



2012

# Northern Bobwhite Population Structure and Diversity in Texas and the Great Plains

Katherine S. Miller  
*Texas A&M University*

Leonard A. Brennan  
*Texas A&M University*

Randall W. DeYoung  
*Texas A&M University*

Fidel Hernandez  
*Texas A&M University*

X. Ben Wu  
*Texas A&M University*

Follow this and additional works at: <http://trace.tennessee.edu/nqsp>

### Recommended Citation

Miller, Katherine S.; Brennan, Leonard A.; DeYoung, Randall W.; Hernandez, Fidel; and Wu, X. Ben (2012) "Northern Bobwhite Population Structure and Diversity in Texas and the Great Plains," *National Quail Symposium Proceedings*: Vol. 7 , Article 97.  
Available at: <http://trace.tennessee.edu/nqsp/vol7/iss1/97>

This Bobwhite Genetics is brought to you for free and open access by Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in National Quail Symposium Proceedings by an authorized editor of Trace: Tennessee Research and Creative Exchange. For more information, please contact [trace@utk.edu](mailto:trace@utk.edu).

# NORTHERN BOBWHITE POPULATION STRUCTURE AND DIVERSITY IN TEXAS AND THE GREAT PLAINS

Katherine S. Miller<sup>1,2</sup>

Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX 78363, USA

Leonard A. Brennan

Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX 78363, USA

Randall W. DeYoung

Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX 78363, USA

Fidel Hernández

Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX 78363, USA

X. Ben Wu

Department of Ecosystem Science and Management, Texas A&M University, College Station, TX 77843, USA

## ABSTRACT

Many northern bobwhite (*Colinus virginianus*) populations have been experiencing severe declines. This decline is of concern to wildlife biologists, landowners, and legislators due to the popularity of this species as a game bird. Previous molecular genetic analyses for populations inhabiting intact habitats in South Texas indicate the northern bobwhite population in this region is genetically diverse with low population structure. We assessed whether landscape affects the population structure and diversity for northern bobwhite in Texas and the Great Plains. We extracted DNA from hunter-harvested northern bobwhites from 19 sites in South Texas from 2004 to 2010. We analyzed 7 microsatellites (Quail 5, 8, 9, 10, 11, 12, and 15). We used  $F_{ST}$  to measure genetic structure and AMOVA for genetic variation. We built 3 matrices to compare the genetic structure with the landscape. Geographic distances (km) between sample locations were ascertained using Google Earth. A matrix of barriers incorporated large water bodies and highways. We used the Biologist Ranking Information from the National Bobwhite Conservation Initiative for the third matrix to identify the number of different habitat patches a quail would need to cross from ranch to ranch. These matrices were compared to the genetic structure (pairwise  $F_{ST}$ ), using Mantel tests with 10,000 permutations. We used partial Mantel tests to test the correlation of pairwise  $F_{ST}$  to combinations of distance and barriers, distance and habitat, and barriers and habitat. Overall  $F_{ST}$  was  $< 0.01$ , suggesting low levels of population differentiation and AMOVA revealed most variation was within individuals. All Mantel tests had a positive correlation with genetic differentiation; however, barriers appear to be important factors for the observed genetic patterns.

**Citation:** Miller, K. S., L. A. Brennan, R. W. DeYoung, F. Hernández, and X. B. Wu. 2012. Northern bobwhite population structure and diversity in Texas and the Great Plains. *Proceedings of the National Quail Symposium* 7:251.

**Key words:** *Colinus virginianus*, genetics, northern bobwhite, population structure, South Texas

---

<sup>1</sup> E-mail: Katherine.Miller@students.tamuk.edu

<sup>2</sup> Present address: Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, 1125 West Avenue B, Howe Building, Room 159, Kingsville, TX 78363, USA.