

RAISING BOBWHITE QUAIL FOR COMMERCIAL USE

The following topics are discussed in this publication:

- **Management (The Key to Success)**
- **Marketing Tips**
- **Breeding Stock**
- **Managing Breeders**
- **Egg Care and Incubation**
- **Brooding**
- **Growout**
- **Preventing Disease Outbreaks**
- **Quail Diseases and Parasites**
- **Feeding Bobwhite Quail**
- **Cannibalism**
- **Feathering**
- **Handling Quail**
- **Releasing Quail**
- **Agencies and Organizations**

Few thrills are as exciting as the sudden whirl of a bobwhite covey rise, especially to a hunter. You may be fortunate enough to have a dependable dog allowing you to get set while he holds a beautiful point. Even so, when the birds burst forth in all directions, your eyes tend to blur, your heart pounds, your palms sweat-- in spite of this you recover to fire away and claim your downed bird or birds, depending on your accuracy. Often you are accused by your partner of claiming birds you did not hit; however, we know it was your partner that missed, not you.

The bobwhite quail has become important to the economy of Mississippi. Though no exact figures are presently available, it is estimated that several million bobwhite quail are annually being produced in the state. These quail are used on private and public hunting preserves, for wildlife release, and for commercial meat sale purposes.

State and federal wildlife agencies have done an excellent job of preventing rapid depletion of wild game. In recent years, however, finding a place to hunt has presented a problem. Since about 75 percent of the nation's land is privately owned and more land is being used daily for industry needs and highways, along with the pressure from a population increase of over 5,000 a day, the hunter of today faces a problem of finding no place to hunt. And this problem will be even greater for future hunters. The solution lies in the hands of

landowners who are interested and who have the ability to operate private and public hunting preserves successfully as a supplement to areas provided by state and federal game agencies.

This circular is designed to assist those who have already ventured or who may venture into raising game birds in an effort to supply the growing demand by hunting preserves and restaurants and for wildlife release. There are many ways of raising bobwhite quail. We present our opinions based on your experiences and our contacts with you growers concerning management and health problems. Take the information in this circular, adapt to your situation, and, most of all, use plain old common horse sense "You'll be a successful bobwhite quail producer."

Your local Soil Conservation Service personnel will be of invaluable assistance regarding best use of farm land to naturally propagate bobwhite quail or released quail. And local ASCS (Agricultural Stabilization and Conservation Service) personnel will provide information of any financial assistance available for wildlife establishment and conservation.

Without proper feed and cover, no amount of stocking with pen-reared birds or attempting to improve the present quail population will result in good quail populations. Spend a little time and money, contact agencies for assistance, and plan ahead for improving quail habitat--nature will do the rest.

ACKNOWLEDGMENT

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MANAGEMENT (The Key to Success)

The difference between good management and poor management is the difference between a profit or a loss. Over 80 percent of all the health problems brought to the diagnostic laboratory could have been prevented by paying closer attention to sound basic principles of management and small daily details.

It is far cheaper to prevent diseases than it is to treat them. Often there are no proved treatments available; and even where treatments are available, there is no guarantee they will work. Good management is the answer to the problem.

Always remember that quail are living beings, that you have stressed them by taking them out of their natural environment, that you have crowded them into close quarters, and that in so doing they are 100 percent dependent on you, the producer, and that you alone make the business a success or failure. When you accept this concept, you will then have the right perspective to succeed at quail raising.

Laws and Regulations

There are certain rules, laws, and regulations applicable to bobwhite quail rearing and marketing in Mississippi. For information and details contact local game wardens or the Mississippi Wildlife, Fisheries and Parks, 2906 North State Street, Jackson, MS 39216. These personnel will help you in any way they can. Contact them before purchasing bobwhite quail or quail eggs for commercial production.

Assistance Available

Your local county agent will gladly advise you as to planting dates and sources of plants suitable to encourage natural propagation. Extension personnel also can supply free pamphlets on rearing quail and assistance with quail management or health problems.

MARKETING TIPS

Marketing should always be a number one consideration. If you are considering going into the business of raising quail or you are already in the business, you have one major objective to make a profit. The love of working with bobwhite and pride and pleasure of producing a top bird certainly contribute to success, but unless you market your product for a profit, your love, pride, and pleasure will be short-lived.

Many producers contract a year or two ahead for the sale of their birds or eggs. Such contracts are excellent, but usually come only to those who have proved they will provide the quality bird desired. If you expect customers to return, you must provide what they want, or else convince them they have a need for what you have produced.

Ending the production year with mature birds on hand, other than selected breeders, is not desirable. You cannot justify the expense of carrying these birds over to next season. Too many producers are losing money because of failure to market all of their birds.

Here are some suggestions to assist you with marketing.

- **Become a member of the Mississippi Game Bird Association. You can make many valuable contacts with both producers and customers.**
- **Join the Southeastern Game Bird Breeders and Hunting Preserve Association. This organization will help you in many ways, one of which is marketing.**
- **Join the North American Game Breeders Association. Attend their annual meeting; you'll make some profitable contacts.**
- **Advertise, advertise, and advertise some more. It does not cost it pays. Be certain the ads are attractive, clear, and concise. An ad or brochure that looks sloppy will not gain sales; seek local printers' advice and assistance.**
- **Keep a neat farm. A prospective customer judges you by the appearance of your farm.**

- **Sell yourself. Make the first impression a good one. Know the business thoroughly. Show interest in the customer and answer all questions with enthusiasm. Require employees also to present neat appearances and pleasing personalities.**
- **Present the prospective customer with advantages you offer, but do not run down fellow competitors to do this. You don't build yourself up by tearing others down.**
- **Make every attempt to have a satisfied customer. Tell the customer what you offer and then be sure to provide this and just a little more. If you give a little more than is expected, your customer of today will return and bring new customers.**
- **Never force a customer to accept birds not wanted. Even though there may be a prior agreement, if the customer does not feel you have produced what is desired, it is best not to force the issue. Accept the refusal gracefully, and if the customer is worth keeping, attempt to produce what is wanted next time. Locate someone else who would be satisfied with the birds that were refused.**

Everyone does not desire the same type of bird; what one refuses another may want. If you receive two consecutive refusals from a prospective customer and are satisfied you have produced a desirable bird, you may be dealing with bargain hunters.

Produce a good bird and demand a good price with a clear conscience. Don't give a prospective buyer the impression you are apologizing for your asking price; let the customer feel an apology is due for paying so little.

- **Always be honest with customers. Lies may sell a few birds, but they do not tend to build future business. Your reputation gets around; be sure it's a good one.**

A thought: "Every time you undersell your product, you are setting its future price."

BREEDING STOCK

If you start with undesirable breeders, you end up with undesirable offspring. It's just this simple; so be cautious when selecting breeder stock from your stock or from someone else's.

