Attaining consistent broiler breeder performance

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Broiler breeder management can be a complicated area and one should not expect consistent flock performance by focusing on only one or two variables.

When assessing egg production, most people focus on bodyweight and bodyweight gains and compare this to a standard curve. This is largely an ineffective technique because pullet bodyweight is a crude indicator of subsequent hen performance. If it were that simple, over time every flock would follow the same bodyweight program!

Excellent egg production is achieved across a host of bodyweights. Simply examining bodyweights in a best versus worst egg production comparison is of minimum value (Fig. 1).

Metabolisable energy intake

The core factor influencing flock performance is nutrient intake and more specifically metabolisable energy intake during certain periods of a bird's life.

Supplying adequate nutrients at appropriate times provides a flock with positive well being signals to produce the correct building blocks for good performance. Timing is critical – increased energy consumption at the wrong time will increase mortality and reduce egg production.

Peak egg production determines the overall performance in three out of every four flocks. For every 1% increase in peak production, an additional 1.6 total eggs per hen housed will be achieved. The response of the hen to light stimulation is determined by its well being or general condition.

After light stimulation, controlling nutrient intake is the primary factor defining the well being of the bird. Today's breeder diets oversupply the pullet and hen with all nutrients except for metabolisable energy, therefore energy is the limiting nutrient.

Energy must be elevated during the flock's climb to peak egg production but high amounts of bodyweight coupled with increases in egg production will increase mortality and lower total egg production.

The amount of energy supplied can exceed the hen's ability to convert feed energy into tissue and egg mass, thus increasing mortality and causing unnecessary stress.

Between the initial light stimulation and 5% egg production, an excess of energy intake is negatively correlated with hen livability.

Assuming the correct muscle mass was achieved at light stimulation, hens need relatively low energy increases during this period.

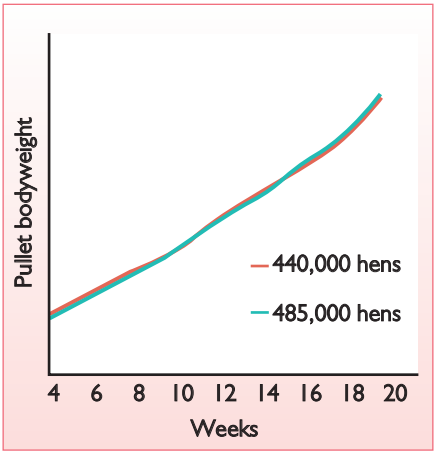
This is not the right time to try and correct an error associated with improper pullet management. The focus during this period should be on reducing stress related to transfer with emphasis on reproductive system development rather than bodyweight gain. An average weekly energy increase should be no more than 9kcal/bird.

Modern breeders are very efficient at producing an egg. Not including the energy content of the egg, the Cobb hen only requires 11kcal/egg. Adding the energy content of the egg, the hen requires 2.11kcal per gram of egg weight (Table 1).

Thus, for a hen laying a 60g egg, the energy needed to produce and lay this egg is 127kcal. For every 5% egg production, a flock requires an increase of 7.5kcal/hen/day of metabolisable energy.

The 7.5kcal/day increase already includes the energy needed for bodyweight gain.

Fig. 1. Analysis of 925,000 hens comparing pullet bodyweights of good and poor producing flocks within the same complex and time period. There is a 21 total eggs per hen housed difference between these two groups (disaster flocks have been removed). Very little differences in bodyweights are evident, signifying that there are more important variables that influence egg production.



Pre-peak management

Post-peak management is important, but not as critical as pre-peak management. Bodyweights must be monitored as excessive bodyweights may decrease fertility and hatchability.

For every 5% drop in egg production the flock will require a decrease of 7kcal/day of energy intake.

There is a slight difference in pre- and post-peak energy amounts for egg production due to the fact that egg size and bodyweight are larger and bodyweight gain is decreased.

Absolute feed or energy intakes have not been mentioned. The energy needed for bodyweight gain and egg production is constant under most environments. Energy required for maintenance, however, is highly variable and determined via bodyweight, ambient temperature exposure and immune system status.

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From a practical viewpoint, energy increases required for egg production should be added to the energy intake at the start of egg production. In other words, peak energy amounts should never be the same but must be adjusted to the amount of feed intake at the start of egg production.

The most critical time of a flock's life is in the rearing phase before light stimulation.

Unfortunately, this covers five months and, as many factors can influence the well being of the flock, it can be overwhelming to analyse this period as a whole.

There are, however, certain periods during the pullet rearing cycle when specific events must occur and other periods which are less critical. Energy intake and muscle accretion are highly correlated to egg production and have the most impact on performance.

The only time that crude protein and amino acid intake are truly limiting is during the first few weeks of a chick's life.

Increased crude protein intake will improve flock uniformity but also increase bodyweights. Heavy bodyweights early will require a higher degree of feed restriction later.

Energy intake from 10-14 weeks is an important factor affecting breeder flock performance. Flock analysis shows that increasing energy intake during this time boosts egg production regardless of bodyweight gains.

An average weekly energy increase of at least 7kcal/bird/day during weeks 10-14 is required. If bodyweights are below target, weekly energy increases of greater than 7kcal/day are required. When bodyweights are at or above standard, the 7kcal/day weekly energy increases still need to take place.

From 14 weeks of age to light stimulation, the weekly increase of energy should average 18kcal/bird/day. Bodyweights must still be monitored, since they provide us with an indicator of maintenance needs and environmental stress.

Table 1. Daily energy needs of a Cobb broiler breeder.

	Energy requirement
3.6kg Cobb hen	282 kcal (maintenance and activity)
Body weight gain (5g/day)	14.3
60g egg: x 2.11kcal/g of egg weight	126.6
Total kcal/day	422.9

Metabolisable energy increases may be adjusted higher to achieve the minimum bodyweight standard but never lower.

Most breeder experts have focused on bodyweight and bodyweight gain to improve egg production.

The main focus should be on managing the bird according to the environmental conditions and always keeping the objectives in mind. Achieving consistent flock performance requires the magnitude of the well being signals to change based on the situation.

Critical time frame

There are numerous variables impacting breeder performance, but the primary factor is energy intake. Managing flocks based on accumulated energy intakes over long periods of time is inadequate.

There are certain time frames (four to six weeks in length) of a breeder's life when energy intake should be controlled tightly and other periods when energy intake should be less restricted. Modelling will provide a greater understanding of how the breeder hen functions and allow us to make recommendations based on the environment, housing and management conditions.

One breeder program will not fit all flocks and what works for one customer will not necessarily work for another. ■