

EFFICACY OF MUSTANG MAX (F0570) FOR INSECT PEST CONTROL IN COTTON

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Abstract

Zeta-Cypermethrin has been extensively evaluated in field efficacy trials during the past years for control of the major insect pests of cotton. Mustang Max, a new zeta-cypermethrin formulation with an optimized content of the most active isomer, was evaluated in 2001-02 to determine efficacy. Mustang Max was also compared to standard insecticides currently being used in cotton. In field efficacy trials, Mustang Max applied at 0.018 lb ai/A provided commercially acceptable control of Helicoverpa zea (Boddie) better than that of Karate, Baythroid, Leverage, Denim, Steward and Decis at rates of 0.028, 0.028, 0.068, 0.01, 0.1 and 0.02 lb ai/A, respectively. Mustang Max at 0.018 lb ai/A also provided acceptable control of Lygus lineolaris (Palisot de Beauvois) better than Karate, Baythroid, Steward, Intruder, Centric, Denim and Decis at rates of 0.028, 0.028, 0.10, 0.044, 0.048, 0.01 and 0.02 lb ai/A respectively. Nezara viridula control with Mustang Max at 0.018 lb ai/A was equal to Bidrin at 0.5 lb ai/A and better than Intruder, Centric or Karate at 0.044, 0.062, and 0.028 lb ai/A respectively. Aphis gossypii Glover, control with Mustang Max at 0.018 lb ai/A was somewhat less than Provado, Actara or Leverage at 0.047, 0.063 and 0.068 lb ai/A respectively and better than Baythroid at 0.028 lb ai/A.

Introduction

Zeta-cypermethrin is a pyrethroid insecticide that has been used successfully throughout the cotton belt for many years to control a variety of pest both alone and in tank mix combinations. Mustang Max (FMC Corporation) is a new zeta-cypermethrin formulation, which consists of a higher concentration of the most active isomer at a Cis/trans ratio of 55/45%. Mustang Max is a broad-spectrum cotton insecticide, which exhibits the ability to control numerous cotton pests at lower use rates, and has demonstrated longer residual activity than traditional zeta-cypermethrin.

For the past several years, Mustang Max (F0570) has been evaluated in university/extension efficacy studies under a broad range of environmental conditions and cotton insect pests infestation levels across the cotton belt. Reported herein, are summary results of these studies with regard to the efficacy of Mustang Max for control of the Cotton Bollworm (Helicoverpa zea Boddie), Tarnished Plant Bug (Lygus lineolaris Palisot de Beauvois), cotton aphid (Aphis gossypii Glover) and Green Stink Bug (Nezara viridula).

Materials and Methods

Field efficacy results presented herein were obtained from small plot trials conducted by university/extension, contract research and FMC personnel across the cotton belt utilizing similar test procedures. Test plot size generally ranged from 6 to 8 rows wide by 40 to 100 feet in length, replicated 4 times in a randomized complete block design. Applications were typically made with compressed air or CO₂ charged small plot sprayers using water as the carrier. Total spray volume ranged from 5 to 18 gallons/acre. Cotton varieties, planting dates and production practices were typical of each geographic area.

Mustang Max 0.8 EC was evaluated at 0.018 lb ai/A and compared against various standard cotton insecticides, Karate Z, Baythroid 2 E, Provado 1.6 F, Bidrin 8 E, Actara 25 WG, Leverage 2.7 EC, Intruder 70 WP, Steward 1.25 SC, Assail 20 WP, Decis 1.5 EC, Tracer 4 SC and Denim 0.16 EC plus an untreated check. Trials were initiated and subsequent treatments made in accordance with insect pest control recommendations for the region.

Insect infestation levels were determined by standard evaluation procedures that varied by species. Cotton Bollworm infestations were determined by examination of a set number of cotton plants and/or bolls per plot prior to and following subsequent applications. Data were then compiled and analyzed based on a seasonal mean percent live larvae/plant, boll damage and percent control over multiple applications and evaluations. Mustang Max was analyzed against the specific competitive

compounds only in those replicated trials where all treatments occurred. By analyzing the data in this manner, variability due to pest infestation levels, application methods and environmental conditions could be eliminated.

Tarnished Plant Bug and Green Stink Bug infestations were determined using the standard sweep net technique. Numbers of plant bug/stink bug adults and nymphs were obtained from a sample size of no less than 25 sweeps per plot taken 3 days post-treatment. Plant bug data were summarized using a combined total of both adult and nymph stages. Stinkbug data were compiled and analyzed based on a seasonal mean percent control.

Cotton aphid populations were assessed by counting the number of pests per square inches of leaf surface or total pests per leaf taken from a designated location on the plant. In both cases, seasonal mean percent control values were generated based on the untreated check.

