Vegetative Injury Occurring at Different Intensity and Growth Stage Effect on Peanut

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Introduction

• Physical injury of crops can occur from different sources:
  • Hail storm damage
  • Animal feeding
  • Movement of animals or equipment through the field

• Understanding this injury aids management decisions after it occurs.

• Evaluating recovery through yield loss, unharvested pods, and Normalized Difference Vegetation Index (NDVI) compared to non-injured plants will help growers and insurance adjusters decide the best course of action for management after injury.

Objective – Determine if physical injury to vegetation impacts peanut production.

Materials and Methods

• Experiment conducted in Tifton, GA in 2020 using Georgia-06G seed planted at 19.7 seed m\(^{-1}\).
• Used Randomized Complete Block design with factorial arrangement of injury timing x intensity.
• Four replications.
• ANOVA with PROC GLIMMIX in SAS 9.4 with mean separation using pairwise t-tests.
• Injury treatments applied using gas powered weed trimmer with flexible rubber tines at wide angle at varying RPM (Figures 1 and 2).
• Injury treatments applied at four times in the season at three intensities:
  • 30, 60, 90, and 120 Days After Planting (DAP)
  • 33, 66, and 99% injury levels (Figure 3)
• Unharvested pods collected by sifting through the inversion zone to scavenge remaining pods left in the soil after digging.
• NDVI measured using a Crop Circle Active Light Sensor (Holland Scientific).

Results

Yield (Figure 4)

• All treatments that sustained physical damage had yield reduction.
• Yield reduced with increasing intensity for any given treatment date.
• For 33% and 66% intensities, yield at 30 DAP was greater than at least one later date at similar intensity, then stabilized after 90 DAP.
• Largest reduction in yield between 60 and 90 DAP timings for 99% intensity. Continued management after 99% intensity not recommended regardless of timing.
• Economic analysis needed to determine breakeven for other timings and intensity levels.

Unharvested Pods (Figure 5)

• Unharvested pods greatest at 120 DAP with 66% and 99% injury.
• Injury at 66 or 99% intensity may salvage yield potential with fewer losses if harvested immediately since no opportunity for recovery.
• Greater pod loss with lighter intensity at 30 and 60 DAP may be offset with different management strategies to recuperate yield potential. More research needed.

NDVI (Figure 6)

• NDVI values recovered for 33% and 66% injury levels at 30 and 60 DAP.
• Greatest opportunity for vegetative recovery at 60 DAP timing across all intensities.
• Canopy recovery reduced when injury occurred at 90 or 120 DAP. This response likely because of shift to reproductive production.

Conclusions

• Physical injury to peanut canopy had a negative influence on yield.
• Plants can recover from less severe damage that occurs early in the season but are unable to recover from severe damage occurring late in the season.