

Ohio Invasive Plant Assessment Protocol

Botanical Name: *Elaeagnus umbellata*
 Common Name: Autumn Olive
 Family Name: Elaeagnaceae
 Assessment conducted by: OIPC Team

Step I Outcome: **Invasive**
 Step II Score: **63**
 Step II Outcome: **Invasive**

Score

Notes

References

Step I

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.

X

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

x

1=> species has naturalized in all 5 regions.
 2=> species has been observed as naturalized in counties in all five regions.
 3=> Only 19 of 88 counties do not have species occurring in natural (non-landscaped) areas.

1,2,3

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?
 Yes
 No
 Unknown

x

1,2,3,4=> self-replicating populations.
 4=>populations can become dense thickets, displacing native plants, also, could potentially change soil nitrogen levels, impacting habitats that are infertile soil dependent.

1,2,3,4

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?^{b,c}
 Yes
 No
 Unknown

x

IN, MI,PA [also in KY, but not included here]

6,7,8,9

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, proceed to Step II.

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)

3

1,2,3,4

2. State Distribution^a

- 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)

5

1,2,3

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)

5

IN, MI,PA [also in KY, but not included here]

6,7,8,9

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 easily and fragments can be easily dispersed (5 pts.)
- Information unknown (U)

0

Can send up root suckers and will vigorously resprout when above ground mass is harmed or removed, but does not have rhizomes or runners.

4

5. Sexual Reproduction

- no sexual reproduction (0 pts.)
- infrequent sexual reproduction (1 pt.)
- frequent sexual reproduction, but high variation among years in seed production (3 pts.)
- frequent sexual reproduction (one or more events per year) (5 pts.)
- Information unknown (U)

5

Prolific seed producer through sexual reproduction.

4

6. Number of Viable Seeds or Propagules per Plant

- few (0-10) (1 pt.)
- moderate (11-1,000) (3 pts.)
- prolific (>1,000) (5 pts.)
- Information unknown (U)

5

4=>66,000 seeds/plant. 18=> in Japan, "for an individual, approximately 10 000 fruits are produced per year (Kohri et al. 2002)" but with "on an "off" years.

4,10,18

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)

1

Two months in most locations, but three months in FL

4

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.)

- can only colonize certain habitat stages (e.g. early successional habitats) (1 pt.)

- aggressively colonizes and establishes in edge habitats (3 pts.)

5

Dispersed by birds and small mammals. 10,23=> bird dispersed. 18=> in Japan, seeds are dispersed by birds, often upwards along waterways; but at least one other citation mentions mammal-dispersal. 19=> both European starlings and American Robins consume autumn olive seeds. 20=> "ingestion by starlings improves germination for both E. umbellata and C. orbiculatus seeds, and that starlings retain seeds long enough for seed dispersal to occur." 24=> "produces large quantities of small fleshy drupes, which are consumed by birds and may be dispersed in great numbers over large distances (Suthers et al. 2000; Ahmad et al. 2006)."

4,5,10,18,19,20,23,24

3

4=> 3-5 years in favorable conditions

4

6

10=> persists in edge and can establish in interior of forests in MI. 13=> densities decreased with increasing distance to the nearest road but the trend was not significant. 15=> "Soil net N mineralization and net nitrification rates were higher under autumn-olive compared with open field." and "increased N levels in soil and soil water indicate that abandoned agroecosystems invaded by autumn-olive may be net sources of N to adjacent terrestrial and aquatic systems rather than net sinks." 16=> "drought and moderately shade tolerant, enabling it to survive on a variety of sites." 17=> lack of deer browsing facilitates invasion of autumn

4, 10,13,15,16,17,21,24,27

Step II

- aggressively colonizes and establishes in intact and healthy natural areas (6 pts.)

- Information unknown (U)

olive, and exhibits greater growth and understory survival than native competitors. 21=> had greater plant weight and fewer leaves lost than paired native species in both the pine barrens and the hardwood forest in NJ. 24=> "Field measurements showed that E. umbellata is able to maintain higher levels of photosynthesis relative to nearby Quercus alba plants, with less water loss." and "it readily colonizes disturbed areas or poor-quality soil where its association with Frankia, a nitrogen-fixing endosymbiont, may confer a unique advantage over other local species." 27=> persists in both edges and interiors of forests in IL.

Step II: Ecological Importance

11. Impact on Ecosystem Processes

- no known effect on ecosystem-level processes (0 pts.)

- moderate effects on ecosystem-level processes (e.g., changes in nutrient cycling)(3 pts.)

- causes long-term, substantial alterations in the ecosystem (e.g., changing fire regime of an area, changing hydrology of wetlands) (6 pts.)

10=> considered allelopathic, it fixes nitrogen, and can form large monocultures, displacing native plant species. 11=> forms dense stands at the expense of native vegetation. 14=> "fixes nitrogen via a symbiotic relationship with the actinomycete Frankia. At the plot scale, the presence of autumn-olive has been related to elevated soil water nitrate-N (NO₃-N) concentrations." In streams, % cover was positively correlated with mean stream NO₃-N concentrations, suggesting additional negative ecosystem consequences of invasion beyond losses in biodiversity."

6

4,10,11,14

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.)

0

No evidence

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.)

- 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.)

0

No evidence (but can cover grasslands, potentially disrupting grassland bird habitat.). 16=> serves as food source for many bird species; can also be browsed upon by white tail deer (but which prefer native species, leading to further invasion of autumn olive). 22=> cicadas tend to prefer native Acer and avoid non-native Elaeagnus; cicadas prefer longer and broader branches for ovipositing (which are found more often in native species)...."because branch structure can differ substantially among host species, our results suggest that periodical cicadas may be sensitive to the changes in plant composition that often result from non-native plant invasions." 26=> there were no negative effects of nesting in autumn olive bushes for catbirds, etc.

16,22,26

6

10=> is allelopathic and changes soil nitrogen, and can create monotypic stands that displace native plants. 11=> forms dense stands at the expense of native vegetation. 25=> autumn olive is allelopathic to some tree seedlings, but not all.

4,10,11,25

0

No evidence

4

4&10=>states that species forms monotypic stands, but total area of stands unclear. 24=> "a deciduous, drought resistant invasive woody species that forms extensive, dense thickets." 27=> in IL, density across edges and interior forests at four sites ranged from 0.15 to 0.98 stems per m2.

4,10,24,27

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.)

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*, twigrush-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, and are not included in Schneider and Cochrane (1997)

- 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.)

4

14=> "it could significantly alter nutrient cycling, inhibit natural succession, and replace native vegetation (U.S. Army Corps of Engineers, 2002; Ehrenfeld, 2003; USDA, 2007)."

4,11,14

5

4=> conifer bog, forests, prairies, savannas; 10=>Forests and grasslands; 11=>prairie, savanna, barren, dune and shore communities.12=> in KY: Disturbed areas, roadsides, pastures, fields, sparse woodlands. 16=> in woodlands, grasslands, abandoned fields, and other disturbed areas. 18=> in Japan, species can be found along gravel bars.

4,10,11,12,16,18

Total Score:

63

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