

Common barberry, *Berberis vulgaris*
 Japanese barberry, *Berberis thunbergii*

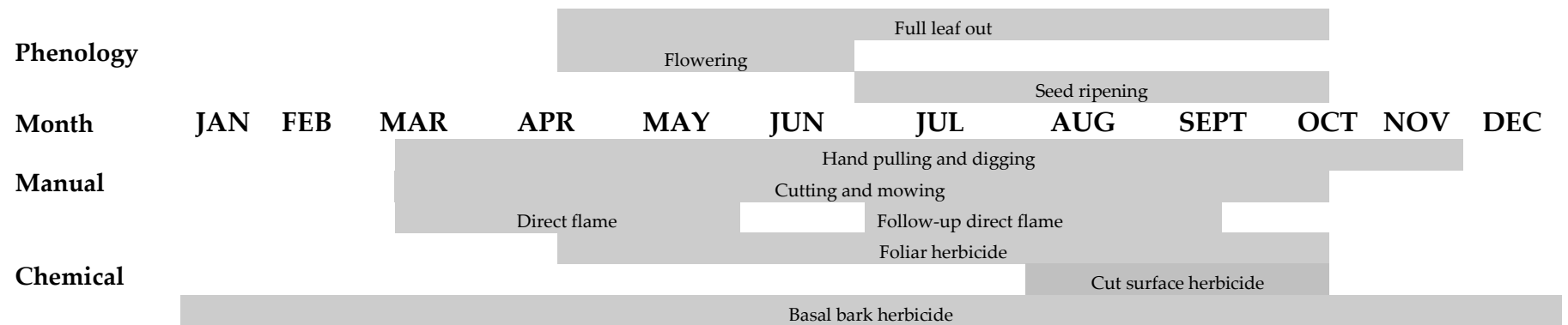
Summary of Treatment Methods:

Habitat: Japanese and Common barberry can aggressively invade in diverse habitats, from wetlands to fields and pastures to upland forests, in both moist and dry soils. As birds carry barberry seeds, it is common to find plants concentrated along tree-lined roadsides and field edges where birds roost. They thrive in sunlight and are tolerant of shade, however common barberry seems to be less shade tolerant than Japanese barberry and is less likely to be found in an interior, closed-canopy forest. Plants growing in dense shade may flower and fruit less heavily than those in more open sites.

Reproductive Strategy: Reproduction is mainly by seed but it can root sprout and layer. Barberry produces a large number of seeds with high germination rates, estimated at up to 90%. Fruits mature from July to October and persist well into the winter. Fruit production varies with light level, but even under very low light levels (4% full sun) some seeds are produced.

Dispersal: Barberry has a very steep seed dispersal curve—most seedlings are found under or adjacent to adults, but a small number may be found tens of meters from the nearest adult. Seeds are disseminated by birds, grouse, turkey and small mammals.

Species Phenology and Treatment Options:



Treatment Methods:

Category	Method	Method Description	Considerations
MANUAL		<ul style="list-style-type: none"> Manual treatment can be highly effective for Japanese and common barberry Japanese and common barberry leaf out very early compared to most native vegetation, thus making them easy to detect It is beneficial to manually remove these plants before they begin fruiting later in the growing season 	
	Hand Pulling	<ul style="list-style-type: none"> Pull entire plant by the base of the stem Be sure to remove entire root system If feasible and fruit is present, bag and dispose of fruits to prevent seed dispersal Dry or burn all vegetation (most importantly roots) by hanging upside down on surrounding vegetation or piling into a brush pile and burning. 	<ul style="list-style-type: none"> Effective on small-medium sized plants and small infestations Most effective if done when soil is wet Remaining portions of roots system not removed can resprout The inner bark and roots of Japanese barberry yellow colored so are easy to identify Use thick gloves when pulling to avoid injury from spines Avoid dragging or piling pulled plants into an area that is currently uninfested
	Weed Wrenching	<ul style="list-style-type: none"> Remove plant by the base of the stem Be sure to remove entire root system If feasible and fruit is present, bag and dispose of fruits to prevent seed dispersal Dry or burn all vegetation (most importantly roots) by hanging upside down on surrounding vegetation or piling into a brush pile and burning. 	<ul style="list-style-type: none"> Can be more helpful than pulling larger plants
	Mowing/ Cutting	<ul style="list-style-type: none"> Use lopper, pruning shears, weed whacker/brush saw or mower to cut the stem as close to the ground as possible Cut at least 1 times during growing season (mid April-mid October) Repeat for 3-5 years 	<ul style="list-style-type: none"> Cutting/mowing can help slow the spread of barberry but will not eradicate it Most effective if followed up with foliar herbicide application or direct flame weeding
	Grazing	<ul style="list-style-type: none"> Might be a viable treatment option for Japanese and common barberry. More research is needed 	
Flame Weeding	<ul style="list-style-type: none"> Use a flame weeder to singe the leaves and the cells of the stem of the plant Hold the flame about 1 foot away from the stem of the plant. Apply the flame for 3-6 seconds or until the internal cells of the stem glow. Apply from two or three directions depending on the size of the plant 	<ul style="list-style-type: none"> Flame weeding is a very successful method for treating Japanese and common barberry Only use this application method during the spring months when the soil and surrounding vegetation is moist to avoid starting a forest fire 	

