

Understanding Healthy Foals' Caloric Requirements (AAEP 2012)

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On the surface foal nutrition might seem simple: foal nurses mare, nutritional needs satisfied. But in reality foal nutrition is much more complicated, making it important for individuals to understand newborn nutritional needs.

During a presentation at the 2012 American Association of Equine Practitioners convention, held Dec. 1-5 in Anaheim, Calif., Mary Rose Paradis, DVM, MS, Dipl. ACVIM, an associate professor in the Department of Clinical Sciences at Tufts University's Cummings School of Veterinary Medicine, reviewed normal foal nutrition for attendees.

Nursing Basics

"The newborn foal is absolutely hungry and wants to eat," Paradis stressed, explaining that neonatal foals have very limited liver glycogen concentrations and experience a drop in glucose levels shortly after birth. This is likely the reason the foal feels hungry and seeks out the mare's udder in the first place. Most foals, she said, will stand and suckle in 90 minutes to two hours.

The first milk the foal consumes is the mare's colostrum. Paradis explained, "Colostrum is higher in gross energy, specific gravity, total protein, and vitamins A and D" than mare's milk.

It also provides about 50% more energy than regular mare's milk, she said.

"Depending on the quality and quantity of the colostrum meal, it will help maintain the foal's glucose in the normal range for 10 to 20 hours," she noted.

Initially after consuming colostrum, foals nurse six to eight times per hour and consume about 80 milliliters of milk per meal. As foals' metabolism slows and they age, she said, they will nurse one to two times each hour until they're weaned.

Foals Caloric Requirements

Paradis explained that mare's milk provides 500 to 600 kilocalories (kcal) of energy per liter of milk. The average 50 kilogram (kg) foal consumes about 15 liters of milk per day, which translates to about 25% to 30% of their body weight. Thus, the average foal consumes roughly 7,500 to 9,000 calories per day.

Studies have shown that the resting energy expenditure hovers around 2,500 calories per day for a healthy 50-kg foal. Additional calories consumed are used in activities (such as play) and growth. The average foal gains 1 to 2 kg per day (2 to 3 pounds) and grows 0.4 to 0.33 centimeters taller each day during the first month of life.

Nutritional Assessments

Signs of foal disease and malnutrition are often subtle and difficult to detect, Paradis said, so it's crucial for veterinarians to conduct regular physical exams and nutritional assessment starting immediately after birth.

"The goals of nutritional assessment would be to identify the malnourished foal early, to identify at-risk foals, and to prevent any nutritional deficiency," she said.

In the initial physical exam and nutritional assessment, veterinarians should determine if the foal experienced any nutrient delivery compromise *in utero*, as evidenced by low birth weight; normal foals generally weigh 10% to 11% of their dam's weight, she said. Low birth-weight foals might be at higher risk for the development of problems such as infection, so a practitioner exam is especially important.

In subsequent nutritional assessments, veterinarians should begin nutritional assessments by obtaining a history and evaluating the foal's nursing frequency and mare's udder for signs of problems.

"If the foal is constantly trying to nurse and the mare's udder is flat, one may suspect that the mare is not producing enough milk to satisfy the foal," Paradis said. On the other hand, "an enlarged udder with streaming milk may indicate that the foal is not nursing adequately. This would be the first sign of a medical problem in the foal that should be investigated."

Tracking Growth

Paradis recommended monitoring the foal's growth on a regular basis—specifically, every three to four days. While a scale is the most accurate way to evaluate average daily weight gain, it's often not a practical option for owners. Thus, she suggested owners use the following formula to monitor weight gain ("Y" is the foal's girth circumference in centimeters or inches and "X" equals the foal's weight in kilograms or pounds):

$$X \text{ in kg} = Y \text{ in cm} - (63.7/0.38) \text{ or } X \text{ in pounds} = Y \text{ in inches} - (25.1-0.07)$$

Paradis also stressed that owners can monitor body weight using a modified Henneke Body Condition Scoring scale, ranging from 1 to 5 rather than the traditional 1 to 9. Paradis said that a 1 on the modified scale represents a foal that is extremely emaciated (some are born this way and they already need nutritional help, she said). A 3 on the modified scale represents a foal with a little fat covering his body, but still on the thin side, she said. Finally, a 4 or a 5 represents a normal foal, she said. These foals have a flat back and nice rounded curves, though their ribs are generally visible.

Paradis stressed that owners should keep a detailed log of their foal's average daily weight gain and other nutritional observations they might make.

"These (measurements) allow recognition of a decreasing average daily gain of weight and growth of the foal early and intervention nutritionally to correct the problem," she said.

Take-Home Message

Understanding foals' nutritional needs and properly monitoring their average daily weight gain can help alert owners to potential problems that might be otherwise hard to detect. If problems arise with a particular foal, it's important to seek advice from a veterinarian or equine nutritionist.

Disclaimer: Seek the advice of a qualified veterinarian before proceeding with any diagnosis, treatment, or therapy.