

**GLYPHOSATE AND WATERSTRESS EFFECTS ON FRUITING AND
CARBOHYDRATES IN GLYPHOSATE RESISTANT COTTON**

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Abstract

Both water stress and Roundup (glyphosate) treatments to Roundup-Ready (RR) cotton cause abscission of young bolls, although the interaction of these factors is not known. Therefore, studies were conducted to quantify the effects of water stress and Roundup treatments on fruit retention, fruit placement, and carbohydrate partitioning in RR and conventional cotton varieties grown in a phytotron environment. RR plants treated with Roundup at the 4-leaf stage, postemergence (POST) and at the 8-leaf stage, POST-directed (PDIR), had fewer first position bolls at 0 and 1 d of water stress than non-treated RR and conventional plants, but did not differ at 2 and 3 d of water stress. Roundup-treated RR plants reached first bloom 3-4 d later than non-treated plants. All plants subjected to 2 and 3 d of water stress had fewer bolls and squares than plants with 0 and 1 d of water stress. Five-day old bolls from RR plants treated with Roundup had lower fructose content than bolls from non-treated plants. However, subtending leaf carbohydrates and boll sucrose, glucose, and starch content did not differ with Roundup treatments. Increasing water stress caused reductions in subtending leaf glucose, sucrose, and starch content, as well as reductions in boll starch and sucrose content. Reductions in boll starch and sucrose content in response to water stress may indicate the potential for abscission. Roundup treatments to RR cotton do not seem to alter carbohydrate profiles in boll or leaf tissues in the same manner as does water stress. Differences in carbohydrate profiles of young bolls and leaves from Roundup-treated and water stressed cotton plants suggest that water stress and Roundup treatments may promote fruit abscission in different manners.