UNIVERSITY OF MISSOURI
Extension

AG Newsline

AG-BUSINESS, AGRONOMY, HORTICULTURE,
LIVESTOCK AND COMMUNITY DEVELOPMENT
FOR WEST-CENTRAL MISSOURI

APRIL, MAY, JUNE 2007

RECOMMENDED LEVEL OF

Distillers Grains in Feed Rations

As corn prices rise a common question amongst cattle feeders is "How much distillers grains can I feed?" When the net cost of distillers grains in the feedbunk, adjusted for moisture, is less than the cost of corn, the incentive is to feed levels beyond meeting the protein requirement.

The exact level depends on the first limiting factor which will vary from product to product. The factors which might limit the inclusion of distillers grains in a feedlot ration include the level of fat in the total diet and the total sulfur intake of the animals.

Moisture and fiber appear to be secondary to the fat and sulfur issues.
Sulfur is likely the first factor to limit the amount of corn coproducts that can be fed in many situations. Sulfur levels of most corn coproducts can range from .4 to .9% S on a dry matter basis. Some liquid coproducts have been tested as high as 1.5 to 2% S. Sulfur is added during both the wet and dry corn milling process, so the coproducts contain additional levels above that concentrated from the original corn.

Although it is based on limited research in cattle, the NRC recommends a maximum tolerable level of .4% of the ration dry matter for sulfur in the ration. Using that recommendation as a guide, the maximum level of corn coproducts would range from 30% of the dry matter at high sulfur levels (.9%) to over 70% at low levels, based strictly on the sulfur content.

As far as fat is concerned, previous research with high oil feeds such as whole soybeans or cottonseed meal suggest that feed intake in feedlot cattle starts to back off when greater than 5% of the ration dry matter in the form of fat is added. Since distillers grains are 9-12% oil, fat would restrict their use to around 50% of the ration. This would give a total fat content of the ration of around 8%. Several experiments have been conducted where excellent performance was achieved at levels in the 40-50% range.

Studies where higher levels have been fed are fewer, but less successful. It appears that the practical limit for feeding distillers grains to beef cattle is approximately 50% of the dry matter. Changes in milling technology that reduce oil and/or sulfur content could dramatically increase this level.

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IN THIS *Issue*

Production and Handling Practices to

Reduce food-borne illness

As the fruit and vegetable growing season nears, producers need to be up-to-date on practical steps that can be taken to lessen the instances of food-borne illness originating on the farm.

University of Missouri Extension, Missouri Department of Agriculture, Missouri Department of Health and Senior Services and the Missouri Farmers' Market Association have hosted a number of workshops around the state to aid growers in understanding what food-borne illness is and safe production and handling practices from field preparation to point-of-sale that will lessen the risk of its spread.

Food-borne illness outbreaks have made numerous headlines in the past year and the CDC estimates that there are over 75 Million cases per year. In the fall of 2006, over 199 people became ill and 3 died as a result of eating E-coli contaminated spinach. These numbers do not indicate the number of individuals that did not seek treatment. They also do not reveal the numerous measures that most food producers institute on the farm to lessen spread of pathogens through foods.

Though FDA and USDA investigators believe that the most recent spinach outbreak was a result of fecal contamination on the farm, one thing is certain: there are numerous paths that dangerous pathogens can enter our food and there are reasonable steps that can be implemented to reduce the risk of that happening.

To better understand how to prevent the spread of pathogens that cause food-borne illness, it is important to understand what those pathogens are and how they survive. A number of food-borne pathogens are present in the intestinal system of healthy animals and foods can become contaminated or cross-contaminated if they come into contact with even a small amount of pathogen contaminated intestinal contents. These pathogens are then capable of surviving without an animal host for 3 months or more in manure slurry and soils. Some pathogens can live up to a year or more in contaminated soils, while others can survive on fruits and vegetables.

