

## New York City EcoFlora



illustration by Charles Edward Faxon from *The Silva of North America* by Charles Sprague Sargent, Vol. 5, plate 274. 1894.

### *Fraxinus* (Oleaceae, Olive Family) Ash

**Description:** Trees or rarely shrubs, the bark usually thick and furrowed, sometimes smooth or scaly. Leaves opposite, odd-pinnately compound or rarely simple. Inflorescences in axillary panicles usually borne on twigs of the previous season. Flowers usually reduced and wind pollinated; calyx short-tubular, deciduous or persistent; petals usually 0, rarely 2–4. Fruit a single-seeded samara with a well differentiated wing and seed body or flat and undifferentiated.

**Where Found:** Widely distributed in the northern hemisphere; forest edges, light-gaps and swamps. In some forests across northeastern North America Ash may comprise 50% or more of total trunk diameter (basal area).

**Natural History:** Like Oaks, Ash trees exhibit the phenomenon called masting, producing abundant seed crops some years and few or none in other years. The seeds are an important food source for many birds and mammals. Numerous insects and fungi have co-evolved with Ash. The Ash Bolete (*Boletinus merulioides*) is common near Ash trees in New York City. Native and non-native Borers are common on Ash. Some attack already weakened trees while others, such as the non-native Emerald Ash Borer attack healthy trees. Aphids are often present but rarely cause serious harm. Fall webworm may cover branches with webbing. Mites feeding on flowers cause Ash Flower-galls that are mutant flower clusters that usually persist through the summer. A Rust fungus produces yellow, cup-like structures with yellow spores. Anthracnose causes the leaves to turn brown, especially along the margins. Verticillium Wilt causes branches of infected trees to wilt and die and may eventually kill the entire tree.

**Cultural History:** In the Iliad of Homer, Achilles' javelin was made of Ash. In Norse mythology, the Ash or Yggdrasil is the tree of life, supporting the heavens and rooted in wisdom. The wood is prized for its strength, flexibility and shock resistance. It is one of the few woods that will burn when green.