The following suggestions help with selection of the best breeding stock:

- **Buy only from reputable breeder dealers. Get the best breeder birds available; your future in the business depends on good breeder stock.**

The Mississippi Game Bird Association or Southeastern Game Bird Breeders and Hunting Preserve Association can advise you of dependable sources. Join these associations, you will get to know other breeders throughout the region. Locating a source of birds in your own area is always best since the birds are acclimated and are exposed to your environmental conditions and problems.

- Visit the breeder's farm, with permission, and look at the facilities, birds, records, and equally important size up the management. Usually a quick look around will tell a lot about an individual's management. However, practice good disease security to prevent spreading disease from or to your farm.

If you plan to buy birds or eggs --

- Check the breeders for conformation in size, shape, and color according to the species.
- Check for off color, size, body or leg deformities, and other abnormalities.
- Check records for past history of disease and mortality, if these records are available.
- When purchasing eggs, insist on uniformity in size and shape of the eggs. A large egg produces a large chick; small egg, a small chick. An extra large egg seldom hatches. A mixture of sizes results in unfair competition and can give the birds a poor and slow start.
- When purchasing chick quail for future breeding stock, check the points mentioned above and then look for alertness and vigor in the chick quail. Demand close culling; do not accept cull chicks with the idea you can bring them out.

If you plan to keep birds from your own stock (this is most advisable), select those that show best growth, stamina, and feathering. Save birds from your earlier hatches each season prior to peak production. These birds usually are stronger, healthier, lay more eggs, are more resistant to disease, and have fewer blowouts during egg production.

Always save more birds than needed for breeder selection. This allows for continual culling of undesirables as they appear and still gives the number of breeders desired. Having a few extra cocks and hens is advisable so you can quickly replace an infertile male or nonproductive hen.

The type breeder desired is determined by the market. Larger birds are desired for table meat, but may not make good flyers. Some hunting preserves, however, use these slow flyers for beginners and poor shots. A smaller bird (around 6-7 ounces) is desirable for the hunting preserve catering to experienced hunters. This size bird is more active and moves faster. Larger birds do not lay as well as smaller birds of the same species.

For those who carry the same breeders over for 2, 3 or more years, close observation and culling should be carried out throughout each laying season. Using the same breeders for more than one laying season can lower egg production, fertility, and hatchability with weaker offspring, and less disease-resistant birds.

With small breeding operations it is often advisable to introduce unrelated breeder stock at least every third year to prevent inbreeding problems. You may exchange males with another breeder who has an unrelated strain, purchase new birds, or buy eggs and raise your own new blood line. When bringing in new stock, it is advisable to quarantine these birds for 3 weeks before placing with your stock. Then you can observe them and eliminate

any appearing to have a disease. Purchasing day-old unrelated chicks or eggs from unrelated stock is highly recommended for introducing new blood into your breeder stock.

Some large producers do not drag out egg production. Shortly after peak production is reached, they cut off production. They report that after peak production hatchability tends to get poorer. As an individual producer you must determine whether cutting off production is a good practice to follow. Often, because of their individual attention to management, smaller producers surpass achievements of larger producers.

The last, but not the least important, suggestion is to have your breeders blood tested each season, prior to egg production, for pullorum typhoid disease. Waiting to test until the birds are laying affect egg production. A number of approved and qualified testing agents are located throughout the state. Their names and addresses are listed annually by the Mississippi Poultry Improvement Association. Most chicken hatcheries have these lists, as do county agents and Extension poultry specialists at Mississippi State University. The cost for this work is very reasonable if you live near one of the qualified testing agents. However, a producer willing to take a few hours' training can do the blood testing. If you want to qualify for this work, contact the official state agent, National Poultry Improvement Plan, through your local county agent. Necessary arrangements can be made for a visit to the farm for instructions and required procedures.

MANAGING BREEDERS

Each producer has ideas on managing breeders. The following suggestions may be helpful in your program:

- Overwinter breeders in pens of 20 or more. This is more natural for quail, and they keep warmer. If on wire in raised pens and exposed to the cold, have drop curtains to keep wind from circulating under the birds to avoid drafts.
- Use wire flooring for breeders to prevent exposure to internal parasites. Ground or wood flooring with litter works well but requires much closer observation, cleanup, and general management.
- Blood test for pullorum before laying season. (See section on "Breeding Stock.")
- Pair breeders 4-6 weeks before their normal laying season. The normal, natural laying season in Mississippi begins around the middle of March and continues to the last of September. Bobwhite quail are monogamous (prefer one mate one cock to one hen). A ratio of one cock to two or three hens also performs well.
- Put breeders in individual 12- x 24-inch cages. If sectional cages are used, have a solid partition between cages to keep cocks from fighting. Fighting can cause egg breakage, lower fertility and mortality even though birds are in separate cages.

Indoor Breeding

Indoor breeding allows the use of artificial light to induce pre-season and year-round egg production. If you prefer this program, a 17-hour day is recommended. All-night lighting does little to increase egg production. However, some do find it helpful in preventing the birds from flying as much and injuring themselves. Generally lights are used beginning in December to induce pre-season egg production in January. Caution never reduce the total amount of light during the laying period. Reducing light time will reduce egg production. If year-round production is desired, using a 17-hour day is the simplest procedure. Time clocks are inexpensive and can be used to turn the light on and off.

Continuous egg production or pre-season production results in production during the winter. For best egg production results, the breeders need to be penned in an area where the temperature can be controlled. Keep the temperature during the winter 60°F or above and during the summer below 85°F.

Observe the birds closely and keep records. If breeders fail to mate, replace the cock. Egg fertility is also a method of checking mating performance. When quail are paired, this is simple, but in colony breeding it is more difficult to pick out infertile cocks. If an individual hen continually lays soft-shelled eggs, replace the hen. But if a number of hens lay soft-shelled eggs, contact your feed supplier and arrange to adjust nutrient profile in the breeder diet. You may consider topdressing the feed with pullet-sized oyster shell as a temporary solution.

Outdoor Breeding

If you have outdoor breeding pens, it is best to place the open ends facing south for sun and warmth. Also enclose the area with a wire fence for protection from dogs, skunks, weasels, cats, and other animals (including two-legged ones).

Protect breeders from general disturbances caused by laborers, children, and curious visitors. Any disturbance may cause them to injure themselves; injury leads to cannibalism, influences egg production and mating (fertility).

Visit the birds several times daily to be sure feed and water are present. Lack of either can, and usually does, lead to greater and costlier problems. Remember a penned bird cannot hunt for food and water as nature teaches it to do; you must provide this. The bird, not by choice, is 100 percent dependent on you.

