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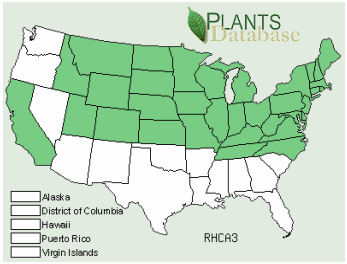
FOREST INVASIVE PLANTS RESOURCE CENTER

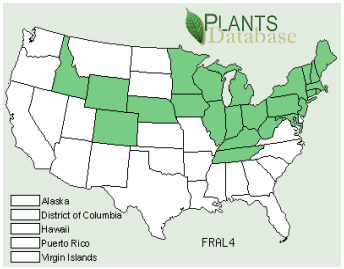
Common Buckthorn
(*Rhamnus cathartica*)
Glossy Buckthorn
(*Frangula alnus*) [Synonym: *Rhamnus frangula*]


Open growth form of *Rhamnus cathartica.*

IN BRIEF
Buckthorns are woody shrubs or small trees that can form dense, shady stands in forest understories and former open areas. Both species threaten forests by out-competing native plants--including tree seedlings--for nutrients, light, and moisture.

RANGE MAPS


Common Buckthorn



Glossy Buckthorn

DESCRIPTION


Distinctive orange inner bark of buckthorn.

Plant habit. A tall shrub or small tree, buckthorn can grow 20 to 25 feet tall and up to 10 inches in diameter. A columnar variety of glossy buckthorn has also been developed.

Bark. Brown or gray in color, often with scattered short, horizontal, light-colored lines called lenticels. Older bark of common buckthorn can be rough, and strips of bark may curl. Inner bark (sapwood) is a distinctive orange/yellow color (expose inner bark by scraping with a knife, key, or fingernail or by nicking tough specimens with a chainsaw).

Branches. Buds and leaves are mostly opposite in common buckthorn mostly alternate in glossy buckthorn. Common buckthorn often has short, sharp, spike-like thorns at the tips of twigs. Glossy buckthorn is thornless; twigs are tipped with buds.

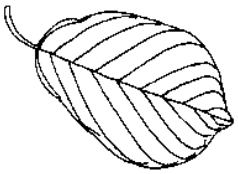

Common buckthorn twig with thorn-like tip.

Common buckthorn: toothed edges and curved veins.

Leaves. Leaves are oval, dark green, glossy, and sometimes pointed at the tip. Common buckthorn leaves are

hairless, have 3-5 pairs of veins curving toward the tip from the mid-vein, and have tiny teeth along the margins. Glossy buckthorn leaves sometimes have fine hairs on the underside, lack teeth on the margins, and have 8-9 pairs of veins that run parallel from the midrib. Leaves appear early in the spring and stay green late into fall, well-beyond the growing season of most native woody plants.

Common buckthorn.



Glossy buckthorn.

Flowers. Clusters of 2-8 small, inconspicuous, yellow-green single-sex flowers with 4 or 5 petals, borne on short stalks where the leaf meets the twig. In common buckthorn, male and female flowers occur on separate trees (female flowers appear after the leaves)**.**

Fruit. Fruits appear where leaves meet stems. Common buckthorn has clusters of round, shiny, black, berry-like fruits - each on a short stalk. Glossy buckthorn fruits are similar, but progressively ripen from a distinctive red to a dark purple-black. Fruits ripen in late summer, and are about 1/3-inch in diameter and contain 2-3 seeds.

Yellow/green flowers of common buckthorn.

Ripe fruits on common buckthorn.

Glossy buckthorn fruit turns red, then black.

Habitat. Common buckthorn occurs in uplands, mainly in the understory of oak woods, savannas, riparian woods but also in grasslands. It is often found in disturbed areas such as thickets, hedgerows, pastures, abandoned fields, roadsides and on rocky sites. Glossy buckthorn is an aggressive invader of wet or moist soils, but also grows well in a wide variety of upland habitats, including old fields, roadsides and dry woodlands. It has become a problem in wetlands as varied as acidic bogs, calcareous fens and sedge meadows. It is capable of growing in both full sun and shaded habitats.

DISTINCTIVE FEATURES

- Inner bark is bright yellow or yellow-orange, even on twigs.
  Expose color by scraping any time of year.
- Leaves appear early in spring and stay green late into fall.

LOOK-ALIKES

Three native non-invasive buckthorns resemble the exotic species. All have alternate leaves, lack thorns and have yellow inner bark. Carolina buckthorn (*Rhamnus caroliniana*) foliage and fruit look like glossy buckthorn, but leaves are longer and more narrow. As a shrub or small tree, it can reach 20 feet. Crushed twigs have a strong odor of almond and its naked buds are fuzzy brown. Alder buckthorn (*R. alnifolia*) is short, less than 3 feet tall, and its hairless buds are covered by dark scales. Leaves are similar to glossy buckthorn but have fine teeth, fewer (5-6) pairs of veins and are hairless on the undersides. Lance-leafed buckthorn (*R.. lanceolata*) is less than 6 feet in height and is found in bogs and swamps. Its leaves are 2-6 inches long and narrow, hairy underneath, and taper to a point at both ends. Native cherries and plums have dark, peeling outer bark, similar to common buckthorn, but lack the yellow/orange inner bark.

