



# U of M Horse Newsletter

Providing research-based information to Minnesota Horse Owners

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UNIVERSITY OF MINNESOTA  
**EXTENSION**

## Preventing Hay Fires

Hay fires that damage or destroy hay, buildings, and livestock cost farmers millions of dollars in building and feed replacement costs, lost revenue, and increased insurance rates. Since 2000, there have been over 900 livestock and poultry barn fires in Minnesota, resulting in over 26 million dollars in damages (Minnesota Fire Incident Reporting System). Although not specifically tracked by MFIRS, some of these fires have been caused by spontaneous combustion of hay that was baled too wet.

Proper moisture at baling is the key to preventing hay fires. Managing the curing process and storage is vital to reducing the risk of hay fires.

**MOISTURE IS THE KEY.** Moisture content of the hay at time of baling is the single biggest hay fire risk factor. Hay baled at less than 15% moisture has a minimal risk of fire (Table 1). As moisture content increases, the risk of dry matter losses and fire increase.

*Table 1.* Moisture Guidelines at Time of Baling.

MOISTURE RANGES (%)	COMMENTS
< 10	Too dry. Hay may be brittle and dusty.
10 - 15	Recommended moisture range. Minimal risk of fire.
16 - 20	Could mold unless propionic acid is used, slight risk of fire hazard.
21 - 25	Will likely mold unless propionic acid is used, moderate risk of fire hazard.
> 25	Severe heat damage is likely, high risk of fire hazard.

Baled hay becomes a potential fire hazard when the interior bale

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temperature does not decrease. This occurs when heat is created by bacteria respiration. Table 2 lists the effects of internal bale temperature and fire potential.

*Table 2.* The Effects of Internal Bale Temperature and Fire Potential.

TEMPERATURE RANGES (F)	COMMENTS
< 130	Minimal fire risks.
130 to 140	Minimal fire risk. Continue checking.
150	Moderate fire risk. Check frequently.
175 to 190	Fire is imminent. Call the fire department.
> 190	Use extreme caution. Bales may combust when moved.

Maximum temperature is not the only concern with potential hay fire. Rate of temperature increase should also be monitored and considered when addressing a fire risk. If the internal bale temperature is gradually rising, there is usually a minimal risk of fire. However, if a rapid rise in temperature occurs, the risk of fire is high. Fire is not the only potential threat of wet hay. Hay that is baled too wet can have a significant amount of dry matter loss.

Moldy hay is especially dangerous to horses. Ingestion and exposure to mold spores can cause colic, heaves, and other respiratory health issues. Moldy hay is also a health risk for horse owners. Farmer's lung is an allergic reaction associated with inhalation of dust containing spores and dried fungi that are commonly found in moldy hay. Farmers lung can be disabling for people and repeated exposures can cause scarring and fibrosis.

Next month, steps to reduce the risk of hay fires will be discussed.

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## UPCOMING EVENTS

**Would You Like to Volunteer at the Equine Center?**

Contact Sue Loly at [Lolyx001@umn.edu](mailto:Lolyx001@umn.edu)

**Would You Like to Tour or Rent the Equine Center?**

Contact Katie Newcomb  
[cvmumec@umn.edu](mailto:cvmumec@umn.edu)  
or 612-624-7414

**Do you have an excess of composted horse manure?**

**Do you want composted horse manure?**

Contact Betsy at 612-596-1175 or [eliza003@umn.edu](mailto:eliza003@umn.edu)

**New Horse Fact Sheets Now Available On-Line**  
([www.extension.umn.edu/horse](http://www.extension.umn.edu/horse))

1. *Barn Disaster Planning* 4 pages. \$4.00
2. *Fly Control Around Horses*. 4 pages. \$4.00
3. *Horse Behavior and Stable Vices*. 4 pages. \$4.00
4. *Preventing and Treating Colic*. 4 pages \$4.00
5. *Equine Vaccinations and Deworming*. 4 pages. \$4.00
6. *Vitamin and Mineral Nutrition of the Horse*. 2 pages. \$2.00



## N Fertilizer Application Rates & Timings

Split nitrogen (N) applications have long been recommended on rotationally grazed pastures. However, the most efficient timing for these nitrogen applications to rotationally grazed pastures has not been established.

