Texas Cooperative EXTENSION
The Texas A&M University System

L-5431
12-00

How to Produce

Broilers and Roasters for Show

Fred D. Thornberry
Professor and Extension Poultry Specialist
The Texas A&M University System

A Successful Exhibitor Must

1. OBSERVE ALL SHOW RULES AND REGULATIONS governing the purchasing and showing of broilers and roasters. Many shows now allow the exhibition of both pullets and cockerals.
2. Purchase Pullorum-Typhoid clean meat strain chicks.
3. Use top-quality feeds.
4. Follow recommended management practices during the entire brooding and growing period.
5. Keep careful records of all expenses and receipts.
6. Cull birds closely and select the show entry properly.

Broiler projects are popular with 4-H and FFA members and are an integral part of most youth livestock shows. Roaster projects (broilers 10 to 14 weeks of age) are also popular. Both projects are especially suitable for youngsters with limited space. Most shows limit the number of chicks ordered to 25 or 50 per exhibitor.

When planning to start a project, contact the county Extension office, a 4-H leader or an agricultural science instructor. Birds not shown can be slaughtered for home use or sold locally to special markets.

Housing

Expensive housing and equipment are not necessary. However, a clean, dry structure that can be well ventilated, a brooder or heat lamps to warm the chicks, and feeding and watering equipment are needed. Provide at least 2 square feet of floor space per broiler. Openings on three sides of the building provide plenty of fresh air for the birds. Plastic sheeting can be used to close sides during brooding and in cold weather. Make certain the concrete or dirt floor is at least 6 inches above ground level to prevent flooding. The roof overhang should be sufficient to effectively protect against blowing rain.

Preparation and Brooding

Clean and disinfect the poultry house, feeders and waterers at least two weeks before the chicks arrive. Wash the house down with soap and water. Then spray a commercial disinfectant labeled for use in poultry houses.

Be prepared for the chicks 2 days in advance. Put at least 4 inches of litter on the floor of the cleaned, disinfected house. Wood shavings, cane fiber, coarse

A typical building used for growing broilers or roasters for a youth project.

Stir the litter daily to prevent packing. Damp or caked litter will cause health problems and affect bird performance.

dry sawdust, peanut hulls or rice hulls make good litter. Hay makes very poor litter. Keep all sticks, boards and sharp objects away from the broiler house.

Construct a cardboard brooder guard (brooder circle) to keep chicks near heat, water and feed. The brooder guard should be 14 to 18 inches high and must be a minimum of 5 feet in diameter for 50 chicks. When chicks are 7 days old, remove the guard and allow them full freedom of the pen.

Electric heat lamps (infrared bulbs) are good heat sources for brooding chicks. Two 125-watt bulbs per 50 chicks are recommended. Make certain lamps are secured so they cannot fall to the litter and create a fire hazard. The lamps should hang so that the bottoms are 18 to 24 inches from the litter. Lamps can be raised or lowered depending on temperature conditions. Place waterers a good distance from the lamps to prevent splashing water from cracking the hot bulbs.

If a gas or an electric hover-type brooder is used, it should operate at a temperature of approximately 92 degrees to 95 degrees F. Gradually reduce the temperature 5 degrees each week until the birds are 3 to 4 weeks old or until the house temperature reaches 70 degrees F.

When chicks are comfortable, they will bed down in a semicircle around the perimeter of the heat zone. If cold, chicks will crowd near the heat source. If too warm, they will move to the outer limits of the brooder guard.

Chilling can stunt chicks. In cold weather the heat source should be turned on 48 hours before chicks arrive to adequately heat the litter.

Rearing

After birds reach 4 weeks of age, the ideal temperature range is 60 to 75 degrees F.

When winter temperatures permit, the house should be partially opened to improve airflow and remove moisture. Supplemental heat may be needed when the outside temperture is low.

In hot weather, fans or evaporative coolers are used to cool birds more than 4 weeks old.

Lighting

Provide all-night light for broilers and roasters. Twenty-four-hour lighting (natural and artificial) improves feathering and increases weight, especially during the summer months. Hang a 40-watt bulb at least 6 feet above birds after removing heat lamps.

