

EFFICACY OF KEY WEEDS IN COTTON WITH F8426 (CARFENTRAZONE) UTILIZED AS A POST-DIRECTED OR SHIELDED SPRAY APPLICATION

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Abstract

Carfentrazone-ethyl (F8426) is a new chemistry discovered by FMC Corporation that is registered for use in corn and small grains as Aim™ 40DF. The product is characterized by rapid burndown activity that offers other advantages such as a novel mode of action, no soil residual or carryover, and no systemic off-target potential. F8426 is non-selective on cotton, and research trials have shown significant activity in a post-directed or shielded spray use pattern for the control of key weeds with the product used alone or in an additive combination with other cotton postemergence herbicides. Development will continue to determine the optimum fit of F8426 in cotton postemergence weed control programs as well as in other cotton use patterns such as preplant burndown and defoliation.

Introduction

F8426 has shown excellent potential as a new weed control tool in cotton in initial studies as a directed spray in cotton. Research trials from across the Cotton Belt have indicated control or enhancement of control on many troublesome weed species with carfentrazone-ethyl used alone or in combination with standard cotton postemergence herbicides. Several trials were conducted in 1998 and 1999 and results will be given on the summary data from all trials on selected key weeds in cotton.

Materials and Methods

1998 Trials

Several post-directed replicated research trials were initiated in 1998, which focused on the efficacy of F8426 on key cotton weeds at locations across the U.S. Trials were evaluated at 3, 7, and 15 DAT. Research in 1998 was concentrated on rate range determination and adjuvant selection for optimization of weed control parameters with the product alone.

1999 Trials

Continuation and expansion of the program was carried out in 1999 utilizing the same experimental design. However, evaluation timings were expanded to 3, 7, 15, and 30 DAT to determine both the initial burndown and ultimate control

capabilities of the individual herbicides and their mixtures. Targeted optimum F8426 rates were directed at key weeds in cotton in combination with Roundup Ultra, Buctril, and Staple to determine additive versus stand alone attributes of F8426 on each species.

Results and Discussion

F8426 Weed Control Alone

Summarized weed control data from 1998 and 1999 demonstrated that F8426 was highly effective on species that represent major problem pests in cotton production. F8426 alone gave excellent control of *Amaranthus spp.*, *Ipomea spp.*, and lanceleaf sage (*Salvia reflexa*).

F8426 Mixtures with Standards

As an additive to standard rates of Roundup Ultra, Buctril, and Staple, carfentrazone-ethyl was shown to provide excellent augmentative benefits for efficacy on several weeds. In some cases, the standard herbicides only gave partial control or suppression that was greatly improved with the addition of F8426.

Roundup Ultra Mixtures

Roundup Ultra efficacy data showed enhancement of control with F8426 on Spurred Anoda (*Anoda cristata*), *Ipomea spp.*, Yellow Nutsedge (*Cyperus esculentus*), and Sicklepod (*Senna obtusifolia*) when carfentrazone-ethyl was added at F8426 rates as low as 0.008 lb ai/A. Of particular significance is the speed of control value of F8426 addition to Roundup Ultra. Carfentrazone-ethyl provided quick burndown efficacy superior to Roundup Ultra in all cases to more quickly accomplish the removal of weed competition for nutrients and moisture conservation and enhanced yield potential.

Buctril and Staple Mixtures

The addition of Buctril to carfentrazone-ethyl in a weed control system was examined on *Ipomea spp.* and on Spurred Anoda. Initial burndown activity was somewhat enhanced with F8426 added, and the overall control by 15 DAT showed a significant efficacy increase over Buctril alone on these weeds.

Staple efficacy data was limited due to environmental conditions across the cotton geography in 1999, but limited trials did demonstrate that F8426 was capable of enhancing burndown and ultimate overall control of Staple on Ivyleaf Morningglory when tested under hot and dry conditions not conducive to optimum Staple activity.

Environmental Effects

Overall conditions in the Southeast and Mid South areas of the U.S. were in general hot and dry throughout the normal period at which postemergence weed control applications are made. Thus, many of the trials were challenged by these

conditions and efficacy of both the standards and F8426 were significantly influenced by the environment.

Summary

Carfentrazone-ethyl is well into development as a new post-directed weed control tool in cotton that offers growers enhanced efficacy on key pests alone or as an additive product to postemergence standards. F8426 has shown efficacy in cotton and in other crops on a wide spectrum of weeds, especially when mixed with other herbicides for additive activity. Key weeds in other crops that F8426 will control alone include Velvetleaf (*Abutilon theophrasti*), Annual Nightshade (*Solanum*) spp., Amaranthus spp. (including Waterhemp (*tuberculatus* and *rudus*), and Lambsquarters (*Chenopodium album*).

In cotton, carfentrazone-ethyl test results indicated clearly that the product would fit as both a stand alone and mixture product in post-directed weed control systems, providing quicker burndown and enhanced efficacy for some of the cotton herbicides on the markets.

Carfentrazone-ethyl development in cotton will continue in 2000 to further determine optimum use parameters and advantages in cotton weed control systems, as well as potential for other use patterns such as preplant burndown and harvest aid application. F8426 was registered on corn and small grains under a reduced risk or safer pesticide designation, and it is hoped that the registration on cotton may be submitted as a reduced risk pesticide as well.