**5.12.2011**

# UES Early Season Invasive Worksheet

## Garlic Mustard *Alliaria petiolata*

- **Origin:** Native to Europe. First recorded in the U.S. about 1868, from Long Island, New York. It was likely introduced by settlers for food or medicinal purposes.
- **Characteristics**: Cool season biennial (occurring every two years) herb. First year plants appear as a rosette of green leaves close to the ground. Rosettes remain green through the winter and develop into mature flowering plants the following spring. Flowering plants reach 2 to 3 ½ feet in height and produce buttonlike clusters of small white flowers, each with four petals in the shape of a cross.
- **Seeds**: Beginning in May, seeds are produced in erect, slender pods and become shiny black when mature. By late June, when most garlic mustard plants have died, they can only be recognized by the erect stalks of dry, pale brown seedpods that remain, and may hold viable seedpods through the summer. A single plant can produce thousands of seeds, which can scatter as much as several meters from the parent plant.
- **Spread:** Seeds do not float well and are probably not carried far by wind. Dispersal is aided by human activities and wildlife (white-tailed deer prefer native plants to garlic mustard, so large deer populations remove competition natives and expose and disturb the soil through trampling allowing Garlic Mustard to thrive).
- **Threat**: Garlic mustard posed a severe threat to one of our rare native insects, the West Virginia white butterfly (*Pieris virginiensis*). Several species of spring wildlowers known as 'toothworts', also in the mustard family, are the primary food source for the caterpillar stage of this butterfly. Invasions of garlic mustard are causing local extinctions of the toothworts, and chemicals in garlic mustard are toxic to the eggs of the butterfly (they don't hatch when laid on garlic mustard leaves).
- **Location:** Mostly found in the northeastern United States, but is present as far west as Kansas and Nebraska.
- **Habitat:** Frequently occurs in moist, shaded soils of river floodplains, forests, roadsides, edges of woods and trails edges and forest openings. Does not tolerate high acidity.

### Management Options (Garlic Mustard)

Because the seeds of garlic can remain viable in the soil for five years or more, effective management requires a long term commitment. The goal is to prevent seed production until the stored seed is exhausted. Hand removal of plants is possible for light infestations and when desirable native species co-occur. **Care must be taken to remove the plant with its entire root system because new plants can sprout from root fragments.** This is best achieved when the soil is moist, by grasping low and firmly on the plant and tugging gently until the main root loosens from the soil and the entire plant pulls out. **Pulled plants should be removed from site if at all possible, especially if flowers are present.**

For larger infestations of garlic mustard, or **when hand-pulling is not practical, flowering stems can be cut at ground level or within several inches of the ground, to prevent seed production. If stems are cut too high, the plant may produce additional flowers at leaf axils.** ***Once seedpods are present, but before the seeds have matured or scattered, the stalks can be clipped, bagged and removed from the site to help prevent continued buildup of seed stores*****.** This can be done through much of the summer.

## **Burdock *Arctium minus***

- **Origin:** Native to Europe. Came to the U.S. via accidently introduction. It was brought into North America by the French in the early 1700s by the thousands. It was used exclusively as cotton twill. When the cotton gin came into use, the French left and the Burdock plant spread quickly.
- **Characteristics**: Common burdock is a biennial in the Aster family(*Asteraceae)*. In the first year of growth the plant forms a rosette. The second year the plant is erect. The stout, grooved, rough stem has multiple branches, and grows to 2-6 feet tall. The large heart-shaped leaves are alternate, dark green, smooth above, whitish green, and woolly-hairy beneath. The flowers are pink, lavender, purple or white in numerous heads, ¾ inch across. The head is enclosed in a prickly bur composed of numerous smooth or woolly bracts tipped with hooked spines, flowering July to October. One plant typically produces 15,000 seeds. It reproduces by seeds. Large thick taproots branch out in all directions.
- **Seeds**: Flowers in July to October. One plant typically produces 15,000 seeds over its lifetime. One burr typically contains 40 seeds. It reproduces by seeds and has large, think taproots branching out in all directions.
- **Spread:** Spiny seeds attach to people and wildlife and spread. Spreads only through seed.
- **Threat**: Indirectly affects the development of economically important plants by hosting powdery mildew and root rot. Reduces the value of sheep's wool due to the seed heads entangling in it and significantly damage the quality of the wool. It is responsible for tainting milk products if grazed in large quantities. Also reported that small animals, especially birds and bats, can get tangled in the burs and possibly die.
- **Location:** It is reported invasive in CO, ID, IL, KY, MD, MI, OH, OR, PA, SC, TN, VA, WA, WI, WV, and WY.
- **Habitat:** Frequently grows along roadsides, ditch banks, stream banks, old fields, waste places, and neglected areas. It can be found in full or partial shade.
- **Edible:** Burdock root is edible, and if often used in a stew to aid digestion. It will sooth ulcers and act as a digestive aid. The oil of the root will relieve scalp itching and promote hair growth. I may also relieve dandruff. Traditional Chinese practitioners use the root to treat sore throats tonsillitis and colds. Because the root contains insulin, herbalists use it to treat diabetes.

