Supplemental Feeding Research and Practice

For more than a decade Tall Timbers and the Albany Quail Project have been investigating the effects of supplemental feeding on bobwhite and other species of wildlife that may directly or indirectly influence bobwhite populations. At Tall Timbers, we have just completed a seven-year project on supplemental feeding effects on bobwhite populations. In this Quail Call, we quickly revisit past studies and present results of our seven-year research project. We also delve into how feeding different rates affects bobwhite hunting and reproduction. Finally we present some preliminary results on using feeders versus spreading feed. In the next issue of the Quail Call we continue down the feed trail with information on how coveys behave relative to different rates of feeding and how this influences their survival but also what it means from a hunting standpoint and how we can design more efficient feeding programs. This study is being funded by the Orvis Company. We will also revisit the issue of high protein feeds, and how they may or may not improve bobwhite productivity. We hope you enjoy this issue and as always the Game Bird Lab and Albany Quail Project greatly appreciate the long-term dedication to bobwhite management of our members and wish to thank you for your generous donations that make this research possible!

Until recently, using quail feeders has been a common practice in the Red Hills since the 1950s, but are they effective?

Background and Rationale for Research

Early research published in the wildlife science literature on the effects of food plots as a supplemental food source for bobwhites yielded equivocal results. Research indicated that food plots or feeders had no effect on demographic rates or populations. However, early research did demonstrate improved body condition of birds with access to sorghum food plots which provided a mechanism for improving survival rates. There were important weaknesses with these studies that reduced their utility to quail plantations with large areas of quality habitat and intensive feeding programs. For instance, these studies were often conducted where no other habitat management was occurring and therefore other limiting factors could mask any potential positive (or negative) effects from feeding. Many of these studies were short-term or had very low sample-sizes of radio-tagged bobwhites, so they may have
observed an effect one year but not the next; short-term studies lead to short-term insights. Finally, early supplemental feeding studies relied on feeders rather than spreaders, and in some studies feeder density was less than one feeder per 50 acres, akin to feeding an elephant with a teaspoon. The most important problem with these studies may have been the lack of suitable habitat. Habitat must come first for any other practice to have a chance at affecting bobwhite populations. Even with these weaknesses, these studies, and those on other game species, were enough to leave a sour taste in the mouths of professional biologists about feeding. This is because at the same time that these studies were published massive habitat loss and population declines were occurring across the range of bobwhites and bobwhites were plentiful in the past without supplemental feeding programs. These results led biologists to focus on attempts at restoring habitat for bobwhite and the value, if any, from food supplementation was largely dismissed, and rightly so in that context. Biologists often are concerned that encouraging landowners to invest in food supplementation when habitat is lacking is misguided as there was no proof it was beneficial in any meaningful way to bobwhite and it was also perceived as baiting. Regulations in many southeastern and western states prohibited the practice based on the weight of the evidence in the literature and professional ideals.

However, on areas with focused habitat management and sustainable bobwhite populations, it has long been a common practice to supplement feed for bobwhites at least from November through March. Also, planting of food plots was a common management practice on many of the plantations in the South and throughout the bobwhite range. With concerns about regulations prohibiting the use of supplemental feeding as a form of baiting, and with little published information on the effects of supplemental feeding on bobwhite demographics, the Albany Quail Project (AQP) began to investigate the issue in the early 1990s.

**Feeding Effects and Demographics**

In 1993 the AQP set up an early study on Nilo Plantation with the control area being a discontinuation of the long standing November to June feeding program. The preconceived notions at that time were that the feeding likely improved hunting by localizing coveys near hunting trails but that it likely had little effect on population sizes or demographics. This classic study helped to dispel those myths by documented higher overwinter survival of fed birds in a year following drought with poor native food and cover. The AQP considered the reason for the observed increase in winter survival to be a smaller home range size and a reduction in daily movements, for fed coveys (Sisson, et al 2000 – Quail IV) and therefore lower predation. This same study revealed the first indication of improved body condition, earlier nesting, and higher reproductive output for birds on the fed study site, but these results were not published. The study was discontinued after two years due to significant population declines on the unfed study site. At about the same time Tall Timbers and AQP conducted studies comparing populations on areas with and without food plots (Figure 1). The results were not too surprising; winter food plots in areas of good habitat did not affect population density! So food plots began to be phased out of management and supplemental feeding via spreading was gaining more credibility with managers and researchers.

