**Ohio Invasive Plant Assessment Protocol**

<table>
<thead>
<tr>
<th>Botanical Name:</th>
<th>Celastrus orbiculatus</th>
<th>Score</th>
<th>Notes</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name:</td>
<td>Oriental Bittersweet</td>
<td></td>
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<tr>
<td>Family Name:</td>
<td>Celastraceae</td>
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<tr>
<td>Assessment conducted by:</td>
<td>OIPC Team</td>
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</tbody>
</table>

**Step I: Outcome**  
**Step II Score:** 59  
**Step II Outcome:** Invasive

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

1. Is this plant known to occur in the state and listed as “noxious” on any federal or Ohio Department of Agriculture plant list?  
   - Yes. Place on invasive plant list, no further investigation needed. **STOP**  
   - No. Continue on to question 2.

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?*  
   - Yes. Place on invasive plant list, no further investigation needed. **STOP**  
   - No. Continue on to question 3.

3. Does this plant form self‐replicating populations outside of cultivation, structure, or normal processes or functions of a natural ecosystem?  
   - Yes  
   - No  
   - Unknown

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?*  
   - Yes  
   - No  
   - Unknown

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**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.

1. Current Invasion in Ohio  
   - plant is not found in natural areas (0 pts.)  
   - plant is found in natural areas but only because it persist from previous planting in that location (e.g. old home sites) (0 pts.)  
   - plant is only expanding from sites of previous planting (1 pt.)  
   - plant occurs in natural areas away from site of planting (3 pts.)  
   - Information unknown (U)

   **Score:** 3

2. State Distribution*
- plant is not naturalized in any region of Ohio (0 pts.)
- plant is naturalized in only one region in Ohio (1 pt.)
- plant is naturalized in two regions in Ohio (2 pts.)
- plant is naturalized in three regions in Ohio (3 pts.)
- plant is naturalized in four regions in Ohio (4 pts.)
- plant is naturalized in five regions in Ohio (5 pts.)
- Information unknown (U)

3. Regional/US Distribution
- plant is not considered to be a problem in any other state (0 pts.)
- plant has been reported as a widespread problem in another non-neighboring state within the USDA Plant Hardiness Zones 5-6 (1 pt.)
- plant has been reported to be a widespread problem in 1-2 adjoining states (3 pts.)
- plant has been reported to be a widespread problem in 3 or more adjoining states (5 pts.)
- plant has been reported to be a widespread problem in similar habitat outside the US (1 pt.)
- Information unknown (U)

### Step II: Biological Characters

**4. Vegetative Reproduction**
- no vegetative reproduction (0 pts.)
- reproduces readily within the original site (1 pt.)
- has runners or spreading rhizomes that root easily (3 pts.)
- fragments easily and fragments can be easily dispersed (4 pts.)
- has runners or spreading rhizomes that root easily AND fragments can be easily dispersed (5 pts.)
- Information unknown (U)

**5. Sexual Reproduction**
- no sexual reproduction (0 pts.)
- frequent sexual reproduction, but high variation among years in seed production (3 pts.)
- frequent sexual reproduction (one or more events per year) (5 pts.)
### 6. Number of Viable Seeds or Propagules per Plant

- **few (0-10) (1 pt.)**
  - Information unknown (U)

- **moderate (11-1,000) (3 pts.)**

- **prolific (>1,000) (5 pts.)**
  - Information unknown (U)

### 7. Flowering Period

- **one month or less per year (0 pts.)**
- **two months (1 pt.)**
- **three to five months (2 pts.)**
- **longer than five months (3 pts.)**
  - Information unknown (U)

### 8. Dispersal Ability

- **low potential for long-distance seed/propagule dispersal (>1km) (0 pts.)**

- **medium potential for long-distance seed/propagule dispersal (3 pts.)**

- **high potential for long-distance seed/propagule dispersal (5 pts.)**
  - Information unknown (U)

### 9. Generation Time

- **long juvenile period (>5 or more years for trees, 3 or more years for other growth forms) (0 pts.)**
- **short juvenile period (<5 years for trees, <3 years for other forms) (3 pts.)**
  - Information unknown (U)

### 10. Establishment

- **unable to invade natural areas (0 pts.)**

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<table>
<thead>
<tr>
<th>4,5,6,30</th>
<th>3,5,9,10,11</th>
<th>8,30</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,&quot;prolific&quot; but no # given. 6,seed germination rates are high for this sp., in both shade and lightened settings, but no numbers given. 30,mean number of seeds per fruit is 4.1 in Indiana. [Due to the lack of actual numbers for OH, the response is 'moderate' to err on the conservative side...This answer may change to 'prolific' with more evidence.]</td>
<td>species has long range dispersal b/c many birds eat fruit; 9,&quot;long range dispersal&quot;; 6,seeds are dispersed by birds and mammals (and humans) and that avian consumption aids seed dispersal; 10, &quot;fruits are eaten by birds which provide more widespread dispersal.&quot;</td>
<td>species matures in 2 years</td>
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11. Impact on Ecosystem Processes

