

NAME OF SPECIES: <i>Cynoglossum officinale</i> L. (1)	
Synonyms: <i>Cynoglossum officinale</i> L. f. <i>bicolor</i> (Willd.) Lehm. (1)	
Common Name: common hound's-tongue, gypsy-flower (1). Hound's-tongue, beggar's lice, dog's tongue, dog bur, sheep lice, common bur, glovewort, and woolmat (3). Also rats-and-mice (4).	
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
	2. <u>Abundance</u> : 173 recorded occurrences of this species in WI (1), however this species is probably vastly under-reported.
	3. <u>Geographic Range</u> : Recorded from 38 counties in WI (1).
	4. <u>Habitat Invaded</u> : Boreal Forest, Northern Hardwood Forest, Open woodlands, Southern floodplain forest, Forest edges, roadsides, prairies, open woods and pastures, lake shores, Dry-mesic forest, Southern hardwood forest, wet meadow (1). Disturbed Areas <input checked="" type="checkbox"/> Undisturbed Areas <input type="checkbox"/>
	5. <u>Historical Status and Rate of Spread in Wisconsin</u> : Hound's-tongue was first recorded in WI in 1859. (1)
	6. <u>Proportion of potential range occupied</u> : Unknown.
II. Invasive in Similar Climate Zones	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
	<u>Where (include trends)</u> : Hound's tongue occurs throughout the contiguous U.S., in all but 6 southern states and much of Canada. Hound's tongue is reported as a problem plant in natural areas and parks in several states including Michigan, Missouri, Indiana, Colorado, and Oregon. (3) (6)
III. Invasive in Similar Habitat Types	1. Upland <input checked="" type="checkbox"/> Wetland <input checked="" type="checkbox"/> Dune <input checked="" type="checkbox"/> Prairie <input checked="" type="checkbox"/> Aquatic <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Grassland <input checked="" type="checkbox"/> Bog <input type="checkbox"/> Fen <input type="checkbox"/> Swamp <input type="checkbox"/> Marsh <input checked="" type="checkbox"/> Lake <input type="checkbox"/> Stream <input type="checkbox"/> Other: Hound's-tongue most commonly grows on sites frequently disturbed such as roadsides, sand dunes, heavily grazed areas, forest clearings, logging roads or open woodlands. Hound's-tongue establishes and spreads quickly in areas disturbed by logging, grazing and other activities. (3) (6) In Iowa, hounds tongue was found on an upland site dominated by white oak (<i>O. alba</i>), northern red oak (<i>O. rubra</i>), and shagbark hickory (<i>Carya ovata</i>) (6).
	IV. Habitat Effected
IV. Habitat Effected	1. <u>Soil types favored or tolerated</u> : In England and in the Netherlands, hound's-tongue occurs on sand dunes and calcareous substrates. Hound's tongue is absent from acid coastal dunes and from acid sandy soils and does not occur on peat or clay soils. In British Columbia it is found on soils ranging from well-drained, relatively coarse material to clay subsoils in the open coniferous and deciduous forests. In Eastern Canada, hound's tongue is often associated with rocky pastures in limestone regions. (6)
	2. <u>Conservation significance of threatened habitats</u> : Some of the prairies and grasslands in WI that could be threatened by hound's tongue are ranked G2-G3 and S1-S3. Some of the savannas and woodlands in WI that could be threatened by hound's tongue are ranked G1-G2 and S1-S2. (9)
V. Native Habitat	1. <u>List countries and native habitat types</u> : In Temperate Asia - Northern Iran; western and northern Turkey; Armenia; Azerbaijan;