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By Crystal Weber, University of Missouri Extension CD Specialist
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Welcome to
Travis Harper

Travis Harper has recently joined University of Missouri Extension as an agronomy specialist based in Henry County, with additional responsibilities for Cass and Johnson counties.

Travis received a Master of Science degree in Crop, Soil, and Environmental Sciences from the University of Arkansas in 2006. The main focus of his research was examining the effects of rice, soybean, and corn rotations on surface water quality, soil physical properties, and rainfall infiltration in the delta region of Arkansas. Other research areas included native prairie systems, phosphorus management, water-dispersible clays, and the use of gypsum as a soil amendment to increase water infiltration on sodic soils. He received a bachelor's degree in Extension Education from the University of Arkansas in 2002. As an undergraduate student, Travis worked extensively with the University of Arkansas Cooperative Extension Service in Benton and Washington counties, focusing primarily on forage production, youth, and the EQIP program. Travis also spent time working on cotton physiology research and was very involved with both collegiate 4-H and FFA. He is originally from Oklahoma, where he grew up on a small farm that produced, among other things, beef cattle and hay.

Travis is excited to join University of Missouri Extension and encourages you to contact him at (660) 885-5556 or by email at harpertw@missouri.edu.

FEEDING ETHANOL COPRODUCTS AND THE

Associated polio risk

Polioencephalomalacia ("Polio") was first reported in 1956 and was described as a disorder of the nervous system of cattle. This condition is characterized by blindness, incoordination, staggering, and seizures.

Polio is actually not named for these clinical signs, but for the changes that occur in the brain. To detect the lesions of polio, examination of the brain at a diagnostic lab is required.

There are several causes of polio that have been identified. It is now known that the brain lesions observed in cattle with polio can be caused by sulfur toxicity, lead toxicity, salt toxicity, decreased oxygen availability to the brain, thiamine deficiency, and damage to the brain's blood supply. Sulfur toxicity is still responsive to thiamine treatment but is not caused by a thiamine deficiency. At one time, "blind staggers" observed in Wyoming was thought to be caused by selenium toxicity. This theory has now been discounted and the condition is known to be caused by sulfur toxicity.

When sulfur is ingested in excess, rumen microbes produce too much hydrogen sulfide. The hydrosulfide stays in the rumen fluid and hydrogen sulfide gas accumulates in the rumen gas cap. The hydrogen sulfide is absorbed across the rumen wall into the blood stream. A small portion of hydrogen sulfide can be belched from the rumen and absorbed through the lung. This elevated level of sulfide in the blood interferes with cellular energy production. Since the brain has a high requirement for energy production, it can be severely affected.

Sulfur intake can occur in the feed or water, so the total dietary intake of sulfur is needed in order to evaluate the risk of developing polio. This is especially pertinent now because of ethanol byproducts, especially dried distillers grain with solubles (DDGS). Ethanol byproducts may contain a high concentration of sulfur.

The National Research Council recommends that the maximum tolerable dietary concentration of sulfur in the ration on a dry matter basis not exceed 0.4%. Not all cattle consuming 0.4% or more will develop clinical polio. Researchers in South Dakota indicate that dietary sulfur levels of 0.7% of dry matter or greater may cause polio in growing cattle. Other factors such as ruminal microbial populations, trace element concentration or ruminal pH can affect sulfur production and absorption. As the pH decreases, the amount of hydrogen sulfide in the rumen increases. This pH decrease is commonly seen as feedlot cattle come up on feed and this change in diet may increase the chance of polio occurring.

Sulfur associated polio occurs in two forms. There is an acute and subacute form. In the acute form sudden death is observed; in the subacute form, there are a range of signs from staggering to blindness to down and recumbent.

There is much variability in the sulfur content from ethanol byproducts, both within an ethanol plant and between plants, so periodic sampling may have to be done to have an accurate idea of the dietary intake of sulfur.

Treatment for polio cases is not very specific, but it does involve proper supportive care for the animal. Injectable thiamine, steroids, or other anti-inflammatory drugs can have beneficial effects and may be recommended by your veterinarian. When animals go off feed with polio, production of sulfide ceases and this is one of the reasons subacutely affected animals recover without treatment. Removal of animals from sulfur sources is the most important control measure.

