

Avoid Fires From Wet Hay

Lester R. Vough
Forage Crops
Extension Specialist
University of Maryland

Spontaneous combustion is always a possibility with stored hay, but particularly if hay was baled too wet or too green. This year, hay growers are commonly facing the situation that hay really needs one more day of drying but rain is forecast.

The choice is often to go ahead and bale rather than have the losses from rain damage. In many cases, that is the wise decision — there may be some musty and/or moldy hay but most of it is feedable, at least to beef and dairy animals. But in other cases it turns out to be an unwise decision, resulting in spontaneous combustion and loss of barns and storage structures if the hay was stored inside.

Hay that was too wet from rain or dew or that was not allowed to dry sufficiently in the field will go through a curing process (sometimes referred to as a sweat) in storage. During the curing process, heat is produced. This heat buildup is caused from live plant tissue respiration coupled with bacteria and mold activity. Plant respiration converts plant sugars to water and carbon dioxide, increases neutral detergent fiber (NDF) and acid detergent fiber (ADF) and decreases the net energy content of the hay. Plant respiration slows as moisture content decreases but does not stop until plant moisture is 20 percent or less. In the range of 20 to 35 percent moisture content, molds

are the predominant microorganisms that grow in hay. As with respiration molds likewise consume plant sugars, producing water and carbon dioxide, causing loss of dry matter, digestible nutrients and net energy. If the moisture generated by respiration is not dissipated out of the bale, mow or stack, than the moisture content of the hay will increase.

Both plant and mold respiration generate heat. If the hay heats to 100°F or higher, browning reactions begin. In these reactions, also called caramelization, proteins and amino acids combine with plant sugars to form a brown polymer resembling lignin. This also results in increased levels of ADF and of acid detergent insoluble protein (bound protein) and reduced digestibility and net energy (Table 1). Browning reactions release heat, and when coupled with heating from mold growth, result in an upward spiral in temperature of the hay mass.

Although most problems with spontaneous combustion begin occurring within two weeks after hay has been placed in storage, combustion is possible for two months. Growers, especially those who know that the hay was a little too wet or green when it went into storage, should start checking for temperature rises within two days following storage and monitor on a daily basis for at least 10 days to two weeks.

Although one may check the top bales in the mow or stack or the surface of large round bales to find out if there is heat buildup, chances are the problem will occur in the middle or lower bales in

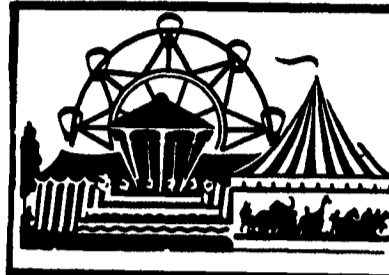
the mow or in the middle of large round bales. These areas are difficult to reach but one way to check the temperature of suspected hay is to force or drive a pipe or probe deep into the mow or to the center of large bales, then drop a thermometer tied to a string down the pipe or probe and leave it there for 15 minutes. If the temperature is up to 160°F, read and record temperatures at least daily to monitor the temperature trend. If the temperature is in the 160-180° range, consider moving some hay out so it can dry and cool. If the temperature is 180-190°, alert the fire department to the situation and stop ventilation of mows or stacks to the extent possible to reduce the air supply. If the temperature is above 210°, call the fire department. Do not attempt to move hay at that temperature unless water and fire fighting equipment are on the scene as the hay may ignite when it becomes exposed to a greater air supply as it is moved.

Heating also increases when bale density is higher and as both the size of the bale and the size of the mow or stack gets larger. The higher the bale density and the larger the bale, the drier the hay needs to be at the time of baling.

With small rectangular bales, hay can generally be safely baled at 18-20 percent moisture. With large round bales or large rectangular bales, hay should generally be no higher than 16-18 percent. Thus hay baled at 18-20 percent moisture as small rectangular bales will generally store safely while the same hay baled as large round or square bales will typically heat and be musty or moldy.

Table 1. Problems associated with hay heating.

TEMPERATURE	PROBLEM
115° - 125°F	When coupled with high moisture, molds and odors develop and decrease palatability.
> 120°F	Heating reduces digestibility or protein, fiber, and carbohydrate compounds.
130° - 140°F	Hay is brown and very palatable because of the caramelization of sugars; unfortunately, nutritional value is reduced.
> 150°F	Hay may turn black and spontaneous combustion is possible.



Fair Happenings

Schnecksville Community Fair
Schnecksville Community Fair will be held at Schnecksville Fire Company grounds, Route 309, Schnecksville, on June 20-24. The fair opens nightly at 5:30 p.m. and Saturday at 3 p.m.

The community fair is sponsored by Schnecksville Community Fair Association. The fair offers free admission, free live entertainment and parking is \$3 per vehicle, except on Friday (fireworks night) \$4 per vehicle.

The theme this year is "A Circus Of Country Fun." One of the main attractions will be a circus model display by the "David Deacon Blanchfield Ring #86" of the Circus Model Builders International. This free attraction will be displayed under a big top, with model displays ranging from HO, 1/4-inch, 1/2-inch, 3/4-inch, 1-inch, and 12 inches to the foot.

In conjunction with our circus display, this year's fair will feature a Circus Parade scheduled for Saturday, June 24 for 5:30 p.m., with the parade route circling the fair grounds. The Circus Parade will feature five full size circus wagons, clowns, magicians, animals, fire truck, honor guard, Santa Claus, plus so much more! Another free attraction will be Carla Wallenda's high wire act, with up to three performances daily!

