



Cotton Stalk Destruction with Herbicides

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Introduction

In its native habitat cotton is a perennial shrub that may survive for many years. The perennial habit of cotton allows it to regrow following harvest, providing the potential for development of hostable fruit (squares and bolls) for boll weevil feeding and reproduction. Under good environmental conditions, cotton plants can generate hostable fruit in three to four weeks. Early harvest and stalk destruction when performed on an area-wide basis are among the most effective cultural practices for managing over-wintering boll weevils.

Stalk destruction is more important in the southern and eastern portions of Texas, where rainfall and warmer temperatures occur, prolonging fall cotton growth. In the western and northwestern regions, freezing temperatures generally kill the plant before regrowth can develop hostable fruit. When field conditions and weather are favorable for tillage, stalks can be shredded and then disked to destroy the intact plant. Stubble stalk pullers can also be used to uproot the stalk. These mechanical methods are generally successful, but some stalks may survive these operations. Also, many growers are implementing reduced tillage systems which do not allow for primary tillage operations, causing producers to evaluate new methods for stalk destruction.

Several herbicides have been registered for cotton stalk destruction. Herbicides available include, but are not limited to 2,4-D (ester and salt formulations), several dicamba products (Weedmaster, Clarity, Banvel), and Harmony Extra (thifensulfuron-methyl + tribenuron-methyl). For these products to be legal for cotton stalk destruction, the label must contain a section addressing "crop stubble" or specify cotton as the target pest following harvest. Also, prior to the application of any hormone-type herbicide verify if you are in a regulated county, and comply with all local restrictions governing herbicide use and application.



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Research regarding the best approach for using herbicides for cotton stalk destruction is somewhat limited, and continued field research is necessary to determine the best approach. However, recent work conducted in the Rio Grande Valley reported that acceptable control was provided by two applications of 2,4-D. The first application was made shortly after shredding and the second application was made several weeks later. Effectiveness of 2,4-D on non-shredded stalks was generally much less than where stalks were shredded. Studies in Central Texas showed that 2,4-D or dicamba provided the best control. A single application made shortly after shredding provided the best results in this study. A second application was not needed due to cool fall conditions which limited cotton regrowth. Results from these and other studies, as well as producer experience indicate that 2,4-D applied immediately following stalk shredding provides the most cost effective means of chemically terminating cotton stalks. In some instances, a second application may be needed.

Important Characteristics of 2,4-D

Volatility - volatility refers to the tendency of a chemical to vaporize. Vapor drift is the movement of herbicide vapor off-target. The level of volatility of a chemical is related to the compounds vapor pressure. The amine and sodium salts of 2,4-D are generally considered to be of minimal volatility hazard. Ester formulations, however, are volatile compounds. Most current, commercial 2,4-D ester formulations are termed "low-volatile", but keep in mind that they remain potentially volatile compounds. Under hot and humid conditions the volatility hazard increases. Consequently, extreme care should be taken when applying 2,4-D and other hormone-type herbicides.

Salt Formulations - amine salts are the most commonly used form. The amine salts of 2,4-D are not considered volatile; however, windy conditions can cause physical drift of the herbicide onto susceptible plants. Most amine salts readily dissolve in water to form clear solutions.

Ester Formulations - esters are essentially insoluble in water. The ester is diluted in oil with an emulsifying agent added. When mixed with water, the emulsifier keeps the tiny oil-like droplets suspended, much the way butterfat is suspended in milk. When mixed with water, the 2,4-D emulsion appears milky colored. Ester formulations are generally considered to be slightly more active than the salt formulations and are more susceptible to volatility.

Current Best Management Practices

Based on most recent field research, it appears the non-volatile, amine salt formulations are equally as effective as the ester formulations for cotton stalk destruction, and minimize problems associated with off-target drift. The first application should be at the rate of one pound of active ingredient/acre (eg. 1 qt. of a 4 lbs. a.i./gal. formulation). Generally, a second application of 0.5 to 1.0 lb. a.i./acre will be necessary for control of any live stalks and emerged cotton seedlings.

To obtain optimum results, cotton stalks should be shredded (6 to 8 inch height) and the spray application should be made soon after shredding. Best results are achieved if the herbicide is applied the same day as the shredding operation. To achieve optimum effectiveness, some growers have mounted spray booms directly on their flail shredders and are banding their herbicide during the shredding operation, and achieving excellent results. Note that thorough coverage is essential, and should be in the range of 5 to 10 gallons water/acre. Also, the addition of surfactant at the rate of 0.5% v/v (2 qts./100 gals. water) is recommended.



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