

2021

## Efficacy of Imiflex, Zest, and Assure II on Green Foxtail Control

V. Kumar

*Kansas State University*, vkumar@ksu.edu

I. Effertz

*Kansas State University*, ieffertz@ksu.edu

T. Lambert

*Kansas State University*, tl55@k-state.edu

*See next page for additional authors*

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### Recommended Citation

Kumar, V.; Effertz, I.; Lambert, T.; Liu, R.; and Bean, B. (2021) "Efficacy of Imiflex, Zest, and Assure II on Green Foxtail Control," *Kansas Agricultural Experiment Station Research Reports*: Vol. 7: Iss. 5. <https://doi.org/10.4148/2378-5977.8087>

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## Efficacy of Imiflex, Zest, and Assure II on Green Foxtail Control

### Abstract

Grass weeds pose a serious management challenge in grain sorghum. Recent development of three herbicide-tolerant grain sorghum technologies such as Inzen, Igrowth, and DoubleTeam will provide the opportunity for producers to use nicosulfuron (Zest), imazamox (Imiflex), and quizalofop-p-ethyl (FirstAct) for grass weed control, respectively. The main objectives of this research were to (1) determine the effectiveness of Imiflex applied preemergence (PRE) on green foxtail control in comparison to commonly used group 15 herbicides; (2) compare the efficacy of Zest, Imiflex, and Assure II applied early- or late-POST at two different rates; and (3) determine the tank-mix compatibility of Zest, Imiflex, Assure II, and Select Max (clethodim) with 2,4-D (Weedar 64) and dicamba (Clarity) on green foxtail control. Field experiments were conducted in fallow ground with a natural infestation of green foxtail at Kansas State University Agricultural Research Center in Hays, KS. PRE herbicide programs, including Imiflex, Dual II Magnum, Warrant, and Outlook were tested. Imiflex, Zest, and Assure II were tested in early- or late-postemergence (POST) timings. The early POST treatments of Imiflex, Assure II, Zest, and Select Max alone or in tank-mixture with Weedar 64 and/or Clarity were also tested in a separate study. Among PRE programs, Imiflex tested at both rates provided an excellent control (89 to 94%) of green foxtail up to 50 days after PRE (DAPRE), whereas control did not exceed more than 51% with any of the group 15 herbicides. Among early POST programs, Assure II at 10 fl oz/a provided 95% green foxtail control at 28 days after early POST (DAEPOST). Green foxtail control with early POST treatments of Imiflex, Zest, and Assure II (6 oz/a) was moderate and ranged from 77 to 83% at 28 DAEPOST. Green foxtail control with late POST treatments of Imiflex, Zest, and Assure II was inadequate and ranged from 14 to 31% at 21 days after late POST (DALPOST). In a separate study, tank-mixing Weedar 64 or Clarity with Assure II reduced the efficacy by >50% on green foxtail control compared to Assure II alone treatment. These results suggest that PRE applied Imiflex (6 or 9 oz/a) can provide excellent residual activity for early season control of green foxtail. Furthermore, Assure II applied early POST at a higher rate can provide effective control of green foxtail; however, the efficacy will significantly decline if Assure II is tank-mixed with Weedar 64 or Clarity.

