Building Better Athletes Through Nutrition

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Nutritional strategies for raising and competing sounder Thoroughbreds, many of which can be applied to horses of all breeds, was presented by Laurie Lawrence, PhD, at the Thoroughbred International Exposition and Conference (TIEC). Lawrence, who has done extensive research on equine nutrition at the University of Kentucky, covered nutrition of foals, weanlings, and broodmares.

Foals and Weanlings

Measuring growth of foals and weanlings by charting weight and height is easy for the horse owner to do on a regular basis. It is more difficult to measure quality of growth. For instance, it's very difficult for horse owners to measure bone strength, integrity of cartilage, and changes in conformation. Lawrence said that average growth of foals is about 75 pounds and 1.3 inches per month, and weanlings add about 50 pounds and 0.85 inches per month.

Lawrence emphasized that no matter what the end goal is, moderate, steady growth is more desirable than rapid, uneven growth. Research backs this up, and she cited a study headed by Harold Hintz, PhD, MS, of Cornell University in 1976 that showed that slow growth followed by rapid growth can increase the risk for flexural deformities. Research at the University of Kentucky in 1988 showed that very rapid growth produced more evidence of developmental orthopedic disease than moderate growth. Therefore, nutrition programs should be tailored to avoid rapid growth in young horses.

In one study done by Lawrence, average daily gain (ADG) in 21 nursing foals at four to five months of age was 1.5-2.5 pounds per day. At that age, foals are generally ready for weaning, although each equine operation is different. Weaning is stressful on foals, with many losing weight or staying at the same weight instead of continuing to gain. Lawrence said abrupt weaning seems to be the most stressful. To minimize stress, she recommended that foals be adapted to feed before weaning. Foals should be fed 1.0-1.5 pounds of feed per day

per month of age (i.e., a 4-month-old would receive four to six pounds of feed per day, usually divided into two to three feedings). In addition, Lawrence suggested that good-quality pasture (or forage) be provided. Owners should make sure all foals are eating properly.

Balance of nutrients is key for foals and weanlings, said Lawrence. Lawrence presented a table that compared nutrients needed with what is provided in a variety of feeds.

NUTRIENTS NEEDED IN TOTAL DIET				
Nutrient	**Percentage of total diet**	**Percentage in oats**	**12% grain mix**	**16% Foal Mix**
Calcium	0.7%	0.1%	0.6%	0.9%
Phosphorus	0.4%	0.35%	0.5%	0.7%
Copper	25 ppm	10 ppm	20 ppm	35 ppm

Based on these values, feeding young horses oats or a 12% grain mix (or a mixture of the two) will leave them deficient in calcium, phosphorus, and copper. In addition, feeding oats will cause an incorrect calcium-phosphorus ratio, which should be 1:1 or 2:1, but with oats this ratio is 1:3.5. Therefore, Lawrence recommended the 16% foal mix, stating that it's generally better to buy a feed already mixed rather than mix your own.

Although it is difficult to measure bone strength, research has given insight into this topic. "Think activity," said Lawrence. It has been found that pasture turnout versus stall confinement can increase bone density. In one study, horses with 24-hour turnout had denser bones when compared to a group with 24-hour stall confinement and a group with 12 hours of pasture access and 12 hours of stall confinement. One interesting fact was that horses confined all of the time began to lose bone density.

Lawrence said that from birth to 18 months a horse's skeletal system experiences changes in length, density,

and conversion of cartilage to bone. From 18-36 months horse's accumulate less than 5% of their final height, but bone width and density are still increasing. Feeding a nutritionally balanced feed with adequate calcium and minimizing confinement will maximize the horse's potential for strong bones, she said.

Maintenance Feeding

After three years, growth has stopped, and the nutritional emphasis is now on maintenance, support of normal bone turnover, support of joints, and minimizing inflammatory processes.Feeding a balanced diet with adequate mineral intake is important. Lawrence discussed the possible benefits of omega-3 fatty acids, noting that nothing has been proven yet in horses. There is speculation that omega-3 fatty acids (the most common in plants is called linolenic acid) can have anti-inflammatory properties. Therefore, increasing intake of omega-3 fatty acids for horses with arthritis or inflammation could have beneficial effects. Good sources of linolenic acid include linseed oil whereas soy oil and corn oil tend to be higher in linoleic acid, which is an omega-6 fatty acid.

Broodmare Nutrition

Lawrence said high-quality forage will meet the protein and calorie needs of gestating mares after weaning, but mineral intake might be inadequate with just pasture. Providing free-choice supplementation, such as with a salt block in the pasture, might insure adequate salt intake, but copper and selenium might continue to be deficient. It is hard to know whether the mare is consuming the proper amount from a mineral block each day. Therefore, feeding three to four pounds of a low-protein mixed feed would provide the necessary nutrients to a mare in early- to mid-gestation. For heavy mares which don't need grain, feed a suitable mineral supplement.

Copper intake is especially important for gestating mares. Lawrence cited research from 1998 that found mares consuming low copper diets during gestation produced foals with a high incidence of physitis and articular lesions.

Calcium is also of utmost importance. In one study in which mares were fed adequate versus low-calcium diets, the estimated breaking strength of the mare's metacarpal bone declined during lactation for mares fed the low-calcium diet. In addition, these mares had not regained their previous bone strength several months after weaning. Bone strength might be lower in mares which have produced several foals, which could explain the high incidence of pelvic fractures in older mares sometimes reported by veterinarians, said Lawrence.

No matter what age of the horse, or activity state, proper nutrition is important and can contribute to a sounder horse and a better athlete.
