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Picloram Residues on Rangeland : A Project Review

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INTRODUCTION

Picloram residues — sounds like leftover pickle juice. Picloram is actually the active ingredient in a group of herbicides marketed as Tordon®. Tordon 22K® is used by the Ministry of Forests to control knapweed on rangelands. Of the 45,968 ha of provincial land treated with Tordon® between 1987 and 1991, 9797 ha were treated by the Ministry of Forests. This represents 21% of all provincial government use. The amount used on private lands is unknown.

Picloram is a water soluble herbicide taken up into plants via roots and foliage. Two characteristics of picloram make it effective in the control of weed species: 1. its relative mobility which enables it to make contact with roots, and 2. its soil persistence which allows control of germinating plants over a number of years. These two characteristics also create environmental concern because the herbicide can potentially move into and contaminate domestic and irrigation water sources.

Trotter et al (1990) reviewed numerous studies to develop Canadian Water Quality Guidelines for Picloram. They conclude that picloram is one of the most mobile herbicides used in weed control. This mobility, along with its reported half life in soils from 1 to 13 months, has led Ministry of Forest staff to question the environmental impacts on British Columbia rangelands. This study is designed to provide data on the persistence and movement of picloram residues under field conditions of southeastern British Columbia.

PROJECT DESIGN

The project has two components:

1. to provide information on the persistence of picloram residues, on areas historically sprayed with Tordon®.
2. to provide detailed information on the down-slope movement and depth at which the chemical moves, following an operational application.

- Herbicide monitoring in progress
- Multi-agency project participants looking for results



Knapweed
(*centaurea* spp.)

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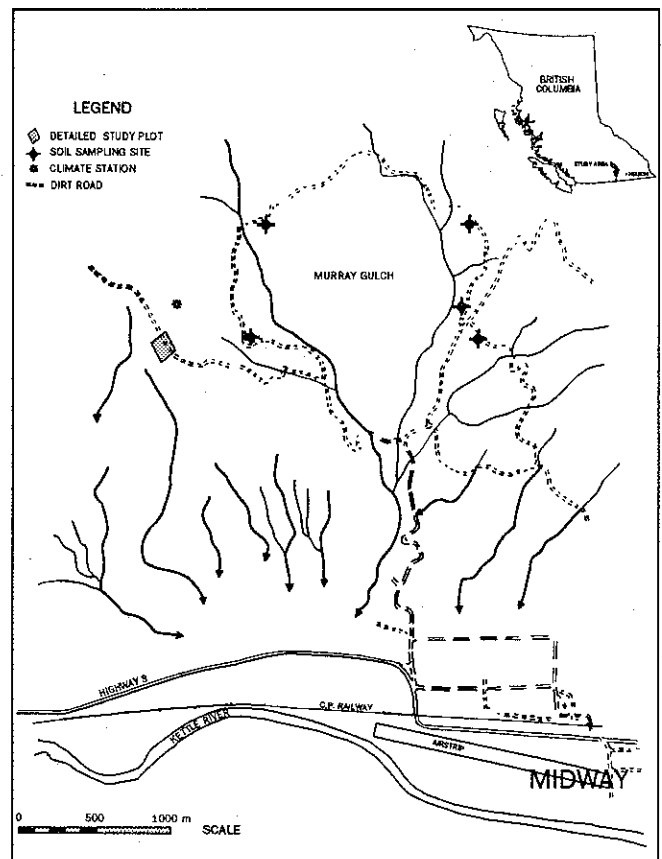


Figure 1: Location of study sites near Midway, B.C.

STUDY SITES

The study location is in the Murry Gulch area near Midway, B.C. (Figure 1).

For Component 1 of the study, five sites were chosen throughout the area. At each site, 10 m by 2 m plots are established along the existing roadside from which soil cores representing depths from 0-15 cm, 15-30 cm, and 30-60 cm, are taken for residue analysis. The five sites were ground sprayed on July 8, 1992 at a rate of 0.561 kg/ha active ingredient. Soil sampling began 24 hours following the application and occurred at weeks 1, 3, 6, and 12. Additional sampling will continue at weeks 34, 46 and 52.

