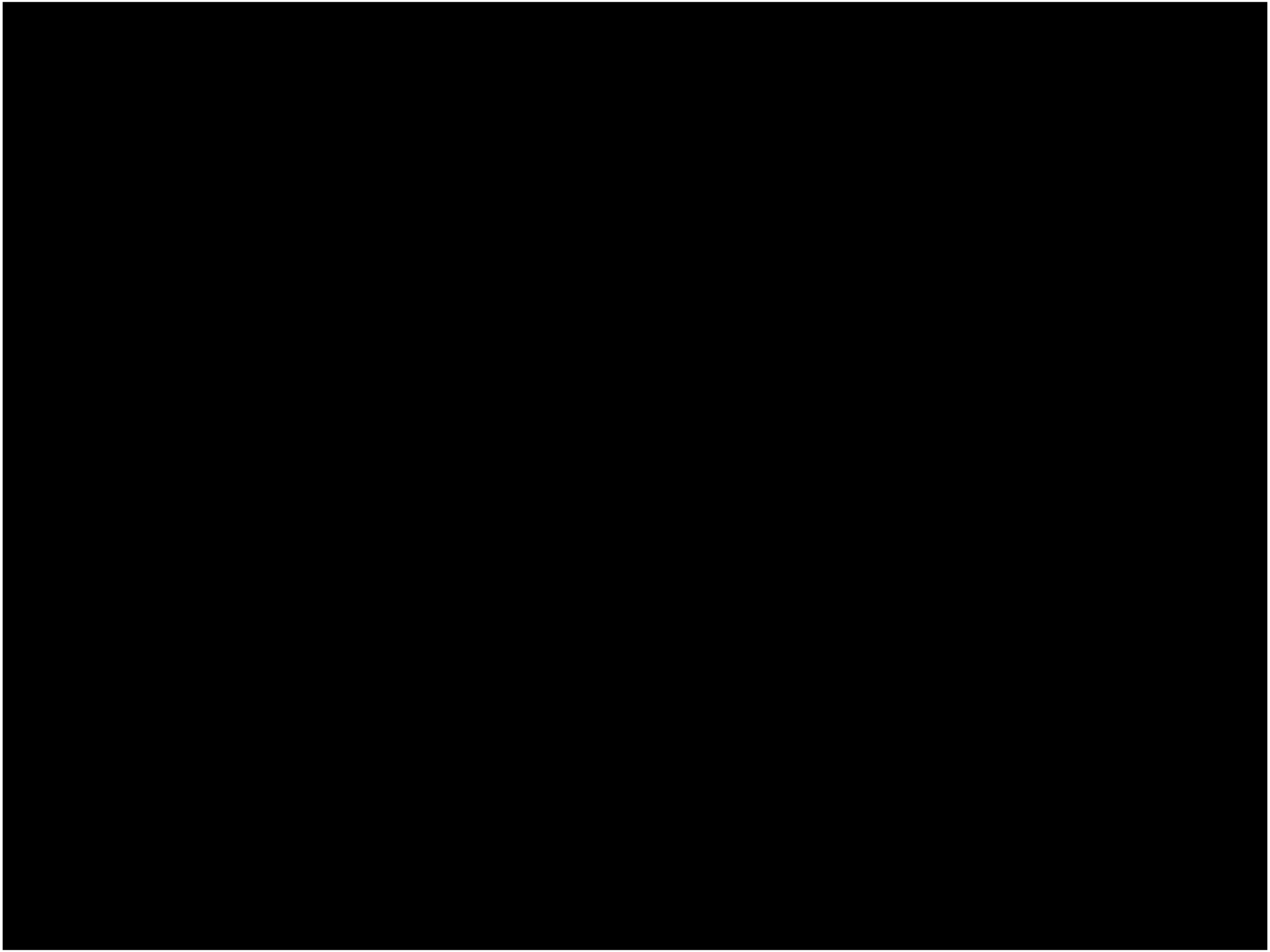

GREENING THE GROUNDS
Secrets to successful sustainable grounds maintenance programs
merlin organics™
Smart biology for the greenest landscapes.
gomerlinorganics.com

