Feeding Weanlings

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Feeding young horses is a serious business. If we underfeed, we risk problems stemming from malnutrition. If we overfeed, there is the risk of developmental orthopedic disease that can affect bones and joints. Somewhere in between the two extremes there is a correct balance that results in orderly growth and development as the horse reaches its genetic potential and remains healthy while doing so.

On the surface it appears that more problems stem from overfeeding than from underfeeding. There are two likely reasons. One involves reporting of the problem by the individuals involved. If a person is underfeeding, the nutrition is only one part of a scenario that involves overall neglect. And, as a rule of thumb, owners who neglect their horses do not seek veterinary help when problems arise. So, there might be more problems with malnutrition than appears on the surface.

The owner who is overfeeding often is doing so with a specific goal in mind and is apt to seek help when problems arise that threaten reaching the stated goal. In many cases, the goal is to achieve early development of a young horse that is being prepared for the sale, show ring, or racetrack.

A well-developed, athletic yearling normally sells for more money in the sale ring and will win more prizes in the show ring than the similarly bred youngster that is less developed.

While this article is designed to look at feeding weanlings, it must be broader than that because feeding programs should blend from one stage of growth into another without abrupt change. This means that discussion of a weanling feeding program should begin with proper nutrition for the broodmare while the weanling-to-be is still a fetus.

Much has been written and spoken about proper nutrition for young horses and bits and pieces of general information will find their way into this article. Two prime sources, however, are Bob Coleman, MS, PhD, an

extension horse specialist at the University of Kentucky, and *Horses and Horsemanship* by the late M.E. Ensminger, BS, MA, PhD. This is a book that has been updated with new editions through the years and is an old standby for horse owners on a variety of subjects. The book has withstood the test of time as it discusses all things equine in layman's language.

The GI Tract

Before one can intelligently discuss feeding horses at any stage of development, it is necessary to understand at least the basics of the equine digestive system because it is unique among mammals. Basically, the system is designed for grazing, with the horse consuming small quantities of food frequently throughout a 24-hour period. We often change Nature's plan by attempting to stuff large quantities of feed into that rather delicate digestive system a couple of times per day because it is more convenient from a labor point of view.

An examination of the equine digestive system begins with the mouth. It is here that the digestive process begins. Food is masticated by the teeth and moistened with saliva. In the mature horse, approximately 85 pounds (10 gallons) of saliva is produced daily. In addition to moistening the foodstuffs, equine saliva contains the enzyme ptyalin that aids in the digestive process.

The masticated food passes through the pharynx to the esophagus, which, in the mature horse, is a 50- to 60-inch tube that provides passage of the food from mouth to stomach. The stomach lies between the esophagus and the small intestine. It has a capacity, in the mature horse, of between eight and 16 quarts. The stomach's prime job is to secrete gastric juices that break down proteins and fats.

Next comes the small intestine, a tube that connects the stomach with the large intestine. In the average adult horse, the small intestine is about 70 feet long and three to four inches thick when distended. It has a capacity of about 12 gallons. In the small intestine, there is a further breaking down of protein, fats, and carbohydrates, such as sugars and starch.

The small intestine connects to the large intestine, which is divided into four parts--cecum, large colon, small colon, and rectum. Fermentation and digestion occur in the cecum, and nutrients are absorbed. The digestion process continues in the large colon via fermentation, and there is a further absorption of nutrients. In the small colon, waste products are gathered and become solid. It is here that dung balls are formed for exit through the

rectum.

With those basics in mind, we can take an informed look at feeding the weanling. However, if an appropriate nutrition program has not been followed with the foal's dam during gestation and while it is a suckling, the horse will not have developed as fully as Nature intended. Proper nutrition of the broodmare is highly important during those early days and weeks after birth because nutrients are passed to the foal through the mare's milk. If the mare is not being fed properly, her milk might be lacking in the key nutrients required by the foal.

In many cases, milk from the broodmare simply does not provide all of the nutrients the foal needs. Compounding this situation is the fact that there is a rapid decline in nutrients provided to the foal via mare's milk six to eight weeks after birth.

As a result of this decline in milk production and quality, a supplemental or "creep" feeding program might be necessary in order to provide the foal with proper nutrition. Creep feeding can also help bridge the traumatic gap when a foal is weaned from its dam and placed on its own independent feeding program, says Coleman. Before joining the staff at the University of Kentucky, Coleman served as the Horse Specialist for Alberta Agriculture, Food and Rural Development in Edmonton, Alberta, Canada. While serving in that capacity, Coleman conducted a 53-day trial that involved creep feeding a large group of foals on an Alberta farm.

