

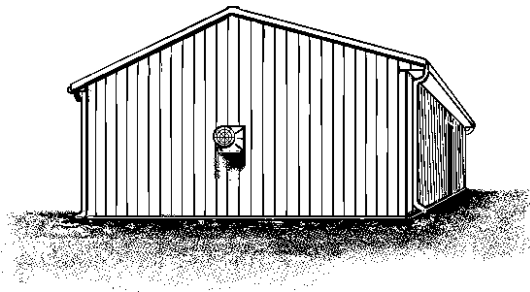
PLANT & PEST ADVISORY

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Hay: When Feed Can Become a Fire Starter

Daniel Kluchinski, Mercer County Agricultural Agent



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Stored hay is a valuable feed source for livestock and horses throughout the growing season and especially during the winter. However, when certain conditions occur, the potential of barn fires caused by spontaneous combustion can become a concern. Recent hot weather and newly harvested hay have led to a number of inquiries about spontaneous combustion or ignition of recently cut, then barn stored hay. It is important to understand the normal stages of heating in hay bales, and when conditions can lead to spontaneous combustion.

Baled hay goes through three normal stages of heating. The first stage is the heat of respiration. After cutting the hay, plants continue to respire or breathe. During respiration, carbohydrates in the plant combine with oxygen to produce carbon dioxide, water and energy. The energy is released as heat. This respiration normally does not raise the temperature over 100°F.

The second stage of heating is due to microbial activity. There are two types of microorganisms that come into play: the mesophiles and thermophiles. The mesophiles live and multiply best at moderate temperatures, and the thermophiles multiply best at elevated temperatures. In most freshly harvested hay, the temperatures will increase to 115 to 120°F, with a slight hesitation before the temperature continues to rise. At this temperature range the mesophiles cease to multiply and the thermophiles take over, up to temperatures of 150 to 160°F. It is the respiration of these microorganisms feeding on the hay that produces the heat during this stage. Reaching this stage should be of concern as it may rapidly lead to stage three.

The third stage is the heating caused by the chemical combination of oxygen and plant material. This process occurs at 130°F and then becomes of greater importance when at 165°F, this is the sole source of heat. This is the critical temperature and stage when the hay can ignite if the following conditions are met: (1) there is sufficient oxygen, (2) water is present, and (3) heat is generated faster than it can dissipate. Note that as the temperature in the hay increases, so does the rate of oxidation and heat. Therefore the critical point at which the temperature can increase to the kindling point can occur at an extremely rapid rate. Most importantly, there is a narrow moisture range at which spon-

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taneous combustion can start. This is a hay moisture content of 30 to 35%.

To reduce risk of spontaneous combustion in hay, follow these guidelines:

Avoid temptation to bale wet hay. Unless hay is treated with a hay preservative, do not store if the moisture level is above 20%.

If wet bales are harvested, pile in an area and monitor the temperature before placing them in storage. Don't place new hay bales on top of older stored bales. A transfer of moisture can occur.

Fix the leaking barn roof if bales are to be stored. A transfer of moisture can occur.

Check hay every two weeks for the first two months in storage.

Check hay temperature with a temperature probe or thermometer. You can also use an iron rod. Push the rod into the bale for 15 minutes then pull it out and feel the inserted end. If the bar is too hot to handle, the critical temperature may be reached. Normally bales will reach temperatures near 100°F during the first two to four weeks, then decrease.

Check for hot spots or odors, especially in the middle bales. This would show signs of microbial decomposition and heating. □

Proper Hay Storage Reduces Losses

Daniel Kluchinski Mercer County Agricultural Agent

Hay producers spend long hours cutting, tedding, raking and harvesting hay, but then sacrifice their hay harvest by improperly storing the bales. This is especially true for round bales, which are often seen left laying in or along the field border until used. This article discusses hay storage and management options to reduce hay losses associated with round bale storage.

✓ **Outside, uncovered storage** of bales may avoid the costs associated with storage buildings, however, it does not consider the revenue in lost hay. Spoilage losses averages 15 percent in the northeast, and can exceed 40 percent when storing bales in this manner. The amount of loss depends on several factors including the length of storage, bale size and density, precipitation, and drainage in the storage area.

If outside storage is necessary, create a storage area or pad using railroad ties, gravel or pallets. This helps to keep the bales off the moist soil surface. Then, align the bales in a north to south orientation, with approximately two feet between the bales. This allows for sunlight to reach the bales and keep them dry.

