10-Minute University™

The Clackamas County Master Gardener Association in collaboration with and in support of the OSU Extension Master Gardener™ Program

Organic Matter as Garden Soil Amendments

Soil amendments can improve soil structure, increase fertility, and enhance water retention. Amendments should be low in chemical salts and contain enough nitrogen to feed plants and soil microbes. To benefit plants, amend the entire planting bed. If that is not practical, backfill new plantings with native soil. Filling the planting hole with added compost and other amendments creates an interface (where two soil types come together) with native soil which impedes movement of air, water, and roots.

Assess Needs

Test your soil: It is important to begin with a baseline before making changes. A routine test will measure soil texture, organic matter, nutrient levels, pH, and other properties. Additional tests can assess heavy metal contamination, soil biology or other attributes. If you only want to know the soil pH, a test kit from the garden center may do. In Oregon, some Master Gardener™ associations, including Clackamas County, offer free soil pH tests. https://cmastergardeners.org

Amend based on test results: If you need to adjust soil pH, know that change comes slowly. To maintain soil organic matter content, organic amendments must be added as part of an overall program – organic matter is not "one and done." If test results show nutrient deficiency in areas where annual crops are grown, fertilize as recommended. Where landscape plants are grown, you may delay fertilizing if plants appear healthy and show normal growth (nutrient deficiency often stunts growth).

Organic Amendment Materials

The following materials are decomposed plant or animal products:

Yard waste compost: Compost made from yard debris is a common source of organic amendments. Using yard waste compost recycles local materials. You can make your own. https://cmastergardeners.files.wordpress.com/2022/02/gardening-with-compost.pdf

The quality of commercial compost varies depending on the source materials and how the compost is made. The US Composting Council has a Seal of Testing Assurance (STA) program https://www.compostingcouncil.org/page/CertifiedCompostSTA. Commercial composters who participate in this program must test their products for pathogens, heavy metals and pesticides on a regular basis and make results available upon request.

Any compost can be a source of weed seeds. Occasionally, commercial compost can be a source of persistent herbicide residues. Before using compost, run your own bioassay by planting pea seeds and observing if they germinate and grow normally.

https://s3.wp.wsu.edu/uploads/sites/411/2014/12/PDF_Clopyralid_Bioassay.pdf

If your bioassay results are favorable, add 1-3 inches of compost and mix into the soil when making a new bed. Annual additions of ¼ to ½ inch of compost can maintain soil organic matter and fertility. Compost contains low levels of nitrogen which is released slowly.

https://pubs.extension.wsu.edu/soil-fertility-in-organic-systems-a-guide-for-gardeners-and-small-acreage-farmers

Peat Moss: This is no longer recommended due to the environmental damage from peat harvest.

Coco fiber (Coir): This byproduct of coconut harvesting has broader use in container media. It may be a source of high salt, depending on how it was processed. https://extension.okstate.edu/fact-sheets/soilless-growing-mediums.html

Biosolids: These by-products of municipal wastewater treatment contain nutrients, organic matter, and inorganic content. Class A biosolids have been treated to reduce pathogens and are suitable for use in gardens and landscapes. https://pubs.extension.wsu.edu/organic-soil-amendments-in-yards-and-gardens-how-much-is-enough-home-garden-series

Manure: Manures are an age-old soil amendment. They generally contain higher levels of nutrients and salts than yard waste compost and have fertilizer value. Unfortunately, the potassium and phosphorus (P and K) that they contain is almost never required in home gardens or landscapes, and they are implicated in recent studies that show that home vegetable gardens often contain unnecessarily high amounts of those chemicals. Raw manure will be a source of weed seeds and pathogens. Use composted manure to reduce risk. Apply in the spring, two weeks before planting. Fall applications increase the risk of nutrient leaching and/or water pollution. Typical nutrient content for raw and composted manures is in this publication: https://pubs.extension.wsu.edu/fertilizing-with-manure

Coffee Grounds: This waste product can be used as a soil amendment by working one-half inch into the top 4 inches of soil. It has a pH of 6.5 to 6.8 and is slow to decompose. Coffee grounds contain low levels (1-2%) of nitrogen and some micronutrients, so you will need to add a small amount of nitrogen fertilizer to compensate. Its addition can stimulate soil microbe activity, which ties up soil nitrogen. Test in a small area before use because coffee grounds may inhibit growth of some plants. https://today.oregonstate.edu/news/used-appropriately-coffee-grounds-improve-soil-and-kill-slugs

Biochar: This is made by heating biomass such as wood chips, crop residues and dairy manure under low oxygen conditions. Its properties vary depending on the source material and the temperature at which it is made. It typically contains 50-80% carbon and has a high pH. https://extension.psu.edu/biochar-properties-and-potential

Cover crop: Green manures or cover crops are incorporated into the soil or harvested and laid on the soil surface as mulch. They increase soil organic matter, reduce erosion, may add nitrogen, and may promote soil aggregation. Success requires planning so that cover crops are sown and killed so as not to compete with the vegetable garden. https://cmastergardeners.files.wordpress.com/2022/10/cover-crops-for-home-vegetable-gardens.pdf