Pest and Disease Control

Check the birds regularly for lice or mites. A small dusting box containing sand mixed with an effective insecticide works well. Every time birds are handled, dust them with an insecticide. At present, permethrin dust is effective. Periodic spraying of the birds with the proper concentration of permethrin provides excellent control of external parasites. Insects develop resistance; therefore, check with your county agent as to what is best in your area at the time the insecticide is needed.

Control rodents with anti-coagulant baits, and screen out sparrows or other birds where possible. They not only are a source of mites and lice but also transmit diseases to breeders, frighten the birds (causing injury and lowered production), contaminate them, and eat a lot of feed.

Sanitation is a must throughout your entire program. Clean water troughs daily, water jars at each refill, feeders at least once weekly, and maintain a general cleanup.

Do not store mixed feed for longer than one month ahead of needs. It may become moldy, lose quality, and become harmful to the birds, especially if improperly stored.

Do not allow your labor to raise fowl of any type. They can transmit diseases from their hands to your birds. This source of disease is often overlooked by quail producers.

Keep visitors out of the breeder pens and areas. For some, this may be hard to do, but it will save you problems in the future.

Egg Production

The number of eggs per hen will vary, depending on breeder characteristics, breeder selection, and your general management program.

Guide for Number of Eggs Per Hen

Normal mating season (no artificial light)	50-100 eggs
Normal mating season (artificial light - 17-hourday)	70-150 eggs
Preseason or year-round production (17-hour day or all-night lights)	150-200+ eggs

When using artificial lights, remember never to decrease the total hours of light per day during the laying season. If you decide on a 17-hour day, this means more hours of artificial light when the days are short and less when the days are long, if your breeders are exposed to daylight.

Some of you will constantly exceed the guide above because of improved birds and your attention to management. It is extremely hard to arrive at a figure to use as a guide in the bobwhite quail business. More attention to breeder selection results in increased eggs per hen each season. Improved feeds also boost production, and more attention to management adds to total production per bobwhite each year.

EGG CARE AND INCUBATION

You can ruin a perfectly good egg by improper care. Each egg lost is costly since it represents one less bird for sale.

Observing the following tips will help you get better quality eggs:

- **Collect eggs twice daily and three times daily if they are exposed to high temperatures.**
- **Store the eggs with the small pointed end down. If eggs are held more than 3 or 4 days before setting, turn them at least twice daily. Tilt to an opposite slant each time to an approximate 45° angle to prevent yolk from sticking to the shell membrane.**
- **Transfer eggs to a cool-humid storage area. Temperature of the storage area should be 55°F with a relative humidity of 75 percent. Do not use a standard air conditioner (as used in your home) for cooling the eggs. This type conditioner removes moisture from the air; the idea is to add moisture to the air. The egg is mostly water; take away this moisture, and the egg is worthless.**
- **Do not wash dirty eggs or wipe clean with a damp cloth, or you will remove the natural protective coating of the egg and leave it exposed to entry by germs and other organisms. Some discard dirty eggs; however, moderately dirty eggs may be salvaged with some work and care. Remove excessive dirt and dry matter by scraping with a sharp blade. Do not use sandpaper as this reduces the integrity of the shell.**
- **Holding eggs longer than 10 days in storage affects hatchability. Therefore, plan your incubation program so eggs are not stored longer than 10 days. Planning ahead saves headaches, frustrations, and money.**
- **Before placing cool, stored eggs into the incubator, allow them to warm to room temperature. Otherwise, the shock of going from 55°F to 100°F can cause sweating and may reduce hatchability.**

Incubation

Improper adjustment of the incubator and careless egg incubation can ruin all plans. The following pointers may serve as reminders of correct incubation procedures:

- **Determine the size and type incubator needed for your future quail business. Game bird equipment suppliers can furnish you with capacities and capabilities of various makes and models. For continuous setting you need an incubator with a separate hatching unit.**
- **Thoroughly clean and disinfect the incubator and hatcher before each usage. For complete details on egg and incubator sanitation, contact the Poultry Science Department, Mississippi State University.**
- **Constantly check the incubator and hatcher during operation to insure that the temperature and humidity are correct. Correctness of both is essential for a good hatch. The incubator and hatcher should be in a room where no major variance in temperature or humidity occurs.**

The following is a guide for incubator settings; this is only a guide. Follow the manufacturer's recommendations if they are given for quail. Note the difference in the temperatures listed for still-air and forced-air incubators. Forced-air incubators are those with internal fan air circulation. Still-air incubators usually have very small capacities, up to 50 quail eggs. In these, the thermometer bulb is located near the tops of the eggs without touching them.

Guide for Incubator Settings

Period of incubation		23 days
Incubator temperature (at set)	Forced-air	99.75 - 100°F
	Still-air	102°F
Humidity	(at set)	84 - 86°F wet bulb
	(at pip)	90 - 94°F wet bulb

Initially, following the manufacturer's recommendation on temperature and humidity settings is very important. After a few hatches you may find you need to vary from the manufacturer's guide for best results. More quail raisers have problems with humidity than with temperature.

If the incubator has multiple trays, operate it with all trays in position all times (whether with or without eggs) to maintain proper temperature and humidity readings.

For continuous incubation or where trays contain eggs of various stages of incubation, a temperature setting of 100°F and a wet bulb reading of 90°F work satisfactorily.

Move the eggs to the hatcher on the 21st day of incubation. A temperature of 99-100°F and relative humidity of 90-94°F W.B. is recommended for hatching. No turning is practiced after the 19th day. Hatchability of total eggs set should be 75-85 percent.

Incubation Period for Various Fowl

	<u>Number of Days</u>
Bobwhite quail	23 - 24
Japanese quail (Coturnix)	17
Pheasant	23 - 28
Chukar partridge	23 - 24

Wild turkey	28 - 30
Mallard duck	28
Muscovy duck	35 - 37
Goose	30 - 34
Guinea Fowl	28
Bantam Chicken	21

Common Causes of Poor Hatchability

- Continuous disturbance of breeders during mating season results in higher percentage of infertile eggs.
- Keeping blood line over 3 years may result in problems.
- Using eggs from old breeders.
- Hen or rooster crippled or deformed results in infertile eggs.
- Too many hens per rooster.
- Holding eggs in storage too long.
- Improperly storing eggs before incubation.
- Failure to turn eggs.
- Not allowing stored eggs to reach room temperature before incubating.
- Wide variation of temperature during incubation.
- Improper humidity during incubation and particularly during hatch-out period 21-23rd day.
- Poor sanitation and failure to clean hatcher.
- Washing eggs.

BROODING

This is one of the most important phase of your bobwhite quail program. Failure to brood properly can result only in disappointment. Here are some basic guidelines.

Clean Brooding Area

First, thoroughly clean the brooding area. This includes walls, ceiling, floor, wire, and all equipment. One of the best aids is strong water pressure to knock down dust, waste material, cobwebs, etc. Take all equipment outside and wash, clean, and disinfect. Leaving this equipment out in the sun is very beneficial; the sun is one of our best disinfectants.

