Northern Bobwhite Nest Site Characteristics and Artificial Brush Structure Use in Weeping Lovegrass CRP

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INTRODUCTION

- Decreasing populations of grassland birds
- Northern bobwhite quail
- Habitat loss and fragmentation
INTRODUCTION

• 1985- Food Security Act initiated the Conservation Reserve Program (CRP)
  • Protect highly erodible lands
  • Reduce crop surpluses
  • Improve water quality
  • PROVIDE WILDLIFE HABITAT (secondary purpose)

• ≥ 1 million acres enrolled into CRP in Texas Southern High Plains at one time

• Native and exotic grasses seeded
INTRODUCTION

• Northern bobwhite quail (NOBQ) nest success in weeping lovegrass (*Eragrostis curvula*)?

• Woody cover and forb production limiting factors?

• ↑ woody cover = ↑ BOQU use?
INTRODUCTION

• Methods to increase woody cover
  • Containerized or root stock shrubs
  • May take years to reach usable size
  • Plant large shrubs
    • Expensive and not always feasible
• Artificial Brush Structures
INTRODUCTION

• Artificial Brush Structures (ABS)

• Teepee-type ABS used most by BOQU (Webb and Guthery 1982)
• Nest Success ↑ 2X by addition of predator exclusion welded wire on teepee-type ABS (Treadway 2002)
OBJECTIVES

• Estimate nesting success in WL CRP
• Identify habitat features associated with successful nests
• Identify habitat features selected by BOQU for nest sites
• Observe the use of ABS by BOQU
STUDY AREA

- 400 ha CRP
- Lynn County, TX
- Weeping lovegrass, silver bluestem (*Bothriochloa laguroides*), three awns (*Aristida* spp.)
STUDY AREA

- Subhumid climate
- Hot summers and moderate winter temperatures
- Loam and sandy loam soils with \( \leq 1\% \) slopes
- 951 m elevation
- 51 cm average annual precipitation
- 85\% precipitation between April 1\text{st} to October 31\text{st}
METHODS

- Weld 4 t-posts
- Remove upper 30cm to form a flat-topped teepee structure
- Weld rebar to top form a square
- Cover with 5cm x 10cm welded wire
- Rebar, wire, vinyl siding, hog rings for door
  - Screening cover
ABS SETUP

• 24 transported to study site
  • 1 Structure/2.7 ha

• Cedar boughs (*Juniperus pinchotti*)
  • screening cover

• 1 feeder + 1 waterer / ABS
  • ≥ 30% protein feed and water

• Chicken wire at base
  • Detain BOQU temporarily
**CAPTURE**

- 2/20/2002-4/04/2002
- 3/01-24/2003
- Walk-in funnel traps
- Trapped quail
  - Ventilated cotton bags
  - Banded
  - Sexed
  - Aged
  - Weighed to nearest 0.01 g
RELEASE

• Ventilated cage
  • Transportation

• 6.5 necklace style radio transmitter
  • Monitored 1/3 days until 8/15
  • Bird use of ABS noted

• Birds trapped together
  • Released together as covey
NEST MONITORING

- Incubation activity
  - Determined by telemetry

- Nest
  - Found when hen absent
  - Eggs counted
  - Location flagged

- Successful nest
  - Any hatched eggs
NEST SITE CHARACTERISTICS

• Evaluated after nest termination
• Visual obstruction with Robel pole
• % ground cover
  • Weeping lovegrass
  • Native grass
  • Forbs
  • Bare ground
• Measurements
  • At nest site
  • 10 m in cardinal directions
• Characteristics measured at random points
DATA ANALYSIS

• Stepwise logistic regression
  • Identify habitat characteristics of successful vs predated nests and selected by BOQU for nest sites
    • Predictor variables - % weeping love grass, native grass, forbs, bare ground and visual obstruction

• Predictor variables + distance from ABS → Successful nest characteristics

• Nest site location and success solved separately
  • Identify habitat characteristics of potential and successful nests sites
• Interpreted logistic regression coefficients by stating odd ratios

• 2-factor ANOVA
  • Year and location
  • Year and success
  • Determine differences in predictor variables

• Binomial proportions tests
  • Compare nest success between years
RESULTS

2002
• 15 hens radiomarked
• 5 hens nested in weeping lovegrass area
  • 7 nests
• 2 hens nested in a wheat (Triticum aestivum) field with no weeping lovegrass
• 2 hens renested
  • Occurred after loss of a nest
• No hens nested > 2
• 71% nest success

2003
• 32 hens radiomarked
• 15 BOQU nested in weeping lovegrass area
  • 20 nests
• 7 BOQU nested in areas with no weeping lovegrass
  • 8 nests
• 4 BOQU renested
• 4 ♂ incubated a nest
• No BOQU nested > 2
• 70% nest success
RESULTS

• % bare ground + nest location relationship
  • $B = -0.156$, $SE = 0.040$, $Wald = 15.61$, $P < 0.001$, $Exp(B) = 0.856$

• Potential nest sites ↓ 14% with each 1% ↑ in bare ground

• No other variable predicted nest location

• % weeping lovegrass > @ nest vs random site
  • Not selected as predictor variable for location

• No variables predicted successful nests ($P = 0.19$)
RESULTS

• Variable vegetation characteristics between yrs
  • No difference
  • Except for nest site distance from ABS
    – 2002: Nest sites closer to ABS (n=7, v=32.9, SE=5.5)
    – 2003: Nest sites further from ABS (n=20, v=343.9, SE=72.8)

• 2-factor ANOVA revealed no differences in predictor variables (P > 0.05)

• BOQU observed frequently using ABS
  • 60% of nests located ≤ 55m
  • Use peaked during hot summer temperatures
  • ♂ observed using structure as calling perches
  • Brooding adults used structures > other individuals
DISCUSSION

• High nest success = 70-71%
  • 38% (Mueller 1999)
  • 46% (Hernandez 1999)
  • 38% (Carter et al. 2002)
  • 42% (Treadway 2002)

• Reasons for high nest success unclear
  • Nest predators observed @ site throughout study

• Weeping lovegrass CRP composition @ site
  • thick but did not form monoculture
  • Not avoided by BOQU
  • Weeping lovegrass present in ¼ m² quadrats @ nest
  • Suitable nest cover for BOQU
DISCUSSION

• Reasons unclear why no variables differentiated successful from predated nests

• Reasons unclear why nests closer to ABS in 2002 than 2003
  • Possibly caused by increased forb abundance
  • \( \uparrow \text{forbs} = \uparrow \text{food} = \downarrow \text{reliance on ABS food source} = \uparrow \text{nest distance from ABS} \)

• Confirmed consumption of high protein feed
  • Radiomarked bird predated but crop left intact
MANAGEMENT IMPLICATIONS

• 1000s acres of weeping lovegrass CRP in Texas Southern High Plains

• Landowners attempting to convert weeping lovegrass CRP to native grasses
  • Land ownership changes
  • CRP rules
  • Belief that BOQU will not nest in weeping lovegrass

• Conversion process expensive
  • Establishment of native grasses relies on substantial > average precipitation
MANAGEMENT IMPLICATIONS

• Results suggest complete conversion of weeping lovegrass to native grass CRP unnecessary

• Steps to ↑ BOQU usable space in weeping lovegrass CRP
  • Burn strips in December-January
  • Disk 10% of burnt strips to ↑ forb abundance and diversity
  • Plant woody species
  • Install ABS
    • Too expensive to install ABS @ densities used in study
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