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Feeding the Commercial Egg-Type Replacement Pullet[1]

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TODAY'S PULLET

Advances in genetic selection make today's pullets quite different from those of only a few years ago. Pullet body weight is less. Age at housing and at 5 percent production are earlier. Total egg numbers are increasing, egg mass is greater, and feed conversion has improved.

Poultry producers who raise their own replacement pullets have better control of their pullet's growth, condition and development. When producers purchase their replacement pullets from commercial pullet growers they are putting their fate in the hands of someone else.

The major cost of producing a pullet is feed. Thus, feed reduction in order to reduce production costs is an obvious possibility when pullets are bought from outside suppliers. The profits made by a commercial pullet grower through feed reduction in the critical first 12 weeks of age may result in losses in the layer house.

When an egg producer purchases pullets that are underweight, it is important to know whether the birds were underfed in protein or energy while in the growing house. The poultry producer should always know the body weight, flock uniformity, vaccination schedule, feeding program, lighting, environmental conditions during grow-out, and the general management of his pullets. Without the basic knowledge of the flock grow-out, it is virtually impossible to understand and possibly solve problems which may later occur during the laying period. It must be kept in mind that once egg production begins, it is too late to solve problems resulting from poor grow-out nutrition or management.

The two most important criteria of pullet quality are uniformity within the flock and proper body weight at a specific age. Almost anything that adversely affects a pullet will usually be reflected in lower body weights and poorer flock uniformity. The goal for flock uniformity is to have 80 percent of the pullets within plus or minus 10 percent of the average flock body weight.

BODY WEIGHT

Pullets are grown to attain a certain body weight at a particular age. Each tissue and organ in the bird develops at different rates. Variation exists throughout the growing period with respect to nutritional demands for these various tissues and

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organs. For example, growth during the first 6 weeks of a pullet's life is not in fat, but in high protein organs such as heart, liver and kidney. "Critical periods" exist during the growing period and simply feeding to body weight while ignoring these critical periods of development may have a detrimental effect on performance in the laying house. It is essential to have the correct amount and balance of amino acids, other nutrients, and energy in the diet at different stages of the growing period.

There is a direct relationship between the pullet's development during rearing and subsequent performance during the laying cycle. In addition, body weight at 6 weeks of age has been shown to be positively correlated with performance. Pullets on or above target body weight at this age are usually the best performers during the laying period. If a pullet is not on target body weight by 12 weeks of age, she will more than likely be a small pullet entering the laying house and possibly a financial burden for the rest of the laying period.

Monitoring pullet body weight and proper nutrition go hand-in-hand throughout the entire rearing period. Underweight pullets approaching peak egg production just cannot consume enough energy each day to maintain or even attain peak production. The bird, at this point, will use her body stores of fat and protein to furnish the energy in an attempt to produce eggs at her full genetic potential.

The egg production curve of a laying hen is similar to the milk production curve of a high-producing dairy cow who is also pulling on her body's nutrient stores in an attempt to meet the energy demands of high production. Dairy cows and underweight pullets reaching peak production are in a daily negative energy balance and lose body weight simply because their energy needs exceed their ability to physically consume the energy required each day in order to maintain production. Small pullets reaching peak egg production will usually experience a decline in egg production at or shortly after peak. This is often referred to as the "post-peak" production drop.

Many of the problems which occur during the early part of lay can be traced back to insufficient or improper type of body weight attained during the various stages of the growing period. In order to avoid these problems, pullets must be fed in a manner that will allow full expression of their genetic growth potential during the growing period. Because each strain of egg-type bird available today is the result of intense genetic selection by a particular breeding company, each strain is different. Also, rearing conditions for pullets vary depending on company policy and environmental pressures and can affect growth rate. Thus, no one set of feeding standards is ideal.

The desired body weight of the flock is usually the weight the breeder recommends at a given age. Being above the recommended body weight at any given age should not give cause for as much concern as a pullet being underweight, especially in hot weather. The onset of the female production cycle is determined by a combination of three factors: age, body weight (especially fat) and lighting. Coordination of all three factors is very important if the flock is expected to enter production on schedule.

TYPES OF DIETS

According to most breeder production management guides, the body weight of the pullet by 6 weeks of age must be at or above 1 pound. Anything less is not acceptable. The starter diet, which is usually fed for 6 or 7 weeks, is very critical and must provide the total amino acid needs of the pullet until it reaches the desired target weight for a particular age. Most production management guides recommend a starter diet which contains a protein level of 19 to 20 percent. The recommended amino acid profile of the pullet starter diet depends on the particular breeder company and strain of bird being used.

Depending on which management guide is followed, the number of diets following the starter diet can vary from 2 to 4. Some breeder companies recommend a pre-starter diet be fed for 2 or 3 weeks, especially in summer when temperatures are higher. No matter which strain is being used, the most efficient period of growth in the pullet prior to the onset of egg production is the first 6-8 weeks of age. Even though the pre-starter arid starter diets are the

most expensive, producers should not hesitate to allow birds access to these higher protein diets for the needed amount of time necessary to attain the proper body weight for a particular age prior to being fed the grower diet.

