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Soil Organic Matter: Importance and Management Practices

A fertile and healthy soil is the basis for healthy plant, animals and humans. Organic matter is the most important component of a healthy soil. In general, increasing organic matter content of a soil improves its health.

Soil organic matter is the total organic carbon containing substances in a soil. It includes plant, animal and microbial residues in soil.

Organic matter influences plant growth through improving physical properties of soil. It improves soil aggregation, soil tilth, soil aeration and water holding capacity of soil. Organic matter is like a sponge for holding water. It releases nearly all of the water it holds for use by plants. In contrast, a large proportion of the water held by soil mineral particles is not available to plants. One-gram of soil organic matter can hold up to five grams of water. Because of improved soil aggregation, infiltration and water holding capacity, soil erosion is reduced with increased organic matter. Organic matter also acts as an insulating agent and balance soil temperature.

Organic matter also influences plant growth through improving soil chemical properties. It provides buffering against soil pH change. The soil organic matter particles interact with metals, metal oxides and hydroxides present in soil and hold the metal cations by forming a metal-organic complex called "chelate (grabbing as claw)". This property of organic matter reduces the leaching loss of nutrients in the water-soluble ionic form and improves the nutrient holding capacity of soil. Organic matter accounts up to 90% of adsorbing power of a mineral soil and act as a storehouse for nitrogen, phosphorous, sulfur and micronutrients. Organic matter particles have about 30 times higher cation exchange capacity than mineral soil particles.

Organic matter provides carbon as an energy source to nitrogen fixing bacteria and other microorganisms in soil. It provides food and creates a favorable condition for other soil inhabitants like earthworms. Organic matter stimulates various biological and physiological processes associated with cellular metabolism and mitigates the toxicity of heavy metals and toxic organics in the soil. Improving organic matter content can increase soil microbial population and activity, and nutrient transformation, which ultimately improves the nutrient release in a plant available form.

Soil organic matter generally increases when plant biomass production is higher and organic material additions occur. Cropping systems that incorporate and add organic materials into the soil include:

- ▶ crop rotation with high residue crops
- ▶ planting cover crops

- ▶ adopting rotational grazing
- ▶ even distribution of cattle manure and urine in the pasturelands
- ▶ using perennial forage legumes and grasses in the rotation

Tillage increases the microbial activity and accelerates the decomposition rate of organic matter and soil loss through erosion due to breakdown of soil aggregates. Adopting reduced or no-till practices in the crop fields optimizes microbial action and improves soil organic matter build up over time. Most of the organic matter is on the top depth (0 to 3 inches) of the soil profile. Adopting practices that minimize loss of surface soil help to conserve and build up organic matter in addition to conserving soil.

Periodic soil testing and proper fertilization encourages plant growth both above and below ground. Increased plant root growth helps to maintain or build up soil organic matter over time.

Planting perennial forages, rotational grazing and maintaining stubble height during grazing in pasturelands and mowing in hayfields help to maintain and improve soil organic matter.

Source: *Dhruba Dhakal, agronomy specialist*



- Section 179
- Bonus depreciation

Managing Asset Purchases

Many have already filed their current taxes, so planning for next year may not be a high priority. Planning throughout the year is a good practice to adopt, it is important to consider alternative tools for asset purchases.

Section 179 of the Internal Revenue Service (IRS) tax code allows businesses (including farms) to expense up to the full purchase price of qualifying equipment and/or software in the year it is placed in service rather than depreciate it over its useful life. It is an incentive created by the U.S. government to encourage businesses to buy equipment and invest in themselves. Recently, the IRS announced the 2020 tax year Section 179 maximum “expensing” deduction increased an additional \$20,000 to \$1,040,000. The Tax Cuts & Jobs Act (TCJA) of 2017 made Section 179 permanent, which is indexed or adjusted for inflation each year.

Section 179 has limits: there are caps to the total

amount that can be written off (\$1,040,000 in 2020), and limits to the total amount of the equipment which can be purchased (\$2,590,000 in 2020). The deduction begins to phase out on a dollar-for-dollar basis after \$2,590,000. Section 179 is a tool designed for small and medium sized businesses. Another limit is a taxpayer’s Section 179 deduction for any year may not exceed the taxpayer’s income from the business. For example, if the taxpayer’s income from the business is \$80,000, then the taxpayer’s Section 179 deduction cannot exceed \$80,000 for that year. However, the Section 179 deduction not allowed because of the limitation can be carried forward to the next tax year.

Historically, when businesses purchased qualifying equipment, most wrote it off a little at a time through depreciation over a period of years representing an assets useful life. Section 179 is a tool, which allows a tax payer to write off that expense at a much accelerated rate. This allows more flexibility for businesses to manage income for tax purposes. Section 179 can be used for new or used assets.

Bonus depreciation is another useful tool to consider. The Tax Cuts and Jobs Act increased bonus depreciation from 50% to 100%, but the increase is for a limited time. (Note: assets with a 15 or 20-year life still only qualify for 50%). Assets purchased through 2022 are eligible for 100% bonus depreciation, but beginning in 2023 the percentage decreases by 20% each year and is totally eliminated in 2027. Another result of the changes from TCJA is bonus depreciation is now available for both new and used asset purchases.

Bonus depreciation must be applied to all assets of the same property class placed in service that year. For instance, all 7-year assets.

Both Section 179 and Bonus depreciation are not allowed if the property was purchased from a related party.