✓ **Outside, covered storage** of bales can reduce losses compared to uncovered storage. Bales should be stacked at a storage site where drainage problems have been remedied. One to four inches of stone works well to reduce moisture that might come in contact with the bottom of the bales. The bales should be stacked in a pyramid or triangle shape, with three bales forming the bottom or base, two on top of that, then one bale placed on top. Stakes or posts may help to keep the bales from rolling apart. Pay particular attention when working with large round bales since they have a tendency to roll. These approximately 1000 pound bales can cause injury or death.

The triangle should be covered with a tarp and secured to prevent the tarp from blowing off and rain from entering the bales. A 25 foot wide tarp will cover five foot diameter bales stacked in this arrangement. The cost of this system is approximately \$10 per ton, and includes materials, labor, machinery and site preparation. The wrapping can be re-used. Individual wrapping with a bale wrapper can also reduce weather losses. The cost is slightly higher than the group covering discussed above, as the material used to cover the bales is more expensive and not reusable. The cost for single wrapped bales ranges from \$10 to \$15 per ton.

✓ **In-barn hay storage** can considerably reduce hay losses, to about 4 percent. The overall cost is the highest of all options, ranging from \$15 to \$20 per ton. Available barn space, or new structures specifically used for hay storage can be built or used. Either structure must allow adequate space for equipment access and bale stacking. At least two feet of head room above the top bales is needed to allow for air circulation, and walls must be sufficiently strong to bear the weight of the stacked bales.

Hay producers must evaluate these options and select the best one for their operation. Cutting hay losses reduces revenue losses, but requires more labor, machinery and management costs. Farmers should consider their individual operations, review their round bale storage management, and determine what steps may be taken to reduce hay storage losses. Any method or management tool that can reduce hay spoilage and losses will be beneficial. □

Weekly Pest Summary - 6/26/97

Joe Mahar, Field Crops IPM Agent; Dave Lee, Salem County Ag Agent; Sue Jones, Field Crops IPM Program Associate; Miles Huffaker, Salem County Program Associate

◆ Alfalfa

Three fields were found over threshold in Salem County for **potato leafhopper**. All fields were in second cutting regrowth. Immature **leafhoppers** have now been found in Hunterdon County. Warren and Sussex Counties still enjoy low populations of **leafhoppers**.

Moisture stress from lack of rain is increasing in Salem County and other parts of the state.

◆ Corn

Corn growth continues to be very uneven with some fields having bare spots where there is no corn growth. Poor growing weather is responsible for the most part. Seedling rots are common and insect injury is also common.

Three fields that were treated with soil insecticide in Salem County now have varying amounts of **wireworm** injury with one field having severe injury. The material and rates were appropriate but the field needs to be studied more to understand the insecticide failure.

Tom Morgart of Resource Conservation and Development reports that **black birds** continue to plague a replanted corn field in Hunterdon County. Bird damage was the reason for replanting in the first place.

Cutworm activity still is being found in Sussex County.

European corn borer is active in fields across the state where the plants are large enough to attract egg laying.

Weeds, especially **lambsquarter**, **pigweed** and **smartweed** are becoming troublesome in various areas of the state.

◆ Soybeans

Weed pressure is increasing especially in roundup-ready bean fields that are awaiting their applications of roundup.

◆ Wheat

1996 kernal bunt survey results from the State Department of Agriculture reports no positive samples found in New Jersey. Another survey will be conducted this year. □

Leafhopper Season

William J. Bamka, Burlington County Agricultural Agent

Though corn and soybeans are a bit slow, don't forget to scout alfalfa for **potato leafhopper**. Last year we escaped from major **leafhopper** problems. Don't be caught off guard by last year's mild **leafhopper** pressure. The **potato leafhopper** migrates in each year on southern jet streams with rain storms from the south. The **potato leafhopper** is the major insect pest of alfalfa in most of the eastern US.

The **potato leafhopper** is a sucking insect which reduces quality, yield, and stand longevity of alfalfa. **Potato leafhopper** injury (hopper burn) is caused by disruption of the plant vascular system. **Leafhoppers** have been noted throughout the state, though no fields above threshold have been identified. Scouting for **potato leafhopper** with a sweep net is essential. When leafhopper burn is evident on the leaves, the damage has been done.

For further information on thresholds or scouting for **leafhopper**, contact your County Agricultural Agent. □

Correcting Manganese Deficiency

Joseph R. Heckman, Ph.D., Soil Fertility

Crops grown on sandy coastal plain soils are susceptible to manganese deficiency. A high soil pH (greater than 6.2) decreases manganese availability and the likely occurrence of deficiency.

◆ Susceptible Crops

Soybean	Corn
Alfalfa	Wheat
Lima bean	Soybean

◆ Symptoms

Manganese deficient plants have yellow to white colored leaves, but with green veins (interveinal chlorosis). Plant growth is stunted and yield is reduced. Plant tissue with less than 20 ppm Mn is generally considered deficient.

