Texas Cooperative EXTENSION
The Texas A&M University System

Cotton and 2,4-D Drift – Not A Good Mix

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The last five years have seen a gradual movement north of cotton into the Texas Panhandle. As a result cotton is now being planted close to fields of corn and sorghum where 2,4-D or dicamba (Clarity or Banvel) have been used for years for weed control. These two products generally provide good economical control of a wide range of broadleaf weeds. However, the weed control is sometimes offset by crop injury that can occur from the herbicides, especially in grain sorghum. One of the main disadvantages to using 2,4-D is that cotton is extremely sensitive to this herbicide. Severe injury can and does occur when 2,4-D drift's onto neighboring cotton fields. This can lead to economic losses resulting in lawsuits or payment of damages between what used to be good neighbors. Although the potential for drift cannot be completely eliminated, it can be reduced and its effect minimized by using proper equipment and spraying techniques.

Drift can either occur from herbicide volatilization or physical drift. Volatilization is almost exclusively a problem that occurs with the phenoxy or 2,4-D type herbicides. When a herbicide 'volatilizes' it changes forms from a liquid to a vapor (gas). The vapor can then move large distances with the wind currents. This type of drift, under the right conditions, can cause severe injury to cotton several miles from the application site. The old 'ester' formulations of 2,4-D were particularly vulnerable to volatilization. Today only 2,4-D amine and what are called low-volatile ester 2,4-Ds are sold. Of these the amines are the least vulnerable to volatilization followed by the 'isooctyl' esters and last the 'butoxyethenol' esters. To minimize the risk associated with volatilization only use 2,4-D amine formulations or dicamba when cotton is growing nearby. 2,4-D amines are only slightly more volatile than dicamba under normal conditions. When possible avoid application when temperatures are above 90°F.

Physical drift can occur with any herbicide and is the most common type of drift. Many variables impact drift. However, research at the University of Mississippi has shown that three variables; wind speed, boom height, and distance downwind to susceptible vegetation, have the greatest effect on drift. When wind speed doubles there is almost a 700 percent increase in drift downwind. When at all possible avoid herbicide application when the wind speed is greater than 10 mph.

Boom height is the second key variable. When boom height is doubled there's a 350 percent increase in drift. Keep spray boom as close to the target as possible. With nozzles spaced 20 inches apart, 80 degree tips such as an 8003 nozzle should be placed 17 to 19 inches above the target. For 110 series tips such an 11002 nozzle the height should be 15 to 18 inches over the target.

The third factor is distance downwind. In the Mississippi research if the distance

downwind was doubled the drift was reduced five-fold. For example drift deposit at 300 feet would be 20% of that of 150 feet. For this reason always provide a buffer strip between your application and susceptible vegetation. Two to three hundred feet of buffer is usually adequate if other good drift control practices are utilized.

Droplet size is also key in controlling drift. The smaller the droplet the greater the risk of drift. The production of small droplets can be controlled by:

a. Use as large an orifice size as you can get by with. For example 8004 tip producers fewer small droplets than an 8003.
b. Increase water volume. 15 gpa is better than10 gpa.
c. Use lowest possible pressure setting within your nozzle's ideal range. The greater the pressure the more small droplets are produced.
d. Nozzle selection. Several nozzles are available that are designed to reduce the amount of very small droplets that are produced. Examples are the Teejet Drift Guard tip and the new Air-induction tips. See your spray tip dealer for information on other nozzles that are designed to minimize drift by producing more uniform large droplets.

One other weather condition that all herbicide applicators need to be aware of is called a thermal inversion. Never spray if a thermal inversion is present. A thermal inversion occur when a layer of warm area is trapped between two layers of cool air. This weather condition is often hard to recognize, but is most common early in the morning under cloudy very still conditions. Dew formation and fog close the ground will often be present. Dust from roads lingering in the air is an indication of the presence of a thermal inversion. Under these conditions drift can move several miles. Always be extra cautious if a thermal inversion is suspected to be present. Once temperatures begin to warm up in the morning and you begin to get air movement, the thermal inversion will dissipate.

Above all, just use a little common sense. If cotton is growing close by use as many of these drift control reduction practices as possible. Also, consider using herbicide alternatives to 2,4-D. Keep in mind that 2,4-D or dicamba are contained in many herbicide premixes such as Landmaster and Fallow Master. See your county agent for list of the most common products that contain 2,4-D or dicamba. Your county agent can also make suggestions on 2,4-D and dicamba alternatives.