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Backyard & Small Poultry Flock Management Series: **Feeding the Laying Hen**

► Whether to supply a consistent source of table eggs for family consumption or for hatching egg production, most individuals involved in small flock poultry keeping have egg production as their primary goal. Many factors can affect a hen's level of egg production; however, nutrition and feeding management are two of the most important.

Adequate nutrient intake is key to successful egg production. Furthermore, most of the cost of raising backyard poultry is tied to feeding your birds. This publication is the first in the Backyard and Small Poultry Flock Management series. This document provides an overview of essential nutrients for the laying hen and helps small flock producers make informed decisions about feeding their hens for maximum egg production.

Important Nutrients for the Laying Hen

A balanced diet for your hens is critical for maintaining bird health and productivity. Deficiencies in one or more nutrients can lower or stop egg production and may lead to disease or even death in your flock. The nutrients a hen consumes are used for two general purposes—maintenance and production. The maintenance requirement is simply what the hen needs to stay alive and healthy, including maintaining the function of organ systems (immune system, heart and lungs, digestive system, etc.). Once a hen's maintenance nutrient requirement is met, she can use any extra nutrients consumed for egg production. But, if she is only consuming a little over her maintenance requirement, the hen's egg production is not likely to be maximized because she doesn't have enough extra nutrients for egg production. Likewise, a diet that does not have the correct balance of nutrients will most likely result in poor or no egg production. This is why it is critical to provide your hens with a good quality, complete, and correctly balanced diet to maximize the number of eggs she lays.

So, what are the most essential nutrients in a hen's diet? In a complete diet, a hen will consume many different and critically important nutrients. However, the following are the ones to keep an eye on while you plan your hen feeding program.

Protein

Because protein is vital in many aspects of bodily functions and bird production (especially growth and egg production), it is usually the one nutritionists point to as the most important when selecting your birds' diet. Dietary protein is used for hormone and enzyme production, immune cell function, tissue maintenance, oxygen transportation, and many other functions. It is also needed to make components of the egg (especially the albumen or egg white). The primary source of protein in most poultry diets is soybean meal, a by-product of soybean processing. Some feeds may also contain smaller quantities of animal proteins, like poultry by-product meal, meat and bone meal, or fish meal, although these are less common ingredients in diets for laying hens. Laying hens should receive a layer diet with around 18 percent crude protein to maintain good egg production.

Energy

A hen uses the energy contained in her diet for "useful work." Almost every function of a chicken requires at least a little energy. Running around the chicken yard

or trying to fly out of the coop requires quite a bit of energy. Energy comes from three sources in poultry feed—carbohydrates (starch), protein, and lipids (fats or oils). Most poultry feeds contain a considerable amount of carbohydrates and a lesser amount of lipids. Most commercially available poultry feeds have corn as their number one ingredient. Corn is an excellent source of carbohydrates in the form of starch. It is also common for diets to contain smaller amounts of oils from vegetable (e.g., soybean or corn) or animal (e.g., poultry fat) origin to increase the energy in the feed or reduce the dustiness of the feed.

Calcium/Phosphorus

Vitamins and minerals in a hen's diet are extremely important for many bodily functions. Most commercially available layer feeds and other poultry diets contain enough vitamins and minerals to meet your birds' requirements easily. However, pay attention to two essential minerals, calcium and phosphorus. In the mineral world, these two are "best friends" and always need to be together. The eggshell is composed of around 96 percent calcium carbonate. Although there is only a small amount of phosphorus in the egg shell (0.5 percent), it is still needed in the diet to allow the hen to properly metabolize calcium.

Moreover, these two should be in the correct ratio to one another. A two-parts calcium to one-part phosphorus ratio (2:1) in the diet is a good rule of thumb for most animals. However, for laying hens, this should be much higher—from 4:1 to possibly as high as 7:1. Other calcium sources for laying hens are oyster shells or egg shells sun dried for 1 or 2 days or oven-dried at 350 degrees F for 10 minutes.

