

Size of Thoroughbred yearlings evaluated

Weigh and measure horses during development to ensure that the skeleton maintains a steady rate of growth while preventing the animal from becoming too heavy.

By **JOE D. PAGAN***

RACEHORSE owners and breeders often ask if the size of their foals and yearlings affects either their sale price or their ability as athletes on the racetrack, and if bigger is better, is there a downside to having a large yearling?

Over the last two decades, Kentucky Equine Research (KER), in conjunction with Hallway Feeds, has studied the growth and development of thousands of Thoroughbred foals and now has answers to these questions.

Hallway Feeds is a feed manufacturer located in Lexington, Ky., that caters to the Thoroughbred breeding and racing market. Since the early 1990s, it has offered a weighing program to its stud farm customers. On a monthly basis, foals are weighed and their wither height measured.

Foals are also condition scored to assess the amount of body fat they are carrying using a body condition scoring system adapted from one developed by Don Henneke in the early 1980s at Texas A&M University. With this system, body condition is divided into nine categories ranging from one (extremely thin) to nine (extremely fat). Typically, young Thoroughbreds range between four and six depending on their age and plane of nutrition.

Each of the measurements is recorded into a software program called Gro-Trac, which KER developed specifically to allow breeders to track the growth rate of their foals and make comparisons to foals of the same breed, age, gender and geographic location.

Bodyweight, height and condition score are entered for each foal on a specific weigh day, and the foal's age for that day is calculated. The growth rate of the foal is displayed graphically along with a reference growth curve.

KER has reference growth curves for Thoroughbreds raised around the world that were developed using weights and heights collected from more than 13,000 foals worldwide (Brown-Douglas and

Pagan, 2006).

Although similar genetically, the geographical location where Thoroughbreds are raised affects their growth rate. For instance, American Thoroughbreds tend to be heavier than English Thoroughbreds at 6, 12 and 18 months of age but are smaller than Australian and New Zealand Thoroughbreds between 15 and 18 months of age.

Skeletal condition

There is reason to believe that large foals and yearlings may be predisposed to certain types of skeletal disease. Growing foals can experience several different types of skeletal diseases. These problems are grouped together under the banner of developmental orthopedic

disease (DOD).

DOD is a growth disturbance resulting from an alteration in normal bone formation. It includes phytitis, angular limb deformities, flexure deformities, wobblers and osteochondritis dissecans (OCD). It is generally accepted that excessive energy intake can lead to rapid growth and more body fat, which may predispose young horses to DOD.

KER has conducted field studies that support the idea that size affects skeletal disease. In one study, growth of 271 foals on one central Kentucky Thoroughbred farm was monitored over a four-year period (Pagan, 1998).

The incidence of OCD surgery in these foals was also recorded, with 10% of the foals requiring surgery for OCD. Yearlings that developed hock and stifle OCDs were 10 lb. heavier than the Kentucky average at 25 days of age (about 5% of bodyweight) and, by 240 days, were 30 lb. heavier than the population average (about 5% of bodyweight).

A second study conducted by KER also confirmed that yearling weight and condition score may play a role in the pathogenesis of OCD. In this study, 218



SIZE MATTERS: Size is related to yearling sale price, indicating that buyers perceive that bigger yearlings make better racehorses. Foals with greater height percentiles had a higher chance of becoming stakes winners.

Photo: Kentucky Equine Research.

weanlings on six central Kentucky farms were studied (Pagan et al., 2001).

On each of these farms, the foals were weighed and measured monthly. The main purpose was to assess the relationship between glycemic response and OCD. The overall incidence of OCD in this study was 11.5%, which is similar to the previous study. However, the incidence on individual farms varied widely.

The main findings from this study were that foals with extreme glycemic responses had an atypical incidence of OCD. Foals with a high glycemic response had a high incidence of OCD; those with a low response had a low incidence of OCD. The glycemic index of the foals' feed was a factor. Additionally, bodyweight and condition score were factors.

Two farms in the study had very different incidences of OCD. Farm 1 had no OCD, while farm 2 had a high incidence of OCD, with six of 19 foals requiring OCD surgery. The height of the foals on both farms was similar, but the foals that required OCD surgery on farm 2 were much heavier and had much higher condition scores than the other foals.

These studies and general experience in the field suggest that large yearlings are more prone to certain types of OCD. However, are there benefits to having a large yearling that potentially outweigh the risks? Do large yearlings sell for higher prices at public auction?

