# COMPOST UTILIZATION IN URBAN LANDSCAPES

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Urban settings offer unique situations for using compost


Parks and Trails


Multiple use public sports fields

# Residential Home Construction


Poor soil preparation = Poor turf quality

# Why use dairy manure compost?

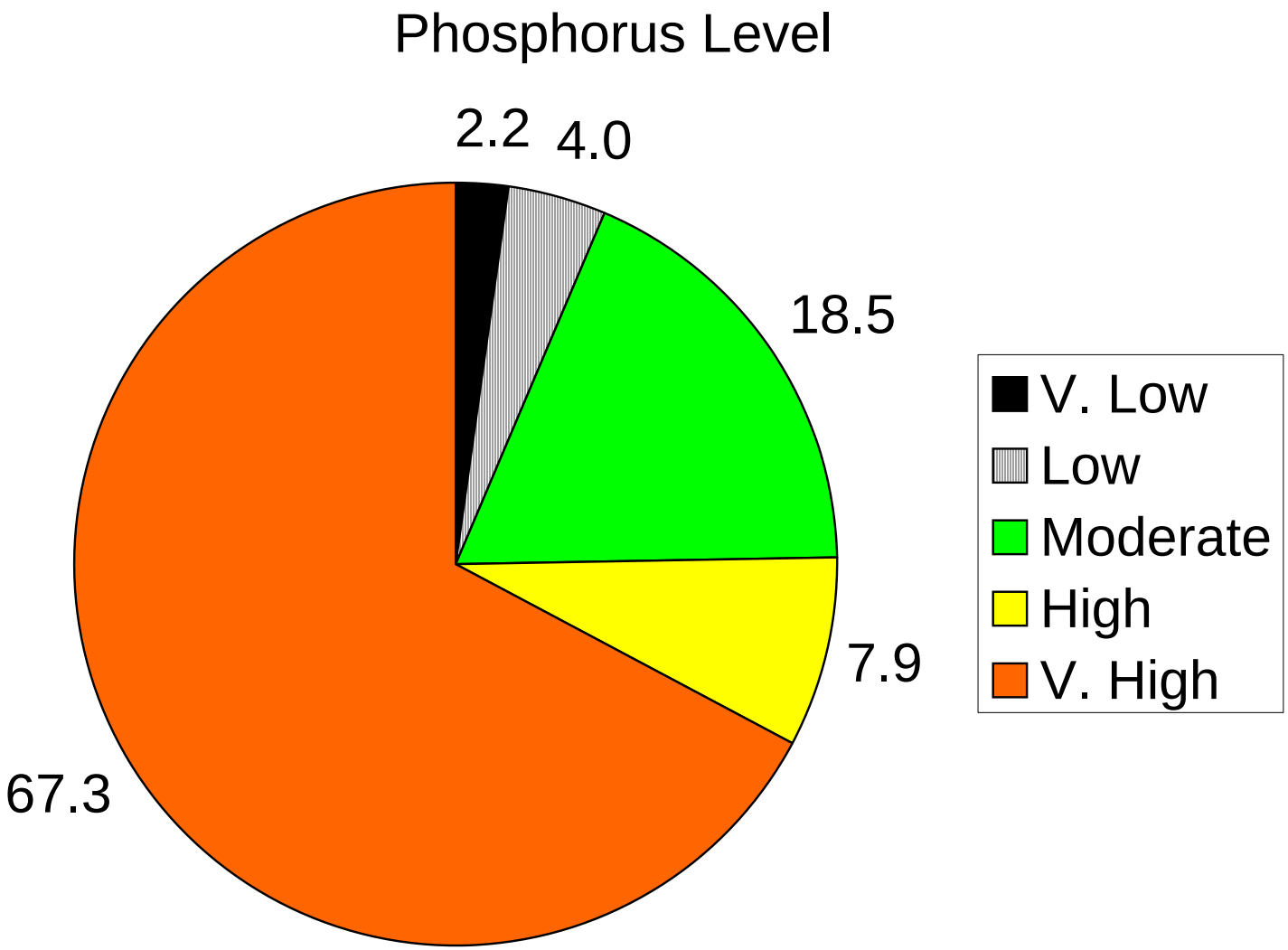
# The Problem

- The Bosque River headwaters are located in near Stephenville, Texas in Erath County.
- Extensive water quality monitoring on the river has revealed that phosphorus is the limiting nutrient causing algal blooms.
- Approximately 40,000 dairy cattle in the watershed produce a huge quantity of phosphorus-laden manure every day.
- Most producers use the manure to fertilize their fields, but many just pile it next to their barns. Rainwater carries nutrients from the manure to local streams.

# The Solution

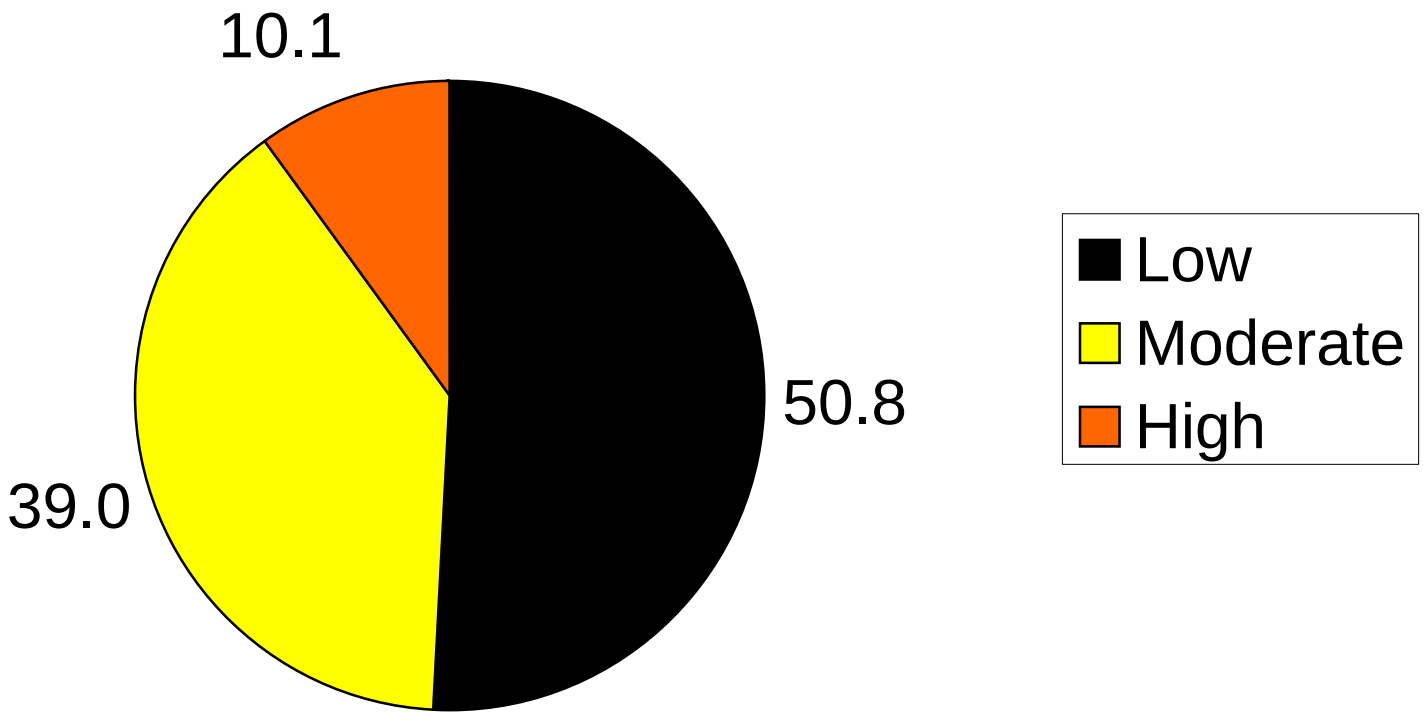
- Compost the dairy manure and transport it out of the watershed.
- Urban areas may provide a larger and more lucrative market for the dairy manure compost.
- However, are there environmental concerns?

