



Feeding the Commercial Egg-Type Laying Hen¹

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Today's Laying Hen

Advances in genetic selection make today's commercial layers quite different from those of a decade ago. Body weight is less, age at housing and age at 5 percent production are earlier, total egg numbers have increased, egg mass is greater, and feed conversion has improved considerably.

Body weight is very important. Smaller birds at peak or shortly following their peak in egg production often do not have the physical capacity to consume enough feed to provide adequate energy and will be forced to rely on body stores. This puts these birds in negative energy balance with weight loss occurring during the peak in egg production. Egg production declines slightly post-peak and is often referred to as "post-peak" production drop. It is more common to see this slight production drop in flocks with the best uniformity.

Even if flock uniformity is high, not all birds in the flock are laying at the same rate. Some hens are laying at a very high rate of production and some have not yet laid their first egg. The flock, in this case, has to be fed in such a way as to protect the hens already in production and ensure they receive the energy and nutrients to achieve and maintain a high peak. However, the diet must also be formulated in

such a way as not to compromise the production potential of the birds not yet in production. Keeping this in mind, a non-uniform flock will usually be a problem flock as the production cycle continues.

The period of time between housing and peak egg production is the most demanding and stressful period in the laying hen's life. During this period she is not only adjusting to her new environment, she must consume enough energy and nutrients to grow and reach a high peak in egg production. During this time a high energy/nutrient-dense diet is required. Good management of the flock during this period is critical and every attempt should be made to minimize stress.

Feed costs often represent more than 70 percent of the production cost of a dozen eggs. Feed costs per dozen eggs must always be the least-cost against expected egg revenue in order to maximize profits. Any savings in feed consumption will usually increase the profit margin. Several management factors can be implemented which will result in feed savings and added profits.

Nutrient Requirements

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Once egg production begins, energy intake is the critical factor controlling egg numbers. Therefore, the diet must contain an adequate concentration of calories if small birds are going to be expected to perform to their full genetic potential at peak and as the laying cycle continues. If greater egg profits are to be realized during an entire laying cycle, it is essential that replacement pullets attain proper body weight. A bird that remains small will lay small eggs at the onset of egg laying. Once egg production begins, it is too late to correct body weight problems in a flock. The smaller birds will remain small and the larger birds will remain large throughout the laying cycle. Since feed intake is correlated with body weight increases, the decreased egg size often seen in some young flocks is most likely a result of feed intake.

Egg producers will normally attempt to get the largest number of high-quality eggs of the correct size from each hen housed in the shortest period of time at the lowest cost. There are numerous feeding and management programs that have an effect on their investment. Feeding programs are designed to meet the nutritional needs of the hens. However, the profit margin is different with each type of feeding program.

Limited Feeding

Some egg producers feel that laying hens need to be full-fed at all times throughout the laying cycle. This is not true. Frequently, these same producers do not have the equipment or management system necessary to implement a restricted feeding program. Limited feeding should not be ignored when an egg producer is looking for ways to lower feed and total production costs. Controlling in-house temperature is one way to achieve the goal of limited consumption of feed after peak egg production in a layer flock because increased in-house temperature results in less feed intake.

If a feed restriction program is implemented, it is important to formulate the diet to supply adequate amounts of critical nutrients each day to the hen. The amino acid, vitamin and mineral concentrations in the diet are more critical with limited feeding than with full feeding. In limited feeding programs, the

objective is to limit only energy without limiting the intake of critical nutrients. The use of nutrient-dense diets is necessary. Energy intake cannot be altered effectively by simply varying diet energy concentration. This is because, in general, the laying hen will consume the amount of feed necessary to meet her metabolizable energy requirement.

Laying hens fed an energy-restricted diet have a lower maintenance requirement, and a hen consuming less feed is more efficient and profitable. If a feed restriction program is used, it is usually not started until the majority of the eggs being produced fall into the large size category. A feed restriction program will result in a slight decrease in egg size which is of less consequence once the majority of the eggs are in the large category. Initiation of a feed restriction program should commence later for layer strains of lower body weight, particularly during periods of hot weather.

