



Injury to Peanut Cultivars from Postemergence Herbicide Tank-Mixtures with Paraquat



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INTRODUCTION

- In the Southeast, paraquat is a commonly used herbicide for postemergence (POST) control of broadleaf and grass weed species in peanut (*Arachis hypogaea* L.).
- Paraquat has a short window of application and can cause significant foliar injury to peanut vegetation (Wilcut and Swann, 1990).
- While foliar injury does occur, this damage does not correlate to peanut yield loss (Wilcut et al., 1989).
- Bentazon is antagonistic toward paraquat when used in a tank-mixture and reduces foliar injury while increasing the flexibility of the window for applications (Wehtje et al., 1992).
- Further research is needed to determine the effects of tank-mixing paraquat with other POST herbicides on peanut.

OBJECTIVES

- Establish a level of injury for and determine the effects on pod yield and grade from POST herbicide tank-mixtures including paraquat on runner-type peanut cultivars.



MATERIALS AND METHODS

Locations: Southwest REC – Plains, GA & UGA Ponder Farm – Ty Ty, GA

Years: 2016 & 2017

Experimental Design: Split-Plot design with 4 replications

Main-Plot Effect (Herbicide Treatments)

- PRE^A + paraquat (0.21 kg ai/ha) + non-ionic surfactant (0.25 % v/v)
- PRE + paraquat + (bentazon [0.56 kg ai/ha] + acifluorfen [0.28 kg ai/ha])
- PRE + paraquat + (bentazon + acifluorfen) + S-metolachlor (1.47 kg ai/ha)
- PRE + paraquat + (bentazon + acifluorfen) + acetochlor (1.26 kg ai/ha)
- PRE + handweed (PRE)
- Non-Treated Control (NTC) (handweed only)

^APRE denotes a preemergence application of flumioxazin (0.11 kg ai/ha) + pendimethalin (1.04 kg ai/ha)

Sub-Plot Effect (Cultivars)



Data Measurements:

- Crop injury – Leaf Burn (visual %) & Stunting (visual %)
- Yield (kg/ha)
- Grade (% total sound mature kernel [TSMK])