# EarthKind Urban Soil Test Results – Spring 2003



# EarthKind Urban Soil Test Results – Spring 2003

## $NO_3$-N Levels



# Dairy Manure Compost Research/Demonstration Plots

Objective: To evaluate the effect of large single applications of DMC on the establishment and subsequent growth of typical urban landscape plants and to evaluate the effects on soil chemical and physical properties.

# Materials and Methods

- 0, 40, 80, 120 ton/acre dairy manure compost (Erath Co., Texas)
- 20 x 20 ft plots size
- One-half ornamentals; one-half turf grass
- Irrigation applications
  - Ornamentals: Years 2003, 2004, and 2005
  - Turf grass:  Years 2003, 2004
- No supplemental fertilization*

**3 x 1 lb/1000ft$^2$ N applied to turf in 2004*

# Analysis of Dairy Manure Compost

| Parameter | Mean | SD |
|---|---|---|
| Total N (g $kg^{-1}$) | 9.0 | (4.3) |
| Total P (g $kg^{-1}$) | 1.0 | (0.1) |
| Total K (mg $kg^{-1}$) | 4.9 | (0.4) |
| Ash Content (%) | 81.3 | (1.1) |
| OM Content (%) | 18.7 | (1.1) |
| Wet Bulk Density (kg $m^{-3}$) | 792 | (19.9) |
| Moisture Content (%) | 34.3 | (1.4) |

# Dairy Manure Composting Facility in Erath County, Texas

# Composted dairy manure application rates and corresponding N, P, and K rates.

| **Compost Rate** | **N Rate (Total)** | **P Rate (Total)** | **K Rate (Total)** |
|---|---|---|---|
| (kg $m^{-2}$) | (g $m^{-2}$) | (g $m^{-2}$) | (g $m^{-2}$) |
| 9 | 81 | 9.4 | 44 |
| 18 | 162 | 18.8 | 88 |
| 27 | 243 | 28.2 | 132 |