Rhamnus alnifolia


Carolina buckthorn with fuzzy brown buds.
Photo by Will Cook, Duke Univ.

LIFE HISTORY AND INVASIVE BEHAVIOR

Buckthorn dominating the forest understory.

Both buckthorns are characterized by prolific reproduction via seed, tolerance of a wide variety of habitats and high levels of growth-form variability (physical traits vary due to local environmental conditions). In full sun, buckthorn can produce fruit a few years after establishment, and seeds remain viable in the soil for many years. Fruit production may be delayed for 10 to 20 years in shaded habitats. Once established, buckthorn has the ability to spread aggressively in nearly any habitat. Seedlings establish best in high light conditions but seeds also germinate and grow in the shade. The vigor of buckthorn germination and growth is directly related to light availability.

Once plants begin to produce seed, buckthorn can rapidly form dense thickets. Birds eat the abundant fruits and facilitate the long-distance dispersal of seeds. The fruits act as a laxative to the digestive system, aiding in dispersal. Typical of other non-native understory shrubs, buckthorn leaves emerge early in spring, shading out native wildflowers. This shading can also prevent the establishment of tree seedlings. Buckthorns aggressively monopolize light, nutrients and water, effectively outcompeting most plants that attempt to grow beneath them. In the fall, common buckthorn leaves remain green long after most native trees and shrubs have lost their leaves; infestations are easy to spot as winter approaches. As buckthorns devastate native plant communities, habitat may be rendered inhospitable to most wildlife.

IMPACTS ON FORESTRY AND FORESTERS

On Forestry: Both species aggressively compete with local woody and herbaceous flora. Because of its dense, shady growth and early leaf-out, buckthorn discourages germination and survival of desirable tree species. Nitrogen-rich leaf litter produced by buckthorn rapidly decomposes and doesn't support fire—in contrast to many of the species it displaces—decreasing management options.

On Foresters: Common buckthorn can form dense, sharp-thorned thickets that hamper access to forests and interfere with forestry operations.

CONTROL METHODS

	Method	Timing
Manual / Mechanical	Hand pulling small plants	Spring, summer, fall
	Repeated cutting or mowing	Spring, summer, fall
	Prescribed burning	Early spring or fall
Chemical	Basal bark application (glyphosate, triclopyr, 2-4D)	Fall
	Foliar spray (glyphosate, triclopyr, fosamine)	Summer, fall, winter
Combination Treatments	Cut stump and herbicide application (glyphosate or triclopyr)	Fall, winter
	Forestry mower (woody plant cutting/grinding machine) Once cut, apply herbicide triclopyr to stumps. Spray resprouting foliage.	Summer, fall, winter

As with all invasive species, buckthorns in natural areas are most effectively eliminated by spotting the invasion early and removing isolated plants before they begin to produce seeds. Buckthorn can be controlled mechanically or with herbicides, or both. Small infestations can be cut or pulled by hand. Large infestations are usually controlled with herbicide, most often using the cut-stump method or basal bark application. Burning can be a useful supplement to other control methods. If management resources are limited, seed-producing female plants should be eliminated first. Removing mature plants allows more light to reach the surface, however, and can stimulate an explosion of seed germination--as can any management method that disturbs the soil. Long-term monitoring and follow-up will be needed to control seedlings and resprouts.

Using a **Weed Wrench™**

Mechanical Control

Hand pulling may be effective for removal of buckthorn 3/8-inch in diameter or less. Uprooting saplings up to an inch in diameter can be aided by using a Weed Wrench™ or shovel to help loosen the roots. Larger plants may be pulled or cut with heavy equipment. Mechanical removal may not be practical for extensive stands due to the amount of labor involved. Uprooting often disturbs roots of adjacent plants and creates open soil that is readily colonized by new seedlings.

Cutting or mowing 3 to 4 times during a growing season over several years can reduce plant vigor by starving the roots, but is only practical in small infestations. In wetlands with artificially lowered water tables, restoring the water to its former level will often kill glossy buckthorn by submerging its roots.

Controlled Burning


Using a propane weed-torch.

Prescribed burns in early spring and fall may kill first-year seedlings, and top-kill larger stems. It is generally difficult to burn in thick buckthorn stands because dense shade excludes grasses and forbs and its leaves degrade rapidly, allowing little fuel build-up. Burning shortly after leaf-out in early spring may reduce resprouting since root reserves will be low at that time. Burning may be needed annually for several years to deplete the seedbank, which general lasts two to three years. For complete control in established stands of buckthorn, burning yearly or every other year may be needed for 5-6 years or more. Regular burns will be effective in suppressing the dominance of these invasive shrubs, if not killing them outright. Propane weed-torches can be used to kill seedlings or top-kill saplings in small infestations. Seedlings generally will not resprout if burned in spring or early summer.

