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# Assessment of Prohexadione Calcium and Postemergence Herbicide Tank-Mixtures in Peanuts

## Year 3

Research evaluating the compatibility of prohexadione calcium tank-mixed with postemergence herbicides in peanut production has progressed through coordinated field and greenhouse studies. With increasing interest in utilizing plant growth regulators (PGRs) such as prohexadione calcium to manage peanut vegetative growth, this project was designed to proactively address questions regarding tank-mixture compatibility, crop safety, weed control efficacy, and potential yield impacts.

Field trials were conducted during the 2023, 2024, and 2025 growing seasons at the Jones Farm and ABAC Data Farm in Tifton, Georgia. Experiments were established as a randomized complete block design with a split-split plot arrangement and four replications per treatment. The whole-plot factor consisted of postemergence herbicides commonly used for late-season weed control in peanut, including clethodim, sethoxydim, chlorimuron-ethyl, and 2,4-DB, applied at labeled field rates. The subplot factor was prohexadione calcium rate, applied at 0x, 0.6x (84 g a.i. $ha^{-1}$), and 1x (140 g a.i. $ha^{-1}$) of the labeled rate. Peanut cultivar served as the sub-subplot factor and included Georgia-06G (normal-oleic) and Georgia-16HO (high-oleic), which differ in growth habit and canopy architecture. Initial tank-mixture applications were made when canopy lapping exceeded 50% (approximately 65–70 DAP), followed by a sequential application of prohexadione calcium alone 14 days later.

Field data collection included visual injury ratings (% chlorosis, necrosis, and epinasty), peanut height and width (cm), mainstem height (cm), mainstem counts, mainstem-to-lateral vine ratios, Tomato spotted wilt virus (TSWV) incidence, pod yield (kg $ha^{-1}$), and grade (%). Results indicate that while some tank-mixtures resulted in observable visual injury, responses were transient and limited to mild chlorosis or epinasty. Injury levels remained ≤5% across treatments, and no long-term effects on peanut growth or yield were observed. Pod yield was consistent across herbicide treatments and prohexadione calcium rates, with no evidence of negative yield interactions.

Complementary greenhouse studies were conducted to evaluate the impact of these same tank-mixtures on weed control efficacy. Greenhouse experiments were established as a randomized complete block design with a split-split plot arrangement, where herbicide tank-mixtures served as the whole-plot factor, prohexadione calcium rate as the subplot factor, and weed species as the sub-subplot factor. Weed species evaluated included large crabgrass (*Digitaria sanguinalis*), morningglory species (*Ipomoea* spp.), Florida beggarweed (*Desmodium triflorum*), and sicklepod (*Senna obtusifolia*). To better reflect field variability, weeds were established on a two-week planting rotation to capture differences in plant size and growth stage. Applications were made using a calibrated spray chamber delivering 140 L $ha^{-1}$ at 4.8 km $h^{-1}$ when weeds reached 5–20 cm in height.

Greenhouse data collection included visual injury ratings at 3, 7, and 14 days after treatment, plant height (cm), and fresh and dry aboveground biomass (mg). Across all species and herbicide combinations, results indicate that tank-mixing prohexadione calcium with postemergence herbicides did not reduce herbicide efficacy or increase weed regrowth relative to herbicide-only treatments.

In summary, results from combined field and greenhouse experiments indicate that tank-mixing prohexadione calcium with commonly used late postemergence herbicides is compatible with peanut production systems. These tank-mixtures did not negatively impact peanut growth, yield, or weed control efficacy. Findings from this project will be used to develop science-based recommendations and extension materials to support growers considering the integration of prohexadione calcium into postemergence weed management programs.