TECHNICAL NOTE

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ECOLOGY AND MANAGEMENT OF CANADIAN HORSEWEED (*CONYZA CANADENSIS*)

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Canadian horseweed. Photo by:Richard Old.
1,200 Weeds of the 48 States and Adjacent Canada xidservices.com

This technical note describes the ecology and management of Canadian horseweed (*Conyza candensis*). It provides a species description, life history and known mechanical and chemical treatments proven to be effective in controlling this species in agricultural situations. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

Introduction

Canadian horseweed, also known as mare's tail and Canada fleabane, is a native forb that has become a problematic weed in agricultural lands. It is known to reduce crop yields through direct competition for resources and by producing allelopathic chemicals which inhibit germination and reduce seedling growth in several species. Studies in Michigan indicate that Canadian horseweed can reduce soybean yields up to 83 percent if untreated (Bruce and Kells 1990). Over the last few decades, scientists have discovered several strains of Canadian horseweed which are resistant to commonly used herbicides, making it a difficult to control pest. It is especially troublesome in no-till cropping scenarios where heavy reliance on glyphosate has created "Roundup resistant" strains. Chemical treatment to combat herbicide resistant Canadian horseweed often requires a combination of several herbicide types for complete control.

Description

Canadian horseweed is a native winter or summer annual forb in the sunflower or composite family. The plants are erect with one to several stems reaching 30 to 150 cm (1 to 5 ft) tall. Stems are typically unbranched at the base unless damage has occurred to the apical growing points. The leaves are linear to oblanceolate, 2 to 8 cm (0.8 to 3.1 in) long and 2 to 8 mm (0.08 to 0.31 in) wide with ciliate-serrate margins. The inflorescence is a loose panicle. The numerous flower heads are very small, 2 to 4 mm (0.08 to 0.16 in) tall and 2 to 4 mm (0.08 to 0.16 in) wide. The rays are white or purplish (Welsh et al. 2003) and very small, only reaching 0.5 to 1.0 mm (0.02 to 0.04 in) in length (Cronquist 1994). The fruit is an achene with a white bristly pappus. There are approximately 700,000 seeds per pound (USDA-NRCS, 2012).

Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / USDA SCS. 1991. *Southern wetland flora: Field office guide to plant species*. South National Technical Center, Fort Worth.

Canadian horseweed was historically used by numerous Native American peoples to treat a variety of ailments. It was used by the Seminole as a cough and cold medicine (Sturtevant, 1954). The Navajo and Chippewa used Canadian horseweed for stomach pain (Densmore 1928; Wyman and Harris 1951), and the Iroquois used an infusion of the plant to combat fevers (Rousseau 1945).

Habitat

Canadian horseweed is native throughout much of North America and was introduced into Europe in the mid 17th century, likely along with Canadian furs shipped to France. Canadian horseweed is common in grasslands and in moist disturbed sites including riparian and wetland areas. In recent years it has become a common pest in agricultural locations throughout its range.

Canadian horseweed is adapted to a broad range of conditions and soil types. It prefers slightly acidic to neutral soils (pH 4.8 to 7.2) in areas receiving 16 to 55 inches annual precipitation (USDA-NRCS 2012). The plants produce large quantities of windborne seed, making it an effective colonizer of disturbed soils (Regehr and Bazzaz 1979).

A bolting rosette of Canadian horseweed. Ted Bodner @ USDA-NRCS PLANTS Database / James H. Miller and Karl V. Miller. 2005. *Forest plants of the southeast and their wildlife uses.* University of Georgia Press., Athens.

Life History

Canadian horseweed has been described as both a summer annual and a winter annual with seed germinating at any time with sufficient moisture and warmth (Waggoner et al. 2011). In winter annual forms the seed germinates in the fall and the plant overwinters as a rosette. It then bolts in the spring and produces flowers in mid to late summer. Spring germinating Canadian horseweed spends relatively little time as a rosette before bolting (Loux et al., 2006).

Canadian horseweed is a prolific seed producer. With small, light seeds that can travel great distances in the wind. Dauer et al. (2007) reported seed of Canadian horseweed travelling at least 1,640 ft from source populations. There may be as many as 12,500 seeds per square yard at 20 ft to more than 125 seeds per square yard 400 ft from the parent plant (Regehr and Bazzaz 1979).

Problems

Canadian horseweed is associated with several agricultural problems. It increases under reduced tillage and no-till situations (Steckel and Culpepper 2006). It can serve as a host for the tarnished plant bug (*Lygus lineolaris*), which can be a pest in alfalfa, cotton and other agricultural crops (Loux et al. 2006). Horseweeds can also be a host for the viral disease, aster yellows, which is transported to other plants via leafhoppers (Loux et al., 2006). Vegetation of Canadian horseweed contains a terpene which can be irritating in the nostrils of horses (Whitson et al. 1996).

Canadian horseweed can reduce crop yields through direct competition for resources. It is also known to contain allelopathic chemicals which can inhibit germination and reduce seedling growth in several species including tomato, radish, wheat, corn, millet and mung bean (Shaukat et al. 2003).