CHEMICAL	<ul style="list-style-type: none"> Active ingredients commonly used in herbicides: glyphosate and triclopyr 		
	Foliar Application	<i>If foliar spraying only:</i> <ul style="list-style-type: none"> Foliar spray when plant is fully leafed out (May-October) Spray leaf surfaces with low volume backpack sprayer, or high volume mist blower 	<i>Low Volume Backpack Sprayer</i> <ul style="list-style-type: none"> Herbicides (active ingredient): glyphosate or triclopyr with surfactant Used to target barberry plants and minimize drift to desirable species
		<i>If cutting and foliar spraying:</i> <ul style="list-style-type: none"> Use lopper, pruning shears, weed whacker/brush saw or mower to cut the stem as close to the ground as possible Cut during early growing season (April and May) Spray sprouts with a low volume backpack sprayer during late growing season (September and October) 	<i>High Volume Mist Blower</i> <ul style="list-style-type: none"> Herbicides (active ingredient): glyphosate or triclopyr with surfactant Used for very larger and dense infestations that have little desirable, native vegetation that will be damaged by drift
	Cut Stump	<ul style="list-style-type: none"> Cut stems 2-4" above the ground in late summer to early fall Apply herbicide immediately after cutting the exposed surface using a sponge, brush, hand-held squirt bottle or directly pouring Apply herbicide to at least the outer 20% of the surface Monitor and do follow up treatment as the following year and as necessary 	<ul style="list-style-type: none"> Herbicides (active ingredient): glyphosate or triclopyr used with surfactant Multiple stems of Japanese barberry can make this application method very labor intensive but is recommended for larger plants
Basal Bark	<ul style="list-style-type: none"> Use a low pressure, low volume backpack sprayer Apply herbicide around the entire circumference of the lower 8-18" of individual stems of the plant and include the root collar Larger stems require a larger (18") treatment area Do not spray to the point of runoff 	<ul style="list-style-type: none"> Herbicides (active ingredient): triclopyr in an oil or oil-water mixture Used to target barberry plants and minimize drift to desirable species Multiple stems of Japanese barberry can make this application method more labor intensive and less efficient than foliar application 	



The Connecticut Agricultural Experiment Station

123 HUNTINGTON STREET, P.O. BOX 1106, NEW HAVEN, CONNECTICUT 06504

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PRESS RELEASE

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MEDIA CONTACTS:

Dr. Scott C. Williams
Center for Vector Biology & Zoonotic Diseases
The Connecticut Agricultural Experiment Station
123 Huntington Street
New Haven, CT 06511
Phone: (203) 974-8609
E-mail: scott.williams@ct.gov

Ms. Megan A. Linske
Center for Vector Biology & Zoonotic Diseases
The Connecticut Agricultural Experiment Station
123 Huntington Street
New Haven, CT 06511
Phone: (203) 974-8490
E-mail: megan.linske@ct.gov

CONNECTICUT AGRICULTURAL EXPERIMENT STATION SCIENTISTS REPORT ON A DECADE'S WORTH OF DATA LINKING INCREASED ABUNDANCES OF BLACKLEGGED TICKS WITH THE INVASIVE SHRUB, JAPANESE BARBERRY.

New Haven, CT – In the most recent issue of the journal *Environmental Entomology*, The Connecticut Agricultural Experiment Station's (CAES) Dr. Scott Williams, Ms. Megan Linske, and Dr. Jeffrey Ward linked increased abundances of blacklegged (aka "deer") ticks (*Ixodes scapularis*) with the invasive shrub Japanese barberry (*Berberis thunbergii*). Japanese barberry was brought to the eastern United States in the late 1800s as a replacement for common barberry (*Berberis vulgaris*) in landscape plantings. Unfortunately, it escaped from cultivation and now grows wild throughout Connecticut's woodlands. Its dense thickets prevent native trees and wildflowers from regenerating and also create a humid environment under which ticks thrive. The CAES research team discovered there are significantly higher abundances of ticks infected with the causal agent of Lyme disease, *Borrelia burgdorferi*, in Japanese barberry-infested forests than in forests without barberry. The team also found that managing barberry can significantly reduce tick abundances for up to 5 years.

