

Winter Creeper

Euonymus fortunei

Description -

- Evergreen vine that can form a dense groundcover. Can grow as a shrub up to 3 feet in height, or climb 40-70 foot vertical surfaces with the aid of aerial roots.
- 1 – 2 ½ inch long paired leaves are dark green, shiny and egg-shaped with finely toothed margins and whitish veins.
- Inconspicuous green-white 5-petaled flowers that bloom June to July.
- Fruits are pinkish to red capsules that split open to expose seeds adorned with a fleshy orange seed coat in fall.

Distribution - Scattered throughout the eastern United States.

Threat - Forms dense ground cover that eliminates native species from the understory. Impedes recruitment of canopy species. Can overtop trees and cause decreased vigor.

Control - Hand pulling for young infestations and grubbing work for sensitive areas where herbicide is not suitable; however, any plant stem left can resprout. For larger vines, immediately apply a 25% solution of glyphosate or triclopyr to cut stems. Foliar spray with a surfactant can also be effective on large populations.

Similar Plants - Periwinkle (*Vinca* spp.) also invasive, has glossy leaves and is evergreen. However, flowers are purple and leaf-shape is more elliptic.

Origin - Introduced from China as an ornamental groundcover.

Burning Bush

(winged euonymus, winged wahoo, winged spindle-tree)

Euonymus alatus

Description -

- Deciduous shrub with gray stems and corky wing-like ridges.
- Opposite leaves, elliptic with a tapered tip, have fine serrations on the margins.
- Leaves turn bright red color in fall.
- Flowers are small, yellowish green in color and inconspicuous in pairs at the tips of y-shaped stems.
- Smooth, purplish fruit are a half inch long and are present from September through October. Each fruit contains approximately four red to orange seeds.

Distribution - Found in most states in the eastern U.S. and the upper Midwest.

Threat - Can form dense thickets in natural woods and shade out native plants. It is also an adaptive plant, growing well in a wide range of soil types and pH levels. Spreads quickly by root suckers and from birds dispersing seeds.

Control - Small plants can be hand pulled. Larger plants can be cut and the stump surface sprayed with glyphosate. Foliar spray is also an option but most effective during early summer months.

Similar Plants - When dormant, twigs may resemble winged elm (*Ulmus alata*). Could also be confused with native strawberry bush (*Euonymus americana*).

Origin - Introduced from northeast Asia and promoted as an ornamental.

Bush Honeysuckles

Lonicera maackii , *L. morrowii* , *L. tatarica* , *L. x bella*

Description -

- Shrubs, ranging from 6 to 15 feet in height.
- Egg-shaped to oblong opposite leaves are 1- 2 ½ inches long; leafing out first in spring and persisting into late fall.
- Pairs of fragrant, tubular white to pink flowers in late spring.
- Fruits are red or orange berries containing many seeds.

Distribution - Introduced for use as ornamentals, and for wildlife food and cover. Bush Honeysuckles are found in a wide variety of habitats from the Central Great Plains to southern New England and south to Tennessee and North Carolina.

Threat - Aggressively forms dense shrub layer that crowds out native plant species. Can reduce tree regeneration and eliminate understory species due to deep shade cast by the dense thickets. Fruits are rich in carbohydrates but do not offer migrating birds the high-fat, nutrient-rich food sources needed for long flights. Increased nest predation has been attributed to branching structure and lack of thorns which enables predators easy access.

Control - Hand removal of seedlings or small plants may be useful for small populations; however any portion of root remaining can resprout. Foliar spray with a 2% glyphosate or triclopyr mixture where risk to non-target species is minimal. Air temperature should be above 65 degrees F. Or, cut stumps and immediately treat cut surface with a 25% solution of glyphosate or triclopyr.

Similar Plants - Coralberry (*Symphoricarpos orbiculatus*) has slender purple to brown twigs and the berries have a purple hue.

Origin - China, Asia and Russia. *L. x bella* is a hybrid of *L. morrowii* and *L. tatarica*.

Bush Honeysuckles



Burning Bush



Winter Creeper



Kudzu

Pueraria lobata

Description -

- Fast-growing vine, usually has three leaflets but may be fused into 1-2 with major to minor lobes. Leaflets 2-4 inches wide and hairy on edges.
- Light purple/pink flowers with a fragrant, sweet grape smell in late summer.
- Roots are fleshy with massive tap roots.

Distribution - Major infestations in eastern and western Kentucky with scattered populations statewide.

Threat - Kudzu kills or degrades other plants by shading them under a blanket of leaves, by girdling stems and tree trunks, and by breaking branches or uprooting trees by its weight.

