

**AIM™ (CARFENTRAZONE-ETHYL) HERBICIDE, A MULTIPLE USE
BROADLEAF HERBICIDE FOR COTTON AND OTHER CROPS**

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Abstract

Post direct, layby application studies in cotton performed in 2002 and 2003 demonstrated commercially acceptable control of various broadleaf weed species in cotton. Other uses for this very versatile herbicide are as a component in a burndown herbicide tankmix that enhances the control of one or more weed species. Last, harvest aid utility as governed by the mode of action of carfentrazone ethyl is a new use for corn and soybeans in 2003 under a Section 24c.

Introduction

AIM EC™ is the emulsifiable concentrate formulation of carfentrazone ethyl herbicide. AIM™ is registered for use in corn (field and sweet corn), grain sorghum, rice, soybeans, and small grains as a postemergence, layby and burndown herbicide. USEPA granted registration for use as a layby, post direct and defoliant-harvest aid in cotton for the 2001-growing season. The mode of action of carfentrazone ethyl relies upon disruption of plant cell membranes. The specific target of disruption is the inhibition of proto-porphyrin oxidase. Observed symptomology is rapid necrosis of plant tissues. This fast activity makes AIM EC™ and ideal candidate for postemergence and layby applications (Mize et al. 2001). The advent of glyphosate resistant marestalk (*Erigeron canadensis*) in Tennessee cotton production systems required finding tankmix partners for glyphosate that would provide complimentary control (Hayes et al. 2003). This led to the search for tankmix partners that did not have the same mode of action as glyphosate, yet were effective against glyphosate resistant marestalk and other broadleaf species.

Experimental Approach

Preliminary studies were initiated in 1998 and further studies continued into 2001 for development and familiarization of use in postemergence, layby and burndown applications of AIM™. Experimental designs were randomized complete block employing 3 or 4 replicates. Locations were throughout the Southern United States that were agronomically and edaphically best suited to grow cotton, corn and soybeans. Plots measured from 12 to 30 ft wide by 30 to 60 ft long. Spray application volumes ranged from 10 to 20 gallons per acre using small plot sprayer equipment.

The primary weed species tested were as follows: morningglories, entireleaf and ivyleaf (*Ipomea hederacea* and *var.*); pigweeds (*Amaranthus spp.*); cutleaf groundcherry (*Physalis angulata*); hemp sesbania, (*Sesbania exultata*); annual bluegrass, (*Poa annua*); broadleaf signalgrass, (*Brachiaria ptyphylla*); and yellow nutsedge, (*Cyperus esculentus* When AIM™ is tankmixed with UAN and 1% COC.).

The herbicides tested in addition to AIM™ (carfentrazone-ethyl) were caparol, cotoran, dicamba, diflufenzopyr, diuron, glyphosate, linuron, paraquat and MSMA. Appropriate labeled and lower rates of tankmix herbicides were used in conjunction with carfentrazone-ethyl. Rates for carfentrazone-ethyl application ranged from 0.008 up to 0.025 lbs ai/A. Adjuvants such as COC, and NIS were used in various treatments.

Results

Postemergence, layby applications of AIM™ 0.025 lbs ai/A applied alone and in tankmixes were well within the range of crop safety in 2002 and 2003. Control of morningglory at 4-9 days after treatment (DAT) by AIM™ (0.016 lbs ai/A) + 1 % COC was 84 and 92% for 2002 and 2003, respectively. As AIM™ has the attribute of no residual activity, later ratings at 11 to 16 DAT saw control settle at 47 and 86% respectively for both years, respective of rating date glyphosate (0.56 lbs/A) alone provided unacceptable commercial morningglory control of 56%. This necessitated the consideration of tankmixes which included use of diuron at either 0.75 to 1 lbs ai/A tankmixed with AIM™ 0.016 to 0.025 lbs ai/A provided not only quick and residual morningglory control but an economical post layby tankmix as well. The tankmixing of caparol and cotoran with AIM™ also enhanced morningglory residual control. In a similar fashion, pigweed, cutleaf ground cherry, hemp

sesbania, broadleaf signal grass control with AIM™ + caparol, or cotoran or diuron was no lower than 86% at either 5-9 DAT or 11-16 DAT. As AIM™ alone does not control annual bluegrass, tankmixes with diuron of 0.75- 1 lbs ai/A or glyphosate were effective in a post layby fashion of controlling this grass.

Studies in 2003 investigating burndowns applied at different timings were driven by the pre-plant interval of the tankmix partner. As noted earlier AIM™ alone does not control annual bluegrass however, in early pre-plant and at plant timings applications there is a fit for controlling certain broadleaves and leaving a grass sod intact, especially in highly erodible land areas. Since conservation tillage is increasing and a detrimental product of reliance upon glyphosate in those conservation tillage systems, no-till or reduced till has been the wide spread selection of glyphosate resistant mares tail. Once again the use of AIM™ alone or tankmixed with glyphosate did not provide as adequate control at plant or 30 days before planting of marestalk as other tankmixes containing cotoran, 2,4-D LVE, dicamba, diflufenzopyr, dicamba, and linuron. Fall applications of AIM™ tankmixed with glyphosate, tribenuron and 2,4-DLVE, 2,4-D LVE, dicamba and diflufenzopyr provided greater than 95% control of glyphosate resistant marestalk at 104-110 days DAT.

In 2003 AIM™ harvest aid studies conclusively showed no differences between the 0.016 and 0.025 lbs ia/A when tankmixed with UAN and 1% COC to control morningglories in corn and soybeans.

Summary

1. Post direct layby studies of AIM™ and tankmix partners indicate crop safety are well within the bounds of safety.
2. There was no difference between the 0.016 and 0.025 lbs ai/A rate of AIM™ in efficacy in post direct layby.
3. There were no differences in post direct layby data from 2001, 2002 and 2003.
4. AIM™ + diuron or fluometuron were equal or superior to glyphosate tankmix in a post direct or layby application for weed control.
5. AIM™ alone does not kill grasses in burndown application and the selection of certain tankmix partners such as 2,4-D LVE, require 21 days before planting while dicamba and diflufenzopyr may be used to burn down marestalk 30 days before planting in no-till or reduced areas where grass covers may be managed for erosion control.
6. AIM™ may be tankmixed with cotoran, diuron or gramoxone to control marestalks and grass cover crop in a no-till or reduced tillage system as an at plant application.
7. There is no difference between glyphosate or gramoxone harvest aid applications or when AIM™ is tankmixed with UAN and 1% COC as a harvest aid in corn and soybeans.

References

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