HEALTH ZONE

Growth Rate in Foals

Foal Health

BY HEATHER SMITH THOMAS

PHOTOS COURTESY HEATHER SMITH THOMAS

A well-fed youngster might grow faster at first than an underfed one

FOALS GROW FASTEST during the first months of life. Genetics, feed, and environment all play roles in growth and skeletal development. Brian Nielsen, PhD (Professor of exercise physiology and nutrition at Michigan State University) says many horse breeders tend to breed for big horses because big ones often sell better. Racehorses come in many sizes, however. Even though a small, wiry, athletic horse might sometimes be a better runner than a larger, taller, longer-striding horse, most people still want to buy larger yearlings at the sales.

Most horses will eventually reach their genetic potential, but the well-fed youngster might grow faster at first (and be bigger at an earlier age) than the underfed young horse. Many breeders want the most growth they can get in their foals and yearlings, so those young horses will look good at a sale and also be readier to start training at a young age.

"The important thing for the young equine athlete is optimal growth rather than maximum growth," Nielsen said. "If we push young horses too fast, we might cause damage to young, growing bones with too much weight on an immature skeleton. If we aren't careful in feeding and in monitoring growth rate, we might also contribute to growth spurts that are detrimental to long-term bone strength and soundness."

Stephen Duren, PhD (equine nutritionist, Performance Horse Nutrition) says it's important to feed for optimum growth but not to push young horses so much (overfeeding) that they are at risk for joint damage and skeletal problems. This risk might also depend on how much milk the mare produces.

"We should not be looking for maximum growth," Duren said. "Feeding a foal is much different than feeding other young livestock where feed efficiency and rate of gain are what we try to maximize. We want a foal to grow up sound and able to be a high-performing athlete."

Nielsen says most people want big horses, so it's important to feed the young horse properly to optimize growth, without going overboard and causing problems. So if you are breeding and feeding from a marketability standpoint and hoping to sell yearlings, you definitely don't want to underfeed these youngsters.

"Looking back to the 1989 NRC (National Research Council) recommendations, the authors gave an option so you could target your goal and choose between two growth rates," Nielsen said. "You could feed young horses for either a fast growth rate or a moderate growth rate. The idea was that if you feed a balanced diet, both groups (with similar genetic potential for growth) would eventually reach the same mature height. It would just take the moderate group a little longer.

"Most people tend to be cautious when they read something about feeding for a fast growth rate because of concerns about developmental problems. You can, however, feed for fast growth without causing skeletal problems, but it is a trickier challenge. Many people do not have a good enough handle on their nutrition (knowing exactly what is in the feed) to avoid problems. When we moved into the update and did the 2007 Horse NRC, we removed the growth-rate discussion, just because of the negative association about feeding for fast growth—whether or not these concerns are unfounded."

THE YOUNG FOAL

"Initially the energy requirement for a growing foal will be satisfied with milk," Duren said. "Depending on how much milk is produced by the dam, this will early on control the growth rate of her

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foal. We discover this when we have orphan foals and put them on nurse mares of draft origin. Those mares produce a lot of milk, and those foals grow more rapidly. As a result they need to be fed differently to make sure we don't have developmental issues associated with high levels of digestible energy."

Initially foal growth is controlled by the amount of milk (and how rich it is) but this soon changes when the foals start consuming forages—hay and pasture—and nibbling at mama's grain.

Growth is controlled by the amount of milk...but changes when foals start to eat forages

"In my consulting practice I want to make sure we are providing foals with supplemental feed beginning at 21 days of age," Duren said. "After the foal has sampled the dam's feed and knows how to eat it, we want to make sure the mare's feed tub is hung higher and out of reach of the foal, and the foal has access to his own feed tub so we can control and know what he eats. The mare can be clipped to the wall next to her tub so she can't eat his, or he has a special foal feeder that the mare can't eat out of.

"I prefer the individual feeding of foals rather than using a creep feeder out in the pasture for the group. You want to control individual intake, based on the mare's milk production and the foal's growth characteristics."