**Management**

**Manual**- Top growth removal through mowing or cutting is effective. Pulling or digging out the plant at flowering. Remove seed heads before seed set. Pulling may be difficult due to large taproot.

## **Canada Thistle** *Cirsium arvense*

- **Origin:** Native to temperate regions of Europe and Asia. Probably introduced to the U.S. in the early 1600's by accident.

- **Characteristics**: Canada thistle is an herbaceous perennial with erect stems 1½-4 feet tall, prickly leaves and an extensive creeping rootstock. Stems are branched, often slightly hairy, and ridged. Leaves are lance-shaped, irregularly lobed with spiny, toothed margins and are borne singly and alternately along the stem.
- **Seeds**: Rose-purple, lavender, or sometimes white flower heads appear from June through October, generally, and occur in rounded, umbrella-shaped clusters. The small, dry, single-seeded fruits of Canada thistle, called achenes, are 1-1½ inches long and have a feathery structure attached to the seed base. Many native species of thistle occur in the U.S., some of which are rare. Because of the possibility of confusion with native species, Canada thistle should be accurately identified before any control is attempted.

- **Spread:** Canada thistle is a creeping perennial that reproduces from vegetative buds in its root system and from seed. It is difficult to control because its extensive root system allows it to recover from control attempts. Combining control methods is the best form of Canada thistle management. Persistence is imperative so the weed is continually stressed, forcing it to exhaust root nutrient stores and eventually die.

- **Threat**: ***General Invasive threats***. Natural communities that are threatened by Canada thistle include non-forested plant communities such as prairies, barrens, savannas, glades, sand dunes, fields and meadows that have been impacted by disturbance. As it establishes itself in an area, Canada thistle crowds out and replaces native plants, changes the structure and species composition of natural plant communities and reduces plant and animal diversity. This highly invasive thistle prevents the coexistence of other plant species through shading, competition for soil resources and possibly through the release of chemical toxins poisonous to other plants.

  Canada thistle is declared a "noxious weed" ***throughout the U.S. and has long been recognized as a major agricultural pest, costing tens of millions of dollars in direct crop losses annually and additional millions costs for control.*** Only recently have the harmful impacts of Canada thistle to native species and natural ecosystems received notable attention.

- **Location:** Canada thistle is distributed throughout the northern U.S., from northern California to Maine and southward to Virginia. It is also found in Canada, for which it was named. Canada thistle has been identified as a management problem on many

national parks and on preserves of The Nature Conservancy in the upper Midwest, Plains states, and the Pacific Northwest.

- **Habitat:** Canada thistle grows in barrens, glades, meadows, prairies, fields, pastures, and waste places. It does best in disturbed upland areas but also invades wet areas with fluctuating water levels such as streambank sedge meadows and wet prairies.

**Management Options**

Management of Canada thistle can be achieved through hand-cutting, mowing, controlled burning, and chemical means, depending on the level of infestation and the type of area being managed. Due to its perennial nature, entire plants must be killed in order to prevent regrowth from rootstock. Hand-cutting of individual plants or mowing of larger infestations should be conducted prior to seed set and must be repeated until the starch reserves in the roots are exhausted. Because early season burning of Canada thistle can stimulate its growth and flowering, controlled burns should be carried out late in the growing season for best effect.