Control - Root system must be killed. Mow or cut monthly over two or more growing seasons. Sever vines and treat roots to get foliar levels manageable for more direct treatments. Late season cutting of vines at root tops followed by immediate stump treatment with 25% glyphosate works best. Foliar application of glyphosate to small plants repeatedly in a season may keep plants in check. No biological controls available. Burning will not kill roots and may stimulate dormant seeds to germinate. Seedlings can be herbicided or pulled, and fire helps clear site for native species and can reveal hidden obstacles.

Similar Plants - Native grapevines similar at a distance, but leaf edges saw-toothed, not smooth and not divided into 3 leaflets. In winter other vines generally lack fuzziness on youngest growth.

Origin - Asia (China, Japan)

(Reference: Plant Conservation Alliance, Alien Plant Working Group)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Chinese Yam

(Cinnamon Vine, Air Potato)

Dioscorea batatas, D. oppositifolia, D. bulbifera

Description -

- Chinese Yam and air potato are long-climbing vines with 2- to 3-inch wide shiny heart-shaped leaves having arc-shaped veins.
- Leaves may vary in shape to arrowhead-like with lobes at the leaf base.
- Pea- to marble-sized bulbils like small potatoes occur at leaf nodes in late summer. These may become potato-sized in other regions.
- Ripe bulbils drop readily at slightest touch.

Distribution - Found increasingly along stream corridors, forest openings, roadsides and around old home sites.

Threat - The vine is fast-growing (up to 1 inch per day at peak). It covers trees, shrubs, ground vegetation, and structures. It reproduces prolifically starting in late June, and can spread rapidly along forest edges and openings.

Control - Shading not recommended for long-term control. Mechanical control includes clipping, pulling, or burning plants before bulbils form in mid-June. Follow-on foliar herbicide control of sprouts with glyphosate. Glyphosate foliar spray (Roundup) June to August as bulbils just forming.

Similar Plants - The native yam has similar leaves, but does not grow as aggressively. It often remains small and vertical (non-vine) and is found in shady forests.

Origin - Asia

(Reference: The Nature Conservancy, the National Park Service, and the Universities of Tennessee, Florida, and Connecticut)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Japanese Stilt Grass

(Asian Stilt Grass, Nepal Grass)

Microstegium vimineum

Description -

- Pale green lance-like thin leaves up to 3 inches long on thin stems. Silvery strip of reflective hairs at center of upper side of leaf.
- Size varies; can be up to 3 feet tall, but often ½ to 2 feet. Sometimes seen as a nearly mat-like cover where mowed.
- Plants come up or break off easily.

Distribution - Observed along road sides, stream banks and trails, but also found deep in forests. Found throughout Kentucky.

Threat - Adapted to shade, invades forests, forms dense patches that crowd out native plants in open and shaded sites. Spreads easily and can take over fields and forests quickly, especially moist, rich soils and wetlands. Seeds remain viable for three years and are easily spread by hay, soil on shoes, tires, and by water.

Control - Repeated hand pulling, especially when plants are in full bloom (late summer). Larger populations may be weed-whacked in late summer just before plants produce seeds. Important to control small populations quickly. Chemical controls include glyphosate (Roundup). In wet areas, wetland formulations are needed (e.g., Rodeo).

Origin - Japan, Korea, China, Malaysia, India

(Reference: Plant Conservation Alliance, Alien Plant Working Group)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Japanese Stilt Grass



Chinese Yam



Kudzu



Sericea Lespedeza

(Chinese lespedeza)

Lespedeza cuneata

Description -

- Perennial herb in the pea family.
- Grows erect from 3 to 5 ½ feet in height with alternate leaves.
- Each leaf is divided into three smaller leaflets about ½ to 1 inch long with awl-shaped spines.
- Leaflets are covered with densely flattened hairs making them appear grayish-green or silver.
- Flowers are pea-like, white with purple markings and emerge singly or in clusters of 2-4 in the upper axils.
- Older stems are woody and fibrous.

Distribution - Found in open areas throughout the eastern United States.

Threat - Invades bottomlands and burned grasslands, crowding out native plants and forming pure stands. Mature seeds may remain viable for up to 20 years. Seedlings may represent only 1% of the seeds actually available in the soil. High tannin content makes it undesirable to wildlife. Fruits are eaten and dispersed by animals and haying of infested fields disperses seed.

Control - Hand pulling is impractical, but mowing plants in the flower bud state for two or three consecutive years may reduce vigor and control further spread. Cut as low to the ground as possible. Foliar herbicide treatment in early to mid-summer with a 2% solution of triclopyr is effective. On wet sites a 2% solution of glyphosate is effective from late June until seed set.

Similar Plants - Do not confuse with the native slender bush clover, *Lespedeza virginica*, which has pink flowers.

Origin - Introduced from eastern Asia for erosion control, wildlife food and as a forage crop.

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Plant Conservation Alliance-Alien Plant Working Group, The Nature Conservancy, and the USDA .