After thorough cleanup, and only then, use a commercial disinfectant on the walls, ceiling, wire, and floor. Using a disinfectant before cleanup is a waste of money; you cannot disinfect a dirty area.

Use Moisture-Absorbing Litter

Put moisture-absorbing litter on the floor. Do not use litter that has been used for any previous fowl. And do not use sawdust or hardwood shavings. Sawdust and hardwood shavings can allow mold and fungus spores to develop and results in respiratory problems. Chick quail also commonly eat sawdust, which is not desirable. Pine shavings and builder's sand are the most commonly used litter materials. Provide at least a 2-inch deep layer of litter in the brooding area. Keep the litter dry; wet litter promotes many undesirable problems like internal/external parasites, eye damage from ammonia, molds etc.

Types of Brooders

Various makes, models, and capacity brooders are available. Your plans now and for the future are governed by what type you use. Take time to plan your future desires regarding quail before you purchase equipment. Poultry and game bird equipment suppliers can give you information on the various types of brooders. Be sure to purchase a type that is easily and accurately adjusted.

Brooding Temperature

Brooders should operate at least 24 hours before arrival of the chicks. This gives you sufficient time to make necessary adjustments, repairs, or replacements, and takes the chill off the brooding area. Be sure each brooder is operating according to manufacturer's directions. Check temperature at the outer edge of hover brooders and at approximately 1-inch above litter. The correct temperature is very important to the health of the chick quail.

Guide for Brooding Temperatures

First Week	98 - 100°F
Second Week	95°F
Third Week	90°F
Fourth Week	85°F
Fifth Week	80°F

Always observe the chicks to see if they are comfortable. If they tend to pile up or crowd near the center of your heat source, more heat is needed. If they stay way out and do not go

under the center, it is too hot. They should spread out comfortably under the brooder in a circle from the center out.

Time will vary as to how long heat should be provided. In warm weather, after a month, only night heat may be needed. Any time quail are sick, heat should be provided regardless of weather. A sick quail usually acts chilled; but by providing heat you help the bird overcome the problem and lose fewer birds.

Use brooder guards the first few days to prevent the chicks from wandering too far from the heat. An 18-inch high corrugated cardboard guard closely encircling the brooder is sufficient to contain wandering chicks. Many producers move the guard on the third day until it is 4-5 feet larger in diameter than the hover. Normally, the brooder guard can be removed after 5 days. Again, judgment on your part, according to your conditions, should determine what is best.

Before the chick quail arrive provide feed on rough cardboard flats or paper towels. Do not place feed on slick material, it can cause the chicks to be spraddle legged. Have at least two feeding and watering areas per pen, and place them close to the brooder so birds do not have to be chilled when eating or drinking. Place clean fresh water in water jars the day before chicks arrive. The brooder heat (which should be on 24 hours before the chicks' arrival) takes the chill off the water and prevents shock. Birds fresh out of an incubator can be overly chilled by drinking cold water. Marbles or clean pebbles in the water troughs attract birds to the water and prevent the drowning.

Provide Enough Space

Provide sufficient floor, feed, and water space. Overcrowding and lack of feed and/or water availability can result in serious problems. Never have fewer than two feeding or drinking sources per pen of birds. The amount of floor space needed is shown in the guide below. However, conditions may require deviating from these recommendations. Experience dictates what is needed.

These guidelines help keep you from varying too far from the normal. Due to different conditions and different management on each farm, what works well for one quail producer does not necessarily work well for another.

Minimum Space Needed by Age of Quail

	<u>1-10 Days</u>	10 Days to <u>6 Weeks</u>	6 Weeks to <u>14 Weeks</u>
Floor space	5-10 birds/sq. ft.	1-2 birds/sq. ft.	1-2 sq. ft./bird
Feed space	.5 in./bird	1 in./bird	1.5 in./bird

Water space	2.5-gal. founts/ 100 birds	1 linear ft./ 100 birds	2 linear ft./ 100 birds
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Debeaking

One of the major problems of rearing quail in confinement is cannibalism (see section on "Cannibalism"). Debeaking is removing the tip of the bird's beak so that the beak ceases to be a puncture tool and, at the same time, becomes an ineffective tweezer for pulling small feathers. Quail debeaking is commonly performed with nail clippers, scissors, and electric debeakers.

Debeaking can be done on schedule or as needed. Debeaking at day old by snipping off about one-fourth of the upper beak (from tip to nostrils) prevents early cannibalism but has to be repeated every 2 or 3 weeks. Be careful with snips not to split or crack the beak. If producing birds for shooting preserves, debeak with nail clippers or scissors. Birds should have natural beaks when released, both for looks and, if unharvested, for survival in nature.

With an electric debeaker birds can be debeaked at 1 day of age or later when needed or at convenience of operator. Remove about one-half of the upper beak measuring from tip to nostrils. This is usually sufficient for the life of a meat-destined bird although if picking reoccurs, a second debeaking may be necessary. Sick or weak birds should not be debeaked; stress will make the problem worse. Be sure the depth of feed is increased for 6 days after severe debeaking. The bird's beak will be sore, and, if hit against the bottom of the trough when feeding, the bird may not eat as it should -- another stress.

Provide proper ventilation and avoid drafts. Always provide ventilation to eliminate stale air, ammonia, dust, and moisture and at the same time provide fresh air. Any time you detect ammonia at your height, it is much more severe at the birds' level. Eye damage and respiratory problems, as well as poor working conditions, result. In other words, "If your house smells, so does your management."

Brooding Schedule Guide By Age

24 hours before removal from hatcher

- Turn on all brooders, set at 98-100°F, and check temperature of each brooder at edge of hover and 3 inches above litter or wire. Leave brooders on.
- Place fresh water in jars around each side and just outside hover so that water will be warmed by brooders. If wide troughs are used, place marbles or clean stones in trough to prevent drowning.
- Place brooder guards around brooder, feed, and water.

