

650 Riverbend Drive, Suite C
Kitchener, Ontario, Canada N2K 3S2
Phone +1-519-578-2740
Fax +1-519-578-1870
www.hybridturkeys.com

Breast Meat Yield in Commercial Turkeys: Utilizing the Genetic Resource

The goal of any company is to develop a strategy that will optimize available resources in order to maximize profits, while at the same time providing customers with the highest quality products. Optimization could be defined as finding the solution that is the best fit to the available resources (in most businesses the solution is sustained profitability). In the quest for optimization, resource management becomes critical, and every company has a different set of resources with which to operate. One company may have a significant feed cost advantage due to its geographical location, while another company may have a significant labor cost advantage. Yet another company may have a significant climatological advantage that allows for maximum growth rate, while another company might have unique brand name recognition at the retail level. A company's resources may be fluid with each resource's relative rank in importance constantly changing. Some important resources are often overlooked or even unidentified.

Considering that many of these resources interact with each other, the list becomes exceptionally long and difficult to manage. Breast meat yield is so influential that virtually every resource and process in a vertically integrated system (and their interactions!) must be carefully evaluated.

Unfortunately in many cases, information on how certain factors impact performance (particularly breast meat yield) is limited or altogether missing. For example, an upcoming Hybrid Info Sheet will

suggest that the incubation environment may have a significant impact on breast meat yield, but in spite of all the embryology research that has been conducted, even this is poorly understood.

Genetic potential is one of the most often overlooked and mismanaged resources. While management teams make decisions as to which breed and how much stock to purchase, in many cases this is where improvements stall. Hybrid Turkeys has installed systems to ensure that the genetic potential from its pedigree breeding pens gets into the hands of the customer as rapidly as possible. How this genetic potential is managed by the customer can have a significant impact on profitability.

The turkey industry is the only livestock industry that depends exclusively on artificial insemination to propagate stock at the commercial level. Even so, the practice of artificial insemination has changed very little since the early 1960's when it was first used commercially. Breeder managers are almost paranoid about low fertility levels and consequently often use the "more is better" approach to manage the artificial insemination system (e.g.: more neat semen per insemination, larger insemination doses, increased insemination frequency, etc.). However, if this approach is taken in hopes of correcting other deficiencies in the system (e.g.: poor insemination technique and mismanagement of the breeding males) the results may be disappointing, and the genetic resource poorly utilized.

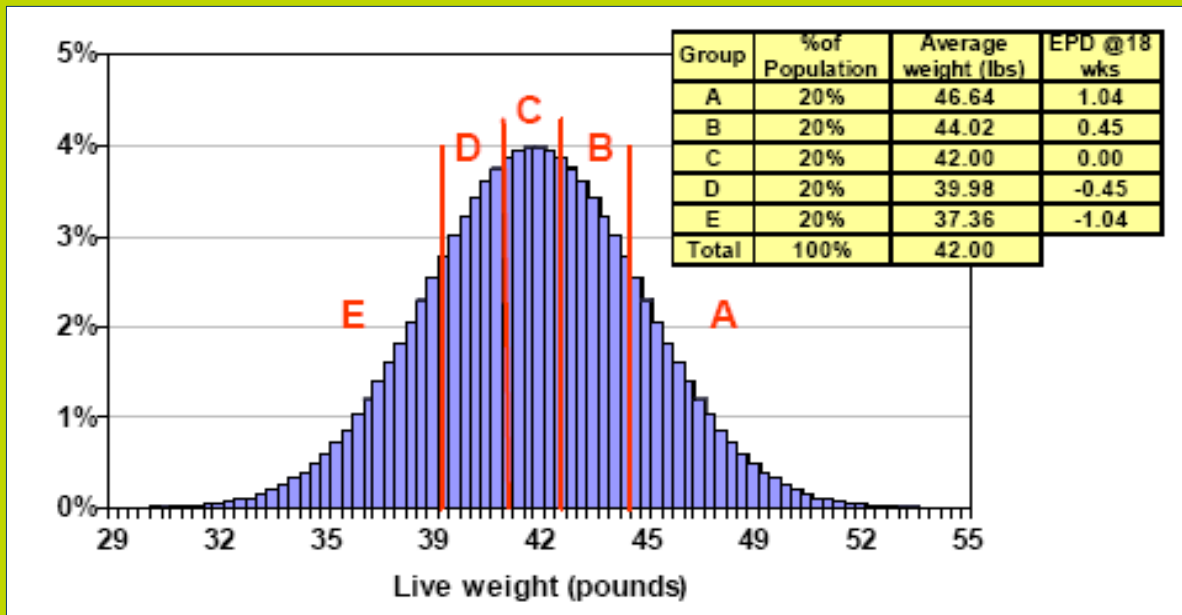


Figure 1: Distribution of body weight parent stock breeder toms @18 weeks of age

The swine industry has taken a different approach... it's called optimization. Integrated swine companies strive to achieve high reproductive performance (i.e.: fertility, conception rates, pigs per litter, etc.), but not at the expense of under utilizing the superior sires at their disposal. In many operations, some reproductive performance may even be sacrificed in order to better utilize superior sires. The impact seen through improved progeny performance (i.e.: growth rate, yield, carcass quality) from better utilization of superior sires is well understood in the swine industry.