Crown Vetch

Coronilla varia

Description -

- Creeping stem reaches 1 ½ feet in length
- Compound leaves range from 2-4 inches in length and have nine to twenty-five oblong leaflets
- Five to twenty pea-like flowers that vary from pink, rose, or lilac appearing in late May-August
- The seed is a four-angled legume with three to seven one-seeded segments.

Distribution - Widely distributed as an ornamental ground cover and for erosion control on banks and reclamation of mine lands.

Threat - Overgrows native vegetation and out competes for resources by covering over them. Can form single-species stands that can totally dominate open natural areas (grasslands). Spreads vegetatively by underground roots or rhizomes and by seed. Seeds remain viable in the soil for several years requiring consistent post-treatment monitoring.

Control - Hand pulling of mature plants can be effective for small initial infestations. Mowing in the flower bud stage for two to three consecutive years may reduce vigor and control further spread. Cut plants as low to the ground as possible before they seed. Mowing or burning and then applying an herbicide such as triclopyr or glyphosate to the leaves while the plants are actively growing has been effective for control. Repeated treatments are often needed due to the dense growth of plants and the inability to adequately cover all stem surfaces with herbicide in one application.

Similar Plants - Partridge pea (*Cassia fasciculata*) and other native vetches and non-native plants in the Pea family. Look for compound leaves and an odd number of leaflets. The flowers, stalks, and leaves arise from the main stem, and flowers form an umbel.

Origin - Native to Europe, southwest Asia and northern Africa.

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Plant Conservation Alliance-Alien Plant Working Group, The Nature Conservancy, and the USDA .

Autumn Olive

Elaeagnus umbellata

Description -

- Shrub that grows to 20 feet with a bushy and spreading crown.
- Leaves are alternate, short-petioled, glabrous, dark green above and silvery underneath.
- Twigs are silvery or golden brown, often with prominent spines.
- Abundant berries turn red as they mature in the fall and are speckled with brown to silvery scales.
- Small clusters of fragrant tube-shaped yellowish flowers bloom May-June.

Distribution - It was actively promoted for wildlife habitat, shelterbelts, strip mine reclamation, and ornamental uses. Found throughout the eastern and Midwestern U.S.

Threat - Rapid growth enables this shrub to out compete native species. Prolific fruit production ensures ready distribution. An individual plant can produce up to 8 pounds of fruit that is eaten and spread by birds and small mammals. Plants develop fruits annually after 3 years of age. Fire stimulates re-sprouts, making grassland management in infested areas more difficult.

Control - Foliar spray with triclopyr or glyphosate should be considered for large thickets where threat to non-target species is minimal. Air temperature should be above 65 degrees F. Basal bark treatment with triclopyr and 2,4-D should be considered when treating individual trees.

Similar Plants - Resembles Russian olive (*Elaeagnus angustifolia*), another invasive species that has become a pest in much of the U.S.

Origin - Native to China, Korea and Japan.

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Plant Conservation Alliance-Alien Plant Working Group, The Nature Conservancy, and the USDA .

Autumn Olive



Crown Vetch



Sericea Lespedeza



Chinese Silver Grass

Miscanthus sinensis

Description -

- Loose plume-like heads of pale pink to red that turn silver in fall; on tall stalks that persist through winter.
- Basal leaves arise from a large central clump.
- Individual leaves taper to a point and are 3-4 feet long.
- Margins are sharp and slightly serrated.
- Seeds are rough with a twisted bristle tip.
- Spreads primarily by underground roots or rhizomes.

Distribution - Can invade roadsides, old fields, shores of reservoirs and forest openings following fires. Has spread throughout the eastern United States to Colorado and California.

Threat - Aggressive, may form colonies and produce a large number of airborne seeds. Can also resprout from pieces of rhizome. Highly flammable and poses a fire hazard as burning plants can have flame lengths of 30 feet.

Control - Small patches may be grubbed, but all of roots must be removed. Plant must be actively growing for herbicidal control. Use a 2% glyphosate solution in fall or late spring. Cover the leaves to the point of runoff, but be careful not to spray desirable vegetation.

Similar Plants - Big bluestem (*Andropogon gerardii*), which has a three-pronged flower spike resembling a turkey's foot. Sugarcane plume grass (*Saccharum giganteum*), is differentiated by its longer flower stalk (up to twelve feet) and shorter leaves (to one and a half feet).

Origin - Asia. Introduced to the U.S. as an ornamental.

Poison Hemlock

Conium maculatum

Description -

- Small white flowers clustered in large compound umbels that are 1.5-2.5 inches wide.
- Hollow stems are purple mottled, erect, smooth, and between 2-10 feet tall.
- Fern like leaves are alternate and basal, upper leaves progressively smaller.
- Leaves are 3-4 times pinnately divided; the enlarged petiole base sheaths the stem.

