *Phyllactinia corylea* (Pers.) P. Karst., and regarded as a synonym of *Phyllactinia ailanthi* (Golovin & Bunkina) Y.N. Yu & S.J. In reference 22, although *Phyllactinia guttata* (Wallr.) Lév. is regarded as the current name of *P. corylea*.

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Tetranychidae	<i>Tetranychus urticae</i> (Koch)	p	85
		<i>Tetranychus viennensis</i> Zacher	p	85
Coleoptera	Cerambycidae	<i>Acalolepta degener</i> (Bates)	p	85
		<i>Mesosa longipennis</i> Bates	p	9
	Chrysomelidae	<i>Gastrolina depressa</i> Baly	p	85
	Curculionidae	<i>Alcidodes waltoni</i> (Bohemen)	p	85
		<i>Desmidophorus hebes</i> Fabricius	p	85
		<i>Eucryptorrhynchus brandti</i> (Harold)	m	2
		<i>Eucryptorrhynchus chinensis</i> (Olivier)	m	2
	Eumolpidae	<i>Basilepta ruficollis</i> (Jacoby)	p	85
	Scolytidae	<i>Xyleborus discolor</i> Blandford	p	182
<i>Xyleborus lewisi</i> Blandford		p	182	
Hemiptera	Pentatomidae	<i>Erthesina fullo</i> (Thunberg)	p	85
		<i>Palomena angulosa</i> Motschulsky	p	85
Homoptera	Cicadidae	<i>Huechys sanguinea</i> De Geer	p	85
	Coccidae	<i>Ceroplastes japonicus</i> Green	p	85
	Diaspididae	<i>Pinnaspis theae</i> (Maskell)	p	85
	Dictyopharidae	<i>Orthopagus lunulifer</i> Uhler	m	85
	Fulgoridae	<i>Lycorma delicatula</i> (White)	p	140
			p	204
Margarodidae	<i>Icerya seychellarum</i> (Westwood)	p	85	
Lepidoptera	Geometridae	<i>Culcula panterinaria</i> (Bremer et Grey)	p	85
		<i>Percnia giraffata</i> (Guenée)	p	65
			p	158
	Hepialidae	<i>Phassus excrescens</i> Butler	p	85
		<i>Phassus miniatus</i> Chu et Wang	p	85
	Noctuidae	<i>Eligma narcissus</i> (Cramer)	p	65
			m	85
			p	158
	Pieridae	<i>Eurema hecabe</i> (Linnaeus)	p	85
		<i>Talbotia naganuvum</i> (Moore)	p	158
	Pyralidae	<i>Dichocrocis punctiferalis</i> (Guenée)	p	85
		<i>Omphisa plagialis</i> Wileman	p	85
	Saturniidae	<i>Actias selene ningpoana</i> Felder	p	141
			p	65 ^I
			p	141 ^{II}
			p	158 ^{III}
			p	207
<i>Samia cynthia</i> (Drury)			p	158 ^{IV}
<i>Samia cynthia ricina</i> (Donovan)	p	207		
	p	207		

^{I, III} Recorded as *Philosamia cynthia walkeri* Felder et Felder; ^{II} Recorded as *Philosamia cynthia* Walker et Felder, ^{IV} Recorded as *Philosamia cynthia ricina* Donovan