

DEAD GRASS AND WEEDS CAN TRIGGER LAMINITIS

Kathryn Watts

Rocky Mountain Research & Consulting, Inc., Center, CO 81125

Horses with carbohydrate intolerance may encounter excess nonstructural carbohydrates (NSC) in the form of dead grass, and weeds.

After a dry fall and early winter, 3 chronically laminitic ponies had relapses 48 hours after being turned out on dead grass in December in Colorado. There have been anecdotal reports of laminitic horses having relapses in turn out areas with no grass, but with appreciable amounts of green weeds that are eaten by horses. As previous laminitic episodes in these animals had always been attributed to excess soluble carbohydrates, dormant pasture grasses and some weeds known to be eaten by horses were tested for CHO content.

All samples were cut with hand clippers, frozen immediately and shipped frozen to Dairy One Forage Lab, Ithaca, NY. The fescue and brome/Kentucky Bluegrass pasture samples were those that caused laminitis relapses. The rest of the grass samples were collected from pure stands of grass from plots maintained at Rocky Mountain Research & Consulting, Inc. at Center, CO during winter of 2003-04. Total precipitation from November through end of February was 1.2 inch of water as snow. The highest amount in a single event contained .23 inch of water. The fescue pasture was from another site that received a fairly substantial snowfall between the 2 sampling dates. Weeds were collected in Center, CO on various dates throughout the 2004 growing season, and submitted as whole plant samples.

As per the Dairy One Feed Composition library, grass hay normally averages from 9-18% NSC. Equines suffering from endocrinopathic laminitis fare better with forages on the lower end of average. The data shows that some dead grass and weeds have high enough NSC concentrations to trigger laminitis episodes in susceptible individuals.

Table 1: Dead grass in mid-winter under drought conditions

	Testing date	NSC*	Starch	Sugar/fructan
Fescue pasture	12-21-03	29.6	1.1	28.5
Fescue pasture	01-07-04	15.1	.3	14.8
Brome/KBG pasture	12-15-03	15.4	1.2	14.2
Brome/KBG pasture	01-04-04	9.4	1.1	8.4
Brome/KBG pasture	02-21-04	8.6	.8	7.8
Crested wheatgrass	01-01-04	13.9	1.1	12.8
Crested wheatgrass	02-23-04	18.2	1.6	16.6
Orchard grass	01-01-04	20.6	1.6	19.0
Orchard grass	02-23-04	21.8	1.0	20.8
Tall fescue	01-01-04	31.7	.8	30.9
Tall fescue	02-23-04	30.3	1.1	29.2
Perennial ryegrass	01-01-04	39.7	.7	38.9
Perennial ryegrass	02-23-04	25.2	.7	24.4

Table 2: NSC content of some common pasture weeds

	NSC*	starch	Sugar/fructan
Dandelion	15.6	1.7	13.9
Redstem filaree	20.1	1.6	18.5
Red clover	18.1	1.8	16.2
Sweet clover	14.1	3.3	10.8
White clover	11.8	.1	11.7
Kochia	12.0	3.6	8.4
Quackgrass	18.1	1.6	16.5
Wild oats	26.4	3.4	23.0

*NSC as % of dry matter, tested by Dairy One, Ithaca, NY

When cool season grasses are subjected to freezing temperatures, growth slows or ceases, but they do not go dormant immediately. If daytime temperatures are above freezing, and adequate sunshine occurs, sugars and fructan continue to form and accumulate. In autumn, grass may have its highest sugar and/or fructan concentration of the year. Growth utilizes sugars; cessation of growth allows them to accumulate. High sugar concentration triggers formation of fructans. When plant cells die and rupture from a hard freeze, fall rains or early winter snow may then leach out these accumulated water-soluble sugars and fructans. However, in areas with little rain or snow, these accumulated sugars may remain in the dead grass tissue.

Cattle grazers know kochia, filaree, chicory, plantain and other weeds to be nutrient dense and acceptable feed for growing cattle. (1)(2) Dandelions and chicory contain the same type of fructan being used to induce laminitis in horses in clinical studies. (3) While animals grazing grass pastures may avoid these weeds, horses maintained on dry lots or with very limited access to fresh forage may find them very desirable. Many of the weeds that have high levels of NSC are also known to accumulate toxic levels of nitrates or oxalates, which could possibly compound the danger to animals with already fragile health.

In conclusion, dead grass and weeds may contain levels of NSC high enough to trigger laminitis in susceptible animals. Caretakers of equines at risk of laminitis should never assume that dead grass or weeds are safe forage. All forage sources for animals with high risk for laminitis should be appropriately tested to assure carbohydrates are within tolerable levels.

Keywords: carbohydrate, grass, weeds, laminitis, fructan

(1) Sanderson M.A., Maria Labreuve, Marvin H. Hall and Gerald F. Elwinger, Nutritive Value of Chicory and English Plantain Forage, *Crop Sci.* 43:1797-1804 (2003).

(2) Beck, R., Steer Diets in Southeastern Colorado, *J. Range Man.* 1975, 28(1):48-52

(3) Suzuki M, Chatterton NJ: Science and Technology of Fructans, Boca Raton, FL, CRC Press, 1993