



Allocating Feed to Female Broiler Breeders: Technical Bulletin #2

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Introduction

Managing broiler breeders is a new challenge with every flock as breeder companies produce new and improved “models” that have better growth efficiency and productivity than the year before. At the same time producers have been getting better at raising highly uniform flocks.

All this progress means that the way we have allocated feed in the past might not be the most effective way to feed new and improved strains. Getting the right amount of feed to your broiler breeder pullets at the right time (during rearing, sexual maturation and lay) is the most important – and the trickiest - part of raising broiler breeders.

Flock uniformity is a key ingredient in the recipe for highly productive flocks. The reason is simple: birds in uniform flocks tend to respond to changing feed allocations in the same way, without a lot of variation between birds. Birds from a flock with poor uniformity will tend to have a wide range of responses to changes in feed allocation. More feed may benefit some of the birds while shortchanging or over-feeding others. The consequences of poor uniformity can be disastrous to a farm’s bottom line.

Modern broiler breeder strains come into lay faster following photostimulation than ever before. Proper timing of photostimulation and feed management during the sexual maturation period is **critical** to the long term productivity of a flock.

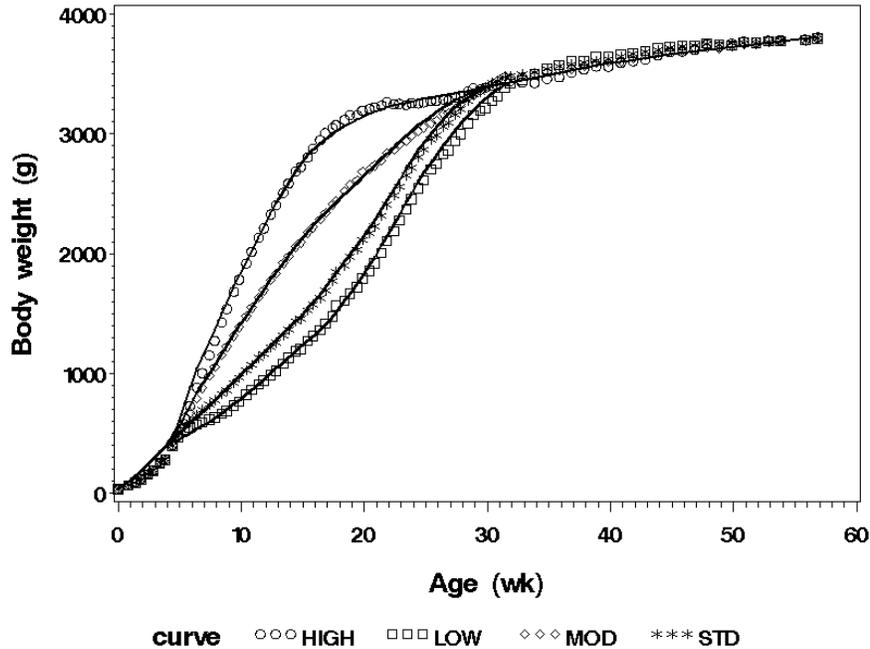
Building a strong foundation

There are a few points you should keep in mind during the initial part of the flock’s life that will result in higher productivity later on:

- Use feeding strategies to control body weight - this may involve skip a day feeding or other programs such as 4/3 or 5/2 where you allocate feed four or five days, and skip three or two days per week, respectively.
- Flocks **must** stay within the breeder company’s recommended target body weight range – avoid over and under weight birds! Remember, productive flocks need to be in the recommended target body weight range and at the optimal frame size to be the most productive.

- The best source of information on body weight targets is your primary breeder guide. We can show you how to allocate feed to meet those targets.

Just in case you think that it is impossible to raise a flock that meets target weights, have a look at the following graph.



This graph illustrates what we were able to achieve in a trial here at the University of Alberta. Birds were raised on one of four very different target body weight curves. As you can see in the graph, none of the groups were **ever** far from target weights.

So, how did we do it?

- **Accurate and frequent** weighing

Birds in this study were weighed **twice** per week starting from placement until 32 weeks of age. After 32 weeks body weights were recorded weekly. Weighing more often allowed us to get rapid feedback on how changes to feed allocations affected body weight and the average daily gain. While weighing twice a week required extra labour, it paid off in accuracy. If you have automatic scales, you might even consider looking at daily gains and daily feed allocations. More frequent weighing gives you a much clearer picture of a flock's status - it's like having washer fluid when the roads are a mess!

