

## QUAIL FACTS

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While bobwhites are one of the most studied wildlife species, relatively little is known about quail in south Florida rangelands. A recently developed research program in south Florida rangelands is attempting to rectify this, and includes researchers from the Florida Fish and Wildlife Conservation Commission, Tall Timbers Research Station, US Geological Survey, and the Universities of Florida and Georgia. In this document, we try to provide some basic information on quail biology.

### What is a Bobwhite Quail?

Officially called Northern Bobwhite with *Colinus virginianus* as the scientific name.

- 9.5 – 10.8” tall
- 5.8 – 7.3 oz. fall-winter weights
  - o Males are heavier than females
  - o Birds in the South tend to be smaller than birds from northern latitude
  - o Pen-raised birds (7+ oz.) tend to be heavier than wild birds
- Fly up to 38 mph

### Where are Bobwhites Found?

Most widely distributed upland gamebird in North America; found throughout the eastern US, eastern Mexico, and the Caribbean

- Isolated, endangered race of “masked” Northern Bobwhite found in northwest Mexico and southwest US
- Considered to be the same species throughout its range
  - o As many as 22 subspecies or races have been recognized
    - Florida has 2 races
      - Eastern race in the north
      - Florida race in the south
        - o Races identical in appearance
        - o Florida race slightly smaller
- Introduced populations in several areas, including Pacific Northwest
- A Florida Quail Myth: most quail found in Florida are descendents of Mexican Bobwhites released in the early 1900s

- In the 1920's ~400,000 birds of the Mexican race were released throughout the southeastern US, including Florida
  - These birds are almost identical to our native subspecies, just a bit smaller
  - They were adapted to a different habitat and climate and did not do well in FL
  - Research has shown that few of these birds survived and traits/characteristics from those birds that did interbreed with native birds were quickly diluted and totally obscured/lost

### **How Can the Sex & Age of Bobwhites be Determined?**

Feather shape and coloration on the head and wings can be used to tell the sex and age of quail.

- Males have black and white stripes on the side of the head
- Females have brown and sandy colored stripes on the side of the head
- Adult birds have rounded tips on the flight feathers at the end of the wing and solid colored smaller feathers that cover the base of these flight feathers
- Juvenile birds have pointed tips on the flight feathers at the end of the wing and the smaller feathers that cover the base of these flight feathers have light colored tips

### **What Affects the Abundance of Quail?**

The size of a quail population is related to the carrying capacity (K) of the land

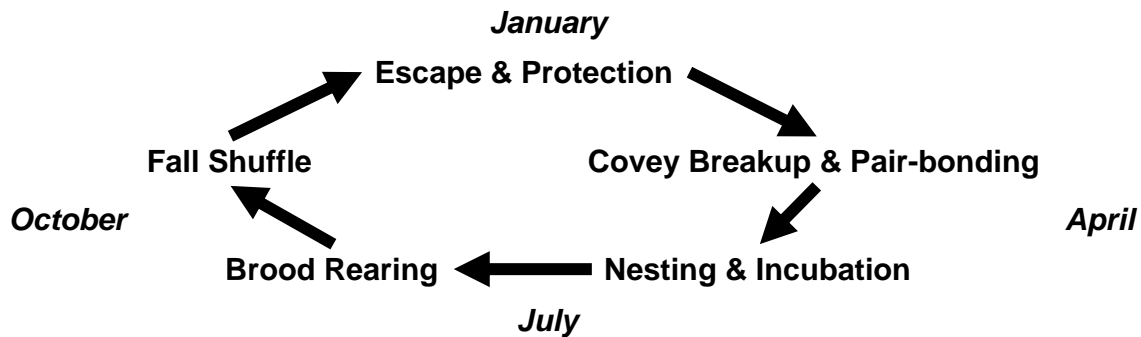
- K = the # of animals that can be supported under the current conditions, including the quality and quantity of habitat components (food, cover, water, and space), and limiting factors such as predation and weather
  - In good habitat quail have evolved a reproductive rate to balance typical mortality, including predation
  - When habitat is poor and or limiting factors are abnormally high (for example a new predator like fire ants, or drought conditions), reproduction cannot balance current mortality lowering or eliminating K, and leading to lower populations or declines
  - The key is the relationship between survival and reproduction, which are both effected by habitat

### **The Bobwhite Annual Cycle**

All aspects of a quail's life cycle are important to survival and reproduction, and each requires a different habitat, many of which are not provided in modern landscapes.