### Keywords

Assure II, green foxtail, herbicide-tolerant sorghum, Imiflex, Zest

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### Authors

V. Kumar, I. Effertz, T. Lambert, R. Liu, and B. Bean

## Efficacy of Imiflex, Zest, and Assure II on Green Foxtail Control

*V. Kumar, I. Effertz, T. Lambert, R. Liu, and B. Bean<sup>1</sup>*

### Summary

Grass weeds pose a serious management challenge in grain sorghum. Recent development of three herbicide-tolerant grain sorghum technologies such as Inzen, Igrowth, and DoubleTeam will provide the opportunity for producers to use nicosulfuron (Zest), imazamox (Imiflex), and quizalofop-p-ethyl (FirstAct) for grass weed control, respectively. The main objectives of this research were to (1) determine the effectiveness of Imiflex applied preemergence (PRE) on green foxtail control in comparison to commonly used group 15 herbicides; (2) compare the efficacy of Zest, Imiflex, and Assure II applied early- or late-POST at two different rates; and (3) determine the tank-mix compatibility of Zest, Imiflex, Assure II, and Select Max (clethodim) with 2,4-D (Weedar 64) and dicamba (Clarity) on green foxtail control. Field experiments were conducted in fallow ground with a natural infestation of green foxtail at Kansas State University Agricultural Research Center in Hays, KS. PRE herbicide programs, including Imiflex, Dual II Magnum, Warrant, and Outlook were tested. Imiflex, Zest, and Assure II were tested in early- or late-postemergence (POST) timings. The early POST treatments of Imiflex, Assure II, Zest, and Select Max alone or in tank-mixture with Weedar 64 and/or Clarity were also tested in a separate study. Among PRE programs, Imiflex tested at both rates provided an excellent control (89 to 94%) of green foxtail up to 50 days after PRE (DAPRE), whereas control did not exceed more than 51% with any of the group 15 herbicides. Among early POST programs, Assure II at 10 fl oz/a provided 95% green foxtail control at 28 days after early POST (DAEPOST). Green foxtail control with early POST treatments of Imiflex, Zest, and Assure II (6 oz/a) was moderate and ranged from 77 to 83% at 28 DAEPOST. Green foxtail control with late POST treatments of Imiflex, Zest, and Assure II was inadequate and ranged from 14 to 31% at 21 days after late POST (DALPOST). In a separate study, tank-mixing Weedar 64 or Clarity with Assure II reduced the efficacy by >50% on green foxtail control compared to Assure II alone treatment. These results suggest that PRE applied Imiflex (6 or 9 oz/a) can provide excellent residual activity for early season control of green foxtail. Furthermore, Assure II applied early POST at a higher rate can provide effective control of green foxtail; however, the efficacy will significantly decline if Assure II is tank-mixed with Weedar 64 or Clarity.

### Introduction

Controlling grass weeds in grain sorghum is a serious challenge for Kansas producers. Season-long interference of grass weed species such as barnyardgrass, Johnsongrass, shattercane, Texas panicum, and foxtail (yellow or green) can reduce sorghum grain yields

<sup>1</sup> United Sorghum Checkoff Program, Lubbock, TX.

by 42% to 100% (Bean, 2020). Lack of effective herbicide options further exacerbate the problem of grass weed control in grain sorghum. Currently, there is no over-the-top (POST) selective herbicide labeled for grass weed control in sorghum. Main objectives of this research were to (1) determine the effectiveness of Imiflex applied PRE on grass weed control in comparison to commonly used group 15 herbicides; (2) compare the efficacy of Zest, Imiflex, and Assure II applied early- or late-POST at two different rates; and (3) determine the tank-mix compatibility of Zest, Imiflex, Assure II, and Select Max with Weedar 64 and Clarity for green foxtail control.

## Procedures

Two separate field experiments were conducted in the 2020 growing season at the Kansas State University Agricultural Research Center near Hays, KS. Experiments were conducted in fallow ground (corn stubble) and the study site had a natural infestation of green foxtail. PRE herbicide programs, including Imiflex (6 and 9 fl oz/a), Dual II Magnum (24 oz/a), Warrant (64 oz/a), and Outlook (18 fl oz/a) were tested. Imiflex (6 and 10 fl oz/a), Zest (0.9 and 1.33 oz/a), and Assure II (6 and 10 oz/a) were tested in early- or late-POST timings. PRE treatments were applied on April 16, 2020, whereas early POST and late POST treatments were applied on June 4, 2020 (on 3- to 4-inch tall green foxtail), and June 24, 2020 (on 12-inch tall green foxtail), respectively. In a separate study, the early POST treatments of Imiflex (6 fl oz/a), Assure II (8 fl oz/a), Zest (1.33 oz/a), and Select Max (16 oz/a) alone or in tank-mixture with Weedar 64 (16 fl oz/a) and/or Clarity (8 fl oz/a) were also tested. Assure II and Select Max treatments included nonionic surfactant (NIS) at 0.25% v/v, whereas, Imiflex and Zest treatments included crop oil concentrate (COC) at 1% v/v. All treatments were applied using a CO<sub>2</sub>-operated hand-held sprayer equipped with AIXR 110015 nozzles. Experiments were conducted in a randomized complete block design with 4 replications (each plot size of 10-ft wide × 30-ft long). Data on percent visible control of green foxtail were recorded at biweekly intervals throughout the growing season. Data were subjected to ANOVA using PROC MIXED in SAS v. 9.3 software (SAS Inst. Inc., Cary, NC). Means were separated using Fisher's protected least significant difference test at  $P < 0.05$ .

