

AMINOPYRALID EFFECT ON CANADA THISTLE (*CIRSIUM ARVENSE*)  
AND NATIVE PLANTS IN WESTERN NORTH DAKOTA

A Dissertation  
Submitted to the Graduate Faculty  
of the  
North Dakota State University  
of Agriculture and Applied Science

By

Luke Walter Samuel

In Partial Fulfillment of the Requirements  
for the Degree of  
DOCTOR OF PHILOSOPHY

Major Program:  
Natural Resources Management

Major Department:  
Plant Sciences

May 2007

Fargo, North Dakota

## ABSTRACT

Samuel, Luke Walter, Ph.D., Program of Natural Resources Management, Department of Plant Sciences, College of Graduate and Interdisciplinary Studies, North Dakota State University, May 2007. Aminopyralid Effect on Canada Thistle (*Cirsium arvense*) and Native Plants in Western North Dakota. Major Professor: Dr. Rodney G. Lym.

Canada thistle is an invasive weed that infests an estimated 5 million ha of range, pasture, and wildlands in the United States. Aminopyralid will control Canada thistle at lower use rates than other auxin herbicides, but the optimum timing of application, mobility in soil, and effects on native plant species are unclear. Aminopyralid application timing was evaluated at three North Dakota locations, Fargo, Jamestown, and Theodore Roosevelt National Park (TRNP), and soil mobility was evaluated in the greenhouse with soil collected near each field experiment. Aminopyralid efficacy on Canada thistle and native plant species was evaluated in TRNP on native rangeland. Spring-applied aminopyralid reduced Canada thistle stem density by 95% after 12 mo regardless of rate compared to an 80% reduction with picloram. All treatments provided excellent control after 12 mo when fall-applied. Aminopyralid soil movement was dependent upon texture. After a simulated flood, aminopyralid was not detected in a clay or sandy loam soil regardless of depth, but was concentrated at the soil surface and bottom of the column in a loam and silty-clay soil. Aminopyralid movement under an incremental rain event was negligible in all soils except the silty clay. Aminopyralid affected Canada thistle-infested and native vegetation plant community composition and structure 10 and 22 mo after treatment (MAT). Canada thistle cover was reduced 10 MAT from 31 to 5% foliar cover while several native grasses increased in treated Canada thistle-infested plots 10 MAT. Slender wheatgrass was reduced 10 MAT in native vegetation plots.