SUPPRESSION OF CANADA THISTLE WITH SUMMER ANNUAL COVER CROPS AND MOWING – YEAR 2. Abram Bicksler and John B. Masiunas, Graduate Research Assistant and Associate Professor, Department of Natural Resources and Environmental Sciences, University of Illinois, 1201 West Gregory Drive, Urbana, IL 61801.

Canada thistle (*Cirsium arvense*) is a vigorous, creeping perennial weed that forms dense patches. There are few options to manage Canada thistle in organic cropping systems. Tillage creates propagules from the deep, fibrous root system, further spreading the problem and causing larger patches. It can take many years of intensive mowing to suppress thistle. Warm season annual cover crops grow when Canada thistle root reserves and ability to regenerate are low and when seedlings first emerge. Competitive summer annual cover crops may prevent thistle growth, flowering and seedling establishment. In preliminary research, Sudangrass reduced Canada thistle while cowpeas alone did not. Combining Sudangrass and cowpea may reduce thistle populations while supplying legume-derived nitrogen for subsequent crops. In 2006, field studies were conducted on organic farms and the University of Illinois Cruse Research Farm using established patches of Canada thistle. Prior to planting cover crops, we tilled to kill emerged thistle, slice the upper roots into small pieces, and prepare the seedbed for planting cover crops. The cover crop treatments were no cover crop (weedy fallow), buckwheat, Sudangrass, and Sudangrass + cowpea. The cover crop treatments were mowed either none, one or two times. Cowpea could not compete with Sudangrass and most cover crop plants in the mix were Sudangrass. Even without treatment, the number of Canada thistle shoots decline over the growing season. This decline in number of shoots in a patch of Canada thistle is natural and is likely due to failed establishment, competition between thistle plants, and pest attack. Cover crops and mowing acted independently to reduce thistle patches. At 3 months after planting cover crops, thistle was 21 and 3% of initial numbers in the buckwheat and Sudangrass (alone or with cowpea), respectively. At 3 months, mowing once reduced thistle more than mowing twice. Two mowings further damaged growing points of thistle but made other weeds and cover crops less competitive and triggered emergence of new thistle shoots. In 2007, at the Cruse Research Farm we determined if previous year treatments affected Canada thistle patches. The field was intensely tilled and we planted organic food-grade soybeans. In soybeans, the areas formerly with Sudangrass or Sudangrass + cowpea had Canada thistle populations approximately 2% of those the previous spring. Canada thistle shoots emerging in these areas were stunted and not competitive with the soybeans. Areas mown once had fewer thistle shoots than areas mown twice. Mowing and buckwheat only suppressed thistle for a single growing season. Sudangrass rapidly grows, tilling extensively, forms a tall dense canopy, tolerates mowing, quickly regrows, and forms thick mulch. Sudangrass combined with mowing controls Canada thistle due to competition for resources and leaching of allelopathic compounds from roots. Mowing also defoliates thistle (mown at 7-10 leaf stage) and causes Sudangrass re-growth and tillering resulting in more competition for light. The thick mulch can smother thistles, modify the soil environment (cooler temps, increased moisture), and release allelochemicals.

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