Canada thistle control at Rosemount MN - 1998 to 1999. Becker, Roger L. and Douglas W. Miller. The objective of this study was to determine the effect of various experimental herbicides on Canada thistle control. The experiment was conducted in an established pasture at Rosemount, MN. The area was mowed during the summer of 1998. The experimental design was a randomized complete block with three replications. Plot size was 8 ft x 20 ft. Herbicide treatments were applied on September 4, 1998 to the center 6 ft of each plot with a backpack type sprayer delivering 20 gpa at 35 psi with 11002 nozzles. Air temperature was 69 degrees and soil temperature was 55 degrees. Soil moisture conditions were dry. Canada thistle regrowth was 6 to 10 inches. The smooth bromegrass/Kentucky bluegrass height was 8-14 inches. Two formulations, NB30111A and NB30111B did not mix well. This resulted in nonuniform application and is likely responsible for decreased efficacy noted with these two compounds (see table). Control was rated on July 15, 1999. Data are presented in the table below.

Treatments were evaluated the following year on July 15, 1999. Brome and Kentucky bluegrass were green, vegetative growth with mature seed-heads at three- to four-ft for brome and one- to two-ft for Kentucky bluegrass. Canada thistle in untreated checks was three- to four-ft tall and at an immature- to mature-seed stage of development. Some seed-head suppression was evident in smooth bromegrass (dominant grass species comprising 90% of pasture grass species present) and was confounded somewhat by uneven seed-head emergence in 20% of the plot area regardless of treatment. Seed-head suppression of brome was not significant even at the 25% level, yet, there appeared to be distinct trends with seed-head suppression in some treatments that followed application patterns and is noted as 0 (absent) or 1 (present) so average values indicate the number of plots of three reps that showed significant injury (60% or greater seed-head suppression).

NB30111A and B both provided poor control of Canada thistle the year following application, in part due to uneven application and lower than targeted active ingredient application rates due to formulation problems as noted earlier. Similarly low control was noted for NB20663 and NB20652. The best control was with the high rate of clopyralid (0.375 lb. ae/acre). Similar, but slightly lower control was obtained by using reduced rates of clopyralid (0.19 lb ae) with Hi-Dep formulation of 2,4-D (1.0 lb ae) as a tank mixture and with clopyralid alone (0.19 lb ae). The rest of the numbered compounds tested provided control that was numerically lower, but not significantly different than clopyralid plus 2,4-D treatments. The Curtail commercial package mixture of 2,4-D plus clopyralid did not provide better control than the Hi-Dep formulation of 2,4-D plus clopyralid applied as a tank mixture. As usual, there was variability between plots in Canada thistle population density and regrowth. Treatment probability F values for visual control were significant at the 6% level when zero values for untreated checks were excluded (5% if zeros were included). Vegetative injury of brome, a composite of reduced leaf height and chlorosis and necrosis of brome leaves, was not significant at the 10% level. However, the injury of grass swards with certain treatments did follow application patterns, most notably with NB20656, NB30073, and NB20652 which may have implications for use in grass pastures relevant to the potential to reduce forage yield in the year of application. This injury would not be of concern for vegetation management where yield is not important such as roadside or right-of-way uses. (Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul).

Table. Canada thistle control at Rosemount, MN - 1998 to 1999. (Becker and Miller).

Treatment	Rate	Canada Thistle Control	Bromegrass Injury
	(lb ae/A)	---------- (%) ----------	
2,4-D[1]	1.0	68	0
2,4-D + clopyralid	1.0 + 0.19	79	17
Clopyralid	0.19	84	18
Clopyralid	0.375	90	13
Clopyralid & 2,4-D[2]	0.19 & 1.0	73	17
NB20656	1.0	65	29
NB20663	0.5	56	17
NB20652	1.5	52	33
NB20830	1.5	72	15
NB30073	1.0	65	26
NB30075	1.0	69	13
NB30111A	1.0	40	0
NB30111B	1.0	49	0
LSD (0.05)		ns	ns

[1] Hi-Dep.
[2] Premix = Curtail 2.38.