

The Importance of Different Feeds for Different Needs

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In an ideal world all the horses on a farm, from broodmares to weanlings to horses in heavy work, could be fed the same feed out of the same bag. Unfortunately, the nutritional needs of horses in different life stages vary tremendously, and this makes it difficult to design a “one bag fits all” feed. The basis of any equine diet should be forage from pasture, chaff or hay. Any concentrate (sweet feed, pellet or grain) should compensate for deficiencies in the forage. One forage may prove to be an acceptable complete diet for a maintenance horse while the same forage may have inadequate levels of protein necessary for a weanling or deficient levels of energy required by a sport horse.

Forage – The Foundation

The horse evolved as a continuous grazer and will graze 14 to 20 hours a day if given the opportunity. The horse has a digestive tract amazingly well adapted to ingesting and digesting forages. Because the basis of any equine diet should be forage, special attention should be paid to the type and quality fed to the horse. Not all forages are created equal. Pasture grasses and legumes as well as hays can vary greatly in the protein, energy, vitamin and mineral content depending on the type of forage, the maturity of the plant and where it is grown. When formulating a concentrate to complement a forage, it is often necessary to make completely different mixes for legumes (such as lucerne and clover) or grasses (such as ryegrass, phalaris etc.). When the forage is a mixture of grass and legume, a concentrate made to be fed with grass forage would be appropriate as long as the mix is less than 50% legume. Remember that horses grazing pastures that contain a high proportion of clover may actually eat mostly grasses rather than clover.

Forage choices may be limited in many parts of the country, thus horse owners may be forced to feed forages which may not be ideal. However, once the forage has been chosen, establishing the type of concentrate should be less challenging. Other factors important when selecting a concentrate apart from the type of forage are age, amount of work and reproductive status of the horse.

Feeding the Maintenance Horse

An adult horse that does little or no work is said to be at maintenance. A maintenance horse has very few physical demands placed on it and therefore has very basic nutrient needs. In fact, if a maintenance horse has good quality pasture and a salt block, little else may be needed unless you need a feed bucket to catch the horse! If a horse is maintaining weight well on grass and/or hay alone but grain is used to catch the horse to check it, then a feed that is designed to be fed at half to one kg is ideal. Special low intake supplements like All-Phase Feed Balancer Pellet or Equivit Gold Pellet are excellent products for horses that do not require any extra energy to maintain weight, but may need a source of nutrients which may be deficient in the forage such as copper, iodine or selenium. Horses survive without the additional nutrients, but for optimal health and well-being, these nutrients should be added to supplement the forage. When a maintenance or spelling horse has a problem keeping weight on, then a concentrate may have to be fed in amounts greater than 1 kg per day, but it does not have to be a special, highly fortified or high protein product.

Feeding the Broodmare

Proper nutrition is more essential in the broodmare than in any other type of horse because it not only affects the mare but also the foal she produces. Prior to breeding, a mare should be in good to fat (CS 3 - 4) body condition to maximize her possibility of conceiving. It has been established that a mare losing weight when being bred is less likely to conceive than a mare gaining or maintaining weight. Providing sufficient energy is an integral factor in broodmare feeding management. Furthermore, many nutrients are important to the integrity of the reproductive organs and deficiencies may decrease conception rates. If a mare does not need grain to maintain weight a concentrated supplement such as those discussed in the last section are useful.

Once mares have conceived, it is common practice to turn them out into the back paddock and forget them until the last trimester of pregnancy. The increase in nutrient needs may not be as great in the first two trimesters as the foetus only gains about 35% of its foaling weight, but a well balanced diet will provide nutrients that can improve the health of the foetus and assure normal development. Ideally, a mare should receive balanced nutrition throughout the entire gestation. However, increases in protein, energy, vitamins and minerals intakes may be necessary once the mare reaches the final third of pregnancy. Concentrates specially designed for broodmares eg Stablemaster Breed N Grow are the most appropriate because they are formulated with the special needs of the mare in mind or you can add a protein/mineral supplement such as the All Phase pellet to oats. In instances where mares are on good pasture and in good condition, they don't need extra energy but do need added minerals. If that situation, a supplement pellet can be fed with chaff only.

