

Soil Amendments for Long-term Urban Soil Improvement

Objectives:

Project objectives are to:

1. Evaluate long-term effects of organic amendment C:N ratios on plant establishment and soil quality..
2. Compare long-term effects of biosolids-blend amendments to compost amendments.
3. Compare effectiveness of surface application vs. incorporation of amendments on soil-water relations and plant health in compact soil.

Our hypotheses are:

1. Plant establishment and plant health will be improved by applying soil amendments to urban soils.
2. Amended urban soils will have greater porosity and ability to capture rainfall and irrigation water.
3. Long-term plant performance and soil quality resulting from application of biosolids + high C:N byproduct amendments will be equal or superior to that obtained by application of yard debris compost.
4. Surface application of amendments will provide significant soil quality and plant establishment benefits, although the benefits may not be as great as with incorporated amendments.

The site is compact sandy subsoil located along the Scott Pierson Bike Trail on the Highway 16 corridor in Tacoma. The site has a western exposure and was an area of cutting, filling, and compaction during construction in 2006. The site is typical of compact urban and roadside soils, and is accessible to the public.

Amendments at the Washington site include:

- Yard debris compost
- Tagro mulch (biosolids and sawdust blend with C:N ratio 30:1)
- Vermicompost
- Unamended control

The yard debris compost and Tagro mulch include treatments with and without incorporation into the soil. The other amendments are not incorporated. Vermicompost was applied at depths of 1 and 3 inches. Plot size is 10 x 16 feet.

The site was planted to Washington State Department of Transportation "Low Mix", which includes Hancock coralberry (*Symphoricarpus hancockii*), gro-low

fragrant sumac, (*Rhus aromatica* 'gro-low') and compact Oregon grape (*Mahonia aquifolium* 'compacta').

Soil quality measurements will be adapted to fit the conditions in the compact, sandy soil at the site. Aggregate stability will not be done because aggregate formation is not significant in sandy soils. Infiltration, bulk density, and compaction measurements may have to be modified where rocks or high levels of compaction do not allow the use of the techniques noted above.

Plant available water will also be determined in situ at the Washington site using tensiometers measured with a pressure transducer and digital readout. Tensiometers were installed to a depth of 15 cm during the fall of 2007. Measurements will be made weekly during the following spring and early summer as the soil dries, and again during the fall as the soil rehydrates.

Plant survival, plant growth (height, width, shoot length, and/or caliper depending on species), and visual quality will be assessed annually. Weed pressure will be evaluated twice during the first year, and weeds removed mechanically or chemically following evaluation.