Section 179 and bonus depreciation are useful tools, but are always subject to change if Congress passes additional tax legislation. There are many rules and details dictating how assets must be depreciated and expensed. Professional tax preparers should be consulted for advice before purchasing assets to ensure the best income tax management.

Source: *Mary Sobba, ag business specialist*

To Deworm or Not to Deworm

Sheep and goat producers around the world know the damaging effects of *Haemonchus contortus*, also known as the barber pole worm. This worm is the most pathogenic gastrointestinal (GI) worm infecting sheep and goats worldwide. The development of the FAMACHA© anemia scoring technique has been a major breakthrough in the fight against this parasite.

Haemonchus contortus is a warm weather blood-sucking worm. High transmission occurs during warm wet weather. Clinical signs of infection include severe anemia, protein loss or bottle jaw, weight loss, and diarrhea. Young goats (kids) and sheep (lambs) are highly susceptible to infection. Immunity of dams decrease around the time of kidding and lambing.

Blood consists of two fractions, a clear, fluid part, called plasma and a cellular part made up of mostly red blood cells. The proportion of red cells to plasma determines whether the animal is anemic or not. This proportion can be measured fairly accurately by assessing the color of the mucous membranes of the eyes. The effects of a heavy parasite load can be seen in the mucous membranes of the eyes as a visible paleness. By monitoring anemia, resilient and susceptible animals can be identified.

Using the FAMACHA© scoring chart, producers are able to selectively deworm only those animals that require treatment. This greatly decreases the development of resistance to dewormers because eggs produced by the few resistant worms that survived treatment will be diluted by all the eggs produced by the animals that did not receive treatment. The five-color (number) FAMACHA© scoring chart corresponds to a sheep or goat's bottom eyelid color and indicates the level of anemia from 1 to 5, where 5 is very anemic.

Sheep and goats should be checked every two weeks during peak *Haemonchus* transmission season if less than 10% of the herd scored in the 4 and 5 categories. This timeframe can be extended to 3-4 weeks outside of peak transmission and extended even further during the winter. If more than 10% of the herd scored in the 4 and 5 categories, sheep and goats should be checked weekly. Do not wait until there is a problem before checking scores.

Eyes must be checked outside in direct, natural light and not in shade or under artificial light. The proper technique to expose the lower eye mucous membranes is required. COVER, PUSH, PULL, POP is the 4-step process describing the technique.

1. *COVER* the eye by rolling the upper eyelid down over the eyeball.
2. *PUSH* down on the eyeball. An easy way to tell if enough pressure is being used is if the eyelashes of the upper eyelid are curling up over the thumb.
3. *PULL* down the lower eyelid.
4. *POP!* The mucous membranes will pop into view. Make sure that the inner surface of the lower eyelid is not scored, but rather score the bed of mucous membranes.

Repeat the process with the other eye because it may be different. Use the higher score so any error is on the side of caution (steps taken from the America Consortium for Small Ruminant Parasite Control).

Resistance to dewormers is an ever-increasing problem, due to the overuse of dewormers. If resistance is occurring in a herd to a dewormer for *Haemonchus*, anemic sheep will be seen after treatment. However, if the dewormer is effective, pale mucous membranes should become noticeably redder in color within a week or so, provided body condition scores are adequate.

For more information, contact an MU Extension livestock specialist. A demonstration video of FAMACHA© scoring can be found by visiting <https://web.uri.edu/sheepngoat/video/>

Source: *Heather Conrow, livestock specialist*



Gardening Tips for April

Ornamentals

- Fertilize established roses once new growth is 2 inches long. Use a balanced formulation. Begin spraying to control black spot disease.
- Shrubs and trees best planted or transplanted in spring, rather than fall, include butterfly bush, dogwood, rose of Sharon, black gum (*Nyssa*), vitex, red bud, magnolia, tulip poplar, birch, ginkgo, hawthorn and most oaks.
- Winter mulches should be removed from roses. Complete pruning promptly. Remove only dead wood from climbers at this time. Cultivate lightly, working in some compost or other organic matter.
- Easter lilies past blooming can be planted outdoors. Set the bulbs 2 to 3 inches deeper than they grew in the pot. Mulch well if frost occurs.

- Begin planting out summer bulbs such as caladiums, gladioli and acidanthera at 2 week intervals.

Vegetables

- Finish transplanting broccoli, Brussels sprouts, cabbage, and cauliflower plants into the garden. High phosphorous fertilizers help get transplants off to a quick start.
- Finish sowing seeds of all cool-season vegetables not yet planted.
- Asparagus and rhubarb harvests begin.
- Try an early sowing of warm-season crops such as green beans, summer squash, sweet corn, New Zealand spinach and cucumbers.
- Thin out crowded seedlings from early plantings of cool season crops such as beets, carrots, lettuce, onions and radish.
- Make succession sowings of cool-season crops.
- Begin planting lima beans, cucumbers, melons, okra and watermelons.

- Begin setting out transplants of tomatoes, eggplants, peppers and sweet potatoes.

Fruits

- Wooden clothespins make useful spreaders for training young fruits limbs. Place pins between the trunk and branch to force limbs outward at a 60 degree angle from the trunk.
- A white interior latex paint may be brushed on the trunks of newly planted fruit trees to prevent sunburn. This will gradually weather off in time.
- Stink bugs and tarnished plant bugs become active on peaches.
- Leaf rollers are active on apple trees. Control as needed.
- Remove tree wraps from fruit trees now.
- Protect bees and other pollinating insects. Do not spray insecticides on fruit trees that are blooming.

Source: Missouri Botanical Garden