

# Finesse and Atrazine Residual Effects on Soybean, Wheat, and Cotton in Different pH Soils

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HONORS THESIS RESEARCH PROJECT

# Introduction

- ▶ Oklahoma has many different pH soils
- ▶ Finesse and Atrazine are two fairly popular herbicides for pre-emergence weed management
- ▶ Purpose: Identify effects of these herbicides on sensitive crops and how they vary in different pH soils
- ▶ This will help determine effectiveness of these herbicides across Oklahoma

# Methods

- ▶ Soil was chemically adjusted to attain pH levels of 4, 5, 6, and 8
- ▶ pH 7 was excluded because it is neutral
- ▶ Soybean, wheat, and cotton
- ▶ 4 pH treatments; each treatment having 3 trays
- ▶ Each tray had 3 sets of 4 pots; each set a different crop
- ▶ After planting, 2 trays of each pH treatment was sprayed with Finesse and Atrazine, respectively
- ▶ Finesse rate: 0.4 oz/acre
- ▶ Atrazine rate: 2 qt/acre

Planting arrangement



12 days after planting

# Methods: continued

- ▶ Herbicides were watered in after application
- ▶ Pots were watered every other day and as needed
- ▶ Pictures and crop injury reports were taken at 3 weeks and 4 weeks after planting
- ▶ After 4 weeks, biomass was collected, dried, and weighed
- ▶ pH 4 treatment was excluded from data reports due to no germination

No germination



18 days after planting

# Results: Crop Injury

	3 Weeks		4 Weeks	
Soybean	Finesse	Atrazine	Finesse	Atrazine
pH 5	38.5	28.5	2	55.5
pH 6	0.5	81	0	90.5
pH 8	5	77.5	0.5	92
	3 Weeks		4 Weeks	
Wheat	Finesse	Atrazine	Finesse	Atrazine
pH 5	6.5	0	2	78.5
pH 6	0	96.5	3	99.5
pH 8	0	97	0.5	94
	3 Weeks		4 Weeks	
Cotton	Finesse	Atrazine	Finesse	Atrazine
pH 5	65.5	68.5	0	0
pH 6	70	85	63.5	100
pH 8	74.5	46.5	75.5	69.5

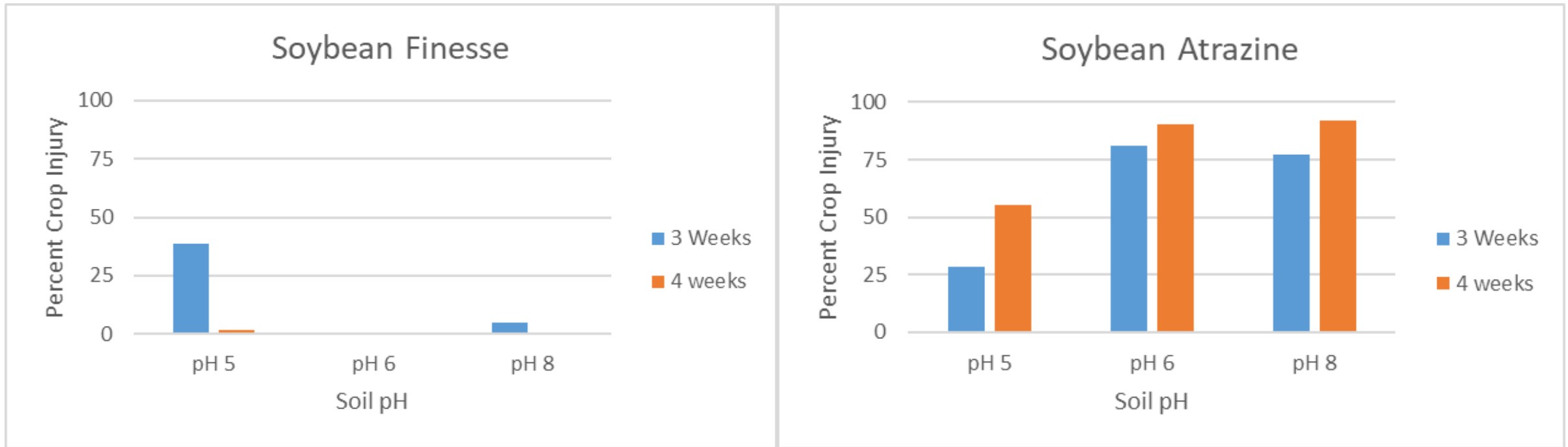
- ▶ Table shows percentage of crop injury observed after 3 and 4 weeks
- ▶ All injury is rated compared to the non-treated plants
- ▶ This table is the average of all 4 plants in each category

