



# **Turfgrass Seeding Practices for Reclaiming Disturbed Urban Land with Compost**

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# INTRODUCTION: DISTURBED SOILS



Permanent vegetation is most effective practice to stabilize soil and reduce water impairment.

Compost has been demonstrated to improve disturbed soils for vegetation establishment.

# NEED TO RE-VEGETATE HIGHWAY ROADSIDES



# BLOWING COMPOST AS SEEDING MEDIUM




# REVEGETATION SUCCESS INCONSISTENT



# **GREENHOUSE COMPOST STUDY**

## **SEEDING TREATMENTS**

- 1) planted on surface of 1 in. compost overlying soil
  - 2) planted on soil surface below  $\frac{1}{4}$  in. compost
  - 3) planted on soil surface below  $\frac{1}{2}$  in. compost
  - 4) planted on soil surface below 1 in. compost
  - 5) planted on soil surface below 1 in. straw mat
  - 6) planted below  $\frac{1}{2}$  in. soil
  - 7) planted below  $\frac{1}{2}$  in. of 1:1 compost:soil mix
  - 8) planted on soil surface
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# COMPOST PROPERTIES

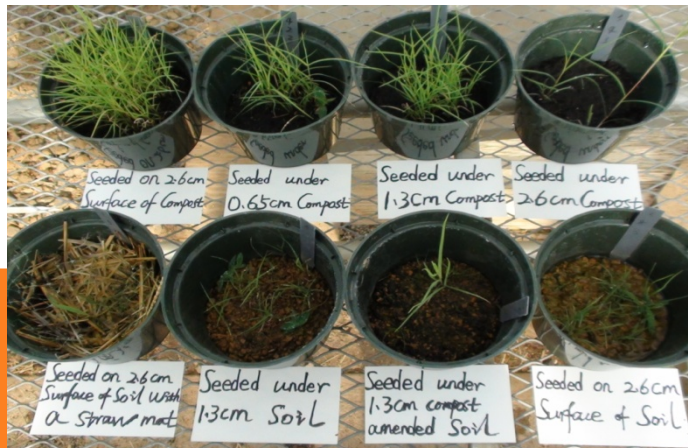
Source	pH	C:N	EC (mmhos/cm)	Solvita Maturity	
				NH3	CO2
Yard waste	7.3	17:1	0.75	5.0	7.5
Food waste	6.0	15:1	1.20	5.0	7.5
Dairy manure	9.3	14:1	2.17	5.0	7.0
Biosolids	8.2	10:1	6.25	2.5	6.5
Papermill sludge	8.5	21:1	2.43	5.0	7.5

# Effects of paper mill sludge compost treatments on germination and emergence of four turfgrass species.

## Tall fescue



## Kentucky bluegrass



## Bermudagrass

## Zoysiagrass



# GERMINATION AND EMERGENCE RESULTS

Seeding depth and turfgrass species >>  
compost type or quality

- Highest G&E – Seeds planted on surface of compost or soils
- Lowest G&E – Seeds planted under 1 in compost



# FIELD STUDY (2009-2011)



To compare compost application and turfgrass seeding practices for revegetating disturbed land

Lynchburg, VA

# INITIAL SOIL TEST ANALYSIS AND FERTILIZER RECOMMENDATIONS: MARCH 2009

Property	Soil Test Qualitative value (Mehlich I conc)	Fertilizer Recommendations (lbs per acre)
N		40
P	VL (3 ppm)	67
K	M+ (80 ppm)	100
Ca	VH (1120 ppm)	
Mg	VH (>120 ppm)	
pH	7.1	