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DETERMING LAND VALUE BASED UPON

Soil fertility levels

Buying a house is one of the most important decisions a young couple faces. Location is important, but consideration must also be given to the soundness of the construction, the foundation, and of course, all of the features it possesses.

So why do we not give the same consideration to the farm acreage we rent and sometimes buy? Its potential to grow crops can vary from "shack to mansion." It is pretty easy to tell if you have deep soil bottomland or shallow sandy hilltop. How often do we consider the fertility level of the land? Does it need lime and if so, how much? Has the ground been "mined" to the point it will cost a small fortune to build it up to a good level?

With fertilizer prices climbing, your profit potential can vary greatly on what the soil needs in lime and fertilizer. We compared a 'poor' field to a 'better' field for clover/grass hay and corn production. The 'poor' fertility field has a pH salt of 5.0, a phosphorous level of 5 lbs P/acre and a potassium level of 130 lbs K/acre. These soil test P and K levels are common throughout many production fields in west central Missouri. The 'better' field has a pH salt of 6.5, a phosphorous level of 45 lbs P/acre and a potassium level of 250 lbs K/acre.

Comparing the two fields for a cropping option of clover/grass mix hay with a production goal of 3 tons/acre, the difference between the two for phosphate and potash fertilizer and lime costs was $86 per acre. The fertilizer cost difference alone was $48/acre. This would be an annual cost until the phosphorus (P) and potassium (K) level is built up to an acceptable level (about eight years). If the 'good' field also had an adequate stand of clover while the 'poor' field did not, you would need to add in nitrogen costs until the clover was established on the 'poor' field.

Comparing the two fields for a cropping option of corn production with a yield goal of 180 bu/acre, the fertilizer and lime cost was a $65 per acre difference. The yearly difference for fertilizer was $29/acre.

Using eight years to build the fertility to an acceptable level, the difference between the two pastures would be $422/acre. Under corn production, the difference over the eight years would be a total of $268/acre! So, the question comes down to a dollar difference. Are these two fields worth the same price? From a landlord's perspective, it becomes important to have a renter who properly manages and cares for the land, rather than simply thinking about $10 per acre more rent.

By Pat Miller, University of Missouri Extension Agronomy Specialist
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MANAGEMENT PRACTICES TO REDUCE THE SPREAD OF

Food-borne illness

(CONTINUED)

Food safety must first begin on the farm with site selection of land. Soils that have had previous microbial contamination should be tested for current microbial persistence and soil fertility.

While manure may be a valuable and cheap nutrient to increase soil fertility, it can also increase the risk of E-coli, Salmonella and Campylobacter and other pathogens contributing to microbial contamination. To reduce this risk, manure should be aged, composted prior to being put onto food crop fields or it should be incorporated into the soils prior to planting food crops. Safe application of manure to food crop soils range from 90 to 120 days *prior to harvesting* of crops.

Food producing acres should ideally be upwind and upstream from animal wastes, contaminated water and other contaminants. Irrigation water, also a potential medium through with food-borne illness, may be spread through direct contact with a food crop (such as water directly hitting the fruit), may enter the food through a puncture in its skin or it can even be spread through the root system of the plant. To limit the spread of food-borne illness through irrigation waters, only potable or drinkable water should be used. Having irrigation water sources tested for contaminants may assist a producer in identifying pathogen risks associated with their irrigation water or its source.

Field management is also an important method to decrease the spread of food-borne pathogens. Staying out of wet fields will reduce the risk of cross contamination that can be spread through the soils. Removing field soil from products and their harvesting bins prior to moving them into packing areas, as well as avoiding harvesting of fruits and vegetables that have dropped to the ground, are good methods to adopt. Attempting to keep all animals, including pets and wild animals out of food crop fields and packing areas is a reasonable step that will decrease the risk of cross-contamination. Keeping farm machinery and harvesting tools clean and stored to avoid potential cross-contamination is also another measure to reduce risk. Wash, rinse and sanitize harvesting, storage and transportation bins and store harvested products at the proper temperatures to avoid potential contamination or cross-contamination.

