

Dicamba Volatility Under Field Conditions
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Multiple weed species are resistant to more than one mode of action, a majority of which are post-emergence herbicides. Dicamba tolerant crops allow growers to apply dicamba herbicides over the top of actively growing soybeans. Although dicamba tolerant crops can provide an effective weed management option, risk of dicamba off-site movement to sensitive crops is a concern (Foster et al, 2019). One such method of off-site movement is through volatility, or the physical change of a liquid into a gas. Dicamba is one post-emergence herbicide that, when moved off target, can result in severe damage to sensitive crops, like soybean. With the release of dicamba tolerant crops, many new premixes are beginning to include dicamba as one mode of action.

This study was conducted to compare volatility and herbicide vapor movement of new dicamba premixes and additives.

Field studies were conducted in Alabama, Georgia, Michigan, Mississippi, Missouri, and Wisconsin using low tunnels. Greenhouse soil flats filled with field soil were treated with each premix and then placed between two rows of soybean. The soil flats were covered by a low, open ended tunnel covered with plastic for a period of 48 hr. An air sampler, calibrated to pull 3L of air per minute, was connected to a polyurethane foam tube (PUF) and was placed under each low tunnel. Treatments included 2.0 lb ae/A dicamba (XtendiMax + Vaporgrip) + 4.5 lb ae/A glyphosate + 4% v/v MON 51817 + 2% v/v Intact; 6.5 lb ae/A dicamba + glyphosate premix (MON 301621); 6.5 lb ae/A MON 301621 + 2.34 lb ae/A glufosinate (Liberty); 6.0 lb ae/A dicamba + glyphosate premix (MON 119151); 6.0 lb ae/A MON 119151 + 4% v/v MON 51817; 6.0 lb ae/A MON 119151 + 2.34 lb ae/A Liberty; 6.0 lb ae/A MON 119151 + 2.34 lb ae/A Liberty + 4% v/v MON 51817 + 2% v/v Intact; and an untreated check. Visual injury ratings and plant heights were taken in 31-centimeter increments from the plot center, where the treated soil flats were located, out to 762 cm.

At 14 DAT, the combination of Xtendimax + Powermax + MON 51817 + Intact showed less injury than both MON 301621 and MON 301621 + Liberty, regardless of distance. No difference in visual injury was observed between MON 301621 and MON 301621 + Liberty at both 14 and 28 DAT. Visual injury from MON 119151 alone or with Liberty did not differ regardless of distance at both 14 and 28 DAT. The addition of MON 51817 to MON 119151 alone or in combination with Liberty reduced visual injury at both 14 and 28 DAT. The combination of Xtendimax + Powermax + MON 51817 + Intact showed similar visual injury to MON 119151 + MON 51817 and MON 119151 + Liberty + MON 51817 + Intact at both 14 and 28 DAT. No differences in visual injury were observed among treatments at distances beyond 427 cm at either evaluation interval. The addition of MON 51817 to MON 119151 alone or MON 119151 + Liberty + Intact reduced dicamba concentrations to near 50 ng/PUF. MON 119151 + Liberty (253 ng/PUF) and MON 119151 (195 ng/PUF) showed the highest levels of dicamba volatility. There were no differences from the untreated check or Xtendimax + Powermax + MON 51817 + Intact when combining MON 119151 + Liberty + MON 51817 + Intact, or when combining MON 119151 + MON 51817. MON 301621 (106 and 81 ng/PUF) treatments were less volatile than MON 119151 treatments that did not contain MON 51817 (195 and 253 ng/PUF).