Feeding

Optimum performance is dependent on proper nutrition. The feed dealer should be informed of the type of feed required at least 2 weeks before chicks arrive so that fresh feed can be ordered. It is absolutely essential that birds receive a high-quality poultry

Water, feed and a heat source are all essential in getting chicks off to a good start.

feed containing at least 20 percent protein. Lower protein feeds will not do the job. Some exhibitors start chicks on a high-protein (26 to 30 percent) turkey or game bird starter to stimulate additional growth. Feed the higher protein feed for 2 weeks. Switch to a broiler feed for the remaining feeding period.

Small amounts of broiler feed lightly moistened with cooking oil and fed several times during the day will stimulate older birds to eat more and increase growth. This supplemental feeding practice can be particularly helpful in hot weather with birds more than 4 weeks of age. Caution: Do not put out more moistened feed than the birds can eat in 10 to 15 minutes. Do not moisten the feed until feeding time. Be certain all birds can eat at the same time.

An adequate level of vitamins in the diet is required to prevent leg weakness. Adequate vitamin intake can be ensured and leg problems minimized by adding water soluble poultry vitamins to drinking water at the manufacturer's recommended level for the first 7 days. Do not add vitamins past this period. Continued high levels can create health problems.

All birds should be able to eat at once. One pie or cookie pan for feed and one chick waterer per 25 chicks are needed the first 7 days. For the first 4 weeks, one tube-type feeder per 25 birds is required. After 4 weeks, one tube-type feeder is needed for every 15 birds. Clean, fresh water must be available at all times. One 2-gallon waterer per 50 chicks is required for the first 4 weeks. One 2-gallon waterer per pen is required after birds are culled at the end of the fourth week. Waterers should be rinsed daily and scrubbed twice weekly.

Feed must be kept before birds at all times if maximum growth is to be attained. Tube feeders are recommended because they hold an ample supply of feed, can be adjusted easily as birds grow and are less likely to cause bruises than horizontal trough feeders. Feeders and waterers should be kept adjusted so that the trough portion is level with the back height of the birds.

Broilers and roasters respond to attention. Walk among birds and stir feed three to five times per day. This will provide exercise and increase feed consumption and growth.

Feather Picking and Cannibalism

Snub the top beaks of birds if feather picking or cannibalism starts. Trim one-third of the upper beak with an electric beak snubber. Vicks® salve or an anti-peck compound applied to the bloody pecked spots will usually stop cannibalism if snubbing is not feasible.

Handle birds carefully. Keep feeders and waterers level with the back height of the birds.

Bird Health

Keep all other poultry away from broilers and roasters. Medication should not be given unless birds are sick or stressed.

Chicks purchased from late August to early November should be vaccinated for fowl pox by 14 days of age.

Parasites are seldom a problem where birds are properly managed and sanitary conditions maintained.

Culling

Birds should be rigidly culled to optimize performance. Small, sick, stunted or deformed birds should be removed when detected. Reduce flock size at 4 weeks of age by removing the smaller and poorer fleshed birds. Keep two or three birds for each one to be shown. Fleshing, uniformity and finish will be improved by the increase in floor and feeder space and the reduction in social pressure. Trim nails to help prevent carcass damage. Leg band the birds kept for easy identification when selecting the show pen.

Selecting the Exhibition Entry

At show time examine birds carefully for physical defects that would cause them to be sifted. These include:

- Cuts and tears
- Broken and disjonted bones
- Skin or flesh bruises anywhere other than on the wing tip

- Breast blisters
- Insect bites
- External parasites (lice, mites or fleas)
- Extremely dirty birds

The following factors must be carefully considered when selecting the show entry.

A. **Conformation** (describes the skeletal system or shape of the bird)

Length. The breastbone should be long, straight, free from defects such as dents or knobs and carry well forward and back between the legs. The breastbone should be parallel to the backbone.

Width. The back should be long and wide with a broad spring of ribs.

