Proceedings of the Arkansas Nutrition Conference

Volume 2021 Article 6

2021

Practical Pullet and Breeder Nutrition

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Proceedings of the Arkansas Nutrition Conference
August 31st to September 2nd, 2021
Rogers, AR

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Introduction

Modern meat chicken breeding stock have been selected for extremely efficient conversion of feed into protein and rapid growth. As a result, it has become increasingly more difficult to rear pullets and breeders to achieve the healthy chick numbers needed to supply the ever-expanding poultry meat market.

There are many factors involved in producing a healthy pullet and breeder chicken. These include; housing, lighting, temperature and air control, health, animal husbandry, feed management and nutrition.

This presentation is titled, Practical Pullet and Breeder Nutrition. Feed nutrient composition is important, but feed management is critical to make the nutrition effective. The nutritionist's job is to establish the correct balance of nutrients in the feed and then to work with breeder managers to ensure that each bird receives the required daily intake of nutrients for age.

The responsibility of the nutritionist

Chickens, and particularly their digestive systems, like consistency. The nutritionist needs to design a feed with readily available, highly consistent, digestible, low toxin ingredients. Once this has been achieved, the feed formulation should not be revised unless there is a change in ingredient nutrient composition. Chasing a few pennies in formulation savings, ends up causing a disruption to the uniformity of the feed.

Pullet and Breeder nutrition is mainly about Feed Management. Pullet and breeder managers need a high quality, consistent feed in order to learn how to feed their birds. Changing feed composition means that managers have to re-learn how to feed their birds with every change.

Determining the correct nutrient composition of pullet and breeder feeds

Too often Nutritionists look to published works for the "correct or ideal" feed formulation to feed their breeding stock. Since we allocate feed on a daily basis or some other feeding program, formulation nutrient levels should be determined based on each operation's particular facilities.

The ability of the feeding system (rate of distribution, type of feeder, stocking density and feed program) will determine the uniformity of feed delivery to each bird.

Once it has been determined how much feed is needed to charge the system and evenly deliver feed, the energy density (bulkiness) of the feed can be set. With feed amounts and ME levels established, the amino acid and other nutrient densities can be calculated. A well-managed, efficient system with sufficient feeder space can feed a more nutrient dense feed than a poorly designed and managed system. A daily feeding program requires a less dense feed than a skip feeding program.

Using available resources to help set nutrient levels of feeds

Primary breeders publish nutrient, feed amount, body weight and conformation guides. Unfortunately, due to the difficulty and expense of conduction breeding stock studies, there is very little useful or reliable published information. Genetic improvement is very rapid so most published work is dated or conducted with older breeds.

Primary breeder guides are good place to start for nutrient levels. However, as with academic institutions, they too have difficulty conducting useful breeder studies that represent all of the different production/ feeding systems.

The procedure used by the author is:

1. Review available information
2. Evaluate housing and feed systems
3. Use actual feed intake, body weight and conformation measurements
4. Calculate daily ME intake based on feed amounts

5. Set amino acid, mineral and vitamin levels
6. Tabulate these values and plot them graphically to see the picture. Table 1.
7. Re-evaluate field performance by handling birds and reviewing the results.