# Former Farmland: A major source of land for new residential construction sites.

# Annual / Perennial Ornamentals

*Pentas* - Egyptian Star Flower

New Gold Lantana

*Echinacea* - Purple Coneflower

Shasta Daisy

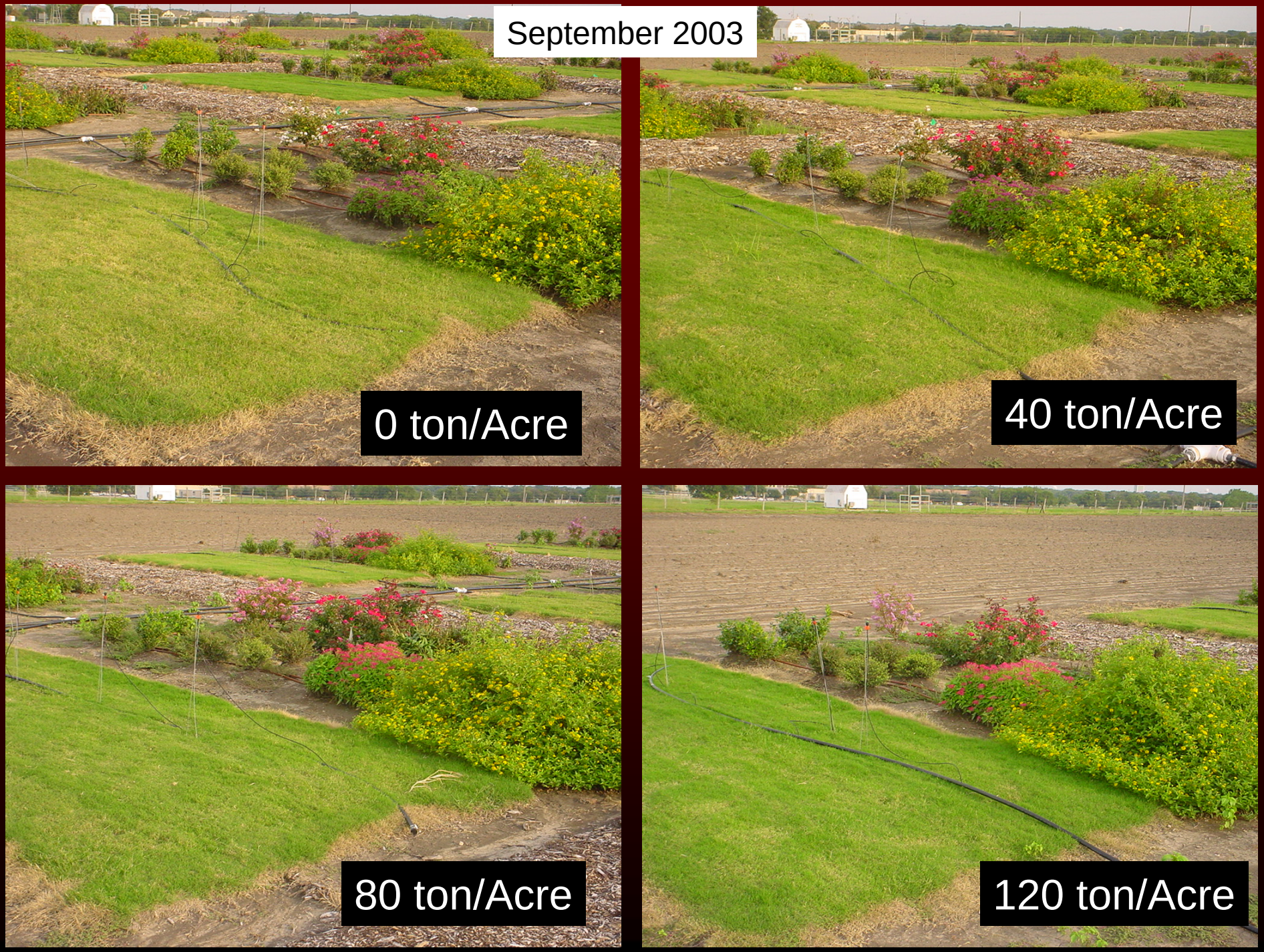
# Woody Ornamentals

Dwarf Burford Holly

