Volunteer canola control in subsequent crops

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Abstract

A volunteer canola (VC) control study was conducted in 2004 and 2005 at Minot, ND (USA) to evaluate herbicides for control of VC in dry pea, flax, sunflower, soybean, and corn. The trial evaluated the effect of canola growth stage on herbicide efficacy. In general, VC control was better when postemergence herbicides were applied at the 3-leaf canola stage compared to 6-leaf or later. Only six postemergence herbicides provided excellent (>90%) VC control at both application timings including tribenuron, nicosulfuron & rimsulfuron, nicosulfuron, foramsulfuron + isoxadifen safener, imazamox, and fomesafen + adjuvants. In peas, soil-applied metribuzin provided good to excellent VC control. Metribuzin applied postemergence provided good VC control at the 3-leaf stage, but only fair control at the 6-leaf stage. In 2004, VC control with MCPA amine and bentazon was good to excellent at the 3-leaf stage, but very poor when applied at the 6-leaf stage. In 2005, MCPA amine and bentazon provided poor to fair control at either stage. Imazamox provided good to excellent VC control at either stage both years. In flax, soil-applied sulfentrazone provided poor VC control. Bromoxynil & MCPA ester provided excellent VC control when applied at the 3-leaf stage, but control dropped 10-20% when applied at the 6-leaf stage. Thifensulfuron provided poor to fair control. In tribenuron-resistant sunflower, tribenuron and imazamethabenz provided good to excellent VC control at either application stage. Soil-applied sulfentrazone provided very erratic control. In soybeans, soil-applied flumioxazin and imazethapyr & glyphosate provided good to excellent VC control, while metribuzin and flumetsulam provided fair to good control. Imazamox and fomesafen applied postemergence provided excellent VC control at both timings. Lactofen provided good control at the 3-leaf stage, but 25-50% less when applied at the 6-leaf stage. Bentazon provided excellent control at the 3-leaf stage, but only fair to good control at the 6-leaf stage. Acifluorifen provided poor VC control at either timing. In corn, soil-applied isoxaflutole provided excellent VC control. Postemergence herbicides nicosulfuron & rimsulfuron, nicosulfuron, and foramsulfuron provided excellent VC control at both application timings. VC control with mesotrione and dicamba & diflufenzopyr dropped 9-18% with the 6-leaf application, while control with 2,4-D amine dropped 15-43%.

Key words: Volunteer canola, herbicides, weed control

Introduction

Canola (*Brassica napus L.*) has emerged as a major crop in the north central United States and Canada. Over 60% of the hectares in North Dakota are planted to glyphosate-resistant canola varieties. Unfortunately, canola tends to volunteer for several years after the crop is grown and can be unsightly and competitive in following crops. In 2004 and 2005, a study was conducted to 1) evaluate several herbicides for control of volunteer canola (VC) in dry pea (*Pisum sativum*), soybean (*Glycine max*), flax (*Linum usitatissimum*), sunflower (*Helianthus annuus*), and corn (*Zea mays*), 2) determine the effect of canola growth stage on herbicide efficacy, and 3) identify the most cost-effective herbicides for volunteer canola control.

Objectives

1. Evaluate volunteer canola control with commonly used preemergence and postemergence herbicides.
2. Determine the effect of canola growth stage on herbicide efficacy. Is 6-leaf to bolting canola more tolerant than smaller canola?
3. Identify the most cost-effective herbicides for volunteer canola control.

Materials and Methods

Several crops were seeded May 12 to May 18 in 2004 and 2005. Dry peas were seeded at 135 kg ha^{-1} into 19-cm rows, glyphosate-resistant soybeans were seeded at 90 kg ha^{-1} into 19-cm rows, flax was seeded at 67 kg ha^{-1} into 19-cm rows, sunflowers were seeded at 50,000 plants ha^{-1} into 76-cm rows, and glyphosate-resistant corn was seeded at 45,000 plants ha^{-1} into 76-cm rows. A light population of canola was seeded over the top to simulate a VC situation. Individual plots were 3 by 9 m arranged in a randomized complete block design with three replications. In 2004, herbicide treatments were applied preemergence (PRE), 3-leaf canola, and 6-leaf canola on May 18, June 18, and June 28, respectively. In 2005, herbicide treatments were applied preemergence (PRE), 3-leaf canola, and 6-leaf canola on May 19, June 16, and June 23, respectively. Treatments were evaluated visually for percent VC control with 0 = no control and 100 = complete control. The mean of the two years is presented in the graphs.