**Name Notes:** *Fraxinus* is derived from the Greek *phraxis* meaning hedge or from the Latin *fraxinus* for lightning.

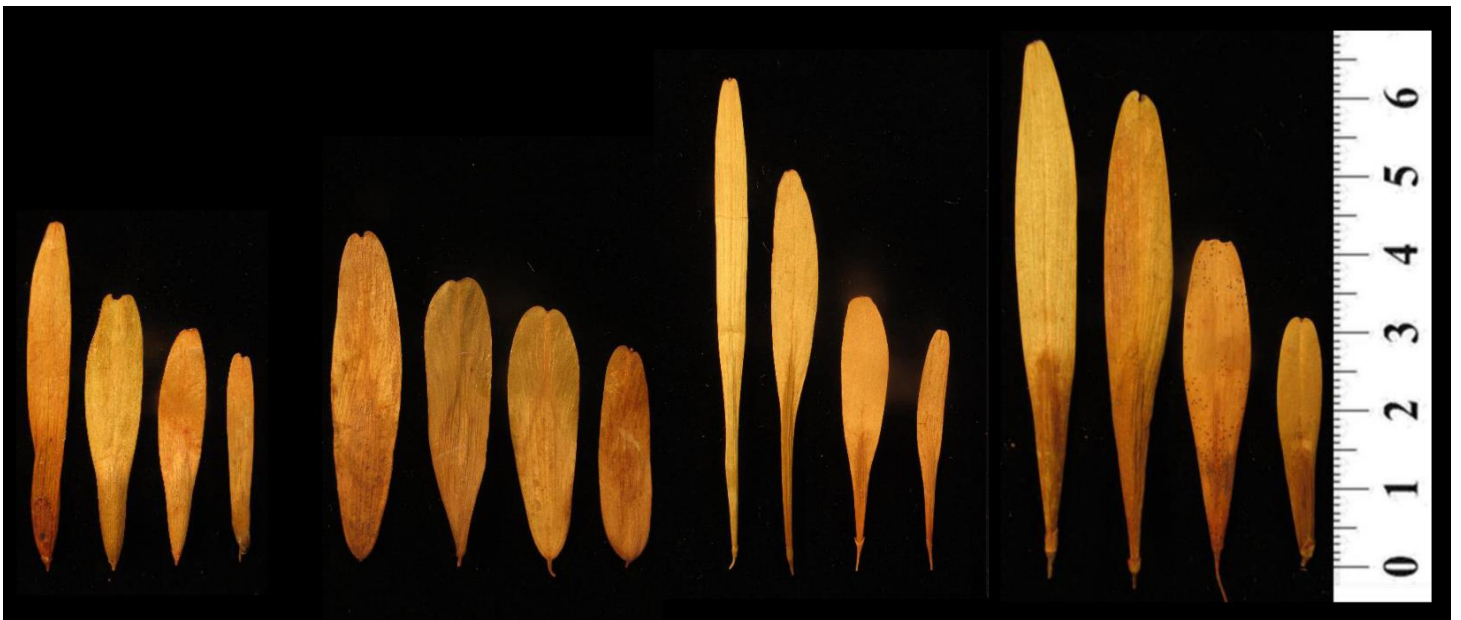
**Species Notes:** The genus consists of about 45 species with roughly half occurring in North America and half in Eurasia. Evidence from the fossil record, evolution of floral anatomy and a better understanding of *Fraxinus* phylogeny based on DNA studies suggest that the genus evolved on the North American continent about 40 million years ago from a common ancestor in the Olive family. The genus diversified into three taxonomic sections (*Dipetalae*, *Melioides* and *Pauciflorae*) and subsequently spread to Asia where three additional sections evolved (*Fraxinus*, *Ornus* and *Sciadhanthus*). One of these (section *Fraxinus*) later migrated back to North America, represented today by the Black Ash, *Fraxinus nigra*. Of the North American species exposed to the Emerald Ash Borer so far, *Fraxinus quadrangulata* (section *Dipetalae*) appears to have the best resistance to the Emerald Ash Borer, although up to 90% of trees are killed. The tree has a narrow distribution in the Midwest. It is closely related to *Fraxinus cuspidata* of the southwestern US and Mexico. It does not occur naturally in New York city, but is cultivated at the New York Botanical Garden.

Ash trees often produce vigorous sterile sprouts with unusual morphologies (epicormic branching). Descriptions and measurements given here are from and for fruiting branches only. Petiolule length varies from the base of the leaf to the apex. Petiolule measurements are for the pair with the longest petiolules (usually the second from the base). Samara size varies within a cluster. Samara measurements are for the largest samara per cluster or specimen.

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## Key to *Fraxinus* of New York City

1. Leaf scar crescent-shaped (curved above); leaflet margins entire to crenate; longest lateral petiolules 0.5–2 cm long.
  2. Leaf rachis usually glabrous; leaflet abaxials whitened; seed body terete, the wing decurrent < 1/3 on the seed body .....*Fraxinus americana*.
  2. Leaf rachis pubescent; leaflet abaxials green; seed body flattened, the wing decurrent > 1/3 on the seed body .....*Fraxinus profunda*.
1. Leaf scar shield-shaped (flat above); leaflet margins crenate to distinctly toothed; longest lateral petiolules 0–0.5 cm long.
  3. Leaflets (5–) 7 (–9); samaras with well-differentiated body and wing; calyx persistent ..... *Fraxinus pennsylvanica*.
  3. Leaflets 9–13; samaras with poorly-differentiated body and wing; calyx deciduous.
    4. Leaflets sessile, each pair with a dense tuft of hair at junction with rachis..... *Fraxinus nigra*.
    4. Leaflets short-petiolulate, but the lamina decurrent to the rachis, each pair without dense tuft of hair.....*Fraxinus excelsior*.



