# AUXIN-TOLERANT COTTON: MANAGING BOTH WEEDS AND OFF-TARGET MOVEMENT

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## Abstract

Cotton with tolerance to dicamba or 2,4-D has been deregulated for commercialization; however during the spring of 2016, growers continue to wait on U.S. EPA approval for the use of 2,4-D or dicamba in their respective technologies. Research in Georgia, North Carolina, and Tennessee has shown auxin-based weed management programs can offer growers more flexibility and more consistent control of problematic weeds such as horseweed and Palmer amaranth. Although auxin-containing herbicide programs may offer greater weed control, the program itself will not be simple. Similar to current practices of today, growers should 1) start clean by controlling all problematic weeds prior to planting, especially Palmer amaranth, 2) apply two residual herbicide chemistries preemergence after planting, 3) make timely sequential postemergence applications, and 4) include conventional herbicide chemistry at layby with directed or hooded applications. Although all growers would like to eliminate the directed or hooded sprays at cotton layby because of time limitations, this may be the most critical application for the entire season in terms of resistance management, especially in auxin systems. Additionally, growers should strive for at least five classes of herbicide chemistry on every cotton acre infested with Palmer amaranth and must understand the importance of a diversified weed management program by including cover crops, tillage, and/or hand weeding as part of a long-term sustainability plan.

Although auxin-based programs offer growers more tools for improved weed control, the crop injury component of the system is more complex. If the U.S. EPA allows postemergence tank mixes of auxin herbicides with other labeled pesticides, the number of potential mixtures increases significantly. For example, one could potentially mix dicamba or 2,4-D with glyphosate + glufosinate + a residual herbicide + an insecticide. Mixtures of three or more herbicides often cause significant and occasionally unacceptable injury. In some studies, significant injury has been seen with just an auxin herbicide plus glyphosate or glufosinate, although the cotton recovers rapidly with these two-way mixtures. Thus, it will be critical and challenging to maximize the activity of the tank mixtures (if approved by the U.S. EPA) while strategically minimizing crop injury, especially in cotton with seven or more leaves.

Off-target herbicide movement from treated cotton fields will also increase in complexity with the use of 2,4-D or dicamba. Auxin herbicides offer unique challenges when considering off-target deposition drift and these challenges must be understood thoroughly by all applicators. Understanding the sensitivity levels of the surrounding crops/plants will be paramount. Many broadleaf species are far more sensitive to auxin herbicides than any currently used in-crop cotton herbicide. For example, tomato and pepper are 6 to 10 times more sensitive to 2,4-D and dicamba as compared to glyphosate while snap bean is at least 15 times more sensitive to dicamba than to glyphosate. In areas with significant crop diversity, it is critical that the sensitivity relationships of auxin herbicides and crops be identified prior to of adoption of these programs.