

## History

The bobwhite quail is a small native gamebird, familiar to many by its cheery "bob-bob-white" whistle throughout the spring and summer. The bobwhite is an important gamebird in Iowa; popular with hunters and second only to the ring-necked pheasant in terms of numbers of birds harvested annually. Quail are also popular with bird watchers and other users of our outdoor resources. From mid-summer to early spring, the characteristic coveying behavior of quail is evident and groups of 8 to 25 birds are common. At night, quail roost in a tight circle with their heads pointing outwards; this gives all members of the covey mutual protection from predators and helps conserve body heat. The only other Iowa bird which coveys and roosts in this manner is the gray partridge, common in northern Iowa. The location of a quail roosting site can be determined by the characteristic oblong pattern of droppings left by the covey. Our native bobwhite was probably never very abundant on Iowa's virgin prairie; most populations were likely restricted to the prairie-timber edges of Iowa. However, early settlement changed Iowa's landscape forever and at least initially these changes proved to be a boom to Iowa's quail population. Between 1860-90 settlers began carving up Iowa a 1/4 section at a time, but early settlers lacked timber and wire to make fences, so they planted Osage hedges instead. Three to 6 miles of some of the finest quail cover ever grown in ever quarter section of land, all within spitting distance of newly planted "weedy" grain fields. Quail populations exploded with this ideal habitat. Quail could be found in every county, but these conditions could not last. By 1920 reports show quail populations beginning to decline as farming practices improved and hedgerows were replaced with barbed wire fence. The 1931-32 winter quail survey reported population densities of 1 quail per 20-40 acres in the northern third of the state, 1 quail per 6-20 acres in the central third and 1 quail per 1-6 acres in the southern third of the state. However, quail populations have declined steadily, both nationally and in Iowa since the 1930's. Intensive farming in northern Iowa had eliminated quail from that part of Iowa by 1950. Bobwhites are now only found in southern Iowa. Unfortunately, southern Iowa has seen this type of habitat reduced substantially in recent years and will continue to see quail numbers decline as farming operations become larger and more efficient, dictating increasing field sizes, removal of fencelines and

hedgerows, and reduced diversity in crops. In earlier years Iowa quail hunters would harvest upwards of 1 million quail annually, but with the destruction of their preferred habitats quail harvests have declined to 200,000 annually in the last decade.

## Identification

While there are significant differences in the appearance of male and female bobwhite, it may be difficult to distinguish sexes unless the birds are closely observed in the hand. Males have white chins and upper throats, a white stripe that extends from the bill through the eye to the back of the head, and a brown to black chest collar under the throat and chin. Feathers of the breast and abdomen are white with black barring while upper body and wing feathers are muted tones of brown and gray barred with black. By contrast, females have tan instead of white coloration on the throat, chin, eyestrip and underparts. Females also lack black neck collars and exhibit brown barring or mottling of body feathers. Iowa quail are about 9 to 10 inches in length and average about six to seven ounces in weight, with females slightly heavier than males. Newly hatched chicks have a downy grayish-buff underside with black strips down the side and a chestnut-red back and head.

## Reproduction

In late March and early April, coveys begin to break up as pair bonds form between individual males and females prior to the breeding season. Increasing photoperiod (daylight hours) brings about this pairing and stimulates growth of the reproductive organs in both sexes. Bobwhite nests are characteristically found in herbaceous vegetation consisting of mixed grasses and forbs such as those found in fencerows, roadsides or idle areas. Nests are generally located within 50 feet of an edge. Both the cock and hen work at building the nest by digging a shallow scrape and lining it with dead leaves and grass. Adjacent grasses are arched over the nest, concealing it from overhead and giving it the appearance of a small tunnel.

Nests may be established as early as mid-April or as late as early September in Iowa, but most young are hatched around the end of June. Unusually cold or warm springs may either delay or advance the peak of hatching. Egg laying begins several days after the nest is built at the rate of about one egg per day until the

clutch (averaging 14) is completed. All eggs in a nest hatch within a 24-hour period and adults and young leave the nest together as soon as the chicks are dry. Mortality of chicks is especially high in the first two weeks following hatch and by fall broods may have sustained losses of 30 to 50 percent. Chicks can fly in two to three weeks and will resemble adults at 15 weeks. Adults and young remain together in a covey until late fall, when the "fall shuffle" (mixing of individual quail between coveys) takes place.

Historically quail were thought to be monogamous, pairing and staying with a single mate during the breeding season. Hens were thought to perform the incubation and brood-rearing activities with only slight help from the male. Recent studies conducted by Iowa DNR biologists indicate hens are polyandrous. By following quail carrying miniature radio transmitters during the breeding season, research biologists determined that male and female quail often switch mates. A hen may lay and incubate a clutch of eggs or she may leave the nest to her mate to incubate, and move to another area, select another mate, and lay a second or even third clutch of eggs. Males can successfully incubate and raise a brood without help from a hen.

