A Population Model for Northern Bobwhites (Colinus virginianus)

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Northern Bobwhites
The northern bobwhite is a small to medium sized, gregarious quail. They have a high reproductive potential and low annual survival. Their importance as a popular game bird is threatened by the decline of the species throughout most of its range, especially the southeast.

Objectives
• Estimate demographic parameters
• Estimate population growth rate
• Elasticity analysis
• Find out how population growth rate could be improved

Field Methods
• Field Site: Babcock-Webb Wildlife Management Area in southwest Florida
• Radio tags attached to captured quail
• Use radio telemetry to determine
  – Date and cause of death
  – Reproductive effort and success
  – Survival of broods
• Data from Oct. 2002 – Sep. 2004

The Model
• Used simple stage-based life-cycle model
• Birth pulse with post-breeding census
• Parameters
  – Annual juvenile survival probability (Pj)
  – Annual adult survival probability (Pa)
  – Fertility of juveniles (Fj)
  – Fertility of adults (Fa)
• Output
  – Asymptotic population growth rate (λ)
  – Elasticities

Parameter Estimation
• Juvenile Survival (Pj)
  – Estimated from chick and older juvenile survival
  – Estimated upper and lower limit based on how we estimated the survival of intermediate period
  – Pj = 0.0267-0.0957
  – Lower than average seen in other studies
• Adult Survival (Pa)
  – Estimated using staggered entry Kaplan-Meier
  – Pa = 0.104
  – Lower than average seen in other studies
• Fertilities (F)
  – Products of survivals and fecundity (m)
  – m = 5.535
  – Fj = 0.148-0.530
  – Fa = 0.576

Results
Population Growth Rate (λ)

Elasticity of λ to Demographic Parameters

Difficult to Increase λ by Changing Single Parameter

Easier to Increase λ by Changing Two Parameters

Conclusions and Management Implications
These are preliminary results only. The population appears to be declining, possibly due to low survival rates. The population growth rate is most elastic to changes in the reproductive parameters and juvenile survival. We recommend management to increase nest success and juvenile survival.

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