## **Crown Vetch** *Coronilla varia*

- **Origin:** Native to Europe, southwest Asia and Northern Africa.
- **Characteristics**: Crown vetch is a perennial legume in the pea/legume family (Fabaceae or Leguminosae. It can form large clumps from creeping stems. The stems can be up to 6 feet long. The vegetative growth habit can rapidly cover and shade out native vegetation. Compound leaves consist of 15-25 pairs of oblong leaflets. Pinkish flowers are clustered in umbels on long stalks. The flowers develop into narrow, flattened pods.
- **Seeds**: The seeds are reported to be poisonous. Crown vetch blooms from May through August. It spreads both vegetatively through rhizomes and through the dispersal of seeds.
- **Spread:** Crown vetch has rhizomes (A horizontal, usually underground stem that often sends out roots and shoots from its nodes) up to 10 feet long which allow the plant to spread rapidly. A single plant may fully cover 70 to 100 square feet within a four year period.
- **Threat**: Crown vetch is a serious management threat to natural areas due to its seeding ability and rapid vegetative spreading by rhizomes. This aggressive exotic is now widespread along roadsides and natural areas. It becomes problematic when it invades into natural areas, such as grassland prairies and dunes, where it works to exclude native vegetation by fully covering and shading native plants. It can climb over small trees and shrubs, and eventually form large single-species stands.
- **Location:** It is reported invasive in CT, IN, KY, MD, MI, MO, NC, NJ, OR, TN, VA, and WI.
- **Habitat:** Crown vetch has been grown extensively in the northern two-thirds of the United States for temporary ground cover, erosion control, and as a green fertilizer crop. It is also used as a bank stabilizer along roads and waterways. It occurs along roadsides and other rights-of-way, in open fields and on gravel bars along streams. It can survive in a variety of environmental conditions, but has the highest yields in areas with 18 inches or more annual precipitation. It can tolerate up to 65 inches of annual precipitation, as well as withstand long periods of drought, but cannot tolerate flooded or anaerobic soil

conditions. It prefers sunny, open areas, as it is intolerant of shade, and mature plants can withstand minimum temperatures of –28° F.

**Management**
**Manual**- pulling out the entire plant; mowing; prescribed burning may be effective against seedlings or in slowing the spread of crown vetch, but will not control large populations
**Chemical**- It can be effectively controlled using any of several readily available general use herbicides such as glyphosate, triclopyr, or clopyralid at recommended label rates on the cut stems and foliage. Follow-up treatment with herbicide is likely.

## **Japanese Knotweed** *Polygonum cuspidatum*

- **Origin:** Native to Eastern Asia. Japanese knotweed was probably introduced to the U.S. in the late 1800's. Also known as crimson beauty, Mexican bamboo, or Japanese fleece flower, it was first introduced as an ornamental and has also been used for erosion control and for landscape screening.
- **Characteristics**: Japanese knotweed is an upright, shrublike, herbaceous perennial that can grow to over 10 feet in height. As with all members of this family, the base of the stem above each joint is surrounded by a membranous sheath. Stems of Japanese knotweed are smooth, stout and swollen at joints where the leaf meets the stem. Although leaf size may vary, they are normally about 6 inches long by 3 to 4 inches wide, broadly oval to somewhat triangular and pointed at the tip.
- **Seeds**: The minute greenish-white flowers occur in attractive, branched sprays in summer and are followed soon after by small winged fruits. Seeds are triangular, shiny, and very small, about 1/10 inch long.
- **Spread:** Japanese knotweed spreads primarily by vegetative means with the help of its long, stout rhizomes. It is often transported to new sites as a contaminant in fill dirt seeds, sometimes distributed by water, and carried to a lesser extent by the wind. Escapees from neglected gardens, and discarded cuttings are common routes of dispersal from urban areas.
- **Threat**: Japanese knotweed spreads quickly to form dense thickets that exclude native vegetation and greatly alter natural ecosystems. It poses a significant threat to riparian areas, where it can survive severe floods and is able to rapidly colonize scoured shores and islands. Once established, populations are extremely persistent.
- **Location:** Current distribution of Japanese knotweed includes 36 states in the lower 48 from Maine to Wisconsin south to Louisiana, and scattered midwest and western states. It is not currently known to occur in Hawaii.
- **Habitat:** Japanese knotweed can tolerate a variety of adverse conditions including full shade, high temperatures, high salinity, and drought. It is found near water sources, such as along streams and rivers, in low-lying areas, waste places, utility rights-of-way, and around old homesites. It can quickly become an invasive pest in natural areas after escaping from cultivated gardens.