*Fraxinus* samaras of native species, scale in centimeters: (l to r) *Fraxinus americana*, *Fraxinus nigra*, *Fraxinus pennsylvanica*, *Fraxinus profunda*.



***Fraxinus americana* L.**

White Ash

**Description:** Tree to nearly 40 m tall with a massive trunk to 2 m diameter; bark rough, the ridges and furrows forming prominent diamond pattern; twigs essentially glabrous, the leaf scar crescent-shaped with tapering, curled tips, buds brown; leaves 20–40 cm long, the leaflets usually 9, petiolulate, largest ovate, 10–15 × 6–10 cm, chartaceous, entire, crenate or toothed, whitened below, the apex cuspidate; samaras 2.5–5 cm long and 3–6 mm wide, the wing extending less than 1/3 length of the plump, cylindrical seed body; calyx persistent.

**Where Found:** Widespread in North America from Nova Scotia to Minnesota, south to East Texas, northern Florida and much of the Atlantic Coastal plain; germinating in gaps in moist fertile soils in uplands, bottomlands and along watercourses. Widespread in New York City. The species is ranked 3 out of 10 in habitat specificity (0 being least specific) by the New York Natural Heritage Program.

**Natural History:** White-tailed deer and cattle will browse the foliage. Beaver, Porcupine, and Rabbits may eat the bark of young trees. The seeds are eaten by Wood Duck, Northern Bobwhite, Turkey, Grouse, Finches, Grosbeaks, Cardinals, Fox Squirrel, Mice, and many other birds and small mammals. Cavity-nesters such as Redheaded, Red-bellied, and Pileated Woodpeckers often forage on and nest in White Ash. Their abandoned nest cavities are then utilized by secondary

nesters such as Wood Ducks, Owls, Nuthatches, Gray Squirrels and others. Most large White Ashes in New York City began dying about 1990, presumably by a fungal pathogen; very few large trees remain.

**Cultural History:** White Ash wood is straight-grained, hard and shock-resistant, making it ideal for tool handles, sporting equipment and other applications. It is the most commercially valuable Ash wood.

**Name Notes:** The common name, White Ash, is probably for the extreme paleness of the wood.

**Species Notes:** The species is characterized by the crescent-shaped leaf scar, stalked leaflets with white undersides and the plump seed body. *Fraxinus americana* has a long list of synonyms.

**Links:** iNaturalist [observations](#) from New York City. [Specimens](#) from the Mid-Atlantic Herbaria Consortium. Global biotic [interactions](#) from GloBI.





Weeping Ash, *Fraxinus excelsior* 'Pendula'.

**Links:** iNaturalist [observations](#) from New York City. [Specimens](#) from the Mid-Atlantic Herbaria Consortium. Global biotic [interactions](#) from GloBI.

## ***Fraxinus excelsior* L.**

European Ash

**Description:** Tree to about 18 m tall; bark smooth at first, becoming longitudinally furrowed; twigs glabrous, the leaf scar shield-shaped (flat above), the buds jet black; leaves 18–30 cm long, the leaflets 9–13, very short petiolulate and blades decurrent to rachis, the largest elliptic, 6–9 × 1.5–2.5 cm, chartaceous, toothed, the apex acute; samaras 2.5–5 cm long and 5–7 mm wide, the wing extending along the entire flat seed body; calyx deciduous.

**Where Found:** Native throughout Europe to the Caucasus and Iran, adventive in eastern North America; spontaneous trees documented from Central Park and the New York Botanical Garden.

**Natural History:** The Global Biotic Interactions database records 160 organisms that eat, parasitize or otherwise interact with *Fraxinus excelsior*.

**Cultural History:** In Norse mythology the tree occupies the center of the world. The wood is used to make the sticks used in the game hurling.