Crop Management: Irrigated & following UGA Extension recommendations

RESULTS AND DISCUSSION

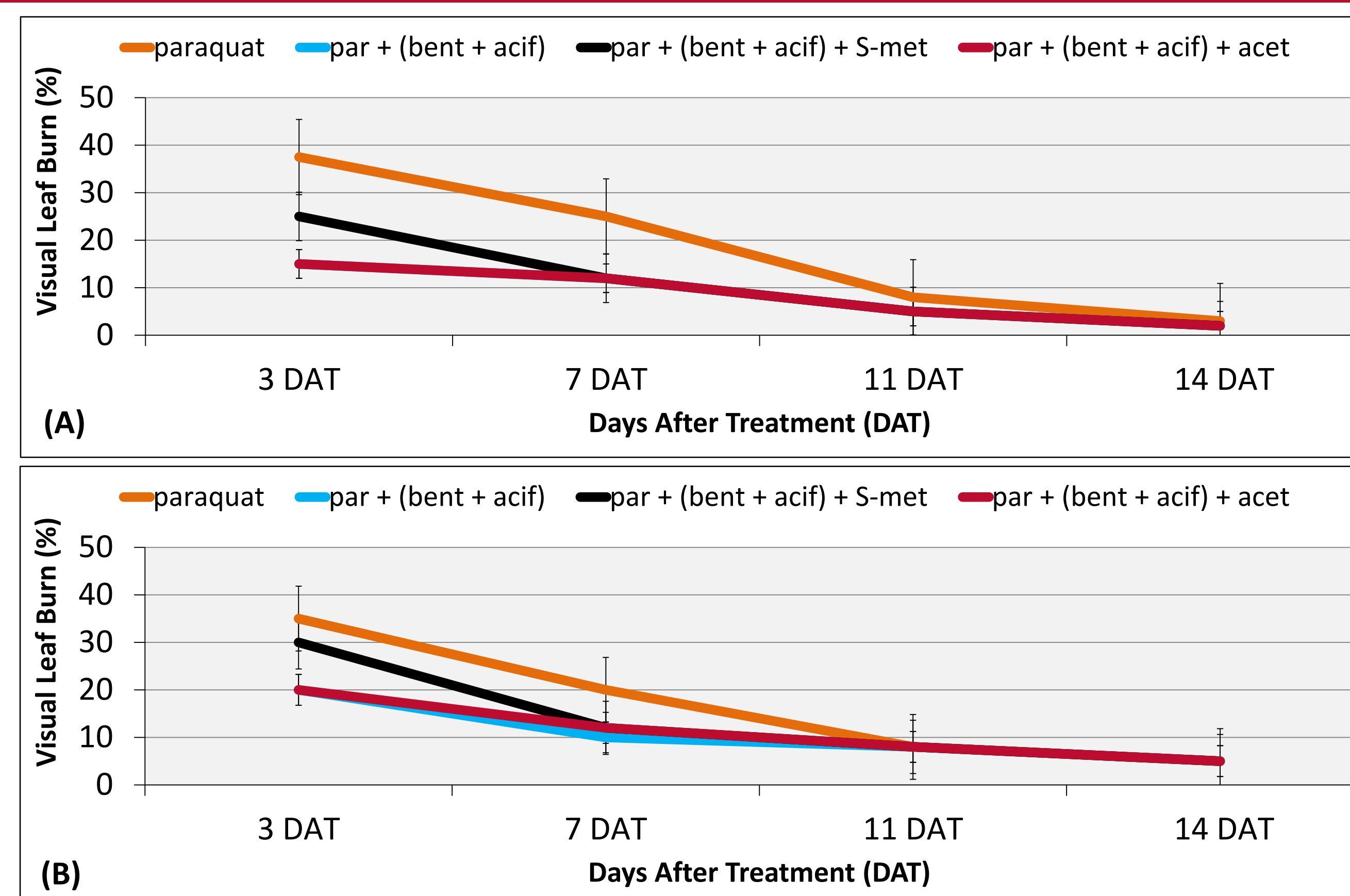


Figure 1. Visual % leaf burn by herbicide treatment for Plains (A) & Ty Ty (B). Crop injury was visually estimated using a scale of 0 to 100%, with 0 = no injury & 100 = crop death. Control treatments showed no injury and therefore were not depicted on the graphs. Error Bars = ± 1 Std. Error of Mean.