Instilling proper hygiene methods, including using soap and warm water to wash workers' hands, should be developed for your farm and anyone tending or harvesting your food crops. Institute hand-washing prior to entering the field, as well as exiting fields. Maintain clean hand-washing stations, restroom facilities, packing facilities and modes of transportation and avoid working in field or in direct contact with crops if you are ill.

By educating your consumers that you are implementing extra steps to reduce the risk of food-borne illness, they too are reminded of methods that they can take to reduce the spread of food-borne illness after the point-of-sale. Offering information on proper storage, handling and washing of food crops can be used as an additional selling point. Educating consumers on safe methods of preservation, thawing and cooking food products to lessen the risk of food-borne illness can help farmers develop a strong and confident relationship with their consumers.

The most important aspect of decreasing the spread of food-borne illness is to educate both yourself and your consumers on the paths that dangerous pathogens may enter food and to minimize those risks through proper production, harvesting, preparation and consumption of foods.

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HORIZON POINT

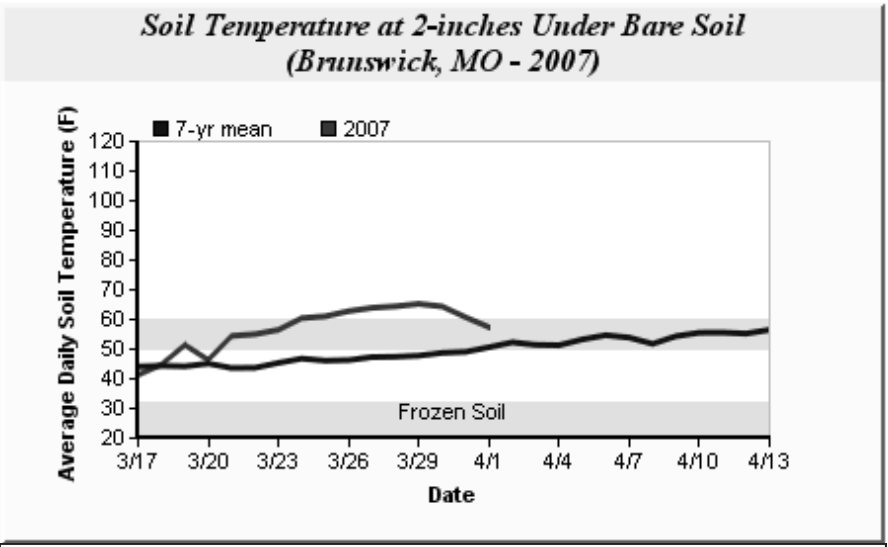
Custom weather analysis

Horizon Point weather analysis offers producers a custom weather analysis, specific to their latitude/longitude and farm characteristics.

Horizon Point is a custom weather analysis system for farmers, with the primary objective being to provide precise information, processed by MU Extension, to aid in management decisions. It provides farmers with the opportunity to have site specific weather reports sent directly to their e-mail address.

Once enrolled in Horizon Point, producers receive reports with historical weather information, forecasted weather information (including forecasted wind speeds), and a custom weather analysis specific to their location. Specific reports and advisories available include soil temperature (see example 'Soil Temperature at 2-inches Under Bare Soil' for Brunswick, generated April 2, 2007), expected weed emergence dates, soil runoff estimator, livestock animal comfort, black cutworm, alfalfa weevil, and grain storage.

Subscribers are able to select the advisories of interest. Chosen advisories are sent only in the seasons when they are appropriate. For example, soil temperatures are namely important in the spring for planting and the fall for fall applied fertilizer management. Soil temperature advisories are not sent during the summer months, when it is not critical to any management decisions.



