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Animal Diseases Caused By Moldy Hay and Feed

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Molds are fungi — parasitic plants that are close relatives of mushrooms. Since ancient times, fungal or mold diseases of plants have been recognized as causing damage to grains. The first important disease in animals that was attributed to fungal contamination was “St. Anthony’s Fire” or “Holy Fire”, the disease we know as ergotism. Epidemics swept through Europe periodically during the Middle Ages, affecting both man and domestic livestock.

Other diseases have been associated with fungal infestation of plants but generally little concern has been given to moldy feeds as potential disease producers. To the contrary, we have regarded mold-damaged grains as acceptable for use in animal feeds. However, our awareness of potential problems increased greatly in the early 1960’s following an outbreak of “Turkey-X” disease in England. Thousands of turkey poults and other poultry young died. Mold-contaminated peanut meal was eventually identified as the source; the fungus *Aspergillus flavus* was the cause. Its product, called aflatoxin, became widely known throughout the animal industry.

Disease-causing mold or fungal toxins, called mycotoxins, are produced when molds grow on plants. The molds may infect grain or grasses in the field before harvest, in storage after harvest or during the decay period. The primary problem seems to occur when grains or hay are stored at high moisture conditions. Corn has been heavily implicated in the problem. Moldy silage that results from exposure to air and improper curing may also be a serious hazard. The toxins may not require warm weather for growth and production; some actually require relatively low temperatures.

The antibiotic penicillin is one familiar example of a mold toxin. This is produced by certain penicillin molds and, fortunately, has a low level of toxicity for man and animals. Hundreds of such molds infect plants and about 100 are known to produce toxins. About two dozen of the toxin-producers have been associated with diseases of man and animals.

Diseases of potential importance in Idaho are described below.

Estrogenic Syndrome in Swine

This disease is caused by zearalenone (F-2) toxin produced by *Fusarium roseum (graminearum)* mold. It has been associated with the mold growing on late-standing or storage corn. In swine, the toxin results in enlargement and edema of the vulva, infertility, abortion or a high percentage of stillbirths. Vaginal and rectal prolapse are also seen occasionally. Males may show mammary enlargement. Gilts seem particularly sensitive to the disease. Cattle and sheep are much less susceptible than swine.

The disease is more prevalent in winter and spring and may be associated with corn in mixed or pelleted feeds. Other toxins produced by the same mold decrease palatability of the feed. Animals recover in 7 to 10 days with no permanent disability when contaminated feed is replaced with feed free of the toxin.

Ergotism

This disease results from infection of the flower of cereal grasses, including wheat, rye, barley, triticale and crested wheatgrass, by the fungus *Claviceps purpurea*. In contrast to the other mycotoxins, the toxin of ergot will always be found with the fungus.

The disease may occur in any animal species. It is characterized by gangrene of the extremities, including the ears, tail, nose and limbs, with initial lameness and pain and subsequent dry sloughing of the affected areas. Colic, constipation or diarrhea may precede the gangrenous signs. Pregnant animals may abort and affected sows with live pigs may have very little milk. With large doses of the mycotoxin, a convulsive form of the disease occurs. Clinical signs include excitability, wobbly gait, abnormal posture and “fits”. Animals removed from the source of toxin early enough may recover from this more acute form.

Aflatoxicoses

This disease occurs in all domestic animals and in fish. Poultry are particularly sensitive. Young animals are more sensitive than mature animals. The mycotoxin, called aflatoxin, is produced primarily by the fungus *Aspergillus flavus*. This organism may grow on almost any type of grain or nut. Starchy cereal grains and high oil content seeds such as peanuts, sunflower and safflower are most commonly involved although hay may be contaminated as well. High moisture and temperature favor growth of the fungus. High-moisture corn (above 20% on a wet basis) is a particular problem with this and other fungi.

Animals may be affected acutely or chronically. In acute cases the clinical signs include depression, loss of appetite, anemia, bloody feces, bleeding from the nose, jaundice and occasional "fits". The chronic disease is probably more important economically since it is very insidious and difficult to recognize. It increases an animal's sensitivity to stress and other diseases, yet its only clinical sign may be an increased problem with pneumonia, etc. The disease may reduce feed efficiency and weight gain and cause anemia and mild jaundice. Occasionally it may cause sunburned-like areas and peeling of the skin in light colored animals.

Other types of fungal toxicities which might become a problem in Idaho include slobbering disease in cattle associated with a fungus on red clover hay and tremors disease in cattle and sheep caused by a *penicillium* mold growing on corn or silage feeds.

The mold toxin diseases must be differentiated from mold diseases of plants such as smuts, rusts and powdery mildews which are of primary importance in limiting growth and production of plants. Animal diseases directly associated with fungal growth in the animal such as "ringworm" are also much different. These diseases are not caused by the same types of fungi as those diseases associated with mold toxins.

Diagnosis

Confirmation of molds as the cause of a specific disease problem is difficult even when the potential for mold toxin disease is recognized. Except with ergotism, the presence of a mold does not confirm it as the cause of a disease since the mold may often grow without toxin production. Toxins in feed are often difficult to identify since they may not be uniformly located in the feed and are present in very small

quantities. Aflatoxins are toxic for calves when fed at 1 part per million in the feed for the first 16 weeks of life. This is about the same relative quantity as 2 hours in 2 years time.

If the specific mold toxins have not previously been associated with a disease, the problems of diagnosis are compounded. In many cases, you may implicate the molds only by observing results when you remove the suspect feed. Feeding tests can be carried out with very susceptible animals. In the case of estrogenism of swine, the suspected feed fed to 21-day-old virgin female rats will produce characteristic signs in one week. For aflatoxins, the material fed to week old ducklings for four weeks will cause liver degeneration and death in positive cases.

A rapid presumptive qualitative test is also available for aflatoxins. If the clinical signs, autopsy findings and preliminary tests indicate possible fungal toxin involvement, analysis at a commercial laboratory will confirm the diagnosis. If you have a question, contact your veterinarian or County Extension Agent to have samples analyzed.

Control

Prevention is the only effective way to approach these disease problems since, in general, there is no effective treatment except good nursing care. Start by recognizing the potential for contaminated feeds to produce disease. Then follow these guidelines to help prevent fungal toxicoses:

1. Maintain correct storage environment for grains, especially to control moisture content.
2. Avoid feeds with obvious mold contamination.
3. Be watchful for changes in palatability with new batches of feeds.
4. Be aware of the potential for problems with certain forages — red clover for example.
5. Examine whole grain feeds for ergot.
6. If moldy feed is to be used, have a good commercial laboratory analyze at least 3 or 4 samples for fungal toxins.
7. Do not rely on pelleting to destroy mycotoxins in moldy feeds.
8. If you must feed some moldy hay, dilute it with good hay and allow animals to use the palatable feed.
9. Hay several years old may be a problem especially if it has been exposed to rain or snow.
10. Be especially alert for mold contamination of hay and grain in years of high rainfall.

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