

## Ohio Invasive Plant Assessment Protocol

Botanical Name: *Euonymus fortunei*  
 Common Name: Wintercreeper  
 Family Name: Celastraceae  
 Posted Date: 7/20/16  
 Initial assessment conducted by: Theresa Culley

Step I Outcome: **Invasive**  
 Step II Score: **45**  
 Step II Outcome: **Invasive**

**Score**                      **Notes**                      **References**

*Directions: Place an "X" in the Score column next to the selected answer to each of the four questions.*

<b>Step I</b>	<b>1. Is this plant known to occur in the state and listed as "noxious" on any federal or Ohio Department of Agriculture plant list?</b>	Yes. Place on invasive plant list, no further investigation needed. <b>STOP</b>			
		No. Continue on to question 2.	x		
	<b>2. Has this plant demonstrated widespread dispersion and establishment (i.e. high numbers of individuals forming dense stands) in natural areas across two or more regions in Ohio?<sup>a</sup></b>	Yes. Place on invasive plant list, no further investigation needed. <b>STOP</b>	x	In regions 3,4,5 but pop sizes are not given. also in region 1	1,2
		No. Continue on to question 3.			
	<b>3. Does this plant form self-replicating populations outside of cultivation in Ohio and is it documented to alter the composition, structure, or normal processes or functions of a natural ecosystem?</b>	Yes		3=>"reduces native diversity";	1,2,3,4,5
		No		4=>displaces herbs and seedlings, and grows on trees; 5=>outcompetes existing vegetation, spreads rapidly, reduces spring ephemerals, becomes a monoculture, replacing native groundcover species.	
		Unknown	x		
	<b>4. Is the plant listed as invasive in an adjoining state or a nearby state east of the Mississippi within the USDA Plant Hardiness zones 5-6?<sup>b,c</sup></b>	Yes			6,7
		No	x	On "watch list" in PA [and listed in KY, but not counted here]	
		Unknown			

*If the answer was yes for both questions 3 and 4, the plant is placed on the invasive plant list and no further research is needed. Stop here. If the answer is no for both questions 3 and 4, the plant is not considered invasive and no further investigation is warranted. Otherwise,*

### Step II: Invasion Status

*Directions: Place the appropriate numerical score (or "U") in the Score column next to the selected answer to each of these 18 questions.*

<b>1. Current Invasion in Ohio</b>	- plant is not found in natural areas ( <b>0 pts.</b> )	3	Along with 1,2, A. Mastalerz has personally observed sp. growing in natural areas away from planting (MS thesis). 17=> "Winter creeper is native to China, Korea, and Japan. It was introduced into the U.S. in 1907 as an ornamental groundcover"	1,2,8,17
	- plant is found in natural areas but only because it persist from previous planting in that location (e.g. old home sites) ( <b>0 pts.</b> )			
<b>2. State Distribution<sup>a</sup></b>	- plant is only expanding from sites of previous planting ( <b>1 pt.</b> )	5	In regions 1,3,4,5; 15 => extensive in areas of southwestern OH and escaped cultivation in Ohio by 1961 (cites Braun).	1,2,15
	- plant occurs in natural areas away from site of planting ( <b>3 pts.</b> )			
	- Information unknown ( <b>U</b> )			
	- plant is not naturalized in any region of Ohio ( <b>0 pts.</b> )			
	- plant is naturalized in only one region in Ohio ( <b>1 pt.</b> )			
	- plant is naturalized in two regions in Ohio ( <b>2 pts.</b> )			
<b>3. Regional/US Distribution</b>	- plant is naturalized in three regions in Ohio ( <b>3 pts.</b> )			
	- plant is naturalized in four regions in Ohio ( <b>4 pts.</b> )			
	- plant is naturalized in five regions in Ohio ( <b>5 pts.</b> )			

