



Grass Founder

by **HEATHER SMITH THOMAS**

A problem that sometimes occurs when horses are on pasture is “grass founder”—a type of laminitis triggered by something in forage plants that are young and growing rapidly. This happens most commonly in the spring or in periods of wet weather, or sometimes in the fall if seasonal rains have stimulated lush regrowth of pastures.

The “something” in green grass was recently discovered to be sugar. Grasses store energy in their seed heads as starch (cereal grains store the most) but researchers in Wales found that grasses also store energy in roots, leaves and stems as fructan—a type of sugar. Thus grass founder falls under the category of carbohydrate overload—lush, fast-growing grass serves as a source of highly digestible, high-energy feed. If some of it moves on into the hindgut before it is fully digested, it is fermented and creates problems, just as too much grain would do.

Whenever grass is growing rapidly, the plant may produce more energy than it needs, so it stores the excess as fructan (which can be converted back to growth energy at night or on cloudy days when the plant is short on energy). In the spring, or whenever the weather brings sunny days and cool

nights, grass plants store large amounts of fructan in their lower stems (for use at night) and may create more than they use up at night. In summer, the plant has less fructan reserves because most of the sugar produced by the plant during the day is used up each night. Thus horses are less apt to develop grass founder during summer.

Eating excessive amounts of fructan can lead to laminitis, just as consumption of too much starch (in grain) can cause problems. Some of it passes through the small intestine undigested and is then fermented by the bacteria in the hindgut (cecum and large colon). This creates lactic acid and bacterial toxins that trigger the laminitis. Contents of the hindgut become acidic due to excessive fermentation, resulting in the death of large numbers of gram negative bacteria—and subsequent release of endotoxin.

Some horses are more susceptible to grass founder than others, perhaps due to their feed efficiency or gluttony. Horses (and especially ponies) that are easy keepers tend to founder more readily at pasture. The fat, idle animal also seems to be more at risk for founder than the fit, active horse in peak athletic condition. Horses that consume a great deal of green grass when unaccustomed to it, may also be more apt to founder than horses already adjusted to pasture diets.

The danger of founder at pasture decreases as the grass matures, the growth rate slows, or the grass becomes drier (more fibrous and less lush). The plants in early spring are high in water content, protein and carbohydrates (including the sugars being stored for night and cool-day growth), and low in fiber. Horses tend to overeat on lush forage, due to its palatability and also its low fiber content which gives a lack of “fill” to the gut. The horse doesn’t feel full so he keeps on eating. For some individuals, this overload of carbohydrate sugar ends up in the hindgut and leads to overproduction of lactic acid.

Horses with low thyroid hormone tend to founder very easily. It is theorized that horses with low thyroid hor-

monone production can’t utilize the carbohydrates properly—the thyroid hormone helps regulate the horse’s rate of metabolism.

Horses that are easy keepers, overweight or cresty necked (many ponies fall into these categories) seem especially vulnerable to grass founder, if they are low on thyroid hormone. Their body metabolism can’t seem to handle the excess of rich green feed when they have unlimited access to this type of pasture.

Prevention

Horses should not be turned onto lush spring pasture without a gradual reintroduction to this type of feed. Usually a break-in period of several days (gradually increasing the time intervals) will keep a horse from having problems. Once an individual suffers from grass founder, however, he seems more likely to founder again.

To avoid grass founder, keep susceptible horses off early spring pasture or lush, fast-growing regrowth until the grass has slowed its growth and is starting to make seed heads, or use pastures containing legumes or species of grass that don’t create as much fructan. Pastures that were grazed short during fall or winter, and which are growing fast in the spring, are often risky.

If a horse is susceptible to grass founder (easy keeper, overweight, or cresty necked), keep him off pasture until the grass starts to mature, and then introduce him to the pasture very slowly. Make sure the transition from hay to pasture is very gradual, taking at least a week to adjust to the green feed. Put the horse out for only 15 to 20 minutes the first day, 30 minutes the second, an hour the next, an hour and a half the next, then about two hours per day for the rest of the week. With some individuals you must limit their time on pasture every day (turning them out for only two or three hours of total grazing time daily, preferably breaking it into shorter morning and evening periods), if they are the type that founder easily. It also helps if you allow a horse to fill up on hay before his turn-out on pasture.

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Gradual change from hay to pasture is always wise, even if grass is not lush. Abrupt transition can disrupt the microbes in the gut and put a horse at risk for colic as well as laminitis. Horses with a history of laminitis, from any cause, should not be allowed to graze young, fast-growing pastures.

When horses are on lush pastures, check them often for early signs of laminitis, such as heat in the feet or a pounding pulse at the back of the

pastern. A horse that is developing laminitis will show foot tenderness or lameness, or even a reluctance to walk. He may stand with his front feet far forward, trying to shift the weight off them, and may walk very gingerly or not at all. Pain in the feet will make him very reluctant to turn (which puts more weight on one foot). He may lie down and refuse to stand on his feet at all. If signs of laminitis or colic occur, the horse should be removed from pasture, and will also need immediate medical attention.

Laminitis

Laminitis is the term for inflammation of the laminae in the foot—the tiny finger-like tissues that attach the sensitive inner parts of the foot to the insensitive outer wall. When laminitis occurs, the horse suffers extreme pain and death of some of these delicate tissues. If the horse founders (the term for damage to the foot) the bond between the coffin bone and the hoof wall is weakened or destroyed, allowing the bone inside the hoof to tip downward. In severe cases, the coffin bone rotates down through the sole of the foot and becomes susceptible to infection—which can lead to the death of the horse.

A number of factors can trigger laminitis, and the events within the horse's body that result in this painful condition are not completely understood. They can vary greatly, depending on the cause. In grain founder, for instance, the starch in the grain creates a prime environment for overgrowth of bacteria in the gut, if the grain gets into the cecum and large colon before it is completely digested (and this is what happens if the horse eats too much). The fermentation and rapid multiplication of bacteria leads to production of endotoxins that can compromise the gut lining and leak into the bloodstream, where the toxins are carried to the horse's feet to damage the laminae and their blood supply.

According to Dr. Rodney Bel-

grave, Equine Internal Medicine, Washington State University, the endotoxin itself is a component of gram negative bacteria—part of the cell wall. When these bacteria multiply rapidly and then die off due to the increased acidity of the hindgut, the endotoxins have severe adverse effects on the cardiovascular system.

“Laminitis is still somewhat of a mystery, as to the actual causes, and there are a multitude of treatments. Usually in veterinary medicine, whenever there is a disease that has a long list of treatments or potential treatments, this means we don't really know how to treat it (though some things may help). When it comes down to the bottom line, all cases are somewhat different and some treatments work for some horses and not for others. This is often hard for people to understand,” he says.

“Veterinarians are also frustrated—when we try to treat horses with laminitis, some respond, and whether or not it's due to what we did, or to the fact they would have gotten better on their own, we don't always know. Some treatments are recommended, just because in some cases the horse got better. I've used a treatment on a horse and it worked, and have used it on another and it didn't work. So all individual cases are different. This makes it very frustrating because there are so many different ways to deal with laminitis.”