



Your Horse's Nutrition

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Balancing Rations and Feeding Guidelines

Every horse owner needs to appropriately feed his or her horse to maintain health and achieve optimal performance. In order to feed your horse properly, you should know how to balance its ration as well as follow some basic feeding guidelines.

Steps to designing a balanced ration

1. Classify your horse as either mature idle, pregnant/lactating, working, or growing, and look up your horse's nutrient requirements in the Nutrition Research Council (NRC) handbook for horses. Horses have different nutrition requirements at different stages of their life and at different activity levels. It's important to adjust their nutrition accordingly.

2. Determine your horse's body weight either by weighing the horse on a scale or by estimating its weight using a heart girth tape or body measurement formulas. Your

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horse's body weight and classification can help establish its recommended daily feed intakes as a percentage of body weight using the NRC handbook. Horses eat about 1.5 to 3.5 percent of their body weight in dry matter every day. The exact percentage depends on the quality of the forage and the horse's physiological state.

3. Condition score your horse by feeling the fat cover around its ribs at midbarrel, on the crest of the neck, behind the shoulders, around the tailhead, along the withers, and down the crease of the back. A condition score card (available in the NRC handbook and other sources) can provide you with an estimate of the condition score according to your observations. Knowing the condition score of your horse allows you to feed your horse to its optimal condition, allowing for optimum reproduction and performance efficiency.

4. Research the feedstuffs available in your area. The best feedstuffs for your horse are those that are palatable and that provide the right amount of nutrients at the lowest cost while keeping the horse healthy. The nutrient content of a feedstuff usually is provided on a dry matter basis, so that feedstuffs easily can be compared with each other.

Dry matter is the percentage of material left after removing all the moisture from the sample. You can

either find the nutrient content of feeds on feedbags when purchasing grain, or you can determine it by a nutrient analysis through a nutrition lab when purchasing forage.

Be aware that nutrient content can vary widely within and between feeds. Select long-stemmed roughage to allow for normal activity of the digestive tract, and select a concentrate feed by comparing cost per unit of energy, which is calculated as digestible energy (DE) or total digestible nutrients (TDN). Often, specific commercial concentrates are formulated to meet the requirements of certain classes of horses. Not all horses need grain in their diet; for example, mature idle horses may do well on forage only.

5. Balance your horse's ration on the basis of energy, protein, vitamins, and minerals. Find a good-quality forage (hay or pasture) and feed a minimum of 1 percent of your horse's body weight in forage dry matter per day. You may use a computer ration balancing program such as Spartan or the program found with the NRC handbook to help calculate your horse's requirements and formulate the correct ration.

6. Change your horse's ration gradually by increasing or changing feed over a 2-week period so that your horse's digestive system and fermenting microbes can adjust to different types and quantities of carbohydrate and fiber in the ration.



Changing feeds too fast can result in digestive upsets (e.g., colic) and/or other problems (e.g., founder), and decreases feed efficiency.

7. Always provide free-choice access to trace mineralized salt. When your horse needs mineral supplementation, buy a *balanced mineral* mixture, including salts, which you can top-dress on the grain ration. Be aware that horses can balance only their sodium intake; they are not nutritionally wise about other minerals. Your horse may not use a trace mineral block if it's getting sufficient salt in its diet. Selenium supplementation may be necessary in some parts of Oregon due to selenium-deficient soils.

8. Do not supplement or dilute balanced rations, because commercial concentrates are specifically balanced to meet your horse's requirements. Balanced rations suggest adequate nutrient intake per unit of energy. Top-dressing supplements upsets this energy nutrient balance.

9. Provide clean water at all times. Horses drink $\frac{1}{2}$ to 1 gallon of water per 100 pounds of body weight per day. This may vary due to temperature, climate, and activity level.

Feeding management guidelines

1. Coffee cans are an easy device for dispensing your feed; however, **weigh all your feeds** first, because different feeds have variable weight densities and weigh differently. Mark your cans to standardize amounts of feed being fed, and re-weigh newly purchased feed.