During the early 1990s, year-round supplemental feeding was not generally practiced because food availability was not considered a limiting factor during summertime. Managers and biologists believed that because bobwhites required a high protein diet during reproduction, and insects and native seeds were plentiful, that spreading grain did not appear necessary for reproduction. Yet some managers used feeders during the summer months, and a few were beginning to feed year round. To get a better understanding of the effects of feeding during summer a 2-year study was begun in 1998 on

![Figure 1. Coveys per hour on courses with all, half, or none of established food plots planted to sorghum.](image)
Tall Timbers and a nearby plantation, where we fed year-round versus unfed control areas. Again, we were doubtful if we would find positive results from feeding, such as those found in the Nilo study, because of the differences in soils and habitats between the Albany study (i.e., sandy soils versus red clay) and those on Tall Timbers. Soils on Tall Timbers have high fertility and nearly optimal PH for quail friendly plants and because of this, and frequent fire, the property has a rich community of legumes, seed producing forbs and grasses, as well as prolific seed producing overstory of shortleaf and loblolly pine (versus slash pine and longleaf), live oaks and other hardwoods associated with the drains. Therefore, it was assumed that feeding would have little effect on bobwhite demographics. But, the 2-year study almost mirrored the results from the Nilo study with one year showing dramatic effects - the droughty spring and summer of 1998. In that study year we found survival rates were 60% higher during the summer months on the two fed study areas, and hens surviving the nesting season produced 3.2x as many nests on fed sites! The following year (1999), rainfall was back to normal and the differences in survival and reproduction were much less pronounced. Subsequently, our “new millennium” Fall Field Day was on Sunny Hill Plantation, a property that had been spreading feed year-round for several years, and also had the highest bobwhite densities we ever measured. Year-round feeding began to get noticed and has since become a common practice among managers.

At this point we had observed changes in bobwhite home range size, winter and summer survival rates, and nesting rates, on sites ranging from highly fertile to sandy soils and on old field ground to native longleaf pine wiregrass habitats. Overall these findings indicated that feeding was changing some important demographics rates during periods of environmental stress. These results were diametrically opposite of recently published theories on how bobwhite populations operate, specifically that habitat availability through time was sufficient to explain bobwhite population densities. Because supplemental feeding remained controversial and because we had not yet proven that bobwhite densities were ultimately higher because of feeding, a long-term study was initiated on Tall Timbers to test the effects of feeding on population size.

Record Chick Production on Tall Timbers!

It is official! The Game Bird Lab documented the highest chick production for hens during the 2009 hatch that has ever been recorded on Tall Timbers. Our sample of radio-tagged hens on our supplemental fed course hatched nests at a rate of 70 nests per 100 hens, which very slightly edged out our last record hatch rate in 2002. Amazingly we had 4 hens hatch over 30 chicks and one hen hatched over 40! This high productivity was a result of high hen survival prior to and during the breeding season and excellent nesting success - seventy percent of our nests on this fed area hatched. In addition to the hens, bobs on this area hatched 53 nests per 100 males, a phenomenal hatch rate for male birds. We see our highest rates of male incubation during the “good” years, apparently hens are in the “mood” to lay eggs and someone has to tend them, so the male does; an interesting reproductive strategy during the good years. In contrast in the droughty summer of 2007, we did not have a single male incubate a nest!

Our actions to improve habitat, including a timber stand improvement cut, and the appropriate timing, frequency, and extent of fire, has helped set the stage for our population to take advantage of this recent increasing phase. Mother Nature has helped most by providing increased rat populations buffering our bobwhites from predators, and about perfect weather through the nesting season. How supplemental feeding affects these predator-prey relationships and hen production has been the focus of our current research.