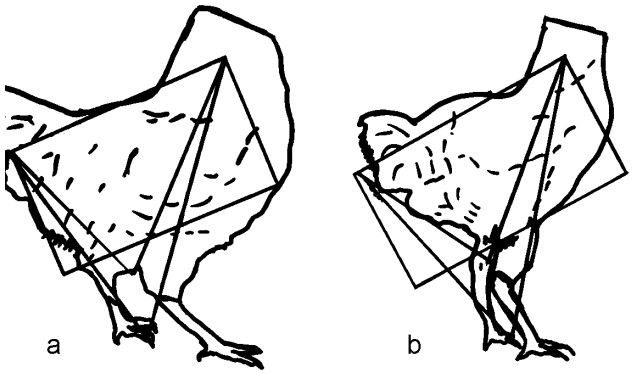
Depth. The body should be full and deep. Body depth must be consistent with breast width. Length, width and depth should be well balanced.

B. **Fleshing** (the amount and distribution of muscle or flesh on the bird)

The breast, thighs and drumsticks carry the bulk of the meat and should be examined closely.

The breast meat is the most valued part of a bird and should be given maximum consideration. The breast muscle should be wide throughout the length of the keel bone. The muscle should carry well up to the crest of the bone. A dimpled breast is desirable.

The thighs and drumsticks should be heavily muscled.



A bird of normal development (a) has a more rectangular shape than a bird of low vitality. A bird whose body is more triangular (b) is less desirable.

C. **Uniformity**

Each broiler should be as near a carbon copy of its pen mates as possible in size, shape, fleshing and finish. If one bird has a defect, it will affect the rating of the entire pen.

Uniformity is not a factor with roaster entries unless pens of two or three birds are shown.

D. **Finish** (amount of fat in and immediately under the skin)

Finish is usually adequate on well-fleshed birds. Without an adequate finish, a well-fleshed broiler will lose a great deal of eye appeal. The fat deposition between feather tracts on the side of the breast is the best indication of finish. Do not confuse finish and pigmentation (skin color).

E. **Skin Pigmentation**

Skin pigmentation results from the deposition of yellow or yellow-orange pigments in the outer skin layer. It is not an indication of finish. Only minor emphasis should be placed on pigmentation.

Handling and Transportation

Record leg bands of birds selected for show. Put selected birds back in the pen with the remaining birds until you transport them to the show.

Properly reared birds usually are reasonably clean. Washing is not recommended.

Large cardboard boxes are ideal carriers. Never place more than four broilers or two roasters in a box when transporting them to a show. Do not crowd. Put 4 inches of litter in the container so breasts will not bruise or become reddened. Be certain to cut adequate air holes in the sides. Avoid bruising birds while putting them in or taking them out of the container. Above all, do not drop the container.

Important: Check birds carefully for bruises one final time before presenting them to the sifter.

Precautions

1. Feed quality feed.
2. Cull closely and provide adequate floor and feeder space.
3. Maintain a comfortable temperature range.
4. Never allow birds to be without feed and water.
5. Do not exceed vitamin recommendations.
6. Keep litter in good condition.
7. Provide supplemental feed in the correct manner.
8. Obtain prompt assistance if health problems occur.
9. Ventilate properly.
10. Review this publication weekly and closely follow suggestions.

Family Safety

Public health agency investigations have implicated improper handling of poultry with occasional outbreaks of disease in humans. Protect your family from bird-transmitted diseases by following these guidelines:

1. Do not bring live poultry of any age into the home.
2. Always wash your hands thoroughly with soap and water after contact with poultry.
3. Do not allow toddlers to handle poultry.
4. Avoid contact with poultry feces.
5. Wash your hands, counter tops and utensils with hot, soapy water after handling raw poultry. (You may also wish to obtain Extension publication L-5088, "Enjoy Poultry Meat Safely," from the county Extension office. It is also available on the Web at *http://tcebookstore.org*)

Produced by Agricultural Communications, The Texas A&M University System
Extension publications can be found on the Web at: *http://tcebookstore.org*

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Chester P. Fehlis, Director, Texas Cooperative Extension, The Texas A&M University System.
5 M, Revision

L-5159

Texas Agricultural Extension Service
The Texas A&M University System

Nutrition and Feeding of Show Poultry

A. Lee Cartwright
Associate Professor and Extension Poultry Specialist
The Texas A&M University System

The championship potential of a chicken or turkey is determined by genetics. The animal's environment dictates whether this championship potential will be attained. Nutrition is a critical part of a bird's environment, and a good ration is the foundation of chicken and turkey growth.