MONITORING GROWTH RATE

Many Thoroughbred breeding farms in North America, Europe, Australia, and Japan weigh their foals periodically to monitor growth.

"There are established growth curves for Thoroughbred horses, and these curves are based on the country they are in," Duren said. "The data have been modified somewhat for each country, to better reflect their situations, and they have established normal growth curves for foals. The word normal is misleading, however, in the sense that not all foals are going to be the same height."

Genetics will play a role in individual growth rate.

Some farms measure as well as weigh their foals, but you won't find a growth curve for withers height in the NRC recommendations. There's not much research that's looked at growth patterns in terms of withers height, but these types of measurements are built into certain monitoring programs.

"Many of my clients monthly weigh all the foals, weanlings, and yearlings on the farm, and track that—not only by how that particular foal is doing and how the rest of the farm's foals are doing but they can also compare that to a central Kentucky average growth rate, or a Canadian average," Duren said.

This can be a way to compare an individual foal with the other foals on the farm, and how they all compare to the breed average.

"My caution with this tool is that we don't want to utilize just that number to determine how to feed the foal," Duren said. "You also need to have some skill in horsemanship and know how to evaluate young horses. If a person thinks they don't have to worry about this and feels the numbers will tell them everything they need to know, they could get off track with some foals.

"The other important thing about a foal growth curve is the shape of the curve and not necessarily the height of the curve. There are always some young horses that will be taller or smaller than the average, so the shape of that curve is what's important. It should be a smooth, consistent growth curve with no erratic deviations (such as growth spurts or periods of decreased growth rate) that might create problems," Duren explained.

"One of the problems I sometimes see is if a foal must be confined because the mare is ill or the foal is ill. This will influence his growth due to lack of exercise—and then when he goes back out, he will rebound with very rapid growth. We need to take that into consideration."

The other problem Duren often sees occurs in cold climates, if weanlings going into their yearling year are not adequately fed through winter.

"Their growth curve will tend to flatten out during winter," he said. "Then when lush spring pasture becomes available, they rebound with rapid growth. I advise my clients to be aggressive enough with the feed in winter to keep the growth curve going smoothly."

It is important to anticipate what will happen with growth rate when these youngsters go out on green grass.

Weaning is another time in the foal's life when there can be a glitch in the growth rate; the foal might not eat as much for a while during the stress of weaning and then show a rebound in growth after he has adjusted

to being weaned and is eating better again.

"We have to anticipate these growth rate changes and make feeding adjustments before they happen," Duren said. "For instance, as we move into green grass in Central Kentucky, a filly that is very robust—with a tendency to become overweight—might need her feed reduced before that point so that she doesn't become overweight. A person needs to anticipate what could happen, rather than be reactionary after it happens."

If a young horse is destined to be a ranch horse or pleasure horse, it can be allowed to grow at a natural rate and reach mature size and weight more slowly, fed mainly on forages, without the extra calories and nutrients fed to young racehorses. With foals destined for a racing career and yearling sales, however, breeders are trying to optimize growth but have to be very careful doing it.

"You can't be pushing them too much or you get into problems, but you can't be so careful that you slow them down," Duren said.

You want them to reach their genetic potential as quickly as possible without harm.

"There are many risk factors," he said. "Your hay might not be the greatest, and you have to contend with cold weather so the growth rate slows down and the growth curve becomes flat when young horses don't have pasture during winter. When green grass comes, they get a rapid increase in growth and this can be problematic. We need to make sure these horses grow properly throughout the winter months and make any feeding adjustments prior to any potential glitches in the growth curve so we can avoid the glitches in the first place."

Measuring the growth of a foal

It takes some fine-tuning as you go along.

"This is where monitoring body weight of the growing horse is a good tool to utilize, but it can't be the only tool," Duren said. "We need to keep looking at body condition also, anticipating what is going to happen next, because even looking at the numbers (weight, height), you might miss the trend in a certain individual and get behind—and then your feeding adjustments are reactionary instead of ahead of the glitches."

Feeding young horses is an art and a science.

"Many successful Thoroughbred nurseries have the staff and management that can objectively look at a horse with the experience to know if something isn't quite right," he said.