# Results: Crop Biomass

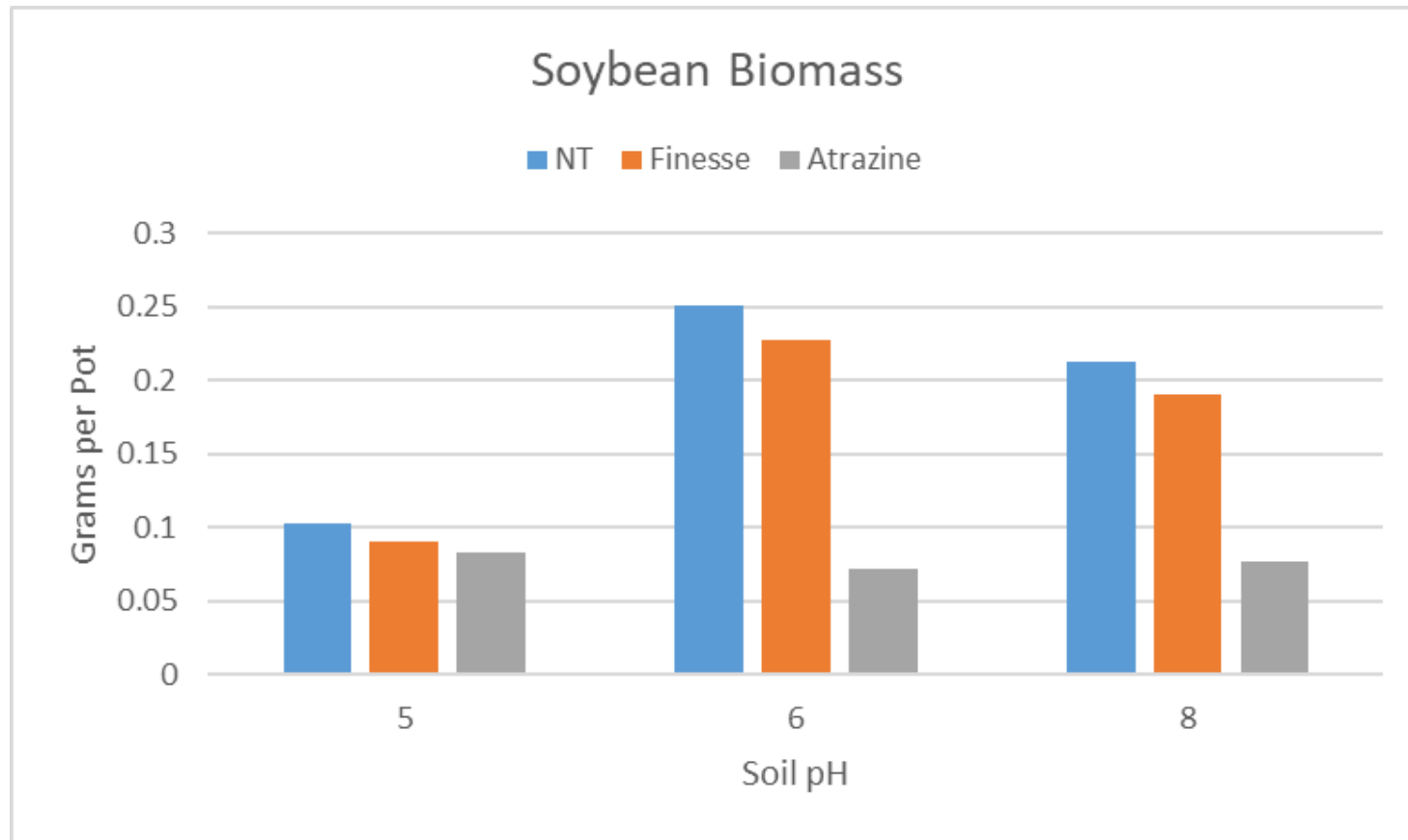
Soybean	NT	Finesse	Atrazine
5	0.1035	0.091	0.08325
6	0.25075	0.228	0.07225
8	0.21275	0.1905	0.07725
Wheat	NT	Finesse	Atrazine
5	0.00675	0.00625	0.00525
6	0.04	0.02175	0.0065
8	0.047	0.02375	0.00675
Cotton	NT	Finesse	Atrazine
5	0.039	0.047	0.03125
6	0.114	0.058	0.035
8	0.1375	0.05875	0.036