◆ Treatment

- Foliar applications of manganese fertilizer should begin as soon as deficiency symptoms appear.
- Plant leaves should exhibit green-up and recovery from the deficiency within a few days after treatment.
- Crops with severe manganese deficiency often require a second foliar treatment to correct the deficiency.
- Manganese sulfate is a commonly used fertilizer for foliar treatment that contains 32% elemental Mn.
- Foliar manganese treatment should apply between 0.5 to 2.0 pounds of elemental manganese per acre at each spraying.
- Manganese sulfate can be applied along with post-emergence herbicides.
- For additional information refer to RCE Fact Sheets: FS568, and FS632.

◆ Prevention

- On sandy soils, be careful to avoid applying excessive rates of liming materials.
- Broadcast 15 pounds of manganese per acre before planting if recommended by soil test. □

Ag Secretary Announces New 'Farm Link' Program

New Jersey Agriculture Secretary Art Brown, Jr., announced that farmers who want to expand their farms or prospective farmers who want to start farming will be able to take advantage of a newly created Farm Link program to be part of the state's Farmland Preservation Program (FPP).

"The Farm Link program will match land owners who have farm property to sell with farmers looking for reasonably priced land," Brown said. Brown chairs the State Agriculture Development Committee which administers the FPP.

"New Jersey farmers often need to expand their operations in order to achieve greater efficiency on the farm but, with our land values so high, it can be difficult to find good agricultural land," Brown said. "We also get many inquiries from people who are ready to retire from farming or have no family members who want to continue to farm but would like to make sure the land stays in production. Farm Link will give us a way to help farmland buyers and sellers get together."

Brown noted that Farm Link can also help people who want to start farming and are looking for affordable farmland since Farm Link will be partnered with the state's Farmland Preservation Program. "We've already preserved almost 38,000 acres of land for agricultural use now and in the future," Brown said. "Since the development rights for this acreage have already been purchased, the land can be sold at the more affordable agricultural value."

In the coming weeks, questionnaires will be distributed to potential farmers as well as retiring farmers and relocating land owners. The information gathered will be kept in a data base and made available at no charge to buyers and sellers.

Farmers who want to sell their land for agricultural use, and want to use Farm Link to locate possible buyers, will be asked to provide information concerning property location, acreage, use restrictions, past and current crop or livestock production.

Both unrestricted farmland and deed-restricted farmland enrolled in the Garden State's permanent farmland preservation program will be tracked through Farm Link.

Ultimately New Jersey's Farm Link program will become an active member of the National Family Farm/Ranch Transition Network, a national clearinghouse for land-link programs that can also offer the state's Farm Link participants to buyers and sellers across the country.

Brown urged people to contact the Farmland Preservation Program at 609-984-2504 if they have agricultural land to sell or are looking for agricultural land to buy. □

June is Peak Tick Season

Deborah Smith-Fiola, Ocean County Agricultural Agent

Last summer's mild weather allowed for optimal survival and host finding for the northern deer tick (now known as the black legged tick), the vector of Lyme disease.

Because of the 2-year life cycle of this tick, last year's larvae have overwintered to molt into the nymph stage, which has peak activity in late May and June. The majority of all Lyme disease cases are the result of the bite of a nymph, usually this time of year.

The deer tick nymph is the size of a poppy seed. It has a black head and a black dorsal shield behind its head. The abdomen is creamy white and translucent before it feeds - after a blood meal, the abdomen darkens and swells. It takes 3 to 4 days for a nymph to finish feeding on an animal and completely engorge with blood — whereupon it swells to the size of a sesame seed, and drops off the host. This is how deer tick populations spread: they hitch a ride on an animal host such as a bird, feed for a few days, then drop off wherever that bird may have flown.

Research shows that 85% or more deer tick nymphs are found in the woods, typically in 4 - 6 inch high vegetation. This location offers the likelihood of finding a small animal to feed upon. Ticks don't fly, jump, or fall from trees. They find a host by crawling up low vegetation and *waiting* for an animal to walk by — then they grasp onto the skin/clothing, and crawl up. Knowing this, beware of walking in tall grass or the shrubby undergrowth in the woods. Widen trails to 6 feet or more to avoid brushing against vegetation. Some homesites will clear cut the shrubby understory layer of the adjacent forest to somewhat reduce the tick potential by mowing or bushhogging - but this has to be repeated annually (or else regrowth occurs along with increased wildlife and increased ticks!)