Distribution - Invades riparian areas, ditches, old fields, roadsides throughout most of North America.

Threat - All parts of the plant are toxic to humans and animals when eaten. Prolific seed production, aggressive growth habits and tolerance of shade allow rapid spread which overwhelms native vegetative cover. Not valuable to wildlife as food or shelter.

Control - Small infestations can be dug up or cut back before flowering. Do not compost flowers as they can go to seed. Plants and the first year rosette phase can be treated with 2,4-D in early spring or late fall. Repeated applications may be required to deplete the seed bank.

Similar Plants - Cow parsnip (*Heracleum maximum*) has palmately compound leaves. Water hemlock (*Cicuta maculata*) has more delicate umbels and twice compound leaves.

Origin - Eurasia. Introduced to the U.S. as a garden plant.

Common Reed

Phragmites australis

Description -

- Herbaceous perennial grass with hollow stout stems that can grow up to 15 feet.
- Lanceolate leaves up to 2 feet long.
- Large feathery plumes of flowers develop by mid-summer.
- Purple/brown flowers turn tan or gray and seeds set through fall and winter.

Distribution - Thrives in sunny wetland habitats. Occurs throughout the U.S.

Threat - Spreads rapidly by rhizomes and can quickly take over areas, creating a monoculture. Rhizomes can extend 30 feet in one year. Produces large quantities of seeds. Monocultures as large as 7000 acres have been documented in other states.

Control - Apply Rodeo herbicide to the leaves when plants are tasseling to translocate the chemical to the rhizome. Re-treatments are often needed due to denseness of foliage and inability of spray to reach all plants at one time. Cutting with hedge trimmers just before seed set can reduce vigor. Treatment will be needed for several years.

Similar Plants - Giant reed is similar in appearance but is usually found in upland sites.

Origin - Uncertain, *Phragmites australis* is found on every continent except Antarctica.

Common Reed



Poison Hemlock



Chinese Silver Grass



Multiflora Rose

Rosa multiflora

Description -

- Thorny, round-shaped, medium to large shrub.
- Leaflets in arrangement of 7 to 9, each leaflet fingernail size, serrated on edges, and longer than wide.
- Flowers are small and white to pinkish white.
- Fruit are rose hips turning from green to red to brown through winter.

Distribution - Widely distributed in KY along road sides, fencerows, stream sides, forest edges and into the interior, and un-maintained fields.

Threat - Forms single species thickets crowding out native plants, especially at stream sides. Seeds are spread by birds and other animals.

Control - Mowing can keep invasions in check. Pulling up small plants can be effective if repeated to control root sprouts and seedling germination. Chemical control involves foliar sprays (glyphosate, triclopyr @ 2 to 3%), cut stump treatment of the same sprays (@ 25% concentrations), and basal bark treatment (triclopyr @ 25% mixed with horticultural oil).

Similar Plants - Native roses. Multiflora rose has a feathery or comb-like projection (stipule) at the base of leaf stems. Other roses have this projection, but lack the feathery or comb-like characteristic.

Origin - Japan, Korea, eastern China

(Reference: Southeast Exotic Pest Plant Council)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Oriental Bittersweet

Celastrus orbiculata

Description -

- Twining vine with round, glossy to semi-glossy, finely toothed leaves the size of a quarter to half-dollar.
- Flowers and fruit occur at base of leaf stems.
- Greenish-yellow flowers in May with 5 petals.
- Greenish-yellow fruit splits open to reveal three red-orange fleshy seeds.

Distribution - Scattered in Kentucky with populations spreading. Alluvial woods, road sides, thickets, and old home sites. Seeds spread by birds and small mammals.

Threat - Aggressively covers, shades, and chokes native vegetation at all levels. Believed to readily hybridize with native bittersweet. Tolerates shade. From forest edges it can enter forests.

Control - Hand pull small infestations, but requires 100% removal, which is difficult. For dense infestations, cut vines and follow with glyphosate herbicide to the stumps. (Note: Apply herbicides before spring wildflowers emerge or after killing frost.) Follow-up & late season treatments necessary.

Similar Species - American bittersweet (*Celastrus scandens*), which has flowers only at ends of vines and oblong (not round) leaves.

Origin - Eastern Asia

(Reference: TN Exotic Plant Management Manual; Plant Conservation Alliance, Alien Plant Working Group; Exotic Pest Plants of Southeastern Forests)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Tree of Heaven

(Chinese sumac, stink sumac)

Ailanthus altissima

Description -

- 11 to 25 spear-shaped leaflets per leaf.
- Small lobes at leaflet base a key identifier, each lobe having a small hard bump (gland). Leaflet edge smooth.
- Crushed leaves, broken twigs, and cut bark have acrid burnt peanut butter odor.
- Yellow-green flowers cluster at end of limbs in July, turn to gray seed clusters in winter.