These are certainly relevant questions for commercial breeders.

Size

To answer these questions, KER, in conjunction with Hallway Feeds, evaluated the relationship between size and selling price in yearlings at the Keeneland September sale (Pagan et al., 2005). Over three consecutive years, 1,040 yearlings were weighed and measured shortly before they were offered for sale at Keeneland.

Of these foals, 80% were sold, while 20% were listed as RNA (reserve not attained). The average and median selling prices of those sold were \$104,149 and \$35,000, respectively, which was similar to the overall sale averages. The average age of the yearlings in this study was 524 days. Colts had an average weight of 1,014 lb., and fillies averaged 974 lb. Colts were also significantly taller.

Many factors affect sale price of Thoroughbred yearlings at public auction, but the study was conducted to see if size matters.

Keeneland divides sales yearlings into sessions or "books" based on pedigree and conformation, and there is a great deal of difference between books in the value of the yearlings. To take this difference into account, the data were first analyzed separately by session. There was no significant difference in the age of

RNA yearlings or those that sold below or above their median session price.

There was a difference in bodyweight. Yearlings that sold above the median session price were significantly heavier than RNA yearlings or yearlings that sold below the median session price. They were also significantly taller.

Since KER records so much population growth data, it is able to express the size of individual foals and yearlings as percentiles of the entire population. This allows comparisons of individuals regardless of their age or gender.

Expressing yearling weight as percentiles confirms the earlier analysis of raw bodyweight data. Again, yearlings that sold above the median session price were significantly heavier.

Once percentiles are calculated, yearling weight and height can be further divided into quartiles. Quartiles divide the foal's weight and height into the lowest 25% of the population, which is the first quartile; the group between 25% and 50% is the second quartile; the group between 50% and 75% is the third quartile, and the top 25% of the population is the fourth quartile.

When dividing the sale yearlings into quartiles, a large difference can be seen in the median sale price among groups. The smallest yearlings had a median sale price of about \$22,000. That increased in each subsequent quartile, with yearlings in the fourth quartile commanding nearly \$50,000.

Size certainly is related to yearling sale price, indicating that buyers perceive that bigger yearlings make better racehorses. Are they right? To answer that question, KER conducted a large study to evaluate the relationship between foal and yearling size and racing performance.

Performance

Racing performance data were collected from 3,734 Thoroughbreds raised in the U.S. between 1996 and 2002, and their growth records were retrospectively examined to determine if various growth characteristics could be associated with success as a racehorse (Brown-Douglas et al., 2006).

Each had been weighed and measured on a monthly basis as foals, weanlings and yearlings. These measurements were converted into percentiles using population data from Thoroughbreds raised in the U.S.

Horses that raced and two-year-old starters were significantly lighter and shorter than nonstarters. Interestingly, the lightest horses in all age groups had significantly more starts than the heaviest. This may indicate that lightweight horses are sounder. On the other hand, stakes winners and graded stakes winners tended to be heavier and much taller than the rest of the population.

Grade-one winners and horses that earned more than \$1 million were

also significantly heavier and taller as yearlings. There were 21 millionaires in this group of racehorses. Their average height percentile was 78, which means they were taller than 78% of the entire American Thoroughbred population.

Can the chance of a horse becoming a stakes winner be predicted by looking at growth? The various growth measurements as well as sire index were combined into a multivariate analysis to predict the chance of a yearling becoming a stakes winner. Measurements included weight and height percentile, sire index and month of birth.

In foals, height percentile was the only variable included in the model that significantly predicted the probability of being a stakes winner. Foals with greater height percentiles had a higher chance of becoming stakes winners.

In general, the model indicated that extremes in weight percentile (low or high) gave yearlings a lower chance of being stakes winners, whereas a greater height percentile improved chances. Sire index was only important if weight percentile was low, and then, yearlings with the greatest chance of becoming stakes winners were tall and not too heavy and had high sire indexes.

These studies show that there is risk and reward to having large yearlings. Bigger yearlings have a higher risk of skeletal disease, but they are worth more at the sales and are better racehorses if they are tall but not too heavy. Therefore, it can be recommended to weigh and measure horses during growth and development to ensure that the skeleton maintains a steady rate of growth while preventing the animal from becoming too heavy.

Full-text versions of the studies cited are at <http://ker.com>.

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