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CORN

MOLD SPECIES—MYCOTOXIN POTENTIAL

FIELD MOLD PROBLEM IN 1992 CROP CORN—
Reports from Wisconsin have indicated a severe mold problem in this year's corn. A number of Minnesota reports of moldy corn coming from the field have also been received and more may be forthcoming as the harvest continues. The delayed harvest, high moisture grain and cool temperatures are favorable for the slow growth of some of these molds. If sufficient amounts of

mycelial growth of certain *Fusarium* sp. exists, the potential for mycotoxin production is present. The presence of a white to pink mold on a significant number of corn ears could be cause for concern, especially if the corn is to be fed to hogs. Poultry and dairy are less susceptible to the *Fusarium* mycotoxins at the field concentrations we routinely find. The higher the mycotoxin concentration the more potential for feeding problems.

For more information regarding the *Plant Pest Newsletter* contact Extension Plant Pathology at 612-625-6290

CORN/Continued

Most of the reports so far have concerning black molds on the cobs. These black molds have been reported as *Cladosporium* and *Nigrospora* and are not known to be toxic to animals. The white to pink molds are the ones with the most mycotoxin potential.

Feeds containing high concentrations of moldy grain can sometimes cause feeding problems. Animals have been observed to go off feed and in dairy decreased milk production can occur. In these cases the specific mycotoxin may not be known but animals usually recover when taken off the affected feed.

Producers who are concerned about their corn can get a mycotoxin screen done through the veterinary medicine dept. at the University of Minnesota. The State Department of Agriculture will also run specific test for certain mycotoxins. ELISA quick tests are also available for some mycotoxins and can be very handy in the field when making on the spot decisions.

Further information on mycotoxins in feed can be obtained by ordering the bulletin *Molds and Mycotoxins in Feeds* AG-FO-3538 from the EDS Distribution Center. If questions arise concerning this matter call Richard A. Meronuck at (612)-625-6290.

*Richard A. Meronuck
Extension Plant Pathologist*

CORN HARVEST DELAYED—Corn harvest has been delayed due to weather conditions and high moisture content of grain. Growers continue to ask about harvest alternatives.

We believe the alternatives now are:

- 1) Combine harvest now when field conditions permit and
 - a) dry to storable moisture content,
 - b) store as high moisture corn for feeding,
 - c) treat with propionic acid and use for feed, or
 - d) hold as wet corn during cold winter months and feed as needed.
- 2) Ear harvest and store in narrow cribs
 - a) ear corn with kernel moisture up to 25% can be stored in naturally ventilated cribs if the free-air-to-free-air distance through the corn is limited to 6 to 8 feet.
 - b) Ear corn with kernel moisture 25 to 30% needs a free-air-to-free-air distance of 2 feet for storage without spoilage.
- 3) Harvest during winter or very early spring as field conditions and kernel moisture permit. Considerations of this alternative are:
 - a) Grain will dry during the winter; kernel moisture should be 15 to 18% by April.
 - b) Weather conditions, especially snowfall, may cause substantial preharvest losses due to ear

droppage and stalk lodging and breaking.

- c) This alternative does not allow for fall tillage, if that's a normal practice for a grower.
- d) Spring harvest may delay planting the '93 crop. If planting is delayed after May 1 for either corn or soybean, substantial yield will be lost.

*Dale R. Hicks
Extension Agronomist-Crops*

WATCH FOR HOT SPOTS IN COOLING BINS—it takes a little more management to use storage bins instead of the dryer to cool hot corn from gas-fired dryers.

Many corn producers have made the switch as it saves time and energy and results in higher quality grain. Producers need to use a little more management to make sure that cooling is complete and condensation along storage bin sidewalls doesn't cause spoilage.

Check grain temperatures to make sure that cooling is complete. You can probe grain bins, use temperature cables or measure exhaust-air temperature. Airflow—and cooling—may not be uniform in storage bins. Reasons include pockets of fine material that restrict airflow, duct-type aeration systems or uneven grain depths.

It's important that the fan operates long enough for all grain in the bin to cool. Spoilage will occur in any spots that remain too warm.

You also need to watch for condensation along bin sidewalls and under the bin roof during in-storage cooling. No spoilage will occur if the fan runs long enough after cooling, or if the corn is moved out of the bin before warm weather.

If there's any wet corn in the bin when warm weather comes, spoilage is likely—especially next to the bin wall.

*Bill Wilcke
Extension Agricultural Engineer*

FEEDING RECOMMENDATIONS—In general it is risky to feed moldy or otherwise damaged feed to animals. Obviously there are circumstances when the livestock owner has no choice but to feed some damaged feeds. The main point to understand is whether or not the suspect feed is causing a problem. One has to simply work through a process of feeding and/or withdrawal of the feed and observing the response in terms of performance of the animals. Large feedlots will buy damaged feeds at a lower price and feed the damaged feed at a certain percentage (depending on degree of damage, 5-10% or more). The risk of lower production vs. lower feed cost must be weighed carefully. If a dairy has all of its feed damaged, then there are very obvious choices to weigh.

