

Commercial

Ostrich Production

The economic value of the ostrich is dependent upon the meat, hide, and feathers. Once the slaughter and postslaughter markets are established, the farming of ostrich may become a successful alternative agriculture business.

Successful large-scale production depends on implementing scientifically proven practices in management and husbandry, breeding, brooding and rearing, nutrition, health maintenance and, above all, hatchery management and incubation. Maximum utilization of quality forage will likely be necessary to make production economically feasible.

North Carolina Cooperative
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Getting Started

- ❑ Buy eggs and hatch chicks — requires the least capital initially, provided eggs can be obtained at reasonable cost. However, production is at least 2 years away.
- ❑ Buy started, sexed chicks (8 weeks or older) — reduces problems involved in hatching and early brooding but will, of course, be more expensive than eggs. Again, production is at least 2 years away.
- ❑ Buy juveniles (year-old-birds) — offers the opportunity to select quality birds within a year of sexual maturity.
- ❑ Buy proven breeders — the expensive route, but enables the producer to begin production immediately.
- ❑ Any combination of the above.

When buying breeding stock, producers should avoid potential in-breeding problems. Avoid purchasing cull stock and non-breeders. Obtain only guaranteed breeders from reliable sources. Be realistic on price. In North Carolina, the prices of chicks, juveniles, and adults are highly variable. Before one attempts such an undertaking, it is highly recommended that marketing informa-

tion for ostrich products should be investigated. This information can be obtained by contacting:

- ❑ The Ostrich News
P.O. Box 860
Cache, OK 73527
(405) 429-3765
- ❑ North Carolina Ostrich
Breeders Association
(919) 783-4121

Methods for raising ostriches vary, and no two ostrich farms are alike, so it is difficult to predict production costs. Accurate expenses and profits can only be predicted by the feed costs, and the market value of ostrich products, egg, or birds within your market area. It costs about \$200 per month to feed and maintain one adult breeding pair.

One thing to remember in evaluating start-up costs of an ostrich farm is that the cost will be amortized over the life of the operation. This will reduce the cost per bird or egg over the operation's lifespan.

Nutrition

Nutrition related mortality problems in chicks and young juveniles include malnutrition or starvation, intestinal obstruction, and leg abnormalities, and misinformation abounds.

It is absolutely essential that ostriches have clean water available at all times. They must receive feedstuffs that provide adequate levels of protein and essential amino acids, and meet vitamin, mineral, and energy requirements.

The following program is practical and has provided excellent results in rearing ostrich chicks. When chicks are 24 to 48 hours old they should be started on a good quality ratite starter ration containing at least 22 percent protein. These rations are formulated to provide all nutrients necessary for optimum growth and health during the first 2 weeks of life.

Fresh foods, including chopped lettuce, kale, and spinach, are low in energy and protein and are not needed by chicks. Some greens, such as spinach and chard, contain oxalic acid, which can inhibit the absorption and use of calcium and contribute to leg abnormalities. High fiber foods can cause intestinal obstructions in young chicks and result in "starveout" deaths. Raw bone (often fed for mineral content) can easily cause health problems and should never be fed to ostriches.

NEVER feed any feedstuff that is moldy, musty, or suspect in any way. Botulism or intestinal problems can occur.

Chicks should receive continuous light and have access to the starter ration at all times during the first 3 weeks. After that, they can be fed all they will consume in two short (20 minutes) daily feeding periods. Good quality small alfalfa pellets should be available to chicks on a continuous basis when twice daily feeding of the starter ration commences. Chicks may also be given oyster shell or grit at this time. Supplementing the high protein starter ration with alfalfa will ensure that chicks consume adequate levels of essential nutrients while minimizing excessive weight gain which may contribute to leg weakness problems. Night lights are not required after chicks reach 3 weeks of age.

Waterers should be rinsed daily and scrubbed every 3 days with a mild disinfectant. Inexpensive, water soluble vitamins and electrolytes for poultry should be added (at the recommended level) to the drinking water for the first 1 to 3 weeks. The fat soluble vitamins — A, D3, E, and K — are compounded with a starch or protein emulsifier to enhance dispersion and availability in water. This will ensure an adequate intake of vitamins, particularly A and D3. Other additives are not needed.

Refusal to eat and drink is a common problem with young ostrich chicks. This problem can be easily allevi-

ated by placing several older chicks (1 to 3 weeks of age) that are already eating with the younger chicks. If older chicks are not available, domestic poultry chicks can be placed with new-hatched ostrich chicks to teach them to eat and drink.

