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## Zalo Tank Mixtures for Early Postemergence Herbicide Efficacy in Corn

*P. W. Geier*

### Summary

This study investigated Zalo herbicide with tank mix partners for season-long weed control in corn. All herbicide evaluated provided greater than 90% weed control early in the season, and Russian-thistle and buffalobur control remained high throughout the year. The best late-season puncturevine control was provided by Zalo plus Hornet; however, this treatment along with Liberty alone provided the least green foxtail control. Late season Palmer amaranth control declined to less than 90% with all treatments. Kochia control declined to less than 90% with Liberty, Zalo alone, Zalo plus *S*-metolachlor, and Zalo plus *S*-metolachlor and Hornet.

### Introduction

The mixing of grass-control herbicides such as quizalofop with tank mix partners for broadleaf weed control often causes antagonism of the grass herbicide. This has resulted in producers having to make two herbicide applications, separated by several days, to effectively control all weeds. Zalo is the first herbicide to combine quizalofop with a broadleaf herbicide (glufosinate) in a proprietary process to minimize this antagonism. The objective of the study was to evaluate Zalo with various herbicides for efficacy in corn.

### Experimental Procedures

An experiment compared Zalo herbicide (glufosinate/quizalofop) in tank mixtures for weed control in corn. Herbicides were applied using a tractor-mounted, compressed-CO<sub>2</sub> sprayer delivering 19.4 gpa at 30 psi and 4.1 mph. Application, environmental, and plant information is shown in Table 1. Plots were 10 by 35 ft and arranged in a randomized complete block design replicated four times. Soil was Ulysses silt loam having 2.8% organic matter, pH of 7.9, and CEC of 29.6. Visual weed control was determined on June 12 and July 10, 2023. These dates were 14 and 42 days after the herbicide applications (DAT), respectively.

### Results and Discussion

All herbicides provided better than 90% Russian-thistle and buffalobur control throughout the season (data not shown). Early-season puncturevine and green foxtail control did not differ between any herbicide treatments (Table 2). However, by 42 DAT, only Zalo tank mixed with Hornet provided more than 80% puncturevine control. Conversely, Zalo plus Hornet, along with Liberty alone, were the only treatments to provide less than complete green foxtail control at 42 DAT. Late-season

Palmer amaranth control was best (81 to 89%) with Zalo plus *S*-metolachlor or Zalo and *S*-metolachlor with atrazine, Impact, Impact Z, or Callisto. While all herbicides controlled kochia 93% or more early, kochia control at 42 DAT declined to less than 90% with Liberty, Zalo alone, Zalo plus *S*-metolachlor, and Zalo plus *S*-metolachlor and Hornet.

## Acknowledgments

Funding for this research was provided by AMVAC Chemical Corporation.

**Table 1. Application, environmental, and plant information in the Zalo tank mixtures study in corn**

| Application timing                | Early postemergence |
|-----------------------------------|---------------------|
| Application date                  | May 29, 2023        |
| Air temperature (F)               | 78                  |
| Relative humidity (%)             | 45                  |
| Soil temperature (F)              | 70                  |
| Wind speed (mph)                  | 4 to 9              |
| Wind direction                    | South               |
| Soil moisture                     | Good                |
| Corn                              |                     |
| Height (inches)                   | 5 to 7              |
| Leaves (no.)                      | 2 to 3              |
| Russian-thistle                   |                     |
| Height (inches)                   | 2 to 5              |
| Density (plants/ft <sup>2</sup> ) | 0.4                 |
| Palmer amaranth                   |                     |
| Height (inches)                   | 0.5 to 3            |
| Density (plants/ft <sup>2</sup> ) | 0.5                 |
| Buffalobur                        |                     |
| Height (inches)                   | 1 to 4              |
| Density (plants/ft <sup>2</sup> ) | 0.1                 |
| Kochia                            |                     |
| Height (inches)                   | 2 to 5              |
| Density (plants/ft <sup>2</sup> ) | 2                   |
| Green foxtail                     |                     |
| Height (inches)                   | 0.5 to 2            |
| Density (plants/ft <sup>2</sup> ) | 0.1                 |
| Puncturevine                      |                     |
| Diameter (inches)                 | 0.5 to 2            |
| Density (plants/ft <sup>2</sup> ) | 0.3                 |

