

Invertebrate Abundance at Northern Bobwhite Quail Brood Locations

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Introduction

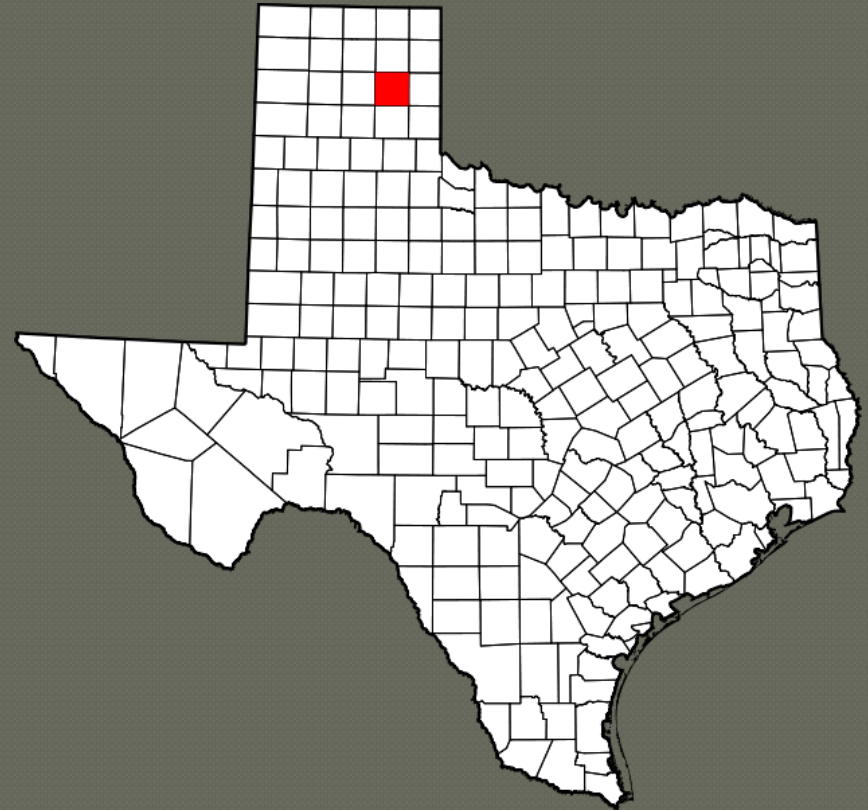
- Northern bobwhite (*Colinus virginianus*) populations have experienced a steady decline throughout Texas
- Texas Parks and Wildlife Roadside Counts reveal steep declines in bobwhite in the Cross Timbers ecoregion
- Rolling Plains ecoregion populations, while more stable, have only exhibited one population peak in thirteen years

Introduction

- Little information exists pertaining to bobwhite chick demographics even though this metric has a major influence on chick survival (Sandercock et. al 2008)
- Bobwhite chicks rely on invertebrates for an important source of protein for growth and development (Stoddard 1931, Nestler et. al 1942, Hurst 1972)
- We hypothesized brooding northern bobwhite hens would select feeding sites with greatest invertebrate diversity and abundance