With a strong hatch, the 2009-2010 hunting season should be one of the best since the 1990s.
A Seven-Year Study of Year-round Feeding and Bobwhite

To recap, several independent studies over an eight-year period began to establish that bobwhite survival and reproduction were improved by year-around supplemental feeding practices. Still, no study had been conducted to evaluate if these short-term seasonal changes in individual demographic variables resulted in increased bobwhite populations. What was needed was a long-term study on a site where habitat was not limiting. Therefore, to better understand the demographics of bobwhite populations, and especially the effect on bobwhite density, we developed a long-term study to compare a year-round fed area on Tall Timbers to an unfed reference area, each about 1200 acres. It was important to be able to test if feeding increased populations and not just increase one or two demographic variables, as it is entirely possible that while nesting improved, other factors could offset these benefits and populations would not change. In fact, at this time, many believed (some still do!) that feeding can increase rodent density and attract more predators to an area increasing predation on quail or that the rats themselves would eat the quail eggs. Of course we now know that cotton rats only rarely depredate quail nests!

From 2001 to 2007 feeding was accomplished on Tall Timbers along feeding trails through the woods each spring after burning (Figure 2). We then spread sorghum two times per month, year round, at a rate of about 45 bushels per mile or 1.5 bu/acre/year. The only times we did not spread was during January and November when we used baited sites to capture and band bobwhites. Over the next few sections we provide the key results from this study.

Each year of the study, we radio-tagged a minimum of 100 bobwhites on the fed portion and 100 bobwhites on the unfed portion of the study area. Bobwhites were radio-tagged during January and again in November. In addition to radio-tagging bobwhites, we banded 800-1200 bobwhites in January and November with individually numbered leg bands. Bobwhites were tracked daily during the spring and summer to measure nesting and brood rearing activities, and 2-3 times per week during the winter months. A sample of broods were captured at eight days of age and tagged with a patagial wing tag to estimate chick survival rates. We harvested bobwhites only in February as a form of recapture to permit estimating the winter population density. We conducted covey call counts at 12 grids in October and November on the property to estimate fall populations. During 2004 to 2006 mammalian predators were reduced on the study areas as part of another experiment and this information is germane to some of the results we observed. Drought conditions during early spring (April and May) occurred during 2001, 2004, and 2007.

Annual Survival Rates

A key demographic variable explaining how bobwhite populations grow in our area is annual survival rate. The higher the survival the higher bobwhite fall populations, in general. In fact, our long-term data on survival and population size are very highly correlated. Annual survival for hens averaged 0.25 on our fed area versus...
0.18 on the unfed area, however there was no difference in average male survival (0.30 for both fed and unfed areas). This is a biologically significant result, as an average survival of 0.18 would indicate a stable population, versus 0.25 would indicate a growing population. More important, some key years stand out where very significant differences in survival occurred. From 2001 through 2003, survival was 2-3 times higher on the fed site than the unfed site (Figure 3). It is interesting that the least effect of feeding on hen survival occurred during 2004 through 2006, a period when USDA Georgia Wildlife Services were reducing mammalian predators on the study areas. In 2007, the year after predator management ended, survival of bobwhites on the fed area once again trended above the survival of quail on the unfed area. This result is interesting and hints at how feeding influences predation on bobwhite! We have long suspected that much of the demographic benefits of feeding are from how it changes predator-prey relationships. This may occur by increasing prey communities, such as cotton rats and songbirds, and therefore providing predators alternative diet items to quail and their eggs. However, when predator abundance was reduced this effect became less apparent. If the benefit of supplemental feeding was improved nutrition, than survival on the fed site should have remained above the unfed site regardless of predator abundance. The key point is our data suggests that supplemental feeding, because it increases survival, is a form of predation management.

Breeding Season Survival

Total productivity of a bobwhite population is strongly linked to breeding season survival rates. Bobwhites are rapid renesters, so even if nests are destroyed, they can bring off a brood – if they survive the nesting season! Therefore, we were interested if breeding season survival was similarly influenced by supplemental feeding as annual survival rates. To do so we estimated breeding season survival from our radio-tagged sample of bobwhites. For the radio-tagged sample mean survival rate was 0.32 for unfed birds versus 0.40 for fed birds, which may seem small but is actually important biologically. This is because a large proportion of the birds remain alive through the first half of the nesting season giving more birds a chance to nest. The largest differences occurred during 2002 and 2007 (Figure 4) when breeding season survival was 1.5 to 2-fold higher than on the unfed site, and the resulting impacts on production were astounding. Figure 4 shows the hatching rate of hens on TTRS, and notice in 2002 and 2007, the increase in productivity of the bobwhites on the fed site is much higher than in other years (Figure 4).