- ▶ All samples were weighed on a precision scale measuring to 0.000 grams
- ▶ This table is the average of all 4 plants in each category

# Results: Soybean Injury



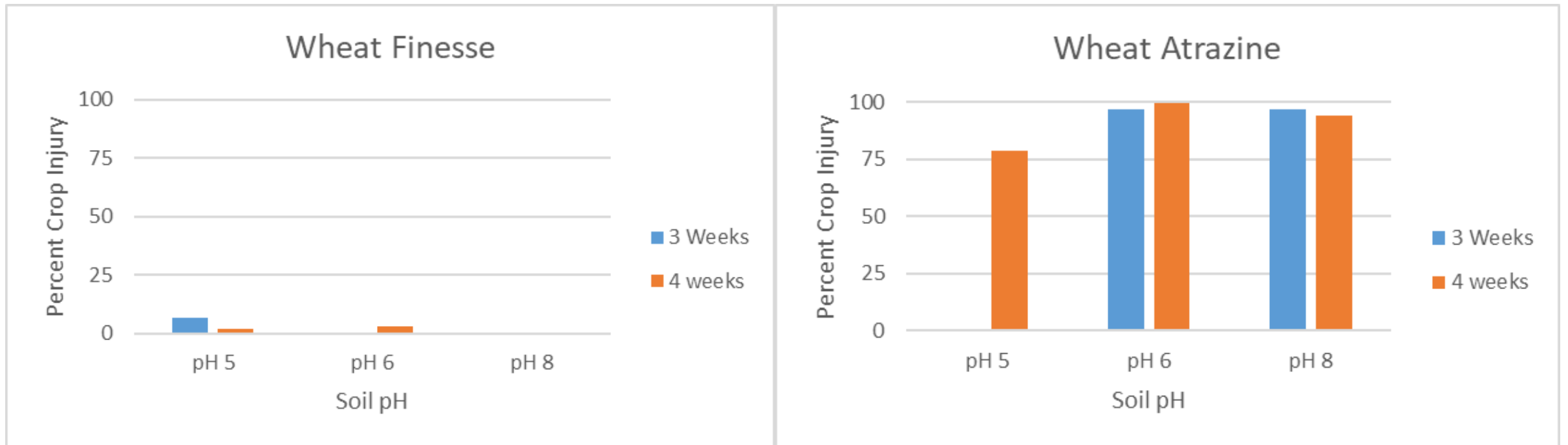
# Results: Soybean Biomass



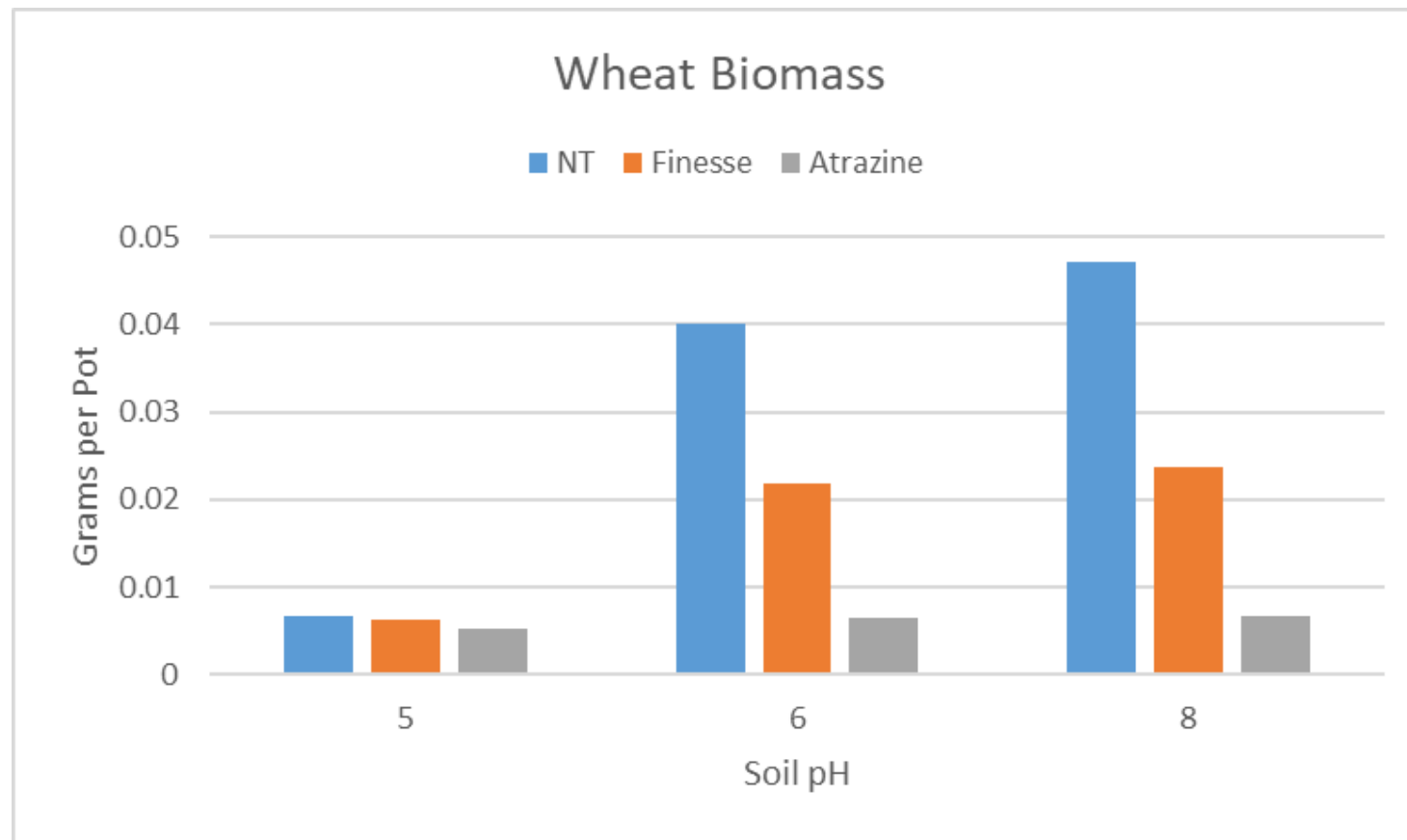
Please notice Y-axis scale change



# Results: Wheat Injury



# Results: Wheat Biomass



Please notice Y-axis scale change