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<ul style="list-style-type: none"> <li>- plant is not considered to be a problem in any other state (0 pts.)</li> <li>- plant has been reported as a widespread problem in another non-neighboring state within the USDA Plant Hardiness Zones 5-6 (1 pt.)</li> <li>- plant has been reported to be a widespread problem in 1-2 adjoining states (3 pts.)</li> <li>- plant has been reported to be a widespread problem in 3 or more adjoining states (5 pts.)</li> <li>- plant has been reported to be a widespread problem in similar habitat outside the US (1 pt.)</li> <li>- Information unknown (U)</li> </ul>	3	PA [also in KY but not counted here] 16 => is also considered an invasive problem in China.	6,7,16
<b>Step II: Biological Characters</b>			
<b>4. Vegetative Reproduction</b> <ul style="list-style-type: none"> <li>- no vegetative reproduction (0 pts.)</li> <li>- reproduces readily within the original site (1 pt.)</li> <li>- has runners or spreading rhizomes that root easily (3 pts.)</li> <li>- fragments easily and fragments can be easily dispersed (4 pts.)</li> <li>- has runners or spreading rhizomes that root easily AND fragments easily and fragments can be easily dispersed (5 pts.)</li> <li>- Information unknown (U)</li> </ul>	3	stolons; 9=> spreads vegetatively by lateral shoots; new plants can also develop from stem fragments. 17=>"New plants can also develop from stem fragments that have developed adventitious roots."	4,5,9,17
<b>5. Sexual Reproduction</b> <ul style="list-style-type: none"> <li>- no sexual reproduction (0 pts.)</li> <li>- infrequent sexual reproduction (1 pt.)</li> <li>- frequent sexual reproduction, but high variation among years in seed production (3 pts.)</li> <li>- frequent sexual reproduction (one or more events per year) (5 pts.)</li> <li>- Information unknown (U)</li> </ul>	1	5=>plant only fruits when it tops a tree, persistent seed production when mature; 10=> "groundcover populations seldom flower and fruit; however climbing stems produce long-stalked clusters of four-petaled flowers in June."; 11=>flowers only on adult types, June-July; [Because sexual reproduction only occurs when adult vines climb a tree, the score here is conservative at 1pt.); 17=> flowers only when it tops a tree.	5,10,11,17
<b>6. Number of Viable Seeds or Propagules per Plant</b> <ul style="list-style-type: none"> <li>- few (0-10) (1 pt.)</li> <li>- moderate (11-1,000) (3 pts.)</li> <li>- prolific (&gt;1,000) (5 pts.)</li> <li>- Information unknown (U)</li> </ul>	3	9=> fruits mature Sept-Nov and each contains one seed; 11=> states the a capsule produces "seeds".	9
<b>7. Flowering Period</b> <ul style="list-style-type: none"> <li>- one month or less per year (0 pts.)</li> <li>- two months (1 pt.)</li> <li>- three to five months (2 pts.)</li> <li>- longer than five months (3 pts.)</li> <li>- Information unknown (U)</li> </ul>	1	9=> reproduces "May-July" [but flowering only occurs when vine climbs upwards into sunlight]; 10=> flowers in June (in Brooklyn, NY); 17=> flowers in IL from May-July with fruits Sept-Nov.	5,9,17
<b>8. Dispersal Ability</b> <ul style="list-style-type: none"> <li>- low potential for long-distance seed/propagule dispersal (&gt;1km) (0 pts.)</li> </ul>		Seeds dispersed by birds, other	

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Step II				
	<ul style="list-style-type: none"> <li>- medium potential for long-distance seed/propagule dispersal (3 pts.)</li> <li>- high potential for long-distance seed/propagule dispersal (5 pts.)</li> <li>- Information unknown (U)</li> </ul>	5	15=> seeds are bird-dispersed. 17=>seeds are red to orange in color.	5,9,10,15,17
	<b>9. Generation Time</b> <ul style="list-style-type: none"> <li>- long juvenile period (&gt;5 or more years for trees, 3 or more years for other growth forms) (0 pts.)</li> <li>- short juvenile period (&lt;5 years for trees, &lt;3 years for other forms) (3 pts.)</li> <li>- Information unknown (U)</li> </ul>	0	No data found to make accurate answer...plant apparently must be growing upwards (vines along ground, rarely if ever, produce seed) and reach stem diameter of 1cm. No evidence on how long it takes to do this.	no data found
	<b>10. Establishment</b> <ul style="list-style-type: none"> <li>- unable to invade natural areas (0 pts.)</li> <li>- can only colonize certain habitat stages (e.g. early successional habitats) (1 pt.)</li> <li>- aggressively colonizes and establishes in edge habitats (3 pts.)</li> <li>- aggressively colonizes and establishes in intact and healthy natural areas (6 pts.)</li> <li>- Information unknown (U)</li> </ul>	6	9=>Can invade forests and also recently burned areas.	3,4,5,9
	<b>Step II: Ecological Importance</b>			
	<b>11. Impact on Ecosystem Processes</b> <ul style="list-style-type: none"> <li>- no known effect on ecosystem-level processes (0 pts.)</li> <li>- moderate effects on ecosystem-level processes (e.g., changes in nutrient cycling)(3 pts.)</li> <li>- causes long-term, substantial alterations in the ecosystem (e.g., changing fire regime of an area, changing hydrology of wetlands) (6 pts.)</li> </ul>	3	3=>"reduces native diversity"; 4=>displaces herbs and seedlings, and grows on trees; 5=>outcompetes existing vegetation, spreads rapidly, reduces spring ephemerals, becomes a monoculture, replacing native groundcover species; 9=> depletes soil moisture and nutrients, blocks sunlight and can overtop trees, shrubs and groundlayer species, causing their death; 12=>can change soil microbial communities (compared to native sp). 21=>plant changes the composition of the soil eubacterial community.	3,4,5,9,12,21
	<b>12. Impact on Rare Organisms</b> <ul style="list-style-type: none"> <li>- no known negative impact on Ohio State-listed or federal-listed plants or animals (0 pts.)</li> <li>- negatively impacts listed species, such as through displacement or interbreeding (3 pts.)</li> </ul>	0		no evidence
	<b>13. Impact on Native Animals</b> <ul style="list-style-type: none"> <li>- no known negative impact on animals (0 pts.)</li> <li>- documented direct or indirect negative effects on animal taxa (3 pts.)</li> </ul>	0	10=>suggests that vine causes loss of landscape diversity that means less food and shelter for butterflies but no empirical data to support this.	10

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### 14. Impact on Native Plants

- no known negative effects on native plants (0 pts.)
- negatively impacts some native plants (increasing their mortality and/or recruitment of certain taxa) (3 pts.)
- impacts native plants to such an extent that community structure is greatly altered (6 pts.)