Perhaps the most surprising discovery is that some hens care for their brood for just a few weeks after hatching then abandon the brood to care for itself and find another mate and raise another brood the same summer. Broods abandoned at 3 weeks of age have been known to survive to full growth without assistance from adult quail. We now know that quail are much more opportunistic and persistent breeders than once realized. Because they are adaptable and will make attempts to nest throughout the summer, in some years virtually every hen that survives the perils of the nesting season produces a brood of young.

This is one reason quail show an amazing ability to rebound from substantial population losses. Following heavy winter losses, quail populations may recover completely in two to four years, given good weather during nesting and mild winters between successive years. On the Decatur-Wayne research area near the Missouri border, DNR biologists have censused quail populations on more than 4,000 acres of private farmland in spring and fall between 1970-85. In the spring of 1979 the lowest quail count (58 birds) ever recorded on the area was observed following a winter which had been the most severe in 40 years. By the

fall of 1979, quail had tripled their numbers. The winter of 1980 was extremely mild, allowing excellent survival. Near perfect nesting conditions in spring allowed quail numbers to rebound to levels which exceeded those just prior to the severe winter of 1979. Only two years had been required to return the population to its original status.

Two very important points must be made in regards to this research. First, this recovery took place in good to excellent quail habitat. Population response in marginal habitat may take years to recover and some poor habitats separated from good quail habitat may never again hold quail following severe winters. Secondly, the recovery of quail on the Decatur-Wayne area took place even though quail were still hunted during the period of reduced numbers.

## Food Habits

Quail generally forage twice a day, in early morning and mid to late afternoon. Bobwhites are primarily seedeaters, using both weed seed and waste grains. Corn and soybeans form the major portion of the diet in fall, winter and spring. Among weed seeds, ragweed is often consumed. Insects are an important food item for adult females during the reproductive period because of the high protein demands of egg laying. Young quail also feed very heavily on insects, gradually shifting to a greater proportion of seeds as they near adult size. The foods consumed by quail, however, may vary from year to year and season to season based on availability.

## Limiting Factors

The most "critical" aspect of bobwhite quail management is creating a good mixture of required habitat types in a small area of 50-100 acres. Required habitats must be in close proximity to each other because most quail spend their entire lives on less than 300 acres. The amount of brushy/weedy habitat available to quail for nesting, escape and winter cover is, without a doubt, one of the major limiting factors for quail populations in Iowa. The amount and distribution of brush and weed habitats often spells the difference between the survival or death of quail coveys during severe winter weather. Osage orange hedgerows, wild plum thickets, tangled areas of wild grape, multiflora rose and raspberries, brushy draws,

fencerows, and weedy areas are fast disappearing across the major quail range in southern Iowa.

A Wisconsin study reported that quail populations on a particular area were eliminated when the amount of hedge declined to less than one mile per section of rural farmland. However, hedgerows alone cannot provide all brushy cover requirements. Woody thickets on creek and ditchbanks, idle corners, weed patches, fencerows grown up to brush, and shrubby borders of woodlots are also essential. Unfortunately, this type of cover has been reduced substantially in recent years with the advent of larger modern farm equipment and the increased use of farm chemicals. This will result in the eventual elimination of idle brushy/weedy areas necessary for good quail numbers, unless landowners make positive efforts to preserve such habitat.

### Habitat Needs

Quail are fond of early successional habitats (recently disturbed habitats) especially where several of these habitats come together and create a diversity of edges. An ideal land-use pattern for bobwhite might be an area with 30 percent brushy/weedy habitat and 10 percent woodland interspersed with odd shaped row crop fields. As the degree of interspersed (that is, the mixing or breaking up of these habitats), of these habitat types is increased, a given area will become more attractive to quail. Edge effect can be increased by planting or maintaining hedgerows of Osage orange, honeysuckle, autumn olive or other shrubs on the borders of fields and woodlots. Brushy draws, shrubby and weedy fencerows, and windbreaks also provide both travel lanes and vital escape cover for quail.

The attractiveness of an idle area for quail is also dictated by the type and structure of vegetation. Quail (like pheasants) move primarily by walking, resorting to flight only to escape predators or travel significant distances. Given their diminutive stature it is not surprising that quail avoid areas of dense, thick, matted vegetation like switchgrass or CRP. Areas with excessive litter or lodged matter are not attractive to quail since movement is hampered by dead vegetation. They prefer habitats of medium-density composed of mixed grasses and forbs. Idle areas should be managed to provide nearly bare ground underneath standing vegetation.