## Results

Results indicated that PRE applied Imiflex at 6 or 9 oz/a provided an excellent control (89 to 94%) of green foxtail up to 50 days after PRE (DAPRE), whereas control did not exceed more than 51% with any of the group 15 herbicides tested (Figure 1A; Figure 2). Furthermore, green foxtail control with PRE applied Imiflex ranged from 51 to 61% at 77 DAPRE. Among early POST programs, Assure II at 10 fl oz/a provided 95% green foxtail control at 28 days after early POST (DAEPOST) (Figure 1B). Green foxtail control with early POST treatments of Imiflex, Zest, and Assure II (6 oz/a) was moderate and ranged from 77 to 83% at 28 DAEPOST. Green foxtail control with late POST treatments of Imiflex, Zest, and Assure II was inadequate and ranged from 14 to 31% at 21 days after late POST (DALPOST) (Figure 1C). In separate study, tank-mixing Weedar 64 or Clarity reduced the efficacy of Imiflex, Zest, Assure II, and Select Max herbicides (Figure 3). For instance, tank-mixing Weedar 64 or Clarity with Assure II reduced the efficacy by >50% for green foxtail control compared to the Assure II alone treatment (Figure 3 and 4).

### ***Conclusions***

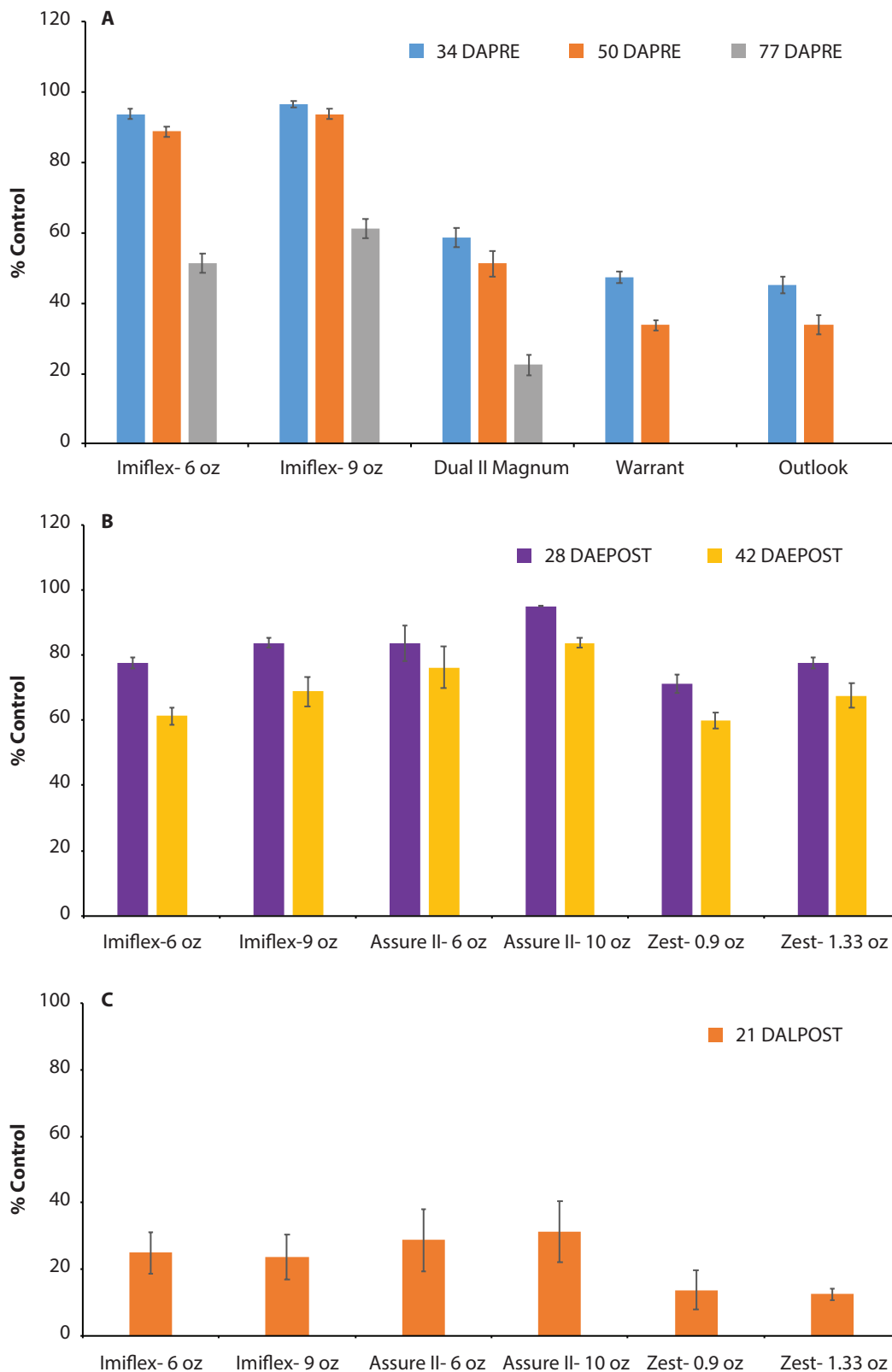
Results suggest that PRE applied Imiflex (6 or 9 oz/a) can provide an excellent residual activity on green foxtail control. Furthermore, early POST treatment of Assure II at a higher rate can provide effective control of green foxtail; however, the efficacy will significantly decline if Assure II will be tank-mixed with Weedar 64 or Clarity.