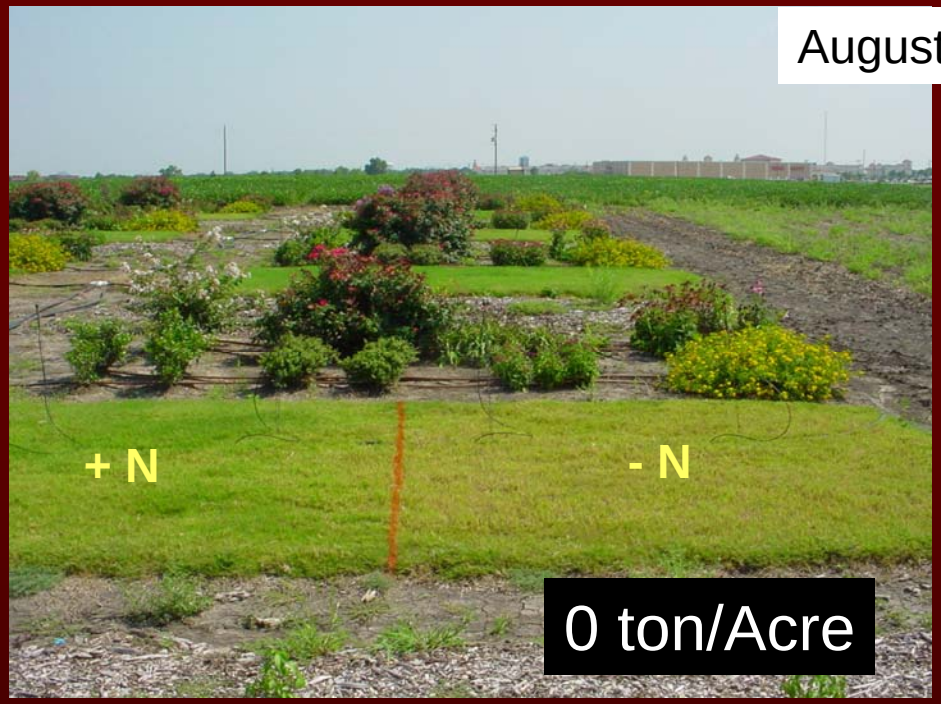
Dwarf Yaupon Holly

Knockout Rose

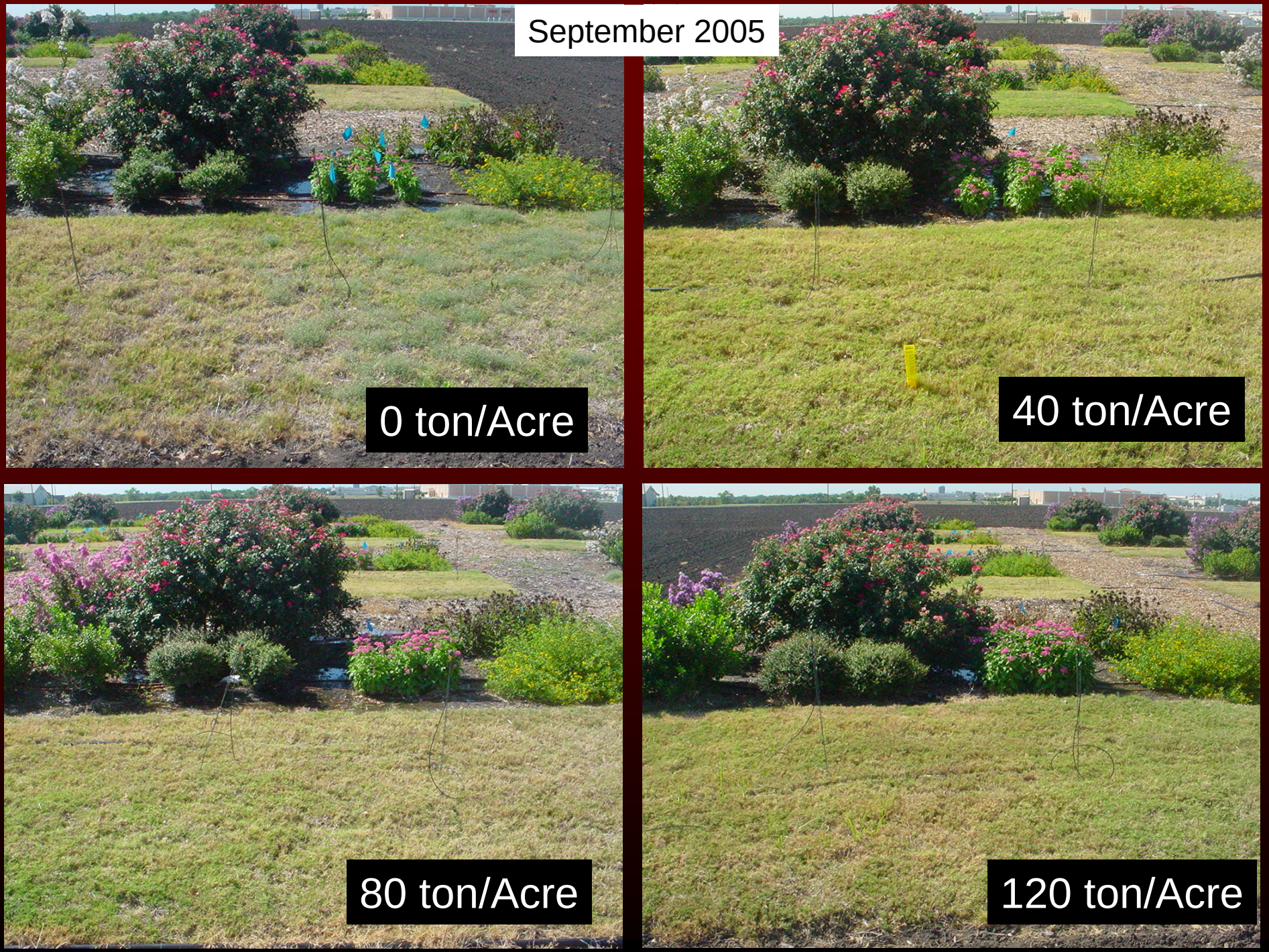
Crape myrtle

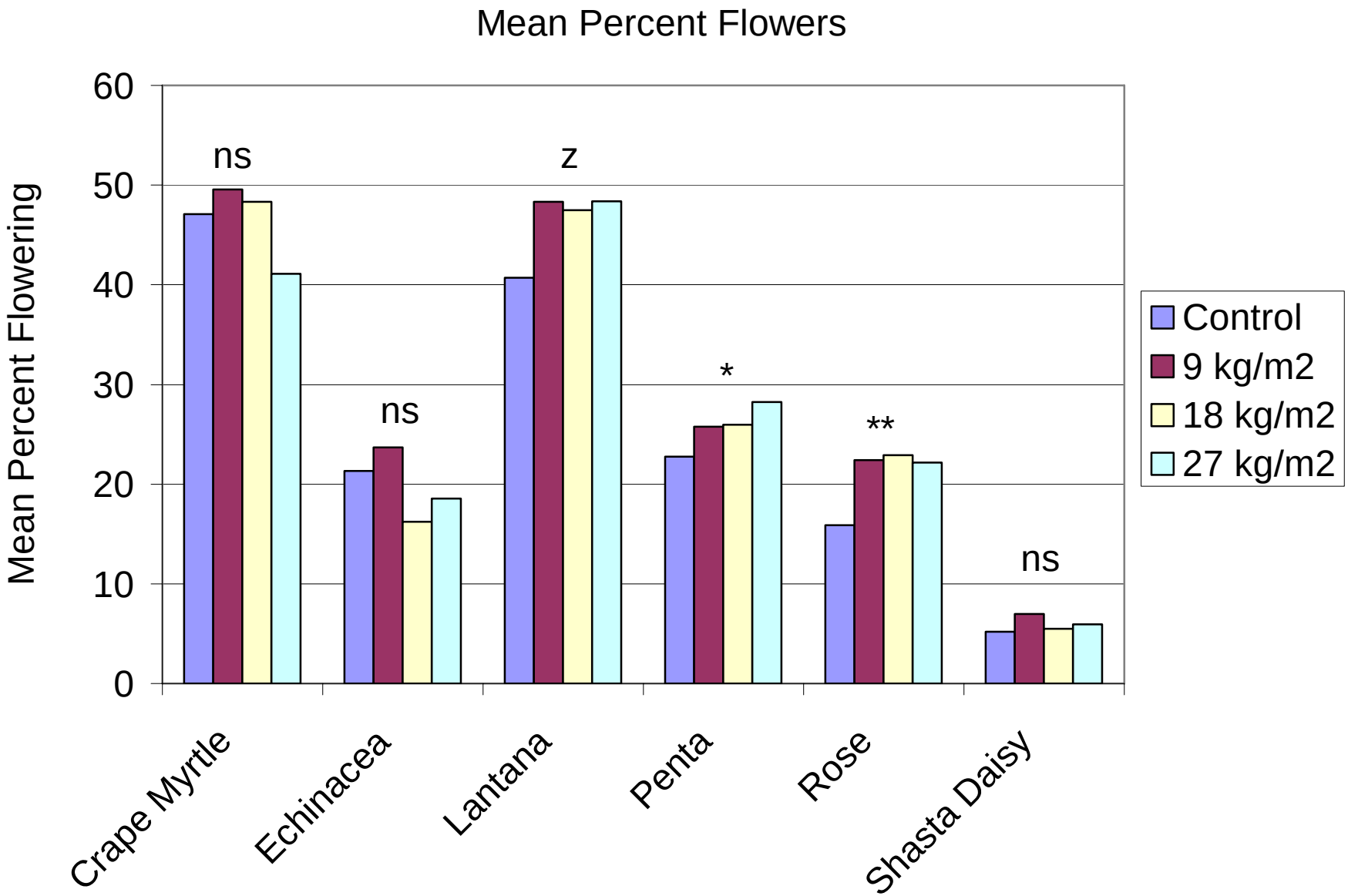

September 2003
0 ton/Acre
40 ton/Acre
80 ton/Acre
120 ton/Acre

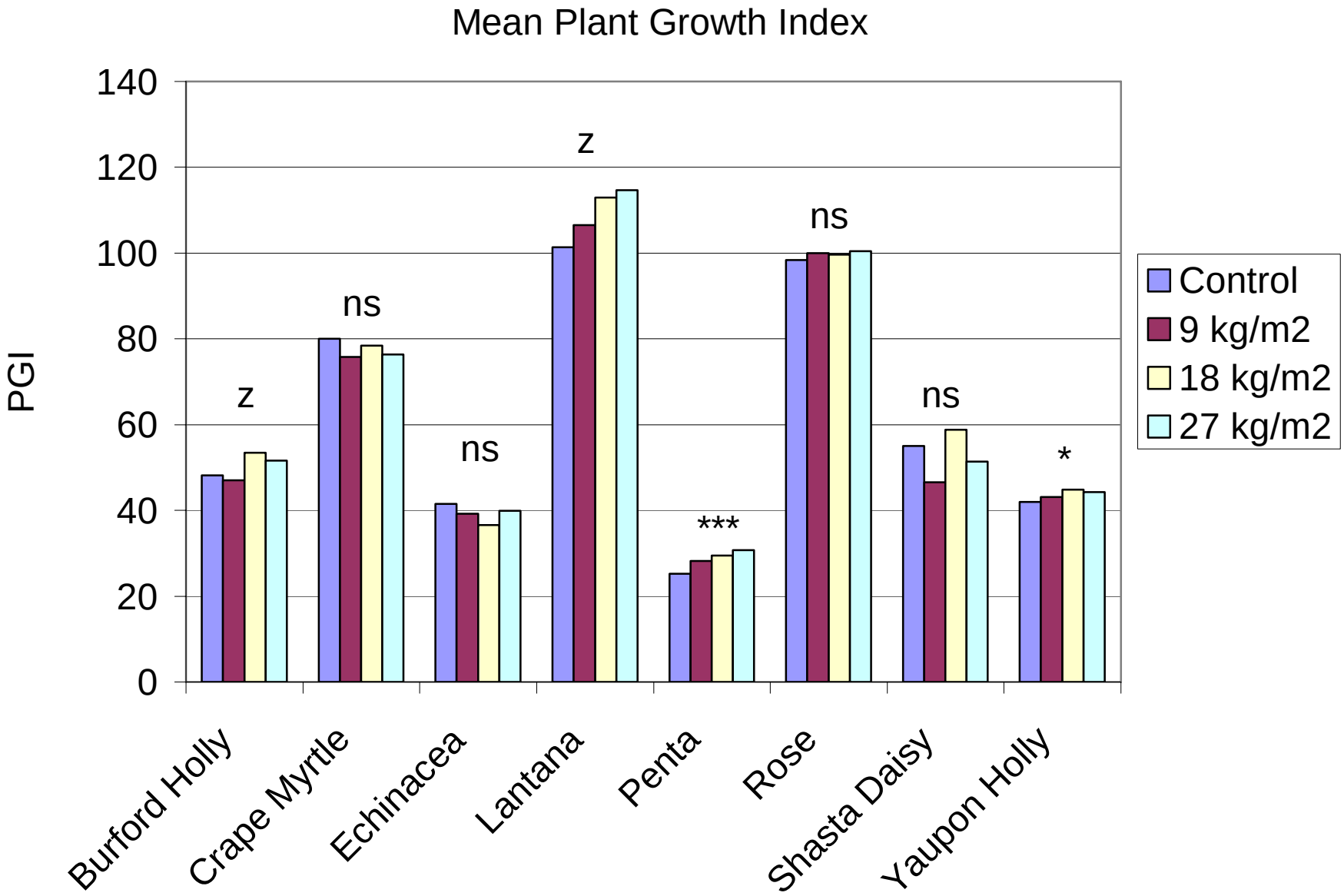
August 2004