Table 1. Daily nutrient intake per bird, assuming daily fed

						Feed Composition					Daily Nutrient Intake				
Week Age	Age Days	Avg. Weight Ross 708 lbs	Ross 708 gain per week	BW lbs	Daily Feed g/b/d	ME kcal/kg AVG	CP % AVG	dLys % AVG	dM+C % AVG	dThr % AVG	ME kcal/d AVG	CP g/b/d AVG	dLys mg/b/d AVG	dM+C mg/b/d AVG	dThr mg/b/d AVG
0	-	0.08	-		16	2800	19.0	0.95	0.82	0.74	44	3.0	151	130	117
1	7	0.24	0.16		25	2800	19.0	0.95	0.82	0.74	70	4.7	237	205	185
2	14	0.47	0.23	0.50	29	2800	19.0	0.95	0.82	0.74	81	5.5	274	237	214
3	21	0.68	0.21	0.70	31	2800	19.0	0.95	0.82	0.74	87	5.9	296	256	231
4	28	0.88	0.20	1.10	33	2800	16.3	0.63	0.61	0.53	93	5.4	209	203	176
5	35	1.08	0.20	1.30	35	2800	16.3	0.63	0.61	0.53	99	5.8	223	216	188
6	42	1.28	0.20	1.50	38	2800	16.3	0.63	0.61	0.53	105	6.1	237	230	200
7	49	1.48	0.20	1.70	40	2800	16.3	0.63	0.61	0.53	112	6.5	251	243	211
8	56	1.68	0.20	1.90	42	2800	16.3	0.63	0.61	0.53	118	6.9	265	256	223
9	63	1.87	0.19	2.10	44	2800	16.3	0.63	0.61	0.53	124	7.2	278	269	234
10	70	2.07	0.20	2.30	46	2800	16.3	0.63	0.61	0.53	130	7.6	292	283	246
11	77	2.27	0.20	2.50	49	2800	16.3	0.63	0.61	0.53	137	7.9	307	297	258
12	84	2.47	0.20	2.70	51	2800	16.3	0.63	0.61	0.53	143	8.3	323	312	271
13	91	2.67	0.20	2.90	55	2800	16.3	0.63	0.61	0.53	154	8.9	346	335	291
14	98	2.87	0.20	2.97	58	2800	16.3	0.63	0.61	0.53	163	9.5	367	355	308
15	105	3.06	0.19	3.25	62	2800	16.3	0.63	0.61	0.53	173	10.0	388	376	327
16	112	3.30	0.24	3.55	65	2800	16.3	0.63	0.61	0.53	183	10.6	412	398	346
17	119	3.49	0.19	3.70	70	2800	16.3	0.63	0.61	0.53	195	11.3	439	425	369
18	126	3.8	0.26	3.80	74	2800	16.3	0.63	0.61	0.53	207	12.1	467	452	393
19	133	4.02	0.27	4.11	79	2800	16.3	0.63	0.61	0.53	220	12.8	495	480	417
20	140	4.32	0.30	4.45	83	2800	16.3	0.63	0.61	0.53	233	13.6	524	507	441
21	147	4.63	0.31	4.75	88	2800	16.3	0.63	0.61	0.53	245	14.3	552	534	464
22	154	4.95	0.32	5.00	93	2800	16.3	0.63	0.61	0.53	259	15.1	583	564	490
23	161	5.28	0.33	5.35	97	2800	16.3	0.63	0.61	0.53	272	15.8	612	592	514
24	168	5.61	0.33	5.61	102	2800	16.3	0.63	0.61	0.53	284	16.6	640	620	539
25	175	5.93	0.32	5.93	105	2800	16.3	0.63	0.61	0.53	295	17.2	664	643	559
										Cumm	**4181**	**246**	**9680**	**9288**	**8093**

Figure 1. Daily intake ME (kcals) and Crude Protein (grams)