Check the Feed Label

Choose a commercially available complete feed as the nutrition source for your birds. Readily available at your local feed supply stores, these diets are specifically formulated to meet the needs of growing pullets and laying hens. As you decide which feed to give your birds, pay attention to the feed label to know the concentration of important nutrients in the diet and match those to the recommendations for pullets and laying hens. Most feed labels contain, at minimum, the amount of protein (or crude protein), fat, and fiber. The label or tag on a layer feed should display the amount of analyzed calcium and phosphorus in the feed. These two minerals are the most important in eggshell formation.

Don't Forget Pullet Development

Although this publication focuses on laying hens, don't forget the importance of pullet development. Pullets are young hens less than 1 year old and that have not started laying eggs. Poor nutrition, disease, stress, and temperature extremes can slow pullet growth and delay the age at which she lays her first egg. It may also negatively affect her ability to lay eggs. Slower growing breeds (Rhode Island Red, Jersey Giant, Plymouth Rock, New Hampshire; many other American, English, and Mediterranean class breeds; and most fancy or rare breeds), as well as day length and season can delay first egg production. Generally, most pullets will lay their first egg at 20 to 25 weeks. During the growing phase (from chick to first egg laid), it is vital to offer pullets a complete starter/grower diet from 1 to 6 weeks of age as their sole source of nutrition. Several complete diets are commercially available, each formulated to meet your growing pullets' needs. Feed pullet chicks a starter diet containing at least 18 percent protein.

Choosing the Right Feed for the Laying Hen

Commercially available feeds. For the small flock producer, the choices of commercially available feeds for laying hens can be overwhelming. The good news is that a complete feed labeled for laying hens has been formulated to meet the nutrient requirements of most small flock layers. A laying hen will consume between 100 and 150 grams of feed per day or roughly 0.25 pounds. Therefore, 10 laying hens (10 x 0.25 = 2.5 pounds per day) will consume a 50-pound bag of feed in approximately 20 days. With that in mind, *the key for the small flock producer is to provide the correct amount of a complete feed as the sole source of nutrients for the birds.* Table 1 is a general guide to recommended protein, calcium, and phosphorus levels in a layer diet.

Table 1. Recommended Layer Diet Composition	
Protein	16% or more
Calcium	3% to 4%
Phosphorus	0.4% to 0.5%

Homemade poultry feeds. For some small flock producers, mixing their own layer feed is an attractive option. This can be a challenging option for most because you must have a reasonably in-depth knowledge of what your birds require for their age and what nutrients are in the ingredients you are mixing. Feeding an imbalanced diet can have lasting adverse effects on your flock. Mixing homemade feeds can also require investing in additional equipment, and sourcing your individual ingredients can be challenging. Consult someone with knowledge of poultry nutrition before proceeding with a homemade feed.

General Considerations for Laying Hen Feeds

- **Age of feed.** Make sure your feed is fresh at all times. Complete feeds that are too old can lose quality. Minerals in the feed can naturally oxidize other nutrients, reducing their availability to the bird. As a good rule of thumb, the feed should be no older than 3 months. The purchased feed should have the manufacture date on the bag. If it doesn't, ask your retailer.
- **Feed storage.** All feed should be stored in a dry, reasonably mild temperature (room temperature is ideal). Never store feed in direct sun or in a very hot storage area. Also, ensure that your feed is stored in a rodent- and insect-free container or area. Rodents and insects can easily spread disease and consume your valuable feed.
- **Overfeeding nutrients.** Although not typically an issue in small and backyard layer flocks, make sure your birds don't overconsume nutrients. This can be a problem when producers supplement their birds with treats or extra feed beyond the complete diet. Remember that complete feeds are designed to be the sole source of nutrients for your birds. Overconsuming protein and minerals can lead to urinary system problems. Excess energy intake can lead to fat deposition. Both of these scenarios can negatively affect your birds' productivity.

