

Impacts of Bermuda Grass on Northern Bobwhite Chick Mobility and Heat Exposure

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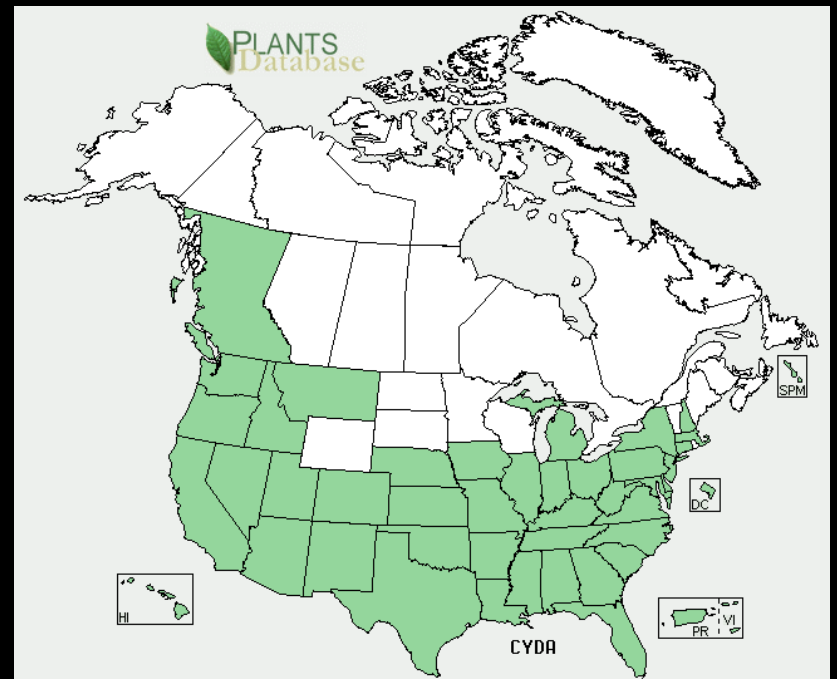
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Field Borders



Bermuda Grass

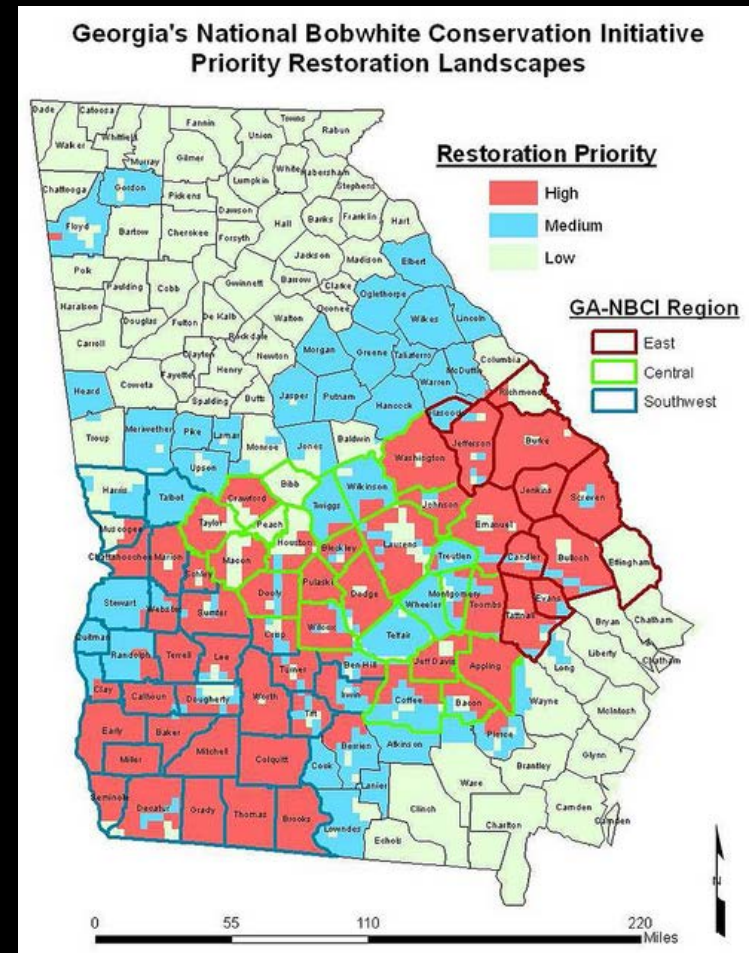


Objectives

- Measure the effect of Bermuda grass density on northern bobwhite chick movements
- Compare ambient temperatures in areas dominated by Bermuda grass and NOBO friendly forbs
- Determine lethality curves for NOBO

Study Area

- Upper coastal plain of GA, USA
- Hot summers
- Dominated by agriculture
- Bermuda grass prevalent



Experimental Design

- Randomized complete block design
 - Treatments: “Low” Bermuda grass density (0-20%); “High” (>20 %); and a control of 0% Bermuda grass
 - “Trials” considered blocks (n=8)



