

Feeding for Breeding

The ultimate goal of any horse breeding program is to produce sound, superior equine athletes. Many factors play a role in the development of an equine champion and it is hard to sort out those factors in order of priority. However, certain basic factors must be followed in order to increase the chances for success.

The Broodmare:

Stallions receive much of the attention and glory when one of their progeny turns in a performance worthy to be called champion. However, in the overall scheme of things, the broodmare arguably has more to do with it than the stallion. Therefore, close attention to the care and management of the broodmare is of utmost importance to the success of any breeding program.

The most basic step in correctly managing broodmares is to maintain them in moderate body condition. Several different body condition scoring systems are currently in use in different geographic locations, but they all have the same objective. A non-lactating bred mare should carry enough flesh to cover her ribs and present a relatively flat topline when viewed from the rear. Excessive fat exhibited by fat deposition in the throat latch area, pings of fat around the tail-head, cresty neck and difficulty feeling the ribs with moderate finger-tip pressure to the horse's side should be avoided if possible. However, a mare that is obese on grass is far preferable to a mare that is obese due to excessive grain intakes. A lactating mare must be managed in a manner that ensures optimal growth of her foal while concurrently ensuring normal development of her fetus. Many mares produce more than 15kg of milk per day and as a result find it difficult to maintain desired body condition during lactation. This is not a problem however since fetal development is not very rapid from a quantitative standpoint during this time. After weaning, however the broodmare should be brought back up to desired body condition within 6 - 8 weeks. Broodmares maintained in desired body condition will generally breed more successfully and produce thriftier foals.

From a nutrient requirement standpoint, the non-lactating pregnant broodmare has similar requirements to a mature horse at maintenance during the first half of gestation. Protein and energy requirements are only increased slightly and from a practical standpoint these mares are fed the same as a mature horse at maintenance. Broodmares should be on pasture as much as possible with grass forming the foundation of their diet. However the second half of gestation does bring important changes to the nutrient demand of the mare. During this time, the foal's size is increasing fairly rapidly and this is a very critical time for normal skeletal development of the fetus. Broodmare mineral intakes and balances are extremely important now and should be monitored closely. Often, concurrent with this change in mineral requirements are seasonal changes in pasture nutrient content. In some geographic locations changes in pasture nutrient content due to seasonal changes are minor, however, in some of the major equine breeding areas of the world these changes can be substantial and may pose major

problems to the breeder. In some areas snow covers the ground for the majority of the mid and last trimesters of gestation leaving mares predominantly on a hay and grain diet. This is not a problem unto itself, however, problems may arise after the snow melts and lush spring grass becomes available. In many cases this means mares transit between a relatively low to moderate protein diet to a high protein diet within a fairly short period of time. Even in areas where snow cover is only transient or totally absent, weather conditions can fluctuate greatly. If a frost develops after pasture growth is under way, nitrate levels as well as molds and mycotoxin levels in the grass may substantially increase. Combining these factors with the fact that pasture calcium levels are often fluctuating at this time can result in either total reproductive failure or foals born with congenital angular limb deformities.

During the last trimester it is important that the mare's nutrient load not change drastically. A substantial increase in the protein and energy intake of mares as they get closer to foaling is a major cause of foaling problems and angular limb deformities in foals. If a mare is slightly thin within 30 days of foaling it is better to maintain her at this body condition level until after foaling. The mare's protein and energy intake can be safely increased after the foal is delivered.

In areas where winter grazing is limited and mares are predominantly fed hay and grain during winter months and then transition to high protein, high energy, low calcium spring pastures, a feeding program intended to buffer this large transition has worked successfully. In such cases, mares are intentionally fed more protein than required during winter months with the use of alfalfa hay or high protein grain mixes. When spring pastures become available the supplemental protein from these sources is either reduced or eliminated all together and the protein from pasture grass provides the difference. When pasture protein levels become very high (greater than 27%; dry matter basis), grazing may need to be limited in order to avoid excessive nitrogen intakes, which can interfere with re-breeding performance, even in the absence of laminitis. In areas where pasture calcium is known to decrease when spring pastures are lush, additional calcium may need to be supplied in order to ensure proper calcium to phosphorus ratios. At this time a limited amount of legume hay may be fed in order to accomplish this objective. It is important that mares continue to be maintained in a moderate body condition throughout this time period, however.