# FIELD STUDY TREATMENTS

## 1: Fertilizer and seed

- No cover (Control)
- Straw blanket
- Compost blanket:  $\frac{1}{4}$  in depth

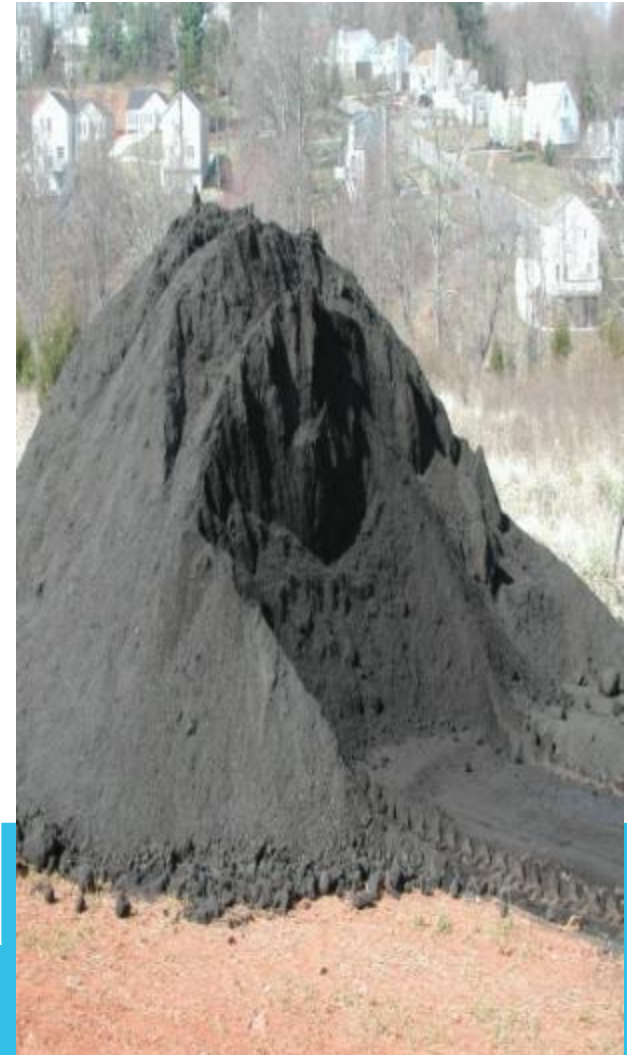
## 2: Compost - broadcast: 1 in. depth

## 3: Compost - broadcast & incorporated: 1 in. depth

## 4: Compost - broadcast & incorporated: 2 in. depth

# COMPOST COMPOSITION

Parameter	Result
Moisture (%)	43
EC (mmhos/cm)	3.0
pH	7.9
C:N	18:1
Total Organic C (%)	30
Total N (%)	1.7
P (%)	1.0
Maturity (Solvita)	Very Mature (low CO <sub>2</sub> , NH <sub>3</sub> )



# APPLYING AND INCORPORATING COMPOST

1



Compost

2



Aerovate

3



Seed, roll



3/28/2009

# NUTRIENTS RECOMMENDED AND APPLIED

Treatment	C	N	P	K
	lbs/ac			
Fertilizer	0	40	67	100
¼ in compost	2,848	117	87	140
1 in compost	11,392	466	349	558
2 in compost	22,784	933	698	1116