The fair provides much free entertainment for the young and old. Some of the free attractions nightly include Yiengst Magic Circus, Master of the Chainsaw, Old Time Plow Boys (antique tractor display), animal exhibits, 36 craft persons for the craft show, petting zoo, Lollipop The Clown, and more.

The schedule of events for Tuesday, June 20, Opening Day includes 9 a.m. judging of 4-H Grange and Open Class. A 5 p.m. dining room and exhibit area open. Carnival rides open at 5:30 p.m. Opening Ceremonies will be at 7 p.m. located near the 4-H building. Plan to attend the Baked Goods Auction at 7:45 p.m. And

energy costs of up to 35 percent compared to conventional methods.

Later, Scott Aldrich hooked up his tractor to the conservation district's no-till grain drill and provided a no-till oat planting demonstration.

About 35 farmers participated in the field day.

For more information, contact Ed Reed, (717) 278-4600 ext. 282, Bob Hotchkiss (717) 278-1011, or Mark Madden (717) 278-1158.

at 8 p.m. is the "Sierra Band."

On Wednesday, June 21, the dining room and exhibit area open at 5 p.m.; with the carnival rides opening at 5:30 p.m.; and the 4-H Rabbit Show at 6 p.m. The New Tripoli National Bank "Apple Pie Contest" will be judged at 7 p.m.; with the entries received between 3 and 6 p.m.; and 1st place is \$150. Also at 7 p.m. is the 4-H Sheep Show. At 8 p.m. see Tommy Schafer & The Blue Mountain Ramblers perform.

Thursday, June 22 is ride all night for one price! The dining area and exhibit area open at 5 p.m. and the 4-H Goat Show. At 5:30 p.m. the carnival rides open; 4-H Steer Show at 7 p.m.; and Dairy Show at 8 p.m. See Cruising Route 3 at 8 p.m.

Friday, June 23 the dining room and exhibit area open at 5 p.m.; with the carnival rides opening at 5:30 p.m. At 7 p.m. see the 4-H Swine Show and at 8 p.m. see "Midnight Special" Band. At 11 p.m. see our spectacular fireworks display.

Saturday, June 24 the rides and Exhibit Area open at 3 p.m. Also at 3 p.m. is the judging of Neffs National Bank "Hershey Chocolate Cake Contest"; with the entries received between noon and 3 p.m.; and 1st place is \$150. Don't miss Children's Tractor Pedal Pull at 3:30 p.m. for children 12 years and younger, weighing 100 pounds or less. The Dining Room opens at 4:30 p.m. And at 5:30 p.m., see one of the major highlights of this year's fair, the Circus Parade. At 8 p.m. see "Jesse Wade Gang" sponsored by Neffs National Bank.

The fair will include rides by Nonweiler Amusements, games, many food concessions, Bier Garden, pony rides, bingo, Grange exhibits, Lehigh County 4-H Animals (sheep, rabbits, pigs, steers, and goats), and more.

Don't forget the famous Pennsylvania Dutch dinner platters served at 5 p.m. nightly and 4:30 p.m. on Saturday in our fire hall. Pork and Sauerkraut with mashed potatoes and hot roast beef sandwich with mashed potatoes served daily. Plus on Wednesday ham and string beans. On Friday the fair will also serve a crab patty platter and shrimp in the basket. Premium books are available at the Schnecksville Fire Company or the new King's Market located on Rt. 873, Schnecksville for entering items into the fair.

For more information, call (610) 799-2609 or (610) 767-1735. During fair week, call (610) 799-9467.

Farmers Attend No-Till Field Day

MONTROSE (Susquehanna Co.) — Recently the Susquehanna Conservation District and the Penn-State Cooperative Extension co-sponsored an informative No-till Cropping Field Day at the Aldrich Farmstead in Bridgewater Township.

John Benschoter, the district's nutrient management technician, introduced the information resource people after giving a summary of the program's goals. He also briefly covered the district's Chesapeake Bay program.

Assisting at the field day was Bob Hotchkiss, district conservationist, Montrose Field Office, USDA Natural Resources Conser-



Ed Reed explains calibration procedures on the no-till grain drill to local farmers.

vation Service. In his presentation, he covered the benefits of no-till crop production. Hotchkiss said, "You need to start with a plan which will be flexible enough to take into account the many variables involved in establishing a cropping system." Some of the factors include weather, soils fertility, rotations, wetness, timing and others.

Joel Myers, state agronomist with USDA-NRCS's Harrisburg office, shared with the group of farmers and local agency people valuable personal and technical information about no-till planting. Myers has been working with farmers for many years and helps run the family farm, using many innovative soil-saving techniques. He emphasized that "if a farmer wants to succeed, he or she must recognize how no-till fits into the overall farm management and cropping systems."

Ed Reed, erosion and sediment control technician, provided the

farmers with useful information about the operation and calibration of the no-till equipment. Reed is the technician on the conservation district staff who helps to conduct the no-till education program. Also involved are secretary/treasurer Connie Organisciak and Lillian Theophanis, district manager, who was on hand to handle public relations. Jim Garner, the newly hired district programs assistant, was available to assist during the day's activities. Garner will be more involved with the no-till program as time goes on.

Mark Madden, Susquehanna County extension agent, provided information on weed control options, fertility concerns, forage variety selection, and seeding rates. Madden's presentation provided an update on restricted-use pesticide credits to license holders. Madden commented that "no-till planting can not only help to control erosion, but it can make good business sense as well." No-till planting can reduce labor and



Joel Myers of the USDA/NRCS describes the use of a soil compaction gauge at the recent no-till field day.