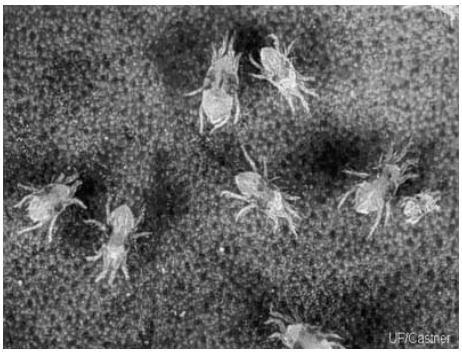
Soil temperature, not air temperature, controls germination of seeds. Soil temperature needs to be above 50°F for corn to germinate and 60°F for soybeans to germinate. Optimum temperatures for germination are higher.

Interested producers can enroll in Horizon Point at: agebb.missouri.edu/horizonpoint.

Should you have any problems with setting up an account or finding the longitude and latitude of your field, contact Horizon Point at 573/884-6311 or HorizonPoint@missouri.edu

Spider Mite Damage to

Vegetables and Flowers



There are many species of mites. Spider mites differ from insects, in that mites have eight legs (4 pairs) while insects have six legs (3 pairs). During the last two to three years, we have noticed significant damage to tomato, green beans, cucumber eggplant, marigold and roses from two-spotted spider mites (*Tetranychus urticae).*

Two-spotted spider mites are small and generally need a hand lens or other means of magnification to see them.

The two-spotted spider mite (TSSM) is a warm season species and begins to damage plants once weather conditions turn warm with low humidity. TSSM over-winter as dormant females. They may be present around buds, under bark flaps of trees and shrubs, and they also shelter under the surface of soil debris. Generations are completed in as little as 10 days and the population peaks during June-August.

Two-spotted spider mites pierce plant cells and feed on the sap. Initial infestation symptoms include a very fine light speckling or possibly, localized pale yellow spots on the upper surface of leaves. Careful examination of the undersides of affected leaves, preferable with a hand lens or magnifying glass, will reveal colonies of mites. A more generalized bronzing discoloration develops as infestation progresses. The vigor of the plants may be reduced. Webbing may also be visible and is produced when populations are exceptionally high.

Watering and water management are critical in controlling two-spotted spider mites. Providing adequate water for plant growth needs is also necessary for managing spider mites. Drought and fluctuating wet/dry soil conditions can stress plants, allowing spider mite populations to increase.

A high humidity level can decrease feeding by two-spotted spider mite. Thus, spraying susceptible plants with a fine mist of plain water twice a day may reduce mite damage. Hosing of plants with water dislodges mites and also increases the humidity which helps in mite control.

Spider mites are difficult to control with pesticides and many commonly used insecticides aggravate the problem by destroying natural enemies of TSSM.

Insecticidal soaps, horticulture oils, and sulfur dusts are useful miticides and registered on most vegetable crops for spider mite control. Miticide Dicofol (Kelthane) can also be used on many flower and vegetable crops.

Thoroughly read miticide labels before spraying any miticide product. When applying a miticide, adequate spray coverage of leaf undersides is important. Lastly, do not forget to remove all plant debris in the fall to reduce the population of dormant female mites.

Please call Master Gardener Hotline 816-833-TREE for more information.

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Calendar of *Local Events*

FOR STATEWIDE EVENTS, CHECK THE WEB AT: ACCESS.OUTREACH.MISSOURI.EDU/UOECALENDAR

April 11	Fruit Pruning Demonstration & Fruit Production Workshop in Jamesport, with demonstration beginning at 2 PM and the evening workshop at 6:30. Contact Tim Baker (MU Extension Horticulture Specialist) at 660/663-3232 to register for the event.
August/ September	Upcoming 'Soybean Production Short Course' (1 day), tentatively slotted for late August/early September in Ray County. To be added to the mailing listserv, soybean producers and CCA consultants should contact Julie Abendroth at 816/776-6961 or by email at: abendrothj@missouri.edu.