2. **Never feed more than 0.5–0.75 percent of your horse's body weight in concentrate at any one feeding.** Space feedings equally throughout a 24-hour period, and feed at set times to minimize feeding disorders and stall vices.

3. **Always feed from mangers** to avoid ingestion of dirt, sand, and/or fecal material, and to minimize wasting of food. Mangers should be easy to fill, and safe for the horses as well as the horse handlers. Mounted feeders are safe when they are mounted at chest height.

Combination hay and grain feeders are popular because they are designed with a tray that catches the hay leaves. Ground mangers in the form of round rubber tubs also are popular; however, food waste may be increased due to horses pawing at the feed. You can use a hay net or bag when traveling; tie it securely at eye level to prevent your horse from getting its feet in the net.

4. **Protect hay and concentrate feeds from moisture, sunlight, rodents, and insects** during storage, in order to avoid spoilage or deterioration of feed. Stack hay and sacked feed on pallets to insulate it from ground moisture. Lay outside-stored round bales on their sides and push them close together to minimize rain damage. Bins, barrels with tight lids, and feed boxes can protect concentrate feed. Keep bins clean and dry. Feed rooms should have doors and should be well ventilated. To maintain feed freshness, do not store commercial feeds over a month.

5. **At every feeding, check for food refusals** that may suggest your horse is sick, has teeth problems, is dehydrated, is overfed, or there is something wrong with the feed.

6. **Float your horse's teeth and deworm your horse regularly** to allow for efficient feed consumption and use. Consult with your veterinarian for recommendations on products and intervals.

7. **Minimize close contact between horses at feeding time** to discourage dominance hierarchies. Horses are ranked socially into "pecking orders," which manifest

themselves at feeding time when more dominant horses displace less dominant ones through aggressive behavior. When group-feeding horses, place separate feeders in open areas 40 to 50 feet apart. Provide one or two extra feeders. Old, crippled, foundered, or blind horses need special management and can be grouped together for feeding. Foals and growing horses also may be grouped together, as dominance hierarchies are not yet well established.

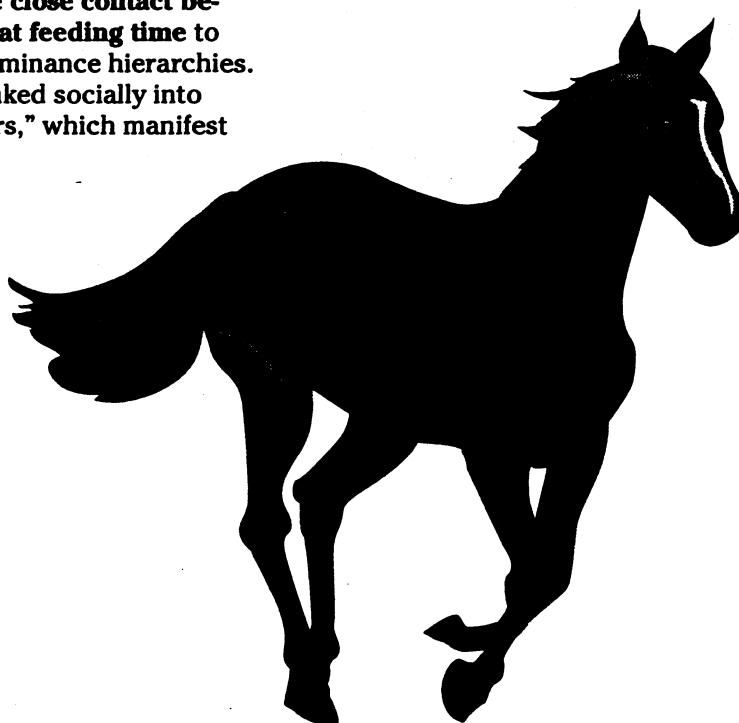
8. **Exercise stalled horses every day** to maintain optimal eating behavior and general health.