3=>"reduces native diversity";  
 4=>displaces herbs and seedlings, and grows on trees; 5=>outcompetes existing vegetation, spreads rapidly, reduces spring ephemerals, becomes a monoculture, replacing native groundcover species. 9=> blocks sunlight and can overtop trees, shrubs and groundlayer species, causing their death. 14 => "Euonymus invasion limits recruitment of native plant species from seed" and can displace native species (see refs). 15 => "chokes out native species (Homoya 2012)." 17=> can grow over trees and shade them, ultimately killing them. 19=>"forms dense mats on the forest floor, covers trees, and reduces native diversity (Swearingen et al. 2010; Hutchison 1992; Schwegman 1996)."

3,4,5,9,14,15,17,19

3

### 15. Hybridization

- no known instances of hybridization with other plant species (0 pts.)
- can hybridize with native Ohio plants or commercially-available species, but seeds are inviable (1 pt.)
- can hybridize with native Ohio plants or commercially-available species, producing viable seed (3 pts.)

0

no evidence

### 16. Population Density

- occurs only as small, sporadic populations or individuals (1 pt.)
- typically forms small, monospecific patches (3 pts.)
- is a dominant plant in area where population occurs (absolute cover 15-50%) (4 pts.)

Along with ref 5, A. Mastalerz has observed naturalized pops occurring at

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- forms an extensive, monospecific stand (absolute cover >50%) (5 pts.)

4

50-100% abundance, but have observed it most often accounting for 15-50% cover. 17=> In IL, "Once established, winter creeper forms dense colonies of trailing and climbing vines that root at the node."  
 18=>"Euonymus fortunei and Asarum canadense, are monoculture forming species. We found that Euonymus participated in neutral feedbacks at high and intermediate light levels (;50% and ;25% of full sun) and trended towards positive feedbacks at low light levels." 19=>"Euonymus grew better in soil conditioned by conspecifics than in soil conditioned by Asarum."  
 20=>species does not have the same environmental constraints that limit the growth of other plant species.

5,8,17,18,19,20

### 17. Role in Succession in Natural Areas

- successional information is unknown (0 pts.)
- is an early successional species that temporarily invades a disturbed site but does not persist as the site matures (0 pts.)
- readily invades disturbed sites and persists, but does not interfere with succession (1 pt.)
- readily invades disturbed sites, persists and interferes with succession of native plants (4 pts.)

4

5=>"Observations by Hutchinson in IL suggest that invasive pops of wintercreeper may alter successional trajectories because it spreads rapidly and replaces spring ephemerals. In mesic and dry-mesic woods at Fern Rocks Nature Preserve, wintercreeper covered the ground and eliminated native groundcover species in many places. Observations by managers in KY indicate that invasive, groundcover populations of wintercreeper can establish monocultures in which native species are excluded."

5

### 18. Number of Habitats Invaded

**Forestlands:** Floodplain forest, hemlock-hardwood forest, mixed mesophytic forest, beech-maple forest, oak-maple forest, oak-hic  
**Grasslands:** Alvar\*, beach-dune community\*, bur oak savanna\*, slough-grass-bluejoint prairie\*, sand barren\*, big bluestem  
**Wetlands:** Bog\*, fen\*, twigrush-wiregrass wet prairie\*, marsh, buttonbush swamp, mixed shrub swamp, hemlock-hardwood  
 \* Considered a rare plant community in Ohio by ODW's Biodiversity Database Program.

- + = xeric limestone prairies or cedar glades and post oak openings are unique to the Interior Low Plateau Region of Adams,
- not found in any natural habitats in Ohio (0 pts.)
  - only found in 1 broad category (1 pt.)
  - found in 2 broad categories or 2 rare habitat types (3 pts.)
  - found in 3 broad categories or 3 rare habitat types (4 pts.)

5 => Oak savannah, bluestem prairie, oak woodland, various mixed hardwood forests, oak pine (sectors dry wood) 0

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- found in 4 or more rare habitat types (5 pts.)

1

forests, oak-pine (eastern dry-xeric), 9  
 => forest margins and openings,  
 recently burned areas, floodplain  
 forests, near lawns, rarely a problem in  
 prairies. 17 => mainly found in forests  
 and forest edges. 20=>"This invader  
 thrives in conditions from full sun to full  
 shade, and invades many forest types,  
 including floodplains, mesic forests, and  
 dry forests (Hutchison 1992)."

5,9,17,20

**Total Score:** 45  
**Number of Unknowns:** 0  
**Outcome:** Invasive

Total Points	Assessment Decision
4 or more U	Insufficient Data
0-34	Not Known to be Invasive
35-44	Pending Further Review
45-80	Invasive