

Geography vs. Genetics



Growth of Thoroughbreds Around the World

One of the most important goals for Thoroughbred breeders is to produce a fully-grown, sound, and top-performing athlete. Rapid growth in horses has been associated with compromised skeletal growth; however, horses that grow too slowly may not reach optimal size, possibly reducing their sales value and lessening their chances of becoming elite athletes. Weighing and measuring growing horses is extremely important in allowing breeders to compare weight and height of their young stock against a reference growth curve, rather than relying on the "eye" alone.

Reference populations and growth curves

Despite many studies on Thoroughbred growth, there are very few credible reference curves available for breeders to use when monitoring the growth of their horses, and most published growth curves are in a form that is neither accessible nor practical for breeders to take advantage of. Furthermore, traditional growth studies that report absolute body weight and height at certain ages have limitations for practical use as their data must be compared with horses of the exact same age and gender.

For over 15 years, Kentucky Equine Research (KER), an equine nutrition and consultation company, has collected body weight and height data from foals born and raised in the major Thoroughbred-producing countries of the world including America, England, Ireland, Australia, New Zealand, South Africa, and India. Using this database of over 13,000 Thoroughbred foals, KER has compiled detailed reference growth curves for breeders to use when monitoring their horses' growth. Using Gro-Trac™, KER's innovative growth and ration management software, breeders can track and compare the growth rates of

their horses to the average growth parameters of a chosen reference peer group.

Percentiles

Traditionally, Gro-Trac has provided some indication of how a horse is growing by comparing it to a reference population and indicating the percentage of reference. This method is useful, but it does not take into account the spread of the data around the average. For example, there is a much wider range for a horse's body weight than for wither height at a particular age. Body weights can differ by as much as 50 kilograms (110 pounds), whereas differences in height will be only a few centimeters. A horse that is plus 4% of reference body weight is not that much heavier than the average, but if he is plus 4% of reference height, he is a lot taller!

Percentiles deal with this spread issue and allow a more relative comparison with the entire population. Furthermore, horses can be compared regardless of gender and age. Using percentiles, breeders can assess if there are any abnormalities in the growth pattern and adjust nutritional and conditioning regimens as necessary. The use of percentiles is not a new concept in growth studies and is commonly used in pediatrics; however, this

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is the first time such a large equine data set has been acquired to create reference populations from which percentiles can be calculated for Thoroughbred horses.

Geography vs. genetics

Although all Thoroughbreds share a fairly narrow genetic base, geography has a significant influence on growth patterns in young Thoroughbreds.

In general, Australian and New Zealand Thoroughbreds tend to be larger than American Thoroughbreds, which in turn are larger than those reared in England. Indian Thoroughbreds are smaller than all other populations. English Thoroughbreds are as much as 4% below the American average and 7% below the Australian reference. In percentile terms, English Thoroughbreds are in the 30th to 40th and 40th to 45th percentiles on average when compared with Australian and American Thoroughbreds, respectively. American Thoroughbreds average in the 40th to 45th percentile for body weight when compared with Australian Thoroughbreds, but there is little difference in height between these two populations. Indian Thoroughbreds are smaller than all other populations, averaging 7-11% below the reference curve of English and American Thoroughbreds and falling between the 5th and 10th percentile for weight.

The observed differences in weight and height between the populations of Thoroughbreds are probably due to the different environments in which they are reared as well as varying management factors during the growth and development period.

Australian and New Zealand foals are heavier than all other countries between one and six months of age. The temperate climate of Australia and New Zealand permits most mares and foals to remain outdoors all year. This year-round access to pasture, in addition to supplementary feed, helps mares maintain or gain weight after foaling, while producing a high level of milk and supporting rapid foal growth. This is in contrast with early-foaling American mares that often lose weight during lactation and whose foals do not grow as fast as foals born later when their dams are grazing spring pasture.

Australian and New Zealand Thoroughbreds are also heavier and taller than all other countries between 15 and 18 months, while American yearlings are heavier than English yearlings during the same period. These differences are most likely representative of the difference in management of yearlings prepared for sale. American and English yearlings tend to be sold in a lean, athletic, and fit condition compared with Australian and New Zealand yearlings, which are often presented in a well-rounded condition with higher condition scores. This trend for fat yearlings is beginning to change as breeders and buyers realize


the potential musculoskeletal problems associated with overconditioned yearlings.

The different racing industries in each country may further influence how growing horses are managed and conditioned. The American racing industry has significantly more shorter-distance, dirt races than the industries of England, Australia, and New Zealand. As a result, American Thoroughbreds are raised to be precocious sprinting horses ready to race at two years old. In contrast, England, Australia, and New Zealand have traditionally produced slower-maturing turf horses. Nevertheless, Southern Hemisphere breeders and trainers have generally favored heavier-boned horses, which may further contribute to bigger yearlings in Australia and New Zealand.

Thoroughbreds in all countries except India showed seasonal changes in daily weight gain in winter and spring coinciding with changes in pasture quality and availability.

This dissimilarity is likely due to the differences in nutritional management of Indian Thoroughbreds as well as climatic conditions, especially the monsoon season. It is therefore understandable that horses growing in these tropical monsoon conditions will not exhibit changes in daily weight gain associated with seasonal variation in pasture growth in temperate climates. Horse farms in India rely heavily on grain as a source of nutrition, and there is little good-quality forage available. Indian horses spend a significant amount of time indoors due to extreme summer heat and monsoon season, and this restricted access to pasture and exercise may hinder growth potential of these horses.

Conclusion

KER has identified considerable differences between Thoroughbred growth patterns around the world, indicating that reference growth curves specific to location are important. A significant goal for breeders is to produce a fully-grown individual with minimal skeletal problems. One management tool to help breeders achieve this goal is using reference growth curves to monitor growth rates. Reference curves from horses raised in the same environment under similar conditions are more appropriate for breeders wanting to track the growth of their young stock rather than using a general "Thoroughbred" curve. In addition, the use of percentiles to assess individual horses' growth gives a much more useful comparison with a population and allows breeders to adjust nutrition and conditioning practices as necessary to affect growth. 



Reprint Courtesy of Kentucky Equine Research, Inc.

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