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 orange to yellow 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-e-AY-nuh
Common name(s): American Hornbeam, Blue-Beech, Ironwood
Family: Betulaceae
USDA hardiness zones: 3A through 9A (Fig. 2)
Origin: native to North America
Invasive potential: little invasive potential
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
Availability: somewhat available, may have to go out of the region to find the tree

Figure 1. Young *Carpinus caroliniana*: American Hornbeam
Credits: Ed Gilman

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 (Fig. 3)
Leaf type: simple
Leaf margin: double serrate
Leaf shape: ovate, oblong
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches
Leaf color: green
Fall color: red, yellow, orange
Fall characteristic: showy

Flower
Flower color: orange, yellow
Flower characteristics: not showy

Fruit
Fruit shape: elongated, oval
Fruit length: .5 to 1 inch
Fruit covering: dry or hard
Fruit color: brown
Fruit characteristics: attracts birds; not showy; fruit/leaves not a litter problem

Trunk and Branches
Trunk/bark/branches: branches droop; showy; typically multi-trunked; thorns

Pruning requirement: little required
Breakage: resistant
Current year twig color: reddish, brown
Current year twig thickness: thin
Wood specific gravity: unknown

Culture
Light requirement: full sun, partial sun or partial shade, shade tolerant
Soil tolerances: clay; sand; loam; acidic; slightly alkaline; occasionally wet; well-drained
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 underside 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.