



Fact sheet

Diagnosis of Nutritional Problems in Horses

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Nutrition is frequently implicated as a cause of disease or poor performance of horses. Sudden changes in feed or feeding schedules, toxins present in feeds or forage plants, and excesses or deficiencies of nutrients can all result in clinical problems. Diagnosis of the nutritional cause is necessary to effect a cure. Finding the source of the problem may be as simple as a getting a thorough history (i.e., the horse got into the grain bin). However, in many cases a more thorough investigation may be necessary.

When a problem arises that is suspected to be linked with the nutritional management of the horse, a complete history, evaluation of the horse(s) involved, feed samples, and tissue samples may be necessary to pinpoint the cause. Each case will be different, but the following discussion details a general sequence of inquiry, including which tests would be appropriate in certain situations.

History

A complete history of the horse(s) should be recorded. This will direct subsequent actions. Important information includes:

1. **How long have the horse(s) been on the feeding/management program?**

If no changes occurred—either in feeds used or management—for over one month or more, and signs had a slow onset or are vague, consider long term problems such as energy, protein, trace mineral, or fat soluble vitamin deficits/excesses.

If no obvious changes were made but signs were of sudden onset, consider the possibilities of spoiled or contaminated feed, or exposure to toxins.

If any changes were made before the onset of clinical signs, they should be highly suspect. Problematic changes can be as obvious as a sudden change in feed type/amount or as apparently innocuous as receiving a new batch of feed, hay, or bedding.

2. **Is the horse turned out in a paddock or pasture?**

If yes, look for toxic plants. Always check for signs that the plants were actually consumed by the horses since many toxic species (i.e., buttercups) are unpalatable and normally do not pose a threat unless the pasture is severely overgrazed and/or the horses are underfed. Also check the water source and trees/shrubs around or in the pasture (leaves and bark of some species are potentially toxic), and for evidence that clippings from lawn mowing or trimming were put in the area.

3. How many horses are affected?

If only one horse in a herd or stable is affected and the other animals are on the same feeding regimen, the possibility of a feed-induced problem is reduced. However, it may be an idiosyncratic reaction, or the animal may have ingested something the others avoided. If more than one horse is affected, try to find the common denominator (i.e., feed, age, type of supplements, type of activity, etc.). Also establish how long the horses have been on the regimens. Verify the reported rations by actually examining the feed room and weighing out the amounts reported to be fed. Ask the people feeding the horses if the animals are actually consuming the amounts to be fed. For example, one horse may have consumed all of a new feed while the rest refused it.

4. Complete feed history: how much of what and when?

Hay: Check for mold and assess overall quality. Is it green and soft, or yellow and fibrous? Does it contain noxious weeds or other contaminants? If alfalfa, check for blister beetles, though they are often hard to find. If a chronic nutritional imbalance is suspected and the same hay has been fed for over a month, nutrient analysis of the hay may be useful.

Concentrates: Check for any evidence of mold, abnormal odor, or contaminants. A representative sample should be taken (see below) for nutrient analysis, especially if the feed was custom mixed. If a commercial feed is being used and erroneous formulation is suspected, get the lot number and manufacturer information from the bag. If feed samples are sent to the manufacturer for analysis, it is important to save some of the feed for independent analysis in case a dispute ensues.

Supplements: Record all supplements' label information and the amount and frequency at

which they were fed. Potentially toxic levels of nutrients such as vitamins A and D, selenium, and iron can result from feeding multiple supplements. It is important to calculate the total intake (from all supplements and concentrates) if signs of toxicity are present (see Table 1).

Water source(s): Inadequate water will result in an increased incidence of impaction colic. Water may also contain high amounts of various trace minerals that would interfere with the absorption/utilization of nutrients. If galvanized steel tanks and copper pipes are in contact with each other, high levels of zinc can leach into the water.

Salt: Regardless of other supplements, salt (NaCl) should be available free choice at all times.

5. Other signs of disease?

Check vaccination and internal parasite (deworming) schedule. If weight loss is one of the complaints, the affected animal's teeth should be carefully checked. Liver and kidney problems should also be on the list of things to rule out.

Samples to Take

1. Feed samples:

When taking feed samples, especially for trace mineral analysis, it is important to avoid contaminating the sample. Wear gloves when handling forages and use the scoop normally used to deliver concentrates to place the samples in a clean sealable plastic bag.

When sampling pastures, take forage samples from a least ten sites, preferably from areas that are obviously being grazed by the animals. Clip the grass and legumes, do not pull them up by the roots. Do not use rusty implements to cut the samples!

Table 1: Common Nutritional Problems: Differentials to Consider

Problem	Nutritional Cause(s)	Rule outs
Weight Loss	Inadequate feed, poor dentition, parasite infestation, heavy metal toxicity, malabsorption, sand ingestion	Chronic illness
Anemia	Excess iron, copper deficit, Iron deficit (rare)	Chronic illness
Developmental Orthopedic Disease	Excess energy intake, inadequate or imbalanced intake of Ca, P, Cu, Zn, I, Se; sudden increase in plane of nutrition	Hereditary predisposition
Rhabdomyolysis	Excess carbohydrate intake, electrolyte deficit, vitamin E deficit (?)	Overexertion
Colics		
Spasmodic	Sudden change in feed, grain overload, toxic plants or substances	Stress
Impaction	Inadequate water intake, excessively fibrous feed, sudden change in feed	Impaired GI motility
Enteroliths	Alfalfa hay or other alkalinizing feed, Ingestion of foreign objects	
Laminitis	Grain or carbohydrate overload, toxin exposure	Metabolic disease, obesity

For hay samples, ideally a hay corer should be used to obtain core samples from at least 10 bales. If grab samples are obtained, take them from the center of at least 15 bales.

2. Clinical samples:

Blood: Blood samples are useful mainly to rule out non-nutritional disease problems and to test for toxic heavy metals. Calcium and sodium

concentrations in the blood are tightly controlled by hormonal mechanisms and do not reflect dietary intake. Plasma concentrations of micro-minerals such as copper, zinc, and selenium may reflect problems with intake but are so variable that only severe imbalances will be detected. Iron status is best determined by measuring serum ferritin, not blood iron. Anemia is NOT diagnostic for an iron deficiency because there are many other, more likely causes of anemia in horses. The

only vitamin for which assays are routinely available is vitamin A, and this is not likely to be deficient.

Urine: Creatinine clearance ratios or fractional excretion can be determined for phosphorus, potassium, and sodium which are reflective of actual intake. Urine calcium content varies

radically over a 24-hour period and is not a reliable measure. Blood and urine for these analyses must be collected at the same time.

Postmortem: GI contents, liver, and kidney biopsy: Most beneficial for chronic trace mineral imbalances (especially copper and zinc) or toxin exposure.

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