	Georgia; the Russian Federation - Ciscaucasia, Dagestan, Eastern and Western Siberia; Kazakhstan; and Kyrgyzstan. In Europe- Denmark; Finland; Ireland; Norway; Sweden; United Kingdom; Austria; Belgium; Czechoslovakia; Germany; Hungary; Netherlands; Poland; Switzerland; Belarus; Estonia; Latvia; Lithuania; Ukraine; Albania; Bulgaria; Greece; Italy; Romania; Yugoslavia; France [incl. Corsica]; and Spain (4).
VI. Legal Classification	1. <u>Listed by government entities?</u> Yes. Noxious or regulated in CO, MT, NV, WA, WY, SD, OR. (2), (4). Also listed in Alberta and British Columbia (5).
	2. <u>Illegal to sell?</u> YES <input type="checkbox"/> NO <input type="checkbox"/> Notes:
B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	1. <u>Type of plant:</u> Annual <input type="checkbox"/> Biennial <input checked="" type="checkbox"/> Monocarpic Perennial <input checked="" type="checkbox"/> Herbaceous Perennial <input type="checkbox"/> Vine <input type="checkbox"/> Shrub <input type="checkbox"/> Tree <input type="checkbox"/>
	2. <u>Time to Maturity:</u>
	3. <u>Length of Seed Viability:</u> Hounds tongue does not produce a large, persistent bank of buried seeds, and seeds remain viable no longer than 2-3 years (6).
	4. <u>Methods of Reproduction:</u> Asexual <input type="checkbox"/> Sexual <input checked="" type="checkbox"/> <u>Notes:</u> Estimates of total seed number per plant in hound's tongue range from 50 to more than 2,000. (6)
	5. <u>Hybridization potential:</u> Hybridization of hound's-tongue has been reported in Europe, but not in North America (6).
II. Climate	1. <u>Climate restrictions:</u> Hound's-tongue is found in temperate regions. In British Columbia it is found on sites that are characterized by hot, dry summers and cold winters. It survives well in wetter grasslands and moist draws in drier sites. The distribution pattern of hound's tongue in Europe suggests that at its northern limits its temperature requirements during the growing season, rather than the occurrence of winter frost, restrict the species to warmer microsites. (6).
	2. <u>Effects of potential climate change:</u> Drier weather could limit its spread.
III. Dispersal Potential	1. <u>Pathways - Please check all that apply:</u> <u>Unintentional:</u> Bird <input type="checkbox"/> Animal <input checked="" type="checkbox"/> Vehicles/Human <input checked="" type="checkbox"/> Wind <input checked="" type="checkbox"/> Water <input type="checkbox"/> Other: Hound's-tongue was introduced to North America in the middle of the 19th century as a contaminant in cereal grains. Cattle and wildlife are important dispersers of hound's-tongue. (3). Hound's-tongue seeds are covered in a spiny husk and possess a protruding barbs that enables the seed to adhere to wild and domestic animals thus promoting long-distance dispersal. European studies, however, suggest that animal dispersal is rare in hound's-tongue, and wind is considered to be the primary dispersal mechanism. Hound's-tongue seeds also readily adhere to shoes and clothing and need to be removed and carefully disposed of (burned or bagged). It is important to clean mowers,