2 hours before removal from hatcher

- **Place egg flats, paper towels, or corrugated cardboard near waterers. Place starter feed on these. Remember, do not use slick paper or slick cardboard for feed trays: birds will become spraddle legged on slick surfaces.**
- **Check temperature of brooders.**

At hatch

- **Cull weak and crippled birds. Debeak lightly if cannibalism has been a past problem.**

1-7 days

- **Check brooders daily and nightly to observe birds and see if they're comfortable. Birds at this age cannot stand wide variation of temperatures.**
- **Keep waterers filled and cleaned.**
- **Remove paper or flats containing feed each evening to prevent collection of droppings from creating a problem. Place fresh feed on fresh paper daily.**
- **On the third day move brooder guard so it is 4-5 feet larger in diameter than hover.**
- **Weather permitting, brooder guard may be removed by the fifth day.**
- **Place additional larger waterers and feed troughs in pens on the fifth day. Some eliminate this step by initially placing all waterers and feeders used throughout brooding.**

7-14 days

- **Reduce brooder temperature to 95°F on the seventh day.**
- **Begin removing small waterers, one each day, until only larger type remain. Do not allow small waterers to remain empty; instead remove the small waterers.**
- **Remove feed flats, one each day, until only larger feed troughs remain. Allow the birds to venture farther from the heat, but use common sense in relation to weather conditions.**
- **Confine birds to brooder area at night, but do not confine under brooder.**
- **Clean jar or pail waterers at each refill. Clean watering troughs daily.**
- **Keep fresh feed before birds; remove dusty and powdery feed daily.**

14-21 days

- **Reduce brooder temperature to 90°F on 14th day.**
- **Keep feed and water before birds at all times.**
- **Allow birds to go into runs on warm days and provide heat so they will have it if needed. Do not confine birds as closely to brooder at night.**
- **Continue to clean waterers and to remove dusty powdery feed from troughs.**

21 days and after

- Reduce brooder temperature to 85°F on the 21st day and continue to reduce the temperature 5°F each week of brooding thereafter. Several 1-3 degree temperature decreases are preferable to a single large decrease. This reduces the possibility for chilling, especially when weather conditions worsen.
- Continue sanitary procedures.
- Do not fail to keep water and feed available at several areas within each pen.

5-6 weeks

- Transfer to grow-out pens.
- Cull and lightly debeak as you transfer.

GROW-OUT

After a brooding period of 4-6 weeks, depending on weather conditions, place quail in grow-out pens. Locate grow-out pens away from breeders and common disturbances, such as road traffic, children's play area, animals, etc. By fencing in grow-out areas, you will keep out many intruders.

Management During Grow-Out

These suggestions aid in successful grow-out:

- Do not crowd the birds. Watch for cannibalism. A good time to debeak is when moving them from the brooding area to the growing out area.
- Provide several feed and water stations. If growing out on ground or litter, place each feeder and waterer on a wire platform. The birds are around these areas in greater numbers than anywhere else in the pen. Wire stands isolate the birds from a concentration of droppings.
- Provide shelter and hiding places for protection from weather and each another. Corn stalks in shocks, pine tops, panels, etc., give the birds places to feel more secure and helps reduce cannibalism.
- Grow meat-purpose quail on wire-floored pens. Outdoor pens should have the openings facing south. Permanent or portable pens are satisfactory. Wire floors for both are recommended. Elevated pens with wire floors require drop curtains around the bottom to prevent drafts.

Wire floored pens can be made in sections. Wired sections allow dropping removal when necessary. The height of the wire floor should be at least 4-6 inches above the ground. Keep the width of floor supports as narrow as possible to prevent buildups of droppings on the top edges. The purpose is to separate the birds from the droppings and thus, reduce the incidence of more common health problems. The height of the pens is governed by what is convenient.

Check the birds only as often as necessary to ensure that feed and water are available. Check also at these times for any evidence of health problems.

Place birds designated for release in flight pens one month before release. Birds are considered mature at 16 weeks of age.

Flight Conditioning

Hunting preserves demand a strong, aggressive, fast bird. To get this type bird, you must condition the bobwhite quail. Allow the bird to preen and condition itself as it would in nature, but while still in captivity.

Flight pens require dirt floors, well-drained soil, ground cover, feed, and water throughout the area. Ideally, widths are 12-15 feet and lengths are in excess of 40 feet. A 12- x 12-foot catching area is needed in each pen. Pen height must permit entry of a tractor to turn soil in pens. Feed stations are designed to prevent rain from wetting and ruining feed. Place feed and water stations on wire stands.

Prevent birds from scalping and injuring themselves when flying, by covering the top sides and ends with open-weave mesh, burlap or cheesecloth. Open-fiber or nylon mesh allows maximum ventilation and light while safely confining the birds. The ends of the pen must be marked with sacks or similar material so the birds know the limits of the flight area.

More than one flight pen allows for bird rotation, which helps avoid a buildup of health problems.

Locate flight pens away from dogs and people. Isolation, not pen length, is the key to having a flighty bird.

When not in use, frequent deep plowing of flight pen soil is recommended. Plowing exposes the soil to the sun and improves disinfecting.

Planting a crop in the flight pen for additional food and cover is practiced successfully by some producers. The crop must not keep out too much sunlight. If the ground is shaded and remains moist for long periods, buildups of molds and various internal parasites, such as worms and coccidia may occur. Food poisoning (botulism) is more common in shaded moist pens, particularly if grain is scattered on the ground.

Do not overcrowd the flight pen. Two square feet per bird is a minimum allotted space for flight-pen birds.

Do not sell nonflight-conditioned birds to hunting preserves unless requested. Nothing is more disgusting to an experienced hunter than having sluggish, wobbly, bob-tailed quail attempting to fly on a covey rise. Hunting preserves may want a few of these birds for the beginner, but mostly, they want the fastest thing on wings.

PREVENTING DISEASE OUTBREAKS

Disease is an unpleasant subject, yet its prevention is part of the game bird industry. When birds are removed from their natural habitat and raised in confinement under crowded conditions, the chance of disease becoming established in the population is greatly increased. Factors that produce mental and/or physical stress, appear to play a vital role in the disease picture. Stress is an often used but ill-defined term. It has several definitions; one dictionary defines it as "the sum of the nonspecific effects elicited by adverse external influences." Another simpler definition states that "stress is a toxic or overdose of a stimulus."

Many known and unknown factors cause stress. Any factor that weakens the body defenses is a stress. Of the known stresses, some are considered necessary and others unnecessary. Among those considered necessary are debeaking, vaccinating against various diseases, and handling or moving birds. Unnecessary stresses most commonly seen are overcrowding, inadequate food and/or water space, and improper brooding. Raising birds year after year on the same ground does not create a stress as such, but it does permit disease-causing agents to build up in the area -- thus increasing the chance of disease outbreaks when stress does occur. Stress increases the bird's susceptibility to diseases.

A producer striving to keep stress and poor management at a minimum is well on the way to controlling a disease problem. A game bird operation of any size cannot be run in a haphazard manner. It requires close, regular supervision. The owner must recognize early symptoms of disease problems and seek help from qualified persons when necessary.

Identify a problem before you try to treat it, and follow instructions given by a disease diagnostician. Excessive treatment with drugs is harmful to birds and expensive. Once birds become overtreated and start dying from the effects, there is little that can be done.

Avoid constant unnecessary use of drugs. Indiscriminant use of drugs and antibiotics can allow development of drug resistant strains of disease organisms.

