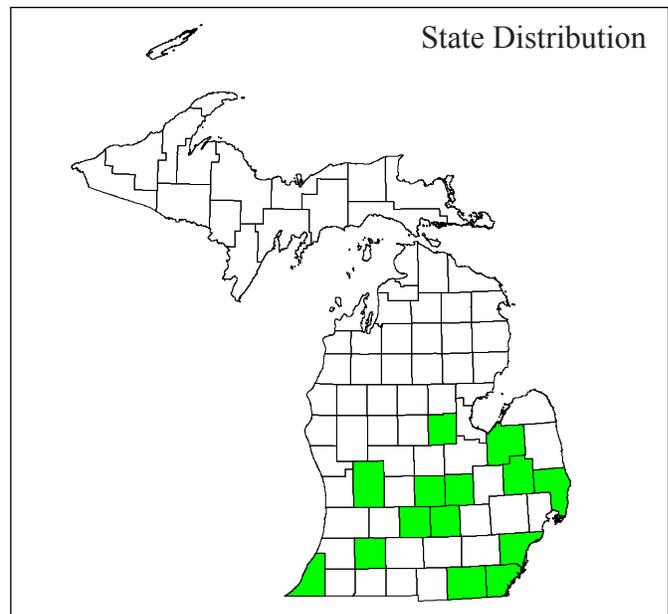
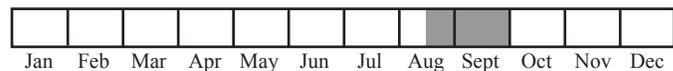




Photo by Susan R. Crispin



Best Survey Period



**Status:** State threatened

**Global and state rank:** G4/S2

**Other common names:** American beakgrass

**Family:** Poaceae (grass family)

**Synonym:** *Diarrhena americana* P. Beauv.

**Taxonomy:** Gleason (1952) recognized two varieties of *Diarrhena americana*, var. *americana* and var. *obovata*, whereas Anderson (1958) determined that intermediates between the two varieties were widespread and concluded the North American population was comprised of a single, highly-variable species. More recently, Brandenburg et al. (1991) used scanning electron microscopy and multivariate statistical analyses to establish that the two varieties were not only distinct but warranted the naming of two separate species for the genus in North America, *D. americana* and *D. obovata*. All specimens in Michigan were subsequently referred to *D. obovata*.

**Total range:** Beak grass ranges from Michigan and Ohio south to Georgia, and westward to Texas and South Dakota. It is considered rare in Alabama, Illinois, Georgia, Maryland, Missouri, New York, North

Carolina, Pennsylvania, Wisconsin, Oklahoma, and Virginia. *D. americana* var. *obovata* is more typical in northern Ohio and Indiana, and westward into the prairie states, whereas *D. americana* var. *americana* tends to range from central Ohio and Indiana south and eastward, although there is significant overlap in portions of their ranges.

**State distribution:** Beak grass has been documented from 24 locations in fourteen counties in southern Michigan. Eighteen occurrences have been confirmed extant since 1980; five are known from records dating 1950 or earlier. Most known populations are very small and localized, though large colonies occur along the Huron River in Wayne County, the Red Cedar River in Ingham County, the Thornapple River in Eaton County, and Salt Creek in Midland County.

**Recognition:** Often forming colonies of **dense clumps**, the 5-12 dm tall stems of beak grass have relatively **broad, shiny leaves (1-2cm** in width) with a **prominent off-set mid-vein**. The inflorescence consists of a long, drooping, terminal panicle with well-spaced, very short, **beaked spikelets** which expand to become **shiny and egg-shaped** as they mature (see photo on page 2). These spikelets contain broad (1.8 – 2.5 mm) fruits sharply tapered into a bottle-nosed beak surrounded by a small palea and a relatively short lemma (4.6 – 7.5 mm long



on the bottom floret) without hairs at its base. Beak grass may superficially resemble a sedge (*Carex*) by its tendency to grow in clumps, but can be distinguished by its round (versus triangular) stems, open (versus closed) leaf sheaths, and the presence of glumes subtending the spikelet (in contrast to single bracts and perigynia). Though the closely related var. *americana* is not known to occur in Michigan, it may be difficult to distinguish elsewhere in the range where it co-occurs with var. *obovata*; contrasting characters include the relatively narrow fruits (1.3 – 1.8 mm) with a broad beak, and minute hairs at the base of a relatively long lemma (7.1 – 10.8 mm long on the bottom floret) (Brandenburg et al. 1991).



Photo by Ryan P. O'Connor

#### **Best survey time/phenology:**

This perennial grass is most conspicuous in late summer and early fall when the distinctive beaked fruits are mature. It may also be recognizable in sterile form to experienced botanists throughout the growing season by its distinctive, shiny leaves, the clump-forming habit, and the restriction of occurrence to southern Michigan floodplain forests.

