EFFECTS OF MICRO-HABITAT, MACRO-HABITAT, AND PREDATOR SPACE-USE ON SUCCESS OF NORTHERN BOBWHITE NESTS

Pat Stockett
Department of Wildlife & Fisheries, Box 9690, Mississippi State University, Mississippi State, MS 39762, USA

Mark Smith
Department of Wildlife & Fisheries, Box 9690, Mississippi State University, Mississippi State, MS 39762, USA

James Austin
Department of Wildlife & Fisheries, Box 9690, Mississippi State University, Mississippi State, MS 39762, USA

Scott Szukaitis
Department of Wildlife & Fisheries, Box 9690, Mississippi State University, Mississippi State, MS 39762, USA

Chrissie Henner
Department of Wildlife & Fisheries, Box 9690, Mississippi State University, Mississippi State, MS 39762, USA

L. Wes Burger
Department of Wildlife & Fisheries, Box 9690, Mississippi State University, Mississippi State, MS 39762, USA

Bruce Leopold
Department of Wildlife & Fisheries, Box 9690, Mississippi State University, Mississippi State, MS 39762, USA

Dave Godwin
Mississippi Department of Wildlife, Fisheries, and Parks, Box 9690, Mississippi State, MS 39762, USA

ABSTRACT

Northern bobwhite (*Colinus virginianus*) exhibit high reproductive potential allowing populations to rapidly respond to newly created habitat and recover from high annual mortality. However, they experience low individual nest success, ranging from 16–50%. Survival of nests, particularly first nests, is an important demographic parameter that influences overall population performance and participation in alternative reproductive strategies such as renesting, double-clutching, and male-incubation. As bobwhite populations continue to decline, old paradigms regarding the relationships among habitat characteristics, predator abundance, and bobwhite productivity are being reexamined. A new emerging paradigm hypothesizes that habitat structure, landscape context, and predator context interact in a complex manner to influence fate of individual nests. Vegetation characteristics at nest sites, and components of bobwhite nesting habitat have been described, but few studies have shown relationships between vegetation characteristics and nest success. In contrast, several studies have demonstrated relationships between landscape structure and nest success, and ongoing research in the southeastern United States is demonstrating relationships between predator context and productivity. Although numerous studies have estimated nest success, no study has simultaneously examined effects of vegetation structure, landscape structure, and predator context on survival of bobwhite nests. We use incubated nests (n = 104) of radiomarked bobwhite on a managed area in east-central Mississippi from 1996–00 to examine effects of micro-habitat, macro-habitat, and predator space-use on nest survival. At each nest we characterized microhabitat by measuring vegetation height, density (Robel Visual Obstruction Reading), grass canopy coverage, forb canopy coverage, litter coverage, litter depth, and % bare ground. Within 50-, 200-, and 400-m concentric circles around nest sites we characterized landscape context using measures of patch richness, patch diversity, and interspersion/juxtaposition indices, and habitat specific measures of patch density, patch shape index, edge density, and % of landscape. We used year-specific harmonic mean utilization distributions of radiomarked raccoons to construct cumulative raccoon utilization distributions to measure intensity of space use by an important bobwhite nest predator. We used logistic regression on nest fate (hatched/failed) to develop predictive models of nest success as a function of micro-habitat, macro-habitat, and predator space-use. We constructed a set of candidate models that hypothesized nest fate as a function of micro-habitat, macro-habitat, predator space-use, micro and macro habitat, microhabitat and predator space use, macrohabitat and predator space use, and a global model that included all 3 groups of predictor variables. We used information theoretic approaches for model selection and inference.

Citation: Stockett, P., M. Smith, J. Austin, S. Szukaitis, C. Henner, L. W. Burger, B. Leopold, and D. Godwin. 2002. Effects of micro-habitat, macro-habitat, and predator space-use on success of northern bobwhite nests. Page 73 *in* S. J. DeMaso, W. P. Kuvlesky, Jr., F. Hernández, and M. E. Berger, eds. Quail V: Proceedings of the Fifth National Quail Symposium, Texas Parks and Wildlife Department, Austin, TX.