Ohio Invasive Plant Assessment Protocol - 2015

Botanical Name: *Achyranthes japonica*
Common Name: Japanese chaff flower
Family Name: Amaranthaceae
Assessment conducted by: Allison Mastalerz

Step I Outcome: **Continue**
Step II Score: **42**
Step II Outcome: **Pending Further Review**

Step I

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

		Score	Notes	References
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	Species occurs in 2 regions (4 & 5), but information on individual populations is lacking.	7
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		
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	x		2,3,4,5,6
	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, 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.

	Score	Notes	References
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		9,12
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**)	2	Regions 4 & 5, along the Ohio River (spread from adjoining states)	9,12
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**)	1	It is currently found in nine states (WV, KY, OH, IN, IL, MO, TN, AL, GA). Wisconsin has proposed the plant be prohibited. 11: species is found in Alabama, Georgia, Illinois, Kentucky, Missouri, Ohio, Tennessee, and West Virginia. [This score is conservative and will likely increase with time.]	9,10,11
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.**)	3	9: Stems can be broken by flooding and seed-bearing stems buried in silt can "result in dense patches of seedlings". A	9

Step II	- 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**)	3	previous year's stem can survive the winter. [This score is conservative.]	9
	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**)	3	9: species is a perennial with a subset of plants in each population flowering each year. An individual plant can produce more than 1,000 seeds. 11: the plant can produce up to 16,000 seeds per square meter.	8,9,11
	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	9: An infestation in Cypress Creek National Wildlife Refuge was observed to produce nearly 100% viable seed, with 65% of collected seeds germinating in initial tests.	8,9
	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**)	2	9:"late summer to early fall"	9
	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**)	5	Seeds have stiff bracts that attach to fur and cloth, and can be dispersed through waterways (especially flooding).	8,9
	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**)	3	Species is a perennial, and can take one to two years to reach flowering size from seed. 9: sizes of flowering and non-flowering individuals in the field suggests that "it may take one or two years to reach flowering size from seed".	8,9
	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.**) - aggressively colonizes and establishes in intact and healthy natural areas (**6 pts.**) - Information unknown (**U**)	6	8:"dense infestations have been found in bottomland forests, riverbanks, field edges and ditches". 11: species can easily invade areas and displace native species.	8,9,11
	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.**)	U	Species creates vigorous root systems and dense populations, but its ecological impacts have not been studied.	
	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		
	13. Impact on Native Animals - no known negative impact on animals (**0 pts.**) - documented direct or indirect negative effects on animal taxa (**3 pts.**)	0		
	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	9:"Because it forms dense populations and grows tall, chaff flower competes with other floodplain species and likely shades many out." 11: species can displace native plant species.	9,11

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

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.**)

5

9:"Infestations can reach densities over 70 plants per square meter (very dense considering each plant can be very wide with many stems and side branches)."

8,9

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.**)

U

Species was first observed in the 1980s in Kentucky, and has since spread to 9 states. The species' ability to form dense monocultures and disperse quickly through floods and human activities will potentially impact succession in natural areas, but further research is needed for confirmation.

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 (xeric limestone prairie*+), post oak opening*+

Wetlands: Bog*, fen*, twigrush-wiregrass wet prairie*, marsh, buttonbush swamp, mixed shrub swamp, hemlock-hardwood swamp*, maple-ash-oak swamp, white pine-red maple swamp*

* 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.**)

1

9: flooded forests, edges, roadside ditches, logging roads, pavement cracks

8,9

Total Score: **42**

Number of Unknowns: **2**

Outcome: **Pending Further Review**

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