Overall Nest Productivity

One of the most surprising outcomes of our feeding studies has been the increased productivity of hens on the fed sites. Over the course of this project the number of hatched nests for hens over a course of a nesting season averaged 0.50 versus 0.32 on the unfed site (Figure 5)! In some years the differences were astounding, with a nearly 2-fold difference in 2002 and a three-
fold difference in 2007. This was a result of increased nesting rate, longer nesting season, and increased survival and the difference seemed to be greatest during dry years, but also during periods of high predation. Collectively this amounts to a huge increase in chick production for the population on the fed site.

Over the seven years, hens on the fed site produced an average of 5 chicks versus 3.4 on the unfed site. Part of the increase was improved nesting success, which was 0.69 on the fed site versus 0.57 on the unfed site. Again, feeding success seems to impact predator/prey relationships allowing more nests to hatch!

**Nesting Season Length**

With increased survival more hens make it to the beginning of the nesting season and more survive through the nesting season. But how does supplemental feeding affect the distribution of nests across the nesting season? We have found that incubation of first nests begins earlier on fed sites than unfed sites. This comparison has held true for 16 of 16 paired comparisons of bobwhites on fed and unfed sites since 1998! This somewhat amazing considering that natural food abundance is relatively high in most years. Over the course of our seven-year study on Tall Timbers, the first incubated nest was observed on fed sites an average of 9.4 days earlier but as long as three weeks earlier in some years. The number of days between the first and last nest of the season averaged 11 days longer on the fed area, but in 4 of the 7 years bobwhites nested on fed sites, 18 to 35 days longer. Further, the proportion of hens and bobs incubating nests during any week of the nesting season was higher for fed bobwhites, especially so early in the nesting season (Figure 6). This provides a clue as to why bobwhites on fed sites are more productive in years when survival rates during the breeding season are the same. Another key point is that over time, predation reduces the number of hens available to nest on both fed and unfed sites. If hens nest earlier on fed sites, then more nests occur overall, as a greater proportion of the hens are alive earlier in the nesting season than later.

Also, adding up to a month of extra time to the nesting season can help cushion populations from events that affect chick survival or nesting success during the early or late part of the season. This happens when we have August tropical storms that wipe out a portion of the hatch, or extremely dry May or June which can influence chick survival during those periods. Longer and more consistent nesting on fed sites helps to produce some productivity when the chances are best for chicks to be recruited into the population.

**Population Levels**

So, overall, we experienced higher adult survival, higher nest productivity, and higher nesting success in most years. Greatest differences were observed in the years with difficult weather, either very cold winters with limited hard mast (pine and oak) or when severe dry conditions occurred during early spring and summer. It was
at these times when the bobwhite populations on the control site generally declined at a faster rate.

The above graph (Figure 7) shows the changes in bobwhite populations on Tall Timbers prior to and during the long-term feeding study. Prior to the study in 2000 bobwhite populations were almost identical on the Fed and Unfed study areas. Feeding on just the “fed site” began in 2001. Between 2001 and 2007, October bobwhite populations nearly doubled on the fed site but remained about constant on the unfed portion of the property, but varied from year to year. If we consider one bobwhite per acre as the benchmark for acceptable bobwhite densities on intensively managed lands, bobwhite densities on the fed study site never declined below this value. In fact they averaged 1.5 bobwhites per acre and peaked at 2.1 bobwhites per acre. This compares to the unfed site where bobwhite declined to an average of 0.88 bobwhites per acre, and were below the benchmark in 3 of the 7 years. The unfed site peaked at 1.4 birds per acre, and was below a 0.5 bobwhites per acre in two of the seven years.