Dry pea

In dry pea, soil-applied metribuzin provided good to excellent VC control (Figure 1). Metribuzin applied postemergence provided good VC control at the 3-leaf stage, but only fair control at the 6-leaf stage (Figure 2). In 2004, VC control with

MCPA amine and bentazon was good to excellent at the 3-leaf stage, but very poor when applied at the 6-leaf stage. In 2005, MCPA amine and bentazon provided poor to fair control at either stage. Imazamox provided good to excellent VC control at either stage both years.

Soybean

In soybean, soil-applied flumioxazin and imazethapyr&glyphosate provided good to excellent VC control, while metribuzin and flumetsulam provided fair to good control (Figure 3). Imazamox and fomesafen applied postemergence provided excellent VC control at both timings (Figure 4). Lactofen provided good control at the 3-leaf stage, but much 25-50% less when applied at the 6-leaf stage. Bentazon provided excellent control at the 3-leaf stage, but only fair to good control at the 6-leaf stage. Acifluorifen provided poor VC control at either timing.

Flax

In flax, soil-applied sulfentrazone provided poor VC control (Figure 5). Bromoxynil&MCPA ester provided excellent VC control when applied at the 3-leaf stage, but control dropped 10-20% when applied at the 6-leaf stage (Figure 6). Thifensulfuron, which is not labeled for use in flax, provided poor to fair control.

Sunflower

In SU-tolerant sunflower, tribenuron and imazamethabenz provided good to excellent VC control at either application stage (Figure 8). Soil-applied sulfentrazone provided very erratic control in sunflower and dry pea with control varying from poor to good depending on crop and year (Figure 7).

Corn

In corn, soil-applied isoxaflutole provided excellent VC control (Figure 11). VC control with mesotrione and dicamba&diflufenzopyr dropped 9-18% with the 6-leaf application, while control with 2,4-D amine dropped 15-43% (Figure 9). Fluroxypyr provided very little control at either application stage. Postemergence herbicides nicosulfuron&rimsulfuron, nicosulfuron, and foramsulfuron provided excellent VC control at both application timings (Figure 10). Atrazine provided almost no control in 2004 at 280 g ha^{-1}, but provided poor to fair control in 2005 at 420 g ha^{-1}.

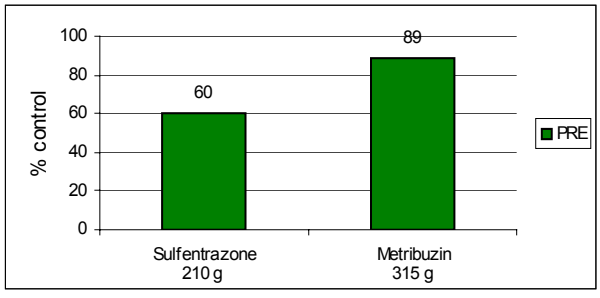

Figure 1. Volunteer canola control with preemergence herbicides in dry pea.

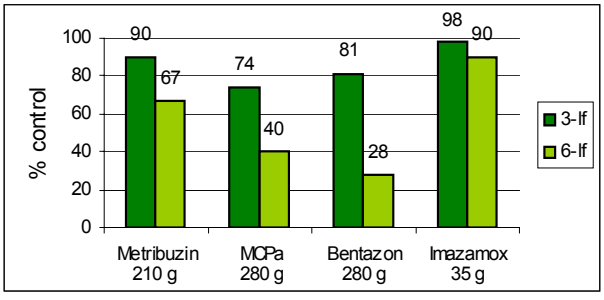

Figure2. Volunteer canola control with postemergence herbicides in dry pea.