- During late fall-early winter, quail assemble in to groups of 11-12 birds known as coveys. Such groups are better able to escape predation, survive winter weather, and forage than single or paired birds

- In late winter-early spring, coveys break-up and birds pair-up for breeding
- In spring, nesting and incubation of nests begins, and continues through late summer
- Brood-rearing continues through late summer-early fall
- During the fall, birds from various broods leave family groups and mix with others, eventually settling in to coveys by winter – this is called the Fall Shuffle



## The Basics of Quail Biology

It's all about survival and reproduction, and all aspects very important to having abundant quail populations; with naturally high annual mortality rates, successful reproduction is the key.

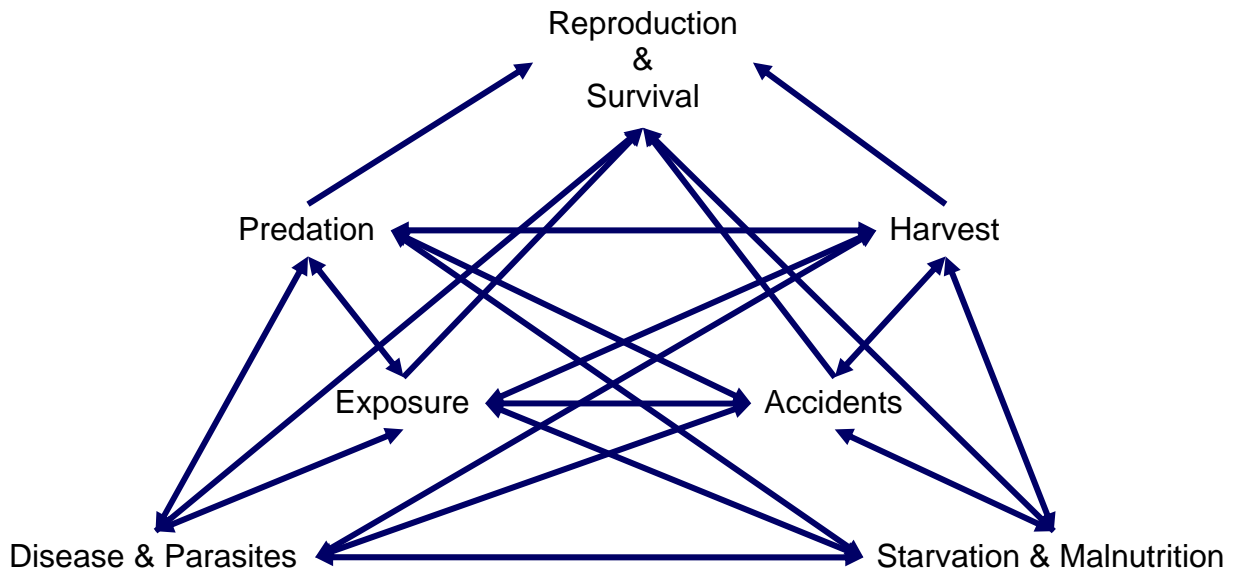
- Survival
  - o Annual survival typically 5-30% for both hunted and unhunted populations
    - Higher in the South than more northern latitudes
    - Males often have slightly higher survival than females
    - Lower in first year birds
  - o Seasonal and regional differences
    - Spring-Summer (breeding season) typically 13-51%
      - In the South: fall-winter > spring-summer
      - In the North: spring-summer > fall-winter
- Reproduction
  - o Covey break-up & Pair-bonding
    - In April coveys break-up and pairs form for mating
    - After mating, pairs may stay together through nesting and brood rearing
    - Originally thought to be monogamous, recent research indicates this is not always the case
      - While some pairbonds are strong, often both male and female mate with other partners
        - o This is necessary for reneating to occur after a failed attempt given the high mortality of quail, and for birds to double clutch
  - o Nesting and Incubation

- After choosing a nest site, the pair builds the nest from dead plant materials (usually dead grasses, stems, and pine needles) in a slight depression, often with overhanging vegetation/canopy, in fields dominated by grasses ~2 ft tall
- Egg laying begins within a few days of nest completion, with females usually laying ~13 eggs
  - First nests have larger clutches than later nesting attempts
- Incubation of nests lasts ~23 days
  - Females incubate about 75% of nests, and males the other 25%
  - Birds almost never share in incubation
  - When males incubate the nest, the female may initiate a second nest = double clutching (5% of time)
  - The peak hatching in Florida is typically late June-early July
- Nest success
  - Typically only 32-44% of nests hatch
    - Predation and weather are major reasons for nest failure
      - Mammals, snakes, and fire ants are major nest predators
        - 5-10% of the time predators also kill attending adult
  - Quail will attempt to renest after a failure 2-3 times until successful, dead, or the breeding season has ended (September)
    - 70-80% of the hens that live through the summer produce a successful nest
- Brood Survival
  - 30-40% survival through 14 days
  - 15-30% survival through 30 days
    - Predation and weather are major causes of mortality
  - Survival similar to adults after 30 days
  - Intensive adult care for chicks though 30 days, then less through family break-up during the fall shuffle
    - Chicks occasionally abandoned after 30 days