This data clearly indicates that bobwhite densities were increased on the fed portion of the property. In 2008, we altered feeding treatments on TTRS to begin studying the effects of different levels of supplemental feeding. The results for the population were telling, the previously unfed portion jumped to nearly one bobwhite per acre (Feb) and the previously fed portion of the property declined to about 0.7 bobwhites per acre reversing the population trends over the past seven years in just 12 months! The bottom line is that given the overall costs for managing a property for bobwhite that supplemental feeding, on average, results in an average annual increase in bobwhite densities of 2-fold (Range 1.05 to 4.0 fold higher!)

**Wrap Up Of Long-Term Feeding Study**

Over the course of many independent studies in the Red Hills and Albany Area it has become clear that feeding positively affects bobwhite populations. It would be easy to be happy with that result but in fact, we want to understand why feeding is having this effect. There are several competing ideas as to why feeding influences bobwhite demographics. One is perhaps the most obvious; that increased food provides nutrients and energy to improve the vigor of the quail allowing it to survive better and nest more often than birds without feed. A second idea is that quail move less when food is abundant and therefore reduce the amount of energy needed to forage and also minimize the risk of predation. We have seen smaller home ranges on fed areas than unfed areas but do bobwhites actually move less over the course of a day? How does feeding influence their intra-day and inter-day movements? An alternative idea is that feeding changes the amount of prey, the distribution of prey and therefore the behavior of predators such that bobwhites become less of a “target” for the predator community. In this case increased abundance of insects, rodents, and the grain itself, provides additional food resources for the predator community, ranging from bobcats to armadillos to snakes. Simply reducing the chance of a nest to be found, say during egg-laying, because nest predators are being satiated on other prey, would increase our observation of increased nest incubation. To begin to answer these questions, and more, we began an intensive study of bobwhite behavior in relation to food availability, which is the topic of the next Quail Call.

**Our Standard Recommendation**

Taking all the pros and cons of supplemental feeding collectively at this point our standard recommendation is to save the dollars used planting food plots and spread grain sorghum or corn on dedicated feed trails through the habitat, year round. At this time, most properties in GA, FL, SC, and AL with focused management for wild bobwhites feed year-round. So our research focus has shifted to "how much is enough” and why feeding affects bobwhite populations so dramatically.
Reducing Feeding Rates — Can We Save Money?

In 2008 we began testing different feeding rates 0, 0.5, and 2.0 bu/ac/yr. An interesting surprise, thus far, was that during the breeding season of 2008 and 2009 the low (0.5 bu/ac/yr) feeding rates had nearly the same effect of increasing nest productivity as the high feeding rates (2 bu/ac/yr). As discussed, our long-term study documented increased nesting productivity and chick production with heavily fed areas compared to control sites. In 2008, there was little difference in nest production between 0.5 and 2.0 bushels per acre per year although both were much higher than the control. Similarly, in 2009 nest production is highest on the 2.0 bushel treatment but nearly as high on the 0.5 bushel treatment, while both are significantly higher than the control (no feed). This leads us to believe that while there may be some improvement in bird condition leading to increased nesting season length and higher rates of renesting, that spreading feed, even reduced amounts of feed, may be influencing the predation of nests by supporting higher alternative prey items. This idea is supported by the fact that body condition of quail in February was slightly better on the control area than on the half bushel feeding area this year, but nesting output was 50% higher on the fed area this spring. One data set we have not included in this article thus far is the effect of supplemental feeding on rodent populations. In 2009, we measured our highest densities on the 2 bushel treatment area – 11 rats per acre, 10 rats per acre on the 0.5 bushel area, and 5 rats per acre on the control. This supports the idea that alternative prey items are highest on the fed treatments, even at very low feeding levels. So even in a “high” rat year (we are experiencing our second year in a row of increasing rat densities), densities are double on our fed sites.