No matter what a bird is fed,

- **it will only grow as well as you feed it, and**
- **it can not grow beyond its maximal potential.**

There are four important principles in developing an appropriate nutrition program for show broilers and turkeys.

Principle 1: To grow, birds must eat and drink.

Inadequate feed stunts development and prevents birds from growing to their potential. Since birds grow quickly, if their feed consumption decreases for only a few hours their ultimate body size can be significantly diminished.

Several factors can cause birds to eat less than they should. These factors are: feed availability, water availability, feed competition, water competition, environmental temperature and personal attention.

Fresh, clean water and feed must be continuously available to birds from the beginning. Order the proper feed from your farm store before your birds arrive. Make sure birds are able to easily reach water and feed. During the first week, place feed in flat pans so young birds can easily find and eat it. Use chick waterers so that water is easily reached. Later, as birds grow, hanging tube feeders can be used. These feeders refill the feeding trough as birds eat. Keep the height of the feed trough adjusted to the birds' chest height. Make sure feed is deep enough in the trough and that access to the feeder is clear. Provide enough feeder space so that all birds can eat at the same time without being too crowded. The bird should be able to eat without fear of being pecked by another bird or without fear of their combs and beaks contacting other objects.

There is a direct relationship between the amount of water a bird consumes and the amount of feed it will eat. If the water supply is inadequate, birds stop eating.

Temperature also is important. If the room is too warm birds will eat less. So a comfortable temperature for the age of the bird should be maintained. Feed quality also affects consumption. Birds given stale, rancid or moldy feed will stop eating. To keep feed fresh, store it properly away from exposure to heat, moisture and sunlight (sunlight destroys vitamins).

Birds respond to attention. Dragging your finger through the feed in the trough will stimulate them to eat.

Principle 2: To grow well, birds must eat the right things.

Bird feed should contain all nutrients needed to grow muscle, bone, internal organs, fat and feathers. The following table lists the five basic classes of nutrients birds need and the feed ingredients that usually supply them.

Nutrient needed:	Nutrient primarily supplied by:
carbohydrates	corn, sorghum, other grains
proteins	soybean meal, meat products, amino acids (methionine, lysine)
fats	corn oil, blended fat products
minerals	salt, limestone, calcium carbonate, calcium phosphate, trace mineral mix
vitamins	vitamin mix, other ingredients

These ingredients are mixed in different proportions and ground into meal. The feed can be bagged as this meal (sometimes called "mash"), or the mash can be pressed into larger pellets or crumbles. Feed bags have tags with information about the mixture of nutrients supplied by the feed. The tag does not list the proportion of all ingredients, but it does list the percentages of several important nutrients that are good measures of feed quality. An example of what you might see on a show feed tag is illustrated below. Notice that some nutrients have minimum levels while others have maximum levels.

Crude protein (CP)	min	26%
Lysine	min	1.5%
Methionine	min	0.5%
Crude fat	min	6.0%
Crude fiber	max	4.0%
Calcium (Ca)	min	1.1%
Calcium	max	1.5%
Phosphorus (P)	min	0.8%
Salt	min	0.4%
Salt	max	0.5%

However, a feed is much more complex than the information on the tag can indicate. It contains amino acids, the building blocks of protein, as well as vitamins, minerals and other nutrients. No one feed ingredient contains all the nutrients required for a complete diet. Some feed ingredients are rich in one nutrient but poor in another. This is the reason feed is a mixture of ingredients. For example, soybean meal is rich in protein, while corn is high in energy but a relatively poor source of protein. Together they complement each other in the feed. Each ingredient has a place in a balanced diet.

Certain fats, vitamins, minerals and amino acids are so vital for the bird that they are called "essential" nutrients. Even though the amounts required are usually small, birds will sicken or die without any one of these essential nutrients.

Principle 3: To win, birds must eat and grow in a balanced way.