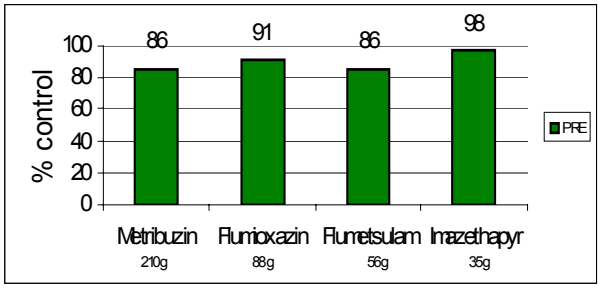

Figure 3. Volunteer canola control with preemergence herbicides in soybean.

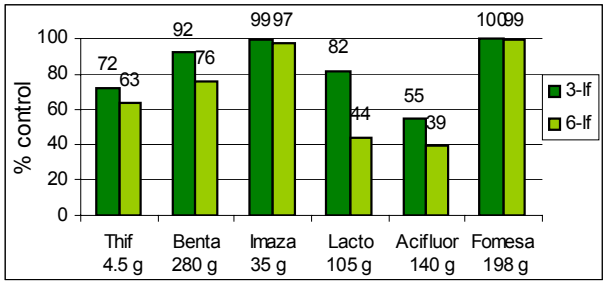

Figure 4. Volunteer canola control with postemergence herbicides in soybean.

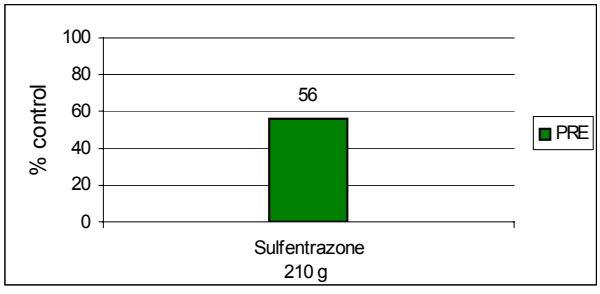

Figure 5. Volunteer canola control with preemergence herbicides in flax.

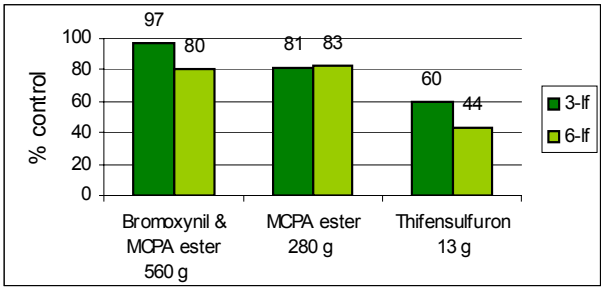

Figure 6. Volunteer canola control with postemergence herbicides in flax.

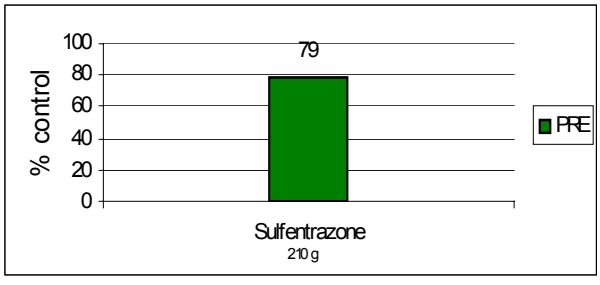

Figure 7. Volunteer canola control with preemergence herbicides in SU-sunflower.

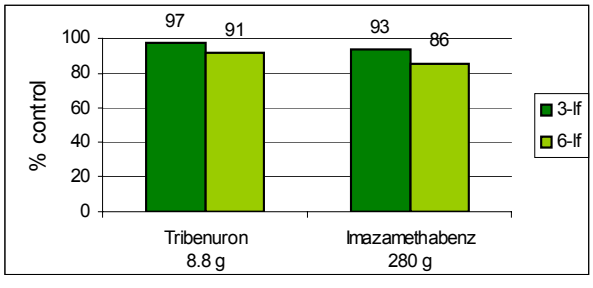

Figure 8. Volunteer canola control with postemergence herbicides in SU sunflower.