It also indicates that when necessary, reducing feeding rates during summer may not severely impact productivity as long as a consistent, but low, feeding program is maintained. Thus far in our study, one quarter the “normal rate” has resulted in 80% of the benefit of the highest feeding program. For instance this year, as of August 1, the number of nests per hen on Tall Timbers was 0.60 on the 0.5 bushel treatment and 0.74 on the 2.0 bushel treatment and only 0.46 on the control. In 2008 there was no difference between the nest productivity at the two feeding levels but again they were all higher than the control. This suggests feeding rate can be reduced during spring and summer without compromising productivity. A simple way to reduce feeding costs during summer would be to feed once every three weeks rather than every two weeks (a 50% reduction in feeding events). Based on our feed availability study extending feeding periods to three weeks still allows for sorghum densities to be high enough to receive use by the birds. Another alternative would be to keep feeding on a normal two-week schedule and reduce the amount fed each time (if your equipment allows) to a rate between 0.5 and 1 bu/ac/year.

The Issue of Hunting Success

While positive demographic effects were being discovered from feeding, the issue of baiting quail remained an unanswered question. It was generally believed that more coveys were found on fed sites than unfed sites, but was this due to baiting the birds to where the hunters hunted? A significant study by the AQP, where they monitored radio-tagged coveys during hunting on a fed and unfed area, provided some insights into this issue. They found out that individual coveys on fed sites were actually less likely to be found during a hunt than coveys that were not fed. Increased number of coveys seen per hour of hunting was a function of a greater number of coveys on the fed area, but individual coveys were less likely to be found. At Tall Timbers, our long-term banding study shows the same result, that on fed sites, harvest rate is the same as on the unfed site. That is the probability of dying from the gun, versus predation, was...
not affected by feeding. We believe, but had not tested, that this occurred for the same reason unfed coveys were more vulnerable to predators – increased daily movements and larger home range size. We will address this issue in more detail in our next Quail Call.

**Hunting Success and Food Availability**

Given that bobwhite behavior, survival, home ranges and to some degree daily movements are affected by food availability on the feed trail, we hypothesized that hunting success may be related to food availability as well. There are two ways to consider hunting success, first if hunters see more coveys during the hunt, which is one element of success. However, the number of coveys actually shot into is probably a more accurate estimate of the quality of hunting. In our discussions with dog handlers on the plantations, about a third believe that hunting is best on “fresh feed” and others believe that it is improved as the feed declines or there is no clear relationship.

To assess this we asked five plantations to keep a record of their feeding dates by course, and then collect hunting records on coveys seen and the number of coveys pointed and providing hunters a shot. There was no relation between how many coveys were seen and the date of feeding. However, there was a somewhat interesting relationship between coveys shot into and date of feeding. Overall, in 2008-2009 season, coveys shot into was about one extra covey per hour during the first few days after spreading grain. This was apparent on three of the five properties, although a general downward trend in coveys shot into occurred on all sites over the course of feeding. We are uncertain if this is just an anomaly, a year effect, or something common to all these properties. It is unclear why bobwhites would hold tighter early in the feeding cycle than later but it could be related to covey behavior and movements or the type of cover they can feed in when food is plentiful. This is a case where more years of study are needed to be sure of our results.

**Revisiting Feeders versus Spreading**

The increase costs of grain in 2007 and 2008 brought back the issue of using feeders instead of spreading. Back in the late 1990s, the AQP did a two-year comparison of feeders versus spreading and found no difference in home range size, survival, or hunting success between the two methods. This was during a period of favorable weather conditions and increasing bobwhite populations. Overall, we did see a 70% reduction in the total amount of feed used with feeders versus spreading, but they were much more labor intensive and a complete demographics study was not yet completed using feeders. Because of the potential to reduce overall feeding costs and improve feeding efficiency, we decided to revisit this issue one more time.

This study is being conducted on a 2,000 acre section of Pineland with the remainder of the place continuing to receive spread feed. A feeder was placed on every ten acres by placing them in good cover approximately every 200 yards along the existing feed trail. The objective was to measure the year round demographics of quail on both sites, as well as the population performance over time, effect on hunting, and amount of feed used. Feed was spread on the ground near the feeders initially in an effort to show the coveys where they were. Things seemed to be going well until sometime in January when food habits (Figure 9) and increasing mortality indicated the birds on the feeder site were not getting the grain they needed.