<http://connect.ag.vt.edu/compostforturf/>

2 in PPI  
compost

1 in PPI  
compost

Standard  
Fertilizer

SF+Straw Mat (back)  
 $\frac{1}{4}$  in compost blanket

1 in  
compost  
blanket

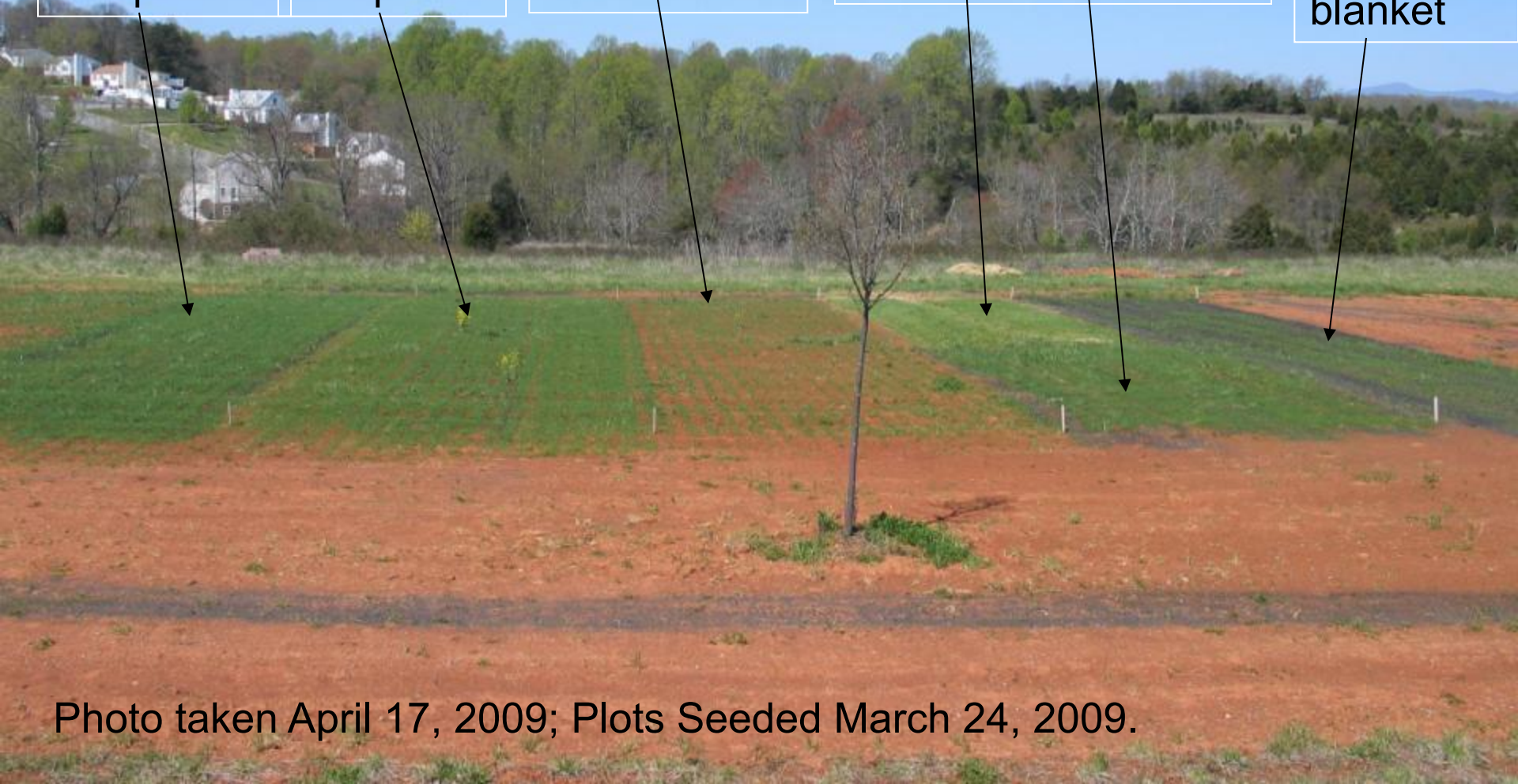
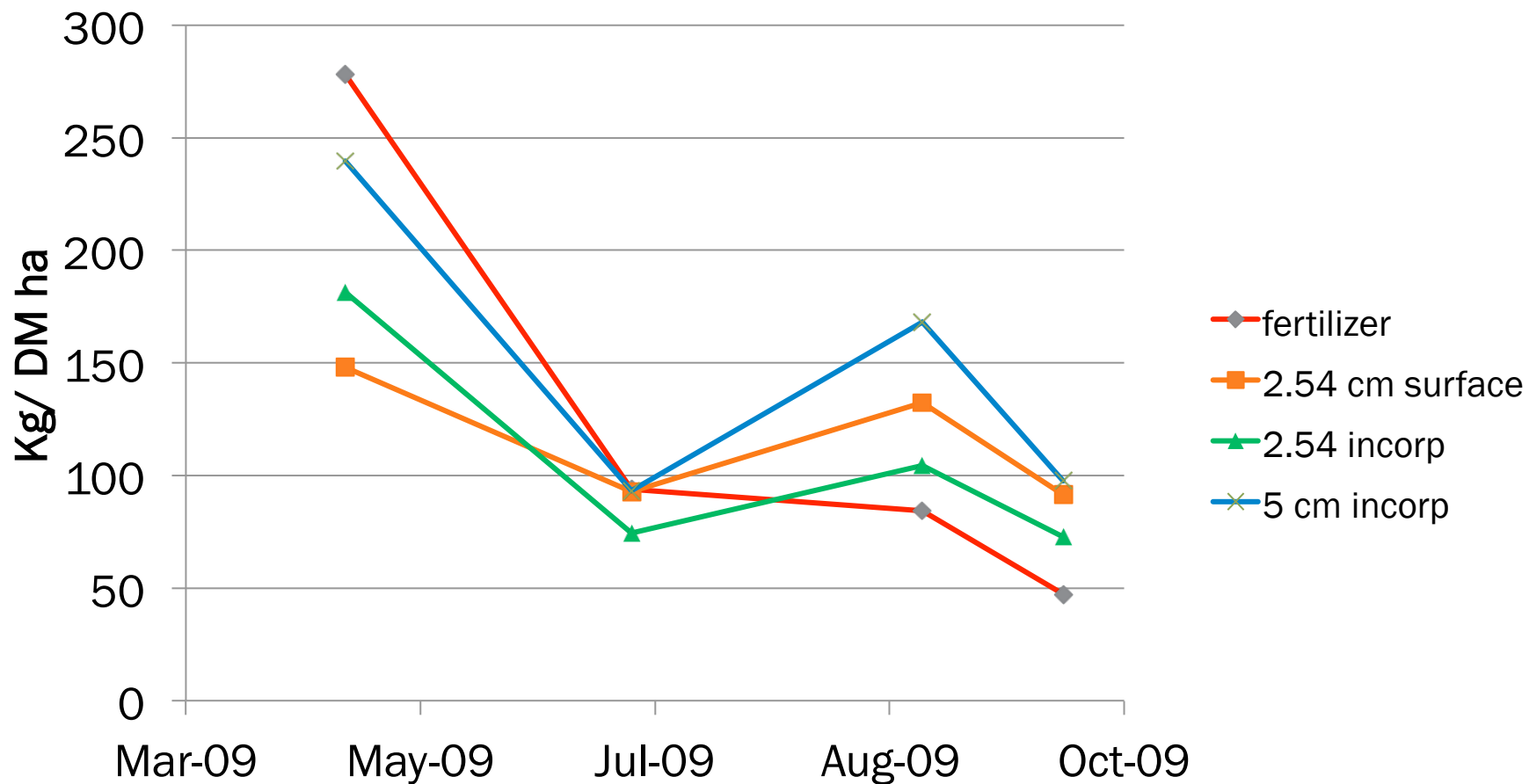


