

Black Henbane: Identification, Biology and Integrated Management

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This MontGuide describes black henbane's biological and ecological characteristics. It also provides mechanical, cultural and chemical management options to control this species.

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BLACK HENBANE (*HYOSCYAMUS NIGER* L.)

is also known as common henbane, hogbean, hogbane, insane root and stinking nightshade. It is an invasive weed that has become an invader of pastures, meadows and roadsides throughout the United States. In western pastures and meadows, it can form dense stands that replace other vegetation and decrease forage production and plant diversity. A land manager's ability to correctly identify black henbane and understand the plant's life cycle and growth requirements is important in selecting management strategies that effectively suppress its populations and promote healthy desired vegetation.

Origin and Distribution

Black henbane is native to Europe and northern Africa where it was cultivated for its medicinal qualities. It was likely introduced to the United States in the 17th century as a medicinal and ornamental plant. Black henbane has since escaped cultivation and spread throughout much of the United States, particularly in the Northeast, Midwest and the Rocky Mountains. It is listed as a noxious weed in California, Colorado, Idaho, Nevada, New Mexico and Washington. Under the North American Weed Seed Free Forage program, it is considered a weed and prohibited from transportation across state lines in forage. Black henbane was first reported in Montana (Musselshell County) in 1881. As of 2010, it has been reported to the Invaders Database in at least 42 counties (Figure 1), and is also known to occur in Choteau, Hill, Meagher, Rosebud, Toole and Treasure counties. It is

listed as a county noxious weed in Beaverhead, Bighorn, Broadwater, Glacier, Judith Basin, Lewis & Clark and Sweet Grass counties.

Black henbane does well in most soils and will grow in a variety of environmental conditions. The plant is primarily found in sandy or well-drained loam soils with moderate fertility and does not tolerate water-logged soils. Black henbane is common in disturbed open sites in rangeland and pastures, along fence rows, roadsides, riparian areas and waste areas. It is also found on heavily grazed sites. Its growth is enhanced by increased levels of soil nitrogen.

Identification and Biology

Black henbane is an annual or biennial of the nightshade family (Solanaceae) that reproduces solely through seed production (Figures 2 and 3). Seeds germinate and develop into a rosette in late May. Rosette leaves are soft, alternate and have leaf stalks nearly as long as the leaf

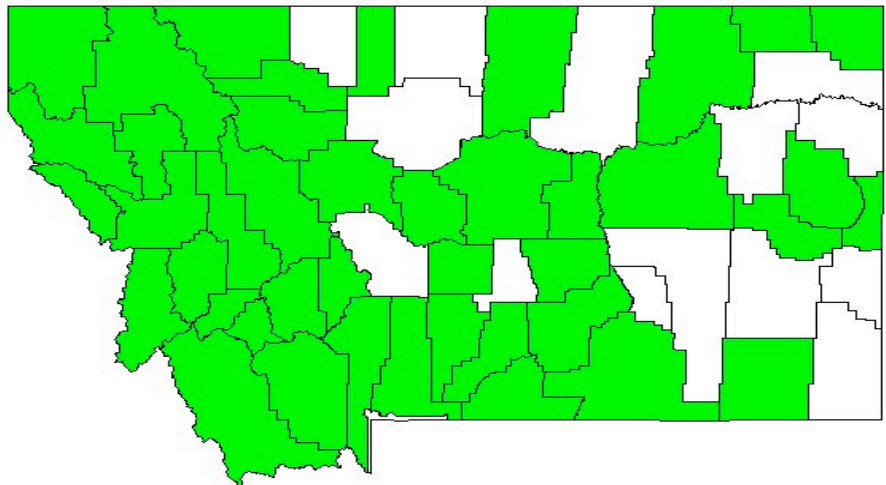


FIGURE 1. Counties in Montana where black henbane has been reported (shaded) to the Invaders Database. Information taken from Invaders Database System (Rice, P.M. INVADERS Database System (<http://invader.dbs.umt.edu>); Division of Biological Sciences, University of Montana, Missoula, Mont. 59812-4824).