	<p>vehicles, and tillage equipment after operating in an infested area. (6)</p> <p><u>Intentional</u>: Ornamental <input type="checkbox"/> Forage/Erosion control <input type="checkbox"/> Medicine/Food: <input checked="" type="checkbox"/> Other: Seeds are available for sale on the internet (7).</p>
	<p>2. <u>Distinguishing characteristics that aid in its survival and/or inhibit its control</u>: Hound's-tongue grows a long taproot that can reach 1 m into the soil. The root serves as an organ for storage of energy. This energy provides protection against winter injury because the carbohydrates act as antifreeze in the plant. Hound's-tongue is early successional, competitive, and a prolific seed producer. It depends on the continual creation of disturbed habitats and dispersal of seeds into these areas to maintain or expand populations. (3)</p> <p>Hound's-tongue rosettes can withstand drought stress, enabling the plant to survive water deficits and to delay flowering until conditions are favorable. Generalist herbivores seem to play a positive role in the population dynamics of hound's-tongue by reducing competition from grasses. (6)</p>
IV. Ability to go Undetected	1. HIGH <input type="checkbox"/> MEDIUM <input type="checkbox"/> LOW <input checked="" type="checkbox"/>
C. DAMAGE POTENTIAL	
I. Competitive Ability	<p>1. <u>Presence of Natural Enemies</u>: Erysiphe cynoglossi, a powdery mildew fungus, is a commonly occurring pathogen on hound's-tongue, which decreases plant size and seed production (3).</p> <p>2. <u>Competition with native species</u>: Hound's-tongue can invade grasslands and suppress native grasses (3). Hound's-tongue can establish rapidly and form dense monocultures in disturbed habitats. Populations of hound's-tongue displace native plant species and hinder the re-establishment of valuable range species, thereby decreasing availability of forage to wildlife and livestock. It is most detrimental on rangelands and hayfields because of its toxicity to livestock, although, in most cases, the fresh plant is considered unpalatable by livestock and is generally avoided. (6)</p> <p>3. Rate of Spread: -changes in relative dominance over time: -change in acreage over time: HIGH(1-3 yrs) <input type="checkbox"/> MEDIUM (4-6 yrs) <input checked="" type="checkbox"/> LOW (7-10 yrs) <input type="checkbox"/> Notes: Colonization of disturbed sites can take place very quickly. (6) Originally introduced to North America as a crop seed contaminant in the mid-1800's and spread to current range by 1988. (3) (7)</p>
II. Environmental Effects	<p>1. <u>Alteration of ecosystem/community composition?</u> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Notes: Can displace native species on disturbed sites, but is a weak competitor with grasses (7).</p>

	<p>2. <u>Alteration of ecosystem/community structure?</u> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Notes: A biennial herb to 2 m tall, may become dense in open woodlands or grasslands (7).</p>
	<p>3. <u>Alteration of ecosystem/community functions and processes?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Notes: Not clearly linked to altered fire regimes (7).</p>
	<p>4. <u>Allelopathic properties?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Notes:</p>
D. SOCIO-ECONOMIC Effects	
I. Positive aspects of the species to the economy/society:	Notes: A salve was once made and applied to burns, wounds and skin irritations. The boiled root was used as a cough remedy, but internal use is now discouraged(3). Also used for Astringent; Bronchitis; Cancer; Cancer(Face); Demulcent; Emollient; Hemostat; Neuralgia; Sedative; Spasm; Tumor; Wart. (4)
II. Potential socio-economic effects of requiring controls: Positive: Negative:	Notes:
III. Direct and indirect socio-economic effects of plant:	Notes: Hound's-tongue is toxic. Hound's-tongue contains pyrrolizidine alkaloids, heliosupine and echinatine. The plant is most poisonous in the rosette stage containing 2.1% pyrrolizidine alkaloids. The toxins decline to 0.6% upon maturity. Toxin in dry hound's-tongue is 0.3% . Symptoms of poisoning include weight loss, photosensitization, jaundice, diarrhea, nervousness, convulsions, and coma. Cattle fed chopped sainfoin (<i>Onobrychis viciaefolia</i>) contaminated with hound's-tongue died. Horses are more affected by the toxin than are cattle; the toxin damages the liver. Horse can die after eating as little as 5 mg of the toxin per kg of body weight for 3 days. Also, the burrs attach to cattle, which cause irritation and potential market loss due to stress. Wildlife poisoning by hound's-tongue is rare. (3)
IV. Increased cost to sectors caused by the plant:	Notes: To prevent infestations, cattle must be thoroughly inspected and cleaned before going to market or before being turned onto range(3). This cost will be borne by the cattle industry.
V. Effects on human health:	Notes: It can also cause dermatitis in humans (8)
VI. Potential socio-economic effects of restricting use: Positive: Negative:	Notes: No known commercial use
E. CONTROL AND PREVENTION	
I. Costs of Prevention (including education; please be as specific as possible):	Notes: Prevention is the most effective method for managing hound's tongue. Preventing or dramatically reducing seed production and dispersal, detecting and eradicating weed introductions early, containing current infestations, minimizing soil disturbances, establishing competitive grasses, and managing grazing properly will all help decrease the spread of infestations.