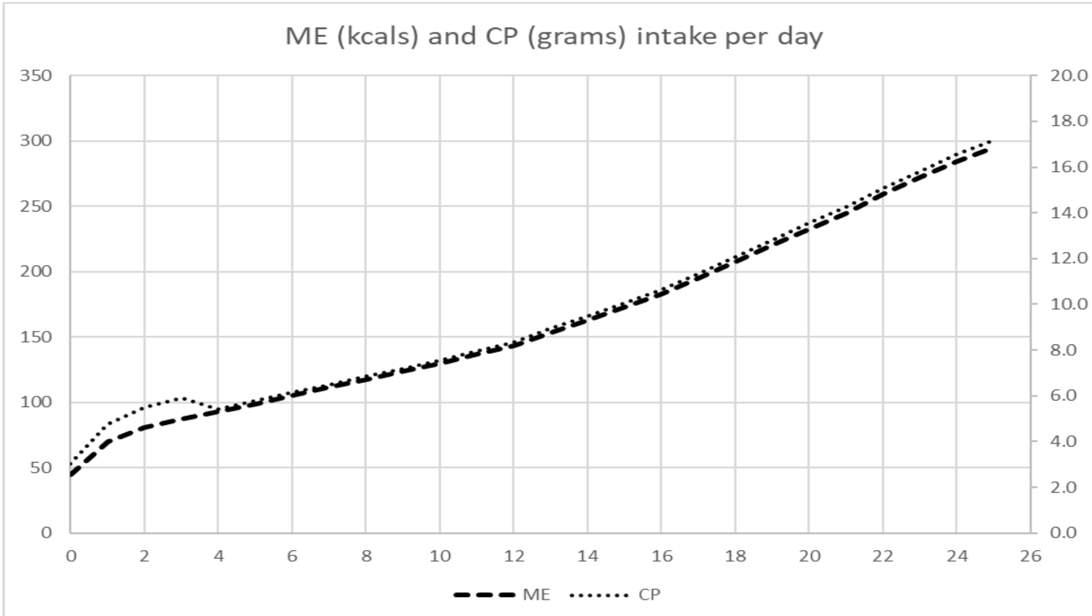
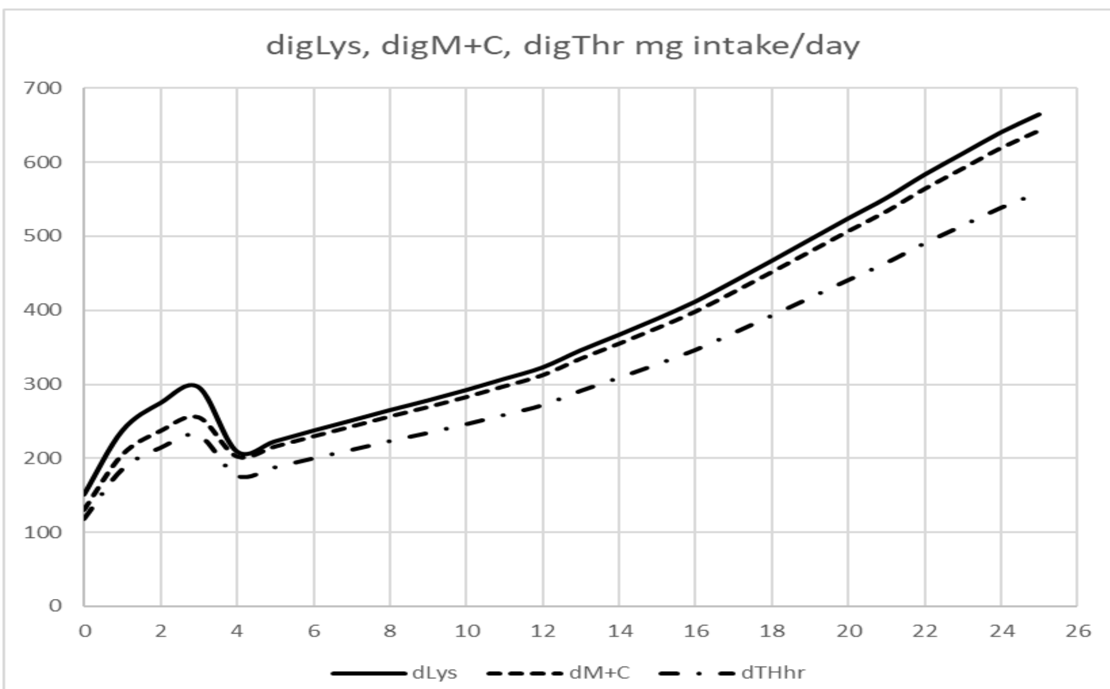


Figure 2. Daily intake digLys, dig M+C and digThr in mg/bird/day



The graphical representation highlights areas of concern. For example, in this scenario; digestible Lysine daily intake at 3 weeks of age is 296 mg/b/day, after the feed is changed from Starter to Grower at +/- 21 days, daily intake drops to 209 mg/b/d, daily intake dose not equal the 3-week intake level again until 10 weeks of age. This puts significant stress on the birds. The more aggressive birds will attempt to meet this daily intake by increasing feed intake.

Anytime we have situations like this, we negatively impact equal daily feed intake (daily nutrient intake). If these changes are large enough, the only option for the less dominant birds to try and meet their daily amino acid needs is to start eating feathers. They will start off eating floor feathers and then start pulling feathers, primarily the soft thigh feathers.

Too often the author hears **"feed higher protein to improve feathering"**, it isn't about crude protein, it is about ensuring that correctly balanced nutrients are evenly distributed to each bird at every feeding. Too often increasing crude protein only exacerbates the problem.