Several herbicide resistant biotypes of Canadian horseweed have been discovered. In 1980, a Gramoxone (paraquat) resistant biotype was first reported. In 1989, atrazine resistant biotypes were discovered in Belgium. Horseweeds resistant to the ALS (acetolactate synthase) family of herbicides were discovered in Israel in 1993 (Zheng et al. 2011). A glyphosate resistant horseweed was first reported in 2000 (VanGessel 2001). Since that time, glyphosate resistant Canadian horseweed has been found in much of the U.S., Europe and Asia (Heap 2012). Glyphosate resistance causes Canadian horseweed to be a serious threat to conservation tillage cropping where weed control is reliant upon chemical treatments.

Control

Canadian horseweed is much easier to control when plants are young (less than 2 inches tall), but herbicide treatments can be effective with plants up to 4 to 6 inches tall. Control efforts should be concentrated in late fall and early spring when plants are young. Small infestations can be controlled by pulling or roguing, while larger areas can be treated with chemicals.

The most effective treatment for controlling Canadian horseweed is 2, 4-D ester or a combination of 2, 4-D ester plus glyphosate (Loux et al. 2012). Spring herbicide treatments with residual activity to control later emerging horseweed are also recommended. Fall treatments will effectively control emerged horseweed, but may not control plants emerging in the spring. Plants not killed by chemical burn down will re-grow and be less susceptible to later herbicide applications. These plants often sprout multiple stems resulting in increased seed production. In populations with a resistant biotype, chemical treatments should contain three or more herbicides (Loux et al. 2006). Three-way mixture of glyphosate, 2, 4-D ester, plus chlorimuron or cloransulam are recommended.

Contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

References

Bruce, J.A. and J.J. Kells. 1990. Horseweed (*Conyza canadensis*) control in no-tillage soybeans (*Glycine max*) with preplant and preemergence herbicides. Weed Technology. 4: 642-647.

Cronquist, A. 1994. Asterales. In: Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal and P.K. Holmgren (eds). 1994. Intermountain flora: Vascular plants of the Intermountain West, U.S.A. Vol. 5. Bronx, New York: The New York Botanical Garden. 496 pp.

Dauer, J.T., Mortensen, D.A., and M.J. Vangessel. 2007. Temporal and spatial dynamics of long-distance *Conyza canadensis* seed dispersal. Journal of Applied Ecology. 44: 105-114.

Densmore, F. 1928. Uses of plants by the Chippewa Indians. SI-BAE Annual Report No. 44: 273-379.

Heap. I. 2006. The International Survey of Herbicide Resistant Weeds. www.weedscience.com (accessed August 27, 2012).

Loux, M.M., Stachler, J.M., Johnson, W.G., Nice, G.R.W. and T.T. Bauman. 2012. Weed Control Guide for Ohio Field Crops. Ohio State University Extension. Bulletin No. 789. URL. http://ohioline.osu.edu/b789/index.html (accessed 28Aug2012).

Loux, M., Stachler, J., Johnson, B., Nice, G., Davis, V., and D. Nordby. 2006. Biology and management of horseweed. The glyphosate, weeds and crops series. Purdue University Extension. GWC-9. 12p.

Regehr, D.L., and F.A. Bazzaz. 1979. The population dynamics of *Erigeron canadensis*, a successional winter annual. Journal of Ecology. 67: 923-933.

Rousseau, J. 1945. Le Folklore Botanique De Caughnawaga. Contributions de l'Institut botanique l'Universite de Montreatl. 55: 7-72.

Shaukat, S.S., Munir, N., and I.A. Siddiqui. 2003. Asian Journal of Plant Sciences. 2(14): 1034-1039.

Steckel, LE. and S. Culpepper. 2006. Impacts and management of glyphosate-resistant weeds in the southern region. National IPM Conference 46.4. [Proceedings].

[USDA NRCS] USDA Natural Resources Conservation Service. 2011. The PLANTS Database. URL: http://plants.usda.gov (accessed Aug. 27, 2012). Baton Rouge (LA): National Plant Data Center.

VanGessel, J.J. 2001. Glyphosate resistant horseweed from Delaware. Weed Science. 49: 703-705.

Waggoner, B.S., Mueller, T.C., Bond, J.A., and L.E. Steckel. 2011. Control of glyphosate-resistant horseweed (*Conyza candensis*) with saflufenacil tank mixtures in no-till cotton. Weed Technology. 25: 310-315.

Welsh, S.L., Atwood, N.D., Goodrich, S. and L.C. Higgins. 2003. A Utah Flora. Brigham Young University. Provo, UT. 912p.

Whitson, T.D., Burrill, L.C., Dewey, S.A., Cudney, D.W., Nelson, B.E., Lee, R.D., and R. Parker. 1996. Weeds of the West.Pioneer of Jackson Hole. Jackson Wyoming. 630p.

Wyman, L.C. and S.K. Harris. 1951. The ethnobotany of the Katenta Navajo. Albuquerque. The University of New Mexico Press.