

Increasing Soil Organic Matter with Compost

“Essentially, all life depends upon the soil ... There can be no life without soil and no soil without life; they have evolved together.” Charles E. Kellogg, USDA Yearbook of Agriculture, 1938

The addition of compost to the soil will improve any soil's physical, chemical and biological properties; yielding healthier soil, plants, turfgrass, trees and shrubs, helping to reduce project costs. Compost is a great source of **Soil Organic Matter**, which offers a variety of benefits proclaimed by university research, actual field use and even regulatory agencies.



Essentially, amending soil with compost enhances the growth of ALL plant life, because the soil that they live in is improved and healthier!

AAPFCO (Association of American Plant Food Control Officials) consists of state Department of Agriculture officials from across the US. They regulate all claims made by compost manufacturers on product labels, literature and websites (subject to individual state approval). The following list, from their **Rules and Regulations for Bulk Compost**, has been **accepted as valid for the benefits of compost**:

- Improves soil structure and porosity – creating a better plant root environment
- Increases moisture infiltration and permeability, and reduces bulk density of heavy soils, improving moisture infiltration rates and reducing erosion and runoff
- **Improves the moisture holding capacity of light soils – reducing water loss and nutrient leaching, and improving moisture retention**
- Improves the cation exchange capacity (CEC) of soils
- **Supplies Organic Matter**
- Aids the proliferation of soil microorganisms
- Supplies beneficial microorganisms to soils and growing media
- Encourages vigorous root growth
- Allows plants to more effectively utilize nutrients, while reducing nutrient loss by leaching
- Enables soils to retain nutrients longer
- Contains humus – assisting in soil aggregation, making nutrients available for plant uptake
- Buffers soil pH

Compost Benefits: Beyond the plants!



The benefits outlined above are typically regarded as aids to **Plant Growth**, but they are far more than that. They also pertain to how compost improves the soil, which impacts overall soil and plant quality, but also water quality and quantity And therefore, the environment, and human existence (and quality of life). By adding compost which contains stabilized organic matter to the soil, you are helping the overall health of the soil:

1. Be protected from wind and water erosion
2. Retain larger volumes of water, and
3. Filter out and/or bind contaminants that might be contained in surface water.

These benefits are so important that municipal ordinances, rules and Best Management Practices (BMP) are appearing around the country that requires the addition of organic matter (OM) to the soil. One example is the following ordinance (*see reverse page*) contained in the Denver Water Authority Rules²:

Denver Water operating rules that apply to soil amendment and limits on use: Operating Rule 14.02.4. Soil Amendment for Irrigation of Turf at Newly Licensed Premises: Proof of proper soil preparation is required before installation of plant material. Penalties of \$1,000 may apply if soil amendment is not completed and approved by Denver Water prior to the installation of plant material. **Proper soil amendment is the equivalent of adding approved compost at a rate of four cubic yards per 1,000 square feet of permeable area, incorporated (rototilled) to a depth of six inches.** *There are other rules and BMPs like this across the country.*

Facts & Benefits: Water use reduction and conservation

1. A University of Illinois study³ about amending farmland soil with compost produced the following facts:
 - In sandy soils, compost will increase water holding capacity by absorbing water.
 - In high clay content soils, compost will improve aggregation, allowing water to move through soil faster. Following a 2nd application of amendments (i.e., compost) all amended plots increased Plant Available Water by 5 to 45% compared to the control.
 - This would have potentially reduced the average amount of irrigation water needed by 10 to 90%
 - At current prices, a reduction of one irrigation cycle would reduce energy costs by \$270 to \$620 on a 160 acre system, depending on the energy source used.
2. The Recycled Organics Units of New South Wales in Australia conducted a Life Cycle Analysis of compost⁴: [Compost use] reduced irrigation water from increased water holding capacity of 3 to 10%, thereby saving 14,000 to 100,000 gallons/acre/year.

Facts & Benefits: Bioremediation

- Bioremediation uses compost to clean and restore contaminated soils by degrading and binding contaminants in soil. The process has been used both in-situ, where compost and other amendments are incorporated into a contaminated soil, and by removing the contaminated soils and adding them to a compost pile⁵.

Facts & Benefits: Resource conservation

- Applying just 2" of compost in lieu of the traditional 6" of 'topsoil', which is typically of unknown origin and quality, reduces project material costs by up to 2/3! The compost will provide additional benefits, as described above, that commercial topsoil just cannot offer.

The US Composting Council supports and strongly recommends regular compost testing to insure product quality and safety. The Seal of Testing Assurance Program (STA) is the ONLY nationally recognized compost testing program. Read more about it at: <http://compostingcouncil.org/seal-of-testing-assurance/>

Cited References

¹Compost-New Applications for an Age Old Technology, USEPA530-F-97-047

²Denver Water Authority – Soil Amendment Program

<http://www.denverwater.org/Conservation/SoilAmendmentProgram/>

³Using Compost to Reduce Irrigation Needs

<http://www.usawaterquality.org/conferences/2007/PPTs&Posters/AgBMPs/Friend.pdf>

⁴Sharma G and Campbell A, 2003, Life Cycle Inventory and Life Cycle Assessment for Windrow Composting Systems, Recycled Organics Unit, New South Wales Department of Environment and Conservation, Sydney, NSW, Australia

⁵Summarized from "Innovative Uses of Compost: Bioremediation and Pollution Prevention", USEPA 1997

⁶USDA NCRS Soil Health Key Points, Feb. 2013

Other Useful References

How To: Soil Best Management Practices, Tools, & Specifications

<http://www.soilsforsalmon.org/how.htm>

Choosing a Soil Amendment

<http://www.ext.colostate.edu/pubs/Garden/07235.html>

Compost Effect on Water Retention and Native Plant Establishment on a Construction Embankment

http://ars.usda.gov/research/publications/publications.htm?seq_no_115=187864

Landscape Architect Specifications for Compost Use

<http://compostingcouncil.org/seal-of-testing-assurance/>

Please visit www.compostsolution.org for many more references on the use of compost for increasing soil organic matter and water conservation.

WHY USE COMPOST?
Because amending soil with Compost will significantly reduce water use!



For every 1% increase in organic matter in your soil, you increase water retention at the rate of 3 quarts per cubic foot, OR each increase of 1% OM can increase soil water holding capacity by 27,000 gallons H₂O/Acre⁶ (this will vary depending on soil type).



Compost: THE Sustainable Solution

US Composting Council · 5400 Grosvenor Lane · Bethesda, MD 20814
301.897.2715 · www.compostingcouncil.org · www.compostsolution.org