The implications of this research are that this invasive plant is altering native Connecticut ecosystems and perpetuating populations of blacklegged ticks which harbor disease agents that can have negative consequences on the health of the Connecticut public. Information on Japanese barberry management can be found at:

http://www.ct.gov/caes/lib/caes/documents/publications/special_bulletins/special_bulletin_feb_2013_ward.pdf

Phone: (203) 974-8500 Fax: (203) 974-8502

Toll Free: 1-(877) 855-2237

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If you find a tick feeding on you or a family member, it can be submitted to the CAES Tick Testing Laboratory where it will be tested, free of charge, for the pathogens that cause Lyme disease, anaplasmosis, and babesiosis. See: <http://www.ct.gov/caes/cwp/view.asp?a=2837&q=378220>.

The best way to avoid tick-borne disease is prevention. Do a tick check every night. While bathing won't wash feeding ticks away, it does provide the opportunity to search for ticks. After coming inside from tick-infested forests, tumbling clothing in the dryer on high heat for 10 minutes will dry out and kill any ticks that may be attached. The Centers for Disease Control and Prevention recommend using permethrin or at least 20% DEET for repelling ticks. For more information see: https://www.cdc.gov/lyme/prev/on_people.html.

Reference:

Williams, S. C., M. A. Linske, and J. S. Ward. 2017. Long-term effects of *Berberis thunbergii* (Ranunculales: Berberidaceae) management on *Ixodes scapularis* (Acari: Ixodidae) abundance and *Borrelia burgdorferi* (Spirochaetales: Spirochaetaceae) prevalence in Connecticut, USA. doi: 10.1093/ee/nvx146. <https://academic.oup.com/ee/article/doi/10.1093/ee/nvx146/4159248/Long-Term-Effects-of-Berberis-thunbergii>



Japanese barberry (*Berberis thunbergii*) - Photo credit: Dr. Jeffrey Ward, CAES

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Shrub Honeysuckles

Amur honeysuckle, *Lonicera maackii*

Morrow's honeysuckle, *Lonicera morrowii*

Tartarian honeysuckle, *Lonicera tatarica*

Bell's honeysuckle, *Lonicera x bella*

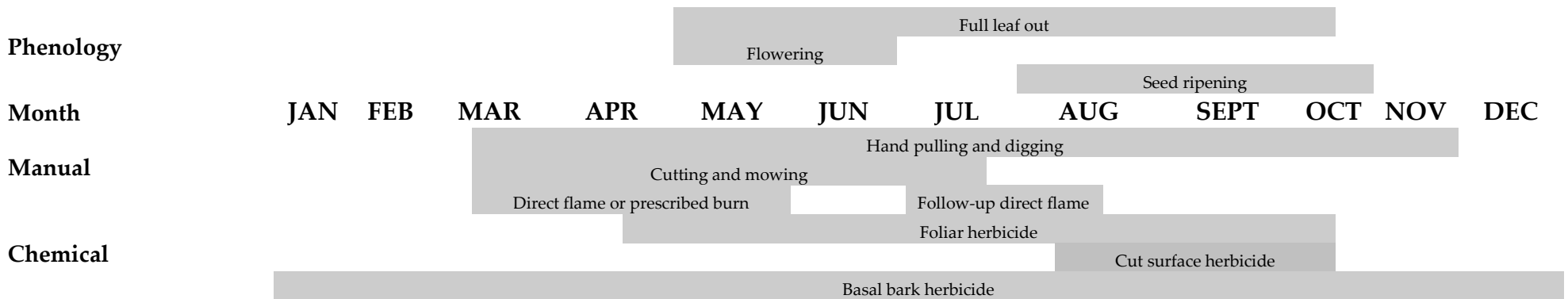
Species Biology and Phenology:

Habitat: Shrub honeysuckles can be found in forests, abandoned fields, open woodlands, and along roadsides and forest edges. They can also tolerate wet soils and invade places such as bogs, fens and lake shores. They are relatively shade tolerant but are more vigorous in full sun.

Reproductive Strategy: Shrub honeysuckles reproduce mainly by seed but some vegetative re-sprouting can occur in established populations. Plants mature between 3-5 years of age. Each plant produces thousands of berries as fruit, and each fruit contains 2-6 seeds. Seeds can remain viable for 3-5 years.

