Green Antelopehorn Milkweed Tolerance to Right-of-Way Herbicides

MISSISSIPPI STATE UNIVERSITY EXTENSION

Milkweed has a dual history: it has been explored as a potential crop, while others saw it as a weed.

Some of the earliest European settlers to North America, colonists in Pomeioc, Virginia, used milkweed seedpod floss to make undergarments (Gerarde, 1597). Henkel (1907) stated American Indians used butterfly (*Asclepias tuberosa*), common (*Asclepias syriaca*), and swamp (*Asclepias incarnata*) milkweed medicinally. Whiting (1943) summarized published literature on cultivation of various species of milkweed for rubber, oil, or fiber and cited work by Neish and Burns (1921) suggesting the floss could be used to fill life preservers. Seedpods were collected, dried, and processed for that purpose during World War II. More recently, entrepreneurs marketed pillows, comforters, and clothing filled with floss as a down substitute (Knudson and Sayler, 1992).

Figure 1. Green antelopehorn milkweed in flower.

In contrast, Darlington (1847) listed butterfly milkweed as the primary weedy species of *Asclepias* in cultivated fields. As a physician, he also stated the medicinal value of milkweed was insignificant. Fifty years later, common milkweed was listed as one of 200 agricultural weeds in the USDA Yearbook of Agriculture 1895 (USDA, 1896). Georgia (1927) described control methods for four species of milkweed in his text and reported the value of butterfly, common, and swamp milkweed roots ranged from 4 cents to 10 cents per pound for medicinal use.

Decline of monarch butterfly populations since 1996 has been attributed at least partly to decreased populations of milkweeds. Howard (2015) attributed the decline to loss of suitable reproductive habitat (milkweed) partly due to increased production of genetically modified crops and the herbicides applied to those crops. A 2016 U.S. government initiative to protect monarch butterflies as well as other pollinators included federal funds to promote pollinator habitat on privately owned property, federally managed lands, and electric, utility, and highway rights-of-way.

The USDA Plants Database (2018) lists 20 species of milkweed native to Mississippi. In a recent survey of Mississippi highway right-of-way vegetation, three species of milkweed were found on roadsides maintained by the Mississippi Department of Transportation. In 800 plots randomly scattered across Mississippi, green antelopehorn (*Asclepias viridis*) (**Figure 1**) was found in four plots, common milkweed was found in two plots, and Michaux's milkweed (*Asclepias michauxii*) was found in one plot (V. Maddox, personal communication). While milkweeds do occur, they are not common on major roadside rights-of-way in Mississippi.

In an effort to determine the impact of roadside vegetation management practices on milkweed, Mississippi State University conducted research in 2016 and 2017 on field populations of green antelopehorn. Plants were sprayed the first week of May both years. The number of green antelopehorn stems was counted in each plot and recorded before herbicide application and 1 year

later. To determine the impact on green antelopehorn, the difference in stem numbers before and 1 year after application was compared to the difference where no herbicide was applied. Treatments were applied to four replicated plots in a randomized complete block design. Data were analyzed statistically to determine valid differences among the treatments. Results are summarized in **Table 1**.

Researchers found that only four herbicides consistently reduced green antelopehorn populations both years: Roundup (glyphosate), Arsenal (imazapyr), and Viewpoint (imazapyr+aminocyclopyrachlor+me tsulfuron) applied at all rates evaluated, and Garlon 4 Ultra/Remedy Ultra (triclopyr ester) applied at the high rate. Opensight/Chaparral (aminopyralid+metsulfuron) reduced populations one year but not both, as did the high rates of Vastlan (triclopyr choline) and Graslan (picloram+2,4-D choline). This could be due to ecotype, morphological development, or environmental differences between these populations and years. The vast majority of herbicides used for integrated vegetation management on roadsides and rights-of-way did not have a negative impact on green antelopehorn populations. One herbicide, Outrider (sulfosulfuron), applied at either rate resulted in an increase in the number of milkweed stems compared to the untreated.

Additional research needs to be done to investigate the tolerance of other species of milkweed to these herbicides.

References

Darlington, W. (1847). *Agricultural botany: An enumeration and description of useful plants and weeds, which merit the notice, or require the attention of American agriculturalists.* Philadelphia, PA: JW Moore.