Distribution - Widespread in the U.S. Scattered throughout Kentucky.

Threat - Grows thickly, excluding native species. Roots exude chemicals that push out native plants. Infests closed woodlands but most common along open areas and forest edges.

Control - Hand pull freshly germinating seedlings, removing entire root. Cut down and immediately spray stump with 25% ai glyphosate in water base in Sept; girdle-inject with 25% ai glyphosate in water base in Sept; basal paint bark with 25% ai glyphosate in oil base in Sept.

Similar Species - Sumac (smooth, staghorn, shining/winged), but sumac has milky sap; black walnut, but crushed walnut leaves have walnut odor, not the acrid tree of heaven odor.

Origin - Central China

(Reference: TN Exotic Plant Management Manual, Plant Conservation Alliance, Alien Plant Working Group)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Tree of Heaven



Oriental Bittersweet



Multiflora Rose



Japanese Honeysuckle

Lonicera japonica

Description -

- Semi-evergreen perennial trailing or twining woody vine with simple, opposite, oval leaves around 1.5 inches long with smooth edges.
- Extremely fragrant, two-lipped flowers, 1 to 2 inches long in pairs throughout summer, mostly white to yellow.
- Small black berries in early autumn.
- Spreads by seeds, underground rhizomes, and above ground runners.
- New stems reddish brown; older vines have light brownish bark that peels off in long strips.
- Creates dense, tangled masses.

Distribution - Common throughout much of the U.S. Found across KY along roadsides, in forests, along streams.

Threat - Dense, strangling growth shades out or topples native plants and depletes soil moisture and nutrients. Changes forest structure and shades excluded native shrubs and herbs.

Control - Hand pulling, grubbing, prescribed burning, late fall foliar spray of 2% glyphosate, repeated control usually necessary.

Similar Plants - Native honeysuckle have fused leaves through which the stem grows along newer growth.

Origin - Eurasia

(Reference: Virginia Native Plant Society, The Nature Conservancy)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Garlic Mustard

Alliaria petiolata

Description -

- Basal rosette leaves (first year), dark green and kidney-shaped, 2 to 4 inches in diameter with scalloped edges.
- Stemmed plants (second year) 1 to 3 feet tall, leaves 1 to 3 inches wide, smaller toward top, small white 4-petaled flowers.
- Young crushed leaves of both stages have garlic smell.

Distribution - Abundant in the Bluegrass Region. Found in scattered locations across KY, especially in moist areas with productive soils. Invades forests and open fields.

Threat - Forms dense ground cover excluding native herbaceous plants in deep forests. Spreads quickly by flooding and animals, and is hard to control once invasions have occurred.

Control - Pull or cut small infestations before spring seed set. Continuous monitoring necessary for five years. Pull early spring and late fall rosettes or treat with glyphosate or tryclopyr (Garlon 3A). Burning helps control plant.

Origin - Northern Europe

(Reference: Wildland Invasive Species Team, The Nature Conservancy)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Chinese & European Privet

Ligustrum sinense and *Ligustrum vulgare*

Description -

- A shrub attaining up to 30 feet in height. Widely used as hedges.
- Leaves are glossy, stiff, and oval to elliptical, one-half to two inches long, arranged opposite other leaves, forming 2 rows along stem with leaves at nearly right angle to stems.
- Small white four-petaled flowers in loose clumps with heavy musky smell.
- Berries are dark blue to black, and less than one-quarter inch in diameter forming in October.

Distribution - Invasive throughout the southeast and scattered across KY. Thickly invades stream sides, fence rows, road sides, and forest edges.

Threat - Grows in dense stands eliminating native species underneath, especially in moist areas. Spread prolifically by birds. Tolerates shade and lower elevations, invades forests.

Control - Mechanical/hand pulling provided roots pulled too. Glyphosate 3% herbicide as foliar spray. Late fall spraying avoids damage to most native plants. Control requires follow-up treatments for seedlings and sprouts. For larger stems, use basal application of Garlon 4 at a 20% solution.

Origin - China and Eurasia

(Reference: Southeast Exotic Pest Plant Council, Virginia Natural Heritage Program, USDA Forest Service)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Chinese and European Privet



Garlic Mustard



Japanese Honeysuckle



Purple Loosestrife

Lythrum salicaria

Description -

- Erect perennial herb with opposite or whorled sessile leaves with heart-shaped bases.
- Showy spikes of purple-magenta flowers during the summer months
- Grows four to eight feet tall and can have 30 to 50 stalks per root mass.
- Strong tap root, stems become woody, persisting for up to two years.

Distribution - Found in every state except Florida.

Threat - Quickly adapts to natural and disturbed wetlands; overtakes native aquatic plants and forms large dense stands. Displacement of native aquatic species impacts waterfowl dependent upon them for food and cover. A prolific seed producer; seeds that germinate in the spring will produce a flowering stem that year. Seeds remain viable for several years.

