THE AUXIN-REGULATED GENE *GH3* SPECIFICALLY DETECTS PLANT GROWTH REGULATOR HERBICIDE INJURY IN SOYBEANS. Kevin B. Kelley and Dean E. Riechers, Graduate Research Assistant and Associate Professor, University of Illinois, Urbana, IL 61801.

The expression of a candidate auxin-responsive gene was evaluated for developing a diagnostic assay for plant growth regulator (PGR) herbicide injury in soybean leaves. Expression of *GH3*, a primary auxin-responsive gene, was evaluated in response to dicamba and clopyralid at the RNA and protein levels, and proteomic analyses evaluated global expression profiles of proteins in response to dicamba. Expression of *GH3* was also analyzed in response to heat, drought, and salt stress, and infection by *Soybean mosaic virus* (SMV) and *Bean pod mottle virus* (BPMV), to determine the specificity of *GH3* expression as a diagnostic marker for PGR herbicide injury. At the RNA level, *GH3* was strongly induced by dicamba and clopyralid within 8 hours after application. Expression peaked 1 to 3 days after treatment (DAT) in response to 10% and 1% of a labeled dose of dicamba and clopyralid, with higher expression levels detected at higher herbicide rates. At the protein level, GH3 expression was also strongly induced at 1, 2 and 3 DAT by 10% versus 1% of a labeled dose of dicamba and clopyralid. Heat, drought, and salt stress, and infection with SMV or BPMV had no effect on *GH3* expression at either the RNA or protein levels. Proteomic analysis identified three proteins that were upregulated in response to dicamba. Two were induced for less than 7 DAT, and a third was identified as a general stress-response enzyme (superoxide dismutase) that is likely not specific to PGR herbicide injury. Expression of *GH3* was highly induced by PGR herbicides at the RNA and protein levels, and was not affected by abiotic stresses or viral infection, indicating that *GH3* expression has excellent potential for use in a diagnostic assay specific for PGR herbicide injury.

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