



HEALTH ZONE

Foal Health

Feeding Weanlings

BY HEATHER SMITH THOMAS

The goal of breeding racehorses is to raise and develop young athletes to reach their best athletic potential. After weaning, foals are generally fed for optimum rather than maximum growth, trying to avoid some of the pitfalls of growing too fast—which can result in developmental problems. Genetics, feed, and environment all play a role in growth and skeletal development.

Dr. W.B. “Burt” Staniar, associate professor of Equine Nutrition at Penn State University, has studied growth rates of foals all over the world.

“Research we’ve been conducting focuses on the first two years of growth, and how nutrition provided by pasture and supplements influence growth,” Staniar said. “In addition, we pay attention to how other variables, such as date of birth, age at weaning, and age at which they enter

Examining the growth rate of foals

training, affect the growth pattern, and ultimately the athletic potential of the young animal.”

In more recent research, Staniar has been focusing on gastrointestinal health, but still has a great passion and interest in growth/development of foals.

“We are doing measurements of early development and how that occurs, and we also monitored the growth of twin foals a couple years ago and compared their growth to their singleton herd mates,” he said. “We’ve also looked at early hoof growth and wear rates on young foals.

“We published an article in 2013, look-

ing at how nutrition influences growth of the young horse. It follows up on some of the work I did earlier in Thoroughbreds, in which we looked at how different dietary energy sources might impact skeletal growth and development of the young horse.”

This work was a spin-off of the idea that high carbohydrate diets may negatively impact cartilage and bone development, contributing to Developmental Orthopedic Disease (DOD).

“It’s important to realize that there are many other factors that also impact development,” Staniar said. “Probably number one on the list is genetics—which we can’t do anything about when we are feeding weanlings. We just need to be careful in what we feed some of these young horses.

“Also important is environmental management from the standpoint of exercise



Dr. Burt Staniar measures foals as part of a study looking at how nutrition influences the growth of young horses

COURTESY DR. BURT STANIAR

and the level of exercise the animals are getting—and how that influences cartilage and bone development. Of particular note is some of the recent research that investigates changes in vascular structure in cartilage and bone.

“If we look at the nutritional aspect, our basic question involves growth hormone,” he continued. “We understand that growth hormone is an important hormone for cartilage and bone development and growth of many different tissues. We were interested in how various dietary energy sources affect this hormone, looking at a high carbohydrate diet versus a high fat and fiber diet, and how these influenced the pattern of growth hormone secretion. The pattern of hormone secretion is a key factor.

“This pattern is crucial, as opposed to the total concentration of growth hormone. An analogy to music could be made, in that the pattern of sounds is often more important than the volume. This is not a hormone that you can check with just a single blood sample to determine its concentration in the body. It is



ANNE M. EBERHARDT

Along with nutrition, the level of exercise influences cartilage and bone development

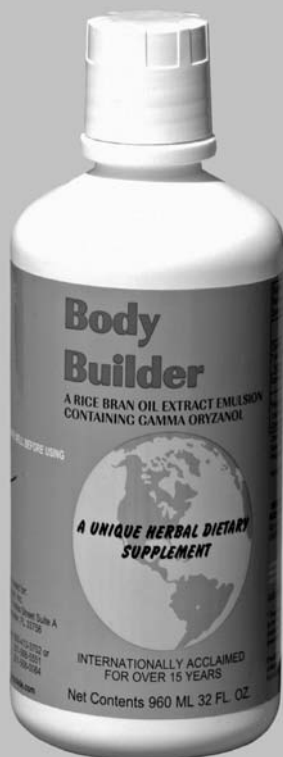
released in a pattern, in pulses—released in varying amounts from the pituitary gland. We did a very labor-intensive study in which we took small samples of blood every 15 minutes from a group of

12 weanlings. Some of them had been fed the high carbohydrate diet and the other group had been fed the high fiber, high fat diet (in many ways the fiber is more important than the fat). This allowed us

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to look closely at the pattern of growth hormones.”

The study looked at glucose, insulin, and at growth hormone levels throughout the day.

“We found that the different diets (different energy sources) resulted in a difference in how growth hormone was being secreted from the pituitary,” he said. “Does that tell us that one of these diets is better than the other? Not necessarily. It does tell us they are different in regard to that very important hormone for cartilage and bone development.

“If we look at the natural diet of the horse (forage) it won’t have the same pattern of ups and downs that come from meal feedings



ANNE M. EBERHARDT

There’s a fine line between optimizing and maximizing growth

of grain. The fiber/fat diet is probably closer to the natural diet of the horse than the high starch diet. A person could argue that fat is not natural in horses’ diets, and that is true. But the fat does not, at least in the variables we measured, have much of an impact on the hormonal profiles,” Staniar said.

