



## Harvard Forest Schoolyard Ecology Appendix to “Our Changing Forests” Field Site Description:

### A Visual Guide to Invasive Plant Species

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- **Garlic Mustard** (*Alliaria petiolata* (Bieb.) Cavara and Grande)

**Threat:** “*Alliaria petiolata* can out compete native herbaceous species, depriving them of light, moisture and space. It also negatively impacts mycorrhizal fungi that are important underground symbionts for northern hardwood species, allowing it to compete with these woody species. In some states this plant threatens native butterfly species by outcompeting their native host plants. When the butterflies lay their eggs on *Alliaria petiolata* the larvae do not seem to survive as well. The seeds of *Alliaria petiolata* usually fall just beneath the plant, but it is probably dispersed longer distances by people when seeds get attached to boots and clothing.”

**Habitat:** “*Alliaria petiolata* is successful in many types of habitats. It prefers moist, shaded areas, but can grow well at roadsides, edges of woods, along trails and in forest openings. Because of its shade tolerance it is one of few invasives that can be present and dominate a forest understory”

**Identification:** “*Alliaria petiolata* is an herbaceous biennial whose flowering form can reach 1 m (3.3 ft.) in height. The first year plants are a basal rosette of leaves that remain green throughout the winter. They develop into mature flowering plants the following spring. The lower, dark green leaves are...kidney-shaped, while the stem leaves are alternate and deltoid. The basal leaf blades can be 6-10 cm (2.4-4 in.) long and wide, while the stem leaves are 3-8 cm (1.2-3.1 in.) long and wide, gradually decreasing in size as they go up the stem. The margins of the leaves are coarsely toothed. The leaves give off a strong garlic odor when crushed.”



Garlic Mustard Inflorescence



Understory Incursion

**Source:** Invasive Plant Atlas of New England (IPANE): [http://www.eddmaps.org/ipane/ipanespecies/herbs/Alliaria\\_petiolata.htm](http://www.eddmaps.org/ipane/ipanespecies/herbs/Alliaria_petiolata.htm)

- **Burning Bush** (*Euonymus alata*), also known as winged *Euonymus*

**Threat:** “Since the seeds of *Euonymus alata* are bird dispersed, it has spread extensively from plantings. *Euonymus alata* plants have been observed in dense thickets, threatening native plants by crowding and shading.... This plant continues to be used as an ornamental, thus continuing its spread in the region.”

**Habitat:** “Can be located in habitats ranging from full sun to full shade. It can also tolerate a variety of soil types and pH levels. It grows well in well-drained soils and does not tolerate water-logged soils as readily. It is found not only in open or disturbed areas but also in forests as understory plants.”

**Identification:** “A deciduous shrub that can grow to 2.5 m (8.2 ft.) in height. The most distinguishing features of this plant are the 2-4 broad, corky wings along the branches. However, sometimes individuals may lack The branches of *Euonymus alata* are gray-brown in color. The leaves are 2.4-7.2 cm (1-3 in.) long, 1.3-3.2 cm (0.5-1.25 in.) wide, taper at both ends, and are positioned opposite to sub-opposite along the branches.... This plant is very conspicuous in the fall as the leaves turn from dark green to a bright red... The (red) fruit appear from September to October and are 1.3 cm (0.5 in.) long”.



Burning bush leaves and berries beginning to turn red



Incursion into a forested site (red color is seasonal in the fall)

**Source:** IPANE- [http://www.eddmaps.org/ipane/ipanespecies/shrubs/Euonymus\\_alata.htm](http://www.eddmaps.org/ipane/ipanespecies/shrubs/Euonymus_alata.htm)

- **Autumn Olive** (*Elaeagnus umbellata* Thunb.)

**Threat:** “Once *Elaeagnus umbellata* is introduced to a region, it seems only a matter of time before it spreads due to the ability of the plant to produce up to 80 lbs. of fruit in a season. Birds (especially Starlings) readily eat the fruit in the fall and spread it for long distances. This efficient dispersal is what has allowed the plant to spread throughout New England. *Elaeagnus umbellata* suppresses the growth of other plants by creating shade. It is a good competitor because of its ability to fix nitrogen. If it is cut, it resprouts abundantly.”