pH 5 Non-Treated Week 3



pH 5 Finesse Week 3



pH 5 Atrazine Week 3



pH 5 Non-Treated Week 4

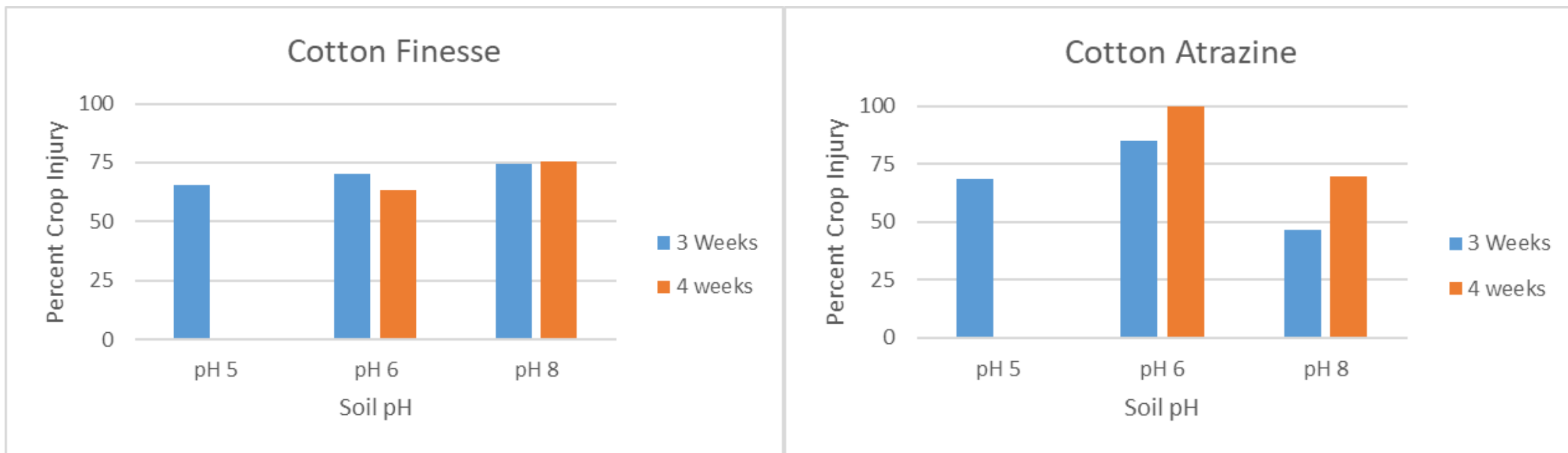


pH 5 Finesse Week 4

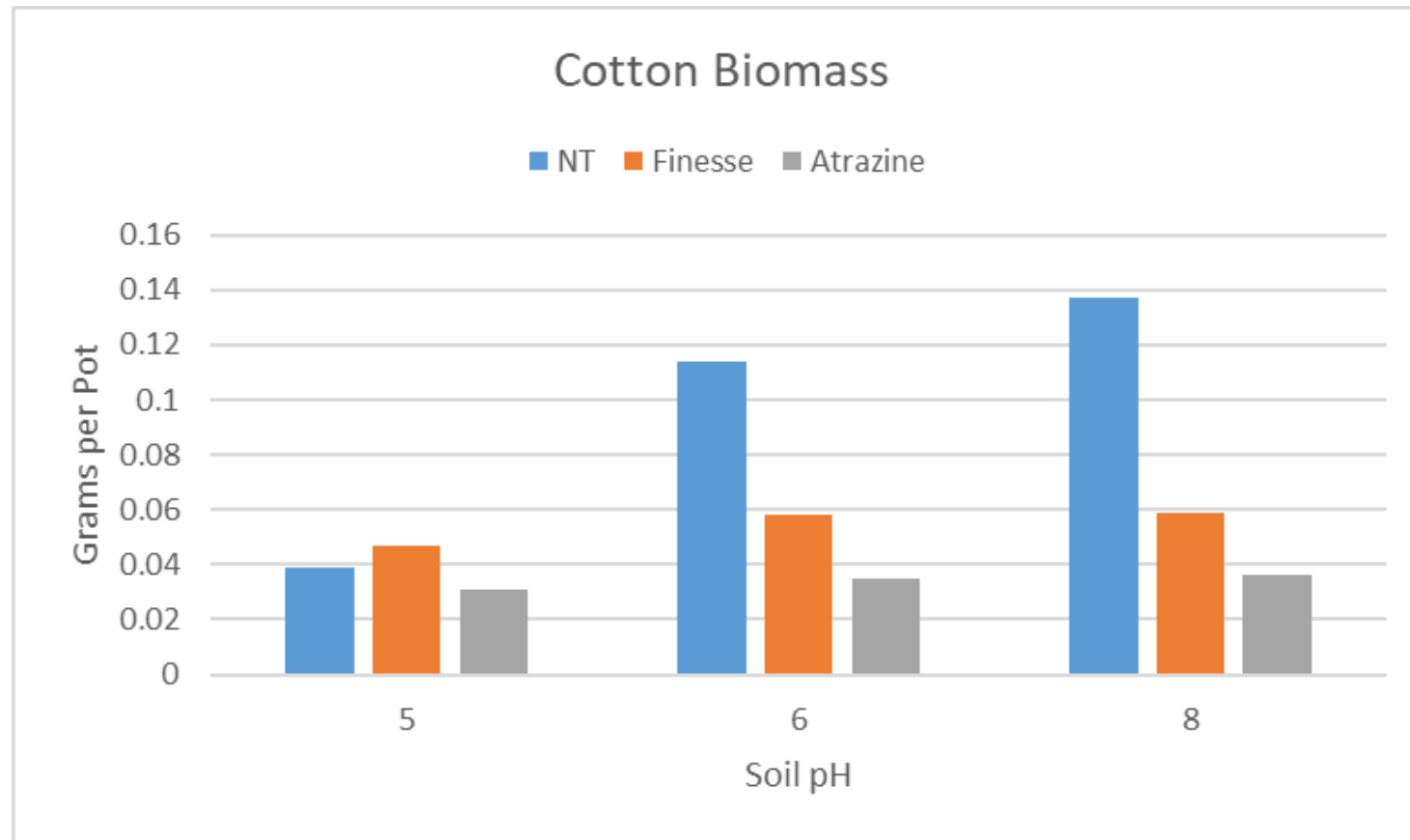


pH 5 Atrazine Week 4

# Results: Cotton Injury



# Results: Cotton Biomass



Please notice Y-axis scale change

# Conclusion

- ▶ It is important to know the effects of herbicides in different pH soils
- ▶ Oklahoma has a pH range of roughly 4.6 to 8.4 across the state (Arnall *et al.* 2018).
- ▶ The residual timing of herbicides dictates planting intervals and crop rotation
- ▶ With further research, we can determine exactly the effectiveness, potency, and residual length in different soils
- ▶ This would help producers be more accurate with their herbicide application and crop planting management