

## AMERICAN HORNBEAM

*Carpinus caroliniana* Walt.

Plant Symbol = CACA18

Contributed by: USDA NRCS National Plant Data  
Center & the Biota of North America Program



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### Alternate Names

ironwood, musclewood, muscle beech, blue beech,  
water beech

### Uses

The wood of *Carpinus* is of minor economic importance because of the small size of the trees. It is whitish, extremely hard, and heavy and has been used for making mallet heads, tool handles, levers, and other small, hard, wooden objects. The wood is not subject to cracking or splitting and was used by American pioneers for bowls and dishes.

American hornbeam is planted in landscapes and naturalized areas. It prefers deep, fertile, moist, acidic soil and grows best in partial shade, but will grow in full sun. Its chief liabilities in cultivation are a relatively slow growth rate and difficulty in transplantation. It is not drought-tolerant.

Seeds, buds, or catkins are eaten by a number of songbirds, ruffed grouse, ring-necked pheasants, bobwhite, turkey, fox, and gray squirrels. Cottontails, beaver, and white-tailed deer eat the leaves, twigs, and larger stems. American hornbeam is heavily used by beaver, because it is readily available in typical beaver habitat.

### 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

American hornbeam is a native, large shrub or small tree with a wide-spreading, flat-topped crown, the stems are slender, dark brown, hairy; bark gray, thin, usually smooth, with smooth, longitudinal fluting (resembling a flexed muscle). Its leaves are deciduous, arranged alternately along stems, egg-shaped to elliptical in outline,  $\frac{3}{4}$  to  $4\frac{3}{4}$  inches long, with doubly-serrate edges. They are glabrous above, slightly to moderately pubescent beneath, especially on major veins, with or without conspicuous dark glands. During the growing season, leaves are dark green but turn yellow to orange or red in the fall. The flowers are unisexual, in catkins. The male catkins are 1 to  $2\frac{1}{2}$  inches long, female catkins are somewhat shorter. Both types occur on the same plant). Fruits are nutlets surrounded by a 3-winged, narrow, leaf-like bract. Numerous nutlets are held together in pendulous chain-like clusters, changing from green to brown in September-October.

### Adaptation and Distribution

American hornbeam occurs primarily as an understory species in bottomland mixed-hardwood forests. Best sites are in the transition between mesic and wet areas -- near lakes and swamps, on well-drained terraces of rivers, terraces or steep slopes of minor streams with some gradient, coves, ravine bottoms, and rises in lowlands. These sites generally have abundant soil moisture but sufficient drainage to prevent saturation and poor aeration during the

growing season, although trees may also grow on sites flooded for up to about 20% of the growing season.

American hornbeam is distributed throughout most of the eastern United States. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Web site.

### **Establishment**

American hornbeam is planted in landscapes and naturalized areas. It prefers deep, fertile, moist, acidic soil and grows best in partial shade, but will grow in full sun. Its chief liabilities in cultivation are a relatively slow growth rate and difficulty in transplantation. It is not drought-tolerant.

American hornbeam begins to produce seeds at about 15 years and peaks at 25 to 50 years, probably ceasing at about 75 years. Large seed crops are produced at 3-5-year intervals. Seeds are mainly dispersed by birds. Seed establishment will occur on leaf litter in deep shade. Flooding, drought, damping off, proximity to an adult of the same species, and herbivory are important causes of mortality for first-year seedlings. Reproduction also may occur by sprouts from the root crown and by root sprouts, although the latter apparently is not common.

American hornbeam is best suited to establishment in bottomlands that have already been stabilized by pioneer species. It is shade-tolerant and persists in the understory of mature plant communities. Shade tolerance declines with age and American hornbeam is likely to become dominant, with other subcanopy species, at some sites after overstory removal.

### **Management**

Because of its thin bark, American hornbeam is probably either top-killed or completely killed by most fires. It occurs mostly in communities that rarely experience fire. It sprouts after top-kill by fire and repeated fires at a closely spaced interval will quickly eliminate the species. The wood rots very rapidly and dying trees usually disappear naturally within a decade.

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