The average lactating mare produces over 12 kg of milk per day during the first two months of lactation. If she does not consume enough energy, protein, calcium, phosphorus, and other nutrients from her diet to go into the milk, she will take from her own body stores. Because most lactating mares are rebred, decreases in body weight and nutrient status from milk production may also affect her ability to conceive. Keeping weight on the mare is easier and more cost effective than trying to help her to regain

condition after weight loss during lactation. The lactating mare needs as much energy as a racehorse so maintaining adequate energy intake is critical. For this reason some mares need up to 8 kg of grain per day.

Table 1: Recommended Nutrient Composition of Feeds

<i>Nutrient</i>	<i>Balancer Pellet</i>	<i>Weanling</i>	<i>Yearling Mare</i>	<i>Performance</i>	<i>Maintenance</i>
Use Rate	1 kg	2 – 3 kg	3 – 5 kg	3 – 7 kg	2 – 4 kg
Protein (%)	25	15	14	11	11
Lysine (%)	1.5	0.75	0.65	0.5	0.5
DE (MJ/kg)	11	13	12	13	12
calcium (%)	3.0	1.0	0.8	0.7	0.6
phosphorus (%)	2.0	0.75	0.6	0.5	0.4
zinc (ppm)	400	125	110	100	100
copper (ppm)	150	45	40	35	35
Selenium (ppm)	2	0.6	0.5	0.5	0.5
Vit E (IU/kg)	400	100	100	150	75
B Vitamins		yes		Yes	
Electrolytes				yes	

Feeding the Growing Horse

The young growing horse will achieve 90% of its adult size within the first year of life. With this rapid growth, the body is laying down new tissues that result in bone, tendon, ligament, muscle and other support structures. The foal's diet should supply sufficient nutrients for building body tissues. Mare's milk is nutritionally balanced to meet the needs of the young foal, provided the mare is well nourished. However, by the time the foal is three months old, an increasing portion of its diet will consist of forage and whatever concentrate it can snatch from its dam's feed bin. At this time, creep feeding can begin for foals where rapid growth and development is desirable. Creep feeding involves separating the foal's concentrated feed from the mare at the time of feeding so the foal can eat without the feed being 'pinched' by the mare. Creep feeding should be done with a feed mix designed for the young growing foal eg Oats plus All Phase Pellet.

Mare's milk is well fortified with the essential amino acids necessary for growth. Most amino acids (the building blocks of proteins) can be synthesized by the body, while others need to be supplied by the diet (limiting). Which amino acids are limiting has been well established in humans and other livestock, but not well defined in the horse. Lysine and threonine are limiting for proper growth in the foal. Once the foal is weaned (and in a creep feed), it is important that the foal have a quality source of the limiting amino acids in the feed. Check the lysine content as well as the crude protein content - a suitable feed will be at least 0.75% lysine.

The various protein sources found in the diet have a different amino acid composition. Soybean meal is an excellent source of the essential amino acids such as lysine and is therefore commonly used in commercial horse feeds. Quality feeds designed for foals will use soybean meal as a protein source. Foal and weanling feeds tend to be higher in protein (15 %) than feeds designed for adult horses.

Some forages supply a great deal of protein (with essential amino acids) to the horse, but the amounts are variable. For example, lucerne hay is usually around 16 - 18% protein and fresh green pastures often run a high as 26%. The growth spurt observed in the yearlings on pasture after the spring grass has started to grow is partly due to the surge in the amount of available protein in their diet. However, grass hays tend to be much lower in protein and the percentage protein in average grass hay may be half that of lucerne. Grass and clover mixed hays are well suited to the young growing horse which has little or no access to fresh forage. For the foal fed grass hay, it is essential that it get additional protein from another source, like a concentrate designed for young growing horses.

