



MONARCH JOINT VENTURE

Partnering across the U.S. to conserve the monarch migration

www.monarchjointventure.org

Monarch Joint Venture

The Monarch Joint Venture (MJV) is a partnership of federal and state agencies, non-governmental organizations, businesses and academic programs working together to protect the monarch migration across the United States.

Our mission is to protect monarchs and their migration by collaborating with partners to deliver habitat conservation, education, and science across the United States.

Our vision is thriving monarch populations that sustain the monarch migration into perpetuity and serve as a flagship for the conservation of other plants and animals.

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Invasive Species Alert:

Black swallow-wort (*Cynanchum louisea*) and pale swallow-wort (*Cynanchum rossicum*)

Monarchs and Swallow-wort

Monarch butterflies (*Danaus plexippus*) need milkweed plants (*Asclepias* species plus a few species in closely related genera) to survive; their caterpillars cannot feed on other host plants. Female monarchs have evolved to lay eggs on milkweed, ensuring that their offspring have adequate resources for development. Females find the milkweed plants using a combination of visual and chemical cues.

An alien invader is jeopardizing this process by confounding female monarchs during the egg laying process. Black swallow-wort (*Cynanchum louisea*, formerly *C. nigrum* or *Vincetoxicum nigrum*) and pale swallow-wort (*Cynanchum rossicum*, formerly *Vincetoxicum rossicum*) are members of the milkweed family (*Asclepiadaceae*) native to Europe. Studies have shown that female monarchs will lay eggs on black swallow-wort, even when it is growing in the same field as common milkweed (Casagrande and Dacey 2007). Laboratory tests show that monarch caterpillars cannot feed on black or pale swallow-wort plants. Thus, swallow-worts may act as a "sink" for monarchs; caterpillars from eggs laid on these invasive plants will not survive, and are essentially wasted. In addition, swallow-worts can crowd out native milkweeds, which can eliminate appropriate food sources for monarch caterpillars.

Black and pale swallow-worts should not be confused with *Cynanchum laeve* (common names sandvine, honeyvine, bluevine milkweed, and smooth swallow-wort), a similar plant that is native to eastern and central U.S. states and Ontario. *C. laeve* is an appropriate monarch host, and is found in many of the same states as the invasive species. Sandvine has heart shaped leaves and white flowers, and is native to North America.

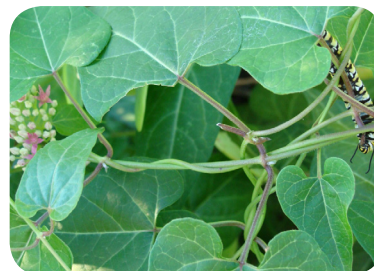
Environmental Effects

Swallow-wort species reduce local biodiversity of native plants, invertebrates, and vertebrates. Studies show a decrease in arthropod biodiversity in areas covered by swallow-wort, when compared to similar old fields vegetated by native plants (DiTommaso et. al. 2005). Swallow-worts can take over open areas, which in turn leads to reduced grassland bird breeding and nesting. As the former Latin name, *Vincetoxicum*, implies, swallow-wort species are allelopathic, releasing chemicals that will hinder the growth of surrounding plants. Studies have shown a reduction in root size for butterflyweed (*Asclepias tuberosa*) and common milkweed (*A. syriaca*) when grown alongside swallow-worts (Michigan DNR 2012). Like other milkweeds, swallow-worts produce glycosides that are toxic to mammals, including grazers.

Monarchs are particularly affected by the spread of swallow-worts. Studies in Rhode Island show that monarch butterflies lay eggs on this "dead-end" host, particularly in areas where common milkweed (*A. syriaca*) is relatively rare. A proportion of eggs are laid on swallow-worts even when the milkweed host plant is present in the field.

There is no evidence that monarchs are evolving an ability to survive on these invasive swallow-worts, despite over a hundred years of exposure. Monarchs may lay eggs on swallow-worts because they are closely related to the native sand vine (*Cynanchum laeve*), an important host plant in the southeastern U.S.

Cynanchum louisea (left), *C. laeve* (middle), and *C. rossicum* (right)

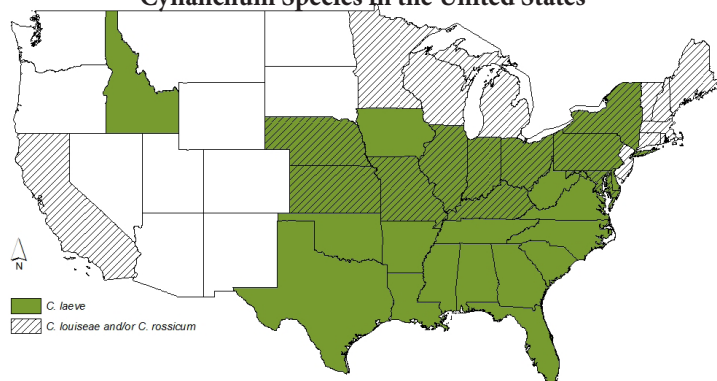


Swallow-wort Biology and Range

Both black and pale swallow-worts are herbaceous twining vines. Plants can reach 3 to 6.5 feet in length and have clear watery sap. The leaves are opposite, oval, and have smooth margins and pointed tips. Stems are covered with downy hairs. Flowers of the black swallow-wort look like milkweed flowers; they are star shaped, dark purple in color, and have five triangular downy petals that are about as long as they are wide. Pale swallow-wort has flowers that vary from pink to burgundy in color. Unlike black swallow-wort, pale swallow-wort flower petals are longer than they are wide. The green seed pods of both species are longer than those of common milkweed, but like *Asclepias* species, the pods split open in the fall, when seeds are ready. The seeds look like milkweed seeds, and are wind-dispersed.

