

## IMPROVING SOIL IN FALL

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Fall is a great time to improve garden soils. This is something that needs to be done every year. Here are a few tips on doing this correctly and avoiding common mistakes.

When clay soils are hard and compacted, some people add sand to improve drainage. However, this may result in soil that resembles concrete.

According to Ward Upham from Kansas State University, for sand to be effective in improving clay soils, sand grains must touch one another so there are pore spaces between grains to hold air and water.

If the grains do not touch, clay fills in voids between sand particles leaving no room for larger pores. Since this is the same principle used in making concrete, the result with soil can be similar.

While sand could be effective, it is estimated soil has to be made up of about 80% sand to work, making the addition of sand impractical.

To improve clay soil, the addition of organic matter like compost, well-rotted manure, grass clippings or tree leaves is recommended; and fall is an excellent time to incorporate organic matter.

Organic matter is a key component of healthy soils with good structure. Soils with good structure are well drained yet have good water holding capacity. Organic matter also promotes beneficial soil microorganisms and macro-organisms like earthworms.

While it is a good idea to have a soil test taken, organic matter are amendments that can be added without a soil test since all soils need organic matter added on a fairly regular basis. On soil tests, five percent organic matter is considered a good percentage to aim for.

In clay soils, organic matter improves drainage and in sandy soil, it increases water and nutrient holding capabilities.

For other amendments, like gypsum or lime, a soil test is best taken before using these materials to determine if they're even needed, and if so, in what amounts. In most Nebraska landscape and garden soils, gypsum and lime are rarely, if ever, needed and may cause more harm than good.

The ideal organic matter is compost which is fully decomposed plant material. Compost looks and feels like good top soil, but it is organic matter not mineral particles of sand, silt or clay.

While it is fine to till under garden plants or incorporate grass clippings or chopped tree leaves into soil at this time of year, know that these still need to decompose. While doing so in the soil, they take nitrogen away from plants; and so nitrogen fertilization will need to be tended to during the growing season.

Manure is another good source of organic matter, but there are risks of introducing harmful bacteria, like E. coli, into gardens. Avoid using manure in vegetable gardens. If used, only use full decomposed manure and incorporate it in fall, not during spring.

For compost, spread three to four inches of compost over the area to be amended; then thoroughly till or spade the compost six to eight inches into soil. Try not to till the soil so much that it starts to be powdery.

If you use no-till gardening, that is great way to protect soil structure. In such cases, spread about two inches of compost over the surface like mulch. Eventually, through freezing and thawing and movement of earthworms and other macro-organisms, it will benefit soil.