Not every tick carries Lyme disease. In order to transmit the disease as they feed, nymphs need to pick up the disease when they were a larva from an infected animal. The infection rate thus varies annually, typically from 10% to 25-30%. (Note that adult ticks have a higher infection rate [up to 45% in Hunterdon County last year]). Even if infected, research shows that the deer tick still must feed at least 24 hours to transmit the disease bacteria from its body to yours. Translated: this means that approximately one out of four ticks may be infected and able to transmit Lyme disease - if it feeds more than a day. So the trick is to *remove ticks as soon as possible!*

Remove ticks only with tweezers. Bent, 'needle-nose' tweezers are preferred. Other methods, including

SEE TICKS ON PAGE 5

Weekly Weather Summary

Keith Arnesen, Agricultural Meteorologist

Temperatures averaged above normal. Extremes were 97 degrees at Toms River and canoe brook on the 22nd and 42 degrees at Hammonton on the 17th. Weekly rainfall averaged 0.88 inches North, 0.50 inches Central, and 0.22 inches South. The heaviest 24 hour total was 1.10 inches at Long Valley on the 18th to 19th. Estimated soil moisture, in percent of field capacity, this past week averaged 69 percent North, 64 percent Central and 38 percent South. Four inch soil temperatures averaged 67 degrees North, 69 degrees Central and 70 degrees South.

Weather Summary for the Week Ending 8 Am Monday 6/23/97

WEATHER STATIONS	RAINFALL			TEMPERATURE				GDD BASE50		MON %FC
	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	
BELVIDERE BRIDGE	.76	11.34	-3.01	90	48	70.	1	590	-142	64
CANOE BROOK	.67	12.23	-3.26	97	50	73.	4	748	50	66
CHARLOTTEBURG	.87	14.75	-.85	94	47	70.	4	536	-1	65
FLEMINGTON	.75	13.25	-1.52	92	45	70.	0	588	-138	69
LONG VALLEY	1.10	14.14	-1.69	90	46	69.	2	526	-68	72
NEWTON	1.15	12.11	-1.92	88	45	69.	1	435	-174	74
FREEHOLD	.02	13.65	-.89	96	49	72.	1	697	-116	69
LONG BRANCH	.00	14.12	-.53	94	50	70.	0	682	-65	42
NEW BRUNSWICK	.77	16.05	1.84	93	50	71.	-1	716	-145	78
PEMBERTON	.59	13.76	-.27	96	49	75.	4	874	28	51
TOMS RIVER	.43	13.05	-1.40	97	46	73.	3	703	-38	50
TRENTON	1.18	15.95	2.74	93	50	72.	0	721	-190	85
CAPE MAY COURT HOUSE	.04	12.49	-.33	92	46	72.	1	741	-78	25
DOWNTOWN	.05	12.43	-.65	93	44	73.	1	759	-173	28
GLASSBORO	.23	15.14	1.01	96	54	75.	3	837	-74	39
HAMMONTON	.06	13.28	-.47	96	42	73.	1	742	-161	21
POMONA	.50	14.26	1.73	94	47	73.	2	750	-75	57
SEABROOK	.00	13.34	.86	94	49	73.	1	828	-110	29
ATLANTIC CITY MARINA	.64	10.29	-1.66	83	61	72.	2	729	-33	52
WOODSTOWN	.10	13.46	NA	96	48	75.	NA	857	NA	NA
WES KLINE — GDD BASE 40 PINEY HOLLOW										
Last Week 207 (Ending 06/16/97)										
This Week 236 (Ending 06/23/97)										

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using your fingers, petroleum jelly, a hot match, etc. may traumatize a tick - and a traumatized tick is likely to regurgitate its gut contents, which may include the Lyme disease bacteria. Grasp the tick under the head, and S-L-O-W-L-Y and firmly pull it out. Disinfect the wound with antiseptic. Save the live tick for identification (put it in a sealed container with a moist cotton ball in a cool spot). The Rutgers Plant Diagnostic Lab (908-932-9140), many county extension offices, the State Health Dept. and NJ Labs (a private company in New Brunswick) all identify ticks (the latter two for a charge which includes determining if infected).

Lyme disease symptoms include: a migratory rash (2" or more in diameter; appearing on 60% of victims,

usually noticed 2-3 days after a bite); fatigue, memory loss, joint pain and inflammation, headache, difficulty concentrating, and flu-like symptoms. Symptoms may progress to mimic other, more severe diseases. See a doctor! Deer ticks and other ticks are now known to transmit other, less common diseases. Ehrlichiosis (HGE), has been identified since 1984, and was diagnosed in 8 people in New Jersey last year, with 2 deaths. Suspect ehrlichiosis if you have Lyme-like symptoms (fever, fatigue, chills, headache, muscle pain) early in the day, but by evening symptoms are severe, to the point of entering the hospital.

For more information, see your doctor and/or call your county agent for the free RCE bulletin, "Prevent Tick Bites, Prevent Lyme Disease." □

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