



Your local link to MU for ag extension and research information

<http://aqebb.missouri.edu/aqconnection>

For more information
please contact your
MU Extension Center:

Adair
(660) 665-9866

Audrain
(573) 581-3231

Boone
(573) 445-9792

Callaway
(573) 642-0755

Chariton
(660) 288-3239

Clark
(660) 727-3339

Howard
(660) 248-2272

Knox
(660) 397-2179

Lewis
(573) 767-5273

Linn
(660) 895-5123

Macon
(660) 385-2173

Marion
(573) 769-2177

Moniteau
(573) 378-5358

Monroe
(660) 327-4158

Morgan
(573) 378-5358

Pike
(573) 324-5464

Putnam
(660) 947-2705

Osage
(573) 897-2497

Ralls
(573) 985-3911

Randolph
(660) 269-9656

Schuyler
(660) 457-3469

Scotland
(660) 465-7255

Shelby
(573) 633-2640

Sullivan
(660) 265-4541

Test Hay Quality Before Feeding

Feeding livestock during the winter months is one of a producer's biggest expenses. Knowing the quality of the hay being fed can ensure livestock are getting the nutrition needed. When a hay quality test is not available, average values are assumed when balancing livestock rations. If hay quality is below average, then animal performance will suffer due to inadequate nutrition. If hay quality above average, producers may be adding unnecessary expense to livestock feed costs.

Plant growth stage at harvest has the greatest influence on hay quality. Plant leaves are higher in protein and lower in fiber than stems. As the plant matures, more stems develop and forage quality decreases. High fiber content also lowers the digestibility of the forage. Weather can influence hay quality. When rain events prevent hay from being baled after it was mowed, nutrients may be leached from the plant. The moisture content when the hay was baled also impacts quality. If hay was very dry when baled, especially legume hay, the leaves can shatter and be lost. Conversely, if hay was baled too wet, the forage may heat to the point it caramelizes, which greatly reduces quality.

If hay was harvested while the plants were under drought stress, anti-quality factors such as high levels of nitrates, may be a concern. Before feeding, test forages, especially sorghum-sudangrass, millets, or corn silage for the level of nitrates. If unsafe levels are present, discuss feeding strategies with an MU Extension Livestock Specialist or a veterinarian. Weeds that are baled along with the desired forages, can reduce quality. Some weeds found in hayfields can also accumulate nitrates including spiny amaranth and other pigweeds, lambsquarter, thistles, dock, and Johnson grass.

The best way to collect a sample is with a hay probe. This is a hollow cylinder 12-18 inches long, which pulls a core from the bale. Many University of Missouri Extension county offices have hay probes which can be checked by producers. Probe large round bales from the rounded side of the bale at waist height. Square bales should be sampled from the end to cut through multiple 'slices' of hay. This method provides a good representation of the entire bale since it will include hay from several places in the windrow. Collect cores from each lot of hay by randomly selecting 20 or more bales to be sampled. Thoroughly mix the cores together and put the entire sample in a clean airtight plastic bag to maintain the moisture content.

Separate samples should be collected for each "lot" of hay or baleage. A lot is a group of bales which are similar in harvest location, the forages and weed species in the bales, and the date mowed and baled. One lot should be similar in the stage of forage maturity at harvest time and whether or not it had rain damage. The goal is to remove the variability within the sample.

Contact an MU Extension livestock specialist for assistance balancing rations after the hay quality results are obtained.

Source: *Valerie Tate, agronomy specialist*



The Basics of Farm Lease Agreements

Landowners and tenants should both strive to have a mutual agreeable lease agreement. The agreement should be structured so each party has a potential to benefit. Common objectives include potential for profit and maintaining or improving the land. Communication between the parties is necessary to regularly review the lease agreement and to maintain a positive working relationship.