- **Body weight gains** – understanding and reacting to them

Instead of focusing just on body weight, look at gains. How much birds gained in the past few days and how much they need to gain in the next few days is very important in a feed allocation decision. We developed a spreadsheet that you

can use for tracking body weight and gains. An example of the spreadsheet is below:

Date	Age (wk)	Target BW	Actual BW	Gain Last Period	Target gain next 4 days	Target gain next 7 days	Target Gain next 14 days	Amount not eaten (estimate)	Amount eaten last period (last allocation)	Amount to feed in next period (next allocation)
		(g/bird)		(g/bird/day)						
5-Dec-02	10	976	971	12.3	15.5	15	14.6		48.5	51
9-Dec-02	10.6	1033	1030	14.8	11.5	14.7	14.5		51	52
12-Dec-02	11	1076	1070	13.3	15.8	15.1	14.7		52	54
16-Dec-02	11.6	1133	1125	13.8	12.8	15.4	14.9		54	55.5
19-Dec-02	12	1176	1154	9.7	19.8	17.4	15.9		55.5	60
23-Dec-02	12.6	1233	1205	12.8	17.8	18.3	16.2		60	64

Using this method, all the information you need to make an informed feed allocation is available at a glance. You can see how the flock has been gaining over the past 7 days, along with the gains needed in the next 4, 7 and 14 day periods. It is a good idea to estimate the amount of feed being wasted or left in the feeders by the flock to further refine the feed allocation. If the flock is gaining at a good rate, increase the feed allocation slightly. If they are gaining too quickly, hold their feed allocation where it is. As the birds grow they will require more feed to maintain themselves, and their rate of gain will decrease on the same amount of feed. When body weight gains are monitored often, you won't get too far off of your target, and small corrections will keep you very close to the target.

This spreadsheet is a good starting point - feel free to use it on your farm. You can download a copy of the spreadsheet at www.poultryresearch.ca.

Pitfalls

There are a few things that can mess up your growth curves:

- 1) Nutrient levels are different in starter, grower and layer diets – you need to consider how nutrient levels differ when switching rations or you could be surprised by changes to body weight gains. Don't worry, though. If you weigh your flock frequently enough, you'll be able to compensate very easily.
- 2) Changing egg production rates. Egg production is just another nutrient requirement (see Figure 1). As egg production increases, birds need to eat to support the increase in production. As egg production decreases, birds require less feed. Don't worry too much about egg production, though. If your feed allocation is close to enough, the birds will lay. The target body weight curve increases through the whole laying period. Because you weigh your flock often enough (at least twice per week until 32 wk), you will be able to adjust feed allocation in response egg production simply by watching body weight.
- 3) Temperature changes. If the temperature is too cold, birds need to generate their own heat by "burning" feed in the cells of their bodies. If the temperature



is too warm, feed intake may drop, and egg production and body weight may also drop.

- 4) Health. Disease outbreaks such as coccidiosis or bronchitis will usually cause a drop in weight gains. If you see an unexpected change in performance, have a close look for signs of disease.

