USE OF RADIO-LABELED HERBICIDES TO UNDERSTAND INTERACTIONS BETWEEN DICAMBA AND GLUFOSINATE

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Abstract

It is common for mixtures containing contact and systemic herbicides, such as dicamba and glufosinate, respectively, to display antagonism when mixed. However, due to current label restrictions, dicamba and glufosinate cannot be mixed in XtendFlex cotton and soybean systems, requiring the herbicides to be applied in sequence. From prior field experiments, it was concluded that dicamba followed by (fb) glufosinate at labeled rates 14 days after initial treatment was optimal for controlling Palmer amaranth. To better understand interactions between dicamba and glufosinate, an experiment was conducted with the respective ^{14}C herbicides applied separately, in mixture, and at 3- and 14-day intervals to 5- to 7-leaf Palmer amaranth. Maximum dicamba absorption occurred when mixed with glufosinate (88% of total applied), whereas all other treatments were comparable and varied from 46 to 52% of the total applied ^{14}C-dicamba. Absorption of ^{14}C-glufosinate was comparable when applied alone or in any of the tested sequences with dicamba, ranging from 58 to 70% of total applied. When glufosinate preceded or was applied with dicamba, approximately 92, 83, and 63%, respectively, of the absorbed dicamba remained in the treated leaf (TL), except for dicamba alone (35%), suggesting that applications of glufosinate prior to a dicamba application restricted translocation. Of the absorbed ^{14}C-glufosinate, almost all could be found in the TL, which is not surprising given the contact nature of the herbicide. To optimize Palmer amaranth control in the XtendFlex system, dicamba should be applied approximately 14 days before glufosinate, which enables maximum effectiveness of both herbicides.