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# Alberta Field Survey of Herbicide-Resistant Weeds

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**Key words:** Chickweed, herbicide resistance, spiny annual sow-thistle, wild oat

## Abstract

In 2001, 236 fields were randomly selected throughout the ecoregions of Alberta and surveyed for grass and broadleaf weeds resistant to Group 1 (ACCase inhibitor) or Group 2 (ALS inhibitor) herbicides. Nearly 20% of surveyed fields had a herbicide-resistant weed biotype. Only 5% of producers with resistant biotypes were aware of their occurrence. This survey serves as a baseline for determining future trends in weed resistance in Alberta.

## Introduction

Because a comprehensive field survey of herbicide-resistant weeds had not been conducted in Alberta, a baseline survey was needed to determine the incidence of herbicide resistance. Accordingly, in 2001, 236 fields were randomly selected throughout the ecoregions of Alberta and surveyed for grass and broadleaf weeds resistant to Group 1 (ACCase inhibitor) or Group 2 (ALS inhibitor) herbicides.

## Materials and Methods

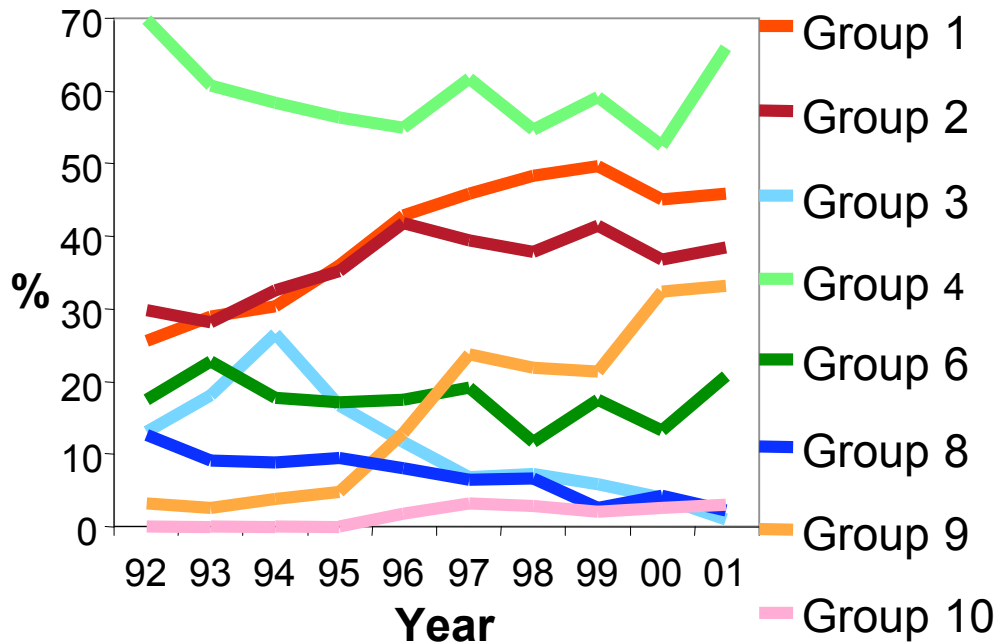
All residual weed species with viable seeds were mapped and sampled before harvest. Selected fields were cropped to cereals, oilseeds, or pulses (field pea). Samples of 20 weed species (three grass and 17 broadleaf) were subsequently screened in the greenhouse with high-risk herbicides belonging to Groups 1 and 2.

Herbicide group use in Alberta was obtained from management questionnaires (428 and 780 producers in 1997 and 2001 general weed surveys, respectively). Farmers provided information on herbicide group rotation and resistance awareness and impact by means of a management questionnaire.

## Results and Discussion

Group 1 or 2 herbicides were consistently applied to 40 to 45% of the surveyed area from 1996 to 2001 (Figure 1).

Nearly 20% of surveyed fields had a herbicide-resistant weed biotype. Of 190 fields where wild oat samples were collected, 11% had Group 1-resistant wild oat and 13% had Group 2-resistant wild oat (Figure 2). Half of the fields with either resistant biotype originated in the Aspen Parkland ecoregion, which was attributed to historically high frequency of use of products from these groups. Most Group 1-resistant wild oat populations exhibited resistance to both aryloxyphenoxypropionate ('fops') and cyclohexanedione herbicides ('dims'). Group 2-resistant