Experimental Design



- Purchased 1-day old chicks
- Set-up a 2 m “race track” for chicks to complete
- Chicks put in groups of 8 chicks
- Randomly chose groups
- Groups not chosen provided stimuli for chicks in trial

Experimental Design/Analysis

- Trials conducted during morning and evening
- Chicks were used at 5 and 10 days old
- ANOVA used for analysis (alpha 0.05)



Temperature Comparison

- Paired design of forb dominated and Bermuda grass dominated plots within field borders
- HOBO[®] temperature data loggers placed in each plot (n=3); probes was placed at “chick level”
- Only daytime readings used in analysis
- *t*-test used to compare

Time-to-Death

where

$$t = \frac{5ms}{G}$$

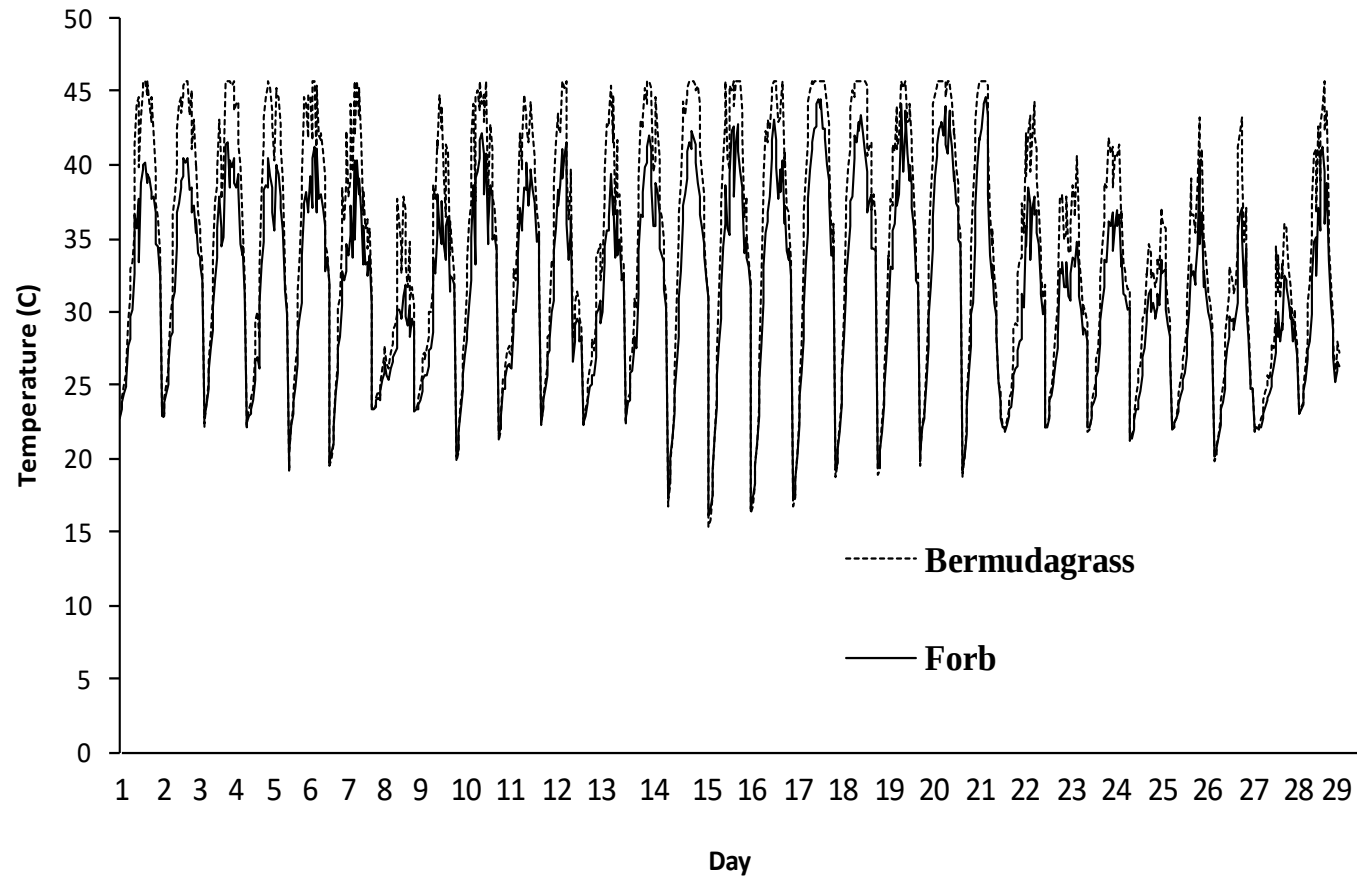
- t = time in seconds;
- m = body mass in g;
- s = specific heat (J/g/C); and
- G = rate of heat gain (W/C)

Guthery (2000)

Results: Time-to-Complete

	<u>Bermudagrass Density</u>		
	Low (0%)	Medium (>0%-20%)	High (>20%)
Chick Age			
5 Days	0.77 (0.095)	1.17 (0.094)	1.22 (0.093)
10 Days	0.61 (0.052)	0.67 (0.056)	0.56 (0.059)