For further reading

Nutrition Research Council, "Nutrient requirements of horses," *Nutrient requirements of domestic animals*, 5th ed. Washington, D.C., National Academy Press, 1989.

Householder, D.D., P.G. Gibbs, G.D. Potter, and K.E. Davison, "Digestive system of the horse and feeding management guidelines," in *Horse Industry Handbook*, American Youth Horse Council, Inc. HIH 710. 1994. 9pp.

Van Saun, R. PhD., Spartan equine ration evaluator version 2.1., Michigan State University Cooperative Extension Service, 1990.



Selecting Hay

Good-quality hay should be the foundation of every horse's ration, because the equine digestive tract requires forage to function normally. The horse needs energy, protein, minerals, and vitamins to support body functions as well as various physiological states (e.g., pregnancy, lactation, growth, and work).

Quality of hay is determined through sensory inspection and chemical analysis of the forage. Sensory inspection can help in distinguishing between poor- and high-quality forages. Nutrient content is determined through chemical analysis.

Sensory inspection

Color of hay indicates when the forage was cut and how well it was cured and stored. A green color usually reflects a high vitamin A content and generally good quality. Distinguish between bright green weeds and the actual hay, because weeds may have a low nutrient composition. A beige color usually indicates excessive sun-curing, overly mature forage, and/or leaching of the nutrients by rainfall during curing. Brown to black hay usually is a sign of heating from fermentation and moisture damage. Do not feed brown to black hay, because it has a high potential of molding.

Maturity of the hay indicates the growth stage of the plant at the time of harvest. More mature hays contain larger stems and a larger proportion of seedheads or flowers. As the plant matures, the concentration of fiber increases—which decreases the digestibility of the forage. All other nutrients tend to decrease or become unavailable, which decreases forage quality.

Leafiness in hay estimates the digestible nutrients, especially protein, in the plant. The leaf-to-stem ratio declines as the plant matures, and leaves often are lost in the curing and handling process.

Odor of hay should not be musty, mildewy, or rotten.

Foreign material is anything that doesn't belong in the hay. Foreign material can be either harmless (certain weeds, other plants, sticks, or dirt) or harmful (poisonous plants, awns, metal objects, insects, or molds). Pay particular attention to the blister beetle, an insect that feeds on maturing alfalfa plants. One to five beetles can kill a horse. Blister beetles occur mostly in arid regions, so examine hay from these areas carefully. Horses also are very sensitive to dust and molds, which can cause respiratory problems as well as colic.

Nutrient analysis

Using wet chemistry and near-infrared spectroscopy (NIR), a veterinarian can analyze nutrient content to formulate a more accurate ration. Wet chemistry is the most accurate method; however, it's expensive and processing is slow. NIR is quicker and less expensive, but also is less accurate. The analysis report provides you with the dry matter, energy, crude protein, fiber, and mineral content of the feed.

Dry matter measures the amount of water in the sample, and is expressed as a percentage of weight of the wet sample. Feeds always should be compared on a dry-matter basis to account for different moisture content.

Crude protein indicates the level of protein and total nitrogen in the forage. Crude protein in hays usually is not limiting, except for lactating mares and growing foals. Protein levels don't predict total energy availability in the hay.

Fiber represents the total cell wall fraction (indigestible or slowly digestible) of the plant. Acid detergent fiber (ADF) is composed of cellulose and lignin. A low ADF value indicates that the plant is easily digested. Hay with levels above 45 percent ADF are of little nutritional value, and samples with less than 31 percent are easily digested. Neutral detergent fiber (NDF) contains cellulose, hemicellulose, and lignin, which represent the total cell wall portion of the plant. High NDF values indicate more mature and lower-quality plants. NDF levels below 40 percent are

excellent, and horses likely will not eat those above 65 percent.

