STEWARD™ INSECTICIDE - AN OVERVIEW OF PERFORMANCE UNDER SECTION 18 IN 2000

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Steward™ insecticide from DuPont Crop Protection, a designated reduced risk pesticide by U.S. EPA, was granted registration for use in cotton on September 29, 2000. State registration petitions have been submitted to each cotton producing state; we expect to have most state registrations granted by early 2001. Steward™ controls all major worm pests plus tarnished plant bug while helping you protect beneficials and your cotton crop.

The product description of Steward:

Common name: Indoxacarb (active ingredient)
Chemical class: Oxadiazine (new insecticide class)
Testing code: DPX - MPO62
Formulation: 1.25 lb. ai/gal SC (oil formulation)
Signal word: Caution
Mode of action: Novel

Indoxacarb has a unique mode of action unlike any current insecticide product. Indoxacarb is a sodium channel blocker: it interferes with a group of ion channels by inhibiting the flow of sodium into nerve cells causing paralysis and death of pests. There is no evidence of cross resistance of indoxacarb to any current insecticide products. The primary activity of indoxacarb it through ingestion of treated foliage; it is also absorbed through the insect cuticle. Feeding inhibition occurs in 0-4 hours, feeding stops quickly thus providing excellent crop protection. Paralysis and death of the target pest typically occurs in 4-48 hours.

Steward is formulated as suspension concentrate with 1.25 lbs. active ingredient per gallon of formulation. Key cotton worm pests controlled by Steward include beet armyworms, cabbage looper, cotton bollworm, soybean looper, tobacco budworm, and fall armyworm. Steward also provides control of tarnished plant bug and cotton fleahopper. Application rates for control of armyworms, tarnished plant bug, and cotton fleahopper will be 0.09 – 0.11 lb. ai/acre (9.2 – 11.3 fl. oz. product). An application rate of 0.11 lb. ai/acre (11.3 fl. oz. product) should be used for cotton bollworm and tobacco budworm and rates of 0.065 - 0.09 lb. ai/acre (6.6 – 9.2 fl oz. product) for soybean and cabbage looper.

Seven states submitted and were granted Section 18 Specific Exemptions for the use of Steward in cotton during 2000 :

1. Texas, Oklahoma: Beet Armyworm
2. Arkansas, Louisiana, Mississippi: Beet Armyworm & Tobacco Budworm
3. South Carolina: Beet Armyworm & Cotton Bollworm
4. California: Beet Armyworm

Steward Section 18 Texas
Results and Key Learning's

Armyworm Complex

- Steward applied at 1:12 (1 gallon of Steward to treat 12 acres) provides excellent control of beet armyworm and fall armyworm.
- Steward provides initial knockdown of beet armyworm at 6-10 hours after treatment. Continues to cleanup the field over the next 6 days.
- Controls all worm sizes. Smaller worms controlled quicker.
- Appears to provide 7-14 days of residual.
- Performance by air & ground application similar. Higher gallonage seems to improve performance.
- Ninety nine percent of Steward applications went out with an adjuvant.

- Steward provides excellent control of soybean & cabbage loopers at 1:12.
- The combination of Steward applied at 1:14 plus Asana® XL at 1:18 (1 gallon of Asana XL to treat 18 acres) provided excellent control of beet armyworm and cotton bollworm.

Budworm/Bollworm

- Steward provided control applied at 1:12 when application was timed to live worms and heavy pressure.
- Key learning: for optimum control Steward should be applied @ 1:12 and timed to egg hatch, not live worms.
- Steward is not a rescue treatment for budworm/bollworm. If the application is timed properly (egg hatch) it will perform well.

Steward Section 18 Midsouth (AR, LA, MS)
Results and Key Learnings

Budworm/Bollworm

- Low to moderate pressure and discrete flights - Excellent control.
- **"Match the Hatch**" - timing treatment to eggs is critical.
- Steward alone: need rate of 1:12 (1 gallon Steward to treat 12 acres).
- Addition of an oil type adjuvant at 1 pint oil/acre was a very common practice.
- Best evaluation timing was at 4 - 6 days after treatment.

Tarnished Plant Bug

- Overall, good to excellent results.
- A few cases where activity was questioned.
- Equal to competitive treatments.

Foliage Feeders (Beet and Fall Armyworm, Loopers)

- Limited acres - Excellent results
- Conventional and BT cotton treated

General Observations

- Helps Conserve Many Beneficials
- No Formulation problems reported

Steward™ at labeled rates can provide from ***5*** to ***14*** days residual protection of treated leaves, squares, and bolls depending on the insect pest, population pressure, crop, and environmental conditions. Due to the insecticidal potency of Steward™, low levels of residual active on the plant may continue to provide good crop protection. Steward™ is not systemic and does not protect new growth nor does it redistribute readily on the surface of the leaf once sprayed.

Steward has very low impact on key predators/ parasites and non-target beneficials.

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Steward should provide the following benefits to the U.S. cotton producer:

- New chemistry, unique mode of action
- Broad-spectrum Lepidoptera (worm) insecticide
- Active against tarnished plant bug and fleahopper
- Quick crop protection through feeding cessation
- Excellent crop safety
- Low mammalian toxicity
- Favorable environmental/ecological profile
- Minimal impact on most beneficial insects and non-target organisms
- Active at low use rates
- Effective against resistant pests
- **Excellent Resistance management tool, Excellent fit in IPM programs**