

What's the Value of Rained-On Hay as Horse Feed?

Krishona Martinson, University of Minnesota; Dan Undersander, University of Wisconsin

Rain occurring while cut hay is laying in the field causes yield and quality losses, reducing the value of the crop as an animal feed. Weather-induced losses are caused by:

1. Prolonged plant respiration reducing soluble carbohydrates and overall energy content.
2. Leaching of soluble carbohydrates and certain minerals.
3. Leaf shattering and loss, removing the highly digestible and high protein portion of the forage.

Several researchers have studied rainfall effects on cut alfalfa. Wisconsin researchers measured dry matter losses of 22% when alfalfa was exposed to 1" of rain after 1 day of drying. Similar hay dried without rain damage lost only 6% of initial yield. Losses appear greatest after partial forage drying. In a Michigan study, rainfall intensity was kept constant at about 0.7" but spread over 1-7 hours. Dry matter losses were 4-13%, with the highest occurring when rain was spread over a longer duration. Given the same total rainfall, a low intensity rain will result in more leaching of soluble compounds than a high intensity rain. Also, as forage moisture content declines, it is more prone to dry matter loss from rain. In a Wisconsin study, the maximum loss in dry matter (54%) was a treatment where 2.5" of rain fell on hay that was nearly dried.

Other species have been studied as well. Yield losses of birdsfoot trefoil appear to be less than alfalfa, while red clover shows even less dry matter loss due to rain, and grasses suffer the least. Dry matter losses usually represent a significant decrease in income since less hay is available for baling, feeding, and selling.

Three primary factors are involved in dry matter losses: leaching, respiration, and leaf loss. Leaching is the movement of cell solubles out of the plant. Very water soluble plant components are leached out and lost when rain occurs. Unfortunately, most of these are highly digested by the animal. About one-half of the dry matter leached by rain is soluble carbohydrates.

Unlike other livestock, losses of soluble carbohydrate can be beneficial for some horses, including those with laminitis, Equine Metabolic Syndrome, or obesity. In order to manage these horses and reduce carbohydrates in harvested forage, horse owners have resorted to soaking hay. Purchasing rained-on hay with naturally low levels of carbohydrates is a possible alternative to hay soaking.

Respiration (breakdown of soluble carbohydrates by plant enzymes) occurs at a rate of nearly 2% dry matter per hour in fresh forage, and declines almost in proportion to the decrease in moisture content until the plant reaches ~60% moisture. Every time the forage is wetted by rain, respiration is either prolonged or begins again in cases where the cured forage was below 60% moisture. In either case, additional dry matter is lost.

In Wisconsin studies, leaf loss was 8-20+% of initial forage dry matter when rainfall was 1-2.5". In Michigan studies, direct leaf loss was much lower (0.5-4%). Experience tells us rain-damaged alfalfa is more predisposed to leaf shatter after it dries, and rainfall often means more raking and lost leaves.

Depending on many factors, digestibility of rained-on hay may decline 6-40%. With leaching of soluble carbohydrates, structural fibers comprise a greater percent of dry matter, reducing digestibility. However, rainfall has little impact on protein concentration. Relatively high protein values are common in comparison to fiber concentrations unless significant leaf loss occurs.

Rained-on hay can be a suitable forage depending on several factors. Quality tends to be retained if rainfall: occurs soon after cutting, was a single event, intensity was high, and forage has not been re-wetted numerous times. Rained-on hay is actually beneficial for horses prone to laminitis and other metabolic disorders due to its reduced soluble carbohydrate content. Analyzing forage for nutrient content is recommended, but can be especially useful when determining quality of rained-on hay.