Feeding Management of the Laying Hen

How much to feed? How much to feed is typically not an issue for small flock laying hens. By nature, chickens will mostly eat to meet their nutritional requirements. The typical breeds used in small laying flocks do not have the genetics for excessive growth or fat deposition. If feeding a complete layer feed, provide feed for your hens at all times. Several high-quality self-feeders are available commercially. These allow birds access to feed at all times. It is okay to feed your flock meals once or twice daily to avoid having excess feed sitting in your feeder, which may attract rodents and insects. If meal feeding, provide enough feed for the hens to clean up in 30 minutes to 1 hour. If using this system, feed your hens twice per day to avoid any accidental feed restriction.

Feeders and feeder space. Various feeders, both available for purchase or homemade, can be used to feed your hens. Feeders need not be elaborate but should, at minimum, provide birds with adequate room to eat, protect feed from potential weather or fecal contamination by hens in your flock, and prevent feed waste. Chickens will notoriously attempt to roost on feeders (and drinkers) at night. This should be discouraged to avoid feed contamination. Some feeders are equipped with "anti-roost" guards. More important than feeder design, birds should have adequate feeder space. Inadequate feeder space can lead to unnecessary fighting and feather pecking, both a stress response. Feeder space is dictated mainly by bird size—the larger the birds, the more feeder space is needed. As a rule of thumb, feeder space should be adequate to allow every bird in the flock to eat at the same time. Birds should have enough room to stand next to each other at the feeder with a bit of "personal space." Additional feeders (or drinkers) can always be added to increase space. Keep feeders at the proper height for your hen size—bottom of the feeder at about bird back height. This will help you avoid wasting excess feed.

Clean water. Under normal circumstances, chickens consume twice as much water (by weight) as they do feed. Therefore, if laying hens consume 0.25 pounds of feed per day, they will consume 0.5 pounds of water per day. Providing a gallon of water each day is enough to sustain the water consumption of roughly 16 laying hens. Making sure that your birds have a clean and fresh source of water at all times is critically important to maintaining hen health and egg production. Water is used in most bodily processes, and an egg is 65 to 70 percent water. Poor-quality water restricting

consumption will reduce feed intake, reducing egg production. Make sure to provide fresh water daily (more often in the summer) and keep drinkers free of slime and mildew. A few drops of household bleach per gallon of water can be added to nonchlorinated water to kill any unwanted organisms. Well water sources can be tested at university, county, and private laboratories for a nominal fee. The results of water analysis can include bacterial contamination (the presence of coliforms can be related to fecal contamination of the water source); pH that in Alabama wells ranges between 5 and 6.5, but varies depending on the well location; minerals (Ca, Mg, P, K, etc.); and nitrites that result from fertilizers, animal wastes, and decomposition of animal or plant matter.

Crumbles versus pellets. Almost all commercially available poultry feeds are in one of two forms: crumbles or pellets (or mini-pellets). Crumbles are broken up pellets designed to help chicks eat, and many layer diets come in crumble form. Pelleting of feed has several advantages, including improved digestion and consistent intake of all ingredients and nutrients in the feed. Whether you choose to feed layer crumbles or pellets is your decision. Adult chickens eating crumbles tend to waste more feed and can have more powdery "fines" left in the feeder that birds prefer not to eat.

Organic versus conventional feeds. Most commercially available layer feeds are conventional. However, more organic feed options are increasingly available. The composition of organic diets is not much different than conventional, but the cost of organic poultry feeds is considerably higher. Suppose you plan to market your eggs as organic. In that case, feed is only one component, so make sure to fully research small-scale organic egg production and the appropriate requirements for your operation.

All vegetarian feeds. Although chickens are omnivorous (eat both plants and animals), many poultry feeds are available as vegetarian, containing no animal protein or animal fat sources. The increase in vegetarian feeds has, in part, been more about marketing than actual nutrition. There is little, if any, difference in nutrient content between vegetarian and nonvegetarian diets, so it is your personal preference. However, make sure to avoid any layer feeds that might contain fish meal or cottonseed meal. These ingredients can negatively affect egg flavor (fish meal can result in fishy flavored eggs) and egg color (cottonseed meal can create green egg whites).