**Step II: Ecological Importance**

- can only colonize certain habitat stages (e.g. early successional habitats) (1 pt.)
- aggressively colonizes and establishes in edge habitats (3 pts.)
- aggressively colonizes and establishes in intact and healthy natural areas (6 pts.)
- Information unknown (U)

<table>
<thead>
<tr>
<th>Impact on Ecosystem Processes</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>- no known effect on ecosystem-level processes (0 pts.)</td>
<td>6</td>
</tr>
<tr>
<td>- moderate effects on ecosystem-level processes (e.g., changes in nutrient cycling) (3 pts.)</td>
<td>2,6,9,10,14,15,21,24,26</td>
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</table>

Will germinate in low light (forest interior) areas and persists "indefinitely" until environmental conditions change (canopy gap) and then it grows aggressively; 9=>can establish in a multitude of

- can only colonize certain habitat stages [e.g. early successional habitats] (1 pt.)
- aggressively colonizes and establishes in edge habitats (3 pts.)
- aggressively colonizes and establishes in intact and healthy natural areas (6 pts.)
- Information unknown (U)
12. Impact on Rare Organisms
- no known negative impact on Ohio State-listed or federal-listed plants or animals (0 pts.)
- negatively impacts listed species, such as through displacement or interbreeding (3 pts.)

13. Impact on Native Animals
- no known negative impact on animals (0 pts.)
- documented direct or indirect negative effects on animal taxa (3 pts.)

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.)

6=> overtops plants, shading them out. Also trees more susceptible to wind throw by increasing the canopy weight, which in turn, increases the disturbance rates of the forest. 7=> highly competitive with native veg. 2,4,9=> might hybridize with native bittersweet ("threatens genetic integrity"). 14=> in the presence of mycorrhizae or sufficient phosphorus, C. orbiculatus can respond by preferentially allocating energy to above-ground growth, thus supporting its liana growth form onto trees and allowing the exotic to overcompensate for damage and have higher growth rates after clipping (simulated herbivory). 6=> "exhibits a 'sit and wait' strategy by establishing and persisting indefinitely in undisturbed, closed canopy forest and responding to canopy disturbance with rapid growth, often overtopping trees." 25=> "Plots with C. orbiculatus had significantly higher soil pH, potassium, calcium and magnesium levels. Furthermore, nitrogen mineralization and litter decomposition rates were higher in plots with C. orbiculatus."
outcompete native species for light resources."
16=> in comparison to native American bittersweet, this species achieved greater biomass and retained leaves longer. 22=> vine decreases growth of native tree species on which it twines. 28=> vine can strangle trees, often leading to their death.

- impacts native plants to such an extent that community structure is greatly altered (6 pts.)

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.)

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

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.)
- readsilvies disturbed sites and persists, but does not interfere with succession (1 pt.)

8=> a female C. scandens was pollinated by C. orbiculatus in a controlled experiment. Viable seed was produced from the cross. 2,4,9=>might
Invasive Total Points Assessment

<table>
<thead>
<tr>
<th>Total Points</th>
<th>Assessment Decision</th>
</tr>
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<tbody>
<tr>
<td>4+</td>
<td>Insufficient Data</td>
</tr>
<tr>
<td>0-34</td>
<td>Not Known to be Invasive</td>
</tr>
<tr>
<td>35-44</td>
<td>Pending Further Review</td>
</tr>
<tr>
<td>45-80</td>
<td>Invasive</td>
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</table>

Decision

- readily invades disturbed sites, persists and interferes with succession of native plants (4 pts.)

18. Number of Habitats Invaded

**Forestlands:** Floodplain forest, hemlock-hardwood forest, mixed mesophytic forest, beech-maple forest, oak-maple forest, oak-hickory forest.

**Grasslands:** Alvar*, beach-dune community*, bur oak savanna*, slough-grass-bluejoint prairie*, sand barren*, big bluestem prairie, little bluestem prairie

**Wetlands:** Bog*, fen*, twig rush-wiregrass wet prairie*, marsh, buttonbush swamp, mixed shrub swamp, hemlock-hardwood swamp*, maple-ash-oak

- 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, Highland and Pike counties,
- 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.)

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

Total Score: 59

Number of Unknowns: 0

Outcome: Invasive