It is most economical to produce as many large eggs as soon as possible after the onset of lay. Frame size (skeleton size) of the bird is a very important factor affecting egg size. If greater egg profits are to be realized during a laying cycle, it is essential to get body weight on replacement pullets as quickly as possible after they have been placed in the growing house. By 12 to 14 weeks of age most pullets have already developed approximately 95 percent of their adult frame size. If a small bird is produced, then small eggs will be laid at the onset of egg production. Once egg production begins, small birds remain small and large birds remain large throughout the laying cycle.

Once egg production begins, energy intake (rather than protein or amino acids) is the critical factor controlling egg numbers. Therefore, the diet must contain an adequate concentration of calories if the smaller birds in the flocks are going to be expected to perform to their full genetic potential throughout the laying cycle and, in turn, be a profitable flock. With both young pullets and mature layings hens, it is an excellent idea to use yellow corn or corn oil in the diet since the linoleic acid they contain will be beneficial in improving egg size and numbers.

Optimum peaks in egg production are seldom seen with non-uniform flocks. in such cases, the mean value for feed intake is often misleading and any attempt to correctly match nutrient intake to requirements of all the birds in the flock is difficult if not impossible. Uniformity measurements of the flock are calculated each time the body weight is determined. Usually, when flock uniformity is high at 16 weeks of age, egg production is higher and mortality is lower after 55-60 weeks of age. Thus, every attempt should be made to attain good uniformity and proper body weight at 16 weeks of;ige.

EFFECT OF TEMPERATURE

The daily nutrient and energy intake of any pullet or mature laying hen is governed by the composition of the diet and amount of feed consumed. The laying hen adjusts her feed intake in order to consume the metabolizable energy (ME) she requires to meet her needs for maintenance, growth, and egg mass. As the energy content of the diet increases, feed intake decreases and vice versa.

Environmental temperature also plays an important role in determining how much feed (energy) the bird will consume. During hot weather feed intake is decreased. Larger pullets at sexual maturity have larger appetites and more physical capacity to consume feed. This is true, even in hot weather. Smaller birds, with their associated reduced appetites, will usually undergo more stress in the multi-bird cages used in today's laying houses. More stress is reflected in fewer eggs and even smaller body weights.

SUMMARY

The main goal in feeding pullets is to produce a flock of birds which, when placed in the layer house, will attain optimum performance. At point-of-lay, the highest quality pullet will usually be a profitable laying hen throughout the laying period. The genetic potential of the pullet is fixed prior to hatch. From day of hatch onward, successful performance in the layer house is influenced by factors to which the pullet is exposed both before and after the onset of lay. Body weight and uniformity are extremely important and many of the problems resulting in reduced profitability from a commercial layer flock could have been eliminated if the proper pullet body weight and condition at the desired age of sexual maturity had been achieved.

Examples of nutrient specifications for the growing period (Table 1) and target weights (Table 2) are shown. It must be remembered, however, that recommendations for a specific flock will vary depending on strain and management.

Table 1. Example of nutrient specifications for the growing period.

	Starter 0-6 weeks to 0.88 lbs.	**Grower** 6-8 weeks to 1.28 lbs.	**Developer** 8-15 weeks to 2.56 lbs.	**Pre-layer** 15 weeks to 5% production	**Pre-peak** 5% to 50% production
Nutrients:					
Protein, % (Min)	20	18	16	14.5	15.5
Met. Energy (kcal/lb)	1325-1375	1350-1400	1375-1425	1350-1400	1340-1350
Linoleic acid, % (Mn)	1.0	1.0	1.0	1.0	1.5
Amino acids (Min):					
Arginine, %	1.20	1.10	1.00	0.90	1.15
Lysine, %	1.10	0.90	0.75	0.70	0.95
Methionine, %	0.45	0.40	0.38	0.34	0.51
Methionine + Cystine, %	0.80	0.73	0.65	0.60	0.82
Tryptophan, %	0.20	0.18	0.16	0.15	0.17
Threonine, %	0.75	0.70	0.60	0.55	0.68
Minerals (Min):					
Calcium, %	1.0	1.0	1.0	2.50	3.55
Phosphorus					
Total, %	0.75	0.72	0.70	0.60	0.65
Available, %	0.45	0.45	0.40	0.40	0.50
Sodium, %	0.19	0.18	0.17	0.18	0.23
Chloride, %	0.15	0.15	0.15	0.16	0.22
Potassium, %	0.50	0.50	0.50	0.50	0.60

Table 2. Example of target body weights during the rearing of replacement pullets.

Age (weeks)	**Body weight**	
	(Pounds)	(Grams)
1	0.14	65
2	0.24	110
3	0.40	180
4	0.55	250
5	0.71	320
6	0.88	400
7	1.10	500
8	1.28	580
9	1.50	680
10	1.70	770
11	1.92	870
12	2.09	950
13	2.27	1030
14	2.43	1100
15	2.56	1160
16	2.67	1210
17	2.76	1250
18	2.82	1280
19	2.89	1310
20	3.00	1360