



## **ENLIST™ TECHNOLOGY FOR WEED CONTROL IN SOYBEAN**

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### **SUMMARY**

Dow AgroSciences is developing the Enlist™ Weed Control System to address critical weed control challenges. A component of this system will be new 2, 4-D choline and 2, 4-D choline + glyphosate formulations. Replicated trials were established at multiple locations to evaluate efficacy of these new formulations against important crop weeds. There was a significant improvement in control with 2, 4-D choline compared to glyphosate alone of several weeds including *Erigeron bonariensis*, *Ipomoea grandifolia*, and *Commelina benghalensis*.

### **INTRODUCTION**

Soybean is a dominant crop in Brazil with planted area projected to continue increasing beyond the current estimate of 25 million hectares (Conab 2012; Lazzarotto and Hirakuri, 2010). Glyphosate is widely used to control weeds in both burndown and in-crop timings across Brazil and most of South America. However, weed shifts and weeds resistant to glyphosate now threaten the sustainability of glyphosate as an important weed management tool (Christoffoleti, et al. 2008). The Enlist™ Weed Control System from Dow AgroSciences will offer a new and innovative means to address weeds that are resistant or difficult to control with glyphosate. This technology will ultimately provide soybean growers with new weed control options including the ability to apply 2,4-D choline before planting and in-crop to Enlist™ soybean that are genetically modified to tolerate 2,4-D and glyphosate. Extensive field testing of this technology has been initiated.

The objective of this paper is present results from several trials conducted to assess efficacy of 2, 4-D choline containing formulations against several important weed species known to be hard to control with glyphosate.

## MATERIAL AND METHODS

The field trials were conducted during the October to January 2010-11 growing period in the states of Minas Gerais, Sao Paulo, and Parana in Brazil. Weeds targeted in the trials were *Erigeron bonariensis*, *Ipomoea grandifolia*, and *Commelina benghalensis*. Most applications were made in fallow settings (no crop present). Treatments included 2, 4-D choline, 2, 4-D choline + glyphosate premix, glyphosate, and no herbicide treatment. Treatments were replicated four times in a randomized block design with plots either two by five meters or three by five meters in size. Applications were made using a backpack CO<sub>2</sub> applicator delivering 150 L/ha of spray volume. Weed sizes at application varied by species but generally ranged from 2 to 6 leaves. Visual weed control ratings were made at 7, 14, and 28 days after application. Data were analyzed using one-way analysis of variance and means separated by LSD test statistic with P= 0.05.

## RESULTS AND DISCUSSION

Even without the benefit of crop competition, control of *E. bonariensis* averaged greater than 80% from a single application of 2, 4-D choline plus glyphosate DMA (dimethylammonium salt) at 2000 g ae/ha, Fig. 1. Glyphosate IPA (isopropylammonium salt) at 960 g ae/ha alone gave variable performance and averaged only 42.5 percent control. These results show a clear benefit of 2, 4-D choline over glyphosate alone for the management of this prolific and competitive species.

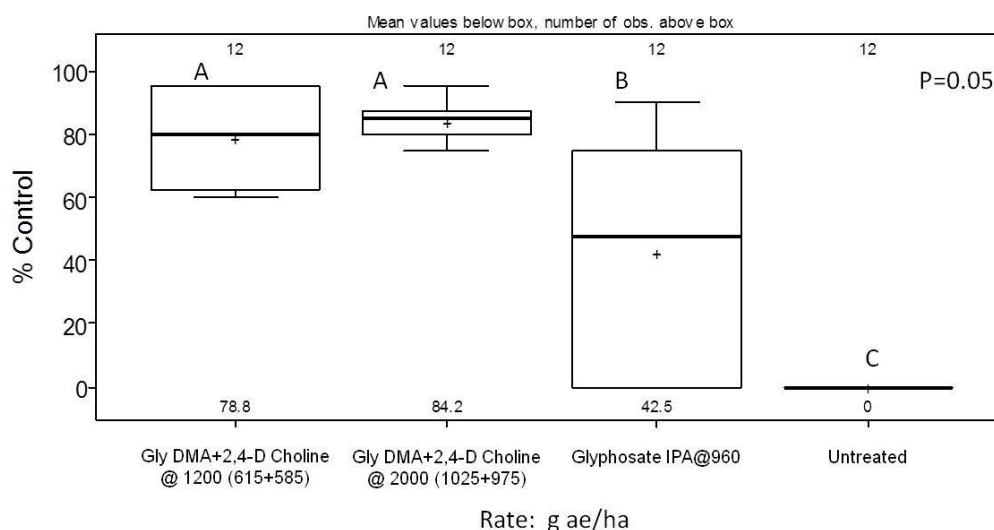


Figure 1. *Erigeron bonariensis* control 28 days after application, summary across three trials (one in San Paulo and two in Parana). Mean values are below box and number of observations above box. Boxes with the same letter indicate the means are not statically different, P=0.05.