At 9 weeks of age chicks can be placed on a good quality ratite, game bird, or turkey grower ration and fed what they will eat in two daily feeding periods. Continue to offer alfalfa pellets as a supplemental feed unless good quality forage is available. Juveniles can be maintained on this program until they reach sexual maturity. Breeder rations contain a high calcium level and should not be fed to juveniles. Suggested diets for ostriches are shown in Table 1.

Adults and older juveniles can be ranged on well drained, succulent pasture plots or they can be maintained under dry-lot conditions. Pastured birds should be maintained on small plots and rotated periodically for optimum grazing efficiency. Birds on large acreage may become semi-wild and difficult to manage.

Succulent forages, such as irrigated alfalfa, wheat, rye, vetch, oats, or Bermuda grass, are desirable for juveniles and adults and will reduce production costs significantly. Some forages may be too tough or high in fiber or too low in protein and energy to provide the nutrient level required for desired growth performance.

If ostriches are allowed to forage on natural grasses or grain, try to balance this nutrient intake with the amount of commercial feed that is fed.

Breeding birds on pasture should receive daily supplements of a good quality, high protein ratite, turkey, or game bird breeder ration to ensure optimum egg production, fertility, and hatchability. Breeders in dry-lot confinement also should be fed the ratite or turkey or game bird breeder ration, with continuous supplemental feeding of good quality alfalfa pellets or cubes of hay. Pellets or cubes are less wasteful and easier to feed than hay.

Ostriches should not be allowed to become overweight. Excess fat is detrimental to egg production by breeders and to meat quality of birds that are to be slaughtered.

Breeders should have access to oyster shell, grit, or commercially prepared bone meal during the breeding period. The addition of poultry vitamins and electrolytes to the feed or water may improve fertility and hatchability.

Table 1. Nutritional Guidelines for Ostriches

Calculated Analysis	Starter 0 to 9 wk	Grower 9 to 42 wk	Finisher (42 wk to Mkt Wt)	Breeder (4 - 5 wk before egg production)
ME (Kg/lb)	1220	1115	1045	1045
Protein (%)	22	19	16	20 to 21
Lysine (%)	.90	.85	.75	1.00
Methionine (%)	.37	.37	.35	.38
Calcium (%)	1.5	1.2	1.2	2.4 to 3.5
Crude Fiber (%)	6 to 8	9 to 11	12 to 14	12 to 14
Available Phos. (%)	.75	.6	.6	.7

Breeder Flock Management

Well-nourished ostrich hens begin laying at approximately 2 years of age and are reported to have a productive life of more than 30 years. Egg production is variable but can exceed 70 eggs per year. Production begins in early spring and continues into the fall. Healthy hens may lay throughout most of the year--particularly if they are placed on an appropriate lighting program.

The reproductive performance of birds is regulated by the length of daylight per day. Lighting programs generally use a combination of natural daylight and artificial light to stimulate and maintain egg production and fertility in breeder birds. Time clocks should be used with artificial light sources to control daylength consistently.

Juvenile hens and cocks should be reared separately from 1 year of age to sexual maturity. Mature hens and cocks should be separated after the breeding season. This will allow the birds to be more rested, and they will begin egg production more readily when placed together for the breeding season.

Eggs are usually infertile during the early part of the breeding season. This is usually caused by infertility in the cock. Breeding cocks should receive 16 hours of light per day beginning 3 to 4 weeks before being penned with their hens. After being placed together, hens and cocks should receive 16 hours of light per day during the entire breeding season. Another method is to determine the longest natural daylength of the year and set the time clock to match this daylength. After natural sunset, 2 to 5 footcandles of artificial light intensity at head height should be adequate to stimulate and

maintain egg production. Two footcandles is actually very dim light. If you held this document at arm's length under two footcandles of light, you should barely be able to read it. Daylength must NEVER be shortened and light intensity must NEVER be decreased during the laying cycle. Three or four days of diminished light or shortened daylengths may cause the entire flock to completely stop egg production.

The breeding pen for a breeding pair should be 1 to 3 acres in size and well drained. Birds in larger

enclosures are more difficult to manage. Eggs also will be more difficult to find and collect. Ideally, there should be a 6- to 8-foot-wide lane between pens to prevent fighting between cocks. A few trees or shrubs in the pens will provide privacy and help induce mating.

Eggs are normally laid in a shallow scrape. They should be collected twice daily. Reproductively active cocks can be extremely protective and aggressive. Caution should be taken when entering their breeding areas. Aggressive cocks can be fed and penned in a catch or holding pen while eggs are collected. Keep in mind that an adult cock may stand 8 feet tall and weigh over 350 pounds. The ostrich is a very fast runner with strides of 16 to 23 feet in length.

