

Advances in Feeding Programs

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A feeding program is a tool used by producers to regulate nutrient intake to obtain the performance that optimizes returns. Many egg producers use some of the most advanced feeding programs available in the animal industry while others are still trying to perfect programs introduced in the 60's and 70's. The purpose of this newsletter is to discuss advances in feeding programs and related challenges .

1950's Fed one diet

Until the 1950's many hens were fed one diet. This is the simplest feeding program to implement. However, **protein (amino acids)** intake cannot be adjusted with age or feed intake resulting in excess protein cost and reduced shell quality due to excess egg size.

1960's Introduction of Phase Feeding Programs

Some time near the 60's phase feeding programs based on hen age were introduced. Feeding less protein as egg mass declines helps control egg size, improves shell quality and has the potential to reduce protein cost up to 2 cents/doz. or more. However, phase feeding offers no means to control protein intake as feed intake changes and it requires more diets.

1970's Introduction of Phase Feeding Based on Intake

As temperature decreases hens eat more feed (protein) but only need more energy. This discovery led to the concept of feeding based on intake. By adjusting dietary protein levels as feed consumption changed, protein intake could be held constant. Feeding based on intake gives more control over egg size and shell quality and reduces protein cost up to 4 cent /doz. or more. However it requires more effort , skill, and diets along with keeping accurate performance and intake records.

Prior to the 90's, nutrient requirements were set by feeding graded levels and finding the amount that gave the best performance and feed efficiency. **Since the price of eggs or feed has no influence on nutrient requirements for performance prices were not considered in setting the requirements and journals would not accept price discussions on requirements.**

1980's Introduction of More Sophisticated Feeding Programs

In the 1980's feeding programs with more phases and ranges of diets became available which also helped increase returns. Although some feeding programs have 60 or more phases and diets can be formulated to the nearest gram , the most common feeding programs use diets formulated to the nearest pound with 6 to 8 phases. It is believed in most cases the accuracy of using more than 8 phases and formulating diets in smaller increments than pounds would be more exact than accuracy of feed intake , nutrient requirements and nutrient content of ingredients would support. .

1990's Introduction of Econometric Feeding and Management (EF&M) Programs (Phase Feeding Based on Intake Econometrically)

Until the 1990's producers knew that when hens over or under consumed their returns were reduced but they had no way of knowing how much. It was also known that feeding for maximum performance did not necessarily mean optimal returns. Feeding one diet as in the 50s tended to maximize egg mass but protein cost could be greater than the value of the increased egg mass especially considering the adverse effect of excess egg weight on shell quality. At this point it became clear, there needed to be a way to let **egg and feed prices (the two major factors influencing profits)** be used in setting protein requirements for optimal performance and returns. **If egg and feed prices could be used to help set requirements the goal could change from feeding for optimal performance that controlled egg size and minimized shell problems to feeding for performance that gives optimal returns.**

Being able to see how returns varies as feed and egg prices change gives producers another criteria to consider when selecting diets allowing the potential increase of up to 2 cents/doz. or more in addition to that obtained by phase feeding based on intake. Producers could also see that the spread in egg price due to size and the spread in feed price due to varying energy/protein cost ratios was just as important in determining protein requirements for optimal returns as absolute egg and feed prices.

The same as producers could reason that phase feeding , feeding based on intake and improved environmental control increased returns, they could now reason that using feed and egg prices as part of the equation was just as important .

2007 Introduction of Advanced Econometric Feeding and Management Programs

In 2007 advanced EF&M programs were introduced. A phase feeding program based on intake, a least cost feed formulation program , an EF&M program, a record keeping program , and a production control program were integrated into a single program.

This allowed producers to know :

- A) The **protein and energy** requirement for optimal performance and feed efficiency (egg and feed prices are not considered).
- B) The **protein and energy** requirement for optimal returns considering egg and feed prices .
- C) The cost associated with over or under feeding **protein** as egg and feed price change.
- D) The cost associated with over or under feeding **energy** as egg and feed price varied (Feeding based on intake)
- E) The cost associated with over or under feeding **protein** and **energy** as egg and feed price changed (phase feeding).

Because protein and energy cost represent up to 85% of feed cost and 60% or more or production cost, it is important to have the above information along with performance criteria needed to select diets based on phase and intake in summary form. This makes the

task of feeding based on intake much easier and more accurate while at the same time helping to optimize performance and returns.

When losing money producers could now know how much less protein was required to optimize performance to the level required to minimize losses. The savings in feed cost would be greater than the value of lost performance. Having this knowledge helps reduce losses and at the same time automatically helps regulate supply 1 to 3% potentially influencing returns up to 70 cents/doz. or more. The opportunity to reduce losses and supply at the same time is most likely to occur when the energy/protein cost ratio is low.

Having cost associated with the over or under feeding protein and/or energy does not control diet selection (protein levels fed). It is only one of the many criteria (egg prod. , egg wt. , hen age , feed consumption, house temperature, egg size requirements of the producer, body wt. , etc.) used to help optimize protein efficiency , performance and returns when phase feeding based on intake.

2010 Introduction of Econometric Feeding and Management Programs for Breaker Egg Producers

The introduction of an EF&M program for the breaker egg industry in 2010 allows producers to see protein (AA) and energy levels required for optimal performance and returns as feed and liquid egg prices change. Cost associated with over or under consumption of protein and /or energy are shown in cents /lb of liquid egg and dollars /million hens /wk. One cent per doz. represents \$250,000/million hens/year. Because feeding can easily influence returns up to 6 cents per doz. and also help regulate supply the importance of feeding correctly takes on even more significance.

SUMMARY

In the 60's phase feeding allowed producers to feed diets containing less protein as hens age improving protein efficiency, performance and returns.

In the 70's phase feeding based on intake allowed producers to inc. or dec. dietary protein levels within phases to maintain a constant protein intake as feed intake changed improving protein efficiency, performance and returns.

In the 90's phase feeding based on intake econometrically (EF&M) allowed producers to tune protein requirements up or down as price of eggs and feed changed improving protein efficiency, performance and returns .

In 2000's a least cost feed formulation program, a phase feeding program based on intake , an EF&M program, a record keeping program , and a production control program were integrated into a single feeding program. This increased ease and accuracy of phase feeding based on intake econometrically helping optimize performance and returns.

A major reason for not optimizing the full benefit of feeding based on intake is some feed mills can't handle the number of diets required especially when least cost formulation is practiced. However, new technology allowing automatic electronic transfer of feed formulations directly to the feed mill along with least cost feed formulation integrated into a single feeding program has eliminated much of that concern.

Some producers may be using phase feeding programs based on intake but either don't feed based on intake or adjust feeds to infrequently. For example, they may re-cost diets without changing diet ingredient composition on a weekly basis but least cost diets and feed based on intake on a monthly or longer interval. They may have no accurate or incomplete performance data which prevents or reduces accuracy of implementation. With improvements in environmental control the challenges of feeding based on intake are reduced but the cost of not feeding correctly as feed intake changes is at least 2 to 3 times greater due to increasing feed prices. This is placing increased pressure to implement feeding programs as accurately as possible but the rewards are much greater.

The correct implementation of feeding programs is only half the equation required to optimize performance and returns. Feed formulation is just as important and in a future newsletter advances in feed formulation along with challenges will be discussed.