

**STEWARD®- A NEW BROAD SPECTRUM
INSECT CONTROL AGENT FROM DUPONT**

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Introduction

Good afternoon! On behalf of Dupont Agricultural Products it's a pleasure to be with you. I'd like to spend a few minutes this afternoon reviewing the development status of our new cotton insecticide, Steward®, formerly dpx-mp062. Steward® was accepted as a reduced risk candidate and granted expedited review by the environmental protection agency in February of '98. This new insect control agent controls all major worm pests in cotton plus tarnished plant bugs while conserving beneficials and offering a high degree of safety to mammals.

Chemical Structure

The development of Steward® began in 1993. It is a compound composed of a 75:25 ratio of two optical isomers, dpx-kn128, the insecticidally active isomer, and dpx-kn127, which is not insecticidally active.

The structure and chemical name of the active isomer, dpx-kn128, are shown in this slide. Indoxacarb, the common name, refers to the pure active isomer. It is a member of a new chemical class: the oxidiazines.

Mode of Action

The route of entry into target insects is through ingestion of treated foliage and absorption through the cuticle. Once inside the insect Stewards® novel mode of action acts to inhibit sodium ion entry into nerve cells. The blockage of these sodium channels in insects leads to poor coordination, paralysis and ultimately death. Insect exposure to a toxic dose of Steward results in a rapid cessation of feeding, generally within 1-4 hours. Pest knockdown occurs within 1-2 days of exposure.

Extensive laboratory and field studies have demonstrated good activity on insects resistant to a broad range of commercially available products, thus making Steward® an excellent tool in IPM and resistance management programs.

Toxicology

Steward® has an excellent toxicological and ecotoxicological profile. As you can see from this slide

mammalian toxicity is relatively low. This characteristic will provide workers, terrestrial mammals, birds and aquatic organisms with improved margins of safety, particularly when compared to op's and carbamates.

Environmental Fate

Breakdown within the environment occurs primarily through microbial action. Soil mobility studies indicate Steward® is slightly mobile to immobile with no vertical movement in the soil below the surface layer.

Formulation

Steward® will be formulated as a 1.25 lb/gal. product. This liquid formulation has demonstrated rapid dispersion within the spray tank, no compatibility problems with tank mix partners and a stable shelf life. At this time packaging has not been determined.

Rate Table

Steward® will be labeled for these pests in cotton. As you can see the rate range for tobacco budworm, cotton bollworm, beet armyworm, fall armyworm and tarnished plant bug will be 0.09 to 0.11 pounds active per acre. Rate used will be determined by insect pressure and size.

For cabbage looper and soybean looper a rate range of 0.045 to 0.065 pounds active per acre should be used.

For best results Steward® should be applied when insects are small. In the case of worms, 1-2 instar.

Budworm-Bollworm Data

As I mentioned earlier Steward® will offer the cotton grower broad spectrum worm control. As you can see from this slide representing 1998 budworm & bollworm efficacy results, Steward® provides good crop protection when compared to commercial standards. This data is an average of 10 studies covering the southeast, midsouth and Texas. The data is based on the number of damaged squares and damaged terminals per 100.

Foliage Feeder DATA

Steward® has demonstrated excellent performance on beet armyworm, fall armyworm, cabbage looper and soybean looper. This slide is a summary of '97 & '98 data across the southeast and midsouth. As you can see Steward® provided excellent control of both beet armyworm and looper when compared to commercial standards.

Tarnished Plant Bug Data

Steward® controls more than just worm pests. Tarnished plant bug is a major problem in much of the cotton belt.

This 1998 data from the midsouth reflects Steward's® activity on this pest. The data is an average of 7 studies and based on the number of tarnished plant bug adults per 100 sweeps. At this time no decision has been made on how we will label clouded plant bug.

Predator Impact

One of the positive characteristics demonstrated by Steward® is its low impact on beneficial insects and spiders. Based on numerous studies impact on a variety of predators has been minor. This data is based on percent survival at 2-5 days after treatment.

Parasite Impact

The same trend has been seen with parasitic wasps. Dr. Glynn Tillman's early work with Steward® showed a high degree of safety to parasitic wasps such as Cardiochiles nigriceps, Microplitis croceipes and Cotesia marginiventris when exposed to residues of Steward®. This data summarizes Dr. Tillman's results and is expressed as percent survival.

Registration Status

As mentioned earlier, Steward® was granted a reduced risk designation by the EPA. Based on predicted timelines we anticipate a registration in the fall of 1999. Our plans are to have Steward® commercially available to cotton growers for the 2000 use season.

Summary

In summary the following key points can be made:

- * Steward® will offer the cotton grower broad spectrum worm and tarnished plant bug control.
- * Steward® will have low impact on most beneficial predators and parasites.
- * It will offer a high degree of safety to users and non-target organisms.
- * Steward® will be an excellent tool for use in IPM and resistance management programs with its unique mode of action.

Thank You

The development of Steward® began six years ago. We at Dupont would like to express our gratitude to all of those involved in the development of this unique product. To the university researchers, regulatory people, contract researchers and to the cotton producers who allowed us to work on their farms, thank you!

Closing

Dupont's commitment to the cotton industry remains strong. It began in the 1950's with the registration of Karmex and continued on with the registration of such products as Vydate-CLV®, Lannate®, Asana® and most recently Staple®. We believe Steward® will provide cotton growers with an important new tool, and do so in an environmentally friendly way.