**Name Notes:** Known as Common Ash because it is the most common species of Ash in Europe. The epithet *excelsior* means superior or to rise higher. It is the New York state motto.

**Species Notes:** *Fraxinus excelsior* is in *Fraxinus* section *Fraxinus* and like it's American counterpart, *Fraxinus nigra* it has 9–13 nearly sessile leaflets. The buds of this species are exceptionally large and jet black, making it easy to identify, even without fruit. There are a number of cultivars, including the



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## ***Fraxinus nigra* Marsh**

Black Ash

**Description:** Tree to about 20 m tall with a slender trunk to 60 cm diameter, rarely larger; bark corky, becoming longitudinally furrowed and scaly with age; twigs glabrous, the leaf scar shield-shaped (flat above), the buds brown to black; leaves 25–40 cm long, the leaflets usually 9 (7–13), sessile, oblong, the largest 9–14 × 2.8–4.5 cm, chartaceous, finely toothed, the apex acute to caudate; samaras 2.5–4.5 cm long and 6–8 mm wide, the wing extending along the entire flat seed body; calyx deciduous.

**Where Found:** Newfoundland to Manitoba and through the upper Midwest, northern Appalachian, Delaware to New England; cold swamps; the species occurs in Westchester and Nassau counties, but has not been seen in New York City since 1915. The species is ranked 8 out of 10 in habitat specificity (0 being least specific) by the New York Natural Heritage Program.

**Natural History:** The seeds are eaten by waterfowl.

**Cultural History:** The wood of Black Ash readily separates along annual rings and is used extensively to make splint baskets, particularly among Native Americans of the northern US and Canada.

**Name Notes:** In the influential *Sylva* of North America, Francois André Michaux applied the name *Fraxinus sambucifolia* of Lamarck, a later synonym of Humphrey Marshall's, *Fraxinus nigra*.

**Species Notes:** *Fraxinus nigra* is more closely related to Eurasian species (including *Fraxinus excelsior*) than it is to any American species and shares with

those species a flat undifferentiated samara and a deciduous calyx.

**Links:** iNaturalist [observations](#) from New York City. [Specimens](#) from the Mid-Atlantic Herbaria Consortium. Global biotic [interactions](#) from GloBI.



***Fraxinus pennsylvanica*** Marshall  
Green Ash

**Description:** Tree to about 20 m tall and rarely exceeding 50 cm diameter; bark with narrow ridges forming prominent diamond pattern; twigs glabrous or pubescent, the hairs red or white, the leaf scars shield-shaped (flat above), the buds brown; leaves 10–25 cm long, the leaflets usually 7, decurrent to the base and appearing sessile, usually narrow-lanceolate to ovate or elliptic, largest 3.5–12 × 1.5–4 cm, coriaceous, margins crenate or toothed, the apex acute; samaras (1.5–)2.5–6.5 cm long and 3–6 mm wide, the wing extending > 1/3 the length of the slender seed body, the calyx persistent.

**Where Found:** Widespread from Nova Scotia to eastern Washington, south through the Great Plains to Texas and throughout the eastern US, absent from south Florida and the southwest; edges and openings in dry to moist woodlands and abandoned fields, and along streams in more arid regions; widespread in New York City. The species is ranked 4 out of 10 in habitat specificity (0 being least specific) by the New York Natural Heritage Program.

**Natural History:** *Fraxinus pennsylvanica* is a fast-growing pioneer species. It tolerates a wide range of soil types and is found in the driest sites of any of our Ash species, although it can occupy wet sites as well.

**Cultural History:** The wood is hard and straight-grained, but the trees do not get as large as *Fraxinus americana*. It is used for tool handles, boxes, crates, pallets and sporting equipment. This species is widely planted as a street tree. The

cultivar 'Marshall's Seedless' is often used in New York City.