NUTRIENT TO CALORIE RATIO

"When we feed horses correctly, one thing I am a huge advocate of is looking at the nutrient-to-calorie ratio," Nielsen said. "We look at the calories the horse is receiving, compared to the total amount of nutrients. We tend to focus on the big factors such as protein (especially if we are talking about amino acids such as lysine) and some of the major minerals, such as calcium and phosphorus.

"The nutrient-to-calorie ratio, however, represents the balance of building materials with the number of construction

IMPORTANCE OF EXERCISE

Pasture is a great source of proper nutrition for foals, and if they are out on pasture they are also running around and getting exercise—which is also crucial for proper skeletal development.

"One of the worse things you can do for a young, growing horse is keep it in a stall without adequate exercise," said Brian Nielsen, PhD (Professor of exercise physiology and nutrition at Michigan State University). "There has been a lot of research that shows it doesn't matter what you feed them, if you are not allowing them to run around and be a horse, you are not stimulating the skeleton enough to become strong. The skeleton will be weak, no matter what you do nutritionally.

Young horses need to be on pasture and able to run and play; exercise stimulates skeletal growth.

By Heather Smith Thomas

workers, to put it in easy-to-understand terms. If you have all the building materials and not enough workers, you have all this stuff at the construction site and it's in the way and not much is actually getting done. This interferes with proper growth. By contrast, if you have more workers (calories) than you have building materials, the workers don't have enough to do and they start causing problems; They sit around and do cat-calls at all the pretty girls that walk by."

This is not very efficient for construction. You always need a balance, having enough nails and boards and not being short on one or the other—or the right amount of workers for the amount of materials, to get things built.

"You want the right amount of energy, compared to the other nutrients, so you get good growth," Nielsen said.

One study looked at yearlings being fed a balanced commercial concentrate and hay, versus just oats and hay.

"At the end of the study, all the horses weighed the same, but the horses fed the commercial concentrate that was balanced for all the nutrients were taller and leaner," he said. "The horses fed the oats and hay, taking in a similar amount of calories, were fatter and shorter. They all had the same weight, but it was a different type of growth."

The skeletal growth was quite different.

"We could do a comparison, looking at young children, and the importance of having the correct amount of calories related to the amount of nutrients," Nielsen said. "If you are feeding them meals that are fairly well balanced in nutrients but then you let them drink soda all day long, that skews the balance. If a growing child is drinking five or six cans of soda per day in addition to the regular meals, the result is usually a child that is carrying extra fat. That child might not be as good an athlete as the child on a more balanced diet."

Visual appraisal won't always tell you whether you are feeding a young horse correctly.

"If breeders look at the body condition score of their young, growing horses, they might see a young horse at body condition '5' and think that's great, and think the horse is consuming the correct amount of calories," he said. "You might be providing the right amount of calories, but you don't know about the other nutrients. You might not be optimizing the growth of skeleton and muscle.

"The only thing you can look at visually and get a good idea regarding whether the horse is consuming the correct amount is calories. Body condition score will tell you whether that horse is taking in too much, too little, or just the right amount. For the rest of the nutrients, however, you have to analyze what you are feeding.

"People often look at the concentrates and grain they are feeding and know what's in that, but they don't have any idea what's in the hay the horse is consuming. If it's a foal, you also don't know the amount or nutrient content of mama's milk or the pasture being eaten. It becomes very complicated."

IMPORTANCE OF ANALYZING FEEDS

If mares and foals are at pasture, the trick is how to determine what nutrients the growing young horse is getting from the pasture.

"You can analyze the forage in the pasture, but three days later it will be differ-

Sunshine and temperature changes can affect a foal's growth rate

ent," Nielsen said. "It is constantly growing, constantly changing, even during the course of a day, from morning until night.

"The sunshine, the temperature changes, etc., all affect growth rate, which affects nutrient levels of the plant.

"You also don't know which plants the horses are eating. You might be sampling the pasture, but what you take as samples might be different from what that young horse is actually eating. It is very complicated to figure out, so I don't have great advice on that aspect of the nutrition.