Disease Prevention Tips

Preventing disease is more economical than curing disease. Treatment of a specific disease is not always effective or possible. It is costly, and often experimental since little research specific to quail disease problems has been performed.

The following general management recommendations can help prevent disease. Many have been mentioned before in this circular in relation to management. But repeating -- good management and disease prevention are synonymous.

- **Do not add adult stock when introducing a new blood line. Get young chick quail or eggs for this purpose. By growing them on your premises they develop early immunity to some of the problems associated with your farm.**
- **Do not hunt cheap chicks or eggs. Know the breeder's history. Isolate purchased chicks from your stock for at least 3 weeks, in case they carry a disease.**
- **Start with clean disinfected pens and equipment. Clean trough waterers daily (jar waterers at each refill) and refill with fresh cool water. Clean feeders at least once weekly.**
- **Always be sure that feed and water are present and easily accessible to the birds. You cannot overdo feed and water availability. Provide several sources of both in each pen.**
- **Do not crowd birds. Producers who fail to heed this recommendation usually fail in the business.**
- **Do not overstock feed. Feed stored for long periods can become moldy and moldy feed is toxic to quail. Old feed tends to lose nutritional value.**
- **Provide heat for sick birds. Chicks chill easily and require additional heat for a more speedy recovery. Mortality normally declines when extra heat is provided.**
- **Isolate young stock from adult breeders. Young birds are highly susceptible to many disease organisms. Birds become more resistant with age. Adult birds may be a source of infection if young stock are not isolated.**
- **Care for the youngest birds first and the oldest last. Always work from young to old where the same person must care for all ages. By following this procedure you are less likely to transmit disease.**
- **After working with known sick birds, do not visit healthy birds unless you take a bath, change clothes, and disinfect or change shoes. This may sound ridiculous, but, if you raise many birds, it pays off.**
- **Use only clean disinfected crates or boxes for transferring. Never borrow a used transfer box from another quail producer.**
- **Remove individual sick and dead birds from the pens daily. Incinerate or properly dispose of dead birds. Isolate individual sick birds until they recover.**
- **Keep floor birds in well-drained pens. Standing water is an excellent source of diseases and internal parasitic infections.**
- **Do not allow unwarranted visitation. Curiosity seekers, feed and drug salespeople, etc., should be dealt with at your house, office, or by phone -- not in the quail pen. People can and do mechanically spread disease on the soles of shoes. Locate feed bins and storage rooms so delivery people do not have to enter the quail pens.**

For those who must visit, prospective buyers or health and management advisors, provide plastic boots or pans containing disinfectant for shoes before entering the pen area.

- **Place a lock on pens to keep thoughtless people from entering the pens while you are absent.**
- **Do not allow personnel working with your quail to raise other fowl. They eventually bring their birds' problems to your birds. It is best to keep other fowl off the farm. Transmission of many diseases occur from one to the other.**

- **Control rodents, wild birds, flies and other insects. Your local county agent can be of great assistance with best control practices.**
- **Do not exhibit birds at a fair or other fowl shows unless you are willing to sacrifice them. It is unwise to return these birds to your flock since they may have picked up a disease from other fowl in the show. Isolate them at least 3 weeks from the other birds if they are returned to your premises.**

Disease prevention is not easy, but it is the best and cheapest in the long run. You must be on your toes and willing to use some elbow grease if you plan to prevent disease. Take care of seemingly unimportant small details; otherwise, they will develop into big problems.

You will not prevent all disease problems from occurring on your farm. However, by following the advice of experienced people and keeping up with changing times and situations, you experience fewer disease problems.

Drug Usage

Drugs are often misused, overused, and inappropriately used. Never attempt to substitute drugs for good management. Drugs are necessary and should be used, but only according to a diagnostician's recommendation.

Guessing your way through a disease problem is likely to be a costly and drastic approach. Early and accurate diagnosis of a disease, followed by a specific treatment, is essential for speedy and satisfactory recovery.

Many drugs do not specify quail treatment levels. A diagnostician can advise you of the best drug and level of treatment for a specific problem. Continuous medication is not normally recommended. Overuse of drugs can cause more losses than the disease; sometimes no drug is the best treatment from a practical and economical standpoint.

Some conditions may justify periodic use of a specific drug for a specific and recurring problem. Using medications is done only on the advice of a diagnostician. Usually management changes can reduce or prevent constant recurrence of many quail diseases.

Remember; it's OK to use the shotgun treatment method when hunting birds but never when dosing them. Always know-what you are treating, why you are treating, and how long to treat for best results with drugs. Diagnosticians are best equipped and qualified to provide this information.

Ways to Administer Drugs

After determining that a drug is necessary for prevention, control, or treatment of a specific health problem, you must decide the best method of administering that drug. Most available drugs are produced in several forms -- injectable, water-soluble (liquid or powder) and feed grade additives.

Three common methods of administering drugs, along with a few pros and cons of each, are as follows:

Injection

You get an accurate measure of the dose using this method, and the response to the treatment is within 24 hours if the drug is effective. However, from a practical standpoint this is the least desirable method. It requires handling each bird, more labor, more time, and likely injury to birds during the catching and handling process.

Injection is normally used only in cases of extreme daily mortality where practicality must be overruled to save the remaining birds.

Water

Drinking water solutions are the most practical method of giving a drug. Response to the treatment is usually seen within 3-4 days.

It is very important to follow the drug manufacturer's directions. Don't give 4 tablespoonfuls when the recommendation calls for 2 tablespoonfuls. Some get the idea that twice the recommended dosage is twice as effective. It is not; it may well do more harm than no drug at all.

With water medication, always consider the environmental conditions at time of drug administration. Birds consume two to three times the volume of water per day at 85°F temperature and above than they do when the temperature is 75°F or below. This caution is particularly advisable when using sulfa drugs.

Feed

This method may be used, but results are slowest by this route -- usually 5-8 days. When administering a drug for long periods, this method is commonly used. It is a route used when treatment is advised but is not an emergency.

A few problems many bird raisers face when wanting to use feed as a route of drug administration are as follows:

- Often impossible to get the drug mixed unless you produce enough birds to use several tons of feed a week or have your own mix mill.
- Mixing medication in feed with a shovel is questionable as to the equality of distribution throughout the feed some birds may get too much, others not enough.
- Feed consumption varies since birds eat less in the summer and more in the winter. Also sick birds normally do not eat well but continue to drink. If you can't get the normal amount of feed into the bird, then the bird is not getting the full benefit of the drug.

QUAIL DISEASES AND PARASITES

The average quail producer cannot read about a disease or look at a picture and make an accurate diagnosis in the field without training, equipment, and experience. Seldom, without training, can you diagnose more than a few internal parasites with the unaided eye. Properly equipped and experienced poultry service people are of invaluable assistance to you in the field.