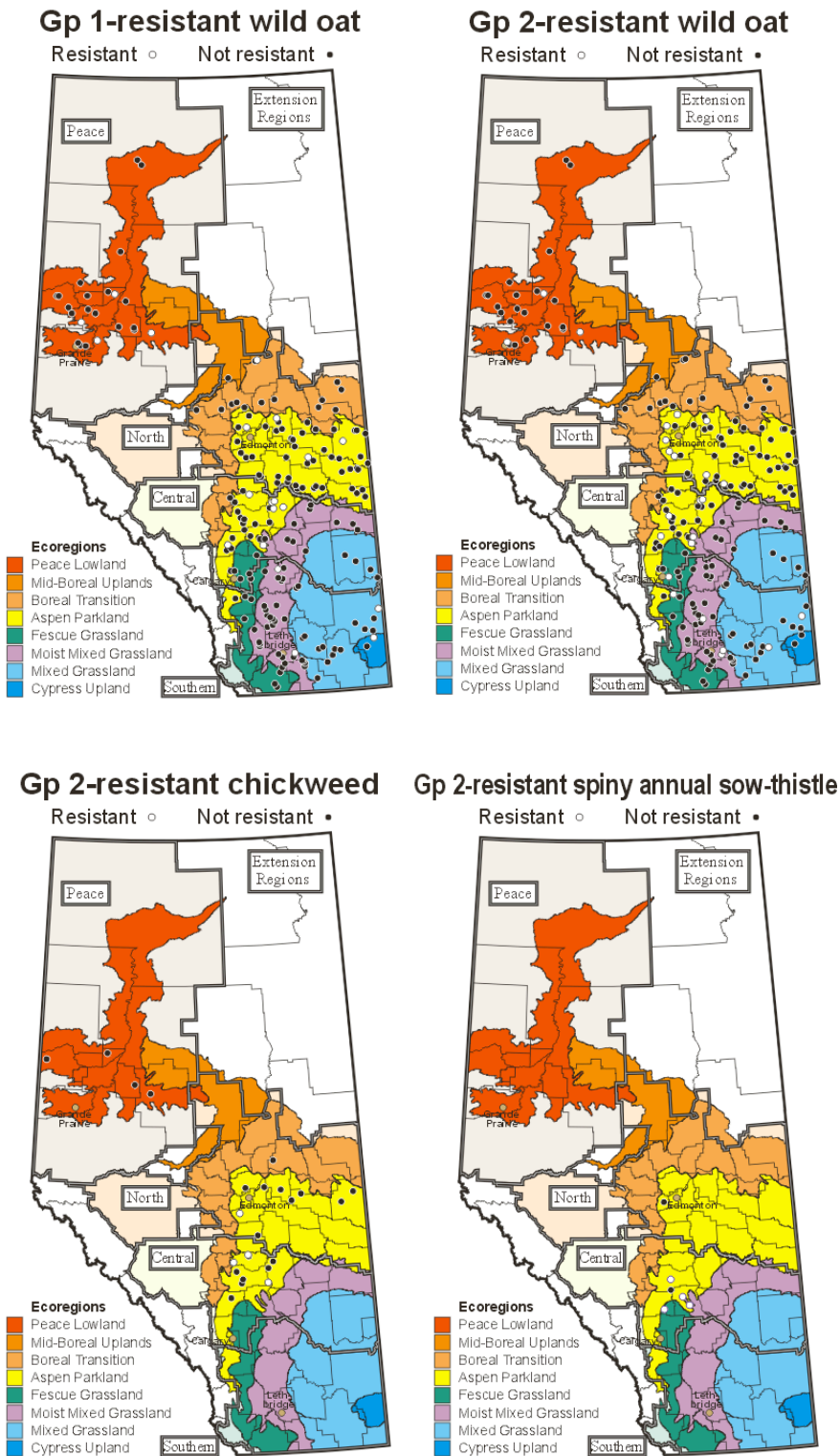


**Figure 1.** Herbicide group use in Alberta, based on percentage cropped area.

populations exhibited broad cross resistance across three classes of Group 2 herbicides. Of 16 broadleaf weed species, Group 2 resistance was detected only in chickweed (four fields in the Aspen Parkland ecoregion) and spiny annual sow-thistle (four fields in the Moist Mixed Grassland, Fescue Grassland, or Aspen Parkland ecoregions).

Although 82% of farmers practiced herbicide group rotation in 2001, the high frequency of use of Group 1 or 2 products (45 and 40% of fields sprayed in 2001, respectively) suggests that rotations practiced by a significant number of these farmers are less than effective in delaying resistance to these herbicides. Use of these herbicides for grass weed control in cereal crops is expected to increase with the loss of older chemistries or decline in preemergence application.

Only 5% of farmers with resistant biotypes previously suspected or were aware of their occurrence. This low level of awareness was consistent with findings from previous surveys, and may be attributed, in part, to the relatively small infestation area of resistant biotypes in most fields. In 2001, only 12% of farmers believed that resistance had a significant impact on their farm. In the next five years, about 20% of farmers expect herbicide resistance to pose a moderate or high impact on their farm.



**Figure 2.** Group 1 or 2 herbicide resistance in wild oat, chickweed, and spiny annual sow-thistle in Alberta in 2001 (Beckie et al. 2004).

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