

STALLION NUTRITION

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Breeding stallions, on the average, have daily nutrient requirements that are 25% above maintenance of a mature stallion during the off season.¹ This is based on the assumption that a stallion's breeding activity and exercise are comparable to the energy expenditure and nutrient needs of a mature performance horse with a light work load. Although limited research has been conducted on nutrition of breeding stallions, it appears obvious that a stallion's book, age, behavior, body condition, general health picture, routine handling and level of free or forced exercise all impact how a sire should be fed. Some stallions are being ridden, trained and hauled, even throughout the breeding season. Others may never leave the farm, but have access to unlimited free exercise and vary greatly in the amount of exercise they give themselves. Still others are more confined and remain essentially sedentary, except for trips to and from the breeding barn. Such variation makes it necessary to evaluate and feed stallions on an individualized basis.

Breeding stallions must be presentable to the public and should be able to complete the breeding season without appreciable weight loss. Results of one field study show that stallion body weight decreases as peak monthly covers occur in the presence of constant levels of feed intake.² While it makes sense that adjustments in feed intake may be needed to maintain stallions during the busiest part of the season, it is equally important to manage these horses so that they enter the breeding season in acceptable body condition.

The body condition score (BCS) system developed for broodmares can be utilized to evaluate the condition of stallions.³ No controlled research has been conducted, but it seems practical to suggest that most stallions should enter the breeding season in a BCS of 6 to 7. When a stallion is in this moderate to fleshy condition, there may be a slight crease down the topline. Individual ribs cannot be seen but can be felt. There is some fat slightly evident between the ribs and fat over the ribs feels spongy. There will be small amounts of fat along the sides of the withers and behind the shoulders and the fat around the tailhead feels somewhat soft.

The goal is to have a stallion in this BCS as the season starts and then be able to meet daily nutrient requirements with a reasonable amount of daily feed. The amount of grazing/hay or hay and grain needed will be influenced by stallion weight, body condition, time of year, nutrient content of hay, energy density of concentrate, exercise/use and other factors. Since requirements are expressed on a weight basis, it is useful to have a good estimate of a stallion's current weight or desired weight when in proper body condition. Weight can be estimated using a formula that involves heartgirth and body length.^{4,5} Its effectiveness as determined by field studies is also documented.⁶

During the off-season, many non-working stallions can be maintained almost entirely on good quality hay or grazing.¹ Stallions not being kept in show shape nor being ridden/trained competitively will usually do quite well on all roughage diets, provided they are already in an acceptable body condition. Typical grass hay provided at 1.75% - 2.0% of bodyweight daily or free choice grazing can be used. If fed average to top quality alfalfa, intake will be slightly lower, approximately 1.5% to 1.75% of body weight per day. In most cases, these non-breeding stallions

will benefit from access to trace-mineralized salt.

For off-season stallions that need to be kept in better shape, some concentrate feed will be needed. In most cases, these stallions will require concentrate at ½ % of body weight daily, or less. Stallions being ridden or trained and those requiring an improved BCS will often have daily feed amounts very similar to a breeding stallion (table 1).

To meet the increased nutrient requirements associated with breeding season, stallions should be provided a properly balanced concentrate. On the average stallions will need a combination of roughage and concentrate ranging from 1.5% to 2.5% of bodyweight daily. It is important to select a concentrate feed that, when fed at levels to maintain weight and support activity, will also meet protein, mineral and vitamin requirements.

The breeding stallion requires 40 grams of crude protein per megacalorie of digestible energy. Where horses receive roughage that contains 10% or more crude protein, a 10% crude protein concentrate will usually be sufficient. Farms feeding low-protein hays, such as grasses that were very mature when baled, and certain native prairie-type hays, will need to feed a concentrate containing 14% crude protein. Higher protein (16% or >) diets for breeding stallions are normally less economical. Furthermore, the excess protein serves no benefit and will contribute to the strong ammonia smell evident in some stallion barns.

The total diet should contain at least as much calcium as phosphorous. Stallions require 1.2 grams calcium and .87 grams phosphorus per megacalorie of digestible energy. To be adequate, concentrate feeds should contain at least .45% calcium and .35% phosphorus. There are plenty of examples in the industry of rather common feeding practices that fail to meet a horse's requirements by either providing deficient amounts of some nutrients, excesses of others, or both. Single grains contain more phosphorous than calcium and this inverted ratio often remains uncorrected, depending on the type, amount and quality of hay a horse receives. Young stallions are still laying down bone in response to growth, and in some cases, remodeling bone stimulated by exercise. Therefore a balanced concentrate helps ensure the young skeleton is not compromised by dietary mineral imbalances. Even in old stallions, skeletal integrity must be maintained. Consequently, stallion owners are challenged to provide a concentrate that contains at least equal percentages of calcium and phosphorus.

Contrary to public opinion, breeding horses do not require supplemental Vitamin A beyond the amount required.⁷ Furthermore, Vitamin E does not appear to have a beneficial effect on sexual drive or seminal characteristics.⁸ Properly formulated feeds from reputable companies are convenient to use and contain required levels of these vitamins. And, they are usually economically comparable to a program where a single grain or combination of grains have been supplemented "on-the-farm" in an effort to meet mineral and vitamin requirements. In most cases, formulated concentrates also have been fortified with trace mineralized salt at levels to meet NRC requirements for the stallion.