	(6)
II. Responsiveness to prevention efforts:	Notes: N/A
III. Effective Control tactics:	<p>Mechanical <input checked="" type="checkbox"/> Biological <input checked="" type="checkbox"/> Chemical <input checked="" type="checkbox"/></p> <p>Times and uses: Tillage, hoeing, and hand-pulling may provide effective control of , providing these operations are done to second year plants before the reproductive growth stages to prevent seed production. Mechanical methods may not be practical on rangeland and natural areas, but could be useful in improved pastures or roadsides. However, this technique requires large labor inputs and may not be practical in large natural areas. Cutting at 0 to 7 cm above the ground reduces, but does not eliminate, seed production. If hound's-tongue is defoliated frequently and intensively, seed production will be reduced.</p> <p>Herbicides are effective in gaining initial control of a new invasion or a severe infestation, but are rarely a complete or long-term solution. Herbicides are more effective on large infestations when incorporated into long-term management plans that include replacement of weeds with desirable species, careful land use management, and prevention of new infestations. Control with herbicides is temporary, as it does not change those conditions that allow infestations to occur. Picloram (summer or fall), dicamba (spring or fall), chlorsulfuron (spring or fall), metsulfuron and 2,4-D amine can kill plants. Repeated applications may be necessary for several years to maintain adequate control. Herbicide choice and rates are influenced by growth stage, stand density, and environmental conditions (e.g. drought or cold temperatures). As of 1999, 5 biological control agents were being screened for their potential use on . These include a root weevil (<i>Mogulones cruciger</i>), a seed weevil (<i>M. borreginis</i>), a stem weevil (<i>M. trisignatus</i>), a root beetle (<i>Longitarsus quadriguttatus</i>), and a root fly (<i>Cheilisia pasquorum</i>). The root weevil can increase its numbers rapidly in large hound's-tongue populations, and can survive harsh climates. The root beetle is host specific to hound's-tongue.</p> <p>No matter what method is used for control, re-establishment of native, competitive cover is imperative for long-term control and prevention of reinvasion.</p> <p>(3) (6)</p>
IV. Minimum Effort:	Notes: N/A
V. Costs of Control:	Notes: N/A
VI. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: N/A
VII. Non-Target Effects of Control:	Notes: N/A
VIII. Efficacy of monitoring:	Notes: Highly effective. Easy to spot even a few plants.

IX. Legal and landowner issues:	Notes: Cattle and horse farms will appreciate efforts to contain the spread.
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F. REFERENCES USED:

- UW Herbarium
- WI DNR
- TNC
- Native Plant Conservation Alliance
- IPANE
- USDA Plants

Number	Reference
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3	Rangeland Ecosystems and Plants, Fact Sheets, Department of Plant Sciences, University of Saskatchewan. http://www.usask.ca/agriculture/plantsci/classes/range/cynoglossum.html
4	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?12866 (20 April 2007)
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6	Zouhar, Kris 2002. <i>Cynoglossum officinale</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2007, April 20].
7	NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer . (Accessed: April 20, 2007).
8	Washington State Noxious Weed Control Board. http://www.nwcb.wa.gov/weed_info/Written_findings/Cynoglossum_officinale.html
9	WDNR Natural Heritage Inventory Working List. http://www.dnr.state.wi.us/org/land/er/wlist/

Author(s), Draft number, and date completed: Mariquita Sheehan, 1st Draft, 20 April 2007

Reviewer(s) and date reviewed: Kelly Kearns, 7 October 2007

Approved and Completed Date: