

GINKGO

Ginkgo species

Plant Symbol = GINKG

Contributed by: USDA NRCS National Plant Data Center



Wikipedia © the Wikimedia Foundation, Inc.

Alternative Names

Ginkgo biloba L., maidenhair tree

Uses

NOTE: Ingesting seeds may be toxic.

Commercial use: The Ginkgo wood is of little value due to its scarcity. It is lightweight, brittle, yellow and in China and Japan, is used for chess sets, chopping blocks and firewood. The leaves are harvested for uses as a blood thinner and to treat circulatory illnesses.

Medical use: The extract from the Ginkgo leaves contains flavonoid glycosides, and ginkgolides. The extract is said to be a memory enhancer, and anti-vertigo agent. There are three effects on the human body: (1) it improves blood flow (including microcirculation in small capillaries) to most tissues and organs; (2) it protects against oxidative cell damage from free radicals (antioxidant); and (3) it blocks many of the effects of PAF (platelet aggregation, blood clotting) that have been related to the development of a number of cardiovascular, renal, respiratory and CNS (Central Nervous System) disorders.

Ginkgo is also added in small amounts to energy drinks, but it does not produce a noticeable effect, except as a placebo, or marketing tool from Ginkgo being listed on the label.

Side Effects: There are some undesirable effects of Ginkgo for individuals with blood circulation disorders, and those taking anti-coagulants (i.e., aspirin, warfarin). Recent studies have found that ginkgo has little or no effect on the anticoagulant properties or pharmacodynamics of warfarin. Ginkgo should not be used by people who are taking the anti-depressant drugs, monoamine oxidase inhibitors (MAOI) or by pregnant women. Ginkgo side effects include possible increased risk of bleeding, gastrointestinal discomfort, nausea, vomiting, diarrhea, headaches, dizziness, and restlessness. If any side effects are experienced, stop immediately taking Ginkgo supplements and consult your doctor.

Culinary use: The Ginkgo nut-like gametophytes inside the seeds are a traditional Chinese food often served at weddings. They are believed to have health benefits or have aphrodisiac qualities. Japanese cooks add Ginkgo seeds to dishes such as chawammushi, and cooked seeds are often eaten along with other dishes..

When eaten by children, in large quantities over a long period of time, the raw gametophyte (meat) of the seed can cause poisoning by MPN (4-methoxypyridoxine), which is heat-stable. Studies have demonstrated that convulsions caused by MPN can be prevented or terminated with pyridoxine. Some people are sensitive to the chemicals in the sarcotesta, the outer fleshy coating. These people should handle the seeds with care by wearing disposable gloves when preparing the seeds for consumption. The symptoms are dermatitis or blisters similar to that caused by contact with poison ivy. Seeds with the fleshy coating removed are perfectly safe to handle.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description

General: The Ginkgo is a medium to large tree that reaches 20–35m tall, although some specimens in

China are over 50m tall. Ginkgo trees often have angular crown and long, somewhat erratic branches. They are usually deep rooted and resistant to wind and snow damage. Young trees are often tall and slender, and sparsely branched, and the crown becomes broader as the tree ages. Some old Ginkgos produce aerial roots, known as *chichi* (Japanese; "nipples") or *zhong-ru* (Chinese), which form on the undersides of large branches and grow downwards. Chichi growth is very slow, and may take hundreds of years to occur. The function, if any, of these thick aerial roots is unknown.

Ginkgo branches grow in length by growth of shoots with regularly spaced leaves. From the axils of these leaves, "spur shoots" (also known as short shoots) develop on second-year growth. Short shoots have very short internodes (so that several years' growth may only extend them by a centimeter or two) and their leaves are ordinarily unlobed. They are short and knobby, and are arranged regularly on the branches except on first-year growth. Because of the short internodes, leaves appear to be clustered at the tips of short shoots, and reproductive structures are formed only on them.

The leaves are unique among seed plants, being fan-shaped with veins radiating out into the leaf blade, sometimes bifurcating (splitting), but never anastomosing to form a network. Two veins enter the leaf blade at the base and fork repeatedly in two. This is known as dichotomous venation. The leaves are 5-10 cm (rarely to 15 cm) long. The old popular name "Maidenhair tree" is because the leaves resemble some of the pinnae of the Maidenhair fern *Adiantum capillus-veneris*.

Leaves of long shoots are usually notched or lobed, but only from the outer surface between the veins. They are borne both on the more rapidly growing branch tips, where they are alternate and spaced out, and also on the short, stubby spur shoots, where they are clustered at the tips. During summer, the leaves are a deep green, turning to brilliant yellow in the fall. They generally remain yellow for a time, then suddenly drop most of their leaves in what can seem like overnight.

Distribution:

For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: The ginkgo is a drought-resistant, adaptable species, and is very cold hardy thriving. It is also very pH adaptable, tolerates air pollution and soil salt

pollution, making it an ideal candidate for adverse urban conditions. It will grow in almost any conditions, it prefers deep, sandy, moist soil and requires full sun.

Adaptation

Ginkgo is a slow-grower adaptable, hardy tree for use as a specimen or grown in groups for commercial production. It transplants well, establishes easily and is often planted in parks, arboreta and botanical gardens as a point of interest. Male cultivars are preferable, as not only is the odor of the fallen seeds unpleasant, but the abundant crops can also be very messy. Cultivars include 'Fastigiata,' a male form with an upright, columnar habit; 'Fairmont,' a narrow, pyramidal male form; and 'Shangri-la,' a fast-growing form with a compact crown and good fall color.