Results and Discussion

Results of the efficacy of Mustang Max for control of the Cotton Bollworm against the standard products are shown in Tables 1, 2 and 3. Mustang Max at 0.018 lb ai/A resulted in seasonal mean number of pests/plant less than that of Karate, Tracer and Leverage at rates of 0.028, 0.063 and 0.068 lb ai/A, respectively, based on 4 replicated head-to-head trials (Table 1). All treatments were significantly better than the untreated check. Mustang Max at 0.018 lb ai/A was essentially equal in terms of seasonal percent damaged bolls to Denim, Leverage and Karate at 0.015, 0.063 and 0.028 lb ai/A respectively and better than Baythroid at 0.025 lb ai/A, based on 13 replicated head-to-head trials (Table 2). All treatments were significantly better than the untreated check. Mustang Max at 0.018 lb ai/A resulted in numerically higher seasonal mean percent control than Karate, Baythroid, Leverage, Denim, Steward and Decis at 0.028, 0.028, 0.068, 0.01, 0.1 and 0.02 lb ai/A respectively, based on 9 replicated head-to-head trials (Table 3).

Mustang Max at 0.016 lb ai/A resulted in numerically higher seasonal mean percent control of Tarnished Plant Bug than that of Karate, Baythroid, Steward, Intruder, Centric, Denim and Decis at 0.028, 0.028, 0.1, 0.044, 0.048, 0.01 and 0.02 lb ai/A respectively, in 5 replicated head-to-head trials (Table 4). All treatments were significantly better than the untreated check.

Mustang Max at 0.018 lb ai/A resulted in equal seasonal mean percent control of Green Stink Bug as compared to Bidrin at 0.5 lb ai/A and numerically higher control than Intruder, Centric and Karate at 0.044, 0.062 and 0.025 lb ai/A respectively, based on 4 replicated head-to-head trials (Table 5). All treatments resulted in numerically better control than the check.

Mustang Max at 0.018 lb ai/A resulted in numerically less seasonal mean percent control of Cotton Aphid than Provado, Actara and Leverage at 0.047, 0.063 and 0.068 lb ai/A respectively and numerically higher seasonal mean percent control than Baythroid at 0.028 lb ai/A based on 3 replicated head-to-head trials (Table 6). All treatments resulted in numerically higher control than the check.

Table 1. Efficacy of Mustang Max 0.8 EC on Bollworm in Cotton.

Treatment	Rate (lb ai/A)	Seasonal Mean Percent Number of Pests/Plant
Mustang Max	0.018	0.8
Karate	0.028	1.3
Tracer	0.063	1.9
Leverage	0.068	3.0
Check*		11.1

* Based on 4 replicated head-to-head trials.

Table 2. Efficacy of Mustang Max 0.8 EC on Bollworm in Cotton.

Treatment	Rate (lb ai/A)	Seasonal Mean Percent % Damaged Bolls
Mustang Max	0.018	3.1
Denim	0.015	2.8
Leverage	0.063	3.2
Karate	0.028	3.7
Baythroid	0.025	4.5
Check*		13.7

* Based on 13 head-to-head trials.

Table 3. Efficacy of Mustang Max 0.8 EC on Bollworm in Cotton.

Treatment	Rate (lb ai/A)	Seasonal Mean Percent % Control
Mustang Max	0.018	91.4
Karate	0.028	72.7
Baythroid	0.028	83.0
Leverage	0.068	60.2
Denim	0.01	73.2
Steward	0.10	63.9
Decis	0.02	68.0
Check*	N/A	0.0

* Based on 9 replicated head-to-head trials.

Table 4. Efficacy of Mustang Max 0.8 EC on Tarnished Plant Bug in Cotton.

Treatment	Rate (lb ai/A)	Percent Control 3 Days After Treatment
Mustang Max	0.18	78.4
Karate	0.028	76.4
Baythroid	0.28	53.8
Decis	0.02	61.7
Steward	0.10	62.1
Intruder	0.044	32.7
Centric	0.048	48.7
Denim	0.01	37.2
Check*	N/A	0.0

* Based on 5 replicated head-to-head field trials.

Table 5. Efficacy of Mustang Max 0.8 EC on Green Stink Bug in Cotton.

Treatment	Rate (lb ai/A)	Seasonal Mean Percent % Control
Mustang Max	0.018	100
Intruder	0.044	32.7
Centric	0.062	72.5
Karate	0.025	92.5
Bidrin	0.5	100
Check*	N/A	0.0

* Based on 4 replicated head-to-head trials.

Table 6. Efficacy of Mustang Max 0.8 EC on Cotton Aphid in Cotton.

Treatment	Rate (lb ai/A)	Seasonal Mean Percent % Control
Mustang Max	0.018	85.6
Baythroid	0.028	20.6
Provado	0.047	89.6
Actara	0.063	94.3
Leverage	0.068	100
Check*	N/A	0.0

* Based on 3 replicated head-to-head trials.