**Habitat:** “Found in pastures, fields, sparse woodlands and planted as ornamentals along roads... It is often found in poor soils because it has nitrogen-fixing nodules that allow it to tolerate these conditions. It can survive the effects of salt, drought and pH levels as low as 4.0.”

**Identification:** “A deciduous shrub that can grow up to 3.7 m (12 ft.) or more tall. Its untoothed leaves are alternate and range from being oval to... lanceolate. The leaves are 2.5-7.5 cm (1-3 in.) long and are green and glabrescent on the top surface. The undersides of the leaves have silver/white scales. The younger branches have a silver color and are scaly...becomes a darker brown with maturity. Flowers...between April and May...located along the stems in clusters of 1-3 or more together. These fragrant flowers are creamy in color and have a slender... tube. The drupe-like fruits are round, juicy, range in color from red to pink.”



Autumn Olive Flowers



Fruit



Incursion

**Source:** IPANE- [http://www.eddmaps.org/ipane/ipanespecies/shrubs/Elaeagnus\\_umbellata.htm](http://www.eddmaps.org/ipane/ipanespecies/shrubs/Elaeagnus_umbellata.htm)

- **Oriental Bittersweet** (*Celastrus orbiculatus* Thunb.)

**Threat:** “*Celastrus o...* causes major damage to native plants by girdling. The vigorous growth of the vine also shades other species. Another threat is the possibility of it displacing American bittersweet (*C. scandens*). *Celastrus ...* does not exhibit this aggressive growth, but it can hybridize with *C. orbiculatus*. People often use *C. orbiculatus* for wreathes and floral arrangements in the fall because of its colorful fruits. Oftentimes, after the plant is used it thrown away, and the fruits are dispersed this way.”

**Habitat:** “Grows most profusely in the sun, but can tolerate dense shade. It grows in disturbed woodlands, fields, along the coast and in salt marshes. Fence rows (where birds sit and disperse the seeds), roadways and railroads are also prime habitat for *C. orbiculatus*. It will grow over anything that it comes upon.”

**Identification:** “Perennial, deciduous vine that can grow up to 17.3 m (60 ft.). The stems of *Celastrus orbiculatus* have dark brown to brown striated bark. The twigs are dark brown, brown or light gray and are smooth and glabrous. Stems can reach 10 cm (4 in.) in diameter. The buds along the stem are axillary. The leaves are alternate and spiral evenly around the stem. They have a light green color and are widely elliptic, ovate to obovate, or circular. The flowers, which bloom in May to early June, are axillary in their position on the stem. There are 3-4 small greenish flowers per inflorescence and they are 1.8-4 mm (0.07-0.15 in.) long and 2.2-5.5 mm (0.1-0.2 in.) wide. The fruits of *Celastrus orbiculatus* are produced from July to October, are globose in shape, 6-9 mm (0.24-0.35 in.) long and 7-10 mm (0.28-0.4 in.) wide, and are yellow in color with a fleshy red aril surrounding them. The fruits split open at maturity revealing 3 red-orange axils that contain the seeds.”



Bittersweet fruit in fall



Bittersweet leaves, inflorescence



Bittersweet invading tree in fall

**Source:** IPANE- [http://www.eddmaps.org/ipane/ipanespecies/vines/Celastrus\\_orbiculatus.htm](http://www.eddmaps.org/ipane/ipanespecies/vines/Celastrus_orbiculatus.htm)

- **Multiflora Rose (*Rosa Multiflora*)**

**Threat:** “*Rosa multiflora* is widely distributed across the country because of its ability to endure a wide range of edaphic and environmental conditions. *Rosa multiflora* rapidly outcompetes surrounding vegetation, takes over pastures, and lowers crop yields. It forms dense, impenetrable thickets. The canes send up shoots when they come in contact with soil. A single plant can produce 500,000 or more seeds. These seeds can remain viable for 10-20 years in the seed bank. *Rosa multiflora*'s hips are dispersed by birds, especially the mockingbird, cedar waxwing and American robin.”

**Habitat:** “Prefers deep, fertile, well drained but moist upland or bottomland habitats with a mild climate. It can be found along roadsides, in pastures, woodlands, prairies, fields”.

