

Invasive Plant Series

FACT SHEETS

This is a high priority species.
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Figure 1. Chaff flower's tall, dense growth habit easily shades out and displaces many native plant species
Ron Rathfon, Extension forester, Purdue University



Figure 2. Leaves are simple, opposite, and the "arching" venation is very similar to that of dogwood leaves
Ron Rathfon, Extension forester, Purdue University



Japanese Chaff Flower

Achyranthes japonica (Miq.) Nakai

EXPERT
REVIEWED

Other Common Names: Chaff flower

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Description: Japanese chaff flower is native to east Asia. How it was introduced to North America is unknown, but the earliest record of its occurrence here is from eastern Kentucky in the early 1980s. Japanese chaff flower, hereafter referred to as chaff flower, is a member of the Amaranth family. It is a perennial herb that can reach heights of 3-6 feet. It forms very dense stands (Fig. 1). Mature plants have extensive root systems supporting multiple stems. Chaff flower begins growing in late spring and flowers in late July. The leaves are simple, opposite, and the "arching" venation is very similar to that of dogwood leaves (Fig. 2). Stems and leaves are smooth to slightly pubescent (fuzzy). Seedlings have red stems. Some of this red tint persists in the stems as the plants grow, particularly at the branch nodes (Fig. 3). It is most readily identified by its erect "bottle-brush" flower spike on which fruits are formed (Fig. 4). Flowers lack petals and occur in a tight cluster at the end of the spike. As the spikes elongate in mid-August, the fruits develop, turn downward and eventually lie flat against the spike stem (Fig. 5). Each fruit has a pair of stiff bracts that readily attach to clothing or fur to aid in dispersal (Fig. 6). Floodwaters facilitate long distance dispersal of seed. Chaff flower leaves senesce in the fall and the bare opposite-branched stems turn straw to brown in color with the elongated fruit spikes intact (Fig. 7). Fruits remain on the dead stalks through most of the winter until animals or people brush against them or the stalks are broken down by snow or floodwaters. Chaff flower may be confused with white vervain (Fig. 8), lopseed (Fig. 9), or one of the pigweeds (Fig. 10). When in bloom, white vervain flowers have white petals, while chaff flower has no petals. W. vervain also has coarsely toothed leaf margins, while chaff flower leaf margins are smooth. Lopseed, like chaff flower, has an opposite leaf arrangement and small fruits closely appressed to the flower stalk that are similar in appearance to those of chaff flower. Lopseed differs in that it has coarsely toothed leaf margins and pale pinkish to purple flowers. Its fruits are arranged in an opposite pattern along the flower stalk, while those of chaff flower are in an alternate arrangement. Pigweed has alternate leaves, while those of chaff flower are opposite.



relatively new to Indiana, arriving on Ohio River floodwaters. At present its distribution is restricted to the counties highlighted in green along the Ohio River.

Invasive Plant Fact Sheet Series

FNR-477-W • Japanese Chaff Flower • *Achyranthes japonica* (Miq.) Nakai

Distribution: First reported in Indiana in 2002, chaff flower now occurs in every Indiana county bordering the Ohio River. It is mainly restricted to the Ohio River flood plain. Some populations have been found beyond the Ohio River flood plain.

Impact: Chaff flower's tall growth habit and dense infestations easily shade out and displace many native plant species. It is typically found in flood plains, ditches, bottomland forests and on riverbanks, growing in rich, moist soil. It prefers partial shade. However, it tolerates full shade, drier upland soils and sunnier conditions on roadsides, field edges and vacant land in urban and industrial areas. It occurs less frequently in open, full-sun environments. Chaff flower spreads quickly along waterways and public areas such as



Figure 3. Red tint of seedlings persists in the stems as the plants grow, particularly at the branch nodes

Ron Rathfon, Extension forester, Purdue University



Figure 4. "Bottle-brush" flower spike

Ron Rathfon, Extension forester, Purdue University

trails. It does not tolerate annual flooding or prolonged periods of inundation. Thus, in bottomlands, it is most commonly found on the first terrace above, or on the edge of, the annually flooded zone.



