LONG-TERM CANADA THISTLE MANAGEMENT IN PASTURES. Jerry D. Doll. Extension Weed Scientist, Department of Agronomy, University of Wisconsin, 1575 Linden Dr., Madison, WI 53706.

While Canada thistle may be a minor concern in annual cropping systems and forage crops that are in rotation with grain crops, it remains a significant problem in pastures, CRP sites, roadsides and similar areas. Many livestock producers are content to live with Canada thistle as long as their grazing and mowing practices keep it to tolerable levels. While this seems to work for many, Canada thistle can reach levels that reduce the utility and productiveness of pastures and producers in this situation look for herbicides to control Canada thistle. The available alternatives vary in degree of effectiveness and cost (usually inversely related). Research in Wisconsin and elsewhere finds that among the selective herbicides, clopyralid is the most effective molecule to control Canada thistle. It is also the most expensive one.

In 2000, we started a long-term project on Canada thistle in a working pasture at our Agricultural Research Station near Lancaster, Wisconsin to compare various strategies of Canada thistle management with the goal of finding the most economical one for grazed pastures. The trial will last at least five years so that reasonable estimates of the long-term costs and benefits can be made.

The trial has four basic systems as starting points and then we either stay with the same product or shift to a different one when retreatment is needed for a total of 12 treatments. The four systems are clopyralid (0.23 lb ae/a), metsulfuron (5.0 g ai/a), dicamba (1.0 lb ae/a as dicamba) and clopyralid plus dicamba (half rate of either product alone) which were broadcast applied in 2000 to a moderate population of Canada thistle in a pasture routinely grazed by beef cattle at the Research Station. Herbicides were applied in mid June (except for 2002 when the date was July 19) following a grazing event using a CO_2 backpack sprayer fitted with extended range flat fan nozzles. The spray volume was 20 gal/a in 2000 and 2001 and 15 gal/a in 2002-2004. Recommended additives, if any, were used at labeled rates. Plots were 20 by 25 ft and treatments were replicated three times.

The decision to treat or not in 2001 and beyond was based on both Canada thistle population counts and a visual assessment in June. We placed a measuring tape diagonally cross each plot in June and dropped a 2x2-ft quadrat five times along the tape in each plot at set points (5, 10, 15, 20 and 25 ft) and counted and recorded all Canada thistle stems found. A visual assessment of thistle abundance (0 to 100 scale) was also done; this is closer to what the producer would do to determine if herbicides are to be used or not. We generally used a threshold of 40 stems/100 sq ft to decide if a treatment would be applied.

Performance observations. 2000. Canada thistle suppression was less than expected from all treatments. Control ratings in July were very good to excellent for clopyralid, fair to good for metsulfuron and clopyralid plus dicamba, and poor for dicamba alone. The thistle pressure ratings in October were relatively high for all treatments, with only those containing clopyralid giving reasonable suppression as evaluated by the change in relative thistle pressure from June to October. Perhaps the fact that the site had been grazed for a week immediately preceding the applications reduced translocation to the roots. The 9-hour interval between application and first rainfall should have been adequate for absorption to have occurred.

2001. Canada thistle populations in the spring of 2001 were essentially unchanged from those of 2000 reinforcing the thistle pressure levels observed in the fall of 2000. The 2001 treatments were not impacted by grazing and were much more effective as all treatments gave 88% visual control in July. Treatments with clopyralid in 2001 had the lowest Canada thistle pressure in the fall. However, Canada thistle pressure in the fall of 2001 was high for all metsulfuron treatments, indicating that this product does not offer long term control.

2002. Only consecutive applications of clopyralid and clopyralid followed by dicamba did not need retreating in 2002. Consecutive use of metsulfuron at the rate used and time applied failed to control

Canada thistle; the same was true for repeated applications of dicamba. The challenge of reducing thistle populations to acceptable levels is indeed a challenge. Modifications in treatments were made this year in that a premixture of clopyralid and triclopyr (Redeem) was used in three treatments instead clopyralid because Redeem is more economical than clopyralid (Stinger).

2003. Seven of the 12 treatments did not need herbicide this year (thistle populations in June were less than 40 stems/100 sq ft). The pattern that emerged is that two consecutive applications of products containing clopyralid resulted in relatively low thistle populations. This year a premixture of 2,4-D and clopyralid (Curtail) was used to replace metsulfuron (which at the time and rate used in this study was not effective). Next year, Curtail will be used to replace clopyralid and Redeem (Redeem is not marketed in Wisconsin) in all treatments except the one based on clopyralid as needed. Canada thistle pressure ratings in October were 2% or less for repeated dicamba application and for clopyralid or Curtail in 2003.

2004. As in 2003, several treatments were not needed in 2004. Plots within a treatment varied more in thistle density than desired and the threshold of 40 stems/100 sq ft was applied as follows: if two of the three plots averaged less than this density, herbicide was not applied. All herbicides applied in June 2004 reduced Canada thistle pressure (visual assessment) in October while the thistle abundance in all untreated plots increased. Pressure ratings in the fall were more variable than desired for some of the herbicides applied in 2004, especially for Curtail where the pressure varied from 0 to 9% within the treated plots. Curtail applied in June 2003 did not need retreating and had little Canada thistle in Oct. 2004. Dicamba plus diflufenzopyr (Overdrive which is labeled for use in pastures) was included in two of the 2004 treatments and reduced thistle pressure in October to very low levels.

Economic assessment. The costliest system was clopyralid (Stinger) used when needed (three of the five years) which cost $164/a (product plus three applications at $8/a each). The least costly systems were two applications of Stinger plus Clarity (half rates of each) followed by two applications of metsulfuron followed by one of Curtail ($93/a), and four applications of metsulfuron and one of Overdrive ($95). While $93 to $95/a may be the lowest cost, they had the most applications (four or five) and would not be recommended because metsulfuron did not give acceptable control as used in this study. Two systems that were effective and more economical than repeated clopyralid applications were Stinger in 2000 followed by Clarity in 2001 and 2004 ($108/a) and Stinger plus Clarity tank mix in 2000 and 2001 and Redeem plus Clarity in 2002 ($103/a).

Tackling Canada thistle in grazed pastures requires a long-term commitment. This trial will continue as we do not have all the answers yet.