**Identification:** “A densely spreading perennial shrub that can grow up to 4.5 m (15 ft.) tall. It has... arching canes that can be red to green in color. Most *Rosa multiflora* plants have thorns, but there have been some plants observed without. The leaves are alternate and pinnately compound, with 5-11 serrated, elliptic leaflets that are 2.5-4 cm (1-1.5 in.) long. These leaves are smooth and dark above and pale with small hairs... This plant produces fragrant flowers during May and June. Each inflorescence bears many flowers, and the flowers have five white (or sometimes pink) petals and numerous stamens. Red fruits develop in mid to late summer, are nearly spherical and measure 6-8 mm (0.25-0.3 in.)”.



White Multiflora flowers



Pink variety



Clusters of berries

**Source:** IPANE- [http://www.eddmaps.org/ipane/ipanespecies/shrubs/Rosa\\_multiflora.htm](http://www.eddmaps.org/ipane/ipanespecies/shrubs/Rosa_multiflora.htm)

- **Buckthorn** (*Frangula alnus* Mill.)

**Threat:** “A great threat to wetlands, where it can form dense stands that cause the growth of other species to be suppressed. It is readily dispersed by birds, and the extended productivity of the fruits allows it to be dispersed throughout the summer and fall.”

**Habitat:** “This plant... can be found in swamps, fens and the edges of bogs. It also can be present in upland habitats such as woodland edges, fencerows and old fields.”

**Identification:** “Deciduous small tree or coarse shrub that grows up to 6 m (19.7 ft.) tall. It is often confused with *Rhamnus cathartica*... short oblong to obovate leaves are 3-7 cm (1-2.5 in.) long and are arranged alternately. They are dark green (in the summer) and shining above... The leaves turn greenish-yellow to yellow in the fall, and remain on the plant when most other species have already lost their leaves. The yellow-green flowers of *Frangula alnus* are... arranged in 1-8 flowered sessile, glabrous umbels. This plant flowers after the leaves expand, from May to September. The fruit are globose drupes, changing from red to black, and are 0.6 cm (0.25 in.) across. They ripen from July to August. It is important to note that at any given time there can be flowers, partially ripened fruits (red) and fully ripened fruits (black) present on the same plant.”



Buckthorn leaves, flowers



Fruits



Forest Incursion

**Source:** IPANE- [http://www.eddmaps.org/ipane/ipanespecies/shrubs/Frangula\\_alnus.htm](http://www.eddmaps.org/ipane/ipanespecies/shrubs/Frangula_alnus.htm)

- **Japanese Barberry** (*Berberis thunbergii* DC)

**Threat:** “Shade tolerant, and forms dense stands in a variety habitats ranging from closed canopy forests, to woodlands, wetlands, pastures, meadows and wasteland. It is readily dispersed by birds, which can bring the seeds many meters away from the parent plants. Though the exact effect on native flora is not determined, it could prove a great threat to native species. This threat is such that the plant is illegal for sale in Canada, and included on some banned lists in New England.”

**Habitat:** “Can be found in a variety of different habitats throughout New England. Initially this plant was described as inhabiting open fields and pastures. However, *Berberis thunbergii* is also associated with closed-canopy forests, woodlands and wetlands. In these habitats, it has the ability to form dense, continuous stands.”

**Identification:** “Dense deciduous shrub 0.5-2.4 m (2-8 ft.) tall. It flowers from mid-April to May in the Northeast and its fruits mature from July to October. The branches are glabrous, deeply grooved, brown and have usually simple spines. The leaves are... narrowly obovate in shape, and are 1.3-3.8 cm (0.5-1.5 in.) long. They range in color from slightly bluish-green to green to dark reddish purple. The pale yellow flowers... are profuse and located along the entire length of the stem. The inflorescences are umbellate with the 8 mm (0.3 in.) long flowers in clusters of 2-4. Bright red berries 7-9 mm (0.28-0.35in.) in length are elliptic or nearly globose in form. The fruits are slightly juicy but solid, and persist on the stems until the following spring.”



Barberry fruit



Flowers



Forest incursion

**Source:** IPANE- [http://www.eddmaps.org/ipane/ipanespecies/shrubs/Berberis\\_thunbergii.htm](http://www.eddmaps.org/ipane/ipanespecies/shrubs/Berberis_thunbergii.htm)

- **Honeysuckle** (*Lonicera maackii* and related sp.)