When your birds experience a serious problem, use a laboratory where equipment, trained personnel, and experience are available. You may guess right in the field about an evident problem, but a less obvious problem can be overlooked unless special tests are conducted at a diagnostic laboratory.

Much is still unknown and unsolved in diseases of quail. Advances are being made daily in methods of treatment and management. Diseases too are also advancing; new ones replace solved ones, and resistant forms of the old diseases provide a daily challenge to research workers. The need for more research is great.

"When you think you have the disease problem well in hand and you become complacent in your management and sanitation, look out; nature is about to teach you a lesson."

Little space is be devoted in this circular for discussion of specific diseases and infernal parasitic problems. However, the following diseases and parasitic problems are the most prevalent and need some discussion; there are many others that can also affect quail.

Ulcerative Enteritis (Quail Disease)

This is the most common and destructive disease of captive reared quail. Losses in young birds may reach 100 percent if not controlled. It is most commonly seen in ground- or litter-reared quail, but can occur in wire-reared birds. It is caused by a bacterium found in the intestinal tract.

If all birds on a given farm were inoculated with the disease the same day, the peak of mortality would occur in 5-14 days. However, this is not the normal situation. Since individual birds usually contact the disease organisms over a period of time, some mortality may occur almost continuously.

A laboratory diagnosis is best and is usually free to residents of Mississippi when performed at state supported laboratories. Take a few sick-appearing birds and a few that died during the night to the laboratory.

You can identify ulcerative enteritis yourself by opening a sick or dead bird. Usually, ulcers are observed on the internal surface of the small intestine. Secondary infections may also

be present but are difficult to identify; thus the laboratory examination is still the best and most accurate.

Disease is usually transmitted by ingesting contaminated droppings. Recovered birds can remain be carriers of the organisms and serve as a source of infection for uninfected birds. Isolate known infected stock from uninfected stock.

Pens, cages, and particularly ground or litter runs may remain infected over a long period of time. Thorough cleanup of premises is essential to prevention. Raising birds on wire is usually effective in helping to prevent the problem, but is no guarantee that the birds will not be affected.

Treatments vary in effectiveness according to prior management and sanitation practices on the farm. Under unsanitary conditions, even the most effective drugs can be overwhelmed. Resistant disease organisms may also develop on a farm after misuse of one drug over a period of years.

Coccidiosis

This internal parasite affects the digestive tract of quail. When the lining of the intestines is invaded, the birds go off feed, become weak-legged, pale, and can die if not treated.

Coccidiosis normally attacks birds at the age of 2-6 weeks and birds that are on litter or ground environment. Older birds usually are more resistant to the problem even if immunity has not fully developed. And if they do contract coccidiosis, it is not as severe as in younger birds.

Preventing coccidiosis from becoming a problem is basically a management job. Wet litter and buildup of droppings around waterers and feeders is a common source of overwhelming infections. Wire sections made to hold feeders and waterers aid greatly in prevention.

All litter- and ground-reared birds are exposed to coccidiosis; however, quail will develop immunity to the problem. Whether or not the birds get sick from exposure is directly related to the sanitary condition of the pen. Where conditions are clean, the exposure is less severe and the birds develop immunity without getting a clinical case of coccidiosis. Unsanitary conditions often result in clinical cases that are treated at high medication cost and loss of birds.

Some feed companies put a drug in the feed to prevent coccidiosis (commonly called a coccidiostat). The coccidiostat is designed for use under good sanitary conditions. It is designed also to allow birds limited exposure to coccidiosis so they will develop immunity without becoming overwhelmed and getting sick.

The idea is to develop immunity early, without a clinical case or loss of birds. Whether you are successful in accomplishing this on your farm depends greatly on your sanitation program.

Histomoniasis (Blackhead)

Histomoniasis is a protozoan disease of fowl that causes high mortality in game birds. The causative organism enters the bird's body in the egg of a common intestinal parasite called the cecal worm. After entering the bird, the protozoa relocate to the liver where they produce necrotic lesions and liver damage.

Typical symptoms include listlessness, drooping wings, loss of appetite, yellowish, sulfur-colored droppings and high mortality. In flocks with multiple species of birds, some species are more severely affected while other species appear immune to the disease. Turkeys and quail are greatly affected but chickens are more resistant to the histomoniasis. Chickens can act as carriers. Therefore, it is recommended that you avoid mixing species of birds within your flock.

Upon necropsy, cecal pouches have thickened walls and contain hard cores of yellow, green or gray material. Cecal worms may be present in the cecae. Lesions on the liver appear as irregular round, depressed, sunken areas. These areas vary in size but are often 1 - 2 centimeters in diameter.

No medication is presently approved in the U.S. for treatment of the disease. Nitarsone (Histostat) and dimetridazole (Emtryl) have been shown to be very effective against the disease and may still be available in some areas. The most effective method for solving the problem is the elimination of cecal worm infections that allow entry of the protozoan agent. Maintain single species flocks, reduce insect and earthworm populations, and use recommended wormers regularly to reduce infestations of the cecal worms.

Capillary Worms (*Capillaria spp.*)

Worms that affect the quail by entering the layers of tissue of the crop are called crop worms, capillary worms, threadworms, and even stronger names by producers plagued with the infestation. At the diagnostic laboratory they are referred to as capillary worms.

Capillary worms are not usually noticed with the unaided eye; however, if you remove the crop from an infected bird and tear it, you can see tiny threadlike worms span across the tissue fragments.

Capillary worms accumulate on premises over a period of time and result in high mortality. They cause a thickening of the crop wall. The birds give the appearance of starvation and in the final stages gasp as if having difficulty breathing.

The problem can be controlled or prevented by the following management practices and using an effective wormer on a regular schedule:

- **Raise all meat birds on wire. The worm eggs are picked up out of the ground and droppings. When on wire, birds are unable to pick them up. Floor- and ground-reared birds are subject to infestation. By complete cleanout of sand, litter, etc., prevention is possible. Most growers do not clean thoroughly enough, and eventually a buildup of the worms results. Wire racks under feeders and waterers 3 to 6 inches off the ground help birds avoid contact with droppings. Clean out regularly under these racks.**
- **Raise all birds on wire, even those for hunting preserves. Place these birds on the ground only when you put them in the flight pen for conditioning. Have more than one flight pen and rotate their use. Plow the ground deeply and often when not in use. Have flight pens on well-drained soil.**

FEEDING BOBWHITE QUAIL

Provide a properly prepared feed. Good commercially prepared game bird feeds are available in most areas. Home mixing is possible but is usually not practical for the volume of feed required. Specific questions on rations, home mixing, etc., should be directed to local county agents or to Extension poultry specialists at Mississippi State University.

