

Avoiding 2,4-D and Dicamba Off-Target Movement from Cotton

William B. McCloskey¹, Naomi M. Pier²

University of Arizona, ¹Extension Weed Specialist, ²Assistant in Extension

Off target movement of the auxin herbicides, 2,4-D and dicamba, will cause substantial injury to downwind, sensitive crops such as cotton, grapes, melons and other broadleaf plants.

Any off-target injury is the responsibility or liability of the applicator and is a significant economic risk (Fig. 1). Enlist™ One and Enlist™ Duo are water-based formulations of 2,4-D that can only be sprayed on cotton varieties with Enlist traits. Engenia® and XtendiMax® are water-based formulations of dicamba that can only be sprayed on cotton varieties with XtendFlex traits.

Engenia and XtendiMax are **RESTRICTED USE PESTICIDES**.

Anyone purchasing, mixing, loading or applying these herbicides must be a licensed certified applicator. All users of these products must undergo training provided by the registrants.

The label is law. Labels specify practices and restrictions on product use to reduce off-target movement and protect applicators and neighbors from yield losses and economic harm.

Tank Mixing

Only tank-mix partners explicitly permitted on the labels and their websites (Table 1) can be used with these herbicides; **all other tank-mix partners are prohibited.** Applicators must check the list of tested products and nozzles at the manufacturer's website (see below) no more than 7 days before applying these auxin herbicides.

Nozzles

The only nozzles approved for use with these products are air-induction or Venturi nozzles designed to produce large-air filled droplets in the extremely-course (XC) and ultra-course (UC) droplet size categories (>502 microns as defined by the ASAE standard S-572.1). This minimizes the number of drift prone small droplets. **Applicators must use EPA approved nozzles at less than the maximum pressure listed on the herbicide labels or websites.**

Enlist Duo: www.EnlistTankmix.com

Engenia: www.EngeniaTankmix.com

XtendiMax: www.XtendimaxApplicationRequirements.com

Table 1. Within 7 days of making any applications, check the above websites and product labels for legally permitted tank-mix partners and nozzles.

Volatility

Volatility is the tendency of a chemical to vaporize or turn into a gas. These products are less volatile than older formulations of 2,4-D and dicamba (e.g., Banvel®). The new dicamba herbicide formulations (Engenia and XtendiMax) also contain components that enhance their stability. Acids or ammonia added to these products can overwhelm their buffering capability.

2,4-D damage



Dicamba damage



Figure 1. Off-target drift of auxin herbicides can cause damage to sensitive plants (e.g., cotton shown here) and expose applicators to economic liability.

DO NOT add ammonium sulfate or urea ammonium nitrate to solutions containing dicamba even if glyphosate is present. When label directions are followed, experience has shown that volatility causes less off-target movement than physical spray droplet drift during spring conditions in Arizona.

Weather and Related Application Requirements

Weather conditions influence how much herbicide moves off-target. Temperature inversions and wind promote drift of small spray droplets. **Do not spray during a temperature inversion.** Spray Enlist products only during daylight hours; Engenia and Xtendimax can only be applied beginning 1 hour after sunrise up to 2 hours before sunset. These herbicides should not be sprayed when wind speeds, including gusts, exceed 10 MPH. Use 15 gallons per acre to assure good spray coverage of weed foliage, but higher volumes (e.g., 20 GPA) may be needed to control dense weed infestations. Sprayer speeds may not exceed 15 MPH and boom height should not exceed 24 inches above the target canopy.

Buffer Zone Requirements and Susceptible Crops

Required buffers at field edges listed on the labels are to protect endangered species and sensitive areas; they do not prevent injury to susceptible crops downwind. Applicators need to monitor wind speed and direction before and during an application (especially near the downwind edges). These products all prohibit spraying if the wind is blowing in the direction of susceptible crops (see label for all crop restrictions) such as tomatoes and other fruiting vegetables (EPA Crop Group 8), cucurbits (EPA crop group 9, e.g., melons) and grapes. Certain crops are so sensitive to dicamba (e.g., soybeans & peaches), 2,4-D (e.g., cotton) or both (e.g., grapes) that observing the label buffer requirements will not prevent injury to downwind crops.

Sprayer Cleanout

Sprayer contamination is a common cause of off target crop damage by herbicides. Follow label instructions with triple-rinse cleanout of spray tank and boom equipment to mitigate this risk. **Do not allow herbicide solutions to sit overnight in spray tanks, hoses and booms.**

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Other Resources:

McCloskey, W.B. 2019. Spray Legally: Summary of Enlist™, Engenia® and Xtendimax® Application Use Requirements on Cotton.

<https://cals.arizona.edu/crops/cotton/files/auxinsummary.pdf>

Enz, J.W., V. Hofman, A. Thostenson. 2014. Air Temperature Inversions Causes, Characteristics and Potential Effects on Pesticide Spray Drift. Publication No. AE1705. North Dakota State University. 16 pp.

<https://www.ag.ndsu.edu/pubs/plantsci/pests/ae1705.pdf>

A PDF of this is available on-line at: <https://cals.arizona.edu/crops/cotton/files/auxin.pdf>