For Component 2, a detailed study site has been established, with 3 transects to measure herbicide residues in soil, as well as 3 transects to measure residues in soil water. Sampling sites for both are located within the spray zone and at 2.5, 5, 10, 20, 40, 80 m downslope of the spray zone (Figure 2). As with the synoptic study (component 1), soil residues will be analyzed in the 0-15 cm, 15-30 cm, and 30-60 cm depths. Water is extracted from the soil using tension cup lysimeters. At each sampling site, lysimeters are located at 7.5, 22.5, 45 and 90 cm in the ground. Spraying of this site will occur in late June or early July 1993.

RELATED MEASUREMENTS

Climate and soils are important in understanding the movement of herbicides. The soils in all sampling locations are classified as Orthic Black Chernozems, dominated by a thick, silt loam textured Ah horizon with little coarse fragment content. The Ah horizon is deep and is up to 100 cm in depth.

A climate station measuring air temperature, relative humidity, solar radiation, wind speed/direction, and precipitation has been in the study area since the fall of 1990. Additionally, measures of soil temperature and soil moisture at depths to 120 cm, support the general climatic data.

PARTICIPANTS IN THE STUDY

Agencies involved in the study through financial or technical support include the Ministry of Agriculture, Fisheries, and Food - Crop Protection Branch, the Ministry of Environment, Lands and Parks - Pesticide Control Branch, Environment Canada - Environmental Protection, well as several sections of the Ministry of Forests, namely Silviculture, Range, Integrated Resources and Forest Sciences.

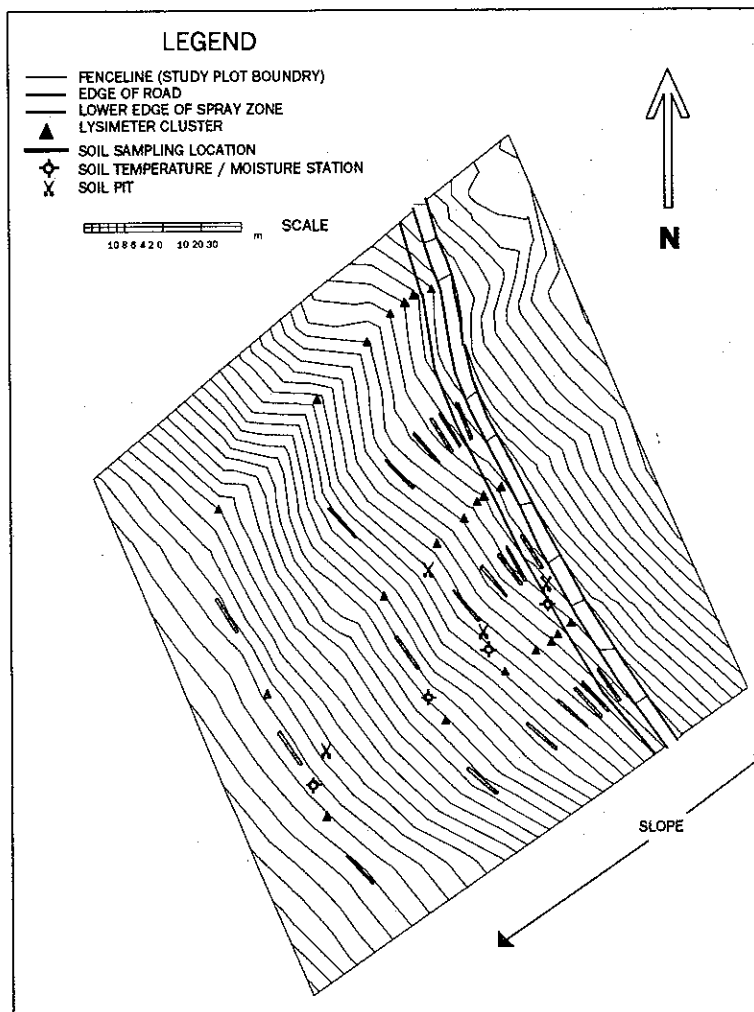


Figure 2: Detailed plot map of study site for component 2.

EXPECTED RESULTS AND BENEFITS

Final results are expected by 1996 and will assist range-land managers with their herbicide program particularly where contamination issues are a concern. The results will assist in making more definitive decisions concerning picloram application and the ability to leach in a southern British Columbia Orthic Black Chernozem.

REFERENCES

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- Trotter, D.M., R.A. Kent and M.P. Wong. 1990. *Canadian water quality guidelines for picloram*. Scientific Series 178. Inland Waters Directorate, Water Quality Branch, Ottawa.

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