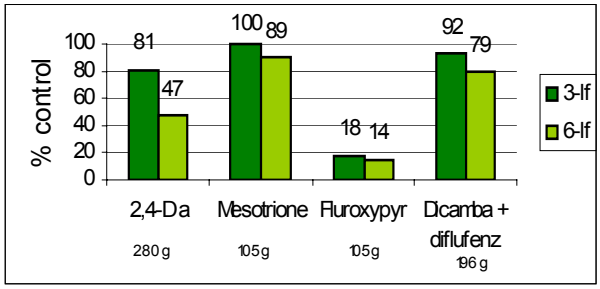

Figure 9. Volunteer canola control with postemergence herbicides in corn.

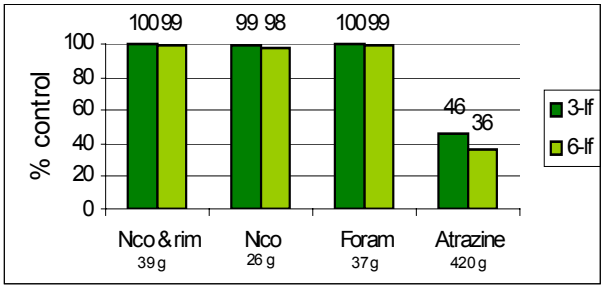

Figure 10. Volunteer canola control with postemergence herbicides in corn.

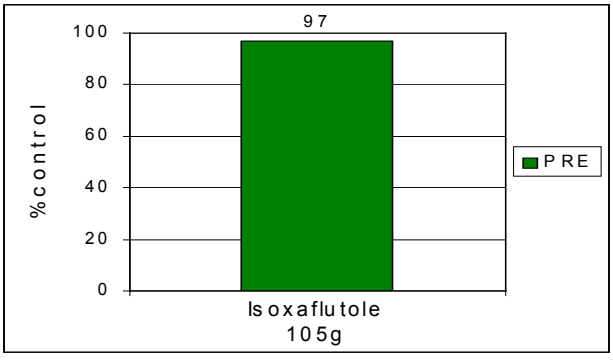

Figure 11. Volunteer canola control with preemergence herbicides in corn.

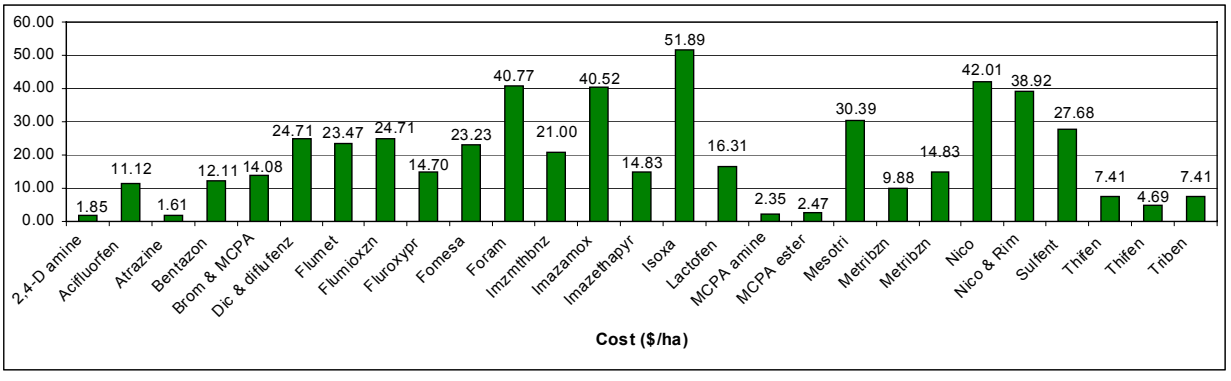

Figure 12. Approximate cost of various herbicides evaluated for volunteer canola control.