"What you need to know, however, is whether the other feed you are providing is fairly well balanced," he continued. "If you want to provide raw grain (such as straight oats) with the hay or pasture, this usually skews things with inverted calcium/phosphorus ratios. Even the protein level of oats is not the greatest for a growing young horse and it's a relatively low-quality protein in terms of amino-acid blends. By contrast, if you feed a commercial concentrate, it has been properly balanced for the important nutrients."

Nielsen encourages breeders to analyze what they are feeding, particularly any grain mix, and the hay. A large Thoroughbred farm, buying hay in bulk, usually has the hay analyzed, to know what the nutrient levels are so they can balance it properly with the rest of the diet such as concentrates or supplements. A backyard horse owner buying hay in small amounts can't benefit as much by having it analyzed because each batch will be different.

"When I was in Madrid, Spain, at a nutrition conference doing a joint talk with Dr. Manfred Coenen, a German professor and one of the leading equine nutritionists in the world, he said there is only one good hay, and that is a hay that has been analyzed," Nielsen said. "Until you have it analyzed, you don't know how good it is. We've done a lot of research analyzing hay, and looking at the micronutrients. The hay might look great—it's leafy and green—but you find it is deficient in copper, or some other nutrient. Unless you had it analyzed, you wouldn't know. If you were feeding that to a young, growing horse, you might be setting him up for skeletal problems because you are not providing enough of certain nutrients."

Providing a balanced commercial concentrate is usually wise. The concentrate will provide some of the micronutrients that might be lacking in the hay. Feeding young horses is tricky, so be sure you are doing it right.

"If you are trying to optimize growth with limitless access to feed, you might be getting good rate of gain—which is desirable—but unless you have things balanced appropriately, you might not be getting proper structural growth to go along with it," said Nielsen.

Mother Nature can be quite forgiving.

"Some deficiencies can end up permanently stunting a horse, yet even if diets are not perfect, young horses can still often reach their destined mature size—just not as quickly," he said. "In some instances body structure might not be as strong as it would have been if diets had been better formulated. The big problem comes when you are trying to grow yearlings to exhibit their best potential early on so they will sell well or be ready to begin training early.

"This does get a bit trickier, so it is helpful to visit with a nutritionist. If you have a large breeding farm and are not visiting with a nutritionist or have someone on staff who is very familiar with equine nutrition, you might be taking some risks," Nielsen said.

"We often want to blame nutrition when things go wrong, but there are other factors involved, including genetics. The intricacies of interaction between genetics and nutrition can be difficult to determine. Certain bloodlines are very forgiving; you are not going to have a problem with growth regardless of what you feed. There are also horses that are programmed for fast growth and if you don't have the nutrients balanced absolutely correctly you will have a wreck on your hands."

Nutrition can be a crucial factor in growth rate and soundness, and sometimes people want to blame it for other problems as well.

"People often want an easy answer and something to blame," he said. "Occasionally nutrition can be at fault. If you are not getting the right nutrients in, you can't expect a good outcome, especially with the growing horse. It's like building a wall. If you don't have mortar, the bricks won't hold together." BH

Heather Smith Thomas is a freelance writer based in Idaho.

MARE RECORDS

Another thing that is important is keeping good records on mares, knowing what a certain mare's previous foals grow like.

"Maybe she's a big, scopey mare with big foals that grow rapidly but they don't get physitis, angular limb deformities, or other developmental skeletal problems," said Stephen Duren, PhD (equine nutritionist, Performance Horse Nutrition). "Another mare always has smaller, more weedy foals because she is not a good milk producer. Contrast that with a mare that's an overproducer of milk, or a mare that despite whatever we do her foals always get physitis."

The mare's records can give a heads-up on how to feed her current foal.

"If we don't pay attention to mare history, we will keep making the same mistakes with some of them," Duren said. "A number of mares will have repeat histories, so we need to be aware of that and take it into consideration, along with proper feeding and monitoring the foals (visually and possibly on a routine weighing schedule). Having some history on the mare might keep you from making the same mistake with her foals year after year."

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