

## IMPROVE SOIL BY INCREASING ORGANIC MATTER

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Complaints about garden soil range from too sandy to hard and dry or gummy and about everything in between. One answer to improving most soil is incorporating organic matter.

Plant roots grow best in soil with good aggregation or soil structure. Such soil provides adequate pore space for root growth and oxygen recharge, good water and nutrient holding capacity, and allow excess water to drain away.

Very sandy soil and very clayey soil tend to be low in organic matter and have poor aggregation. But any soil that is tilled on a regular basis with little or no addition of organic matter will become low in organic matter.

No matter the soil type is, incorporating organic matter improves soil structure. It increases water and nutrient holding capacity of sandy soils, improves drainage in clay soils, and increases nutrients in soil as it decomposes.

A good garden soil has about five percent organic matter. In soil tests I see, organic matter content is often one and one-half to two percent. There is much room for improvement and this soil management practice needs to be done a regular basis.

Fall is a good time to incorporate organic matter. Sources include plant debris like grass clippings, tree leaves and wood chips, well-rotted manure, composted yard waste, peat moss, and green manures.

In annual flower and vegetable gardens, the addition of organic matter is fairly easy. Simply till in plant debris at season's end. This may not increase organic matter content to 5 percent, especially on sandy or clay soils, so consider spreading and tilling in additional organic matter.

If using well-rotted livestock manure, use no more than about one inch annually due to the high salt content of manure. Weed seeds can also be introduced into the garden from livestock manure.

Composted plant debris can be added along with well-rotted manure or by itself. Spread a one to three-inch layer over the garden and spade or till it in six to eight inches deep. Know that excessive tilling damages soil structure. If used once a year to roughly incorporate plant debris or compost, this is fine.

Fresh grass clippings and tree leaves can be incorporated in fall. They are readily available and this is a good way to recycle them. Avoid clippings from lawns that herbicides have been applied to. If leaves are shredded by mowing before tilling in, they will decompose more rapidly.

If plant debris is composted prior to incorporating into soil, the organic matter will last longer because most decomposition has already taken place. About half of the organic matter will remain in soil after two growing seasons. Refer to our NebGuide on Garden Compost at <https://go.unl.edu/composting> .

Green manure is a cover crop like annual rye, winter rye, winter wheat, sweet clover or oats planted in the fall, then tilled under in early spring. For information on cover crops used as green manure, refer to this University of Missouri publication on green manures, <https://go.unl.edu/greenmanure> .

Perennial plants in flower or shrub borders also benefit from organic matter. Since the material cannot be tilled in without damaging roots, spread a two to four-inch layer of organic mulch like wood chips or shredded bark without a weed mat. Over time, this will slowly increase soil organic matter.