

Body weight control of turkey breeder hens

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The progress made in improving the growth rate of turkeys during the past two decades has been substantial. However, this improvement in growth rate has been accompanied by challenges in maintaining reproductive performance of turkey breeder hens.

In a similar fashion, over the past several decades, broiler breeders have been genetically selected for meat yield and rapid growth allowing them to easily exceed optimum reproductive body weight (BW).

Control weight gain

This increase in broiler breeder hen BW has been accompanied by some negative reproductive traits such as, increased number of large follicles in the ovary, increased incidence of double ovum hierarchies, increased production of defective eggs, higher frequency of double yolked eggs and a reduction in egg production, especially for full fed hens.

Therefore, in order to obtain optimal egg production, broiler breeder hen BW gain must be controlled during both the rearing and laying periods and feed restriction of broiler breeder hens to control BW has become an established commercial practice.

Turkey breeder hens have not



Heavy hens of today might not be able to get into the nest boxes built for lighter hens of previous years.

been feed restricted in the past because primary breeding companies emphasised selection of reproductive traits at a rate comparable to growth traits in female pedigree lines. In the mid 1980s, primary turkey breeder companies increased their emphasis on growth rate in the female lines as well as in the male lines.

With this change in genetic selection strategy has come some of the same issues observed in the broiler breeder industry. While the changes in the turkey hen may not be as

great as in the broiler breeder hen, many turkey breeder managers believe that in order to maintain a high level of reproductive efficiency, the turkey industry must now control turkey breeder hen body weight.

During the past few years, there has been considerable interest in the use of nutrient (qualitative) or feed (quantitative) restriction programmes for juvenile turkey breeder hens. As mentioned, this interest has been stimulated by the success with broiler breeders and because the primary turkey breeder companies have shifted some of their selection emphasis toward growth in the female pedigree lines.

Hens hard to handle

As this selection pressure produces even larger strains of commercial turkeys and parent stock breeder hens, the problems associated with multiple ovulations, low egg production, and poor shell quality are likely to increase.

In addition, the hens are simply harder to handle especially during the artificial insemination process and, in some instances, these larger hens may be reluctant to enter nest boxes. Therefore, interest in controlling turkey breeder hen body weight is increasing.

Scott and Payne (1942) theorised that the reproductive performance of turkey breeder hens vary under certain environmental or nutritional conditions. Scott reported that eggs from breeding flocks under free range conditions exhibit superior hatching power in comparison to eggs laid by breeders confined to small pens.

This difference was attributed to increased activity of range breeders which had less of a tendency for increased BW.

Continuous evaluation

Since this study 65 years ago, researchers and industry personnel have found that body weight restriction of turkey breeder hens contains an array of complex factors that must be continuously evaluated.

As has been reported in broiler breeders, the method of feed restriction chosen is of great importance if the aim is to exert control of body weight so that reproductive performance may be maximised.

Factors such as hen age at initiation of restriction, the type, degree, and duration of restriction and the season of year during which restriction occurs all can have significant effects on subsequent onset of hen sexual maturity, peak egg production, maintaining egg production and feed efficiency.

Other factors that influence the hen include the re-alimentation period following quantitative restricted feeding, body weight gain following a time of restriction, hen age and time of year at photo-stimulation and overall diet from a protein (amino acid) and caloric standpoint.

Once research has established a baseline for BW restriction programmes, the physiological mechanisms involved should then be determined so that in future years the turkey industry can continue to adapt to genetic, nutrition and management changes.

The response of turkeys to restricted feed or nutrient intake cannot specifically be predicted from broiler breeder research. This may

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A big breeder hen. Line selected for increased body weight.



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 be because, among other differences, turkeys usually do not gain weight during the whole period of egg production.

Reproductive period

The tendency with turkeys is to gain initially but then lose weight during the reproductive period although turkey hens fed ad libitum during the growing, holding and reproductive phases have been reported to either lose or gain body weight, depending on environmental temperature changes. This body weight loss generally coincides with a decline in egg production.

This BW change is usually accompanied by a decrease in feed consumption as egg production peaks. Attaining some specific BW at time of photo-stimulation may not be as important as maintaining a specified rate of gain immediately before and after photo-stimulation.

A strict monitoring of body weight and feed consumption during rearing are very important tools in managing replacement hen body weight.

It would appear, therefore, that turkey hens should be on a programme where they are increasing their body weight as they come into lay and are consuming a diet designed to assure proper ovarian development and the accumulation of potential body reserves for sustaining egg production.

This sounds counter to the whole idea of restricting body weight.

Timing is essential

However, the timing of body weight control is very important. If body weight is restricted while the hen is coming into the lay period, egg pro-

Commercial turkeys.



Heavy hens are hard to handle.

duction will probably not be optimal and may have a negative effect on the entire lay period.

During the later stages of egg production, egg production is decreasing and the hen needs a less nutrient dense diet. Decreasing protein and energy during the second half of the egg production period, especially during hot weather, can help keep excess body weight off the hen.

Protein in the diet

When considering body weight control to improve reproduction, many researchers have believed that the most efficient way to obtain optimum results was to restrict protein and/or energy within a breeder hen's diet during the adolescent period beginning anywhere from 10 or 12 to 18 or 20 weeks of age.