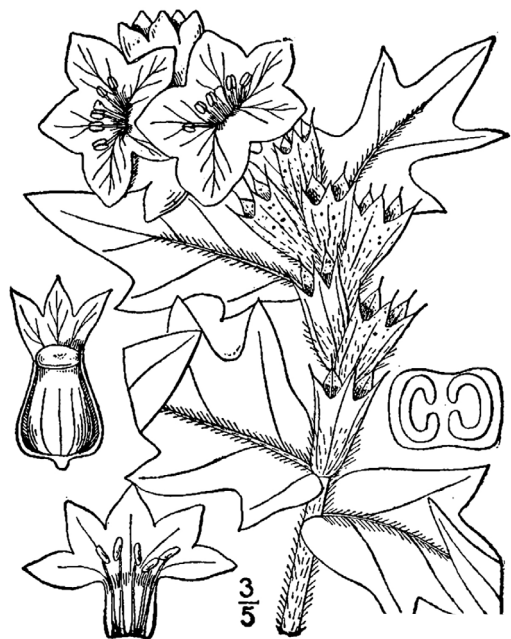


FIGURE 2. General appearance of a black henbane plant. (USDA PLANTS Database, USDA NRCS PLANTS Database, Bugwood.org).

blades. Black henbane has a large, whitish, branched, fleshy taproot. The plant grows 1 to 6 feet tall. Stems of a mature plant are erect, leafy, thick, coarse, hairy and widely branched. Leaves are large – up to 6 inches wide and 8 or more inches long. Leaves are alternate with coarsely toothed to shallowly lobed margins, and are grayish-green in color. Foliage is covered with fine, sticky hairs. It flowers from June to September, with peak flowering usually in July. The 5-lobed, funnel-shaped flowers are brownish-yellow in appearance with dark purple veins. Flowers are arranged in a long spike-like inflorescence in the upper leaves with the youngest flower at the tip. Two rows of 1 inch long, five-lobed, pineapple-shaped fruits appear after flowering. Each fruit capsule contains black, pitted seeds. Black henbane produces 10,000 to 500,000 seeds per plant. Black henbane has an unpleasant odor at all growth stages, especially when it is crushed.

Impacts of Invasion

The full extent of ecological, economical and sociological impacts of black henbane are not well documented. The plant is capable of forming dense infestations, replacing desirable native species, impacting agricultural production, and reducing plant biodiversity. Black henbane is narcotic and poisonous to humans and livestock. All parts of the plant are poisonous. Livestock will usually avoid it because of its foul odor and bitter taste, unless other forage is unavailable.

Integrated Management

Management objectives for black henbane control should involve preventing seed production and periodically monitoring populations. Field observations suggest the seeds of black henbane can remain viable in the soil for a period of five years; therefore, particular attention is required for several consecutive growing seasons to control newly emerging plants. Good vegetative cover of desired plants considerably reduces the chance of black henbane infestation.

Prevention

The most effective method of black henbane management is preventing its spread and establishment. Limiting weed seed dispersal, containing current infestations, minimizing soil disturbances, detecting and eradicating new plants, maintaining competitive desirable plants, and grazing properly will help reduce the establishment and spread of black henbane. Once it is established, persistent management using a combination of techniques will give the best control. Report black henbane locations to the landowner, manager or weed district. Remove all weed seeds from your clothing, equipment and vehicle before moving out of an infested area. Learn to identify the plants and beware of fill dirt, forage and contaminated crop seed from outside your area. Always sow certified weed-free seeds.

Preventing seed production from year to year is critical. Small-scale infestations may be controlled using hand removal or herbicide spot treatments. Larger infestations may require combinations of techniques.