**Threat:** “*Lonicera*... can form large stands that prevent native shrubs and herbaceous understory plants from growing. The fruits persist on the branches into the winter, when birds feed on them. In the spring, *Lonicera*... is one of the first plants to leaf out, giving it a competitive advantage. This shrub can bear fruit when it is as young as 3 to 5 years old. Though *Lonicera* ... has not yet become a major problem in New England, it is very troublesome in the southern and Midwestern parts of the country.”

**Habitat:** “Can tolerate full sun to partial shade conditions. It can be found as an early successional plant or in mixed forests.”

**Identification:** A “woody perennial shrub that can grow up to 5 m (16.5 ft.) in height. The oppositely arranged leaves are ovate to lance-ovate in shape and measure 3.5 to 8.5 cm (1.3-3.3 in.) long. The tips of the leaves are acuminate. The leaves are dark green above and lighter on the lower surface. The veins of the leaves are pubescent. The white flowers are found in erect pairs that are on peduncles shorter than the petioles. The flowers measure 1.5-2 cm (0.6-0.75 in.) long and are bilabiate. The flowers appear on the plant from late May to early June... The fruit are dark red in color, spherical in shape and measure 6 mm (0.25 in.) in diameter. The fruit become ripe on the plant in the late fall.” Similar honeysuckle species include: *Lonicera x bella* Zabel (Bell's honeysuckle), *L. morrowii* Gray (Morrow's honeysuckle), *L. tartarica* L. (Tartarian honeysuckle), *L. xylosteum* L. (Dwarf honeysuckle), and *Lonicera* spp. (Native bush honeysuckles) ... One way to differentiate between the invasive bush honeysuckles and the native ones is that the twigs of non-native honeysuckles all have hollow stems, while the stems of the native ones are solid.”



Flowers and leaves



Fruit



large shrub in open area

**Source:** IPANE- [http://www.eddmaps.org/ipane/ipanespecies/shrubs/Lonicera\\_maackii.htm](http://www.eddmaps.org/ipane/ipanespecies/shrubs/Lonicera_maackii.htm)



- **Japanese Stilt Grass** (*Microstegium vimineum* (Trin.) A. Camus)

**Threat:** This grass “forms dense monotypic stands that can dominate entire habitats, including the understory of a forest. These dense stands displace native understory and wetland vegetation. The fact that this plant can grow in low light threatens not only “edge” communities, but forests as well. Each plant produces many seeds that can persist in the seed bank for long periods of time. Even if an area is burned *Microstegium* seeds will sprout up, making control of large populations difficult. The seeds are easily spread by hikers by attaching to their clothing.”

**Habitat:** Stilt grass “easily invades disturbed areas and has the ability to produce seeds in low light, thus allowing it to thrive in shade. In New England, *Microstegium*... has invaded floodplain forests, early and late successional forests, abandoned fields, roadsides and other habitats.”

**Identification:** An “annual grass that can grow up to 2 m (6.5 ft.) tall. Its culms root at the nodes forming long, branched, prostrate or reclining stems up to 1.52 m (5 ft.) in length with numerous upright branches resembling individual plants. The alternate light green leaves are 5-8 cm (2-3 in.) long and up to 15 mm wide. They are lanceolate in shape and taper at both ends. Both upper and lower leaf surfaces are slightly pubescent, except for the silvery line running down the center of the blade... The inflorescence is a terminal, thick-branched panicle 2-7 cm (0.8-2.8 in.) in length, barely if at all exerted from sheathing leaves... The 3 mm (0.1 in.) ellipsoid fruit, a caryopsis (grain), ranges from yellow to yellow-purple in color, changing with the season. *Microstegium*... begins to flower in mid-September. It fruits from late September through early October producing an abundant crop... giving rise to dense stands of light-green individuals. In late fall, *Microstegium* fades to pale greenish-yellow or turns pale-purple in color”.



Close-up



Mature stilt grass



Fall color

**Source:** IPANE- [http://www.eddmaps.org/ipane/ipanespecies/grass/Microstegium\\_vimineum.htm](http://www.eddmaps.org/ipane/ipanespecies/grass/Microstegium_vimineum.htm)