Lysine drives muscle accretion. The greater the lysine excess, relative to the other amino acids, the more muscle protein accretion and therefore the higher daily maintenance requirement for energy and the other amino acids, particularly TSAA amino acids.

Calorie intake in relation to amino acids

Due to genetically selecting for more lean chickens and efficiency of nutrient utilization, it is very difficult to deposit sufficient body fat on the birds needed for sexual maturity. Overfeeding amino acids (particularly lysine) results in over fleshed birds with little or no fat reserves. Nutritionists should be routinely checking fat deposits on pin bones at 20 to 23 weeks of age. This together with fleshing and feathering will indicate whether or not they have the correct relationship of ME to amino acid balance.

The author has seen many programs where ME is lowered in the Grower feed to reduce calorie density in order to increase feed amounts to the birds. The amino acid density is not proportionally reduced, this results in high CP / amino acid intake.

The author believes this is primarily because nutritionists are afraid to feed a +/-14% crude protein feed. Over feeding amino acids relative to calories results in over-fleshed birds, with no abdominal fat. The maintenance requirement for these birds is higher and they will need higher daily nutrient allocations for the rest of their lives just to maintain this excess fleshing.

Feeding Breeder females post peak

Many perfectly good breeders are damaged due to poor post peak feeding practices. Companies adopt various post peak feeding schedules;

1. A set schedule of so many pounds/100 per day (grams/bird/day) – No two flocks have the same; body weight, condition, egg production, environment and activity. It looks good for benchmarking, but it isn't the best way to feed a breeder.
2. Adjusting according to weight – we sample and weigh a very small sample of birds in a house; the bigger, slower birds are generally the ones that are caught and weighed. Feed adjustments do not manifest themselves in the birds for 10 to 14 days, managers are continually chasing a moving target.
3. Weighing eggs – egg weight responds very quickly to over or underfeeding of nutrients. It is quick and easy, bulk weigh 120-150 eggs per day and plot the weights on a graph. Feed adjustments can be made timely and accurately.

Male feed management

Males are generally poorly managed. Most of the attention is focused on pullets and breeders; males are an afterthought. We do not have chicks without a fertile male. This is very apparent when we look at current hatch statistics.

<u>Why are males and females still reared comingled?</u>

1.They have very different growth profiles and behaviors.

2. Comingled flocks generally have poorer flock uniformity.

3. Feed cannot be correctly and evenly allocated to the birds.

4. It goes against every principle of good pullet and rooster rearing

Male weight, condition and uniformity must be maintained in the layer house.

Testes of males that lose condition resorb and will not recover even if their condition and weight is restored. Common problems seen with male feeding;

1. Incorrect feed amount for level of mating activity and environment
2. Poor feeder designs, too deep, spacing too narrow
3. Feeder lines not secure when lowered. A feeder line that tips will result in a 50% loss in available feeder space.

4. Uneven floors. Breeders like to dust bathe and will scratch shaving away from under feeder lines. Even out floors
5. Feeders too high or too low. Measure feeder heights and observe feeding. Not all roosters have the same shank length. Each flock needs to be observed and the feeder height set accordingly. Hens will feed at male feeders if they are too low.

Summary

Pullet, breeder and rooster nutrition needs to focus on the **equal daily intake of nutrients**. The nutritionist needs to spend time in the field; observing, fleshing, weighing and feather scoring the birds. Proper breeder nutrition cannot be accomplished by sitting in an office running least-cost formulations.

1. Determine the nutrient levels for each phase of growth
2. Know the daily allocation of feed to meet those levels
3. Find those ingredients that are readily available, have a consistent composition and have good digestibility
4. Don't change formulations for a few pennies or even dollars.
5. Understand and manage feeding systems, support upgrading systems that allow more even feed distribution
6. Don't allow nutrition decisions to be mandated by benchmarking systems or accountants. They have never run a breeder or broiler study. They are not responsible for breeder performance, hatchability or chick quality – YOU ARE.

Literature Cited

Aviagen Ross 708 Parent Stock Nutrition Specifications 2021

Cobb 700 Breeder Performance and Nutrition Supplement 2020-01