Invertebrate Abundance at Northern Bobwhite Quail Brood Locations

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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.
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
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
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
Study Area

- Soils characterized as rolling hills and dunes comprised of sandy surface and subsoil
- Vegetation consists of shrub-grassland
Bobwhite hens trapped from February-April

- Hens fitted with 6 gram necklace-style radio transmitter (American Wildlife Enterprises)

- Monitored ≥ 3 weekly throughout breeding season
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
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
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 ($\lambda = 0.55$)
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 ($P = 0.469$)
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.
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)
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)
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.
Acknowledgements

- Texas Tech University, Natural Resources Conservation Service and Texas Parks and Wildlife for funding and assistance

- Landowners Bill Gething and Jeff Haley

- Field technician Chadd Malone


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