C. rossicum spreads primarily by seed dispersal; *C. louiseae* can spread both by wind borne seeds and by rhizomes. Swallow-wort spreads by seeds and by rhizomes. They are frequently found in open areas, such as old fields and pastures, fence rows and roadside ditches; they have also been found in forested areas. Both species were accidentally introduced in the 1800s and have now spread to the Midwest, including parts of Ohio, Indiana, Michigan, Illinois, Wisconsin, Minnesota, and Missouri.

Distribution Map for Native and Invasive *Cynanchum* Species in the United States



Source: USDA NRCS Plants Database, <http://plants.usda.gov>

Resources

Casagrande, R.A. and J.E. Dacey, 2007. Monarch Oviposition on Swallow-worts (*Vincetoxicum* spp.). *Environ. Entomol.* 36(3):631-636 (2007)

DiTommaso, A., F.M. Lawlor, and S.J. Darbyshire, 2005. The Biology of Invasive Alien Plants in Canada. 2. *Cynanchum rossicum* (Kleopow) Borhidi [= *Vincetoxicum rossicum* (Kleopow) Barbar.] and *Cynanchum louiseae* (L.) Kartesz & Gandhi [= *Vincetoxicum nigrum* (L.) Moench]. *Can. J. Plant Sci.* 85: 243-263

DiTommaso, A. and J.E. Losey, 2003. Oviposition Preference and Larval Performance of Monarch Butterflies (*Danaus plexippus*) on two invasive swallowwort species. *The Netherlands Entomological Society Entomol. Exp. Appl.* 108: 205-209.

Kaufman, S. and W. Kaufman. 2007. *Invasive Plants, Guide to Identification and the Impacts and Control of Common North American Species*. Stackpole Books, Mechanicsburg.

Michigan Department of Natural Resources, Michigan Natural Features Inventory, 2012. Invasive Species – Best Control Practices: Black and Pale Swallow-worts. Available at: <http://mnfi.anr.msu.edu/invasive-species/Swallow-wortBCP.pdf>

Midwest Invasive Plant Network. Black Swallow-wort: *Cynanchum louiseae*. Available at: <http://bugwoodcloud.org/mura/mipn/assets/File/Midwest%20Invasives%20Fact%20Sheets/PDF/black%20swallowwort.pdf>

Milbrath, L., J. Biazzo, 2016. Impact of the defoliating moth *Hypena opulenta* on invasive swallow-worts (*Vincetoxicum* species) under different light environments. *Biological Control*. 97: 1-12.

Milbrath, L., A. DiTommaso, J. Biazzo, S.H. Morris, 2016. Tolerance of Swallowworts (*Vincetoxicum* spp.) to Multiple Years of Artificial Defoliation and Clipping. *Invasive Plant Science and Management*: Vol. 9, No. 1, pp. 1-11.

URI CELS Outreach Center. Black Swallow-wort (*Vincetoxicum nigrum*) Control Fact Sheet. Available at: http://cels.uri.edu/docslink/ceoc/documents/blackswallowwort_2009_000.pdf

Control Agents

Controlling swallow-wort may require many years, since seeds can persist in the soil for up to five years. Management strategies vary but the first step is the successful identification of the plant. Swallow-worts are easiest to identify when they are flowering, or in late summer, when plants are more visible as they turn yellow in color. Plants in full sun develop fruits earlier than those in shaded areas, and should be prioritized for eradication to avoid seed dispersal. Once swallow-wort has been removed, it is important to replant the area quickly, as disturbed areas are vulnerable to recolonization by this and other invasive species.

Here are a few mechanical controls that can be used. More detailed information is available in the resources section.

- Mechanical methods, such as hand pulling or digging, cutting or mowing, and seed pod removal. Mechanical methods are most useful in the early stages of infestation, and are effective in controlling the spread of the infestation. It is difficult to remove the entire plant by hand digging and pulling, because the seedlings often break. Cutting the plant can lead to resprouting. These methods should be used in combination with other tools.
- Chemical controls (herbicides) can be effective for large infestations but must be used for a number of years to ensure that younger plants are eradicated. Options include Glyphosate, Garlon and Tricolpyr.
- Prescribed burning alone will not control swallow-wort and may in fact encourage vigorous resprouting. Burns can be used as a management tool in fire adapted areas once swallow-worts have been removed and natives have reestablished.
- Appropriate disposal of all root crowns, root fragments, and seed pods is essential, as any of these can produce new sprouts. Fragments and seeds should be bagged and either burned or disposed of in a landfill. Plant parts should not be composted.
- There are no approved biological controls for swallow-wort in the United States as yet. A leaf-eating moth species, *Hypena opulenta*, has been approved for use in Canada. It is now under review by USDA. This moth feeds exclusively on swallow-wort, and has the potential to keep this plant in check if used in combination with other measures. Research shows defoliation alone may be sufficient to stop plant growth (Milbrath papers).



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Swallow-wort and common milkweed seed pods.