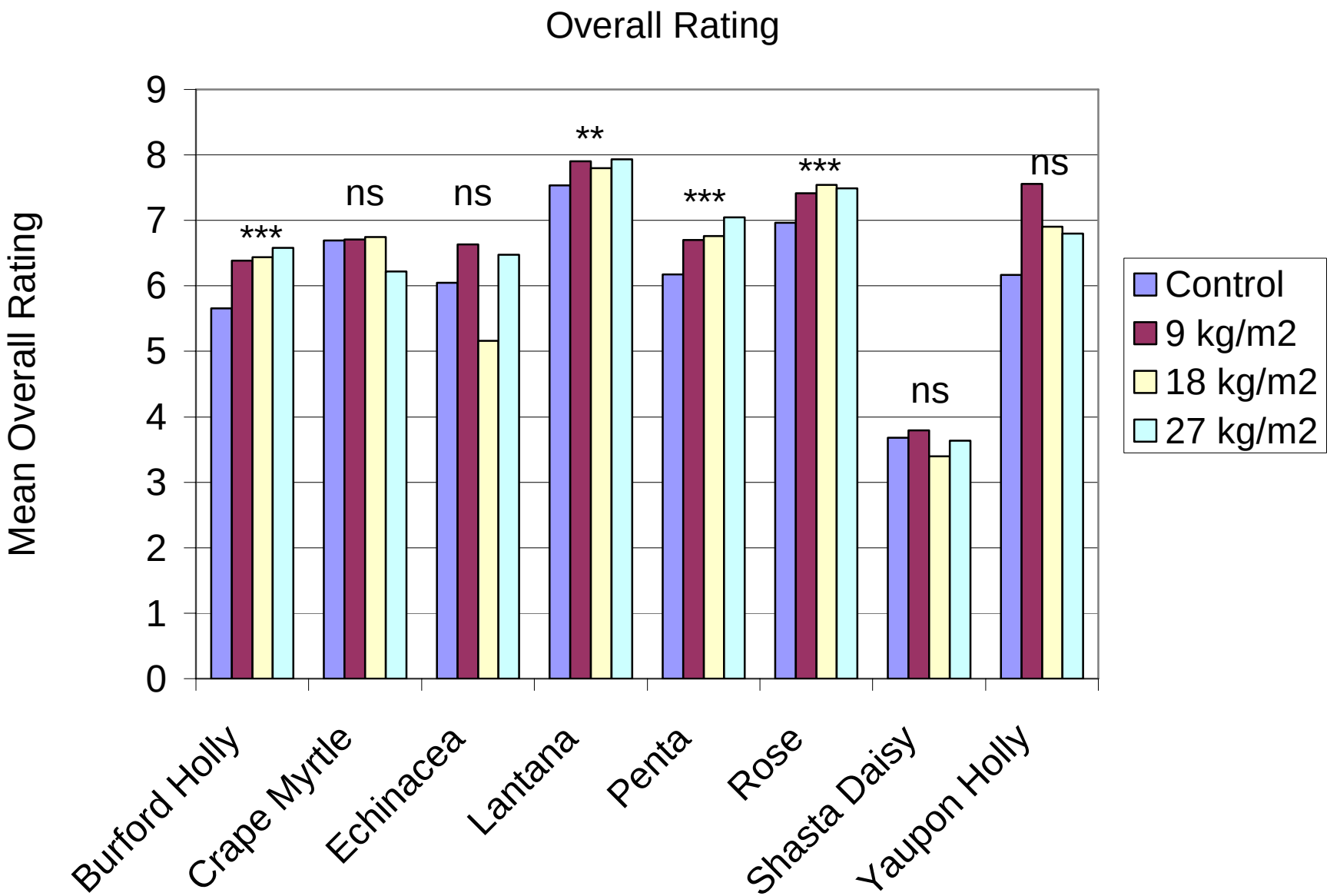




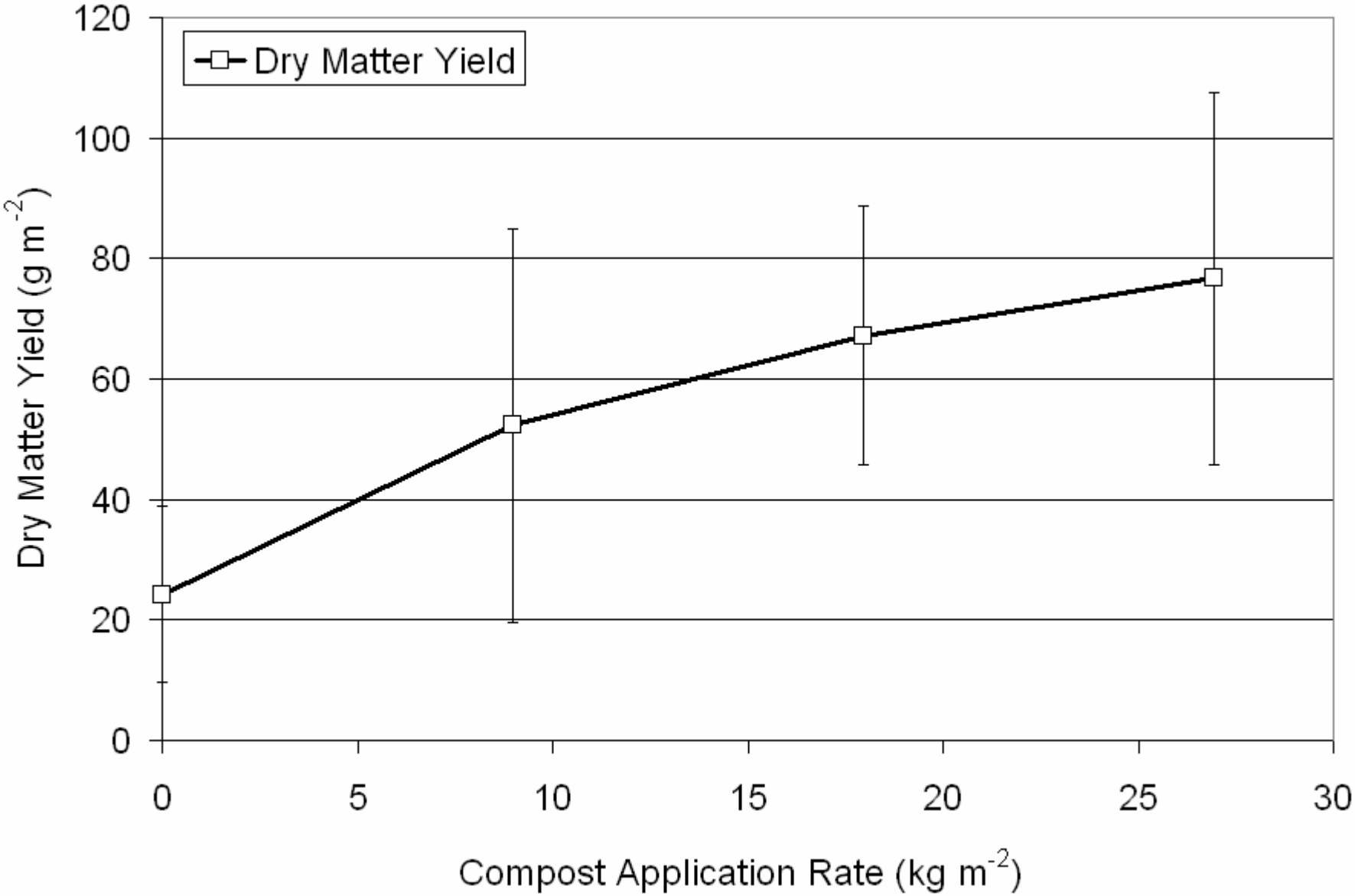


September 2005
0 ton/Acre
40 ton/Acre
80 ton/Acre
120 ton/Acre


Mean Percent Flowers
Mean Percent Flowering
60
50
40
30
20
10
0
ns
z
ns
*
**
ns
Crape Myrtle
Echinacea
Lantana
Penta
Rose
Shasta Daisy
Control
9 kg/m2
18 kg/m2
27 kg/m2