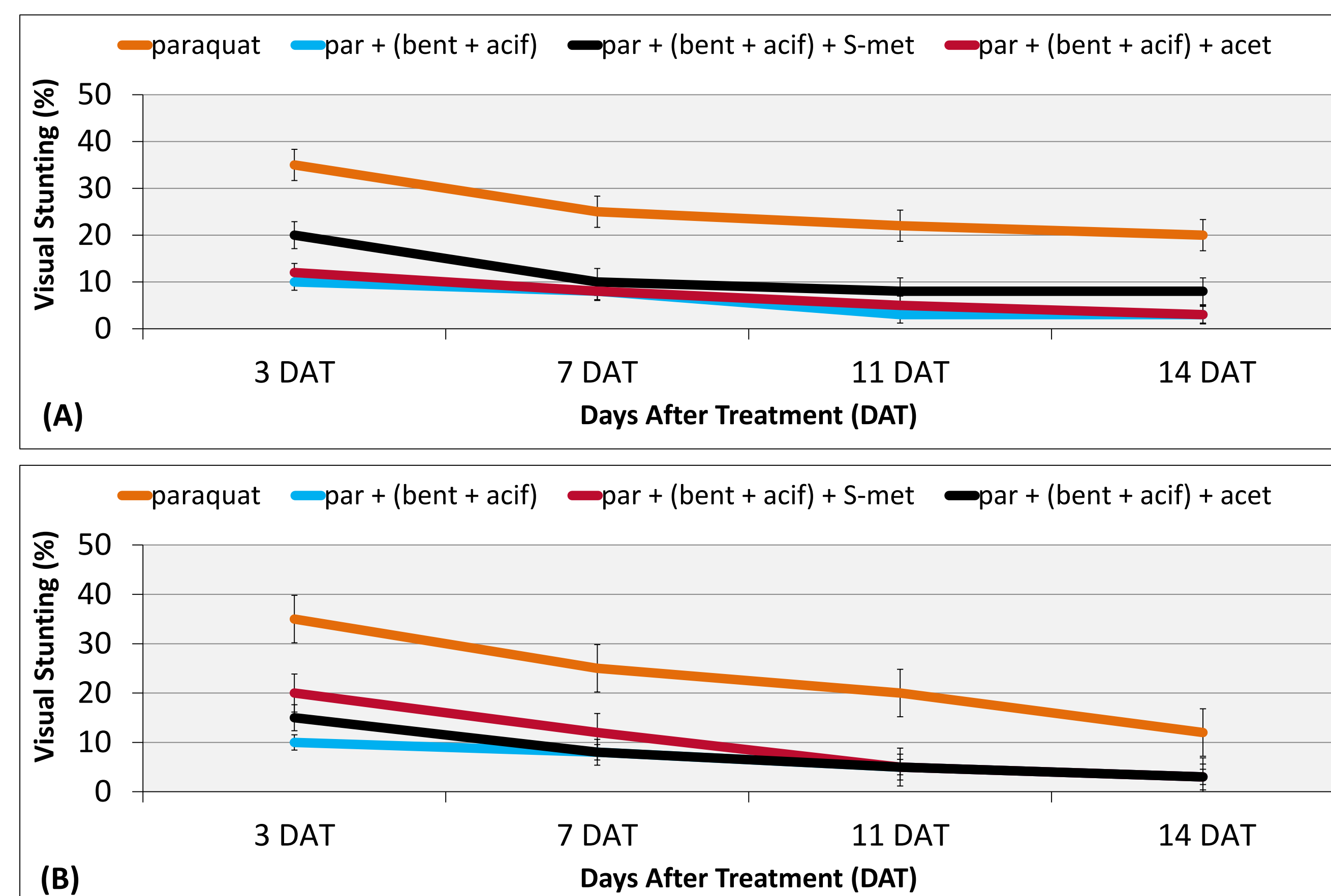


Figure 2. Visual % stunting by herbicide treatment for Plains (A) & Ty Ty (B). Crop injury was visually estimated using a scale of 0 to 100%, with 0 = no injury & 100 = crop death. Control treatments showed no injury and therefore were not depicted on the graphs. Error Bars = ± 1 Std. Error of Mean.



Figure 3. Leaf Burn at 7 days after application for each herbicide treatment. The treatments are paraquat, paraquat + (bentazon + acifluorfen), paraquat (bentazon + acifluorfen) + S-metolachlor, paraquat + (bentazon + acifluorfen) + acetochlor, preemergence control, & the non-treated control.

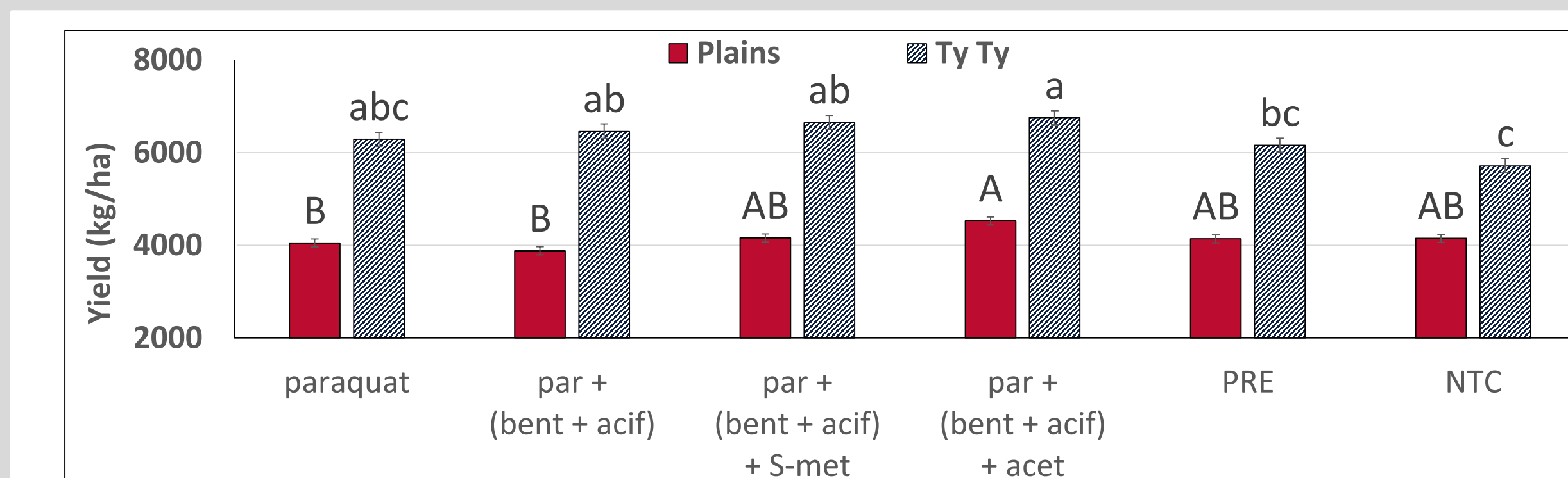


Figure 4. Pod yield (kg/ha) in Plains & Ty Ty for each herbicide treatment.