Minerals in forage determine the minerals needed in the concentrate mixture. Macrominerals include calcium, phosphorus, magnesium, potassium, sodium, and sulfur, whereas microminerals include iron, copper, zinc, manganese, and molybdenum.

Energy is derived from the protein, fiber, and fat content. ADF and crude protein values are used to predict digestible energy (DE) or total digestible nutrient (TDN) values of the feed.

Types of hay

The species of forage present in the hay highly affects its nutrient composition, and therefore, its nutritional value. Hays can be classified as grass hays, legume hays, or a mix thereof. Grass hays include the cool-season species of timothy, smooth brome grass, canarygrass, orchardgrass, tall fescue, and reedtop. Warm-season grasses used in hay are bahiagrass, bermudagrass, pangolagrass, and johnsongrass. Legumes include alfalfa, red clover, lespedeza, and birdsfoot trefoil. Sorghums, sudangrass, sorghum-sudangrass hybrids, and hybrid pearl millets are summer annuals that also are used in hay. The most commonly used forage species are listed below.

Alfalfa is a legume commonly fed to horses. It's higher in digestible energy, protein, and calcium than most grass hays, making it a good feed particularly for young horses and lactating mares. Horses should be changed gradually from grass hay to alfalfa hay, because an abrupt change may cause digestive upsets. Blister beetles in the hay may be a problem in arid regions. Alfalfa bales may weigh between 80 to 120 pounds, with prices generally ranging from \$7 to \$9.50 per bale.

Orchardgrass produces an excellent-quality forage that is fast-growing and heat-tolerant. Pure orchardgrass bales are uncommon; however, orchardgrass often is mixed with timothy. Bales generally weigh between 40 and 80 pounds, with prices ranging from \$2.50 to \$5 per bale.

Timothy is a perennial, cool-season bunch grass adapted to cool, humid climates but not to arid environments. Prices and weights for pure timothy generally are the same as the orchardgrass/timothy mix.

Forms of forage

Square bales that weigh 40–80 pounds commonly are used in the horse industry because handling is easy and storage is flexible. Store bales under cover to minimize weather damage or heat generation. Bales also should be stored on pallets to avoid moisture uptake from the ground. Orchardgrass, timothy, fescue, and palmer's rye are the grass types most commonly harvested as bales in the northwestern United States.

Round bales (800–1,200 pounds) are used efficiently in dry lots with large numbers of horses. Bales should be kept on well-drained soils. Stack bales close together on their sides, especially when storing them outside.

Hay cubes (2 inches by 1½ inches) are made from coarsely chopped hay. Storage and handling of cubes is easier than bales and wastage of feed is lower; however, the price is higher. Also, if cubes are the major source of forage, horses tend to get bored—which increases stall vices.

Chopped hay (1-inch length) can be used in a total mixed ration, which adds the grain mixture directly to the hay. Chopped hay may become dusty, and needs molasses or vegetable oil to keep down the dust.

Pelleted hay is finely ground hay pressed into 3/16- to 3/4-inch-diameter

pellets. It's necessary to provide 1 percent of the horse's body weight per day in long-stemmed forage, because pellets don't provide adequate particle size to maintain normal digestive health and behavior.

Silage is high-moisture forage preserved by fermentation. Consider it as forage only when enough horses are present to quickly consume all the forage that is exposed to air. Numerous problems can occur from the ingestion of spoiled feeds, especially in young animals. Silage has a high ammonia content due to the fermentation process, which may cause toxicity problems in horses. The horse's monogastric digestive system can't absorb large quantities of ammonia, and colic may be the result.

Buying hay

Buy hay by weight rather than by volume. Negotiate price on a per-ton basis. Prices of hay may vary within your region; compare prices as well as nutritional quality before buying large quantities.

For further reading

Russell, M.K. and G.A. Rich, "Selecting hay for horses," *Horse Industry Handbook*, Youth Horse Council, Inc., HIH 750, 1994. 10pp.

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