Hatchery Management

Hatchery management is critical for successful hatchability. Hatchability problems can be caused by inadequate breeder nutrition, mating problems, improper egg handling, incubator or hatcher malfunctions, and humidity or temperature problems.

Successful management of a moderate size hatchery requires a high degree of expertise and attention to detail. Cleanliness is very important. The environmentally controlled hatchery building should be designed for durability and ease of cleaning. It should be of sufficient size to handle anticipated egg volume and must include areas for egg cleaning and culling, egg trays, cooling and storage, incubation and hatching, chick holding, equipment washing, and storage, as well as office and sanitary facilities. Equipment requirements for the hatchery include a standby generator, forced draft

incubators and hatchers, service tables, a vacuum for cleaning, pressure washer, tray washers, and carts. Incubators and hatchers that can be used for ostrich eggs are manufactured and sold by several commercial companies.

Incubation Requirements

Ostrich eggs should be stored large end up at a room temperature of 65 to 70 degrees F. During this holding time, the egg should be rotated twice a day. Better hatchability may occur if eggs are set (placed in the incubator) within 2 to 4 days after lay. Longer storage will reduce hatchability. Never set an excessively dirty egg. Manure or dirt should be gently scraped off or lightly sanded with a fine grit sandpaper. It is generally not advisable to wash eggs unless absolutely necessary. Only in extreme situations should eggs become wet during the cleaning process. Dirty eggs can be flushed with commercially available 3 percent hydrogen peroxide. If eggs are to be wet, the wash water and rinse water must be at least 10 degrees F warmer than the eggs. There should also be an individual towel for each egg and towels should not be reused. Disinfectants should not be used. The use of disinfectants in the cleaning solution can alter the egg shell cuticle and affect the rate of water loss during incubation, thus possibly adversely affecting chick quality and hatch time.

Incubation time to hatch for ostrich chicks is between 39 and 44 days with an average of 42 days. The optimum incubation conditions for the ostrich range from 97.0 to 98.4 degrees F dry bulb temperature with a relative humidity in the 20 to 30 percent range (wet bulb 67 to 73 degrees F). The optimal incubator humidity for ostrich eggs is 25 percent to allow a 15 percent loss of initial egg mass during a 45-day incubation period. The higher the dry bulb temperature the lower relative humidity needs to be. For instance, at a dry bulb temperature of 98.3 degrees F it is estimated that the relative humidity needs to be as low as 20 percent (wet bulb 68 degrees F), whereas at an incubation temperature of 97.5 degrees F the relative humidity may need to be as much as 30 percent (wet bulb 72 degrees F). It should be remembered that the higher the incubation dry bulb temperature, the more water is produced in the egg, thus creating the need for a lower incubation humidity to remove that water from the eggs. Individual hatchery incubation requirements depend on the lowest wet bulb temperature that can be maintained in the

setter room when the air conditioners are set on 100 percent fresh air. This will determine the lowest operating humidity of the incubators.

It is recommended that eggs be transferred no earlier than internal pipping (when a chick pips into the air cell internally). This can be confirmed by candling. When this procedure is followed, hatch time can be more accurately predicted. If the relative humidity in the hatcher cannot be controlled, the embryo should be allowed to externally pip before moving to the hatcher. It is suggested that the hatcher be maintained at the same relative humidity as the incubator at least until external pipping has occurred. This will allow the egg to lose the water necessary to get the proper oxygen intake during this very critical period of embryo development. During the final stages of the hatching process and after external pipping, a relative humidity of 30 to 40 percent is recommended. It is also suggested that the hatcher dry bulb temperature be run at 0.5 degrees F higher than the incubator temperature since the hatcher will routinely have fewer eggs than the incubator.

A chick that is dry, up, and moving about is ready to be removed from the hatcher. On the average, the holding time after hatch should be about 12 hours. Chicks that are in the hatcher for too long can become dehydrated.

Brooding

Ostrich producers often experience high mortality in chicks and young juveniles as the result of improper brooding and poor early management practices. The following recommendations, when implemented and carefully followed, will significantly improve livability and quality of both chicks and juveniles. Caretakers must be trained and properly supervised to maintain desired conditions and to recognize and correct problems.

The brooding facility must be designed to protect chicks from predators (dogs, foxes, etc.) as well as from inclement weather. Chicks should NEVER be allowed to get soaking wet. Their facility must be kept dry and sanitary at all times and should be designed for effective ventilation and ease in cleaning. Concrete floors make brooding units easy to clean.

Temperature at chick level should be 88 to 92 degrees F during the first 10 days of life, then 80 to 85 degrees F until the chicks are 3 weeks of age. From 3 through 8 weeks the ideal temperature is between 70 and 80 degrees F. Chicks must never be exposed to

chilling temperatures nor allowed to become overheated. Chicks brooded in small pens with raised wire floors and heated with infrared heat lamps are particularly susceptible to chilling in cool weather. Warm room brooding (uniform temperature throughout the room) will prevent this problem. Space heaters or central heating is recommended.