### **Factors Limiting Quail Populations**

Many factors effect quail survival and reproduction, which limit populations—predation, diseases and parasites, starvation and malnutrition, exposure, accidents, and harvest. Many of these factors may not kill many birds directly (such as disease), but weaken them to the point where other factors (such as predation) take more animals—they all interact, even harvest. Most importantly, all limiting factors are affected by habitat quality and quantity. It is often the case

that poor habitat leads to increased predation mortality, harvests, disease, etc. It is also important to remember that under good habitat conditions, quail have evolved a very high reproductive rate, to balance normal forms of mortality. It's new forms of mortality (such as a new predator like fire ants), abnormally high forms of mortality (including harvest, predation, disease), or reduced reproduction that lead to population declines, and all relate to habitat conditions.



## Habitat Quality & Quantity!

- Predation
  - o Primary cause of death
    - 40-65% due to avian predators
      - Mostly during nesting season and migration
      - Coopers and sharp-shinned hawks important in the South
    - Mammalian predators important during nesting season, and in the North during winter
    - Snakes are important nest predators
    - Fire ants important predators on chicks especially during hatching
      - Ant stings not only kill birds directly, but weaken chicks making them more susceptible to other limiting factors
- Diseases and Parasites
  - o Numerous diseases, parasites, and pathogens possible, but not well understood in wild birds

- Effects on wild birds probably indirect, making birds more susceptible to other limiting factors
- Most found only in pen-raised birds, raising concerns about releases of pen-raised birds in the wild
- Starvation and Malnutrition
  - Can be a significant problem in the North where winter weather may keep birds from feeding or bury foods
  - Typically more of an indirect problem
    - When food is lacking, birds must forage longer and further from cover increasing their vulnerability to predators and exposure
    - The most important aspect may be the effects on reproduction and chick growth and survival
      - Laying hens need a higher protein diet (>24%) and chicks require a diet with 28% protein that can only be obtained by eating insects
        - Low protein diets can reduce egg production and hatchability significantly, as well as chick size and growth—smaller chicks survive less
        - Insect populations are tied to vegetation/habitat
- Exposure
  - Effects usually indirect making birds more susceptible to other factors, and related to cover
    - Winter cold and snow
    - Summer sun and heat
      - Shrub and other woody plant cover such as palmetto necessary
  - Weather
    - Wet spring-summer flood nests and kill chicks through hypothermia and drowning
    - Droughts reduce plant cover and insect abundance
    - Snows can cover foods
- Harvest
  - Effects not well understood
    - Not thought to be a major limiting factor
    - Late season harvests may be the biggest problem

## **Bobwhite Habitat**

When it comes to quail, ultimately it's all about having quality habitat. With good habitat limiting factors will be minimized. Quail live in a wide variety of habitats, from arid rangelands in TX, to agricultural lands in the Midwest, more forested areas of the Northeast, to south Florida range and forest. Therefore, when thinking about quail habitat, it's important not to think about particular species of plants (e.g., bahiagrass), but what the habitat does or can provide in terms of the main habitat components (food, cover, water, and space) in relation to limiting

factors such as predation and weather. For example, too much shrub cover in TX (mesquite) is causing the same problem (poor nesting and forage habitat) as too much in Florida (palmetto or hardwoods), and sodforming grasses in KY (fescue) causes the same problem as bahiagrass in Florida—poor nesting habitat and foraging habitat. Regardless of where you are, quail have specific requirements.

### **What is Good Quail Habitat?**

If you have good habitat, you may get 1 bird/acre. A covey can exist on as little as 10-15 acres, but typically needs at least 30-40. The key is providing all of the habitat components in close proximity to each other. Quail need tall bunch grass (such as bluestems) near escape and thermal cover (such as palmetto) to nest. This needs to be as close as possible to brood rearing and foraging habitat (such as a weed fields) to reduce predation and exposure.

### **How Do We Manage Habitat?**

To create and maintain quality quail habitat, we must provide small patches of nesting, foraging, and escape/thermal cover mixed among each other, like patches in a quilt—often referred to as the Crazy-Quilt. Prescribed fire, grazing, mechanical treatments (such as roller-chopping), and herbicides can all be used to create the Crazy-Quilt. However, no one prescription of these techniques will work everywhere because of differences among sites in soils, vegetation, and climate.