

“STEWARD” (DPX MP-062), A NOVEL NEW INSECTICIDE FOR COTTON INSECT CONTROL

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Abstract

“Steward,” under the DuPont test codes JW062 and MP062 has been extensively evaluated to determine use rates and application timing required to control economic pests while minimizing impact on beneficial arthropods. “Steward” represents a novel new mode of action which is primarily exhibited via ingestion of the insecticidally active isomer KN128 (indoxacarb.) In field studies throughout the cotton belt, “Steward” has demonstrated a high degree of activity on the Heliiothine complex, fall armyworm, beet armyworm, cabbage looper, soybean looper, and the tarnished plant bug. Field and laboratory studies on the major beneficial arthropods found in U.S. cotton indicate “Steward” as soft on the major beneficials which will facilitate its use and utility in cotton pest management programs.

Introduction

“Steward” has received extensive field testing by DuPont and outside investigators to determine its fit and utility for managing primary and secondary cotton insect pests.

Test protocols targeting tobacco budworm and cotton bollworm were designed as full season replicated experiments with one or more applications timed at egg to 1st instar thresholds for each field generation. Results for armyworm, looper, and tarnished plant bug were attained by comparing post treatment insect populations and or damage compared to pretreatment infestation or an appropriate untreated check.

Beneficial insect evaluations were made as topical or leaf residue exposure studies in the lab, or in the field following one application. Degree of impact was determined by beneficial population change from pretreatment level or to an appropriate untreated within the replicated design.

Results and Discussion

Insect Activity – Pest Species

In the mean of 23 trials, “Steward” applied at .09 - .11 lbs a.i. provided control of tobacco budworm and cotton bollworm equal to the commercial standard “Tracer” (spinosad) and improved control compared to the standards “Pirate” (chlorfenapyr), “Asana” (esfenvalerate), and the combination of “Larvin” (thiodicarb) + “Curacron” (profenofos).

At .09 - .11 lbs a.i. activity of “Steward” was similar to the standard “Pirate” at .2 lbs a.i. when applied to neonate to second instar beet armyworm. Single applications of “Steward” applied to established populations of soybean and cabbage loopers in cotton provided a high level of activity on all larval stages at rates of .045 lbs a.i. and above. In several field trials an effective residual of 10 days or greater was shown where looper or beet armyworm populations failed to become established following applications of “Steward” for budworm -bollworm control.

Two years results with “Steward” on the tarnished plant bug, *L. lineolaris* indicate reduction in plant bug population and square protection similar to the standard “Vydate C-LV” (oxamyl). Further tests are intended to confirm rates and application timing.

Insect Activity - Beneficial Species

In laboratory studies, “Steward” at the proposed .045 - .11 lbs a.i. cotton use rates demonstrated a high level of safety to five braconid wasps commonly found in U.S. cotton. Following exposure to dry leaf residues “Steward” had no toxic effect on the survival of *Apanteles congestus*, *Bracon mellitor*, and *Micropletus croceipes* at any rate tested. “Steward” at the highest rate .11 lbs a.i. had only a slight effect on *Cardiochiles nigriceps* at one day post treatment. *Cotesia marginiventris* was the only parasitic wasp that showed sensitivity to “Steward” at rates of .065 - .11 lbs a.i. at one day, however, no effect on *C. marginiventris* was shown at 7 days post treatment.

Comparison of “Steward” to pyrethroid, carbamate, and organophosphate standards indicate low to moderate impact on minute pirate bug, big eyed bug, damsel bug, and spiders at field use rates of .065 - .11 lbs a.i. Impact on lady beetles and lace wing is augmented by increase in “Steward” rate, selectivity on lady beetles or lace wings is similar to “Tracer” at .063 lbs a.i. and “Vydate C-LV” at .33 lbs a.i..

Conclusions

“Steward” represents a new insecticidal mode of action with low potential for development of cross resistance. Toxicology studies indicate “Steward” as having low acute mammalian toxicity and a favorable aquatic and wildlife profile.

Field and laboratory studies conducted since 1993 with “Steward” under the DuPont codes Dpx JW062 and MP062 have defined use rates for foliar feeders such as cabbage and soybean looper in the range of .045 - .065 lbs a.i. Neonate to second instar beet armyworm control is attained at .065 - .09 lbs a.i.. Control of the Heliothine complex and the tarnished plant bug are achieved with “Steward” at rates of .09 to .11 lbs a.i.

Field studies suggest timing “Steward” applications to the egg or 1st instar stages at intervals of 5-7 days to facilitate

control of tobacco budworm, bollworm, and tarnished plant bug. In addition to its activity as a contact insecticide, “Steward” has demonstrated significant residual activity providing 10 or more days protection from secondary foliar feeders such as beet armyworm, fall armyworm, and loopers. While “Steward” provides a high degree of activity on primary and secondary cotton pests, laboratory and field studies have verified “Steward” as soft on key parasite and predatory species thus providing a useful new tool for cotton pest management.