University Extension
UNIVERSITY OF MISSOURI
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Drought Information

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Fire Hazards during summer

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Due to the recent rains in most areas of the state, many farmers may feel the drought is over. But if it's a typical July and August in Missouri, it will be hot, dry and humid. Dry weeds and grass, maturing crops and improper cured and stored hay and straw present fire hazards that Missouri farmers should recognize.

Typical causes of farm fires this time of year are:

- Brush or "side road" fires that get out of control or started by discarded cigarettes or matches
- Spontaneous ignition resulting from baling and/or storing improperly cured hay or silage
- Driving across a field and/or dry pasture with a truck or car equipped with a catalytic converter.
- Machinery fire that is caused by overheating or build-up of debris

COVER FIRES

The "key" to preventing these types of fires (grass, brush, etc.) is not to burn during this time of year. If you must burn, do everything you can do to control the spread of the fire. In some areas of the state, fire permits are required before any open burning can be done. Check with your local fire department to see if a permit is required or if the local governmental agency has "banned open burning" during this period.

If a farmer is going to burn a "brush pile" during this time, they should consider establishing a fire break by cutting all grass and brush back and if possible, disking up around the pile to reduce the potential for fire spread. Also, these fires should never be left unattended. What started out as a controlled burn, could quickly get out of control.

SPONTANEOUS IGNITION

Fires that destroy or damage hay, silos, and barns cost Missouri producers thousands of dollars in terms of facility replacement, feed replacement and lost revenues. This is unfortunate because proper harvesting and storage practices can eliminate these fires.

What causes hay fires? Baled hay or straw with a moisture content greater than 25-30% (i.e. without any preservative) will continue to heat as the thermophilic bacteria that are present, continue to feed and and multiply, generating heat in the process. This heating can generate enough heat to raise the temperature as high as 160 degree - 170 degrees F before bacterial activity ceases. At these temperatures, in combination with the oxygen that is readily available, the hay will continue the chemical process and can result in heating reaching the kindling point (approx. 190 degrees F), at which, if there is enough heat generated and oxygen available, fire is produced.

What causes a silo fire? Unlike a bale fire, a silo fire results from low moisture content and air leaks into the silo. If forage is stored at the recommended moisture content, the water in the forage conducts heat away from the silage mass and overheating will not occur. If forage is too dry, heat cannot be dissipated quickly enough and the internal temperature rises until spontaneous combustion occurs. As the temperature rises above 130 degrees F, a chemical reaction occurs which may sustain itself. Heat kills microorganisms at 250-400 degrees F and begins to break down the forage by a trapped oxidation process known as pyrolysis. As pyrolysis continues, oxygen within the silage supports the smoldering fire. If the surrounding silage cannot support combustion, the fire may die, leaving a charred cavity. More frequently, the fire will slowly spread until it reaches the surface by burning through wooden doors.

PREVENTION

The moisture content is a key factor in the microbial activity and the resultant heating. Recommended moisture contents, based upon type of storage are as follows:

Method	Moisture Content
Large packages (round bales, stacks)	16-18%
Conventional square bales	20-22%
Using acid preservatives	20-30%
Silage	50-60%

To accurately determine how hot it is inside a bale, stack or silo, a farmer will need to probe the bale, stack or silo and lower a thermometer into the probe to take reading. In most cases, with the exception of large round bales, the farmer will need to take multiple readings to locate hot spots. The following are temperatures that can be used to evaluate the situation.

TEMPERATURE INTERPRETATIONS

Below 130 F	No problem
130 to 140 F	No problem yet, temperature may go up or down. Recheck in a few hours.
150 F	Temperature will most likely continue to climb. Move the hay to provide air circulation and cooling. Monitor temperature often.
175-190 F	Fire is imminent or may be present a short distance from the probe. Call the fire department. Continue probing and monitoring the temperature.
200 F or Above	Fire is present at or near the probe. Call the fire department. Inject water to cool hot spots before moving hay. Have a charged hose ready to control blazing when moving hay.

SILAGE TEMPERATURE INTERPRETATIONS

Below 104 F	No problem.
140 - 170 F	There is no clear indication, so readings should be taken every two or three hours to check for dangerous heating.
180 F or higher	Danger - silage will eventually char, smolder or burn. Notify fire department.

CATALYTIC CONVERTERS - HOT ITEM!

Most cars and light trucks built since 1975, use catalytic converters as a pollution control device. The normal operating temperature of the converter is about 550 degrees F but this temperature can go as high as 2,500 degrees F if the engine is misfiring.

Each year we receive a number of reports of wheat fields, pastures, etc., catching fire as a result of the farmer driving his pickup or car into the field. Especially, during a drought and harvest time, farmers need to remember NOT TO drive vehicles equipped with converters into the pasture, wheat, hay or oat field. If they must, they should be constantly alert and prepared to control any fires. What starts out as a small fire could quickly get out of control and not only destroy a wheat field but valuable equipment at the same time.

MACHINERY FIRES

Operators who have experienced a combine fire know the value of good equipment maintenance and have a properly maintained fire extinguisher readily available.

Most of the fires result from a buildup of chaff around the engine and exhaust manifold, overheated bearings, severely overloaded or slippery belts, engine backfiring, etc. Due to the drought conditions this year, we may need to watch the potential problems closer.