The study is still hailed by nutritional experts as being one of the best ever conducted in eliciting answers to questions about creep feeding. A report on the study, which was conducted in 1997, was published in the *Journal of Veterinary Science* in 1999. It is referenced here because, the study concluded, creep feeding can help alleviate the stress of weaning and can be the springboard for a sound feeding program for weanlings.

A complete report on Coleman's study was published in *The Horse* (see **www.TheHorse.com/emag.aspx?id=4475**), so we will only summarize here. There had been concern that a creep feeding program could contribute to orthopedic developmental problems because the foal was, in a sense, being stimulated to develop at its genetic maximum. Coleman concluded that the results were just the opposite--creep feeding actually cut into the potential for post-weaning developmental problems rather being a contributing cause. The reason for this, he concluded, is that the foal on creep feed will have grown to its optimum potential, thus reducing a spurt of compensatory growth after weaning.

Here is one of his statements included in the report: "Foals are under a great deal of stress at weaning because their diet is changed and there is the loss of companionship with their dams, and they may be moved to a new location. Stress at weaning can result in injury, weight loss, and health problems. These stresses can result in reduced competitiveness of the foals in the marketplace or in the show ring. Creep feeding has been shown to reduce stress on foals at weaning. Foals that are accustomed to dry feed prior to weaning exhibit less stress than those foals that do not receive concentrate before weaning."

The creep ration utilized by Coleman in the study included oats and barley as the major grain components, with a small amount of wheat included in one ration, while combinations of canola meal and soybean meal were used as the protein supplements. One of the rations contained 13% protein and the other 17%. There was very little difference in results between the two rations.

The bottom line of the study was that the creep-fed foals were in better physical condition and were healthier than their counterparts that were not creep-fed. In addition, the creep-fed foals were ready to move on to the next phase of development. And, perhaps most importantly, no problems with limb development were noted.

Unfortunately, it is virtually impossible to offer a blanket feeding program for all weanlings in all locations. There are many variables, such as grass quality if they are on pasture, type and quality of hay being fed, ambient temperature (horses need more energy-producing food in cold weather), etc.

What's In a Diet?

Because it is impossible to concoct one specific formula for all weanlings in all locations, nutritionists tend to talk in terms of digestible energy (food consumed that can be utilized by the horse's digestive system), megacalories, and protein content. In one of his formulation tables, Coleman suggests that a 4-month-old, 385-pound weanling that is expected to gain 1.85 pounds per day should consume approximately 14 megacalories (a megacalorie is equal to 1,000 calories. of digestible energy) per day.

The recommended diet would be 70% grain by weight and 30% hay. An appropriate diet also would provide crude protein at the rate of 13.1% and would contain 0.62% calcium and 0.34% phosphorus, along with 650 International Units per pound (IU/lb) of vitamin A.

The recommendation listed in the *Nutrient Requirements for Horses, Fifth Edition,* published in 1989 by the National Research Council (NRC), is that the diet should contain 1.5 to 2.5 times more calcium than phosphorus. (There are plans to update the 1989 NRC report, but this project is still underway).

As the weanling grows and matures toward its yearling year, the amount of digestible energy required increases slightly.

Three of the basic grains utilized in equine diets are oats, corn, and barley. Here is how they break down, according to the NRC report, as to nutrient content on a dry matter basis:

- Corn--1.7 megacalories of digestible energy per pound; 10% crude protein; 0.04% calcium, and 0.53% phosphorus.
- Barley--1.65 megacalories of digestible energy per pound; 13% crude protein; 0.05% calcium, and 0.38% phosphorus.
- Heavy oats--1.5% megacalories of digestible energy per pound; 13% crude protein; 0.06% calcium, and 0.33% phosphorus.

It becomes immediately obvious that the calcium-phosphorus ratio is out of the required balance in all three grains, and while corn is the highest in megacalories, it is the lowest of the three in crude protein. Thus, one can conclude, either alfalfa hay with its higher calcium content or a supplement containing calcium would be needed to balance the total ration.

Here is a similar breakdown, also on a dry matter basis, for alfalfa in mid-bloom and for timothy, also in mid-bloom.

- Alfalfa--1.04 megacalories of digestible energy per pound; 18.7% crude protein; 1.37% calcium, and 0.24% phosphorus.
- Timothy--0.90 megacalories of digestible energy per pound; 9.7% crude protein; 0.48% calcium, and 0.23% phosphorus.

Take-Home Message

The important thing to remember when feeding weanlings--or horses of any age--is to know what they are ingesting. This means testing hay and feeding a balanced grain ration that meets the needs of specific horses in specific areas. Feed hay and grain should by weight rather than by guessing or by "coffee can" measurements.