DETERIORATION OF MOIST OR WET FEEDS—

The deterioration of high moisture grains range from slight brownish discoloration to visible mold to a dark tobacco color to black. Nutritional changes may include loss of dry matter, loss of simple carbohydrates (decline in net energy), oxidation of fat soluble vitamins, binding of protein to CHO's resulting in an undigestible complex, and the production of mycotoxins and many other unknown byproducts of microbial degradation of feedstuffs. Some deterioration of grains will have an abnormal smell. High moisture ensiled grains have a sweet acidic smell, but sometimes smell similar to acetone. Any deviation from this should be considered as abnormal. Moldy or musty smells, sour or butyric acid smells, a sweet or sweet caramelized to tobacco to a burnt smell should be considered abnormal.

LABORATORY CONFIRMATION OF DAMAGED FEEDS—

Laboratory analysis can be performed to help confirm or rule out a diagnosis of moldy corn disease. Traditional nutrient analysis of feed is generally unrewarding when assessing damage to feeds. Mycotoxin analysis is a highly sensitive testing procedure detecting parts per billion with predictable accuracy. The unfortunate part of such assays is that there usually are pockets of mold in ensiled feeds and are usually mixed growths of mold in a silo. Therefore the test is only of the sample taken since thorough mixing the feed mass is not always possible and may not be desired because dilution would

then take place. Common sense must prevail in setting up a protocol for assessing feed for mycotoxin analysis. Specific mycotoxin information and analysis is given elsewhere in this text. Mold and yeast counts may be helpful in determining the fitness of the feed, but if the samples are not preserved properly artificially high or low counts can be produced. High mold and yeast counts do indicate spoilage. In good quality silage, the counts probably should be below 100,000 CFU per gram. In abnormal feeds, counts have been in the millions.

Nutrient analysis of damaged feeds can be rather unrewarding. Generally nutrients that are adversely affected by spoilage are decreased energy, increased unavailable (ADF-N) protein, increased ADF and NDF, increased lignin, and increased ash. The magnitude of these changes may be from a few percent to 50% or more. One cannot predict from looking at the feed and assessing the feed tests, what the effects are going to be on the animals consuming such feeds.

The magnitude of losses in terms of milk production or reduced rates of gain are not predictable based on feed tests or observations of the feed. Where extensively damaged feeds have been fed for months or years at a time, the losses have been variable, ranging from none to over a 50% drop in milk production or a drop in rate of gain expected at 2.5 lb per day to .5 lb per day.

Bill Olson

Clinical Nutritionist

*Dept. of Clinical and Population Sciences
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SOYBEAN

FARMERS URGED TO HAVE FIELDS TESTED FOR SOYBEAN CYST NEMATODE—

The soybean cyst nematode (SCN) continues to expand its range in Minnesota. To date, its presence has been confirmed in 30 counties of the state.

Ward Stienstra, University of Minnesota plant pathologist, and Greg Tylka, Iowa State University plant nematologist, who are conducting research to find ways to better cope with this yield-reducing parasite, urge farmers to have their fields tested for the nematode this fall.

A good time to take soil samples is after harvest. The earlier you determine the nematode status of your fields, the better your chances are for limiting or slowing its spread. And if tests show that soybean cyst nematode eggs are present in a field, getting an analysis now gives you time to buy seed of resistant varieties for planting next spring.

Genetically resistant varieties, such as the University of Minnesota's new variety, Alpha, can help reduce the yield loss that results from the nematode. Trials conducted in 1991 for the Minnesota Agricultural Experiment Station, revealed seven SCN-resistant and eight SCN-susceptible varieties were grown on SCN-infested land. Yields averaged 35.7 bushels per acre for the SCN-resistant varieties, versus 27.9 for the susceptible ones.

A variety's ability to resist the nematode should not be the only consideration when choosing a variety to grow. Resistance to Phytophthora root rot and iron chlorosis must also be taken into account. And since resistant varieties generally do not yet have the yield potential of susceptible ones, there's no advantage in planting a resistant variety where the nematode is not present.

Any field can be tested for the nematode, even those that are currently in corn or other crops. The time of the

SOYBEAN/Continued

year, current crop, rotation and other available information all factor into the interpretation of the soil test results.

Since above-ground symptoms of SCN damage are not unique and may not appear for several years, a soil test is the only sure way to tell whether the nematode is present in a field. Symptoms of SCN damage often are mistaken for damage resulting from soil compaction, iron deficiency chlorosis and other nutrient deficiencies, drought stress, herbicide injury or other plant diseases.

Among the labs that have the capacity to analyze soil samples for the presence of the SCN is the University of Minnesota's Plant Disease Clinic, which charges \$15 a sample to test for the nematode.

Two soil samples, consisting of 1 pint each, should be taken for a SCN analysis. For best results, the number of acres represented in a single soil sample should be between five and 10. The fewer the number of acres included in the sample, the more accurate the results will be.