Photo taken April 17, 2009; Plots Seeded March 24, 2009.



# TREATMENT EFFECTS ON TURF BIOMASS, 2009



# Comparison of Turfgrass Density – July 2011

Standard fertility  
treatment, Rep 3

2" compost,  
incorporated,  
Rep 3

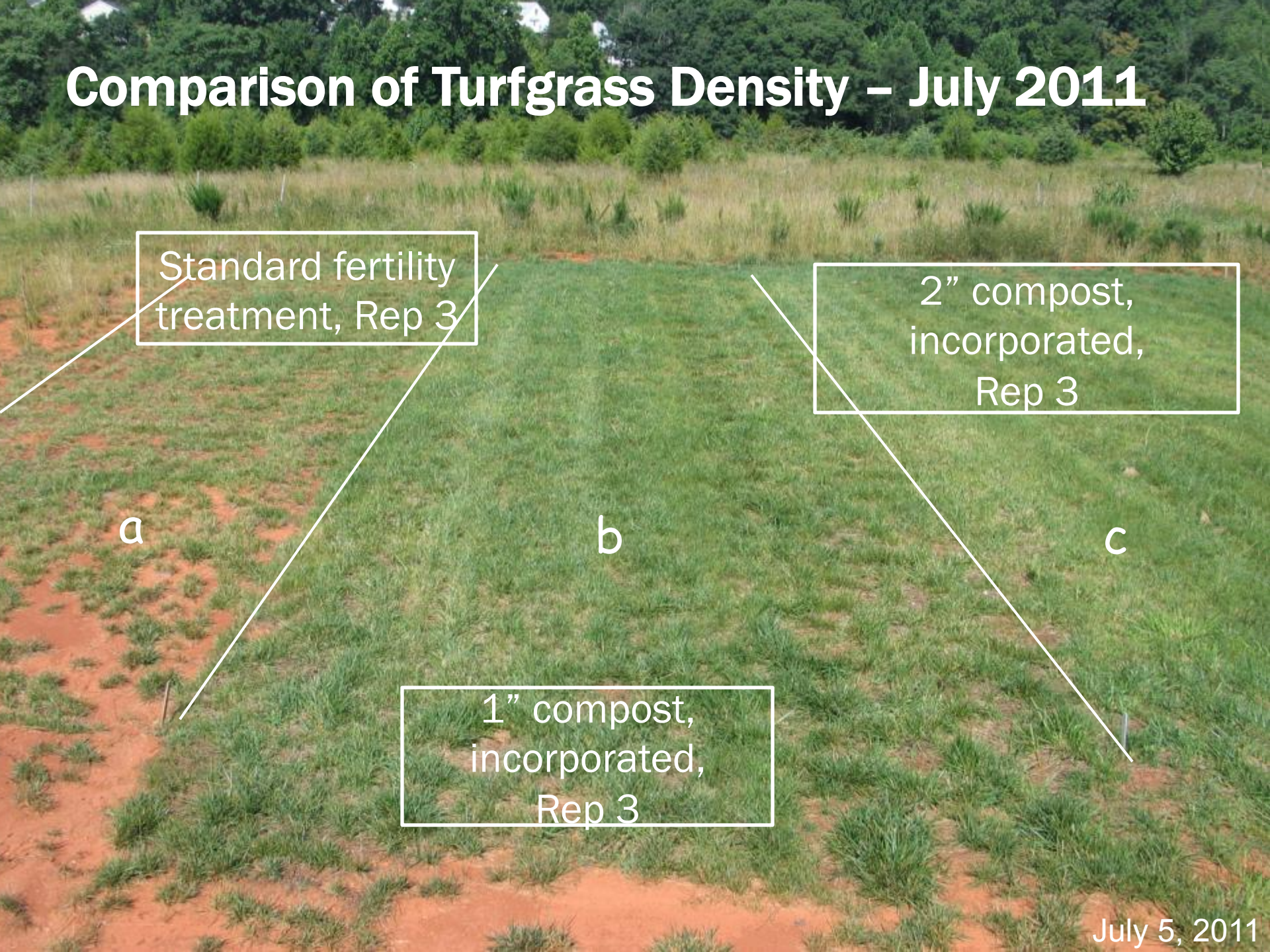
a

b

c

1" compost,  
incorporated,  
Rep 3

July 5, 2011



# SOIL PROPERTIES TWO YEARS AFTER TREATMENT APPLICATIONS, JULY 2011

Treatment	P	TOC	Bulk density
	ppm	%	g/cc
Fertilizer	16 a	1.22a	1.25 b
1 in. compost, incorporated	22 b	2.82b	1.24 ab
2 in. compost, incorporated	26 c	3.20b	1.18 a

# CONCLUSIONS

Slow release of compost nitrogen likely improved turfgrass biomass with time.

Incorporated compost performed better than compost blanket.

Greater turfgrass density with compost than with standard fertilizer practices.

Soil properties improvements: compost > fertilizer.