Grazing

Grazing to control black henbane is not an option because it is poisonous to livestock, poultry and swine. Fortunately, because of the foul odor of the plant, livestock seldom graze black henbane, and few cases of livestock poisonings have been reported. However, dried plant matter in baled forage retains its toxic properties and will be readily consumed.

Mechanical

Cultivation prior to seed production may be used to control black henbane. Cultivation must be repeated annually until the seed bank is depleted.

Pulling or digging isolated plants or small infestations prior to seed production can be an effective means of controlling this plant if the entire taproot is removed. If pulling, gloves and protective clothing are strongly recommended to prevent skin irritation. Because of its thick, tough stem and roots, black henbane can be difficult to hand-pull. Pulling when the soil is moist increases the likelihood of removing the entire root.

If initial pulling or digging does not kill the plant, the method must be repeated throughout the season to ensure no seeds are produced. Pulling and digging may have to be repeated over several years to control plants emerging from the seed bank. Care should be taken with mature plants to avoid spreading seed, and the plants must be disposed of properly. Plants with mature fruits should be carefully placed and sealed in bags to prevent seed dispersal, disposed through the trash or burned, and the area should be monitored for new seedling emergence for at least five years.

Burning: Black henbane with mature fruits can be burned to kill seed and reduce seed spread.

Mowing: Repeated mowing prior to seed production can be effective control.

Chemical

Several herbicides are listed as providing control of black henbane (Table 1). Herbicide recommendations vary by region and site. Read and follow the herbicide label to determine whether the herbicide applies to your situation, what rates are appropriate, and ensure all safety recommendations are followed. Herbicides should be applied with a non-ionic surfactant at the rosette stage and prior to flowering to prevent seed production. The area should be monitored after application and any escapes or regrowth should be retreated.

Biological

There are no biological control insects or pathogens available for black henbane.

TABLE 1. Herbicides recommended for controlling black henbane.

Herbicide Active Ingredient (Trade Name)	Product per Acre	Application Timing or Growth Stage
<i>Dicamba</i> (e.g. Vanquish, Clarity)	8 to 32 ounces	Rosette to bolting
<i>Picloram</i> (Tordon)	1 to 2 pints	Actively growing plants when there is adequate soil moisture
<i>Metsulfuron</i> (Escort)	0.5 to 1.0 ounces	Bolting to early flowering
<i>Metsulfuron + chlorsulfuron</i> (Cimarron Plus)	0.625 to 1.25 ounces	Actively growing plants

Black Henbane Uses and Lore

In spite of its toxicity, black henbane has a long history of human use for its medicinal and poisonous properties and even in sorcery in the Middle Ages. Black henbane is still valued by some for its medicinal values and is cultivated for drug companies worldwide. Black henbane contains two alkaloids (hyoscyamine and scopolamine) that are used as medicines under controlled conditions. It's been used as a mild pain reliever, antispasmodic, mild diuretic, pupil-dilator and sedative. This plant should never be used without the advice of a doctor or herbal physician.



FIGURE 3. Black henbane flowering plant and dried flower stalk (Steve Dewey, Utah State University, Bugwood.org).

In the middle ages, black henbane was widely used in Germany to augment the inebriating qualities of beer. It took many years to prohibit the use of henbane in brewing after numerous cases of poisonings. Black henbane may have been used for ritual and shamanic purposes throughout Eurasia. In Greek mythology, the dead are crowned with henbane – most likely because of its ability to make one forget oneself. In German folklore, it was an ingredient in incense for bringing rain and in shapeshifting work.

While the alkaloids found in black henbane have been used as medicines under controlled conditions, it is considered a poisonous plant to humans and animals. All parts of the plant contain alkaloids which can be toxic when consumed. Symptoms of black henbane poisoning include nausea, vomiting, headache, abdominal pain, diarrhea, excessive salivation, rapid pulse, convulsions, coma and impaired vision. It can also cause skin irritation if it comes in contact with bare skin.



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