**Table 2. Weed control with Zalo tank mixtures study in corn**

| Treatment            | Rate    | Puncturevine         |                     | Green foxtail |        | Palmer amaranth |        | Kochia |        |
|----------------------|---------|----------------------|---------------------|---------------|--------|-----------------|--------|--------|--------|
|                      |         | 14 DAT <sup>1</sup>  | 42 DAT <sup>1</sup> | 14 DAT        | 42 DAT | 14 DAT          | 42 DAT | 14 DAT | 42 DAT |
|                      | fl oz/a | ----- % Visual ----- |                     |               |        |                 |        |        |        |
| Liberty              | 32      | 95                   | 70                  | 99            | 78     | 93              | 65     | 94     | 83     |
| Ammonium sulfate     | 3 lb    |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 97                   | 73                  | 100           | 100    | 93              | 65     | 93     | 80     |
| Crop oil concentrate | 1.0 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 3 lb    |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 96                   | 80                  | 100           | 100    | 97              | 81     | 98     | 83     |
| S-metolachlor        | 20      |                      |                     |               |        |                 |        |        |        |
| Crop oil concentrate | 0.5 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 2.5 lb  |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 96                   | 75                  | 100           | 100    | 98              | 89     | 100    | 91     |
| S-metolachlor        | 20      |                      |                     |               |        |                 |        |        |        |
| Atrazine             | 32      |                      |                     |               |        |                 |        |        |        |
| Crop oil concentrate | 0.5 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 2.5 lb  |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 96                   | 80                  | 100           | 100    | 98              | 89     | 99     | 91     |
| Impact               | 1.0     |                      |                     |               |        |                 |        |        |        |
| S-metolachlor        | 20      |                      |                     |               |        |                 |        |        |        |
| Methylated seed oil  | 0.5 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 2.5 lb  |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 97                   | 75                  | 100           | 100    | 98              | 83     | 100    | 91     |
| Impact Z             | 10.7    |                      |                     |               |        |                 |        |        |        |
| S-metolachlor        | 20      |                      |                     |               |        |                 |        |        |        |
| Methylated seed oil  | 0.5 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 2.5 lb  |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 99                   | 99                  | 99            | 85     | 92              | 75     | 94     | 83     |
| S-metolachlor        | 20      |                      |                     |               |        |                 |        |        |        |
| Hornet               | 3.0     |                      |                     |               |        |                 |        |        |        |
| Crop oil concentrate | 0.5 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 2.5 lb  |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 97                   | 75                  | 100           | 100    | 96              | 75     | 100    | 91     |
| Impact Core          | 24      |                      |                     |               |        |                 |        |        |        |
| Methylated seed oil  | 0.5 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 2.5 lb  |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 99                   | 75                  | 99            | 100    | 98              | 79     | 100    | 96     |
| Impact Core          | 24      |                      |                     |               |        |                 |        |        |        |
| Atrazine             | 32      |                      |                     |               |        |                 |        |        |        |
| Methylated seed oil  | 0.5 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 2.5 lb  |                      |                     |               |        |                 |        |        |        |
| Zalo                 | 32      | 97                   | 73                  | 100           | 100    | 97              | 81     | 100    | 93     |
| Callisto             | 3.0     |                      |                     |               |        |                 |        |        |        |
| S-metolachlor        | 20      |                      |                     |               |        |                 |        |        |        |
| Crop oil concentrate | 0.5 %   |                      |                     |               |        |                 |        |        |        |
| Ammonium sulfate     | 2.5 lb  |                      |                     |               |        |                 |        |        |        |
| LSD (0.05)           |         | NS                   | 9                   | NS            | 6      | 4               | 9      | 3      | 7      |

<sup>1</sup> DAT = days after the early postemergence application.