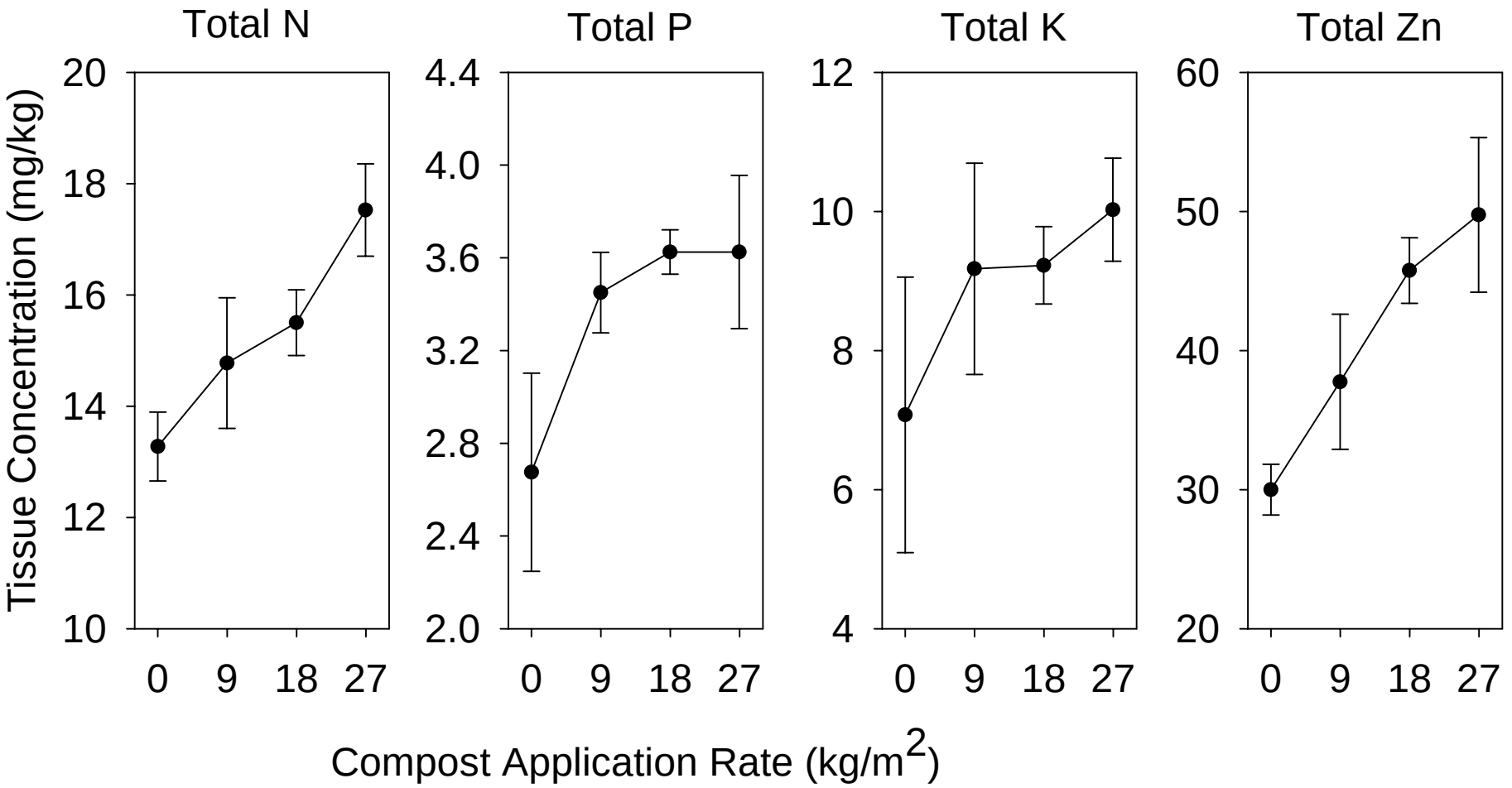

Mean Plant Growth Index
PGI
140
120
100
80
60
40
20
0
z
ns
ns
z
***
ns
ns
*
Burford Holly
Crape Myrtle
Echinacea
Lantana
Penta
Rose
Shasta Daisy
Yaupon Holly
Control
9 kg/m2
18 kg/m2
27 kg/m2


Overall Rating
Mean Overall Rating
9
8
7
6
5
4
3
2
1
0
***
ns
ns
**
***
***
ns
ns
Control
9 kg/m2
18 kg/m2
27 kg/m2
Burford Holly
Crape Myrtle
Echinacea
Lantana
Penta
Rose
Shasta Daisy
Yaupon Holly