A ration is the amount of food that a bird will eat in a day. Birds will eat this much and no more, so everything they need must be in this amount of feed. Several balances of ingredients must be maintained:

energy and protein

amino acids (complete protein)

minerals

essential fats (and fat-soluble vitamins)

A chicken or turkey stops eating once a certain amount of energy has been consumed in a day. The bird stops eating even if it has not eaten enough protein, vitamins and minerals. Because fat contains more than twice the energy contained in protein or carbohydrate, an increase in the amount of fat in a diet must be balanced with increased protein. The energy concentration of the diet must be balanced with other nutrients in the diet.

Protein contains 20 amino acids that build muscle protein. Fourteen of these building blocks must be supplied and balanced in the diet. If any one of them is missing, or isn't supplied in the proper amount, muscle protein can not be made and the remaining amino acids will be used for energy or fat instead.

Twenty-seven minerals are required in poultry diets. In a good poultry ration these minerals are carefully balanced. Mineral supplements should be added to a diet only with extreme care, because an excess of one type of mineral can cause a deficiency of another mineral. The bones of a growing chick are especially susceptible to mineral deficiency, **or imbalance caused by excess supplementation**.

Vitamins should be given in adequate amounts, but some vitamins can be toxic if too much is given. Some vitamins even interact detrimentally with minerals. Excess vitamins are not only expensive, but can cause health problems.

To illustrate the complexity of a complete and balanced poultry ration, Tables 1 and 2 list the scientifically determined nutrient requirements of broiler chickens and turkeys at different ages as published in the National Research Council's *Nutrient Requirements of Poultry*. These nutrient concentrations are the **minimal** requirements for growth and health. **Your show diet will be a different formulation, since the National Research Council's data state minimal values.** Feed formulation is a complicated process that ensures a feed contains all the nutrients that a bird needs. Specialized training or a computer program are required to confidently formulate a poultry ration.

Table 1. Nutrient requirements of broiler chickens as percentages, milligrams or units per kilogram of feed for different ages.

Nutrient	Units	0-3 weeks of age	3-6 weeks of age	6-8 weeks of age
Energy in diet[a] (ME/Kg)	kcal	3,200	3,200	3,200
Protein	%	23.0	20.0	18.0
Arginine	%	1.44	1.20	1.00
Glycine + Serine	%	1.50	1.00	0.70
Histidine	%	0.35	0.30	0.26
Isoleucine	%	0.80	0.70	0.60
Leucine	%	1.35	1.18	1.00
Lysine	%	1.20	1.00	0.85
Methionine + Cystine	%	0.93	0.72	0.60
Methionine	%	0.50	0.38	0.32
Phenylalanine + Tyrosine	%	1.34	1.17	1.00
Phenylalanine	%	0.72	0.63	0.54
Threonine	%	0.80	.74	0.68
Tryptophan	%	0.23	0.18	0.17
Valine	%	0.82	0.72	0.62
Linoleic acid	%	1.00	1.00	1.00
Calcium	%	1.00	0.90	0.80
Phophorus, available	%	0.45	0.40	0.35
Potassium	%	0.40	0.35	0.30
Sodium	%	0.15	0.15	0.15
Chloride	%	0.15	0.15	0.15
Magnesium	mg	600	600	600
Manganese	mg	60.0	60.0	60.0
Zinc	mg	40.0	40.0	40.0
Iron	mg	80.0	80.0	80.0
Copper	mg	8.0	8.0	8.0
Iodine	mg	0.35	0.35	0.35
Selenium	mg	0.15	0.15	0.15
Vitamin A	IU	1,500	1,500	1,500
Vitamin D	ICU	200	200	200
Vitamin E	IU	10	10	10
Vitamin K	mg	0.50	0.50	0.50
Riboflavin	mg	3.60	3.60	3.60
Pantothenic acid	mg	10.0	10.0	10.0
Niacin	mg	27.0	27.0	11.0
Vitamin B_{12}	mg	0.009	0.009	0.003
Choline	mg	1,300	850	500
Biotin	mg	0.15	0.15	0.10
Folacin	mg	0.55	0.55	0.25
Thiamin	mg	1.80	1.80	1.80
Pyridoxine	mg	3.0	3.0	2.5

[a]These are typical dietary energy concentrations.