Scratch grains, treats, and kitchen scraps. A wide variety of extras are available when feeding chickens. None of these are complete feeds and should be used sparingly or not at all. Chickens do enjoy treats. If these are given in excess, the birds will fill up on these incomplete feeds and not consume enough of the complete feed to sustain egg production or growth. The ice cream analogy works well here. If children are offered ice cream at every meal, they will eat it with gusto. Of course, we know that the children won't receive essential nutrients for growth from a lot of ice cream. The same applies to your birds. If you give them too much "ice cream" in the form of scratch grains, treats, or kitchen scraps, their egg production is likely to suffer. In the same way, avoid mixing scratch grains with your complete feed. This only dilutes the nutrients your birds need. *Complete feeds (along with clean water) are designed to be the sole source of nutrients.*

Oyster shell and other calcium supplements. Some small flock producers provide their laying hens with oyster shell (or other calcium sources) as a calcium supplement to their diet. Commercially available oyster shells are just dried, ground oyster shells from the seafood industry. They are composed of mostly calcium carbonate (around 95 percent). If you are feeding a high-quality complete layer diet (check the calcium-phosphorus levels), supplementing a layer flock with oyster shell is probably unnecessary. However, oyster shell is inexpensive and providing it to your hens will not have negative consequences. A hen at any given age can genetically put only a certain amount of calcium into her egg shell, so adding extra calcium beyond what she needs will likely have only marginal effects on eggshell thickness.

Grit. Because chickens have no teeth, the gizzard or muscular part of a bird's stomach is designed for grinding feed. Naturally, chickens, and other birds, will pick up and swallow small pebbles from their environment. These pebbles will temporarily lodge in the folds of the gizzard to enhance its grinding ability. Many people believe chickens need these pebbles (or grit) supplemented in their diet. This is untrue if the feed being provided is already ground (which all commercial feeds are). Birds that generally consume whole grains and seeds (songbirds, pet birds) need a source of grit in their diet. Backyard chicken flocks do not.

Fermented feed. A newer trend in small flocks is the use of fermented feeds. Adding water to a commercial layer feed, allowing it to ferment naturally, and then feeding it to a flock as a wet mash can have some positive effects on digestion and water intake. However, the negative consequences should also be considered. Providing your birds a wet feed (especially in the summer) will attract flies and other potentially disease-causing insects. Likewise, the unconsumed wet mash will spoil quickly, and the logistics of keeping feeders clean can be challenging.

Feeding Roosters

Many small-scale producers include a rooster or two in their layer flock, whether to produce fertile eggs or just for the enjoyment. Roosters, of course, are not needed for egg production but for fertile egg production. Some producers may be interested in hatching eggs to produce replacement birds or just for the fun. Be aware that local zoning ordinances can prohibit roosters, so check with your city or county government before adding roosters to the flock.

A mature rooster doesn't require nearly the nutrients needed for a laying hen. In most backyard and small flock situations, feed roosters the same diet being provided to the laying hens. Rarely the rooster's extra consumption of nutrients (especially protein and calcium) can negatively affect the kidneys. Make sure to provide males with plenty of clean drinking water at all times. Adding a little apple cider vinegar (1 tablespoon per gallon) to the drinking water can help avoid any issues (this can also benefit the whole flock). Also, feeder space becomes even more important with roosters in the flock. Inadequate feeder space can lead to excess fighting between roosters and between roosters and hens.

Final Word

A small layer flock can be an enjoyable and productive hobby for individuals without much space. Hen nutrition is critical to keeping a healthy flock that can lay eggs year-round. Feeding a high-quality, complete feed appropriate for your flock and providing clean, fresh water will help you go a long way toward poultry-keeping goals.

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