### **References**

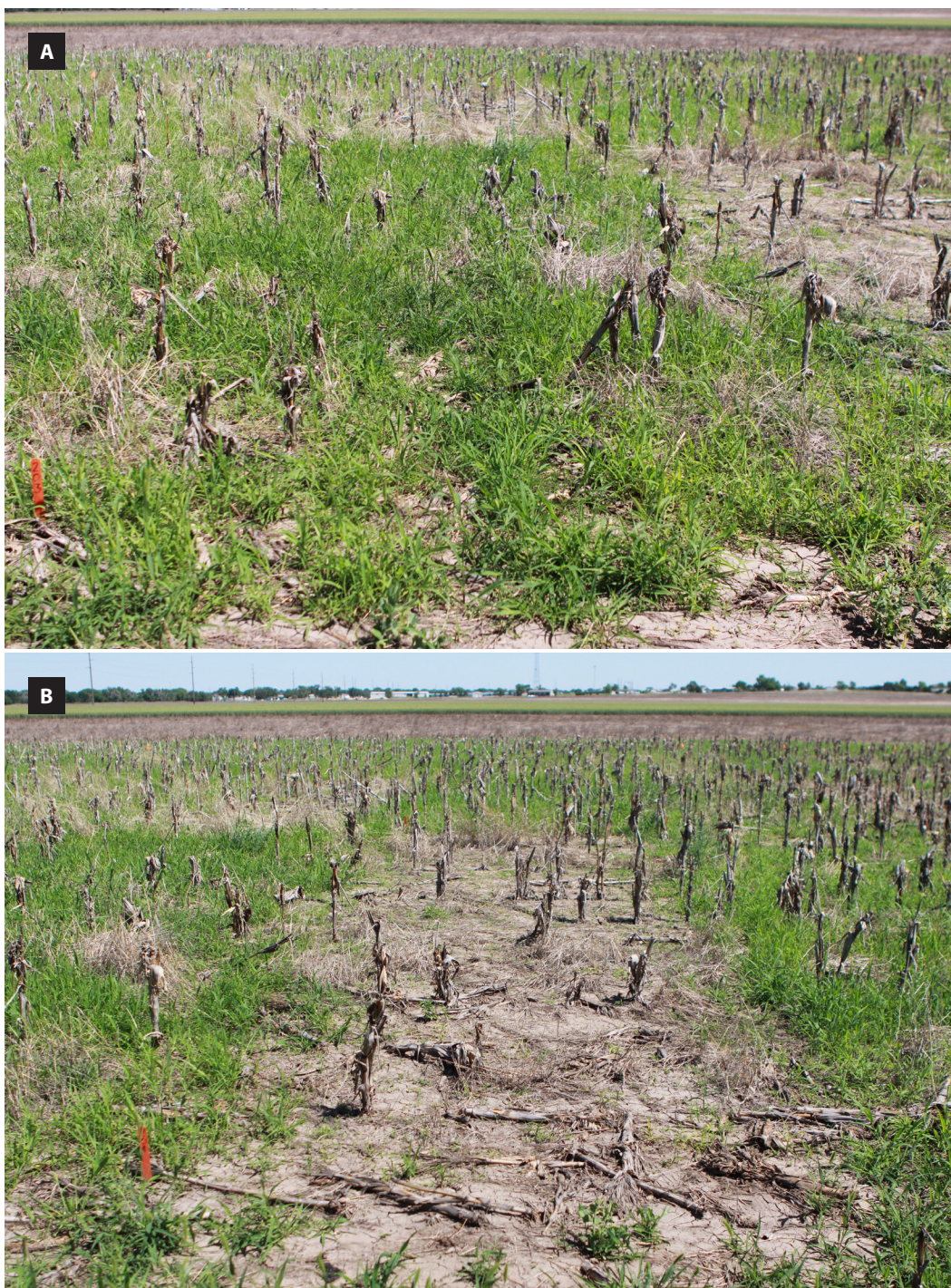
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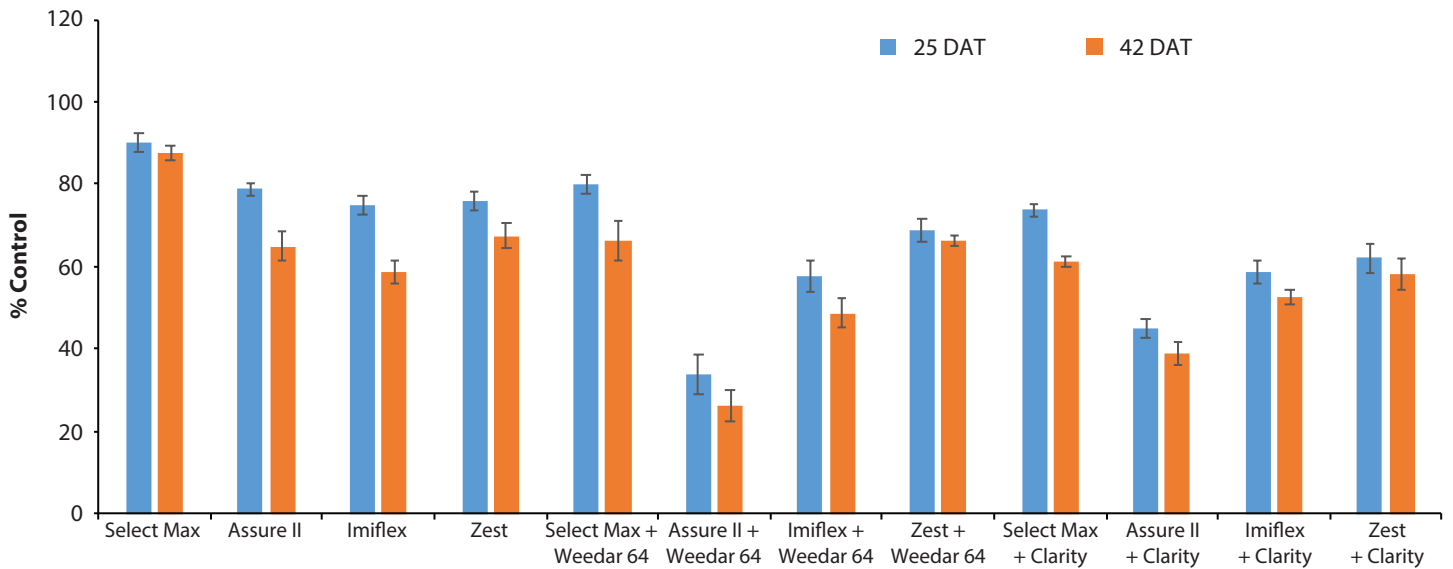
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**Figure 1. Green foxtail control with PRE (A), early POST (B), and late POST (C) herbicide programs at the Kansas State University Agricultural Research Center near Hays, KS.**