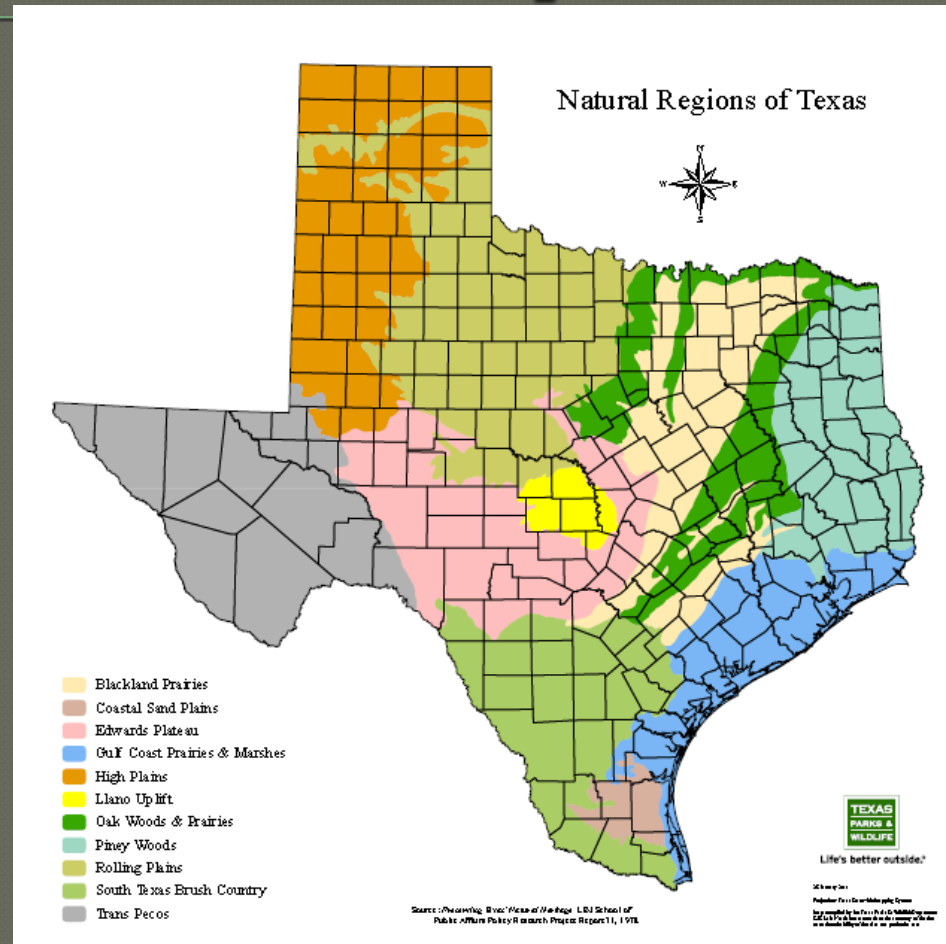
Study Area

- Experiment conducted in eastern Texas Panhandle in Gray County, Texas
- Sampling conducted on private grazing lands managed for livestock and wildlife
- Traditionally maintained strong bobwhite quail populations



Study Area

- Area falls within the Rolling Plains ecoregion
- Climate characterized as semi-arid (20.13 inches avg. annual precipitation)
- Majority of precipitation (84%) coincides with breeding season



- Soils characterized as rolling hills and dunes comprised of sandy surface and subsoil
- Vegetation consists of shrub-grassland

Study Area



Methods

- Bobwhite hens trapped from February-April
- Hens fitted with 6 gram necklace-style radio transmitter (American Wildlife Enterprises)
- Monitored ≥ 3 weekly throughout breeding season



Methods



- Invertebrate samples collected at observed brood and paired random location
- 10-meter transects swept 25 times with 38 cm diameter sweep net
- Samples sorted and counted by Order

Analysis

- Shapiro-Wilks test indicated non-normal distribution of error ($P > 0.05$)
- Wilcoxon signed rank test conducted to compare between years, brood, and random sites
- Analysis executed using IBM SPSS



Results

- Samples collected from 6 and 8 radio tagged females with broods in 2008 and 2009
- Samples pooled over both years due to small sample size ($n = 34$)
- Coleoptera, Hemiptera, and Orthoptera selected from 14 collected Orders due to high frequency of occurrence ($\lambda = 0.55$)

Table 1. Invertebrate abundance at brood and paired locations in Texas Rolling Plains

Order	Brood		Random	
	$\bar{x}$	SE	$\bar{x}$	SE
Coleoptera	2029	0.541	1970	0.495
Hemiptera	1.558	0.327	1.441	0.280
Orthoptera	11.617	1.537	12.176	1.848
Total	15.647	1.985	16.441	2.188
Diversity	2.911	0.232	3.205	0.238

- We found total abundance did not differ between sites ($P = 0.925$), nor did abundance of Coleoptera ($P = 0.990$), Hemiptera ($P = 0.888$), and Orthoptera ($P = 0.911$)
- Similarly, invertebrate Order diversity did not differ between sites ($P = 0.469$)

Discussion

- Abundance of Coleoptera, Hemiptera, and Orthoptera ranked highest among all Orders collected
- These are an important component in gallinaceous chick diets
- However, bobwhite hens in our study did not select brood sites based upon invertebrate abundance or diversity

Discussion

- Randel et. al (2007) reported similar results from wild turkeys in Texas.
- In contrast, black grouse, capercaillie, and ruffed grouse hens appear to select sites with higher invertebrate abundance (Baines et. al 1996, Haulton et. al 2003, Wegge et. al 2005)

Discussion

- Important note – Palmer (2001) reported lack of correspondence of arthropod abundance between standard sampling techniques and human-imprinted chicks.
- Race (1960) suggested sweep-net techniques sample inaccessible vertical strata
- However studies suggesting hens select sites based upon abundance used sweep net techniques similar to ours (Baines et. al 1996, Haulton et. al 2003, Wegge et. al 2005)

Management Implications

- Although we discovered no detectable differences, it should not discount the importance of invertebrates to quail chicks.
- Brood rearing hens in other gallinaceous species have been found to select sites of higher invertebrate abundance and diversity.
- We suggest management practices to increase abundance and diversity would be beneficial to bobwhite chicks.

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