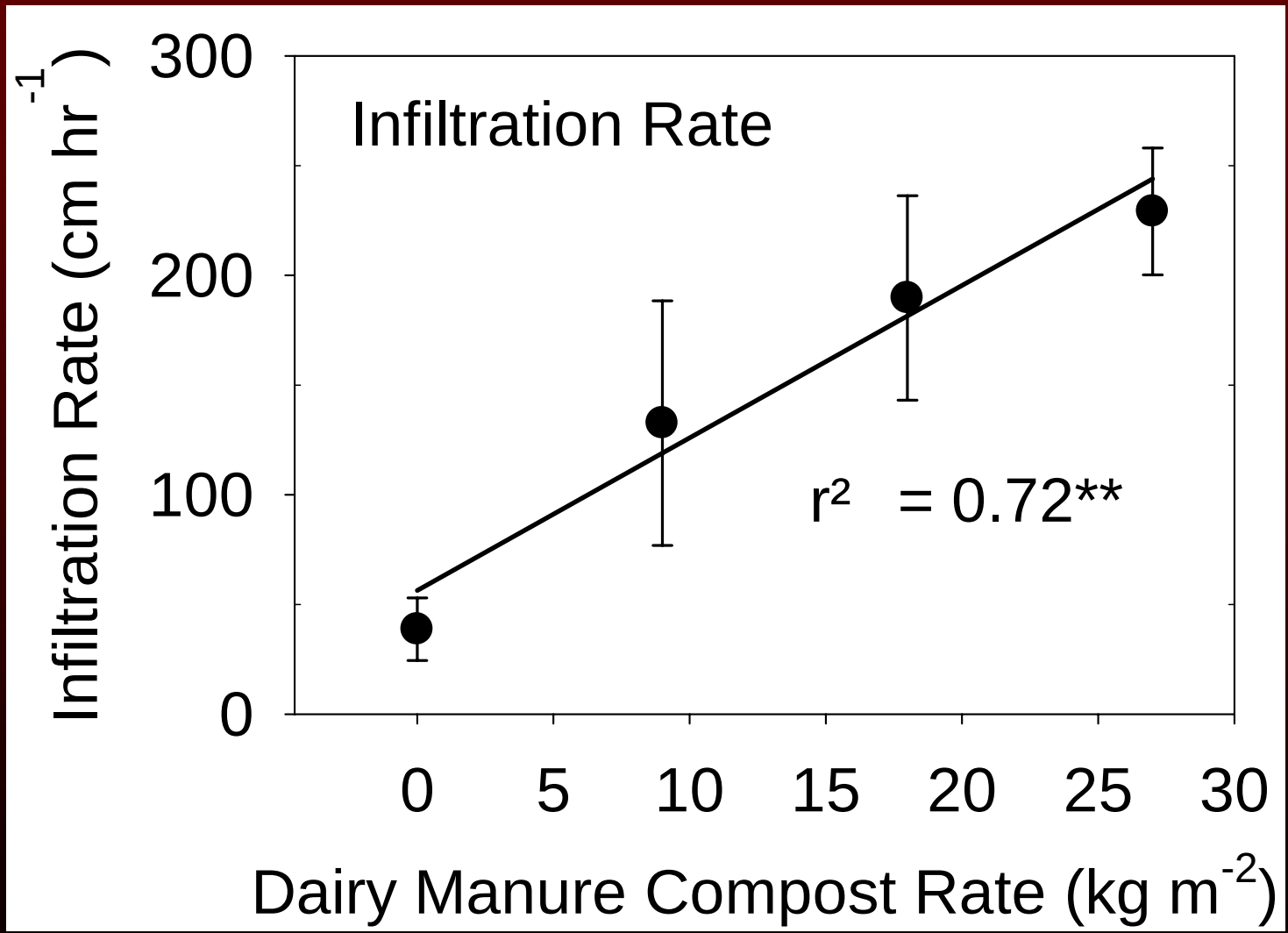
# Bermuda grass Dry Matter Yield



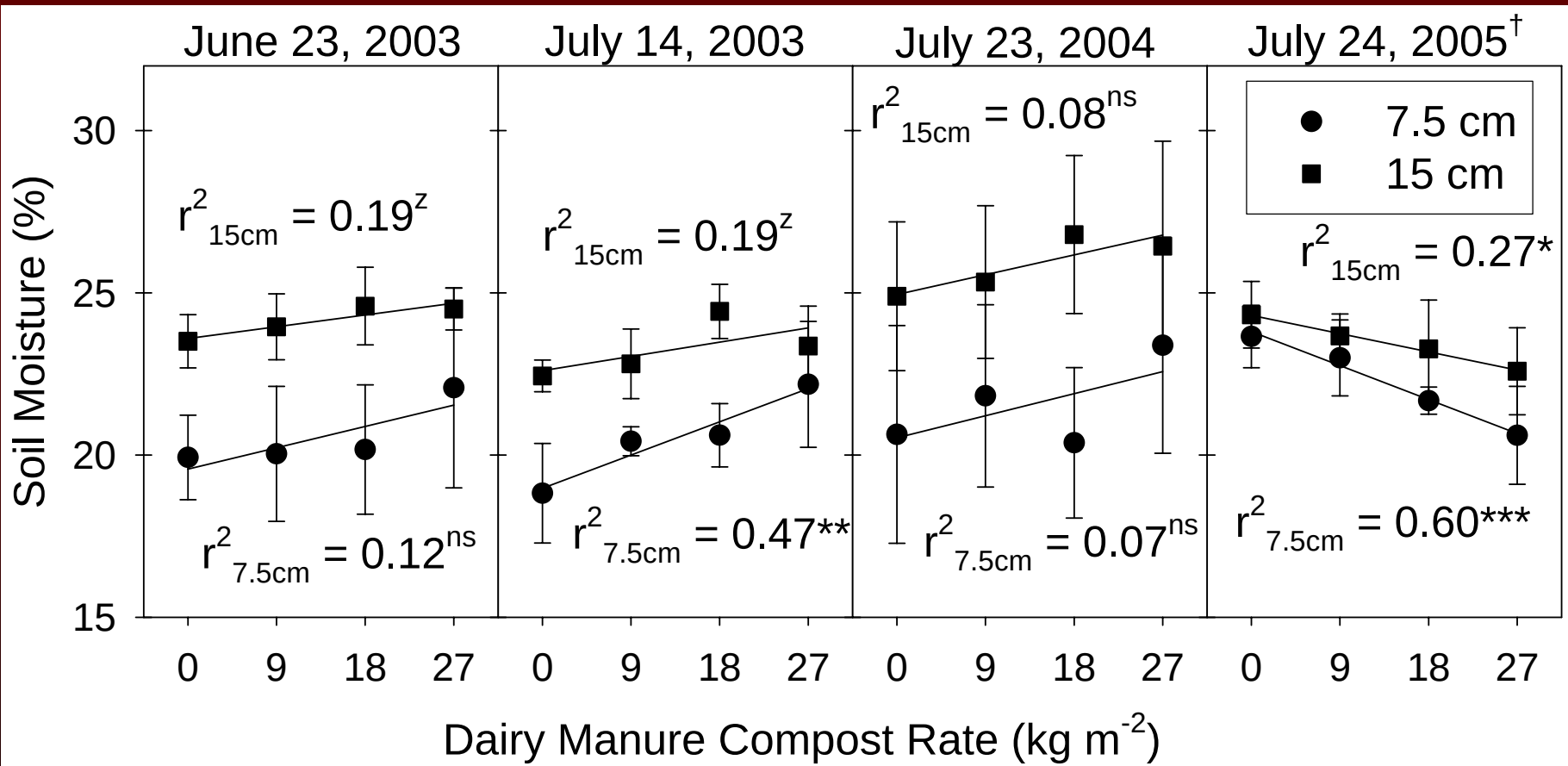
# Nutrient Content of Bermuda Grass



# Effect of Dairy Manure Compost on Infiltration Rate *(18 Months after application)*

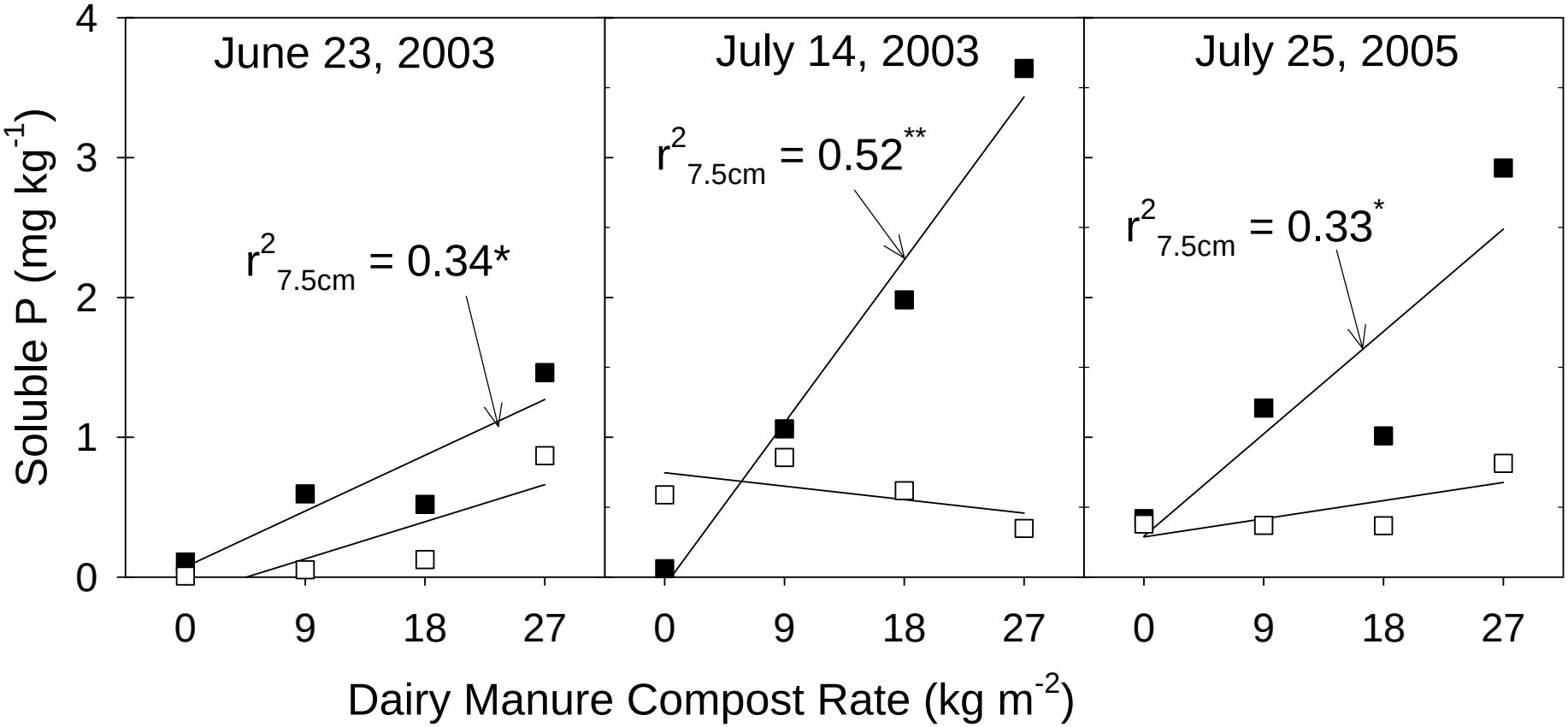


# Effect of Dairy Manure Compost on Soil Water Content *(Multiple Dates)*

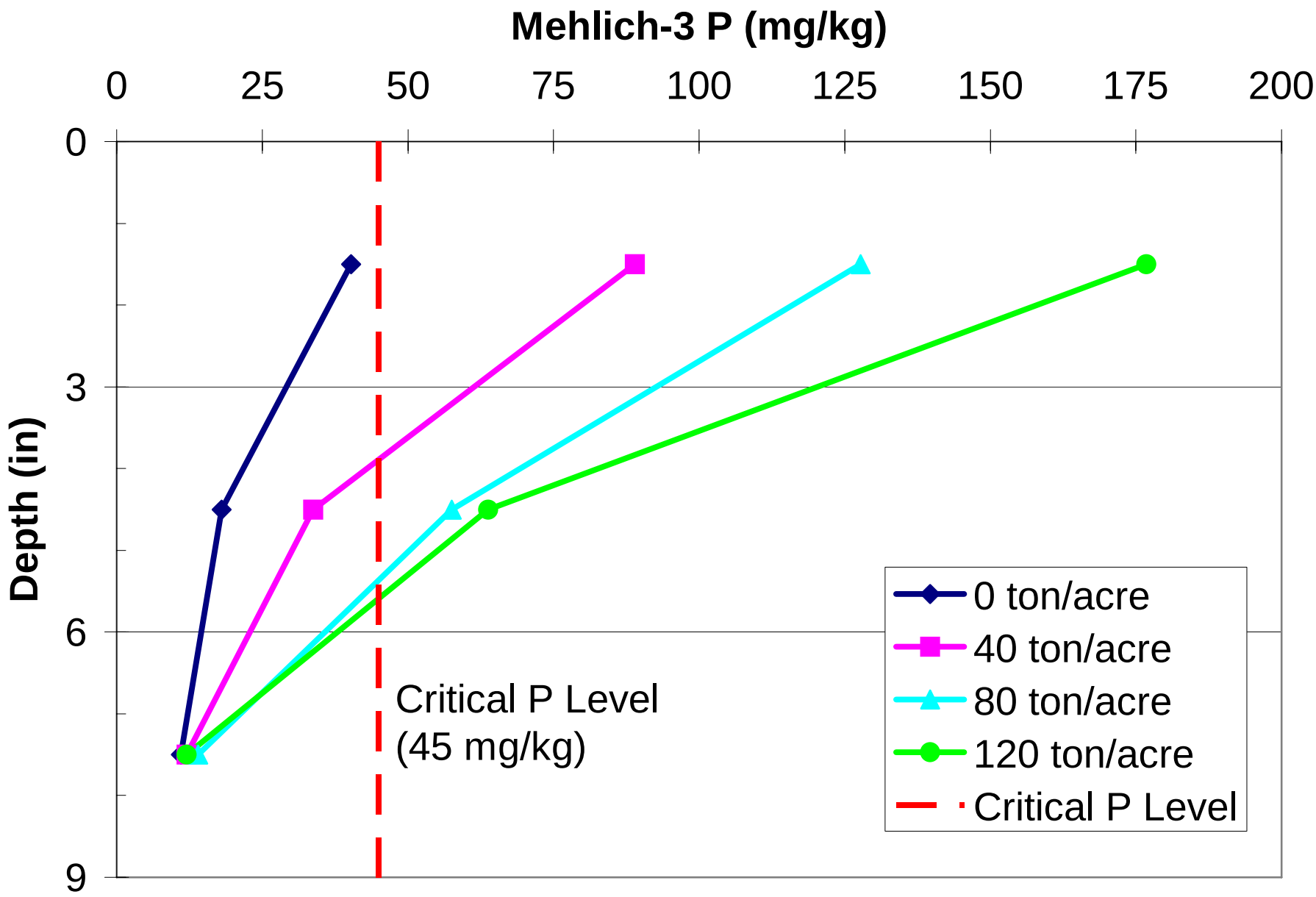



† *No irrigation was applied during the 2005 growing season.*

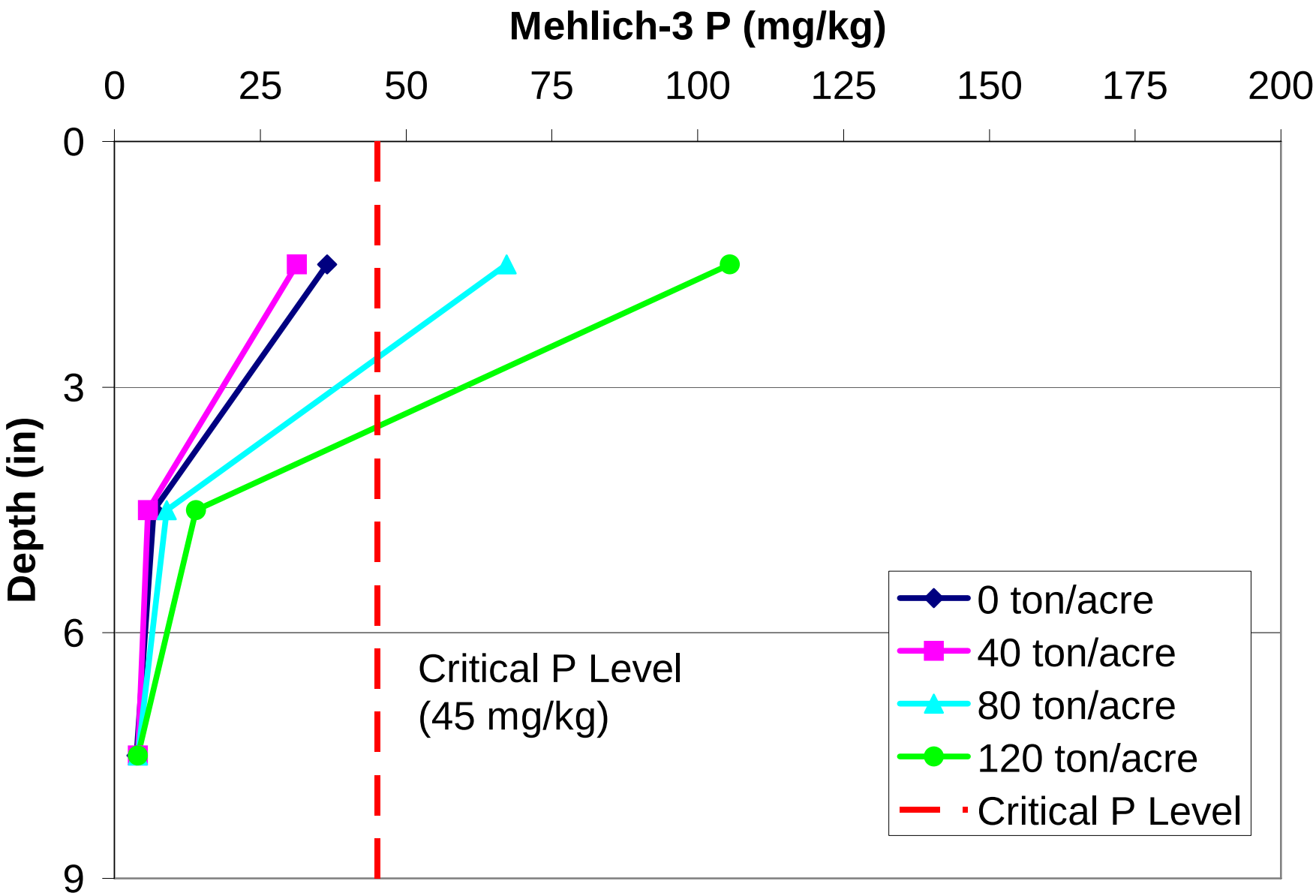
# Soluble Soil P
# 1st and 3rd year after compost application



# Dairy Manure Compost – 16 Months after application



# Dairy Manure Compost – 28 Months after application



# Conclusions

- The long term performance of newly-established urban landscapes can be improved by amending the soil with dairy manure compost prior to installing plants.
- Large applications of dairy manure compost will elevate soil nutrient levels to high levels, so it is important to avoid runoff from the landscape and to limit future nutrient applications.


0′
1′
2′
3′
4′
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