Research conducted by Wisconsin Extension faculty determined that the optimum time to apply nitrogen is early May and early August. Mid-June applications are not productive because cool season grass (i.e. timothy, orchardgrass, and brome grass) growth is slowed by summer heat and reduced precipitation.

Split applications of nitrogen or a single, well-timed application resulted in the highest yield. Three applications of 50 units of nitrogen each, and a single application on May 1 provided the highest overall yield. Single applications of 50 units of nitrogen on either May 1 or August 1 provided the greatest forage increases per pound of nitrogen applied. The single 50 unit application on June 15 consistently provided the lowest yield increase and the lowest yield increase per pound of nitrogen applied.

The greatest return per dollar were realized with the May 1

application and the three 50 unit applications. The lowest return was from the June 15 single application. It is important to realize, in early May, that pasture growth may already be greater than the animals' ability to utilize it. Nitrogen applications at this time will only exacerbate this problem.

In order to capture this increased growth, pastures may need to be mechanically harvested, have a reduced resting period, or stocked with higher than normal stocking rates. To view the entire research report, go to [www.extension.umn.edu/cropenews/2007/07MNCN20.htm](http://www.extension.umn.edu/cropenews/2007/07MNCN20.htm)

Author: D. Cosgrove, PhD, UWRF

## Research Update: Pasture Fertilizing

Inorganic fertilizers (man made), which contain readily available nutrients and little to no organic matter (OM), are commonly used to maintain soil fertility in pastures. Unprocessed (non-composted) organic materials, such as horse manure, while high in OM, may not contain nutrients in the readily available state. Land application of composted horse manure represents a management strategy that could replenish soil OM, and reduce the need for inorganic fertilizer.

The objective of this study conducted at the University of Florida was to evaluate soil and forage characteristics in response to fertilization with inorganic fertilizer, unprocessed stall materials or

composted horse manure that has been introduced by soil incorporation (tillage) at the time of pasture establishment.

Incorporation of horse stall material into soil, whether unprocessed or composted, produced similar forage yield to that observed with inorganic fertilizer in newly established pasture. Soil OM was not impacted by any of the fertilizers. An increase in soil OM may require more than one yearly application of compost, particularly on sandy soils.

The results of this study suggest that the incorporation of unprocessed or composted horse stall materials into soil can reduce or replace the use of inorganic

fertilizers when establishing grass pastures with minimal reduction in forage quality or production. Such a practice could decrease the cost of manure disposal and purchased inorganic fertilizer, recycle nutrients, and reduce environmental degradation by stabilizing nutrients that may threaten water quality.

Spreading horse manure (whether composted or not) on an existing pasture has different guidelines than above. If you have less than one horse for every two acres of pastures, you may be able to spread additional manure on the pasture without increasing the parasite load. If you have more than one horse for every two acres of pasture, then spreading additional manure is not recommended. Authors: S. Dilling, L. Warren and A. Peters, Univ. of FL

## Ask the Expert

Q: Where can I get hydrated lime? I'm trying to do everything I can for fly prevention and putting lime in stalls and in wet areas was recommended to me.

A: Hydrate lime, calcium hydroxide, (commonly sold as barn line - any coop or farm supply store

should have it), increases pH. It can help reduce ammonia odor in barn stalls. It will also help absorb moisture, which may help reduce flies.

At amounts commonly applied (usually minimal amounts), it is unlikely to provide benefit for fly

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control. Maggots are pretty tolerant of wide ranges in pH.

If you are using lime in a pasture area, significant use of the lime may increase the pH enough to inhibit plant growth.

Bottom line, lime does not directly control flies.