**MANAGEMENT OPTIONS**
Grubbing is effective for small initial populations or environmentally sensitive areas where herbicides cannot be used. Using a pickmatik or similar digging tool, remove the entire plant including all roots and runners. Juvenile plants can be hand pulled depending on soil conditions and root development. Any portions of the root system not removed will potentially re-sprout. All plant parts (including mature fruit) should be bagged and disposed of in a trash dumpster to prevent reestablishment.

**Chemical:** *Cut stem application - Foliar application*

## **Goutweed** *Aegopodium podagraria*

- **Origin:** Native to most of Europe and Northern Asia, to eastern Siberia. Goutweed was apparently first brought to North America as an ornamental during the early stages of European settlement and was well established in the U.S. by 1863. In parts of Russia, the leaves are sometimes used as a salad ingredient and potherb in the spring.
- **Characteristics**: Goutweed, also known as bishop's-weed and snow-on-the-mountain, is an herbaceous perennial plant. Most leaves are basal, with the leafstalk attached to an underground stem, or rhizome. The leaves are divided into three groups of three leaflets, making it "triternate." The leaflets are toothed and sometimes irregularly lobed. Foliage of the "wild" type is medium green in color; a commonly planted variegated form has bluish-green leaves with creamy white edges. Sometimes reversion back to solid green or a mixture of solid green and the lighter variegated pattern occurs within a patch. Small, white, five-petaled flowers are produced in mid-summer. Flowers are arranged in flat-topped clusters (called compound umbels) and are held above the ground on a leafy stem up to about 3 feet tall.
- **Seeds**: The seeds are small and elongate, similar in size and shape to carrot seeds, and ripen in late summer. In contrast to the dense foliage cover produced by goutweed, flowering shoots are uncommon in densely shaded areas
- **Spread:** The rhizomes of goutweed are long, white, and branching, superficially resembling those of quackgrass. Patches of goutweed typically form a dense canopy and can exclude most other herbaceous vegetation. Because of this, it is often used as a low-maintenance ground cover.

  Goutweed is vigorous, rhizomatous perennial that spreads mainly by vegetative means. Patches increase in size through extension of the rhizome system. The flowers are pollinated by a wide variety of insects, including beetles, bees, and especially small flies. The seeds have no apparent morphological features that would facilitate dispersal. Goutweed seeds require cold stratification to germinate. While established goutweed plants are highly competitive in shaded environments, seedlings generally need recently disturbed soil and rather bright light in order to survive. Goutweed apparently does not form a long-lived seed bank, and the seeds generally germinate the year after ripening. Establishment of goutweed seedlings in the shade is rare. The primary vector for

dispersal to new areas is humans. Most goutweed colonies spread to neighboring natural areas from intentional plantings, or by the dumping of yard waste that includes discarded rhizomes.

- **Threat**: Goutweed is an aggressive invasive plant that forms dense patches, displaces native species, and greatly reduces species diversity in the ground layer. Goutweed patches inhibit the establishment of conifers and other native tree species as well.
- **Location:** Goutweed is currently known to occur in twenty-nine states in the mid-Atlantic, Northeast and Northwest and is reported to be invasive in natural areas in Connecticut, Michigan, New Jersey, Pennsylvania, Vermont, and Wisconsin.
- **Habitat:** Goutweed is an ecologically versatile species. It is found in old gardens and flowerbeds, around shrubs and other plantings, and in a variety of other disturbed habitats such as felled forests, abandoned fields, and pastures. In Eurasia, goutweed is primarily a species of deciduous and southern boreal forests, and it expands aggressively in similar habitats in North America. Goutweed appears to do best on moist soil and in light to moderate shade, but is highly shade-tolerant and capable of invading closed-canopy forests.

**Management**

A variety of methods are available for controlling goutweed, depending on the extent of the infestation and the amount of time and labor available. Regardless of the control method used, the patch should be carefully monitored periodically for a few years. New shoots should be dug up and destroyed. Once goutweed control has been achieved, revegetation with native or non-invasive exotic plant materials is recommended. This is particularly important on sites where erosion is a concern or where other invasive species are likely to colonize the site if left alone.

