

Nutrition and Feeding of Show Poultry

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 cannot grow beyond its maximum potential.

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

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 even 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 eat-

ing. 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 the 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%
Lysinemin	1.5%
Methioninemin	0.5%
Crude fatmin	6.0%
Crude fibermax	4.0%
Calcium (Ca)min	1.1%
Calcium.....max	1.5%
Phosphorus (P)min	0.8%
Saltmin	0.4%
Saltmax	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 cannot 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 they can also 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 comput-

er program are required to confidently formulate a poultry ration.

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 broiler and roaster chickens or turkeys, 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.

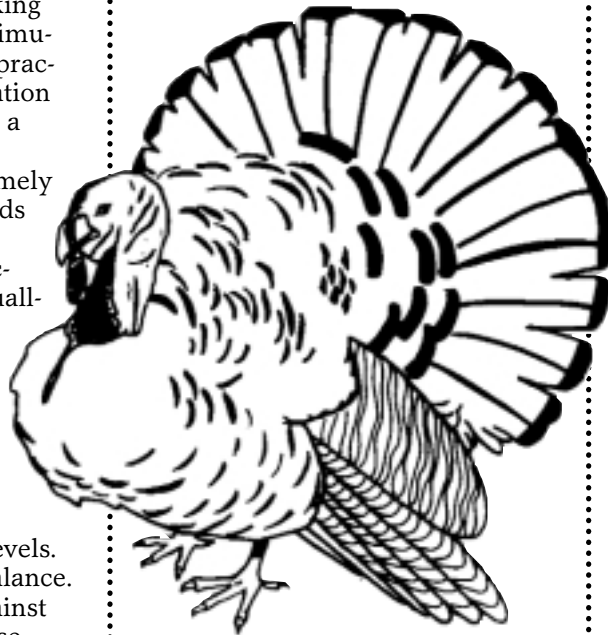
However, many people feed small amounts of starter ration lightly moistened with cooking oil several times a day to stimulate older birds to eat. This practice is acceptable in moderation because it generally creates a "grower-type" diet from the starter ration. During extremely hot or cold weather, the birds may also benefit from this treatment. Beyond this practice, supplementation is usually ineffective or harmful.

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 cannot improve your ration, but you can unbalance it.

Common mistakes made with supplements include:

- Giving vitamin and electrolyte supplements for more than 10 days
- Supplementing balanced rations with cracked corn, oats or other grain
- Adding green chops, lettuce or other low nutrient ingredients to the diet
- 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. **Roaster chickens** are usually shown in competition between 10 to 14 weeks of age. Their diets are similar to the diets fed to broiler chickens.

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 magic 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.

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
Phosphorus, 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

^aThese 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	4-8	8-12	12-16	16-20	20-24
		F: 0-4	4-8	8-11	11-14	14-17	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
Phenylalanine + Tyrosine	%	1.8	1.65	1.4	1.2	1.05	0.9
Phenylalanine	%	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
Phosphorus, 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

^aThese are typical dietary energy concentrations.

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:

- Do not bring live poultry of any age into the house.
- Always wash your hands thoroughly with soap and water after contact with poultry.
- Do not allow toddlers to handle poultry.
- Avoid contact with poultry feces.
- 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://agpublications.tamu.edu/catalog/topics/Poultry.html>)

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

Educational programs of Texas AgriLife Extension Service are open to all people without regard to race, color, sex, disability, religion, age or national origin.

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 AgriLife Extension Service, The Texas A&M University System.

5M, Revision