



### **How Rain Affects Hay Quality**

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Hay season should be in full swing throughout Manitoba, at least according to the maturity of most of the grasses.

Unfortunately the one thing that Manitoba needed to assure a good forage crop is now preventing producers enough time between mowing and baling to put up hay in good condition.

Waiting for a no rain window wide enough between cutting and baling dry hay, this year, has been near impossible and is costing producers' quality in their hay crop as it continues to mature.

Understanding how rainfall impacts forage that is drying down but not baled can in some cases enable producers to make timely decisions that weigh the risk between a chance of rain and a guaranteed period of no rain in putting up some better quality forage.

#### **What causes weather-related losses in hay quality?**

Rained on hay can lose quality due to:

- Leaching of soluble carbohydrates, proteins and certain minerals as rainwater falls on and moves through the cut forage.
- Increased and prolonged plant respiration due to the re-wetting of hay above 30-40% moisture. This leads to losses in yield, soluble carbohydrates and overall energy content.
- Leaf shattering and loss due to increased raking to dry the windrow after a rain. Frequent wetting-drying cycles also increase leaf loss.
- Microbial activity continues in wet hay, resulting in the breakdown of the plants and consumption of their nutrients. Mold growth can also occur.
- Color bleaching. This effect, though, is more an aesthetic issue than a quality issue.

### **How much can rain reduce hay yield?**

There have been many studies done looking at the effects of rain on hay. One study conducted in Wisconsin recorded dry matter losses as high as 22% when alfalfa hay was exposed to 1 inch of rain one day after being cut. Similar alfalfa hay never exposed to rain only lost 6% of its potential dry matter yield. Alfalfa hay exposed to 1.6 inches of rain over a few days lost 44% of its potential dry matter yield.

In another study in Michigan, the effects of one to seven hour rains were examined on alfalfa hay. Here, dry matter losses ranged from 4-34%, and were greater the longer the rain lasted. Grass hay often will not experience the same degree of loss as alfalfa hay. The majority of yield loss in alfalfa hay is due to leaf loss. Grass leaves are not as easily lost.

### **How does rain reduce my hay yield?**

Rain reduces dry matter hay yields through its effects on: leaching, plant respiration and leaf loss. Leaching is when water soluble components of cells move out of them. Most of these compounds are easily digested by livestock and include: carbohydrates, soluble nitrogen, minerals and lipids. They are leached out and lost when cut forage is rained on.

Plant respiration is the breakdown of soluble carbohydrates by enzymes. It occurs even when plants are not rained on. Respiration losses occur from the time the plant is cut until the forage reaches 30-40% moisture. Each time cut forage is rained on; respiration either continues or starts again if the forage was already less than 40% moisture. In both cases dry matter is lost, although the exact amount is difficult to estimate.

Studies differ when it comes to the impact of rain on leaf loss. In the Wisconsin studies, leaf loss ranged from 8-20%. In Michigan, leaf losses were only 0.5-4%. Based on experience, most producers know that rain damaged hay is more at risk to leaf shatter after it dries. Extra raking or tedding is often needed to speed up drying, which also increases leaf loss.

### **Do rain intensity and forage moisture make a difference?**

The studies tend to agree on this issue. Given the same amount of rain, a low intensity rainfall causes more leaching of soluble carbohydrates than a high intensity rainfall.

Plus, as the moisture content of the cut forage decreases, the more dry matter will be lost when rained on. Hay that is almost dry enough to be baled will lose more dry matter when rained on than hay that has just been cut. In the Wisconsin studies, up to 54% of the potential dry matter yield was lost when almost cured hay received 2.5 inches of rain.

### **How does rain affect the quality of my hay?**

Most of the studies have shown that there is little impact on crude protein levels when field cured hay is rained on. It is common to see high crude protein values compared to fiber levels. However, due to the leaching of soluble carbohydrates, acid detergent fiber and neutral detergent fiber levels will increase. This lowers the digestibility of the hay and its overall forage quality.

### **Conclusion**

Rained on hay will be of better quality if:

- The rainfall is soon after mowing compared to when the hay is drier.
- A higher intensity rainfall compared to a lower intensity rainfall, assuming the rainfall amount is the same.
- Forage is rewetted only once compared to multiple times.

To know the true quality of rained on hay, or hay in general, it is always a good idea to get a forage analysis done on your hay before feeding it to your livestock.

For more information on managing hay to improve dry-down go to:

[High Quality Hay Management](#)