IMPROVED EFFICACY OF GLYPHOSATE WITH ADJUVANTS

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INTRODUCTION

- Glyphosate is the most commonly used non-selective POST herbicide under diverse conditions.
- Adjuvants have been found to increase efficacy of foliar applied herbicides, thereby lowering application rates which are economically and environmentally desirable.
- Non-ionic surfactants have been commonly used to improve glyphosate activity; however, not all surfactants have synergistic effect (Sharma and Singh, 2000).
- It has been observed that some adjuvants are either herbicide or weed specific and may not be effective as a blanket mixture with herbicide for wide spectrum weed control.
- Recently there is also increased interest in using fertilizer, particularly ammonium based adjuvants to increase glyphosate activity.

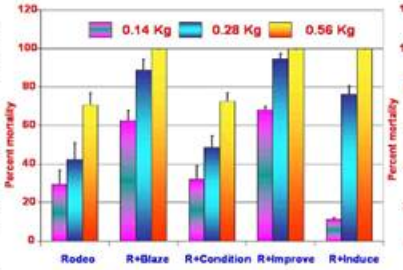

Figure 1. Effect of adjuvants on the efficacy of glyphosate against *E. crus-galli*.

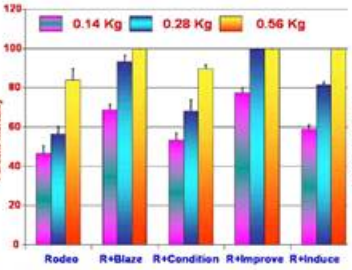

Figure 2. Effect of adjuvants on the efficacy of glyphosate against *P. maximum*.

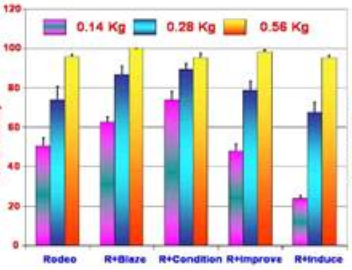

Figure 3. Effect of adjuvants on the efficacy of glyphosate against *B. bipinnata*.

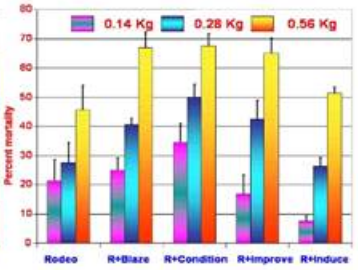

Figure 4. Effect of adjuvants on the efficacy of glyphosate against *A. theophrasti*.

OBJECTIVES

To evaluate the efficacy of glyphosate with some non-ionic surfactants, 'Blaze' , 'Improve' and 'Induce' and an ammonium sulfate based conditioning agent, 'Condition' on some grass and broadleaf weeds.

MATERIALS AND METHODS

- Green house experiments were conducted to evaluate glyphosate (Rodeo, with no added surfactant) efficacy by tank mixing with 0.5% of Blaze, Condition, Improve and Induce.
- *Echinochola crus-galli* L (barnyardgrass), *Panicum maximum* Jacq. (Guineagrass), *Bidens bipinnata* L. (Spanishneedles) and *Abutilon theophrasti* Medik. (velvetleaf) were planted in 12 cm plastic pots using Metromix media.
- Thinning was done a week after emergence and 5 plants per pot were maintained for spraying.
- Glyphosate at 0, 0.14, 0.28 and 0.56 kg ae ha^{-1} alone and mixed with four surfactants was sprayed at the 4 leaf stage of weeds.
- Spraying was done with an air pressure chamber track sprayer fitted with a Teejet 8002 flat fan spray nozzle delivering 189 L ha^{-1} volume at 138 kPa pressure.
- There were 4 replicate pots for each treatment arranged in a completely random block design in the green house maintained at 25/16^{o}C day/night temperature.
- Experiment was repeated under similar conditions. Visual mortality data was recorded at weekly intervals for 4 weeks till herbicide effect was stabilized. Mortality data was arcsin transformed for ANOVA.

RESULTS

Visual mortality at 4 weeks after treatment ± SEm values are presented in Figures 1-4 and photos .

ACKNOWLEDGEMENT

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SUMMARY

1. **All the four surfactants increased glyphosate activity by 4 to 16% compared to glyphosate alone.**
2. **Among the weed species higher mortality was observed in *Panicum maximum* and *Bidens bipinnata* followed by *Echinochloa crus-galli* and lowest in *Abutilon theophrasti*.**
3. **Improve surfactant was more effective on grasses than broadleaf weeds; whereas reverse was true for Condition.**
4. **Activity of Induce + glyphosate was significantly less at 0.14 and 0.28 kg ae ha^{-1} compared to other surfactants.**
5. **Blaze was equally effective against both grasses and broadleaf weeds. Statistically both Improve and Condition were at par when mortality was averaged over weed species, but better than Condition and Induce.**

REFERENCES

Sharma, S. D. and M. Singh. 2000. Optimising foliar activity of glyphosate on *Bidens frondsa* and *Panicum maximum* with different adjuvants type. Weed Res. **40**:523-533.