**Habitat:** In Michigan and elsewhere in its range, beak grass inhabits moist, shaded to partly-shaded southern floodplain forests. It most commonly occurs on levees and drier portions of first bottoms and second bottoms where it is usually found in scattered clumps, although it also may form a locally dense groundcover in some localities. It thrives in areas with light disturbance caused by such natural events as windthrows and in

areas with minimal vegetative competition. Typical associates include dominant overstory trees such as *Acer saccharinum* (silver maple), *Acer nigrum* (black maple), *Fraxinus pennsylvanica* (red ash), *Platanus occidentalis* (sycamore), *Populus deltoides* (cottonwood), *Salix nigra* (black willow), and *Tilia americana* (basswood). Common shrubs include such characteristic species as *Lindera benzoin* (spicebush) and *Staphylea trifolia* (bladdernut). Common associated groundcover plants include *Arisaema dracontium* (green dragon), *Arisaema triphyllum* (Jack-in-the-pulpit), *Asarum canadense* (ginger), *Floerkea proserpinacoides* (mermaid weed), *Geranium maculatum* (geranium), *Laportea canadensis* (wood nettle), *Pilea* spp. (clearweed), *Rudbeckia laciniata* (cut-leaved coneflower), *Thalictrum dasycarpum* (tall meadow-rue), *Verbesina alternifolia* (wingstem), and *Viola striata* (creamy white violet). Rare but characteristic associates may include such species as *Hybanthus concolor* (green violet, state threatened), *Hydrastis canadensis* (goldenseal, state threatened), *Morus rubra* (red mulberry, state threatened), *Panax quinquefolius* (ginseng, state threatened), *Silphium perfoliatum* (cupplant, state threatened), *Trillium nivale* (snow trillium, state threatened), *Euonymus atropurpurea* (wahoo, state special concern), *Gymnocladus dioica* (Kentucky coffee tree, state special concern), and *Jeffersonia diphylla* (twinleaf, state special concern) among many other potential species.

**Biology:** This perennial grass spreads vegetatively via shallow rhizomes and can form patchy to extensive clones. Typically emerging by mid-spring, beak grass flowers and is wind-pollinated in mid-summer, and the characteristic fruit sets in late summer to early fall. The large, inflated spikelets are likely an adaptation to aid in dispersal downstream, especially during spring or fall flood events.

**Conservation/management:** Four of the best six populations occur in Huron-Clinton Metroparks along the Huron River. Another large population occurs primarily on private land adjacent to a township park, and an additional five populations occur on state-owned land.

The most severe threats to this grass include alteration or destruction of floodplain habitat and competition from exotic plants, especially such aggressive invasive species as *Rosa multiflora* (multiflora rose), *Rhamnus*



*cathartica* and *R. frangula* (common and glossy buckthorn), *Berberis thunbergii* (Japanese barberry), *Hesperium matronalis* (dame's rocket), and *Alliaria petiolata* (garlic mustard) that commonly invade floodplains. Garlic mustard and dame's rocket are particularly well known invasives that have the ability to quickly dominate the groundcover and rapidly degrade site quality. Trampling from ORV use also threatens this species in some localities.

Conservation strategies to protect beak grass include removing invasive species, protecting the hydrology of river systems and corresponding cyclical flooding regimes, maintaining healthy, intact, mature floodplain forests, and using conservation planning and restoration to connect previously fragmented floodplain forests to create contiguous riparian corridors. Populations of beak grass may also be significantly affected by the loss of red ash from the floodplain forest canopy due to emerald ash borer in southeast Michigan, though the complete ramifications of this pest are unclear.

**Comments:** This grass can be easily overlooked until it fruits late in the field season, and may thus be somewhat underrepresented in collection records. The name "*Diarrhena*" refers to the two stamens characteristic of the genus and comes from the Greek *dis* for twice and *arren* for man (Hitchcock, 1951).

**Research needs:** In the context of increasing development pressure, research on the role of present day and historic disturbance (canopy and hydrologic) would benefit the conservation of this species, particularly in areas of large beak grass populations. Both short-term and long-term monitoring, as well as virtually any research on the population biology of this species would greatly assist in future management and conservation planning efforts. Research is especially needed on the effect of the emerald ash borer on beak grass, particularly in floodplains with a significant ash canopy and moderate to high levels of invasive species.

**Related abstracts:** Southern floodplain forest, cerulean warbler, Indiana bat, goldenseal, ginseng, showy orchis, Virginia snakeroot.

#### Selected references:

Anderson, D.E. 1958. Taxonomy and distribution of the genus *Diarrhena*. Master's Thesis, Iowa State University, Ames, IA.

- Brandenburg, D.M., J.R. Estes, and S.L. Collins. 1991. A revision of *Diarrhena* (Poaceae) in the United States. Bull. Torrey Bot. Club 118(2): 128-136.
- Hitchcock, A.S. 1951. Manual of the Grasses of the United States. 2<sup>nd</sup> ed. rev. by Agnes Chase. USDA Misc. Publ. 200. 1051 pp.
- Iltis, H., J. Reed, and T. Melchert. 1960. *Elymus arenarius* and *Diarrhena americana* in Wisconsin. Rhodora 62: 199-201.
- Swink, F. and G. Wilhelm. 1979. Plants of the Chicago region, 3rd edition. Morton Arboretum, Lisle, Ill. 922 pp.

#### Abstract citation:

- O'Connor, R.P. and M.R. Penskar. 2004. Special Plant Abstract for *Diarrhena obovata* (American beak grass). Michigan Natural Features Inventory. Lansing, MI. 3 pp.

Updated January 2010.

Copyright 2004 Michigan State University Board of Trustees.

Michigan State University Extension is an affirmative-action, equal-opportunity organization.

Funding for abstract provided by the National Oceanic and Atmospheric Administration.