Georgia, A. (1927). *Manual of weeds with description of all the most pernicious and troublesome plants in the United States and Canada, their habits of growth and distribution with methods of control.* New York, NY: MacMillan Company.

Gerarde, J. (1597). *The herball or general historie of plantes.* London, England: John Norton.

Henkel, A. (1907). *American root drugs.* USDA Bureau of Plant Industry Bulletin 107. Washington, DC: Government Printing Office.

Howard, E. (2015). *Where are the monarchs? Examining issues that affect the monarch population*. Retrieved from https://journeynorth.org/tm/monarch/conservation_overview.html

Knudsen, H. D., & Sayler, R. Y. (1992). Milkweed: The worth of a weed. In E. Madigan (Ed.), *New crops, new uses, new markets: Industrial and commercial products from U.S. agriculture* (pp. 118–123). Washington, DC: Government Printing Office.

Neish, A. C., & Burns, J. W. (1921). Utilization of the common milkweed. *Canadian Chemistry and Metallurgy, 5*(11), 316–319.

U.S. Department of Agriculture. (2018). *PLANTS database*. Retrieved from https://plants.sc.egov.usda.gov/java/

U.S. Department of Agriculture. (1896). Two hundred weeds: How to know them and how to kill them. In C. W. Dabney (Ed.), *Yearbook of the United States Department of Agriculture 1895* (pp. 592–611). Washington, DC: Government Printing Office.

Whiting, A. G. (1943). *A summary of the literature on milkweeds (*Asclepias *spp.) and their utilization.* USDA Biographical Bulletin No 2. Washington, DC: Government Printing Office.

Table 1. Differences in stem numbers 0 and 12 months after treatment application to field populations of green antelopehorn milkweed in Oktibbeha and Lowndes Counties.

Active Ingredient(s)	Trade Name	Rate/A	2016	2017
aminocyclopyrachlor	Method (2 lb ae/gal)	8 fl oz	=	=
		12 fl oz	=	=
aminocyclopyrachlor+chlorsulfuron	Perspective (55.3% ai)	2.5 oz	=	=
		5 oz	=	=
aminopyralid	Milestone (2 lb ae/gal)	3.5 fl oz	=	=
		7 fl oz	=	=
aminopyralid+2,4-D	GrazonNext HL (3.74 lb ag/gal)	1 pt	=	=
		2 pt	=	=
aminopyralid+metsulfuron	Chaparral/Opensight (71.6% ai)	1.5 oz	-	=
		3 oz	-	=
foramsulfuron+iodosulfuron+thiencarbazone	Derigo (36.4% ai)	3 oz	=	=
		6 oz	=	=
fluroxypyr	Vista (2.8 lb ae/gal)	11 fl oz	=	=
		22 fl oz	=	=
glyphosate	Roundup Powermax (4.5 lb ae/gal)	1 qt	-	-
		2 qt	-	-
		4 qt	-	-
hexazinone	Velpar L (2 lb ai/gal)	1.5 pt	=	=
		3 pt	=	=
imazapyr	Arsenal (2 lb ae/gal)	1 pt	-	-
		2 pt	-	-
imazapyr+aminocyclopyrachlor+metsulfuron	Viewpoint (61.7% ai)	10 oz	-	-
		20 oz	-	-
metsulfuron	Escort XP (60% ai)	0.25 oz	=	=
		0.5 oz	=	=
metsulfuron+chlorsulfuron	Cimarron Plus (63% ai)	0.6 oz	=	=
		1.2 oz	=	=
metsulfuron+nicosulfuron	Pastora (71.2% ai)	0.75 oz	=	=
		1.5 oz	=	=
picloram+2,4-D (choline)	Graslan (3.81 lb ae/gal)	1.3 pt	=	=
		2.67 pt	-	=
sulfometuron	Oust (75% ai)	0.5 oz	=	=
		1.0 oz	=	=
sulfosulfuron	Outrider (75% ai)	0.65 oz	+	+
		1.3 oz	+	+
triclopyr (choline salt)	Vastlan (4 lb ae/gal)	2 pt	=	=
		4 pt	=	-
triclopyr ester	Remedy Ultra/Garlon 4 Ultra (4 lb ae/gal)	2.5 pt	-	=
		5 pt	-	-

= indicates green antelopehorn populations not different than the untreated; + indicates populations increased compared to the untreated; - indicates populations decreased compared to the untreated.

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