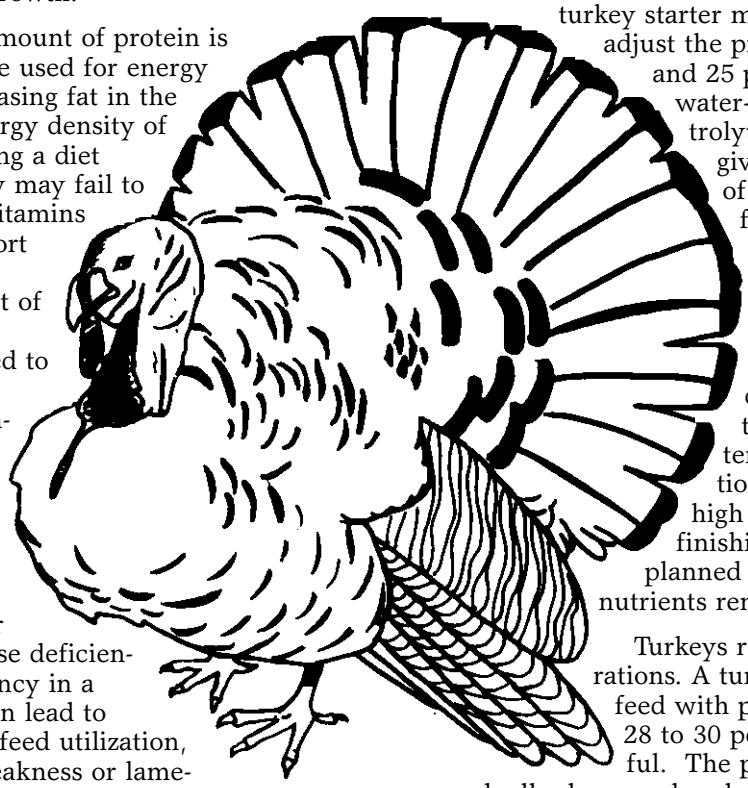
Table 2. Nutrient requirements of turkeys as percentages, milligrams or units per kilogram of feed for each sex at various ages.

Nutrient	Units	Sex and age (in weeks)					
		M: 0-4 F: 0-4	4-8 4-8	8-12 8-11	12-16 11-14	16-20 14-17	20-24 17-20
Energy in diet[a] (ME/Kg)	kcal	2,800	2,900	3,000	3,100	3,200	3,300
Protein	%	28	26	22	19	16.5	14
Arginine	%	1.6	1.5	1.25	1.1	0.95	0.8
Glycine + Serine	%	1.0	0.9	0.8	0.7	0.6	0.5
Histidine	%	0.58	0.54	0.46	0.39	0.35	0.29
Isoleucine	%	1.1	1.0	0.85	0.75	0.65	0.55
Leucine	%	1.9	1.75	1.5	1.3	1.1	0.95
Lysine	%	1.6	1.5	1.3	1.0	0.8	0.65
Methionine + Cystine	%	1.05	0.9	0.75	0.65	0.55	0.45
Methionine	%	0.53	0.45	0.38	0.33	0.28	0.23
Phenylalnine + Tyrosine	%	1.8	1.65	1.4	1.2	1.05	0.9
Phenylaline	%	1.0	0.9	0.8	0.7	0.6	0.5
Threonine	%	1.0	0.93	0.79	0.68	0.59	0.5
Tryptophan	%	0.26	0.24	0.2	0.18	0.15	0.13
Valine	%	1.2	1.1	0.94	0.8	0.7	0.6
Linoleic acid	%	1.0	1.0	0.8	0.8	0.8	0.8
Calcium	%	1.2	1.0	0.85	0.75	0.65	0.55
Phosporus, available	%	0.6	0.5	0.42	0.38	0.32	0.28
Potassium	%	0.7	0.6	0.5	0.5	0.4	0.4
Sodium	%	0.17	0.15	0.12	0.12	0.12	0.12
Chlorine	%	0.15	0.14	0.14	0.12	0.12	0.12
Magnesium	mg	600	600	600	600	600	600
Manganese	mg	60	60	60	60	60	60
Zinc	mg	75	65	50	40	40	40
Iron	mg	80	60	60	60	50	50
Copper	mg	8	8	6	6	6	6
Iodine	mg	0.4	0.4	0.4	0.4	0.4	0.4
Selenium	mg	0.2	0.2	0.2	0.2	0.2	0.2
Vitamin A	IU	4,000	4,000	4,000	4,000	4,000	4,000
Vitamin D[b]	ICU	900	900	900	900	900	900
Vitamin E	IU	12	12	10	10	10	10
Vitamin K	mg	1.0	1.0	0.8	0.8	0.8	0.8
Riboflavin	mg	3.6	3.6	3.0	3.0	2.5	2.5
Pantothenic acid	mg	11.0	11.0	9.0	9.0	9.0	9.0
Niacin	mg	70.0	70.0	50.0	50.0	40.0	40.0
Vitamin B^{12}	mg	0.003	0.003	0.003	0.003	0.003	0.003
Choline	mg	1,900	1,600	1,300	1,100	950	800
Biotin	mg	0.2	0.2	0.15	0.125	0.100	0.100
Folacin	mg	1.0	1.0	0.8	0.8	0.7	0.7
Thiamin	mg	2.0	2.0	2.0	2.00	2.0	2.0
Pyridoxine	mg	4.5	4.5	3.5	3.5	3.0	3.0