Some of the best ways to increase quail habitat on your farm include strip-disking sod bound areas, feathering woodland edges, creating brush piles, and planting food plots. Strip-disking simply breaks up sod bound vegetation creating bare ground with abundant weedy vegetation preferred by quail. Timber edge feathering is simply the process of cutting the larger trees along the edge of a woodland to encourage shrubby/brushy regrowth. Brush piles from this activity create ideal escape and loafing cover for quail. Corn and milo food plots, especially those with a good weedy component of foxtail or ragweed, provide habitat and food during severe winters. The better interspersed these habitats are in an area the more attractive it is to quail.

### Hunting

Quail hunting is second only to pheasant hunting in Iowa in total harvest and hunter participation. Quail hunting is best enjoyed with a lightweight 20-gauge shotgun and a good pointing or retrieving dog. An open-choke, double barrel or other shotgun is preferred by many, as most quail shooting is close-in work. Shot size from seven and one-half to nine is adequate. Field borders, brushy ravines, hedgerows and brushpiles are all likely spots to find quail. A hunter's opportunities are greatly improved, both in terms of shooting and bringing birds to hand if he has a well-trained dog. Breed is dictated by an individual hunter's preference, but English Setters, Brittany Spaniels, German Shorthaired Pointers and Labrador Retrievers are all popular in Iowa.

Iowa's southern counties along the Missouri border offer quail enthusiasts the best hunting opportunities. Small farms with a diversity of crops and shrubby-brushy habitats offer the best populations. However, these farms are becoming less and less common in Iowa. Since 1962, Iowa's quail population has declined an estimated 66% statewide. As noted above, the reasons for this statewide decline in quail populations are intensified agriculture and the resultant loss of quail habitat. With this decline in quail numbers, quail harvest (-77%) and quail hunters (-41%) have also declined over the last 4 decades.

Many sportsmen and other Iowans fear that hunting quail during periods of low populations will contribute to a further decline in quail numbers. This fear often manifests itself in demands for reduction in season length and bag limits. However, radio telemetry

studies of hunted and non-hunted quail populations by wildlife professionals in Iowa and Missouri have shown that survival does not differ between hunted and non-hunted populations. In other words, regulated hunting has no measurable impact on quail numbers. This should come as no surprise because hunting seasons and limits are established by the DNR so that hunting has no deleterious effects upon the resource.

Even though loss of habitat has been identified as the cause of Iowa's declining quail population, some individuals and groups advocate stocking as another "solution" to low quail numbers. Quail stocking efforts, however, have proven to be both costly and ineffective. Survival of pen-reared quail used in stocking is extremely poor once they are released in the wild. Usually less than 1% of released birds even survive 6 months. Recent studies in the southern U.S. have also shown that releasing pen-raised quail can be detrimental to existing wild birds because released birds attract predators to the area for an easy meal. This concentration of predators leads to higher losses of wild birds that they would not normally experience.

Even though quail populations are well below historic levels, our current population is likely as high if not higher than before white man set foot in Iowa. At the turn of the century man's activity on the land was beneficial to quail. Now at the end of the century his activities are detrimental. Iowa will always have some quail, but how many there are ultimately rests with the landowners and their willingness to include quail and quail habitat in their land management decisions.

### Economics

Revenue from the sale of hunting licenses and habitat stamps as well as the federal excise taxes on sporting arms and ammunition purchased by partridge hunters helps support a wide variety of Iowa Department of Natural Resources' programs including wildlife management, wildlife research, and wildlife habitat acquisition.

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# THE NORTHERN BOBWHITE QUAIL

(*Colinus virginianus*)



### Biological Facts

- Weight:** 6-8 ounces; females slightly heavier than males.
- Length:** 8-11 inches.
- Flight speed:** 30-40 mph.
- Habitat:** brushy/weedy early successional habitats interspersed with agriculture.
- Foods:** waste grains and weed seeds.
- Life expectancy:** 90-95% annual mortality rate; most live only about 1 year.
- Mating:** polyandrous; females will reproduce with more than one male in a year.
- Nesting period:** peak May-July, range March-September.
- Nests:** shallow depression in the ground lined with grass or leaves with overhanging vegetation.
- Clutch size:** 12-16 eggs for first nests (range 7-28).
- Eggs:** dull white or cream; ovate (1 1/4 x 1 inches).
- Incubation:** 23 days.
- Young:** precocial; leave nest immediately; can make short flights at 12-14 days.
- Broods per year:** 1-2; persistent renesters.
- Nest success:** ave. 56% (range 30-60%).
- Fledge:** young identical to adults at 15 weeks and remain with parents through fall and winter.
- Migration:** none; year-round resident