

**LEPINOX™ WDG
(BUDWORM/BOLLWORM/ARMYWORM
CONTROL)**

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Abstract

Lepinox WDG is a new insecticide that received EPA registration for field crops in late 1996. Lepinox features a new active ingredient developed by hybrid protein engineering. The active ingredient in Lepinox functions as a stomach poison and is toxic to tobacco budworm, cotton bollworm, beet armyworm, and fall armyworm.

Introduction

Although tobacco budworm and cotton bollworm are the most widespread and damaging caterpillar pests of cotton in the United States, the beet and fall armyworm can cause significant damage during population outbreaks. Insecticides based on the microorganism *Bacillus thuringiensis* (BT), such as Condor®, have proven useful in managing populations of tobacco budworm and cotton bollworm. BT-based insecticides have not been useful in managing armyworm populations in cotton due to the lack of toxicity against the *Spodoptera* genus. Indeed, insecticidal crystal proteins which are toxic to Heliothines are not toxic to armyworms and vice versa which is why presently available transgenic cotton provides control of tobacco budworm but not armyworm species.

Discussion

Research scientists at Ecogen Incorporated have developed a technique termed Hybrid Protein Engineering for joining portions of different toxins to generate new novel insecticides. This technique creates chimeric or hybrid toxins which did not exist previously and which have unpredictable insecticidal properties. One of these hybrid toxins is highly toxic to tobacco budworm, cotton bollworm, beet armyworm, and fall armyworm. The gene encoding production of this toxin was inserted utilizing Site Specific Recombination™ into a BT host background for production. The resultant product is formulated as a water dispersible granule and is named Lepinox WDG. Lepinox received EPA registration late in 1996 for use on row crops, pasture, turf, and many vegetables.

As a protein toxin, Lepinox functions as a stomach poison and must be ingested to provide control. Laboratory bioassay data indicate Lepinox is more active against tobacco budworm and cotton bollworm than BT-based

insecticides while providing good toxicity against beet and fall armyworm. Initial development trials began in sweet corn in 1993 where the fall armyworm is a major pest. Development expanded into cotton, soybeans, pasture, and turf in 1996. Lepinox is formulated as a 15% water dispersible granule and is applied at 1.0 - 2.0 pounds per acre. In addition to small plot research trials, 56 large plot demonstration trials were conducted on cotton and soybeans in the mid-south and Texas in 1997. Results indicate that Lepinox is a versatile product when used alone or in tank-mixes. Because Lepinox is a stomach poison and lacks translaminar characteristics, coverage is important and applications must be made to young larvae. Therefore, proper scouting is imperative to provide optimum timing of application. Lepinox should be applied against first and second instar larvae and should not be considered as a rescue treatment.

Summary

Lepinox WDG is a new unique insecticide for control of caterpillar pests of cotton including tobacco budworm, cotton bollworm, beet armyworm, and fall armyworm. Lepinox functions as a stomach poison and trial data indicate the product is useful when used alone or when tank-mixed with conventional pesticides. The technology used to create Lepinox will result in additional new active ingredients.

Table 1. Efficacy of Lepinox WDG for control of tobacco budworm on cotton (Hearne, TX)

Treatment	Rate/acre	Percentage infested squares		
		3DAT1	3DAT2	7DAT2
Lepinox WDG	1 lb	6	4	4
Condor XL	1 pint	10	8	8
Match®	3 pints	12	12	10
DiPel ES®	3 pints	14	20	18

Table 2. Efficacy of Lepinox WDG tank-mixes for control of tobacco budworm on cotton (Hearne, TX)

Treatment	Rate/acre	Percentage infested squares		
		3DAT1	3DAT2	7DAT2
Lepinox WDG+	1 lb	2	2	2
Curacron®	1 pint			
Lepinox WDG+	1 lb	4	8	2
Pirate®	½ pint			
Pirate®	1 pint	18	16	12
Curacron®	1 pint	12	10	14
Tracer®	2 ounces	16	12	4