“It is hard to see a difference between the diets until you compare the characteristics of growth hormone release. When we look at things like after-meal percentage of total secretion, the high glycemic diet had lower levels and it took longer for them to come back up. So that diet inhibited growth hormone secretion after the meal, and when the secretion recurred again it was released in a larger pulse. It all has to do with how glucose, insulin, and growth hormone interact with one another. This is what we are trying to understand from a scientific perspective.

“This relates back to how the horse owner can actually apply some of this data. For young, growing animals you may want to feed them in a way to lessen the glycemic and insulin responses following a meal, so this won’t have such an impact on some of the other hormones. There are a couple of ways of doing this. You don’t have to just feed a low non-structural carbohydrate diet. You could solve the problem by spreading it out into many small meals. If there is a great sweet feed that you want to use, you can still feed it—if you divide the daily ration into four or five small meals to provide all through the day rather than giving it in one big meal. This is a perfectly acceptable way to accomplish the same thing. You do not have to feed the fat/fiber diet, though it would also be a potential solution,” he explained.

“If I were feeding weanlings, and had the choice, based on this research, I would try to find a higher fiber/fat feed for them rather than a high non-structural carbohydrate feed, but there are multiple ways to address this problem.”

The farm manager simply needs to figure out what works best for that farm’s situation and the ability to provide the feed for these young horses. And certain foals may need to be fed a bit differently than the others if you know they are genetically programmed for fast growth. It’s best to try to avoid surges in growth. When you know what the genetics are, you can pay particular attention to those individuals.

“Looking at growth patterns, and understanding all of this, there are ways to continue to try to grow our horses optimally, especially when preparing young horses for sale and needing them to have good growth rate,” Staniar said. “There are ways to get healthy growth, versus increasing the risk of some of these problems. You can still maintain a relatively rapid growth rate without necessarily incurring some of the risks that go along with too-fast growth and DOD. You have to be careful, walking a fine line between optimizing and maximizing growth.

“A lot of the people who have been feeding weanlings/yearlings for a long time know what they are doing,” he said. “I worry most about the breeders who are new to this or just getting into it. They may not know how to daily or weekly evaluate how their young animals are growing.”

There are ways to measure growth rate, looking at weight and height, to monitor the weanlings, for instance.

“We have another recently published article looking at Thoroughbred growth curves,” Staniar said. “We looked at the time of birth and the influence on growth rate by season of birth. This was an interesting study. The foals born in January and February have a significantly different pattern of growth than foals born in April and May. This is something breeders can take into account, but there is no easy answer. We can’t say that it’s healthier for

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foals to be born in April and May than in January, but we can say that the patterns of growth are different. It is worthwhile to look at that more closely and think about the fact a foal born in January/February in the Northern Hemisphere tends to be born into a less optimal environment than the foal born in April or May. So we then need to find ways to feed that January foal a little better, making sure the mare is getting additional supplementation to make up for the lack of green grass," he explained.

Weaning time is when we need to also pay attention to nutrition and environment, trying to make a smooth transition for the foal so his growth pattern is not interrupted.

"Even with a well-planned feeding program, we still see a decrease in growth during weaning, because the animals are stressed," he said. "Though conditions for forage in the fall may be good, from that point on the pasture quality declines as we move into winter."

Environmental conditions change; the foal's body starts to conserve energy for thermal regulation (to keep warm) and growing winter hair. There's not as much energy put toward growth. It's getting colder, pastures are declining in quality, and all signals to the animal are that the environment is changing and it must get ready for winter.

"In all the growth data I've looked at, there's a decrease in growth rates during winter months, with February usually the lowest for horses in the northern hemisphere," Staniar said. "But if you realize this will occur, you can provide weanlings with more energy, and an environment

that doesn't allow growth to decrease quite so much."

You can counterbalance some of the negative effects of that first winter for the weanling and make up for some deficiencies in the environment, such as providing good quality hay.

"If a foal really drops off in growth at weaning, when he's stressed and especially if forage availability and temperature are less than optimal—with all of these stresses happening at once—he makes up for it later," Staniar said. "The more an animal decreases growth at this point and conserves energy (for maintenance instead of growth), when spring comes and there's good grass again, the

more the animal tries to catch up."

This growth spurt is called compensatory growth and happens in all species.

The more the young animal decreased growth through the first winter, the more likely there will be a greater increase in growth the next spring. It is this type of growth spurt that has been indirectly linked with developmental problems in the growing skeleton.

If you can compensate for the decrease during winter and think about it in spring (not accentuating a growth spurt by feeding high-energy feeds at that time), this can smooth out the peaks and valleys of the young horse's growth and potentially help minimize some of the risk for DOD. **BN**

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