Dispersal: Seeds are mostly dispersed by birds that eat the berries. Despite providing the bird with feeling full, shrub honeysuckle berries provide little to no nutritional value for birds.

Species Phenology and Treatment Options:



Summary of Treatment Methods:

Category	Method	Method Description	Considerations
MANUAL	Manual treatment can be highly effective for honeysuckle		
	Hand Pulling	<ul style="list-style-type: none"> • Pull entire plant by the base of the stem • Be sure to remove entire root system • If feasible and fruit is present, bag and dispose of fruits to prevent seed dispersal • Dry or burn all vegetation (most importantly roots) by hanging upside down on surrounding vegetation or piling into a brush pile and burning 	<ul style="list-style-type: none"> • Effective on small-medium sized plants and small infestations • Most effective if done when soil is wet • Remaining portions of roots system not removed can re-sprout • Avoid dragging or piling pulled plants into an area that is currently uninfested
	Weed Wrenching/Honeysuckle Popper	<ul style="list-style-type: none"> • Remove plant by the base of the stem • Be sure to remove entire root system • If feasible and fruit is present, bag and dispose of fruits to prevent seed dispersal • Dry or burn all vegetation (most importantly roots) by hanging upside down on surrounding vegetation or piling into a brush pile and burning 	<ul style="list-style-type: none"> • Can be more helpful than pulling larger plants
	Mowing/Cutting	<ul style="list-style-type: none"> • Use lopper, pruning shears, weed whacker/brush saw or mower to cut the stem as close to the ground as possible • Cut at least 1 times during growing season (mid May-October) • Repeat for 3-5 years 	<ul style="list-style-type: none"> • Cutting/mowing can help slow the spread of honeysuckle • Cutting/mowing will encourage re-sprouting and may need to be conducted for 3-5 years to fully exhaust root system and kill plant • Most effective if followed with foliar herbicide application
	Grazing	Grazing goats or other heard animals might be a viable treatment option. More research is needed.	
	Flame Weeding	Might be a viable treatment option for this plant, especially for young plants or sprouts of cut plants. More research is needed.	
CHEMICAL	Active ingredient commonly used in herbicides: glyphosate or triclopyr		
	Foliar Application	<p><i>If foliar spraying only:</i></p> <ul style="list-style-type: none"> • Foliar spray when plant is fully leafed out (May-October) • Spray leaf surfaces with low volume backpack sprayer, or high volume mist blower 	<p><i>Low Volume Backpack Sprayer</i></p> <ul style="list-style-type: none"> • Herbicides (active ingredient): glyphosate or triclopyr with surfactant • Used to target honeysuckle plants and minimize drift to desirable species

	<p><i>If cutting and foliar spraying:</i></p> <ul style="list-style-type: none"> • Use lopper, pruning shears, weed whacker/brush saw or mower to cut the stem as close to the ground as possible • Cut during early growing season (April and May) • Spray sprouts with a low volume backpack sprayer during late growing season (September and October) or the following year 	<p><i>Low Volume Motorized Mist Blower</i></p> <ul style="list-style-type: none"> • Herbicides (active ingredient): glyphosate or triclopyr with surfactant • Used for very larger and dense infestations that have little desirable, native vegetation that will be damaged by drift
Cut Stump	<ul style="list-style-type: none"> • Cut stems 2-4" above the ground in late summer to early fall • Apply herbicide immediately after cutting the exposed surface using a sponge, brush, hand-held squirt bottle or directly pouring • Apply herbicide to at least the outer 20% of the surface • Monitor and do follow up treatment the following year and as necessary 	<ul style="list-style-type: none"> • Herbicides (active ingredient): glyphosate or triclopyr mixed with surfactant
Basal Bark	<ul style="list-style-type: none"> • Use a low pressure, low volume backpack sprayer • Apply herbicide around the entire circumference of the lower 8-18" of individual stems of the plant and include the root collar • Larger stems require the larger (18") treated area • Do not spray to the point of runoff 	<ul style="list-style-type: none"> • Herbicides (active ingredient): triclopyr in an oil or oil-water mixture • Recommended for scattered or light infestations of large plants • Used to target honeysuckle plants and minimize drift to desirable species
Cut Surface	<ul style="list-style-type: none"> • Cut stems 2-4" above the ground • Apply herbicide up to one month following cutting using a sprayer, hand-held squirt bottle or directly pouring • Apply herbicide around the entire circumference of the cut surface until wet • Do not apply herbicide until the point of runoff 	<ul style="list-style-type: none"> • Herbicides (active ingredient): triclopyr in an oil or oil-water mixture • Recommended for scattered or light infestations of large plants • Used to target honeysuckle plants and minimize drift to desirable species