



## Kelly Feehan

*Extension Educator – Community Environment*

2715 13<sup>th</sup> Street, Columbus, NE 68601

[402-563-4901](tel:402-563-4901)

[environment.unl.edu](mailto:environment.unl.edu)

[water.unl.edu/stormwater](http://water.unl.edu/stormwater)

[platte.unl.edu](http://platte.unl.edu)

Twitter: @KellyFeehan2

### Fall Soil Management

By: Kelly Feehan, Extension Educator

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Gardeners ask me about soil testing during fall. They feel their garden is no longer yielding as well and wonder if something is missing from the soil.

Soil testing every few years is wise and I provide gardeners with a list of private labs. I also remind gardeners they have to tell the lab what to test for. I suggest they begin with a basic test that tests for organic matter, pH and some nutrients.

I then ask them about their soil management practices such as how often do they till and how often do they incorporate organic matter. It's not unusual to hear tillage is done too often while the addition of organic matter is not done at all or often enough.

Excessive tillage is harmful because it damages soil structure. Good soil structure has good aggregation. Soil aggregates are clusters of sand, silt or clay particles held together in tiny, irregularly shaped groups.

These tiny groupings are surrounded by pore space which is where roots grow.

In soil with good aggregation, pore spaces are larger than those found in a soil with poor aggregation where soil particles are tightly packed together. Good structure allows soil to be well drained, yet have good water holding capacity and adequate pore space for root growth and oxygen exchange.

When tillage is used, tilling once a year is best. The key is to till when soil is barely moist. It should not be wet or too dry. Tilling wet soil destroys soil structure and results in hard clods that break down slowly. It also causes soil compaction making soils hard to dig and restricting oxygen and root growth.

Fall into early winter is a good time to till soil as long as it isn't frozen, too wet or too dry. It is better to till at these times than to wait until spring when cold, wet conditions limit our ability to work soil. Soils should be roughly tilled during fall.

Fall is an excellent time to add organic matter. The goal is to have five percent organic matter. On most soil tests I see, organic matter is between one and two percent. Organic matter plays a key role in soil structure as well as adding nutrients.

Almost all soils benefit from the addition of organic matter. It improves drainage in clay soils and increases water holding capacity of sandy soils. It provides energy needed by soil microorganisms to build soil structure. They, along with earthworms, create a soil glue that helps aggregates form.

The addition of organic matter is not a one-time practice as it breaks down over time. It can be increased by working plants and mulch under at the end of each season along with incorporating composted manure or compost. To avoid damaging cultivation, one to two inches of compost can be spread over the top of no-till gardens each year. Compost is decomposed organic matter.

There is a limit on how much organic material, such as tree leaves, can be added at one time. As a rule, a two inch deep layer is adequate with five to six inches being the maximum to add at one time. Shredding organic material before spreading it on the garden during fall will promote faster decomposition.

The addition of manure into garden soil is recommended to be done during fall to avoid food safety issues with bacteria. If manure is used as an organic matter source, use manure that has been composted for one year or more and incorporate it into soil during the fall.

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Fall is an excellent time to add organic matter and till garden soils. Early winter can still be a good time for this important soil management practice as long as the soil isn't frozen, too wet or too dry. It is better to till now than to wait until spring when cold, wet conditions limit the ability to work soil. Tilling soil when it is wet destroys soil structure and results in hard clods that break down slowly. Soil needs to be moist, not wet or dry, when tilling. There is a limit on how much organic material, such as tree leaves, can be added at one time. As a rule, a two inch deep layer is adequate with five to six inches being the maximum to add at one time. Shredding organic material before spreading it on the garden will promote faster decomposition. Remember, soil management is an important key to a successful garden; and the addition of organic matter is one practice that can reap many rewards for soil health. (Source: Ward Upham, K-State)

I was once asked how deep to bury old apples to control insects overwintering inside of them. Common apple insects are codling moth and apple maggot. Both emerge from apples and overwinter as pupae in soil, rather than inside fruit. It is important to promptly pick up and destroy apples as they fall from trees during summer and fall, before the insect can emerge from the fruit. Now is too late to use this as a control method. If burying is used to dispose of infested apples as they drop from trees, bury them at least twelve inches deep. When I asked this grower what apple insect he was trying to control, the answer was a small black, oval shaped beetle that was found in old apples and his old tomatoes. This insect is a sap beetle which is not an apple pest. Sap beetles feed only on old, overripe or damaged fruit. Sap beetles are easily controlled with prompt harvesting and removal of fallen fruit from the garden or orchard.

With winter approaching, exclusion is the best means of keeping mice out of buildings. Mice are attracted to buildings when they detect heat escaping from openings. Prevent mouse entry by eliminating all openings one-fourth inch or larger. Secure gaps less than one-half inch around pipes with sealant to stop air flow. For larger gaps, use copper woven-wire mesh, or a new product that uses stainless steel fibers to fill gaps. Complete the job with a sealant or mortar to prevent air movement. Larger openings can be secured with wood, aluminum flashing, concrete, or one-fourth inch wire mesh. Doors, windows, and screens should fit tightly. If needed, cover the edges of doors and windows with metal to prevent gnawing. Materials that are unsuitable for plugging holes used by mice include latex, plastic, rubber, boards less than one-half inch thick, or other soft materials. Mice will chew through these.

When firewood begins to be brought indoors, calls start coming in about insects emerging from firewood. The main concern is if these insects can damage wood inside the homes. Most insects emerging from firewood, even tree borers and subterranean termites, are considered nuisance pests when brought into the home via firewood. This is because most insects cannot survive in the home when introduced from firewood. For example, subterranean termites quickly die without their underground colony, and tree borers will not damage aged or finished wood inside of a home. To avoid nuisance pests emerging indoors, bring firewood inside only as needed. Do not store firewood indoors. If firewood is held below 50 degrees Fahrenheit, insects in the wood remain dormant. If brought indoors and allowed to warm, insect activity resumes and insects may emerge. If so, swat, sweep or vacuum them.

A recent question asked was if Saucer Magnolia needs to be covered, such as with plastic, for winter protection. Saucer magnolia is cold hardy to zone 4 so it is plenty hardy for our area. As a hardy tree, Magnolia does not need winter protection. Attempting to cover it with anything, especially plastic, is likely to do more harm than good as this would create an unnatural environment around the tree. The biggest issue with Magnolia is they bloom so early in spring that flower buds are sometimes killed by a spring freeze. Due to issues with flower buds freezing, planting Magnolia in the right location is most important, as with all plants. Magnolia are best grown where protected from strong winds. Also avoid southern exposures close to a house as the warmth may induce buds to open too early in spring. As with any plant, planting the right plant in the right location is the best protection against weather extremes.