One sample should be from the area where a SCN problem is suspected. Collect 10 to 20 soil cores with a

soil sampling tube, or 1/4 cup of soil from 10 to 20 locations using a shovel. Soil should be taken from the root zone, at a depth of 6 to 8 inches. Combine the soil core in a bucket, mix well and place 1 pint of the soil into a plastic bag or paper soil test bag. For the second 1-pint sample, take soil cores from the area surrounding the suspect area.

Send the soil samples to the Plant Disease Clinic, Department of Plant Pathology, 495 Borlaug Hall, 1991 Upper Buford Circle, University of Minnesota, St. Paul, MN 55108-6030. Farmers who have questions about sampling procedures or the SCN analysis may call the clinic at (612) 625-1275.

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MISCELLANEOUS

DIAL U

County Agents: Please Alert
Master Gardeners of the Following Items

Perennials and Bulbs That Came Too Late: Every year people receive plants through the mail after there's snow and/or the ground has frozen. This season is no exception.

Bulbs must be planted outdoors, then mulched well, or they may be potted and forced indoors (see AG-FS-1116, *Forcing Bulbs for Indoor Beauty in Winter*). Don't save them to plant outdoors next spring; they'll never bloom decently.

Perennials may be planted outdoors if the soil hasn't frozen, but must be mulched heavily with a foot or more straw or marsh hay. Leaves pack down and probably won't give them the special protection they need, given the cold temperatures we're already experiencing. Another alternative for perennials is to store them in plastic bags (with perforations punched in the bags) in a refrigerator over winter, then plant them once the soil can be worked, next spring.

Powdery Mildew—Some indoor plants may have a problem with powdery mildew. It appears as a white to

gray powder-like substance on the leaves and flower stalks. The disease development is favored by high relative humidity and lack of light. Cultural practices to increase ventilation and light intensity are important. Wettable sulfur may provide some foliage protection when used according to label directions, but it can be phytotoxic to flowers. In severe cases, it is best to discard infected plants.

Cluster Flies have been common calls, especially during warm, sunny days. Cluster flies resemble house flies in size and color and can be identified from the yellow, wavy hairs on the side of the body near the head; however, you have to look very closely to see them. Cluster flies are often found around windows and other sunny areas, especially on the south side. Fortunately they are not harmful to people or property and despite the circumstantial evidence, cluster flies do not reproduce indoors.

During the summer they parasitize earthworms. Starting in August, cluster flies start searching for sheltered sites to hibernate, just like boxelder bugs. They enter homes around windows, vents, under siding, and through other spaces and cracks they find. As long as they remain somewhere unheated (e.g. a wall void) they successfully hibernate. They remain that way until they are warmed up. Then they can literally come out of the walls.

The best time to control cluster flies is in August when they first start looking for places to hide (spray around the outside of the house with permethrin). Once they get into the house there is little people can do except to kill the flies as see them. People can expect to see cluster flies throughout the winter on warm days and in the spring.

Storing Garden Produce can be a real problem, since few homes have cool, damp basements or root cellars anymore. The basement may be cooler than the living quarters, but most do not stay in the 30's or low 40's needed by many fruits and vegetables, roots and tubers. Again, a second fridge may come in handy.

Apple Samples—We have received many samples this fall concerning damaged apples. In most cases the problem was apple maggots which were very common this summer. The apple is typically misshapened with sunken areas on the outside. Inside you can find brown trails indicating where the maggot was feeding. If control is desired for next year, there are several control strategies beginning July 1 when the adult flies first start to emerge. For more information, see AG-FS-1007, *The Apple Maggot*.

In a few cases, plum curculio oviposition damage was found. Curculio damage is usually minor, although occasionally they can also deform apples. If severe plum curculio problems are found, the best time for treatment is in the spring at petal fall and again about seven to ten days later. Malathion or Imidan (may be hard to find in the Twin Cities) are effective insecticides.

With the Holidays Coming it's good to remind people that even though the idea of "living Christmas trees" has a lot of appeal, in reality, potted outdoor evergreens can rarely be used indoors then transplanted outside in January in Minnesota. It only works well in milder climates.

There's no need to feel badly about buying a "real" tree that has been grown and harvested specially for that purpose. These trees are a renewable resource grown on land that usually won't support other crops.

Dial U Would Like to Suggest that readers of the *Plant Pest Newsletter* who enjoy these garden and landscape tips buy a copy of *Minnesota Gardening, 1993*, the calendar published cooperatively by the MN Extension Service and Experiment Station. Written expressly for northern gardeners, each month features timely tips written by Dial U specialists along with a list of supporting fact sheets and bulletins. It makes a great holiday gift for your gardening friends and family.

You can buy the calendar from any county extension office or directly from the Distribution Center, 3 Coffey Hall, 1420 Eckles Ave, U of MN, St. Paul, 55108. It's also available at bookstores, gift shops, and garden centers throughout the state.

Other common calls include insects on houseplants.

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Entomology

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