**Name Notes:** The glabrous forms of the species are called Green Ash and the pubescent forms are called Red Ash.

**Species Notes:** *Fraxinus pennsylvanica* is the most widespread and variable North American Ash. Pubescence, leaflet marginal teeth and fruit size are all variable and none are strongly correlated with any other character state. Nevertheless, there are two morphotypes that can be generalized with the extremes located at opposite ends of the range but grading from one to the other through the intervening geography (including New York City). On the Great Plains at the northwestern extent of the range, there are trees with small, distinctly toothed leaflets and very small samaras (1.5 cm long). While in the southeast, along the Gulf and Atlantic coastal plain there are trees with large, crenate to entire leaflets and larger samaras (to 4.8 cm long). There are no trees in the southeast with leaves and fruit as small as in the northwest and in the northwest there are no trees with leaves and fruit as large as those of the southeast. *Fraxinus darlingtonii* Britton was applied to specimens from Pennsylvania with long, extremely narrow fruits. Specimens from the Great Plains with prominent teeth and smaller fruit were named *Fraxinus austinii* Fern., *Fraxinus campestre* Britton and *Fraxinus pennsylvanica* var. *lanceolata* (Borkh.) Sarg. *Fraxinus pennsylvanica* var. *subintegerrima* (Vahl) Fernald and *Fraxinus pennsylvanica* var. *pennsylvanica* are names applied to both glabrous and pubescent forms (respectively).

**Links:** iNaturalist [observations](#) from New York City. [Specimens](#) from the Mid-Atlantic Herbaria Consortium. Global biotic [interactions](#) from GloBI.





***Fraxinus profunda*** (Bush) Bush  
Pumpkin Ash

**Description:** Tree to 35 m tall and 2 m diameter, the trunk often swollen at the base; bark rough, forming rectangular blocks, the irregular furrows deep and only vaguely diamond patterned; twigs densely pubescent or rarely glabrous, the leaf scars crescent-shaped (curved above), the buds brown; leaves 25–50 cm long, the leaflets usually 7 (–9), elliptic or lanceolate, largest 10–20 × 4–8 cm, thick and leathery, essentially entire; samaras 5.5–8 cm long and 7–12 mm wide, the wing scarcely differentiated from the plump seed body, the calyx persistent, 2–5 mm long.

**Where Found:** On the Mississippi and Ohio floodplains from New Orleans to central Michigan and western Pennsylvania, along the Gulf Coast and Atlantic Coastal Plain from central Florida to New York City and disjunct in the southern Appalachians; swamp forests and wet depressions. The species was first recorded for New York state from the Bronx as early as 1904, but the tree was dropped from the flora during most of the 20th century. It was rediscovered growing wild at NYBG in 2008. Mature specimens are documented from Mosholu Parkway, the New York Botanical Garden, the Bronx Zoo, Pelham Parkway, Pelham Bay Park and Central Park. It is expected on Staten Island and may also occur in Queens. The species is ranked 8 out of 10 in habitat specificity (0 being least specific) by the New York Natural Heritage Program.

**Natural History:** In 2004, The Michigan State Champion Pumpkin Ash was found

on Belle Isle in the Detroit River; it measured 38 m tall and 3.3 m diameter.

**Cultural History:** The wood of Pumpkin Ash is similar to *Fraxinus americana* and is similarly utilized.

**Name Notes:** The species is called Pumpkin Ash for the often pumpkin-like swollen trunk base. The epithet *profunda* is said to refer to the deep water in which the species sometimes grows.

**Species Notes:** *Fraxinus profunda* is characterized by the distinctive, blocky bark; large, pubescent, leathery leaflets with entire margins; large persistent calyx; and large samaras exceeding 5.5 cm long and 7 mm wide. It has been classified as a synonym of *Fraxinus pennsylvanica*. The species is the only Ash with eight pairs of chromosomes (octoploid).

**Links:** iNaturalist [observations](#) from New York City. [Specimens](#) from the Mid-Atlantic Herbaria Consortium. Global biotic [interactions](#) from GloBI.