In spite of the high selection intensity that has been imposed for many generations in livestock, considerable genetic variation (genetic potential) still exists. In fact, it is this variation that allows primary breeders to continue making genetic progress. Commercial swine and cattle breeders have developed a statistic known as the Expected Progeny Difference or EPD. This statistic uses estimates of heritability and a prospective sire's own

performance record (compared to his contemporaries) to estimate his impact on progeny performance compared to that of other sires. In many areas of the country, breeders enroll their candidate sires in performance tests where traits such as growth rate, feed conversion, fat content, and loin eye volume are measured. The EPD is calculated for these traits and prospective buyers use this information to make better buying decisions.

Genetically speaking, commercial turkey breeders expect to receive the best possible parent stock the primary breeder can deliver. Even so, there remains considerable genetic variation, and consequently genetic potential, in every group of parent stock breeder toms. How this genetic potential is managed can have a significant impact on the profitability of an integrated operation.



The EPD statistic used by the swine and cattle industry was developed to estimate the comparative breeding value of individuals. However, the same philosophy can be used to compare groups of animals within a population; Figure 1 shows the distribution of a single flock of parent stock toms with an average flock weight of 42 pounds (19.1 kg) at 18 weeks of age.

If we divide this population into five groups (i.e., A, B, C, D, and E) based on body weight from highest to lowest, we find that the average weight of the five groups is 46.64, 44.02, 42.00, 39.98, and 37.36 pounds, (21.2, 20.1, 19.1, 18.2, and 17.0 kg) respectively. Using this information, the expected progeny difference (EPD) or the breeding value for each group can be calculated.

The difference in EPD between groups is considerable. Progeny sired by the males from group A would be expected to average over two pounds (one kilogram) heavier than those sired by males from group E! Most commercial turkey breeder operations practice 50% selection pressure in their parent stock breeder tom flocks. Even so,

the estimated progeny difference between groups A and B would still be 0.59 pounds (0.27 kg)!

The Hybrid Info Sheet, "Selection Pressure – Cost Benefit Analysis", provides a template to help Hybrid customers evaluate the impact of parent stock selection pressure (i.e. managing genetic resource).

The Impact of Selection Pressure on Breast Meat Yield

Growth rate and breast meat yield are strongly related. Not only do heavier turkeys put more weight on each shackle in the processing plant, but faster growing turkeys typically have a higher percentage breast meat yield. Figure 2 presents data from a commercial turkey processing facility. Each point represents data from a single flock of turkeys.

While many factors can affect breast meat yield, growth rate, especially after 16 weeks of age,

clearly has a significant impact. Utilization of superior sires will result in improved growth rate and the associated breast meat yield that could net an operation slaughtering 5 million toms over \$1.5 million annually. Managing the genetic resource in a commercial turkey breeder operation is really all about the efficient utilization of superior sires. One reason that this resource is often under utilized is that breeder operations are frequently managed independently of the overall integrated system. The performance of the breeder operation is often evaluated based upon poult cost alone with little consideration given to the final product's performance. When one considers that the impact of better sire utilization could be over \$0.01 per live pound produced, it is easy to understand why the genetic resource can be such a powerful tool in a turkey operation.

Managing the genetic resource requires top-notch management of the breeder male...a challenge in any breeder operation. To manage this resource properly, managers must have the necessary equipment and facilities, but just as importantly, they must have good technical information. The Hybrid Turkeys website library contains a wealth of information about managing parent stock breeders.

Visit www.hybridturkeys.com and click on "Library", then "Management" to read more.

The following is a checklist of things to consider when evaluating a parent stock breeder tom program:

- Are sufficient parent stock breeder toms purchased to accomplish selection pressure goals?
- Are parent stock breeder toms brooded and grown to selection age such that they will express their maximum genetic potential for growth rate?
- Is body weight accurately measured at a selection age which correlates well with market age of the progeny?
- Are parent stock breeder males (within each flock) identified and housed by their weight ranking at selection age?
- Is growth rate of parent stock breeder males (post selection) properly managed for maximum reproductive performance (i.e.: frequent collection of high quality and volumes of semen) and longevity (minimize culling and mortality)?
- Are artificial insemination doses prepared based on a target sperm cell number per insemination rather than on a volume basis?
- Are adequate facilities provided for managing breeder toms (e.g. pen density, ventilation, lighting, cooling)?

These are but a few of the things to consider when developing a strategy for managing the genetic resource. Hybrid technicians are available to help customize a strategy for managing parent stock breeder males based on each customer's available resources.