***Breeders* - Feed a game bird breeder feed at least 1 month before normal egg production season and continue throughout the breeding season.**

***Chicks* - Feed a game bird starter feed from day old to 6 weeks. Allow free-choice feeding.**

***Release Birds* - Feed a game bird developer from 6 weeks to maturity. The ideal feed contains high levels of protein components that promote the growth of high quality feathers.**

***Meat Birds* - Feed a game bird grower from 6 weeks to slaughter age.**

Feed Consumption Guide by Age

<u>Between Ages of</u>	<u>Total Feed Consumption</u>
1 Day - 8 Weeks	1.3 - 1.5 Lb/Bird
8 Weeks - 16 Weeks	2.5 - 3.0 Lb/Bird

Feed usage varies from farm to farm. Where poor management is practiced, feed is wasted by the careless producer, the birds, and rodents or wild birds.

CANNIBALISM

The most common causes for cannibalism are crowding, lack of feed or water space, lack of or too much heat, and the general cannibalistic nature of wild birds placed in confinement. It is cheaper to prevent cannibalism than to control it after it starts. To prevent cannibalism -

- Brood quail chicks in subdued light. Just enough light to find feed and water is all that is necessary. Using colored bulbs in brooders helps eliminate cannibalism.
- Debeak at 6 weeks of age when the birds are moved to grow-out pens. Remove one-third of upper beak. Pecking is worse in summer than winter.
- Do not overcrowd. You are asking for trouble when you overcrowd the birds, not only from cannibalism but from the probability of disease outbreak.
- Provide abundant feed and water space. Extra feeders and waterers are cheap compared to the problems created by the shortage of either. Place feed and water so that they are easily accessible to all birds. Feeding a dusty, powdery feed that collects on the birds' toes and beaks promotes cannibalism.
- Place only uniform sized birds together.
- Immediately remove dead and injured birds. Several visits a day to the pens pays off. Watch for beak and toe picking; debeak if a problem. Isolate injured birds until recovered.
- Properly adjust the brooder temperature. Being too hot or too cold can trigger cannibalism or other problems.
- Providing cover in the pens is important. A place to hide or get away helps prevent cannibalism. Distribute pine tops or other cover evenly throughout the pens.
- Move birds only during the cooler times of day, early morning or late afternoon. Whenever practical, move only during favorable weather conditions. Stresses from heat and unfavorable weather can trigger cannibalism.
- Debeaking or removing part of the beak is often necessary and is routinely practiced by many producers. See methods of debeaking discussed elsewhere in this publication.

Do not underestimate the importance of controlling cannibalism. Not only are birds killed directly but bare backs and defeathering can lead to chilling and respiratory problems. Nonfatal vent pecking sets up infections that kill birds (commonly called blow-outs in hens).

FEATHERING

Bobwhite quail raised on floor, litter, or ground environment feather more naturally than birds raised on wire. There is an increased risk of capillary worms (threadworms, crop worms), ulcerative enteritis (quail disease), and histomoniasis. All of these are much more readily transmitted through floor, litter, and ground environments. The infections are increased when birds peck into litter and droppings.

By rearing on wire, you greatly reduce these problems. Birds for the meat market need never be placed on anything other than wire since feathering is of little importance for meat-purpose birds.

Birds designated for hunting preserves and for restocking must be properly feathered, as wild birds should. Rear birds on wire with dusting boxes in the pens until the birds are moved to the flight pen. Move birds into flight pens at least 4 weeks before release for hunting or restocking. If the dusting boxes do not produce desired feathering, the birds can still feather out nicely and become acclimated to ground conditions and problems. If you overcrowd your flight pens, however, you can end up with bob-tailed birds caused by pecking and pulling of feathers.

HANDLING QUAIL

Quail are subject to injury at any time during confinement. Injury causes loss of production, unsellable birds, and it often triggers cannibalism. Use transfer boxes that have padded ceilings and are only 6-7 inches deep. Provide plenty of air holes but be sure they're small enough to eliminate most of the light. This dimness gives the quail the sense of being hidden. Driving quail into transfer boxes is preferred to catching them.

Where catching is necessary, a minnow net is satisfactory as long as you use it for catching rather than batting.

When handling the individual bird, grasp it with its neck between your first and second fingers and with thumb and remaining fingers enclosing the body as much as possible. This method prevents the wings fluttering and allows the legs to hang free.

Never hold a quail by a leg, wing, or head. Do not handle quail unless absolutely necessary.

RELEASING QUAIL

Locating a suitable area for release is important, the main considerations being cover, food, and water availability.

There is no precise rule or combination of factors that prescribe what, when, and where birds are to be released. Good results are generally experienced by releasing flight-conditioned birds as soon as they attain adult size and weight but no earlier than October 1. Highest recovery rate is experienced when releases are made during the shooting season.

No techniques have been devised to duplicate the sportiness of a wild bobwhite quail. The best that to hope for is a bird that does not hesitate to fly and survives long enough after release to contribute to a reasonable recovery rate.

Contact your local county agent and soil conservation personnel for advice. If you do not have suitable release areas, they can advise you on how to provide it. Again, plan ahead for best results. Once you have a suitable area for release, plan to release early in the morning so the birds have sufficient light to become familiar with the area.

One method of transporting birds to the release area is in a cardboard box. Place the transporting container in the cover where birds are to be released. Open one end so only one or two birds at a time can walk out. Do not frighten the birds and cause them to scatter wild; allow the quail to come out voluntarily.

Return after the birds are free and remove the box. Feeding the same feed in the same feeders as you used before release is recommended in situations where supplemental feeders are employed in a release-shooting program. Birds that are not harvested immediately by hunters would thus be expected to survive longer. Usually 15-20 birds per covey are released for hunting purposes during hunting season.

AGENCIES AND ORGANIZATIONS

The agencies and organizations listed here may be of service to you with your quail-rearing project.

Mississippi State University Extension Service
Poultry Science Department
Box 9665
Mississippi State, MS 39762
662/325-3416

Mississippi State University Diagnostic Laboratory
College of Veterinary Medicine
Wise Center
Mississippi State, MS 39762
662/325-1330

Mississippi Board of Animal Health
Diagnostic Laboratory
2531 N. West Street
Jackson, MS 39216
601/354-6089

Mississippi Wildlife, Fisheries and Parks
2906 North State Street
Jackson, MS 39216
601/362-9212

Mississippi Game Bird Association
Contact Person: Betty Roberts
P.O. Box 40
Mt. Olive, MS 39119
601/832-3353

North American Gamebird Association
1214 Brooks Avenue
Raleigh, NC 27607
919/ 515-5403

Every producer of bobwhite quail should subscribe to game bird publications, read available bulletins and publications related to care and management of quail, and be broad-minded enough to make changes and progress with the industry.

"The game bird industry is going to continue to grow. If you expect to be a part of the growth, you must continually educate yourself on game birds, be a cooperative and active member of your state game bird organizations, and be a good manager of your business."

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