Chemical Control

Chemical methods are best used during late fall when most native plants are dormant and buckthorns are still green. The persistent leaves of both species provide easy recognition and allow for a targeted treatment at this time. Herbicides can be used during the growing season, but there is more risk of affecting non-target plants and effectiveness is generally lower. Winter application of chemicals – which greatly reduces the risk of damaging non-target species -- also has proven successful. Avoid treatment in spring because sap is rising and chemicals will not be carried reliably to the roots. If treating plants in wetlands or near water, use formulations listed safe for wetlands.

Basal bark treatment. Herbicides containing triclopyr at 12.5% a.i. (active ingredient) formulated for oil dilution -- or 2,4-D at 12.5% a.i. -- mixed with non-toxic bark penetrating oil will effectively control buckthorn. Paint or spray around the stem in a band that is three times the diameter of the stem. Because of the thickness of bark, this treatment may not be effective on trees larger than 6 inches in diameter.

Foliar spray. Apply glyphosate (1.5% a.i.) or triclopyr (1-2% a.i.) formulated for water on leafy stems using a backpack sprayer or long-handled wick. These chemicals are non-selective; they can harm or kill any plant. Foliar spraying usually is less effective and often requires a greater volume of herbicides than other methods. Fosamine (3% a.i.), a non-selective bud inhibitor for woody species, can also be applied in the fall as a foliar treatment.

Combination Treatments

Cut-stump. In summer, fall or winter (avoid spring) cut stems near ground level and treat the stumps with glyphosate (20-25% a.i.) or triclopyr (12.5% a.i., oil-formulated) mixed with non-toxic bark penetrating oil. Triclopyr formulated for water dilution is not effective on this species. Resprouts should be cut and treated again, or sprayed with glyphosate (1.5% a.i.).

Forestry mowers. These powerful machines cut and grind everything in their path. They can be cost-effective and efficient when tackling large infestations of woody invasives. After cutting, shredded stems and stumps can be treated with triclopyr (12.5% a.i.) in non-toxic bark penetrating oil. Alternatively, resprouting foliage can be sprayed as described above. The mowing is best done in winter when the ground is frozen to prevent excessive soil disturbance.

***NOTICE**: Use pesticides wisely. Always read the product label carefully. Follow all mixing and application instructions and wear all recommended protective gear and clothing. Contact your state department of agriculture for any pesticide use requirements, restrictions or recommendations. Many states require individuals involved in the commercial application of pesticides be certified and licensed.*

HISTORY AND LORE

The scientific name of common buckthorn (*Rhamnus carthartica*) is derived from the Greek *rhamnos*, meaning a branch, and *carthartica* which means cathartic or purgative. When ingested, the berries act as a potent laxative – which is why birds are such effective dispersers of seed. Common buckthorn also is known as European buckthorn, Hart's thorn and European waythorn. The names for glossy buckthorn (*Frangula alnus*) come from the chemical *frangulin* which was first isolated from this species, and *alnus* for its alder-like leaves (the genus for alder is *Alnus*). Glossy buckthorn is also called Alder buckthorn, Columnar buckthorn, European alder and Fen buckthorn.

Both species are native to Eurasia and were brought to the U.S. as ornamentals in the 1800s. They soon escaped cultivation and began to invade natural communities. Today, cultivars are still being sold--though their sale and transport is now banned in some states, including Minnesota and Illinois. Non-native buckthorns are also the primary over-wintering hosts of the soy aphid, compounding the damage they can cause when invading woodlots and shelterbelts near soybean fields.

Links and References

Weeds Gone Wild: Buckthorn factsheet
http://www.nps.gov/plants/alien/fact/rhca1.htm

Wisconsin DNR: Buckthorn factsheet
http://dnr.wi.gov/invasives/fact/buckthorn_com.htm

The Nature Conservancy: Links to buckthorn management guidelines
http://tncweeds.ucdavis.edu/esadocs/franalnu.html

Illinois Natural History Survey: Vegetation management for exotic buckthorns
http://www.inhs.uiuc.edu/chf/outreach/VMG/buckthorn.html

Wisconsin State Herbarium: 1. Common buckthorn, 2. Glossy buckthorn
1. http://www.botany.wisc.edu/wisflora/scripts/detail.asp?SpCode=RHACAT
2. http://www.botany.wisc.edu/wisflora/scripts/detail.asp?SpCode=RHAALN

Minnesota DNR: Buckthorn factsheet and control methods
http://www.dnr.state.mn.us/invasives/terrestrialplants/woody/buckthorn/index.html

University of Minnesota Extension: Buckthorn control
http://www.extension.umn.edu/projects/yardandgarden/ygbriefs/h464buckthorncontrol.html

Missouri Dept. of Conservation: Buckthorn management guidelines
http://www.mdc.missouri.gov/nathis/exotic/vegman/eight.htm

Books / Field guides

Invasive Plants Field & Reference Guide: An Ecological Perspective of Plant Invaders of Forests and Woodlands, by Cynthia D. Huebner, U.S. Forest Service, 2005.
(Also online -- http://www.fs.fed.us/r9/wildlife/nnis/invasive-species-field-guide.pdf)

Invasive Plants of the Upper Midwest: An Illustrated Guide to their Identification and Control, by Elizabeth J. Czarapata, University of Wisconsin Press, 2005.