***Manual***
Small patches of goutweed can be eliminated by careful and persistent hand-pulling or digging up of entire plants along with underground stems (rhizomes). Pulled plants can be piled up and allowed to dry for a few days before bagging and disposing of them. Be careful to pick up all rhizomes which, if left behind, can re-root and sprout new plants. For large patches, a team of volunteers or use of herbicide is recommended.

***Mechanical***
Where appropriate, frequent short mowing may control or slow the spread of goutweed in lawns, along roadsides, and other areas.

***Physical***
Preventing goutweed from photosynthesizing in early spring (at the time of leaf-out) can control the plant by depleting its carbohydrate reserves. This can be accomplished by covering the patch with black plastic sheeting when the leaves start to emerge from the ground in the spring, and leaving it in place through the summer. A more effective option is to cut all plants once they've fully leafed out, using a mower, scythe, or weed-whacker type machine, and then cover the area with plastic. Covering the plants in mid- or late summer, after they have regained substantial starch reserves, is probably much less effective.

## Bush Honeysuckle

- **Origin:** Native to Japan, China, Korea, Manchuria, Turkey and southern Russia. Exotic bush honeysuckles have been introduced for use as ornamentals, for wildlife cover and for soil erosion control.
- **Characteristics**: Exotic bush honeysuckles are upright, generally deciduous shrubs that range from 6 to 15 feet in height. The 1-2 ½ inch, egg-shaped leaves are opposite along the stem and short-stalked. Older stems are often hollow. Pairs of fragrant, tubular flowers less than an inch long are borne along the stem in the leaf axils. Flower color varies from creamy white to pink or crimson. Flowering generally occurs from early to late spring, but varies for each species and cultivar. The fruits are red to orange, many-seeded berries. Native bush honeysuckles may be confused with these exotic species and cultivars, so proper identification is necessary. Unlike the exotics, most of our native bush honeysuckles have solid stems.
- **Seeds**: The minute greenish-white flowers occur in attractive, branched sprays in summer and are followed soon after by small winged fruits. Seeds are triangular, shiny, and very small, about 1/10 inch long.
- **Spread:** Open-grown exotic bush honeysuckles fruit prolifically and are highly attractive to birds. In the eastern United States, over twenty species of birds feed on the persistent fruits and widely disseminate seeds across the landscape. In established populations, vegetative sprouting also aids in the persistence of these exotic shrubs.
- **Threat**: Exotic bush honeysuckles can rapidly invade and overtake a site, forming a dense shrub layer that crowds and shades out native plant species. They alter habitats by decreasing light availability, by depleting soil moisture and nutrients, and possibly by releasing toxic chemicals that prevent other plant species from growing in the vicinity. Exotic bush honeysuckles may compete with native bush honeysuckles for pollinators, resulting in reduced seed set for native species. In addition, the fruits of exotic bush honeysuckles, while abundant and rich in carbohydrates, do not offer migrating birds the high-fat, nutrient-rich food sources needed for long flights, that are supplied by native plant species.
- **Location:** Honeysuckle generally ranges from the central Great Plains to southern New England and south to Tennessee and North Carolina. In addition, they are spread sporadically throughout the U.S.
- **Habitat:** Exotic bush honeysuckles are relatively shade-intolerant and most often occur in forest edge, abandoned field, pasture, roadsides and other open, upland habitats. Woodlands, especially those that have been grazed or otherwise disturbed, may also be invaded by exotic bush honeysuckles. Morrow's honeysuckle and pretty honeysuckle have the greatest habitat breadth and are capable of invading bogs, fens, lakeshores, sandplains and other uncommon habitat types.

**MANAGEMENT OPTIONS**

Mechanical and chemical methods are the primary means of control of exotic bush honeysuckles. Hand removal of seedlings or small plants may be useful for light infestations, but care should be taken not to disturb the soil any more than necessary. In shaded forest habitats, where exotic bush honeysuckles tend to be less resilient, repeated clippings to ground level, during the growing season, may result in high mortality. Clipping must be repeated at least once yearly because bush honeysuckles that are cut once and left to grow will often form stands that are more dense and productive than they were prior to cutting.

Seedlings of exotic bush honeysuckles can also be controlled by application of a systemic herbicide. Well established stands of exotic bush honeysuckles are probably best managed by cutting the stems to ground level and painting or spraying the stumps with a slightly higher rate of glyphosate (2-3%).