While protein may be limiting for proper growth, it is not the only nutritional need of the foal. Sufficient quantities of minerals and vitamins are essential for proper skeletal development and health of the foal. Not only are these nutrients needed in sufficient quantities, but also in balance with one another. Too much of one or not enough of another can interfere with absorption of any number of other nutrients. For example, too much phosphorus in the diet can interfere with absorption of calcium, resulting in hyperparathyroidism (big head disease). Commercial mixes try to take the guesswork out of supplying the appropriate amounts of minerals and vitamins in balanced quantities. When other grains (such as oats) are added to a commercial mix by the horse owner, they interfere with the nutritional balance of the feed. If you want to add your own oats then use a balancer pellet or a lower intake feed concentrate eg Stablemaster Legend.

Feeds especially designed for foals are usually power-packed because the foal has such high nutrient needs, yet cannot consume large amounts of concentrate. A feed designed for the adult horse is usually formulated to supply the essential nutrients at higher

intakes. Such feeds would not be appropriate for young growing horses, because they would not consume enough of the essential nutrients, just energy.

By the end of its yearling year, a horse will have obtained 90% of its adult weight. The demands for protein, vitamins and minerals still remain higher in the yearling than those of the adult horse. While yearlings can eat more than weanlings, they still require a feed which is more concentrated than feed intended for adult horses. Typical yearling feeds have 14 to 16% protein and are fortified similarly to the concentrate designed for broodmares. Balance in the diet, particularly of energy and minerals, is especially important during the yearling year because this is when many of the signs of developmental orthopedic diseases (DOD) such as epiphysitis and osteochondritis dissecans (OCD) begin to appear.

When a young horse begins training, horse owners and managers must realize that the horse is still growing. The dual demands of training and growth make it especially important to pay attention to proper nutrition. During the training process, the bones will undergo constant remodeling to adapt to the stress of work. A balance of vitamins and minerals in the diet will aid in minimizing the amount of stress these changes cause. Further, adequate dietary protein is essential as greater muscle breakdown is a physiological consequence of increased work. Protein for growth and work can be usually supplied with a 14% protein concentrate, or 12% if fed with lucerne or lucerne mix hays.

Feeding the Working Horse

Once a horse is in steady work, whether it is light, moderate or intense, special attention should be given to the diet. The demands of performance put stresses on a horse's body that normally would not occur if the horse was turned out in a paddock. How many horses do you know run and jump over a log just for kicks? The energy requirement increases dramatically over maintenance. The body of the horse is very well adapted to storing and mobilizing energy from various types of nutrients, such as fibre, starch, sugar and fat.

Fibre is often neglected as an energy source. The digestive tract of the horse is designed for the horse to be able to obtain energy from forage (fibre). The billions of microbes residing in the caecum and large intestine digest fibre and produce energy in a form the horse can use. The result of microbial fermentation is volatile fatty acids. Once volatile fatty acids enter the bloodstream, they can be used for immediate energy, changed to glucose for energy, or stored in adipose tissue (body fat). This source of energy is not produced very rapidly, and is therefore appropriate for moderate to low intensity work.

Starch and sugars are sources of energy found in large amounts in grain and molasses, respectively. The energy from these sources is converted to glucose in the body, used immediately or stored in the liver or muscle as glycogen (long chains of glucose molecules). This type of stored energy is more readily available and converted more rapidly to energy than volatile fatty acids and fat stores. Starch and sugar are especially important energy sources for intense work like short bursts of speed, but are suitable for any type of work.

Added dietary fat in the form of oil, stabilized rice bran or sunflower seeds is another source of energy for the horse. The advantage of feeding dietary fat is the concentrated nature of the energy source. Fat can be fed in much smaller amounts than grain for the same amount of energy. Further, it appears that horses that have added dietary fat adapt to utilizing fat as an energy source more rapidly than horses with no fat in the diet. The amount of energy available from fat stores is much greater than the stores of glycogen. Therefore, any energy substrate that is stored in such great quantities is advantageous to utilize. The ability to utilize adipose for energy is what allows a trail horse to keep going all day. Some energy is coming from fibre digestion, but a great deal is contributed by fat metabolism. The metabolism of fat is relatively slow, so it is not the first energy store a racehorse will use, but may be turned on in the final lengths of a race to give the horse some staying power.