Leases, whether written or verbal are legally binding contracts between the landowner and tenant. There are several benefits of using a written lease rather than a verbal lease. A well thought out written agreement requires discussion between the parties which leads to well thought out and clearly stated responsibilities of each party.

Each lease agreement should contain several elements. The essential elements should include names of parties, description of property, terms of the agreement, rental rates and arrangements, right of entry and signatures. First, the legal names of each party should be stated and if the parties are individuals or type of entity. The legal description should be included. If the farm is known by a common name, such as the Jones Farm, that too can be included. Second, is the terms of the agreement, which includes the beginning and ending dates. Third, is the rental rate or compensation, which most commonly is dollars per acre, but could also be percent of crop. Fourth, is right of entry. If the landowner has any reason to be on the property, the agreement needs to clearly state it – even if it is fishing in a pond. If the right of entry is not stated in the agreement, the landowner would be considered a trespasser. The fifth element is signatures. Both the landowner and tenant should sign the agreement.

There are several additional elements that should be in the agreement to clarify details. The agreement should state who pays for farm operating expenses. The agreement should also state details about conservation practices. Another element is improvements and repairs including who is responsible and method of accomplishment. Records are important in a share

lease and the agreement should state what records will be shared. The lease is not a partnership and may clearly state no partnership. Leases should include how to handle disagreements such as using arbitration, with each party choosing disinterested parties to arbitrate to settle the differences. As changes occur, adjustments may be needed so a clause in the lease to state how modifications can be made is helpful. Allowable practices can be stated to clarify details. For example, if a field has been no-tilled for many years and it is important to the landowner the practice continues, it should be stated in the agreement.

A lease cannot cover every single detail, but clarifying as much as possible avoids conflict between the landowner and tenant. Communication between the parties is essential.

University of Missouri Extension has several guidesheets related to farm leases <https://extension.missouri.edu/publications>. This article contains information from the recently updated guidesheet G426 Basics of Farm Lease Agreements. For more information contact your regional extension ag business specialist.

Source: *Mary Sobba, ag business specialist*



Soil Improvement in the Garden

The most important resource for garden plants is soil. Soil is an unconsolidated material on the earth surface which is made up of inorganic (mineral) materials and organic matter. It is a living ecosystem containing a large number of microorganisms, macroorganisms (such as earthworms and insects) and plant roots. Soil holds nutrients, air and water required for plant growth and development while also providing structural support to the plant roots. Gardeners want to make improvements to soil for better plant growth and development. There are some methods by which soil can be improved in the garden.

Test Garden Soil

Understanding the soil properties and nutrient status is the first step for creating an optimum soil environment. Testing soil periodically provides information about the properties and nutrient status in soil. A soil test report provides fertilizer and soil amendment (such as lime and gypsum) recommendations for specific crops. In addition, the soil test report suggests which fertilizer nutrient(s) and amounts needed to achieve the expected yield goal. It is recommended to test soil once every

three years. However, the gardener may want to test soil more often if there is a problem.

After harvesting the crop, fall is an ideal time to collect a soil sample for testing because this provides enough time to plan fertilizer and lime applications for the spring season. It is recommended to wait at least three months after application of fertilizer, lime, or manure before taking a soil sample. Soil sampling technique is very important to get accurate soil test results from the garden, so care must be taken to collect a representative soil sample. Details about soil sampling in the garden, landscape and lawn is available at: <https://extension.missouri.edu/programs/soil-and-plant-testing-laboratory/spl-soil-analysis/spl-garden-landscape-lawn-soil-test> or a copy is available at local county extension centers.

Soil samples can be submitted to local county extension centers. Soil sample collection boxes and soil sample information forms are available at local county extension centers. The soil test results are generally available a week after soil sample submission.

Add Organic Matter

Organic matter is considered the heart of the soil. It is a well decomposed product of plant and animal residues which has many benefits in the soil. Organic matter improves physical, chemical, and biological properties of soil. It improves soil structure, increases pore space and makes soil more friable and loose. It is easy to work and till a soil containing a good amount of organic matter. It is recommended to maintain 4-6% organic matter in garden soils.