- In Ty Ty, all herbicide treatments including paraquat yielded greater than the PRE & non-treated controls.
- In Plains, the paraquat & paraquat + (bentazon + acifluorfen) treatments yielded less than the acetochlor tank-mixture.

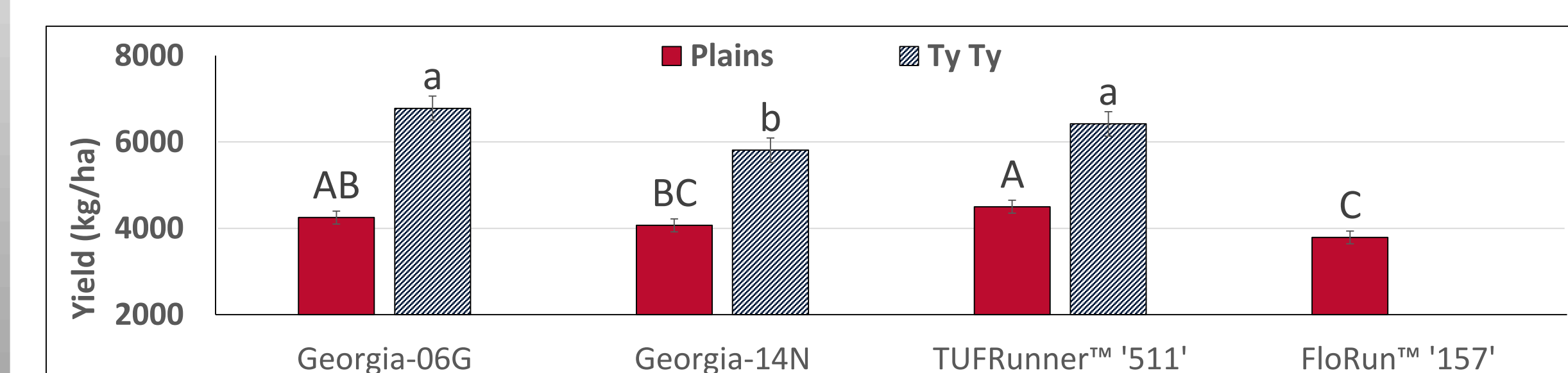


Figure 5. Pod yield (kg/ha) in Plains & Ty Ty for each cultivar.

- In Ty Ty, Georgia-14N yielded less than Georgia-06G & TUFRunner™ '511'.
- In Plains, TUFRunner™ '511' & Georgia-06G yielded greater than FloRun™ '157'.

Table 1. Pod grade for each herbicide treatment (A) and cultivar (B). Pod grade is %TSMK (total sound mature kernel).

(A)	par	par + (bent + acif)	par + (bent + acif) + S-met	par + (bent + acif) + acet	PRE	NTC
Plains	71 A	71 A	71 A	69 B	70 AB	71 A
Ty Ty	76 a	76 a	76 a	76 a	76 a	76 a
(B)	Georgia-06G	Georgia-14N	TUFRunner™ '511'	FloRun™ '157'		
Plains	70 B	72 A	71 AB	70 B		
Ty Ty	76 a	76 a	76 a	76 a		

CONCLUSIONS

- Paraquat alone caused the greatest amount of injury at both locations (Figs. 1-3). This injury had no effect on yield (Fig. 4).
- Georgia-06G and TUFRunner™ '511' have the greatest yield at both locations (Fig. 5).
- Georgia-14N and FloRun™ '157' had the least amount of yield at their respective locations (Fig. 5).
- The paraquat + (bentazon + acifluorfen) + acetochlor treatment may cause a grade reduction in a heavier soil type (Table 1).

REFERENCES

- Wilcut, J. W. and C. W. Swann. 1990. Timing of Paraquat Applications for Weed Control in Virginia-Type Peanuts (*Arachis hypogaea*). Weed Science 38:558-562.
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