If chicks are placed on litter material such as wood shaving, rice hulls, or washed builder's sand, the litter should be covered with burlap for the first 7 to 10 days to keep chicks from eating litter and developing intestinal obstruction problems. After the burlap is removed, the litter or sand should be stirred daily to stimulate drying and prevent packing. Slick surfaces cause spraddle legs, which is always fatal. NEVER cover litter with newspaper, cardboard, plastic, or other slick material or place chicks on such materials.

If ostriches are allowed to forage on natural grasses or grain, try to balance this nutrient intake with the amount of commercial feed that is fed. Ostriches should not be allowed to become overweight. Excess fat is detrimental to egg production by breeders and to meat quality of birds that are to be slaughtered.

At 6 to 8 weeks of age, chicks can be ranged outside in good weather, but they must be sheltered at night. They can be managed in groups of 25 to 50 birds. Young ostriches will swallow anything. Pens must be well drained, clean, and free of coarse, dry vegetation, pebbles, small rocks, wire, staples, and other debris that may cause intestinal obstruction or death, if consumed. Clean up all spilled feed. Again, NEVER allow ostriches access to moldy, wet, or spoiled feed.

By 4 months of age, chicks are fairly hardy and can be ranged outside with less danger of intestinal obstruction problems. Shelter and shade must be available to protect both birds and feed during inclement weather and at night.

Ostriches are hardy animals that readily adapt to a variety of climatic conditions. Performance should be satisfactory in throughout North Carolina, provided adequate shelter is available in pasture plots and pens to protect adults and older juveniles from extreme conditions, such as snow, ice, heavy winds, cold rain, and sleet. In summer, shade must be available. Chicks and juveniles younger than 1 year must, of course, be well protected against bad weather.

The shelter should be designed so that birds must enter through a confinement pen. This makes it easier to catch them. Feed and water should be located inside shelters in order to condition birds to enter the shelters

freely, as well as to protect feed from the weather. Feeders should be positioned so that caretakers can fill them without being exposed to aggressive males. Both feeders and waterers should be the open type and should be adjustable so that they can be kept at chest height of the birds.

Fences for older juveniles and adults should be at least 5 feet high and constructed of 5 to 7 strands of smooth, barbless wire. The bottom wire should be high enough above the ground so that the caretaker can escape from aggressive cocks. Mesh wire is sometimes used for outside fencing to keep out predators, but it should not be used in pens because the birds can injure themselves on it. Fence posts should be on the outside of pen areas.

Loading chutes and catch pens should be at least 8 feet high and of solid construction to prevent frightened birds from seeing beyond the pen and attempting to escape by jumping or climbing out.

Tame, gentle ostriches are much easier to handle and less prone to injury than non-gentle, semi-wild birds. Spend time with chicks and young juveniles to tame them. Move gently among the birds, taking care to avoid frightening them. Daily hand-feeding of tidbits to juveniles is recommended. Ostriches can be trained to follow but are difficult to drive. Teaching young ostriches to follow by trailing pellets, lettuce, etc., will make handling easier as they mature.

In chicks and young juveniles, there is little difference between the sexes. Early sex determination is difficult, but can often be made by examining the sex organs. The penis of the cock is slightly larger than the hen's clitoris, although both are very similar in appearance. At about 9 months of age, sex determination becomes easy when the penis emerges during urination.

Chicks can be tattooed, branded, or microchipped at 1 day of age. The brand can be placed on the bare patch of the belly immediately behind the thigh. A thin wire can be formed into the identifying numerals or letters, heated red-hot, and touched to the skin to create a permanent mark. Leg and wing bands also can be used for identification, but these may create health problems.

Health

Mortality and health problems diagnosed mainly in chicks and juveniles include starvation and malnutrition, intestinal obstruction, leg abnormalities, and coliform infections. Causes include improper brooding or nutrition, stress, improper handling, and genetics.

Diagnoses in a variety of areas in the United States have confirmed rhinitis, candidiasis, Salmonella, aspergillosis, and coccidiosis infections. Parasites identified include lice and ascarids.

Ostrich diseases and parasites reported in Africa include anthrax, tape worm, wire worm, nematodes, ophthalmia, lice, and ticks. While none of these has proven to be a problem in the United States, it is possible that imported ostriches may bring them in and create future problems.

Professional assistance should be obtained promptly when a health problem is suspected. Indiscriminate use of medications can create problems and should be avoided.

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