Protein can also be used for energy, but it is not the ideal source. If sufficient protein is provided in the diet for turnover of body tissues, the remaining protein can be broken down into a form that is utilized as energy (glucose or fatty acids). The problem with using protein for energy is that during the process of breaking down the protein molecule, nitrogen is left as a by-product. The body will excrete the excess nitrogen in the form of ammonia through urination. Excess protein results in increased water intake, increased urination, and increased internal heat production. The first two are not generally a problem as long as the horse has adequate water available, although the ammonia can be overwhelming in a stall. The increase in internal heat production is normally marginal, but may cause a problem in a horse already under heat stress. Generally, excess protein is not necessary for the performance horse and in cases may be detrimental. Adequate protein is generally provided by a high quality grass or grass/legume mix hay and a 10 to 12% protein feed eg Stablemaster Furlong.

The harder the horse works and the more difficult the performance, the more vitamins and minerals the horse is going to need. For example, B vitamins are used during the cycle of energy production and therefore would be used at a higher rate when the horse is working than by the maintenance horse. Contractions cause oxidative damage to muscle cells and vitamin E and selenium work as antioxidants to help restore muscle integrity. The stress of intense exercise on bones during a performance may slightly increase the need for minerals important in bone integrity such as calcium, phosphorus, magnesium, copper and zinc. Unfortunately, hay and grain alone are low in some of the essential vitamins and minerals needed for optimal performance. Concentrates designed especially for the performance horse take this into consideration as manufacturers fortify the product to supply the increased needs for performance. In essence, you get what you pay for – if the feed is cheap, it is likely not very well fortified because the vitamin and mineral fortification is often the most expensive part of a concentrate.

In choosing a commercial feed to use it is best to pick a feed that suits your feeding system and style. If you want to add your own Oats and corn, don't use lower amounts of a full feed. There are a number of well formulated concentrates used at approximately 2 kg per day eg Stablemaster Phar Lap with allow you to add your own grain, but still supply enough critical minerals, vitamins and added fat, so that you don't need added supplements.

Feeding the Older Horse

Age takes a toll on the horse's body - parts start to wear out. Everybody can see an older horse get stiffer in the joints as it ages. What horsemen cannot see is what kind of wear and tear is going on in the digestive tract. Life long exposure to parasites can leave permanent scarring in the delicate absorptive tissues of the intestines. Normal degeneration of the digestive tract also occurs with age. The result is a digestive tract that is gradually losing its ability to absorb nutrients from the feed. Another problem that occurs with age is dental deterioration. If there is a problem with the molars, then the horse loses the ability to chew food well. Inadequate chewing will result in large food particles, which are not broken down sufficiently for digestive enzymes and microbes to effectively digest the feed, thereby decreasing feed efficiency.

Because of the deterioration of the intestinal mucosa and the subsequent decrease in availability of nutrients, special considerations should be made when planning the diet of the older horse. The ability of the horse to digest protein decreases with age. Production of stomach acid, which aids in protein digestion, decreases, and a related decrease in protein digestibility occurs. An older horse should receive a diet higher in protein so that it has a better chance to absorb an adequate amount. For this reason, older horses are usually fed feeds that contain at least 14% protein eg Barastoc Senior.

Many older horses maintain weight better when on fresh green pasture. This is because the grass is softer to bite and easier to chew than dried forage. Pasture is also more energy-dense than dried forage. Lucerne chaff is also a good fibre source for geriatrics and can be made easier to chew by dampening prior to feeding.

Because of the deterioration of the digestive tract, feeds designed especially for seniors tend to be more nutrient dense and manufactured in forms that are readily chewable and easily digestible eg extruded, expanded or steam flaked. They are also likely to have more added fat to increase the caloric density and maintain condition in the older horse.

The nutritional needs of a horse differ significantly throughout the stages of life. The "one feed for the whole farm" idea is becoming obsolete as horsemen increase their understanding of feeding horses for optimum performance and health.