Figure 5. As flower stalk elongates, developing fruits turn downward and lie flat against the stem

Ron Rathfon, Extension forester, Purdue University



Figure 6. Fruit with stiff bracts, which readily stick to fur and clothing

Chris Evans, River-to-River CWMA



Figure 7. In the fall the bare opposite-branched stems turn straw to brown in color with the elongated fruit spikes intact
Ron Rathfon, Extension forester, Purdue University

Management: Recommendations for chaff flower control are still in development. However, the methods below have shown some initial success. In all cases, control should be conducted before chaff flower produces seed in late August/early September. In the Ohio River floodplain, frequent flooding deposits new chaff flower seed, making management in these areas difficult and control less feasible. Efforts should focus on high priority floodplain habitat and infestations outside the immediate Ohio River floodplain.

Prevention: Chaff flower seed can inadvertently be spread by mowing, road maintenance or agricultural equipment. Mow infested areas along roadsides, ditch banks and field edges before seed matures. Chaff flower seed maturation may vary from year to year depending on weather patterns. In southern Indiana, mowing should occur from May through mid-August. Avoid working or recreating in or walking or driving through infested areas during seed dispersal periods. Clean clothing, shoes, ATVs or vehicles following activity in infested areas.

Control:

- Manual - control is feasible only for the occasional plant, small infestations or sensitive areas where herbicides cannot be used. The vigorous root system makes hand pulling difficult. Digging may be required to successfully remove the plant. The seed head may be removed to prevent further spread. All plant parts, especially seeds, should be bagged and disposed of.

Look-a-likes:



Figure 8. White vervain (*Verbena urticifolia* L.)
Ohio State Weed Lab Archive, The Ohio State University, Bugwood.org



Figure 9. Lopseed (*Phryma leptostachya* L.)
Paul Rothrock



Figure 10. Red pigweed (*Amaranthus retroflexus* L.)
Robert Vidéki, Doronicum Kft., Bugwood.org

- Mechanical — Mowing and cutting can be used to prevent flowering and seed head establishment but has not been shown to kill established plants.
- Chemical — Foliar applications of a 2 percent solution of triclopyr (at least a 44 percent active ingredient concentration) or glyphosate (at least a 41 percent active ingredient concentration) herbicide have been effective if applied before or during flowering around mid-August. A non-ionic surfactant should be used to increase herbicide uptake. Since chaff flower often grows in riparian areas and may occur on stream and riverbanks or near open water, caution must be used to follow label restrictions regarding overspray, drift or movement of herbicide into surface waters. Only herbicides and surfactants with an aquatic use label should be applied in these circumstances. Accord, Rodeo, Aquaneat (i.e., glyphosate products) and Garlon 3A and Element 3A (i.e., triclopyr products) are labeled for use in or near aquatic areas. Other herbicides having formulations with aquatic use labels such as 2,4-D and imazapyr (Habitat and others) may be effective on chaff flower, but have not been tested.

For vegetation management professionals: Labels for aminocyclopyrachlor, aminopyralid, chlorsulfuron, dicamba, imazapyr, metsulfuron-methyl, pendimethalin, sulfometuron-methyl, 2,4-D + triclopyr, 2,4-D + 2,4-DP all list pigweeds (*Amaranthus* sp.) as susceptible weed species. Pigweeds are annuals and, like the perennial chaff flower, are members of the Amaranth family. While the listed herbicides may prove effective alone or in combination with other listed herbicides for chaff flower post- and pre-emergence control, they have not been tested.

Additional Information

- iMap Invasives Element Stewardship Abstract: <http://www.imapinvasives.org/GIST/ESA/index.html>
- Indiana Cooperative Agricultural Pest Survey <http://extension.entm.purdue.edu/CAPS/>
- Invasive.org: <http://www.invasive.org/browse/subinfo.cfm?sub=14211>
- Midwest Invasive Plant Network (MIPN) Invasive Plant Control Database: <http://mipncontroldatabase.wisc.edu/Default.aspx>
- River to River Cooperative Weed Management Area: <http://www.rtrcwma.org/Japanesechafffloweralert.pdf>

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