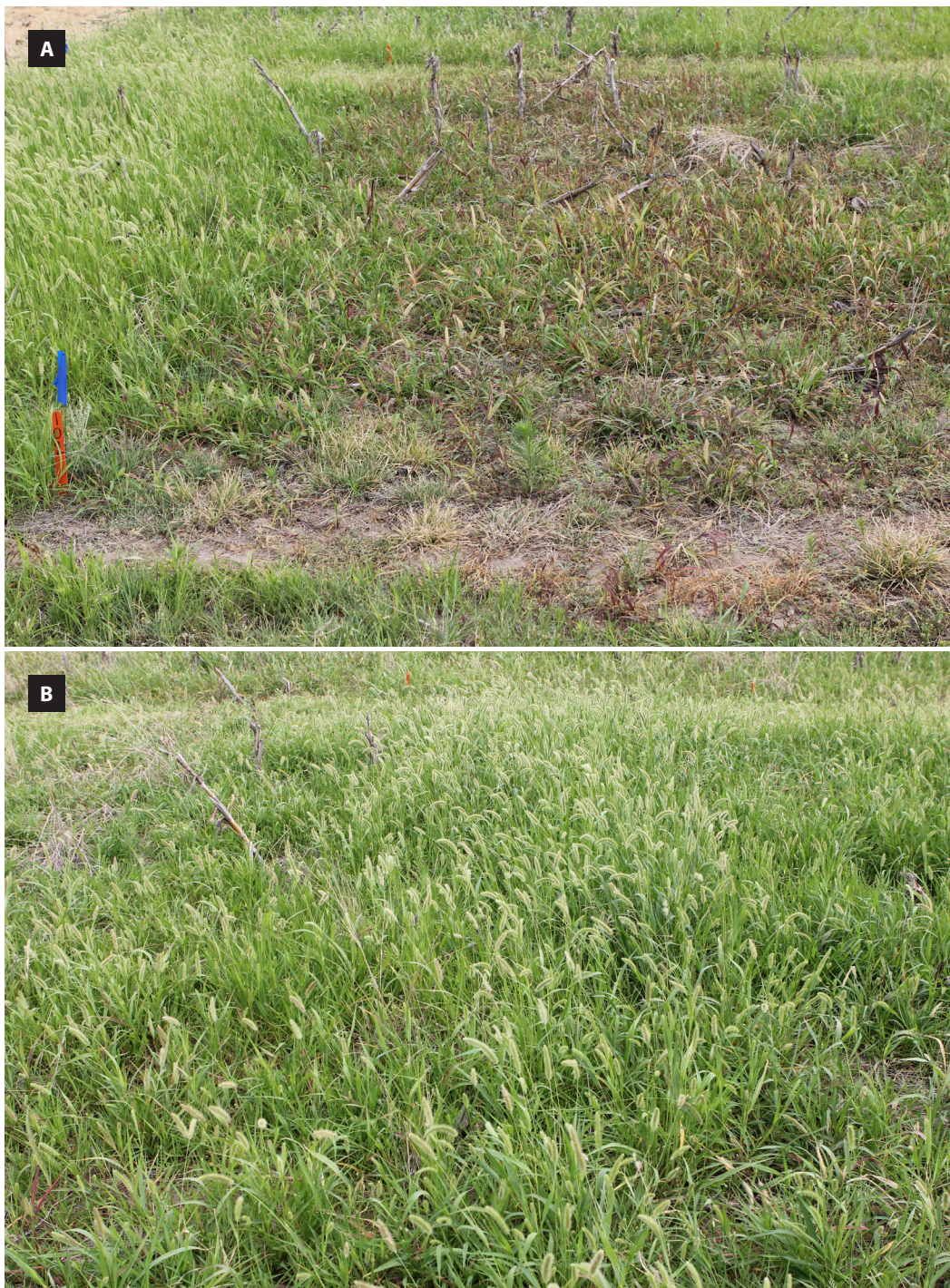


**Figure 2. Comparison of green foxtail control in nontreated weedy check (A) and Imiflex (B) applied PRE at 9 oz/a at 50 days after PRE (DAPRE).**



**Figure 3. Green foxtail control with early POST treatments of Imiflex, Assure II, Zest, and Select Max alone or tank-mixed with Weedar 64 or Clarity at 25 and 42 days after treatment (DAT).**





**Figure 4. Green foxtail control with early POST treatment of Assure II (A) and Assure II + Weedar 64 (B) at 25 days after treatment (DAT).**