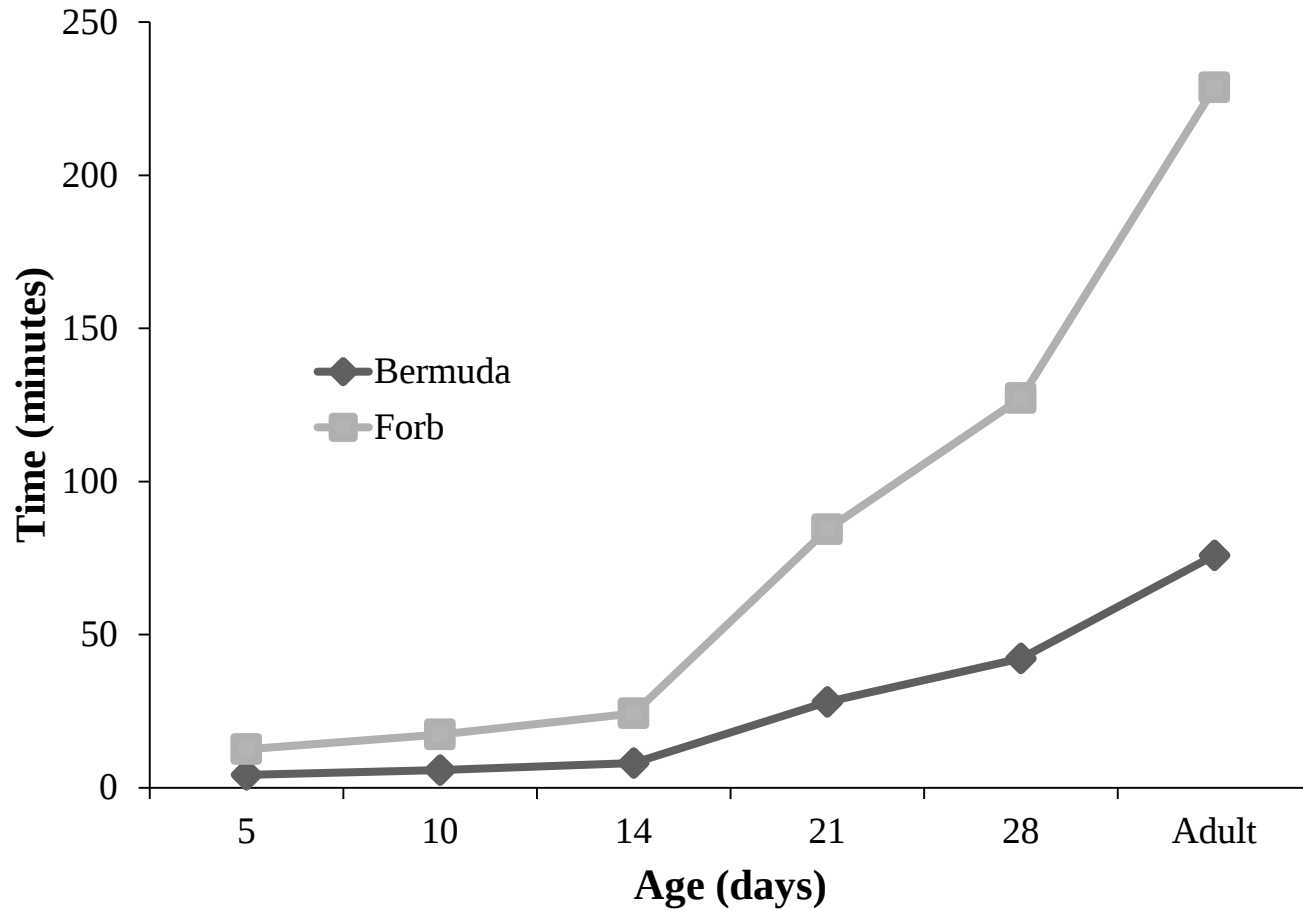
Temperature by Treatment



Temperature Threshold (40° C)

	Bermuda		Forb		
Variable	Mean	SD	Mean	SD	Proportion Different
Mean Temperature (C)	34.51	2.71	31.58	2.31	0.08
Mean Max Temperature (C)	44.20	2.82	40.06	3.48	0.09
% Days > Threshold ¹	0.87	-	0.67	-	0.23
% Time >Threshold	0.32	0.18	0.11	0.12	0.67

Time-to-Death



Discussion

- Bermuda grass density affected movement, but only at 5 days old
- Lack of effect at 10 days not surprising biologically
- Literature scant on thermodynamics of bobwhite chicks (Guthery et al. for adults)

Discussion

- We made assumptions that heat affects chicks similar to adults (perhaps our results are conservative)
- If there are not similar, do adult bobwhites select habitats for their optimal thermal environment or that of the chicks?

Conclusions

- Bermuda grass likely fragments landscape for NOBO because of thermal environment and increased risk from slowed movements
- Removal of Bermuda grass is warranted, but good luck!

Questions?

