

# EFFICACY OF CONDOR XL FOR CONTROL OF TOBACCO BUDWORM AND COTTON BOLLWORM IN THE MID-SOUTH AND TEXAS

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## Abstract

Condor XL bioinsecticide was developed as a 15% active ingredient oil flowable product to replace the popular 7.5% active ingredient product Condor OF in the U.S. cotton and soybean market. Comprehensive evaluations across Texas and the Mid-South growing regions in 1995 and 1996 demonstrated that Condor XL equaled or exceeded the efficacy of Condor OF when used at the equivalent 1/2X rate while providing greater levels of insect control than are often attributed from BT-based insecticides.

## Introduction

Insecticides based on the soil bacterium *Bacillus thuringiensis* have been used in cotton production since the early 1970's. These products became more prominent in their use in the early to mid 1990's, initially as a tool for managing a developing pyrethroid resistance problem with tobacco budworm. However, as improved products such as Condor OF entered the market, the uses of BT products expanded into various strategies throughout the growing season.

Condor XL was developed as an evolutionary improvement to Condor OF as a higher potency product to bring improvements in handling, disposal, shipping, and spraying. The chief difference between the two formulations is the 15% active ingredient in Condor XL compared to 7.5% active ingredient in Condor OF. In addition, Condor XL has revised formulation components for improved mixing and spray deposition.

## Discussion

Condor XL was evaluated in replicated small-plot cotton and soybean trials in 1994 in various locations from Texas to Georgia where Condor XL was applied at 1/2 the use rate of Condor OF. The pest targets were the budworm/bollworm complex in cotton and soybean loopers and velvetbean caterpillar in soybeans. Results indicated that Condor XL could be applied at the lower use rate (i.e. 16 ounces of XL versus 32 ounces of OF) and provide equivalent performance while providing efficiencies in handling and disposal. Prior to commercial introduction in late 1995, extensive large-scale evaluations were conducted comparing Condor XL and Condor OF in cotton growing

areas of Mississippi, Louisiana, and Arkansas. These evaluations continued in 1996 with locations in Texas added to the previous areas. A total of 112 evaluations were conducted covering stand-alone and tank-mix applications. Thirty-eight of the trials included comparisons with other foliar larvicides.

The large plot evaluations consisted of entire fields or portions of fields. Infestations of budworm/bollworm were determined prior to treatment and 4-7 days after treatment. Treatments were evaluated based upon the degree of population reduction and converted to percentage control. As demonstrated in small-plot trials, Condor XL could be applied at 1/2 the rate of Condor OF and provide equivalent performance. Overall, Condor XL provided numerically better control than the 2X rate Condor OF when applied at 8, 12, or 16 ounces per acre when used alone or when tank-mixed with other larvicides. When used alone at 8-16 ounces per acre, Condor XL provided an average of 70-75% control, considerably better than is often credited for a BT-based insecticide. When compared to other larvicides for control of the budworm/bollworm complex, Condor XL outperformed other BT-based insecticides and provided an additive effect when mixed with chemical insecticides including pyrethroids, organophosphates, and ovicides. In many instances, Condor XL alone performed on par with standard chemical insecticides.

The timing and use of Condor XL was determined by cotton consultants and fieldmen. Therefore, the results gave insight into how these professionals utilize biological products. The use of Condor XL varied in different growing regions. One consistent emphasis was the use of Condor XL during the early part of the growing season to preserve beneficial insect populations that were providing control of secondary insect pests such as aphids. Other primary uses including managing pyrethroid resistant tobacco budworm in east Texas through Mississippi and as the primary means of controlling bollworm populations in the High Plains of Texas where Condor XL was occasionally the only larvicide used.

## Summary

Operational evaluation of Condor XL and other foliar larvicides for control of tobacco budworm and bollworm in the Mid-South and Texas demonstrated that Condor XL provided a versatile product for season-long insect management in cotton production. It was noteworthy that Condor XL provided 70+% control of tobacco budworm/bollworm when applied at 8-16 ounces per acre which is considerably better than often credited to biological products. Users of Condor XL were aware of the environmental benefits provided by a BT product and often used these characteristics as part of their insect management strategy.