

## **Peanut Injury Evaluation of PPO Inhibitor Herbicides as Affected by Application Timings and Surfactants**

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Due to the prevalence of ALS-inhibitor resistant weeds such as Palmer amaranth, more PPO-inhibitors are being utilized to control weeds in peanuts. Some PPO-inhibitors, such as carfentrazone and lactofen, are often used as late-season clean up options since they have short pre-harvest interval. However, PPO-inhibitors often cause crop injury or foliar burns. This issue can be further compounded by different surfactants, application timings, and interactions with environmental stresses, especially at the peanut reproductive stages. Therefore, two studies conducted in Henry and Escambia counties in Alabama in 2018, were designed to evaluate three objectives: 1) the effect of PPO-inhibitor based treatments on dryland peanut growth and yield when applied during sensitive reproduction stages 60 (R4-R5), 75 (R6), and 90 days (R6-R7) after planting (DAP) 2) study the role of surfactants and chloroacetamide herbicides on peanut injury and 3) assess the level of correlation of NDVI data to traditional visual injury ratings. At 60 DAP, tank mixes of lactofen and 2,4-DB with pyroxasulfone, S-metolachlor, dimethenamid-P with high surfactant oil concentrate (HSOC), a crop oil, were applied at recommended labeled rates. At 75 DAP tank mixes of lactofen, carfentrazone-ethyl, acifluorfen plus 2,4-DB and either non-ionic surfactant (NIS) or HSOC, were applied at 1) the recommended labeled rates and 2) 1.5 times over the label rate. At 90 DAP tank mixes of 2,4-DB, carfentrazone-ethyl, lactofen were applied at the highest labeled rates with either HSOC or NIS. Visual injury ratings and normalized difference vegetation index (NDVI) readings using a hand held Trimble GreenSeeker were conducted at approximately 7, 14, 21, and 28 days after treatment. Yield was collected at the end of the growing season. Results showed peanuts are more sensitive 75 days after planting to PPO inhibitors in combination with HSOC than any other application timing. Yields losses ranged from 13-31 % with carfentrazone-ethyl 52 g ai ha<sup>-1</sup> + 2,4-DB 420 g ai ha<sup>-1</sup> + HSOC 0.9 % v/v causing the most significant yield loss among all treatments evaluated. For treatments applied 60 DAP, lactofen 219 g ai ha<sup>-1</sup> + 2,4-DB 420 g ai ha<sup>-1</sup> + S-metolachlor 1,700 g ai ha<sup>-1</sup> + HSOC 0.75% v/v was the only chloroacetamide tank mix evaluated to cause a significant yield loss of 13% relative to NTC. Carfentrazone-ethyl at 35 g ai ha<sup>-1</sup> + 2,4-DB at 420 g ai ha<sup>-1</sup> + HSOC 0.75% v/v applied at 90 DAP caused a 21% yield reduction compared to the NTC. A Pearson correlation of injury ratings and NDVI readings, for all applications dates, showed a significant negative correlation (R= -0.69, p<0.0001), suggesting NDVI readings can provide additional support to subjective visual injury ratings. Overall, treatments with HSOC and/or carfentrazone-ethyl were more likely to cause significant injury, NDVI reductions as well as yield loss than treatments with NIS. Peanuts are most sensitive to injury from PPO-inhibitor herbicides at 75 days after planting (around R6 growth stage).