

Table 1. Control tactics for devil's-tongue [*Opuntia humifusa* (Raf.) Raf.] infested with cactus moth (*Cactoblastis cactorum* Bergroth).

TRADE NAME	CHEMICAL NAME	RATE	NOTES
Gramoxone Max	Paraquat	0.8 fl oz per gallon water	Non-selective, Restricted-use pesticide. Add 2 teaspoons nonionic surfactant per gallon water. For best results treat between May and September and thoroughly cover cactus foliage with spray solution. Do not make more than 10 applications per year or exceed 1.6 pints Gramoxone Max per acre per year.
Grazon P+D or Tordon 101	Picloram + 2,4+D	½ gallon/A or 2% solution	Restricted-use pesticide. Herbicidal response may be slow. Add 2 teaspoons per gallon or 2 quarts per 100 gallons of spray solution of non-ionic surfactant. Mid- to late-summer applications are most effective for long term control. Avoid applications when plant foliage is wet.
Surmount	Picloram + flu-roxypyr	3 to 6 pints/A or 1% solution	Restricted-use pesticide. Herbicidal response may be slow. Add 2 teaspoons per gallon or 2 quarts per 100 gallons of spray solution of non-ionic surfactant. Mid- to late-summer applications are most effective for long term control. Avoid applications when plant foliage is wet.
Tordon 22K	Picloram	1 pint/A or 1% solution	Restricted-use pesticide. Herbicidal response may be slow. Add 2 teaspoons per gallon or 2 quarts per 100 gallons of spray solution of non-ionic surfactant. Mid- to late-summer applications are most effective for long term control. Avoid applications when plant foliage is wet.
MECHANICAL CONTROL			
Hand removal			Labor intensive and slow. Avoid contact with spines.
Grazing			Burn to remove spines from pads, then introduce cattle into infested areas.

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Published by the GeoResources Institute in cooperation with the United States Geological Survey (USGS). This info is to be published as part of the GeoResources Institute’s Invasive Species Spotlight program with the Extension Service at MSU.



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INVASIVE SPECIES FACT SHEET

Cactus Moth Host Plant

Devil’s-tongue [*Opuntia humifusa* (Raf.) Raf.]

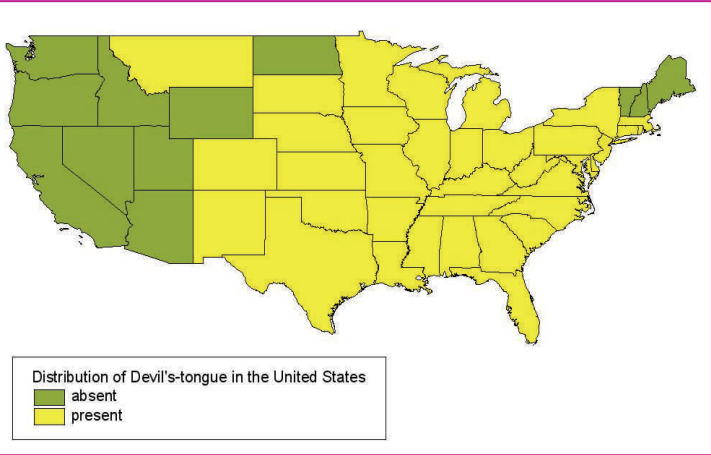
Description, Distribution, and Management

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GRI Pub #5020

INTRODUCTION AND DISTRIBUTION

Devil's-tongue [*Opuntia humifusa* (Raf.) Raf.][Syn. *O. compressa* (Salisbury) Macbride] belongs to the subfamily Opuntioideae in the cactus family (Cactaceae Jussieu). There are around 150 species of *Opuntia* Miller, but only about 34 in the United States. There are four common *Opuntia* species in Mississippi. All four belong to the subgenus *Platyopuntia*, commonly called pricklypear. Devil’s-tongue (*O. humifusa*), cockspur pricklypear [*O. pusilla* (Haw.) Nutt.], and erect pricklypear [*O. stricta* (Haw.) Haw.] are native to Mississippi, but cow tongue pricklypear (*O. engelmannii* Salm-Dyck ex Engelm.) is not. Devil’s-tongue is the most common species in Mississippi.



Three botanical varieties of Devil's-tongue have been accepted. *Opuntia humifusa* (Raf.) Raf. var. *ammophila* (Small) L. Benson does not occur naturally in MS. *Opuntia humifusa* var. *austrina* (Small) Dress has been reported from extreme south Mississippi. *Opuntia humifusa* var. *humifusa* is the most common variety. It is widely distributed in Mississippi and the United States (Figure 1). Devil’s-tongue is most frequent on dry sites with sandy or gravelly soils, or shallow soils over bedrock. It also grows on shell middens (mounds of shells accumulated by American Indians) on the Mississippi coast. It is found throughout the state, from the relic shell middens and dunes of the barrier islands (Figure 2) and adjacent mainland

Fig. 1. Distribution of devil’s-tongue [*Opuntia humifusa* (Raf.) Raf.] in the United States. Data from U.S. Department of Agriculture, Natural Resources Conservation Service.



Fig. 2. Devil’s-tongue (*Opuntia humifusa*) on Horn Island, MS. Photo by Victor Maddox.

in the south to the chalk outcrops of the Blackland Prairies in the northeast to the sandy bluffs of central and southwestern Mississippi. It also is occasionally cultivated as an ornamental.