However, mild changes in dietary protein levels during these periods do not seem to be effective in controlling body weight, especially for



Then and now.

today's hen, with little or no effect on the onset of sexual maturity, egg production, egg weight, or egg hatchability.

Protein and energy restriction must be implemented early in the rearing period to be effective in slowing growth. Some have begun this restriction when coming out of the brooder house at five to six weeks of age.

However, breeder starter diets can be effectively reduced in protein and energy to provide slower but healthy growth of the breeder replacement hen poult.

Using low planes of nutrition that are balanced in energy and protein permit normal body development while discouraging obesity. If the growth of a particular flock of hens seems difficult to slow, one can switch to the next diet sooner or, for older replacement birds, possibly use high fibrous diets to slow nutrient intake.

Likely feed ingredients for high fibre diets would be wheat midds and oats. Many turkey managers use whole oats as the sole ration during the early part of the holding period to good effect although oats can be relatively expensive.

Feed restriction

While protein and energy restriction can be used to control hen BW if implemented early enough, many believe that the current genetic selection programmes and pressures to increase weight gain in commercial turkeys have created a need for some form of physical feed restriction for breeder replacement hens.

Early quantitative feed restriction programmes reported in the scientific literature focused on starting at adolescent ages anywhere from 12 to 24 weeks of age.

Many of these programmes were mild in nature with no detrimental effects on egg production.

In more recent reports, researchers used more restrictive measures

of physical feed restriction with greater reductions in body weight.

For example, Hocking (1992) fed breeder hen candidates either on an ad libitum or restricted bases, beginning at six weeks, to achieve a BW reduction of 40% upon photo-stimulation at 18, 24 and 30 weeks.

Thereafter, all treatments were provided an ad libitum breeder diet.

The BW of the restricted hens was significantly reduced until 48 weeks regardless of time of photo-stimulation.

Feed intake after 30 weeks was no longer different among treatments. It was noted that a large portion of restricted fed hens stimulated at 18 weeks did not commence lay until 30-40 weeks and a significant number of hens photo-stimulated at 24 weeks had short laying periods.

The production of cracked, soft shelled and double yolked eggs was higher in ad libitum fed hens. This study is a good example of an early and aggressive feed and body weight restriction programme, while at the same time demonstrating that hens should not be brought into lay too young.

Several studies

There have been several other studies demonstrating the use of early initiated restriction programmes. One very interesting one was by Renema et al. (1993).



These are very early breeders with saddles – we have come a long way!

They reared a flock of male line hens that were either exposed to a quantitative or qualitative feed restriction from 4-28 weeks and were compared to an ad libitum fed control group.

Quantitatively restricted fed hens were given feed allotments so they achieved a BW restriction of 10% as compared to the control treatment at 28 weeks.

Qualitative restricted hens were fed a low protein diet (12%) from 12-28 weeks.

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All hens were fed a standard breeder diet throughout the lay cycle. The quantitative restricted hens, on the basis of hen-day production, laid 6.8 more eggs than the full-fed control hens. The performance of the low protein fed hens was intermediate.

This may signify that as parent stock hens gets even heavier, qualitative restriction alone may not be enough to control breeder hen body weight.

While these early and aggressive programmes show promise, one must be aware that if hens are restricted too much they will not perform well.

Winter versus summer

An aggressive and highly restricted programme that might work well for hens laying eggs in the winter may not work well at all for hens laying eggs in the summer. The key point here being 'too much'.

This is one of those complex factors mentioned above that needs defining. In many cases, this defining will be within each turkey company's specific programme. In other words, there may not be a 'one fits all' programme.

Feed restriction can reduce breast muscle and abdominal fat pad



Range breeders not that long ago.

weight including during early lay. The reductions in frame size will be permanent.

Total carcass protein content changes will usually be reflective of breast muscle mass changes.

These changes can have either no, positive, or negative effects on reproductive performance depending on severity of the restriction, timing of the restriction, season of year and possibly strain of hen.

Growth and reproductive performance of turkey breeder parent flocks can have a direct impact on net returns to a turkey integrator.

Economic gains from even small

increases in turkey breeder reproductive efficiency can be significant given the scale of profit margin of today's turkey industry.

Feed restriction of broiler breeder hens has resulted in a number of technical and economic advantages.

Researchers today must determine if the same can be concluded for turkey breeder hens.

Unfortunately, the economic consequences of these affects are rarely determined in research studies.

Proudfoot and Lamoreaux (1973) compared economic returns resulting from full feeding, restricted feeding (75% of full feed), and full feeding

low protein diets (12.3%) during the rearing period, as well as feed restriction during the laying period.

They reported that feed treatments used during the rearing period had a significant effect on economic returns of hatching egg production with the restricted feeding programme resulting in higher monetary gains.

Economic benefits

If body weight control of turkey breeder hens by either qualitative or quantitative feed restriction programmes results in egg and poul production that is at least equivalent to standard practices, then economic benefits from a lowered average total cost of production might be experienced.

In conclusion, with escalating feed cost and increasingly heavier breeder hens, understanding the potential production and economic benefits of hen body weight control is likely to play a significant role in determining the future of the turkey industry.

Using economic models or at least tracking the effects of hen body weight control practices within one's own company may allow turkey managers to better assess the optimum cost of producing hatching eggs as well as quality poults. ■