During breeding season, most stallions will received total daily feed in a 50:50 up to a 70:30 ratio of roughage to concentrate. This will be influenced by individual stallion differences, hay quality and the energy density of the concentrate being fed. Almost any concentrate feed will satisfy a stallion's energy needs, but some would have to be fed in such large amounts that digestive tract well being and health could be compromised. On the other hand, some concentrates are so energy dense that very small amounts of feed will meet energy needs not provided by the hay or grazing. Expected energy density of most formulated feeds can be estimated by looking at the crude fiber and fat percentages on the feed tag. Table 2 shows the relationship of crude fiber to expected energy

concentration and the influence of fat supplementation on total energy density. Estimated average daily feed intake levels for 1100-1300 lb stallions are also shown. Stallion owners or managers should never hesitate to call the feed manufacturer for nutritional information not available by looking at the tag.

Where careful feeding management is practiced routinely, stallions with no special digestive problems will often be best managed by feeding a concentrate containing 8% or less crude fiber. Such feeds are more energy-rich than higher fiber feeds and will typically help maintain acceptable body condition in a lesser amount of total daily feed.

Fat-supplemented concentrates can be very practical and beneficial for old stallions that may tend to be thin (BCS = 4 ½ or less) and for horses that see extremely active, such as those that walk the fence line of a paddock, those being pasture-bred and stallions in training. The fat supplemented feeds provide more energy than a traditional concentrate of similar crude fiber level in the same amount of total feed.

Regardless of whether a concentrate contains supplemental fat or not, stallion owners should monitor feed intake carefully. Whenever grain or concentrate intake exceeds ½ % of body weight/day, then total daily feed should be provided in two or more feedings. In fact, some stallions may need to be fed in three or four meals, spaced out as evenly as possible. Changes in type and amount of feed should occur gradually.

Stallions should be fed individually. While this is easy to do on farms where hand breeding or artificial insemination practices are utilized, it is crucial in pasture breeding situations. These stallions should be fed in a separate trough with the assurance that they eat their own feed and are not also eating feed intended for broodmares. Unfortunately, even the best formulated feeds can fall victim to poor feeding management which results in horses that become either too thin, too fat, foundered or even colicky.

There has been a great deal of interest in the use of anabolic steroids. In fact, some young stallions have been subjected to "special feeding regimens," combined with the administration of anabolic steroids in an attempt to gain an edge in competition or sales. Controlled research trials have shown that growth rates are not improved in horses receiving varying levels of anabolic steroids.⁹ However, altered sexual behavior has been observed.¹⁰ Treated stallions have decreased scrotal width and testicular weight that is 40-60% less than in untreated horses. Sperm motility, concentration and total sperm per ejaculate are severely lowered by steroid treatment. There is also evidence that anabolic steroids may actually cause premature closure of the physes of long bones,¹¹ resulting in cessation of growth. So, even though their use will make stallions more aggressive and may cause them to eat more feed, this approach to management can reap havoc in the breeding barn of a farm trying to get mares in foal.

In summary, stallion nutrition must first involve the recognition that breeding horses have requirements that are 25 % or more above maintenance. A sound feeding program should be built around a good quality roughage source, provided at 1% of body weight per day or higher. Balanced concentrate can then be used to get and keep a breeding stallion in BCS of 6-7. However, managers will need to evaluate stallions regularly and feed on an individual basis. Many stallions will require concentrate ranging from ½ to 1% of body weight daily, with amounts depending on a variety of factors. Stallions that need to gain weight and very active stallions may benefit from concentrates containing supplemental fat. A formulated concentrate that is introduced gradually and fed regularly will contribute to a stallion's looks, behavior and performance in the breeding shed.

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Table 1. Daily nutrient requirements of stallions during the off-season and during breeding season.*

Weight of Stallion (lbs)	Status	Digestible Energy (Mcal/day)	Crude Protein (grams)	Calcium (grams)	Phosphorus	Vitamin A (IU's)	Vitamin E (IU/kg of diet)
900	Off-season	13.4	536	16	11	12,000	50
	Breeding	16.8	670	20	15	18,000	80
1100	Off-season	16.4	656	20	14	15,000	50
	Breeding	20.5	820	25	18	22,000	80
1300	Off-season	19.4	776	24	17	18,000	50
	Breeding	24.3	970	30	21	27,000	80

* From NRC (1989)

Table 2. Relationship of crude fiber and fat-supplementation to expected energy density of typical concentrates and approximate daily feed intake by 1100-1300 lb. stallions.

A grain mix containing this much Crude Fiber (%)	With 2-3 ½ crude fat will usually contain approximately this much Digestible Energy in Mcal/lb.	So, a typical 1100-1300 lb. stallion would be expected to need approximately this much daily grain (lbs.) In addition to hay or grazing*	But at a given Crude Fiber level, if the feed also contains 5% added fat (Tag = approximately 7-8%) then the Digestible Energy will be approximately (Mcal/lb.)	And a typical 1100-1300 lb. stallion would be expected to need approximately this much daily grain (lbs.) In addition to hay or grazing*
2	1.62	5.50-8.50	1.72	5.50-8.00
3	1.60	5.75-8.75	1.70	5.25-8.25
4	1.55	6.00-9.00	1.65	5.50-8.50
5	1.50	6.25-9.25	1.60	5.75-8.75
6	1.45	6.50-9.50	1.55	6.00-9.00
7	1.40	6.75-9.75	1.50	6.25-9.25
8	1.35	7.00-10.00	1.45	6.50-9.50
9	1.30	7.25-10.25	1.40	6.75-9.75
10	1.25	7.50-10.50	1.35	7.00-10.00
11	1.20	7.75-10.75	1.30	7.25-10.25
12	1.15	8.00-11.00	1.25	7.50-10.50

* Intake levels may be lower or higher, depending on stallion behavior, exercise & activity. Ranges in intake of feed take into account differences in the digestible energy content of alfalfa and grass hays. These intake estimates also assume that daily hay intake is equal to 1% of horse body weight. In situations where hay intake is greater, these estimated concentrate intakes may be too high for certain stallions.