Control - Small infestations and young plants can be pulled by hand, preferably before seed sets in late summer, early fall. Plant parts should be bagged and removed from the site as any plant fragment that remains could resprout. Cutting and mowing increase vegetative spreading. Older plants can be treated by a foliar application with a glyphosate formulation for use over water. Biological control has also been pursued and used in some areas.

See <http://www.invasiveplants.net> for more information.

Similar Plants - Blue vervain (*Verbena hastata*), and blazing star (*Liatris spicata*), although their preferred habitats are considerably drier. The native winged loosestrife (*Lythrum alatum*) most closely resembles purple loosestrife but has alternate leaves, more widely spaced flowers, and is smaller in size.

Origin - Introduced from Eurasia as an ornamental.

English Ivy

Hedera helix

Description -

- Evergreen climbing vine with dark green waxy, thick leaves with white veins. Can also form a dense ground cover.
- Leaf is commonly three-lobed with a heart-shaped base, though leaves in the sun can be oval with no lobes.
- Umbrella like clusters of greenish-white flowers are seen in fall and dark purple fruits mature in spring.

Distribution - Found in 26 states and the District of Columbia.

Threat - Creates dense undergrowth that shades out native species and inhibits tree regeneration. Also climbs trees, reducing vigor and possibly causing tree death. Also serves as an alternate host for Bacterial Leaf Scorch (*Xylella fastidiosa*), which in turn affects native elms, oaks and maples.

Control - Cutting vines on trees and pulling ground vines may be effective on small infestations. Pulled plants must be removed from the site or they will continue to grow unless desiccated. Repetition of treatment is usually necessary to be most effective. Use of triclopyr is suggested for large infestations. The waxy covering on the leaves limits absorption of chemicals, so repeat treatment may be needed for foliar applications. Cutting the stems with a string trimmer and then applying the herbicide can be effective.

Similar Plants - Possibly could be confused with grapes, *Vitis* spp., but leaves are not waxy or thick.

Origin - Found in Europe, Eastern Asia and Northern Africa. Introduced to the U.S. for use as a house plant and for landscaping.

Johnson Grass

Sorghum halapense

Description -

- Perennial grass, culms can grow 7-8 feet tall.
- Propagates through large rhizomes and mass seed production.
- Flowers are in a purple-colored panicle.
- Leaves are 6-20 inches long with a white mid-vein.
- Stems are pink to red near the base.

Distribution - Common in most of the U.S.

Threat - By the 20th century, Johnson grass was recognized as one of the six most damaging weeds in the U.S. Forms dense stands and has the capability of producing large numbers of seeds that remain viable in the soil for 25 years. Nutritional value as fodder is very low as compared to native species. Out competes native plants for water. May contain allelopathic properties, inhibiting the establishment of plants in its proximity. Readily sprouts from fragmented rhizomes.

Control - Mechanical cutting and use of Roundup as a foliar spray are acceptable when used repetitively. Hand-pulling is usually not effective because rhizomes are left behind, however this method, when repeated, may reduce vigor. If implemented, hand-pulling is best done in early spring. Heavy grazing reduces populations because rhizome development is greatly reduced when plant height is kept below 12 to 15 inches.

Similar Plants - Eastern gamagrass (*Tripsacum dactyloides*), Switch grass (*Panicum virgatum*), and Indian grass (*Sorghastrum nutans*), may possibly look similar to the casual observer.

Origin - Introduced from the Mediterranean region as a forage crop.

Johnson Grass



English Ivy



Purple Loosestrife



Mimosa, Silk Tree

Albizia julibrissin

Description -

- Small- to medium-sized tree with multiple trunks and spreading crown.
- Leaves finely divided and fern-like, bark light brown.
- Flowers a delicate white and pink in clusters like pom-poms in mid-summer.
- Bean pods six inches long and conspicuous through early winter.

Distribution - Found throughout the southeast, southwest and parts of the Midwest. Scattered across KY. Grows in native grasslands, fields, road cuts, and in forest edges.

Threat - Strong competitor in open areas, disturbed forests, and forest edges. Crowds out native tree and shrubs. Can grow in a variety of soils. Can be a problem along streams.

Control - Hand pulling of young seedlings is recommended where feasible. Treat trees by girdling, basal trunk spraying, or cutting to eliminate seed production. Freshly cut stumps should be treated with 25% solution of glyphosate or triclopyr with water or Garlon 4 with oil. Root or stump sprouting is likely as well as seedlings, so follow-up foliar spraying with 2% glyphosate or triclopyr is recommended

Origin - Iran to Japan

(Reference: Plant Conservation Alliance, Alien Plant Working Group)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Japanese Knotweed

Polygonum cuspidatum

Description—

- Forms dense stands that reach 10 feet.
- Leaves 2- to 6-inches long and heart-shaped.
- Stems are bamboo-like (hollow), light green to purplish-red, smooth, and swollen at joints where leaves are attached.
- Small flowers are white to greenish-white in small sprays along smallest branches.