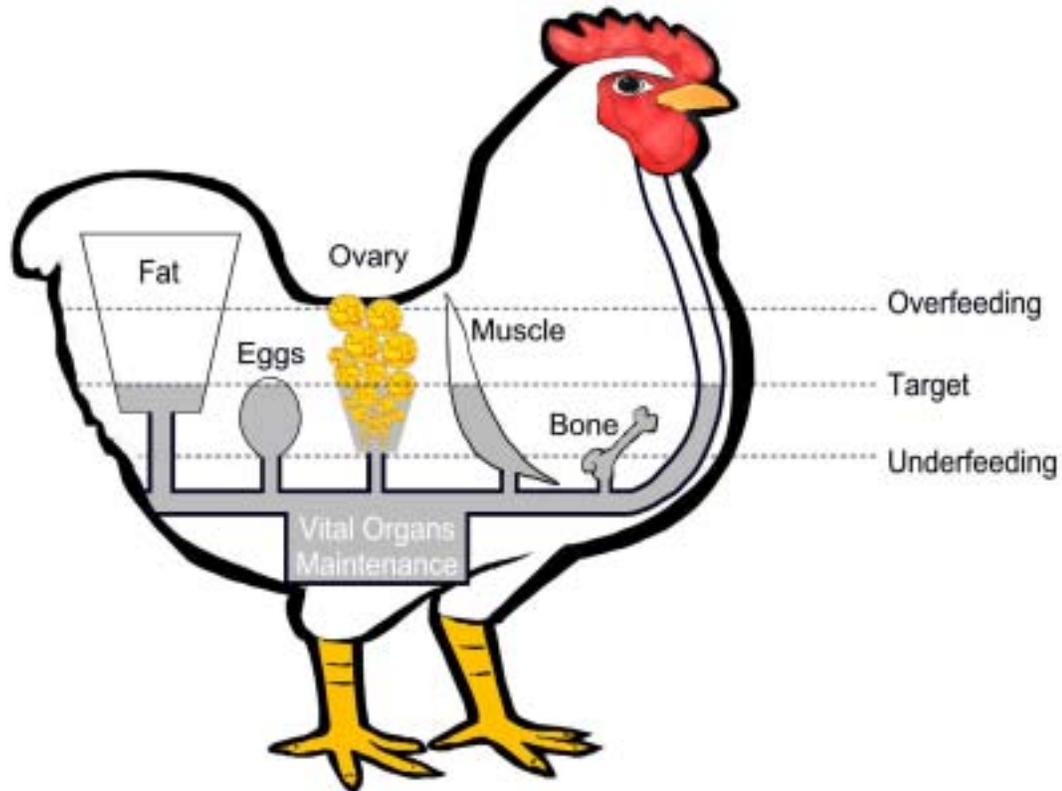


Figure 1. Hydrostratic nutrient partitioning model of a broiler breeder hen. Think of nutrients as water. As they “pour” into the bird, the nutrients serve vital organs first. Bone and muscle growth receive the next highest priority, followed by reproduction. Oversupply of nutrients results in fatness and excess follicle production.

Why is the sexual maturation period so important?

The sexual maturation period is the time between photostimulation (increase in the number of hours of light per day) and peak production. Lighting stimulates the production of sexual hormones that in turn stimulate the development of reproductive organs.

A few things to keep in mind:

- The state of the ovary at sexual maturity has long term implications for egg production and health. Overfeeding as the birds come into production is linked to reproductive disorders and poor persistency of lay. Large decreases to feed intake can negatively impact egg production. Always make changes gradually. When faced with nutrient shortages, the hen

may consider egg production a frivolous activity; it may not rank as important as maintaining body condition. Figure 1 illustrates how nutrients are allocated within the chicken. Fat, egg production, ovary development, muscle, bone, vital organs and maintenance are the reservoirs that nutrients flow into. In the hydrostatic nutrient partitioning model, think of nutrients as water that flows into each of the reservoirs. The first priority for nutrients is maintenance of vital organs, then bone and muscle growth, reproduction, and fat deposition. If a bird is underfed, it may grow a little, but it will not get fat, and it will not lay well. The target level of nutrient intake is optimal for egg production. If nutrient intake is excessive due to overfeeding, excess fat, muscle growth, and ovary development will occur.

- Birds are most sensitive to circulating estrogen levels during the first 2-4 weeks after photostimulation. Over-feeding during this time can cause too many follicles to develop in the ovary, which can increase the number of unsettable eggs (soft-shell or double yolks), and decrease persistency of lay.
- Consequences of good or bad body weight uniformity will be seen during sexual maturation. Uniform flocks are more likely to come into production at the same time and have a higher peak production than non-uniform flocks. Non-uniform flocks are more likely to become even less uniform, and may have reproductive disorders since some birds will be getting more (and some will be getting less!) feed than they need.

So, how do I manage feed allocation during the sexual maturation period?

Feed allocation is most critical as the birds come into production. Hens require energy to produce eggs, maintain their body condition, and continue growing. Extra nutrients go into liver fat, body fat, excessive follicle development and excess muscle. Nutrient shortage will usually result in smaller or fewer eggs, or both.

During the onset of egg production, weekly changes to feed allocations are not quick enough to address the rapid changes in nutrient requirements. More frequent increases are necessary to ensure that the requirements of the birds are met while maximizing production. It is important to provide the nutrients that the birds need right at the time that they need them.

Allocating feed based on egg production may not be effective since there is often too much lag time between changes in egg production and changes to the feed allocation. Rather than basing changes to feed allocations on egg production during this period, **changes to feed allocation should be made based on body weight gains**. Weighing twice per week will allow you to respond more effectively. In addition to what we've told you in this guide, your breeder manual

will offer suggestions for managing feed allocation during this critical period. Use the spreadsheet to track gains and % production.

Using the spreadsheet

Users will need to enter some information to get started:

1. Target body weights from the breeder company manual
2. Recommended feed allocations and diet specifications from the breeder company manual
3. Current ACCURATE (repeatable) body weight (flock average)
4. Flock placement date (age)
5. Feed consumption (subtract amount of uneaten feed, if applicable)
6. Egg production (hen-week %) – although we recommend that you base feed allocations on body weight it is useful to know the egg production rate of the flock.

What about post-peak production?

Post-peak production (roughly 32-60 weeks of age) is perhaps the most overlooked period of a broiler breeder's life. However, careful feed allocation during this period must remain a high priority. Maximizing egg production is the main objective during this time; reducing feed allocation as egg numbers decline has two benefits: feed costs will go down and it keeps the birds from becoming overweight. Too much feed after peak production will result in over-fat hens. Even though more nutrients are supplied for egg production, egg production and fertility decrease as an overweight flock gets older.

After 32 weeks of age, nutrient requirements change more slowly: body weight increases slowly, and egg production decreases slowly. Therefore weighing birds and changing the feed allocation once per week after 32 weeks is adequate. Monitor egg production closely. Once egg numbers begin to fall after peak production, it is time to **reduce the feed allocation slowly while maintaining the small increases in target body weight.**