Adequate intakes of trace minerals and anti-oxidants are critical during the last half of gestation. It must be noted however, that feeding excessive amounts of minerals can be just as detrimental as not feeding enough. Therefore, mineral intakes from forage as well as grain and supplements must be monitored. The primary trace nutrients that should be checked include iron, zinc, manganese, copper, selenium, iodine, cobalt, vitamin E, vitamin A, and vitamin D. There are many interactions between minerals and proper balance between these minerals should be maintained. It is not imperative that an exact ratio be maintained between zinc and copper for example, however, it is important that intakes of trace minerals resemble current recommendations. Due to the many interactions that can occur between minerals, especially in forages, the use of organic trace minerals has become very common over the past several years. Organic minerals are not subject to as

many adverse interactions compared to mineral salts such as zinc sulfate or copper sulfate. As a result of reduced adverse interactions between these trace minerals, mares provided organic minerals, especially organic selenium which has only recently been cleared for use in equine diets in the United States during gestation often produce healthier and more structurally correct foals. Certain mares will also re-breed more successfully when fed organic minerals. High intakes of vitamin E help ensure good immune function, foaling performance and re-breeding success. It should be noted that more needs to be learned about vitamin E metabolism in horses due to the fact that individual foals from dams fed more than adequate levels of vitamin E continue to exhibit signs of vitamin E deficient related disorders. Clearly, this is a vitamin E metabolism issue and not a simple vitamin E intake issue. The use of natural vitamin E sources has had little or no effect on these types of individuals when compared to traditional tocopherols available commercially. The need for vitamin D supplementation will vary depending upon geographic location. In areas where sunshine is abundant, no vitamin D supplementation is required since horses will synthesize all they need via exposure to sunlight. However, in many northern locations, winters are characterized by cloud cover and reduced day length resulting in an advantage to vitamin D supplementation. Vitamin A supplementation becomes advantageous when horses are not on green pastures. However, exercise care not to over supplement vitamin A. Many commercial feeds and supplements contain more than enough vitamin A and doubling up on supplement products may lead to excessive vitamin A intakes.

Guidelines for mares:

- Base program on pasture and/or good quality forage
- Maintain mares in moderate body condition
- Mares fat on pasture and no grain are acceptable whereas mares fat due to high grain intake are not
- Avoid high calcium intakes during late gestation
- Avoid high phosphorus intakes during gestation even if calcium - phosphorus ratios are adequate
- Ensure mares receive adequate intakes of trace minerals, vitamins and anti-oxidants during gestation
- Organic forms of trace minerals support healthier foals and more successful re-breeding
- Adjust feeding programs to account for changes in diet as mares transit between winter hay and grain based diets to lush spring pastures. Protein, energy and calcium intakes often fluctuate widely.

The Stallion:

During the off-season, stallion.s nutrient requirements are the same as any mature horse at maintenance. Therefore he does not really require any special consideration in this regard. However, he should be maintained in a moderate to fleshy body condition but not fat.

During the breeding season, increases in nutrient requirements for a particular stallion are dependent upon the individual stallion's temperament and the size of his book. Some stallions can service 50 - 75 mares with little or no stress and no need for a change in their diets. However, most stallions with books in excess of 100 mares will require a higher nutritional plane to support acceptable health, condition and breeding performance. In fact, some individual thoroughbred stallions are now breeding in excess of 200 mares in a single season via natural service.

Stallions will usually show signs of increased stress due to breeding activity by increasing their aggressiveness, reducing body condition and often times loss of hair from the top and rear of the hips around the tail-head area. The loss of body condition is easily addressed with the use of additional protein and energy intakes via increased hay, pasture and/or grain intakes. Loss of hair around the tail-head area is usually a sign of increased nutrient demand for semen production. Increasing the intake of zinc, vitamin E, and selenium in particular has proven satisfactory towards maintaining hair growth. Aggressiveness cannot always be remedied via diet. However, protein and energy intakes should be adequate to maintain desired body condition, but not excessive. The desired longevity of the stallion should be considered when determining the size of his book. Breeding such large numbers of mares via natural service to an individual stallion is relatively new and the long-term effects on the stallion are not well understood at this time. However, the limited experience we do have suggests that very large books may not only shorten the stallions breeding usefulness, but his life as well.

Note the 32% increase in requirement between barren and pregnant and 100% increase in requirement between pregnant and lactating.

Note the 22% increase in requirement between barren and pregnant and the 59% increase between pregnant and lactating.

Note that for minerals the largest increase in mineral requirement is between barren and pregnant (86% for Ca and 102% for P) whereas these minerals increase only 17% and 15%, respectively between pregnant and lactating.

Trace mineral requirements increase the most between barren and pregnant mares while many trace mineral requirements actually decrease between pregnant and lactating. This is due to the increased requirements during pregnancy for storage of minerals in fetal development requirements. Foals born with inadequate tissue stores of minerals are more likely to suffer from poor immunity and developmental problems.