Establishment

Ginkgos are dioecious with separate female and male sexes. Male plants produce small pollen cones with sporophylls, each bearing two microsporangia spirally arranged around a central axis. Female plants do not produce cones. Two ovules are formed at the end of a stalk, and after pollination, one or both develop into seeds.

The seed is 1.5-2 cm long. Its outer layer, the sarcotesta is light yellow-brown, soft, and fruit-like. It is plum like and attractive, but the seedcoat contains butanoic acid, and smells like rancid butter when fallen on the ground. Beneath the sarcotesta is the hard sclerotesta, and a papery endotesta and nucellus.

The fertilization of ginkgo seeds is unusual in that it utilizes motile sperm; cycads are the only other seed plants with this feature. It was first discovered by the Japanese botanist Sakugoro Hirase in the early 1900s. When the pollen reaches the pollen chamber, two sperm are produced, one of which goes on to fertilize the ovule. The fertilization of ginkgo seeds is complete by the time they fall in autumn.

Pests and Potential Problems

The Ginkgo is disease resistance, insect-resistant wood and has the ability to form aerial roots and sprouts. This means the Ginkgo lives long, with some specimens claimed to be more than 2,500 years old; a 3,000 year-old.

Cultivars, Improved, and Selected Materials (and area of origin)

Ginkgos were once native throughout the Northern Hemisphere, but were rendered extinct in North America and Europe during the Pleistocene Ice Age.

They survived in the Yangste River valley in eastern China where they still grow today. The ginkgo has been cultivated for centuries in China and Japan and it is a sacred tree in the Far East. It grows well in Minnesota, Georgia, and Florida and in zones 8 and 9 of the southeast. It is a common urban planting in many Iowa cities.

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

References

Bartram, T. 1995 *Encyclopedia of Herbal Medicine*, Grace Publishers, Bournemouth.

Blumenthal M, Goldberg A, Brinckman J, Eds. *Herbal Medicine: Expanded Commission E Monographs*. Newton, MA: Lippincott Williams & Wilkins; 2000:359-366 pp.

Bremness, L. 1994. *Herbs*, Dorling Kindersley Eyewitness Handbook, London.

Chevallier, A. 1996. *The Encyclopaedia of Medicinal Plants*, Dorling Kindersley, London.

Coates P, Blackman M, Cragg G, et al., Eds. *Encyclopedia of Dietary Supplements*. New York, NY: Marcel Dekker. 2005. Accessed at Dekker Encyclopedias on September 9, 2005. 249-257pp.

Corrigan, D. 1993 *Ancient Medicine: Ginkgo biloba*, Amberwood Publishing, Christchurch

De Smet PA. 2002. *Herbal remedies. New England Journal of Medicine*. 2002. 347(25): 2046-2056 pp..

Ernest, E, Canter PH, Coon JT. 2005. *Does ginkgo biloba increase the risk of bleeding? A systematic review of case reports*. Perfusion.

Kleijnen, J. & Knipschild, P. 1992 *Ginkgo biloba, in The Lancet*, 1992, Vol.340, 1136-1139 pp.

Lewington, A., & Parker, E. 1999. *Ancient Trees*. London: Collins & Brown Ltd.

Newall, C.A., Anderson, L.A., & Phillipson, J.D. 1996 *Herbal Medicines: A Guide for Health-care Professionals*, The Pharmaceutical Press, London

Ody, P. 1993 *The Herb Society's Complete Medicinal Herbal*, Dorling Kindersley, London.

Rogers, S.K. 1995 *British and Chinese Herbal Pharmacopoeia*, Healthlink Software Systems, Queensland, Australia

Solomon PR, Adams F, Silver A, et al. 2002. *Ginkgo for memory enhancement: a randomized controlled trial. Journal of the American Medical Association*. 2002; 288(7): 835-840 pp.

Weiss, R.F. 1991 *Herbal Medicine*, Beaconsfield Arcanum, Beaconsfield.

Witkam, L. and I. Ramzan. 2004. "Ginkgo biloba in the treatment of Alzheimer's disease: A miracle cure?". *From Cell to Society*.

Wren, R.C. 1988 *Potter's New Cyclopaedia of Botanical Drugs and Preparations*, C.W.Daniel, Saffron Walden.

Xuemin Jiang et al. 2005. *Effect of ginkgo and ginger on the pharmacokinetics and pharmacodynamics of warfarin in healthy subjects*. *British Journal of Clinical Pharmacology*.

Prepared By:

Lincoln M. Moore
USDA NRCS National Plant Data Center
Baton Rouge, Louisiana

Jeffrey D. Walker Wilson
Earth team volunteer
USDA NRCS National Plant Data Center
Baton Rouge, Louisiana

Species Coordinator:

Lincoln M. Moore
USDA NRCS National Plant Data Center, Baton Rouge, Louisiana

Edited: 060803 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site <<http://plants.usda.gov>> or the Plant Materials Program Web site <<http://Plant-Materials.nrcs.usda.gov>>

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call

202-720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

Read about Civil Rights at the Natural Resources Conservation Service.