Good to excellent control of *C. benghalensis* was observed 28 days after application with both 2, 4-D choline plus glyphosate rates, which were statistically superior to glyphosate at 960 g ae/ha, Fig. 2.

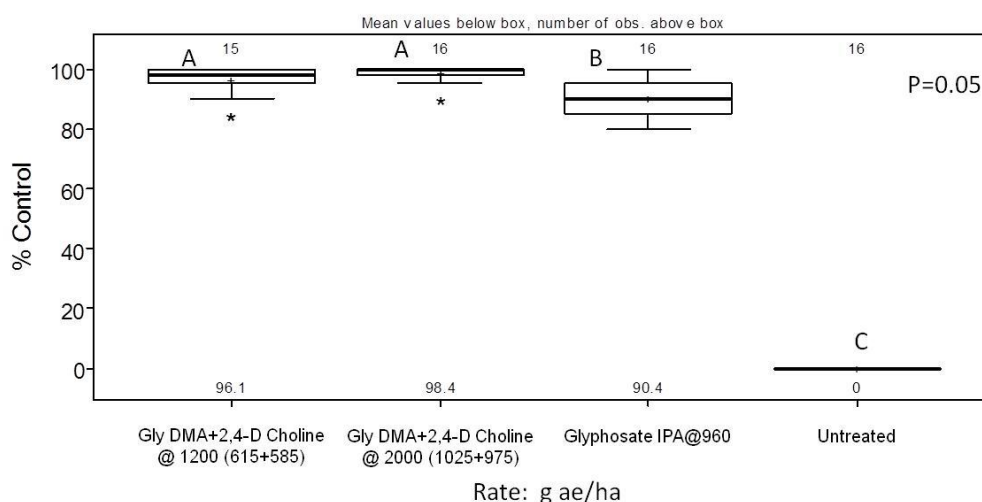


Figure 2. *Commelina benghalensis* control 28 days after application, summary across four trials (three in San Paulo and one in Minas Gerais). Mean values are below box and number of observations above box. Boxes with the same letter are not statically different, P=0.05.

The 2, 4-D choline formulation was evaluated alone at some test locations to determine benefit versus glyphosate, Fig. 3. Excellent control of *I. grandifolia* was observed 28 days after application with both 2, 4-D choline treatments; however, less variability occurred at the 1370 g ae/ha rate. Glyphosate at 960 g ae/ha did not provide commercially acceptable control.

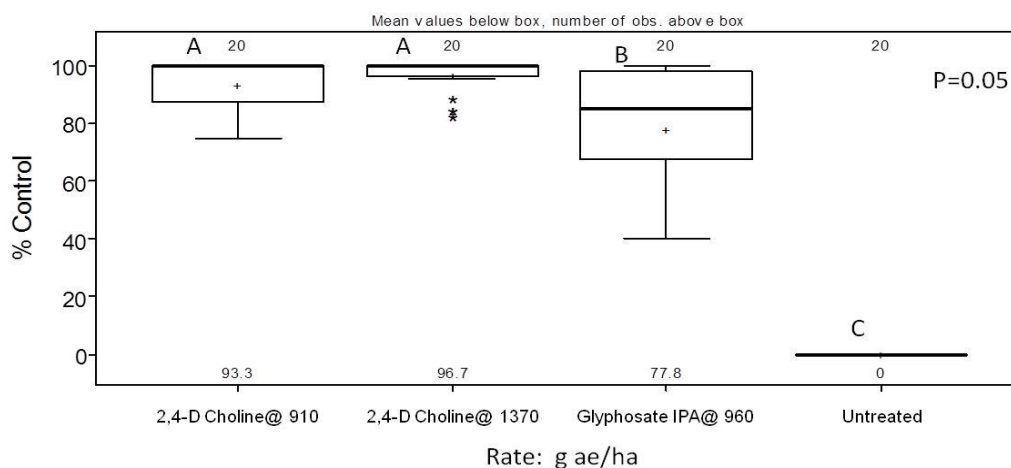


Figure 3. *Ipomoea grandifolia* control 28 days after application, summary across five trials (two in San Paulo, two in Minas Gerais and one in Parana). Mean values are below box and number of observations above box. Boxes with the same letter indicate the means are not statically different,  $P=0.05$ .

## CONCLUSIONS

The results reported in this paper highlight weed control advantages obtained when including 2, 4-D choline in a glyphosate-based soybean weed management program. Higher levels of control would be expected where applications were made with the benefit of crop competition and future studies will examine performance under those conditions. The Enlist™ Weed Control System with features that include 2, 4-D choline formulations and Enlist™ soybean will greatly complement glyphosate-tolerant cropping systems while maintaining key benefits such as conservation tillage practices.

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