ENERGY NEEDS FOR THE COMPETITION HORSE

Regardless of the discipline, nutrition remains pivotal to achieving peak performance. Without a customized, nutritionally balanced ration, a horse will be unable to develop the levels of fitness and muscle mass required to perform at its full potential. Energy deficits caused by inadequate nutrition represent the most significant detriment to performance.

ENERGETIC BALANCE

When determining your horse's ration, it is absolutely essential to establish the ideal energetic balance for your horse. The ration's caloric content should allow your horse to maintain a body condition of between 5 and 6 on the Henneke scale (1983). A universal evaluation method for assessing body condition, the Henneke scale is widely used throughout the industry (see Courrier Hippique, vol. 29 # 3). If your horse's body condition falls outside of the optimal range, it is considered to be either over or underweight. In such cases, the ration will need to be modified. It goes without saying that a horse's energetic needs are proportional to its level of exercise (see Figure 1).

MY HORSE IS TOO THIN

If your horse is losing weight, you can improve its condition by simply increasing its daily caloric intake through either hay or concentrates. Your horse's body condition will determine if, in addition to hay, you need to provide more concentrates. For performance horses, supplementary concentrates often prove to be necessary, since concentrates provide a great deal more calories per kilogram than forage. The more the body condition falls below 5, the more concentrates will need to be added. Ideally, this can be accomplished by introducing an extra meal per day, or by using a feed that is higher in calories and better adapted to your horse's specific individual needs.

For a 500 kg horse, the National Research Council of Canada (2007) suggests that a weight gain of 16 to 20 kg will enable the horse's body condition to rise from 4 to 6. That said, other research has obtained different results. It will therefore be necessary to employ your common sense, particularly when considering the metabolism of each breed and each individual horse within that same breed.

A horse's main source of calories come from starch (grains) and fibre (forage); these food sources are stored in the adipose tissues as fat or in the liver or muscles as glycogen. Horses also obtain food from plant-based oils, which the body stores as fat in the adipose tissues.

Weight gain needs to come from one of these three energy sources, or else a calculated dose of each. Determining a horse's source of calories will depend on its training discipline, health status and individual temperament. Fat reserves fuel a horse's aerobic activities, as does stored glycogen; however, glycogen remains the only available energy source for anaerobic activities (See Figure 2).

MY HORSE IS OVERWEIGHT

If your horse's body condition is higher than 6, you will need to decrease its daily caloric intake by reducing its consumption of concentrates somewhat radically. Depending on your horse, you may also need to cut down on its quantity of forage. The higher the body condition, the more you will need to decrease the horse's calories. As a result, it may happen that your horse's prescribed level of concentrates falls below the recommended amount for its weight and activity level. In this case, a compensatory supplement such

as **Equilizer** will be essential for meeting your horse's nutritional needs. **Equilizer** provides your horse with the protein, vitamins and minerals it requires, without the excess calories. To ensure your horse wants for nothing, an equine consultant will prove to be a precious resource.

PURINA'S ADVICE FOR THE EVENTING HORSE

An eventing horse obtains its energy through approximately equal proportions of aerobic and anaerobic exercise. Depending on its stage of competition (dressage, cross country, jumping), its ration must contain a high percentage of plant-based oils and fibres, in addition to a certain amount of starch. These three sources of calories are proven to be excellent for the eventing horse.

Fibre allows for water to accumulate in the large intestine. This prevents dehydration, a danger for all performance horses, especially those who train for long distances in high temperatures. Plant-based oils serve to increase the ration's caloric levels without causing colic, digestive troubles or the temperamental problems that frequently arise from excess starch. Certain plant-based fats such as flaxseed oil have the added advantage of an optimal omega-3:6 ratio; this strengthens the horse's immune and anti-inflammatory systems. As mentioned earlier, when the horse uses its fat stores as fuel, it is able to save its precious glycogen reserves for anaerobic activity. To ensure that the horse performs optimally during the anaerobic phase, it is essential to add some starch to the ration, though this starch must be derived from highly digestible sources such as extruded feed or flaked grains like corn or barley.

As complete feeds, **Evolution Sport Elite** and **Equilibrium Trimax** offer the best nutritional profile for the eventing horse. These two products also contain significant amounts of vitamins and minerals, including high levels of antioxidants, omega-3 essential fatty acids and probiotics. Combine these feeds with a perfectly timed and measured high-quality hay. As needed, you can also incorporate a supplement such as **Equilizer.** With added electrolytes, especially salt, your high-performance athlete will have everything it needs.

Categories of Exercise, from Light to Intense.

The National Research Council of Canada (2007) lists four different categories of exercising horses. Your horse is likely to fall within one of these four categories.

- Lightly worked horses obtain between one and three hours of exercise per week, typically ranging from walking to trotting. Most leisure horses fall into this category.
- Moderately worked horses obtain between three and five hours of exercise per week; these sessions entail a mixture of trotting and cantering, with the possibility of some show jumping and similarly difficult activities. Included in this category are horses who participate in horseracing somewhat regularly and leisure horses who are taken out on a more frequent basis.
- Heavily worked horses obtain between four and five hours of weekly trotting, cantering and galloping, in addition to more frequent sessions involving show jumping and similarly difficult activities. This category includes eventing horses, polo ponies, endurance horses, jumping horses and all other horses who participate in comparably intense competitive activities.
- Intensely worked horses include racehorses who participate in very elite levels of eventing and endurance competitions.

Although these descriptions provide a good starting point, they remain general. The climate, terrain, and general environment can affect exercise intensity. Additionally, each horse's temperament and metabolism can have a significant impact on its energetic needs.

Aerobic and Anaerobic Exercise

During low-intensity exercise, muscles use oxygen to convert glycogen stores into energy. This process is called aerobic exercise. Aerobic exercise can be maintained for a long period of time. Examples of aerobic exercise occur during the cross-country phase of an eventing race, or throughout most of an endurance race. For aerobic activities, fats serve as the horse's primary source of calories, although starch (glucose) also remains necessary for excellent performance. The reality is, no matter the discipline, depleted glycogen reserves will cause premature fatigue and as a result, performance will suffer.

During very intense exercise, muscles expend energy extremely quickly. At a certain point, the body runs out of aerobic energy reserves and must convert glucose into energy without the use of oxygen. This process refers to anaerobic exercise. Anaerobic exercise can only be maintained for short bursts of time, inevitably resulting in lactic acid buildup. Both race and barrel horses spend the majority of their exertion time in the anaerobic phase. During anaerobic exercise, horses derive most of their energy for muscular contraction from glycogen. However, fat allows horses to save their glycogen reserves and thereby stall fatigue. For this reason, even race and barrel horses will benefit from a ration that is high in fats.

In light of this information, we are better able to understand how food choices significantly influence a sport horse's performance. Food provides essential energy to fuel each horse in its practised discipline.