Distribution - Found throughout much of the U.S. and scattered across KY. Grows along streams, home sites, low-lying areas, and rights of way.

Threat - Dense thickets crowd native vegetation. Tolerates adverse growing conditions. Quickly expands in natural areas from cultivated sources. Threatens riparian areas where it is rapidly colonizing scoured shorelines.

Control - Hand pull small plants. Grub larger plants removing roots (rhizomes) and other plant parts. Foliar spray with glyphosate or triclopyr (2%) during growing season. Treat cut plants with 25% solution to knock down plants for easier foliar spraying when new sprouts and leaves emerge.

Similar Species - Redbud has similar leaf, but lobes at leaf base rounded where knotweed leaf base is flat. Redbud has a solid, woody twig.

Origin - Japan

(Reference: Southeast Exotic Pest Plant Council)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Princess Tree

(Empress Tree, Royal Paulownia)

Paulownia tomentosa

Description -

- Leaves large, heart-shaped, slightly fuzzy.
- Leaves occur in pairs along stems.
- Upright clusters of persistent over-wintering seed pods.
- Showy blue-lavender to violet flower clusters in early spring.

Distribution - Found throughout the eastern half of the U.S. and scattered across KY. Frequently along rights-of-way, stream sides, forest openings and edges, disturbed sites.

Threat - Invades disturbed forest areas where its fast growth can change forest composition. Stream banks and rocky slopes vulnerable to invasions, placing biological diversity at risk.

Control - Hand pulling of seedlings must be done when soil is loose for root removal. Foliar sprays includes glyphosate and triclopyr at 2% solutions. Cut trees should have stumps treated with 25% solutions of glyphosate or triclopyr. Expect follow-up foliar treatments. Girdling and basal trunk treatment with 25% triclopyr are other options.

Origin—Western and central China

(Reference: Plant Conservation Alliance, Alien Plant Working Group)

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Southern Appalachian Man and the Biosphere Program (samab.org), TVA, The University of Tennessee, US Fish & Wildlife Service, The Nature Conservancy, Plant Conservation Alliance, and others.

Princess Tree



Japanese Knotweed



Mimosa, Silk Tree



Treatment Methods

All herbicides should be applied in accordance with specific label instructions, which include personal protective equipment and storage requirements.

Foliar Treatments - Foliar applications should be made with a low pressure (20-50 psi) backpack sprayer at rates of one gallon or less per minute. All foliar treatments should be made after full leaf expansion in the spring and before fall colors are visible. Allow herbicide treatments to dry for at least three hours at an air temperature above 60°F to ensure adequate absorption and translocation. In areas that receive significant public use, it may be necessary to close off the treatment area until the herbicide has completely dried.

Use a nonionic surfactant with all herbicide solutions, unless otherwise specified by the manufacturer's label. Surfactants increase the effectiveness of the herbicide by 1) reducing surface tension and ensuring complete foliar coverage, and 2) increasing the rate of absorption through the leaf cuticle.

Apply herbicide with a backpack or similar hand-operated pump sprayer equipped with a flat spray tip or adjustable cone nozzle. Apply herbicide to the leaves and stems of target plants using a consistent back and forth motion. Herbicide should thoroughly cover foliage, but not to the point of run-off. All recommended herbicides require complete foliar coverage to be effective. Applications made while walking backward will reduce the risk of the herbicide wicking onto the applicator's clothing.

Cut Surface Treatments - Cut surface treatments include hack and squirt, frill, and cut stump methods. The main advantages to these methods are: 1) they are very economical, 2) there is minimal probability of non-target damage, 3) minimal application time, and 4) they can be used in the winter as long as the ground is not frozen. Backpack sprayers or spray bottles are very effective for all of these methods.

Hack and Squirt Method: Using an axe or similar cutting tool, make uniformly spaced cuts around the base of the stem. The cuts should angle downward, be less than 2.5 cm (1 in) apart, and extend into the sapwood. Apply herbicide to each cut to the point of over flow.

Yellow and White Sweet Clover

Melilotus officinalis and Melilotus alba

Description -

- Primarily a biennial, first year's growth is vegetative. Second year plants have a taproot that may exceed 50 inches and 1-10 upright or ascending flowering stems from 3-5 feet in height.
- Fruit a small one to two-seeded pod. Pea-like flowers, either yellow or white.
- Both species flower in June and July, yellow usually a few weeks earlier than white.
- Leaves are alternate and divided into three serrated leaflets; the middle leaflet is on a distinct stalk.

