

Biosolids compost improves landscape plant establishment in compacted soil

Dan Sullivan, Oregon State University
Feb 11, 2010



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Research support: Northwest Biosolids Management Association, Oregon ACWA

Objective

Evaluate best methods for establishing landscape plants in compacted, non-irrigated soil:

- Plant varieties?
- Apply compost?
- Tillage after compost application?

Field trial

Eight plant varieties
4 drought-tolerant varieties
4 "Average Joe" varieties

Soil amendments
biosolids compost
yard debris compost
no compost

Tillage to incorporate compost
tilled
not tilled

Each combination of plant-compost-tillage replicated 4x

Compost nutrients (lb/cubic yard)

Compost Analysis	Biosolids compost	Yard debris compost
Ammonium-N	0.9 (high)	0.04 (low)
Total N	7.3	9.5
Organic C	170	176
C:N	23	19
Phosphorus (P)	4 (high)	2 (low)
Potassium (K)	1 (low)	5 (high)

Compost quality

Analysis	Unit	Biosolids Compost	Yard debris compost
pH		7.7	7.0
EC (soluble salt, 1:5 extract)	mS/cm	1.6 (medium)	0.9 (low)
Stability	mg CO ₂ -C/g OM/day	1.0 (very stable)	2.9 (stable)

Vibrating roller to compact soil

Irrigated approx 1 week prior to compaction



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Three inches compost applied



Compost rototilled into soil, or left on soil surface



Planting with power auger



No-till plot: compost incorporation into planting holes



Watered only in fall, 2008
2009 no summer irrigation

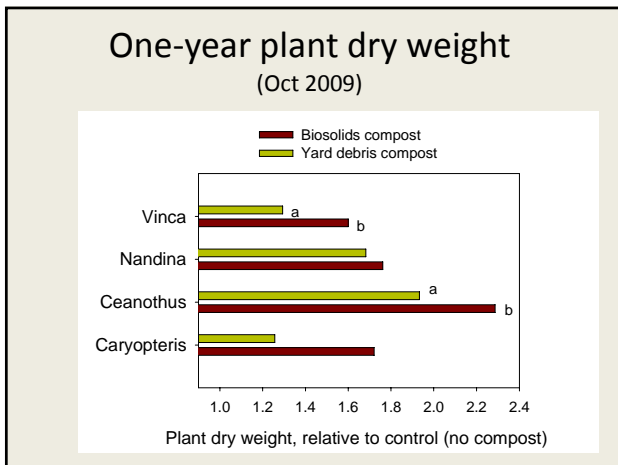
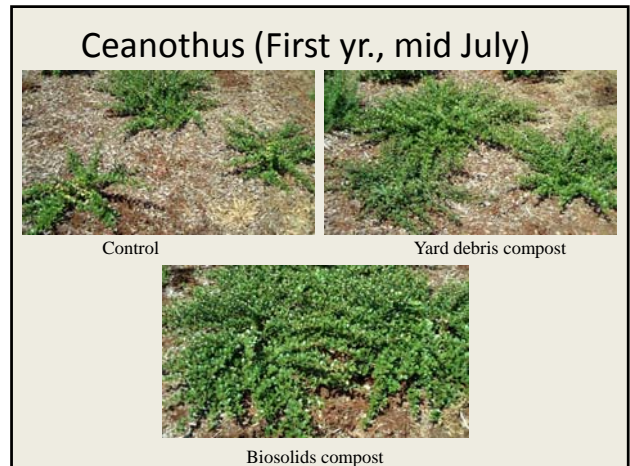
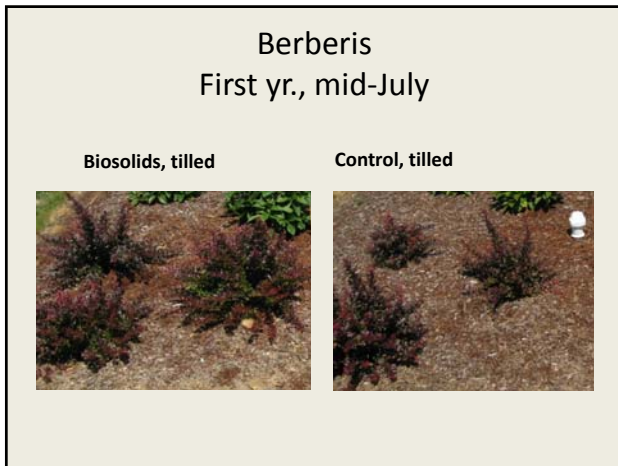
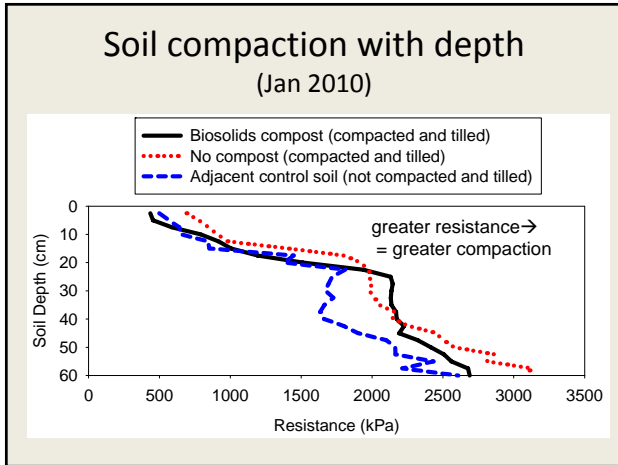


Fall 2008; installation complete



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Conclusions

(first growing season, 2009)

- Most plants survived first year without irrigation

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Conclusions

(first growing season, 2009)

- Plant growth increased with compost for both drought-tolerant plants and for typical PNW landscape plants
- Plant growth: biosolids compost \geq yard debris compost > no compost
 - growth of groundcover plants superior with biosolids compost

Conclusions

(first growing season, 2009)

- Compost left on soil surface was as effective as compost incorporated via tillage in promoting plant growth
 - Likely explanation:
 - rototilling did not incorporate compost effectively in compacted soil
 - some of compost fell into planting holes after power-augering



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