Organic matter improves water and nutrient holding capacity of soil. Optimum organic matter in soil allows healthy root growth of plants. Organic matter is a food source of soil microorganisms. The population and activity of microbes in soil is increased if there is good content of organic matter in it. Soil microorganisms secrete glue-like substances and other chemicals in the soil. These substances help to bind soil particles, improve soil structure, increase soil porosity and reduce soil erosion. Organic matter is a source of macronutrients such as nitrogen, phosphorous and sulfur and other essential plant nutrients including micronutrients.

Organic matter in soil can be increased by making and using compost from plant and animal residues (such as animal manure). Details about making and using compost are available at: <https://extension.missouri.edu/publications/g6956>

When making compost from plant residues, some precautions need to be taken. Avoid using any plant material that is diseased or insect infested. Additionally, make sure it is free from weed seeds. Perennial weeds may also reproduce from vegetative structures. So, avoid using any perennial weed plant parts when composting. Make sure there is no herbicide residue in the plant material used for composting.

Animal manures are good resources for making compost. However, avoid using uncomposted animal manures directly on the garden, because plant injury can occur when using fresh manure. During the decomposition process, microorganisms utilize nitrogen from the soil and garden plants will suffer from temporary nitrogen deficiency. (Avoid using dog and cat manures which may attract rodents and other animals, and spread disease.)

Plant Cover Crops

After harvesting the crop in the fall, planting a cover crop is a good option to improve soil organic matter. Cover crops have many benefits in the garden soil including covering soil and reducing erosion, adding organic matter content to the soil and reducing weed infestations. Cover crop roots secrete enzymes and other organic compounds which maintain or increase the population and activity of microbes in the soil. Common garden cover crops are cereal rye and winter wheat which overwinter and regrow in the spring. Mow or kill the cover crop in early spring before planting garden crops. Seeding oats, tillage radish and turnip, which winter kill, is another option. Planting legume cover crops such as Austrian winter pea is an option. Legumes fix nitrogen from the air due to a symbiotic relationship with rhizobium bacteria in the root nodules. These legume cover crops add nitrogen to the soil after they die if allowed to grow well into the spring.

Use Mulch

Using crop residues such as wheat straw and other crop straw as mulching materials are also a good option to increase organic matter content, reduce soil erosion and conserve moisture in the soil. Mulching provides microclimate for soil microorganisms and macroorganisms such as earthworm. We see many earthworms under the mulching material. After decomposition, organic mulch adds organic matter to the soil. Mulching also reduces weed emergence in fall and spring.

Minimize Chemical Use

Herbicides, insecticides, fungicides, and bactericides not only kills weeds, pest and pathogens but also kill

beneficial soil microorganisms and insects in the soil. It is recommended to consider alternative pest and disease control measures in the garden. Some of these methods include cultural, mechanical, botanical and biological. Weeds can be removed by hoeing and hand pulling when in early growth stages. Low-impact pesticides which are microorganism friendly options such as horticultural oils, insecticidal soap and *Bacillus thurgiensis* (Bt) can be used. Hand-picking larger bugs from the plants and dropping in soapy water is another eco-friendly option. Physical barriers such as row covers and mesh nets keep pests out of the garden. Selecting disease-resistant plant varieties helps minimize problems and the use of pesticides. Crop rotation each year reduces disease and pest infestations. Collecting and destroying disease and insect infested plant parts help minimize issues in the next crop growing season. Including legume garden crops such as green bean, cowpea and peas add nitrogen to the soil .

Source: *Dhruba Dhakal, horticulture specialist*

Mark Your Calendar

Missouri Livestock Symposium

Dec. 2 & 3

Kirksville, MO

<https://missourilivestock.com/>

**PRACTICE SAFE
FARMING
EVERY DAY OF THE YEAR!**