Phase Feeding

A feeding program that uses only 1 feed during the entire laying period will be simple and easy to manage, but costly. Such a program has to be designed to meet the peak nutritional requirements of the hens at all times under all conditions. The feed has a high nutrient density to meet the maximum requirements at the lowest level of feed consumption expected throughout the year. This results in an overfortified and overpriced feed during most of the laying cycle. This simple feeding program is not normally used in today's advanced poultry industry. However, there are still companies in some countries that use only one feed during the entire laying cycle.

In contrast, phase feeding is used extensively in today's industry. Phase feeding was first proposed in the 1960s by Dr. G.F. Combs. This was the term this poultry nutritionist gave to the program of reducing the protein level in the feed as the hen aged. Today, levels of other nutrients, along with protein and amino acids, are lowered as the hen ages or when egg production in the flock declines to a certain percentage. Different feeds are formulated for various stages of production. Usually, the number of feeds ranges from two to four. As the number of feeds increases, so does the amount of coordination needed

to ensure that the correct feed is delivered to the correct age flock. Phase feeding reduces feed costs as egg production decreases because each change in formula is associated with a less fortified feed. The effect of temperature on total feed consumption of the flock, and thus total nutrients consumed, is not considered with a phase feeding program if no adjustments are made to the diet as feed intake changes.

Feeding by Consumption

One feeding program that more closely meets the nutritional needs of a hen is feeding by consumption. This program, by definition, requires a knowledge of the hen's feed consumption. As feed intake increases or decreases, the percentage of nutrients in the diet will decrease and increase accordingly to ensure the proper intake of the required nutrients.

A reliable estimation of feed intake is the most important factor in this program. Without accurate feed intake data, the formulation of layer feeds for proper nutrient intakes is not possible. Higher-priced formulas would then have to be used to ensure proper margins of safety in the dietary nutrient levels. Also, the closer that each diet is formulated to the bird's actual requirement, the smaller the margin of safety in the diet.

Margins of Safety

Nutritionists make continual margin of safety choices as they construct the feed formula. Depending on several factors, the margin of safety can be increased or decreased. The quality of the feed, bird body weight and egg weight all affect the margin of safety in the diet. The availability of feed ingredients and the effect that dietary changes have on overall flock performance must also be taken into consideration when building a margin of safety into a feed formula. During times of low egg prices, cash flow may be a problem for a company and the nutritionist has the responsibility of feeding the hens a cheaper, less nutrient-dense diet for a short period of time.

Summary

Each poultry nutritionist must decide on the nutrient requirements for flocks of laying hens which may be at various ages or levels of production. Breeder's guides contain a high margin of safety in nutrient requirements to ensure a specific bird will perform in all parts of the world under a variety of management and environmental conditions. An example of nutrient specifications for a laying flock is given in Table 1.

Table 1. Example of nutrient specifications for a laying flock.

Nutrient	Minimum Daily Intake per Bird			
	Peaking 50% prod - 32 weeks	32 - 44 weeks	44 - 58 weeks	58 weeks +
Protein, g/bird	16.0 - 17.0	15.5 - 16.0	15.0 - 15.5	14.5 - 15.0
Methionine, mg/bird	412	400	375	350
Methionine + Cystine, mg/bird	680	660	620	580
Lysine, mg/bird	800	780	740	720
Tryptophan, mg/bird	175	170	165	160
Calcium, g/bird	3.40	3.55	3.65	3.85
Phosphorus (total), g/bird	0.65	0.60	0.55	0.45
Phosphorus (available), g/bird	0.45	0.42	0.38	0.35
Sodium, mg/bird	180	180	180	180
Chloride, mg/bird	160	160	160	160
Linoleic acid, g/bird	1.5	1.0	1.0	1.0