![Figure 9. Crop contents of bobwhites on feeder site with spreading (Nov-Dec) and on the same site when only feeders were used (Jan-Feb).](image-url)
Figure 10. Visible fat on bobwhites harvested from a spread area (bird in foreground) and from a feeder area where birds used less sorghum.

Bobwhite Calling Surveys

Previous research by the AQP has shown that calling activity is correlated to breeding behaviors. They found that there is an early peak in calling activity in May, with subsequent lower peaks associated with incubation of nests in June and sometimes July. Their study found taking the average weekly call counts during June and the first two weeks of July provided the best prediction of fall populations. For many years, managers and biologists have used spring call counts to index bobwhite abundance. In fact, many states have conducted bobwhite surveys each spring for decades and the USFWS Breeding Bird Survey is conducted then as well. A better understanding of the calling rate of bobs during these surveys may prove useful for estimating density of bobwhites. Therefore, we estimated calling rates of bobwhites during May, June, and July. We listened to radio-tagged bobwhites over a 5-minute listening period which is a typical length used at point counts. We did not include bobs that were incubating a nest, because we assumed that these birds would not call.

The overall calling rate of bobs from May through July was only 41%. Bobs called most often during early May, with 65% of bobs calling at least once during the 5-minute period. By late May this rate was only 41%. With the onset of incubation in early June the rate increased to 56%, but then declined in late June to 38%, then 31% in early July and only 19% in late July! It is likely that some bobs were with broods and were therefore less likely to call as the season progressed.

Managers can generally keep track of their hatch by the ups and downs of calling activity, with peak calling activity coinciding with peaks in incubation. Those conducting bobwhite surveys need to know that probably only 30 to 40% of bobs are calling during surveys! More research on this topic is needed to better estimate bobwhite abundance using spring bob surveys.
Wrap Up

Collectively, our research clearly demonstrates that supplemental feeding is a population management technique on areas with focused habitat management. We recommend, where bobwhite are a priority and habitat management is sound, that supplemental feeding as practiced in this study, be utilized to reduce predation, increase productivity, and increase populations over time. Relative to overall costs, the proportion of an annual budget spent on feeding is small relatively to the potential population level increases.

From a management perspective, we still recommend year-round feeding. But, it is becoming clear that reducing feeding rates is a potential cost-saving option, especially between May and October. Keep in mind that this past two years, survival overall on our study areas has been high. During periods of heavy predation and/or drought conditions that periodically occur in the Red Hills and Albany areas, it may be important to return feeding rates to the normal or higher levels to minimize predation or the impacts of drought on production. Continued work on this long-term research project will allow us to make better management recommendations on years when bobwhite populations are experiencing heavy losses.

We are still studying why the effects are positive, but the research information suggests that altering predator-prey relations may be playing a major role in why bobwhites do so much better. We are also just beginning to understand covey behavior in relation to feed abundance and how this affects hunting success.

More research is ongoing to help resolve these questions.

MS Candidate, Ryan Miller, releases captured wild quail as part of our long-term study on movement ecology of bobwhite.
Quail Management Research needs your support

Tall Timbers has a long and rich tradition of leadership in quail research. Beginning with Herbert Stoddard’s first study of quail life history nearly 80 years ago, Tall Timbers has led the charge to gain new knowledge that can be used to improve quail management. The Game Bird Program continues to be an innovative leader in the research and management of bobwhites, and serves as an important resource for those who value the future of sustainable populations of wild birds. The Game Bird Program at Tall Timbers now encompasses both the Tall Timbers Quail Management Research (QMR) which conducts research on Tall Timbers and surrounding quail properties and the Albany Quail Program (AQP) which conducts research on quail properties around Albany Georgia.

We hope you will consider making a contribution to the Game Bird Program. Our fundraising goal is $500,000 in 2009 to support both the QMR and AQP projects. If you have supported these programs in the past, please continue to do so as both programs depend greatly on your annual donations. Please earmark contributions for the appropriate program, either AQP or QMR.

If you love these birds as much as we do, please take a moment to fill out the enclosed envelope and mail it today, or visit our website at www.talltimbers.org and make your gift online.

Thank you for your continued support of Tall Timbers and quail research!