[a]These are typical dietary energy concentrations.

Principle 4: To unbalance a balanced ration with supplements is destructive.

If you have a good ration that fulfills all of the dietary needs of the broiler or turkey, do not alter it. Sometimes a little more of a good thing upsets a balanced ration. A balanced approach to nutrition is the key to optimum growth.



Once the correct amount of protein is fed, any excess will be used for energy or to make fat. Increasing fat in the diet increases the energy density of a diet. Birds consuming a diet with too much energy may fail to eat enough protein, vitamins and minerals to support optimum growth. Increasing the amount of vitamins in a ration beyond what is needed to meet requirements wastes money or damages the health of your birds. Some vitamins are toxic at high levels. Minerals also must be in balance. Some minerals compete against other minerals and can cause deficiencies. A minor deficiency in a mineral or vitamin can lead to loss of appetite, poor feed utilization, depressed growth, weakness or lameness. Once nutrients are in balance you can not improve your ration, but you can unbalance it.

Common mistakes made with supplements include:

1) giving vitamin and electrolyte supplements for more than 10 days;

2) supplementing balanced rations with cracked corn, oats or other grain;

3) adding green chops, lettuce or other low nutrient ingredients to the diet; and

4) inappropriate medication. (Do not medicate birds unless they are sick. When a medicated feed has been used, always follow the recommended medication-free feeding schedule before a bird is used for food or taken to a show.)

A good show ration with a feed tag similar to that illustrated on page 2 would be a good choice for broiler chickens until 3 to 4 weeks of age. A turkey starter mixed with broiler feed to adjust the protein level to between 23 and 25 percent is often used. A water-soluble vitamin and electrolyte supplement can be given during the first week of life, but supplementation for more than 10 days may affect the birds' health. After 4 weeks of age a finisher ration with higher energy content and a 21 to 23 percent protein level can be fed. One good way to modify the protein content and energy concentration of show diets is to mix high protein and high energy finishing diets together in well-planned proportions. This way, all nutrients remain correctly balanced.

Turkeys require high protein rations. A turkey starter or game bird feed with protein concentrations of 28 to 30 percent is usually successful. The protein content can be gradually decreased and energy content increased as the turkey ages. Avoid over-supplementation.

There are no secret formulas that guarantee championship birds. Feed them fresh, clean water, and a well-balanced ration; keep them clean, comfortable and unstressed; give them care and attention, and they will develop to their fullest genetic potential.

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Zerle L. Carpenter, Director, Texas Agricultural Extension Service, The Texas A&M University System.
5M–2-97, Revision PS