Distribution - Its use in agriculture and for soil stabilization has helped it to spread across N. America. It is now found in every state.

Threat - Invades grasslands and out competes native plants for space and resources. A plant can produce 14,000 to 350,000 seeds. Seeds may remain viable in the soil for more than 20 years. Infested areas managed with prescribed fire can actually enhance germination rates and seedling establishment.

Control - For small infestations, hand-pulling of first year stems in late summer/early fall may be effective. Mowing in late spring/early summer may reduce but not prevent seed set, as flowering shoots can resprout. Burning two years in a row can reduce plants. Burn early the first year (before green-up, usually in early to mid-April) to stimulate germination. If plants are found that summer, burn the next year in early to mid May. If burning is conducted before buds develop, plants will resprout. Heavily infested areas may need this burning sequence repeated for a few years to effectively impact uneven-aged patches. Foliar application of 2,4-D on young seedlings has been effective.

Similar Plants - Seedlings closely resemble those of alfalfa (*Medicago sativa*), but note the clover's absence of hairs on the underside of leaves and the bitter taste. Sweet clover is most easily identified when in flower.

Origin - Europe and Western Asia. Introduced as a forage crop and for nitrogen fixing to rebuild depleted soils.

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Plant Conservation Alliance-Alien Plant Working Group, The Nature Conservancy, and the USDA.

Musk Thistle

(Nodding Thistle)

Carduus nutans

Description -

- Mature plants range from 1½ to 6 feet tall with multi-branched spiny stems.
- Spiny leaves are dark green, coarsely lobed with a smooth waxy surface and a light colored spine at the tip
- Large, showy pink-purple disk-shaped flower heads contain hundreds of tiny individual flowers which emerge in May to August and occur at the tips of stems. The flower heads will droop on a 90-degree angle from the stem when mature.
- Each plant can produce thousands of straw-colored seeds with plume-like hairs.
- Usually a biennial, a seedling emerges in mid- to late July and develops into a rosette the first year and begins to bolt in mid-March the following year.

Distribution - Found throughout the continental U.S. except for Maine, Vermont, and Florida.

Threat - Invades native grasslands and pastures. Can out compete natives as grazing animals will not eat it. Plants can produce thousands of seeds and may colonize open soil areas that result from prescribed burning.

Control - Hand-pulling or cutting of small populations can be done after the stems have bolted but should be done before seed production. Flowers and seed heads should be bagged and taken to landfill to minimize seed dispersal. Foliar spraying of glyphosate or triclopyr applied during rosette stage prior to flowering is also effective.

Similar Plants - Resembles other thistle species, but nodding head is unmistakable.

Origin - Introduced from Europe and Asia.

Information and resources provided by TN & SE Exotic Pest Plant Councils (tneppc.org and se-eppc.org), Plant Conservation Alliance-Alien Plant Working Group, The Nature Conservancy, and the USDA

Musk Thistle



Yellow and White Sweet Clover



Treatment Methods

(continued)

Frill Method: Using an axe or similar cutting tool, make continuous cuts around the base of the stem. The cuts should angle downward, be less than 2.5 cm (1 in) apart, and extend into the sapwood. Apply the recommended herbicide to the entire cut area to the point of over flow.

Cut Stump Method: Horizontally cut stems at or near ground level; all cuts should be level, smooth, and free of debris. Immediately apply the herbicide to the outer 20% (cambial area) of the stump; delayed treatment may reduce the effectiveness of treatment.

Basal Bark Treatments - Basal bark treatments are effective for controlling woody vines, shrubs, and trees. Treatments can be made any time of year, including the winter months, except when snow or water prevent spraying the basal parts of the stem. Proper plant identification is crucial during the dormant season due to the absence of foliage.

Apply herbicide with a backpack sprayer using low pressure (20-40 psi) with a straight stream or flat fan tip. To control vegetation with a basal stem diameter of less than 7.6 cm (3.0 in) apply specified herbicide-oil mixture on one side of the basal stem to a height of 15.25 cm (6 in) from the base. Apply herbicide to the point of run-off; within an hour mixture should almost encircle the stem. For stems greater than 7.6 cm (3.0 in) basal diameter or with thick bark, treat both sides of the stem to a basal height of 30.5 cm (12 in) to 61 cm (24 in).

Mowing and Cutting Treatments - This method is appropriate for small initial populations or environmentally sensitive areas where herbicides cannot be used. Stems should be cut at least once per growing season as close to ground level as possible. Repeated mowing or cutting may be required for control.

Hand Pulling Treatments - Plants should be pulled as soon as they are large enough to grasp but before they produce seeds. Seedlings are best pulled after a rain when the soil is loose. The entire root must be removed since broken fragments may resprout. If plants have seed capsules present, they should be bagged and disposed of to prevent seed dispersal. Care should be taken to minimize soil disturbance.