

***Carpinus caroliniana*: American Hornbeam¹**

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Introduction

A handsome tree in many locations, the tree slowly reaches a height and spread of 20 to 30 feet. It will grow with an attractive open habit in total shade, but be dense in full sun. The muscle-like bark is smooth, gray, and fluted. Ironwood has a slow growth rate and is reportedly difficult to transplant from a field nursery (although 10-inch-diameter trees were moved with a 90-inch tree spade during the winter in USDA hardiness zone 8b with no problem) but is easy from containers. The fall color is faintly yellow to orange to red and stands out in the landscape or woods in the fall. Brown leaves occasionally hang on the tree into the winter.

General Information

Scientific name: *Carpinus caroliniana*

Pronunciation: kar-PYE-nus kair-oh-lin-ee-AY-nuh

Common name(s): American hornbeam, blue-beech, ironwood

Family: Betulaceae

USDA hardiness zones: 3A through 9A (Figure 2)

Origin: native to the majority of the eastern United States, southeast Quebec, and southwest Ontario

UF/IFAS Invasive Assessment Status: native

Uses: sidewalk cutout (tree pit); deck or patio; specimen; street without sidewalk; screen; hedge; tree lawn 3–4 feet wide; tree lawn 4–6 feet wide; tree lawn > 6 ft. wide; Bonsai; shade



Figure 1. Full Form—*Carpinus caroliniana*: American hornbeam
Credits: Gitta Hasing

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Figure 2. Range

Description

Height: 20 to 30 feet

Spread: 20 to 30 feet

Crown uniformity: symmetrical

Crown shape: oval

Crown density: dense

Growth rate: slow

Texture: medium

Foliage

Leaf arrangement: alternate

Leaf type: simple

Leaf margin: double serrate

Leaf shape: ovate, oblong

Leaf venation: pinnate

Leaf type and persistence: deciduous

Leaf blade length: 3 to 5 inches

Leaf color: green on top, paler green underneath

Fall color: yellow, orange, red

Fall characteristic: showy



Figure 3. Leaf—*Carpinus caroliniana*: American hornbeam
Credits: Gitta Hasing



Figure 4. Leaf, Fall—*Carpinus caroliniana*: American hornbeam
Credits: Gitta Hasing

Flower

Flower color: yellow-green

Flower characteristics: not showy; male—hanging catkin; female—spike-like catkin

Flowering: mid to late spring



Figure 5. Flower—*Carpinus caroliniana*: American hornbeam
Credits: Gary Kling

Fruit

Fruit shape: elongated, oval

Fruit length: $\frac{1}{2}$ to 1 inch

Fruit covering: dry or hard; ribbed, cone-shaped nutlet

Fruit color: brown

Fruit characteristics: attracts birds; not showy; fruit/leaves not a litter problem

Fruiting: ripens in late summer and early fall



Figure 6. Fruit—*Carpinus caroliniana*: American hornbeam
Credits: Gary Kling

Trunk and Branches

Trunk/branches: branches droop; showy; typically multi-trunked; no thorns

Bark: smooth, bluish gray, thin, with fluted vertical ridges

Pruning requirement: little required

Breakage: resistant

Current year twig color: reddish, brown

Current year twig thickness: thin

Wood specific gravity: unknown



Figure 7. Bark—*Carpinus caroliniana*: American hornbeam
Credits: Gitta Hasing

Culture

Light requirement: full sun to partial shade

Soil tolerances: clay; sand; loam; acidic; slightly alkaline; well-drained to occasionally wet

Drought tolerance: moderate

Aerosol salt tolerance: none

Other

Roots: not a problem

Winter interest: yes

Outstanding tree: yes

Ozone sensitivity: unknown

Verticillium wilt susceptibility: resistant

Pest resistance: resistant to pests/diseases

Use and Management

With age, a multiple-trunked, low-branching specimen can be very attractive, showing off the bark and trunk form particularly well when lit at night. Tolerant of pruning, the tree can be used as a hedge plant or lends itself well for use as a screen due to the densely foliated crown. It can also be trained for street tree use by pruning to one central leader with small-diameter horizontal branches forming “layers” of foliage in the crown. Some nurseries offer single-stemmed specimens. Well-suited for small spaces in the shade or sun, ironwood is tolerant of occasional flooding. The wood is very hard and strong and makes a great tree for climbing, if allowed to grow with low branches intact. The wood dulls woodworking tools quickly. Nutlets and buds are eaten by many birds and squirrels. If transplanting from the field, do it in the spring.

It performs well even in areas inundated with water for several days to a week or two once it is established. Although moderately drought-tolerant, it is probably best to provide even established trees with some irrigation during dry spells in the South. Ironwood grows in sun or shade (as an understory tree in the woods) and tolerates most soils, including wet, but not alkaline.

Pests

Relatively few insects attack hornbeam. Maple phenacoccus forms white cottony masses on the undersides of the leaves.

Diseases

None are normally very serious. Several fungi cause leaf spots on *Carpinus*. Leaf spots are not serious, so control measures are usually not needed.

Canker, caused by several fungi, causes infected branches to die back, and entire trees die if the trunk is infected and girdled. Severely infected trees cannot be saved, and infected branches are pruned out. This could limit usefulness in parts of the Deep South.

Reference

Koeser, A. K., Hasing, G., Friedman, M. H., and Irving, R. B. 2015. *Trees: North & Central Florida*. Gainesville: University of Florida Institute of Food and Agricultural Sciences.