Pricklypear cacti (*Opuntia* spp.) are being threatened by the accidental introduction of the cactus moth (*Cactoblastis cactorum* Bergroth) into Florida. Since introduction, the moth has expanded its range to southern Alabama on the Gulf Coast and Charleston, South Carolina on the Atlantic Coast. This moth, native to Argentina, is expected to reach Mississippi within the next year. The caterpillars of this moth are capable of complete destruction of plants and stands of cacti. This exotic pest is expected to have a catastrophic effect on the landscape of the western states and Mexico, if its range expands beyond Louisiana.

IDENTIFICATION, BIOLOGY AND ECOLOGY



Fig. 3. Devil's-tongue (*Opuntia humifusa*) flower with a red center. Solid yellow-flowered forms of devil's-tongue exist in Mississippi. Photo by Victor Maddox.

glochids, and occasionally solitary grayish spines 0.5 to 1.5 inches long. Both glochids and spines are sharp. Unlike the spines, glochids readily detach and can become imbedded in the skin when one handles the plant. Unlike cockspur prickly-pear, Devil's-tongue stem segments do not readily detach.

Normally, devil's-tongue flowers from May to June, but it can also flower sporadically from August to October. Flowers are yellow and 2 to 3 inches broad, with or without a red center (Figure 3). The 1 to 2 inch long berry, first green (Figure 4), eventually ripens reddish brown to purple. The berry is tapered at the base and about ½ to three-quarters of an inch in diameter (Figure 5). Seeds are dark, ranging from 1/10 to 2/10 of an inch in diameter.

CONTROL STRATEGIES FOR CACTUS MOTH

If cactus moth is confirmed on devil's-tongue, there are few options for control of the moth. No effective chemical or biological controls have been recommended for the cactus moth, and mechanical control is labor intensive and may not be 100 percent effective. However, it is an available option. Some success was achieved in Florida by weekly removal of cactus moth egg sticks. Since the cactus moth larvae are internal feeders, mechanical removal and destruction of infected plants or plant parts is another possible means of control. There is some interest in developing genetic control by releasing sterile males, but this control method is not available to date.

If devil's-tongue is infested with cactus moth, it may be feasible to control the cactus using herbicides (Table 1). In rights-of-way and forests or on industrial lands and grasslands, herbicides that contain the active ingredient picloram (trade names Tordon, Tordon 101, Grazon P+D, Surmount) can be used effectively to control Devil's-tongue. Picloram is safe to use in grassland systems since most grasses tolerate applications of this herbicide. Many broadleaf plants, however, do not tolerate picloram applications. An additional treatment that may be used in some situations is paraquat (tradename Gramoxone Max). Paraquat is a quick-acting, nonselective herbicide. Before using any of these products remember to read and follow the label instructions. All herbicides that contain picloram or paraquat are restricted use pesticides. Devil's-tongue in pastures may also be controlled by livestock grazing the foliage if hairs and spines are removed by burning.

Devil's-tongue can reach 16 inches tall, but tends to remain close to the ground, forming a mat. The stems are made up of flattened, ellipsoid, ovoid or oblanceolate segments, sometimes called cladodes. They can be 1 to 8 inches long and 1 to 4 inches broad. The nodes have tufts of hairs, called



Fig. 4. Devil's-tongue (*Opuntia humifusa*) with fruit. Photo by Victor Maddox.

HOW YOU CAN HELP

Currently, an effort is being conducted to locate pricklypear populations in Mississippi. This information will be placed in a web database for public and government agency access. This information can then be used by agencies to locate pricklypear populations for cactus moth monitoring. You can help by providing locations where native and ornamental cacti are growing in Mississippi. Please send this information to: Victor Maddox, Ph.D., GeoResources Institute, Box 9555, Mississippi State, MS 39762-9555, Ph. 662-325-2313, Fax 662-325-8742, E-mail: vmaddox@gri.msstate.edu.

Assistance is also needed from individuals who can volunteer to monitor stands of native and ornamental cacti for the presence of the cactus moth. Individuals or groups willing to collaborate on this project can find additional information at:

MORE INFORMATION

Solis, M.A. 2004. Tracking the cactus moth, *Cactoblastis cactorum* Berg., as it flies and eats its way westward in the U.S. *News of the Lepidopterists' Society*. 46(1):3-7.

Hight, S.D., J.E. Carpenter, K.A. Bloem, S. Bloem, R.W. Pemberton, and P. Stiling. 2002. Expanding geographical range of *Cactoblastis cactorum* (Lepidoptera: Pyralidae) in North America. *Florida Ent.* 85(3):527-529.

Stiling, P. 2002. Potential non-target effects of a biological control agent, prickly pear moth, *Cactoblastis cactorum* Berg. (Lepidoptera: Pyralidae), in North America, and possible management actions. *Biol. Invasions* 4:273-281.

RELATED WEB SITES

For pricklypear: The PLANTS Database, Version 3.5 National Plant Data Center, Baton Rouge, LA. <http://plants.usda.gov>

For cactus moth: The cactus moth, an invading pest. GeoResources Institute, Mississippi State University, Mississippi State, MS. www.gri.msstate.edu/cactus_moth



Fig. 5. Devil's-tongue (*Opuntia humifusa*) with unripe fruit. Photo by Victor Maddox.