

CANADA THISTLE MANAGEMENT IN ORGANIC FIELD CROPS. Matthew M. Harbur, Research Specialist, University of Minnesota Southwest Research and Outreach Center, 23669 130th Street Lamberton MN 56073. Donald L. Wyse and Craig C. Sheaffer, Professors, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108. Deborah L. Allan, Professor, Department of Soil, Water and Climate, University of Minnesota, St. Paul, MN 55108.

Canada thistle is a problematic weed for certified organic producers, who lack systemic herbicides with which to directly attack the weed's vast root system. In the absence of herbicides, systemic, multiple-year strategies are needed to deplete subterranean carbohydrate reserves. In yesteryears, alfalfa was an effective control for Canada thistle; during production of that crop, Canada thistle was repeatedly mowed, thereby reducing its reserves. Three or more years of alfalfa production are required to significantly reduce Canada thistle populations, however, and many producers are unable to sell or feed that crop.

The purpose of the following research was to evaluate several two-year organic cropping systems for their potential to suppress Canada thistle by mimicking the timing of Canada thistle disturbance found in alfalfa systems – while hastening the depletion of Canada thistle populations or producing profitable conventional or alternative crops. Cropping systems included in this study included various components, ranging from repeated tillage to alternative crops to corn and soybean:

Trt	Year 1	Year 2
1.	Field cultivation every 21 d from May-Sept.	Soybean planted in late May.
2.	Field cultivation every 21 d from May-Sept.	Field cultivation every 21 d.
3.	Field cultivation every 21 d from May-Sept.	Soybean planted in late May.
4.	Field cultivation every 21 d from May-Sept.	Field cultivation every 21 d.
5.	Buckwheat planted in mid-June.	Soybean planted in late May.
6.	Buckwheat planted in mid-June.	Buckwheat planted in mid-June.
7.	Pearl millet planted in mid-June.	Soybean planted in late May..
8.	Pearl millet planted in mid-June.	Pearl millet planted in mid-June.
9.	Sunn hemp planted in mid-June.	Soybean planted in late May.
10.	Sunn hemp planted in mid-June.	Sunn hemp planted in mid-June.
11.	Field pea grown until June, buckwheat planted in mid-June.	Soybean planted in late May.
12.	Field pea grown until June, buckwheat planted in mid-June.	Buckwheat planted in mid-June.
13.	Corn planted in mid-May.	Soybean planted in late May.

In the third year, systems were rotated into wheat and alfalfa production to determine the potential of these systems to facilitate alfalfa establishment and enhance alfalfa suppression of Canada thistle during the following year. Two experiments were conducted, beginning in 2003 and 2004.

At the end of the second year of both experiments, treatment effects were highly significant. Systems which included repeated tillage during the first year had the fewest Canada thistle. We had hypothesized that delaying tillage until Canada thistle reached bud stage (mid-June in Minnesota) would maximize the depletion of carbohydrate reserves and hasten the decline of Canada thistle populations. No difference, however, was observed between systems in which tillage was begun in mid-May and those in which it was delayed until mid-June.

Among systems that were cropped during the first year, there was no overall advantage to the smother crops compared to corn by the end of the second year of each experiment. Within the systems that included smother crops during the first year, however, the systems that produced the pea - buckwheat double crop had fewer thistles in the first experiment than those that were sole-cropped. Systems that followed smother crops in the first year with soybean during the second year had fewer Canada thistle at the end of the second season than systems in which smother crops were grown in both years.

At the end of the third year (first experiment only), Canada thistle population density was still least in systems that were repeatedly tilled during the first year. Systems that were produced smother crops during the first year had fewer Canada thistles than the system that was cropped with corn. Among smother crops, however, the advantages of growing field pea in the first year or soybean in the second year had disappeared.

To date, repeated tillage has been the most effective alternative to alfalfa for controlling Canada thistle in organic systems, however, not an alternative that is expected to increase farm income. Among continuous crop systems, smother crops or soybean may allow the production of a crop while also reducing Canada thistle population density. Control of Canada thistle with smother crops may vary widely, however, with differences in smother crop performance among growing seasons.