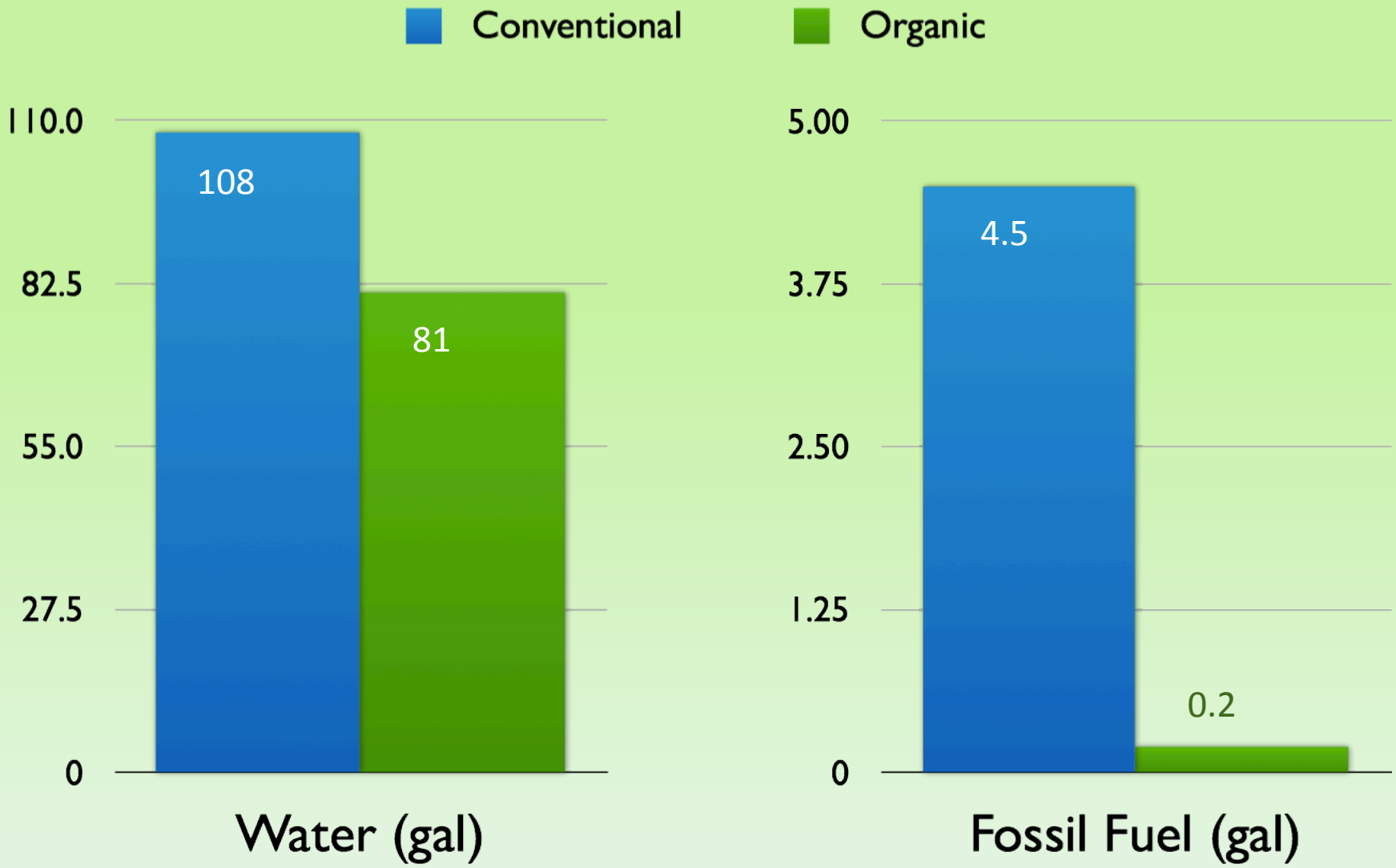


The need for sustainable land stewardship

University of Arizona Mall
Maintained 100% organically

Resource Consumption

Monthly Usage to Maintain One Acre of Turf-Heavy Landscape



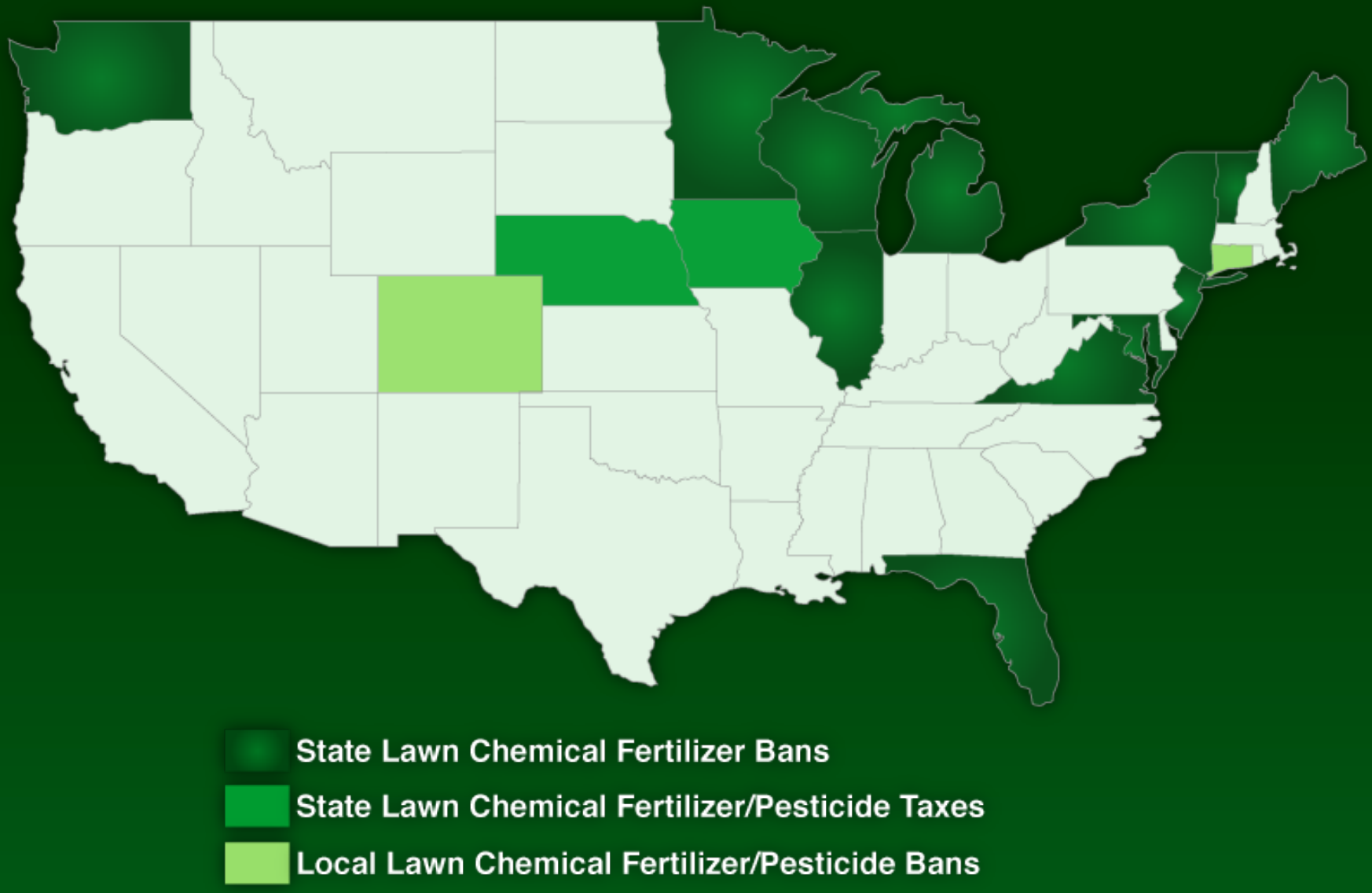
Source: Duke University, Sustainable Landscape Pilot Project, 2011


“Evidence demonstrates associations between early life exposure to pesticides and pediatric cancers, decreased cognitive function, and behavioral problems.”
— American Academy of Pediatrics, Nov. 23, 2012

ADHD
Alzheimer's Disease
Asthma
Autism
Birth Defects
Bladder Cancer
Bone Cancer
Brain Cancer
Breast Cancer
Cervical Cancer
Colorecatal Cancer
Cryptorchidism
Developmental Disabilities
Diabetes Type 2
Endocrine Disruption
Esophageal Cancer
Eye Cancer
Fetal Death
Fetal Defects
Gallbladder Cancer
Infertility (Male & Female)
Kidney/Renal Cancer
Larynx Cancer
Learning Disabilities
Leukemia
Lip Cancer
Liver/Hepatic Cancer
Low Birth Weight
Lung Cancer
Lymphoma
Melanoma
Memory Impairment
Motor Dysfunction
Mouth Cancer
Multiple Myeloma
Neuroblastoma
Neurobehavioral Disorders
Neurodevelopmental Disorder
Non-Hodgkin's Lymphoma
Obesity
Ovarian Cancer
Pancreatic Cancer
Parkinson's Disease
Precocious puberty
Prostate Cancer
Reproductive Diseases
Rhinitis
Soft Tissue Sarcoma
Stomach Cancer
Sinonasal Cancer
Testicular Cancer
Thyroid Cancer
Uterine Cancer

Environmental impacts

Regulatory pressure



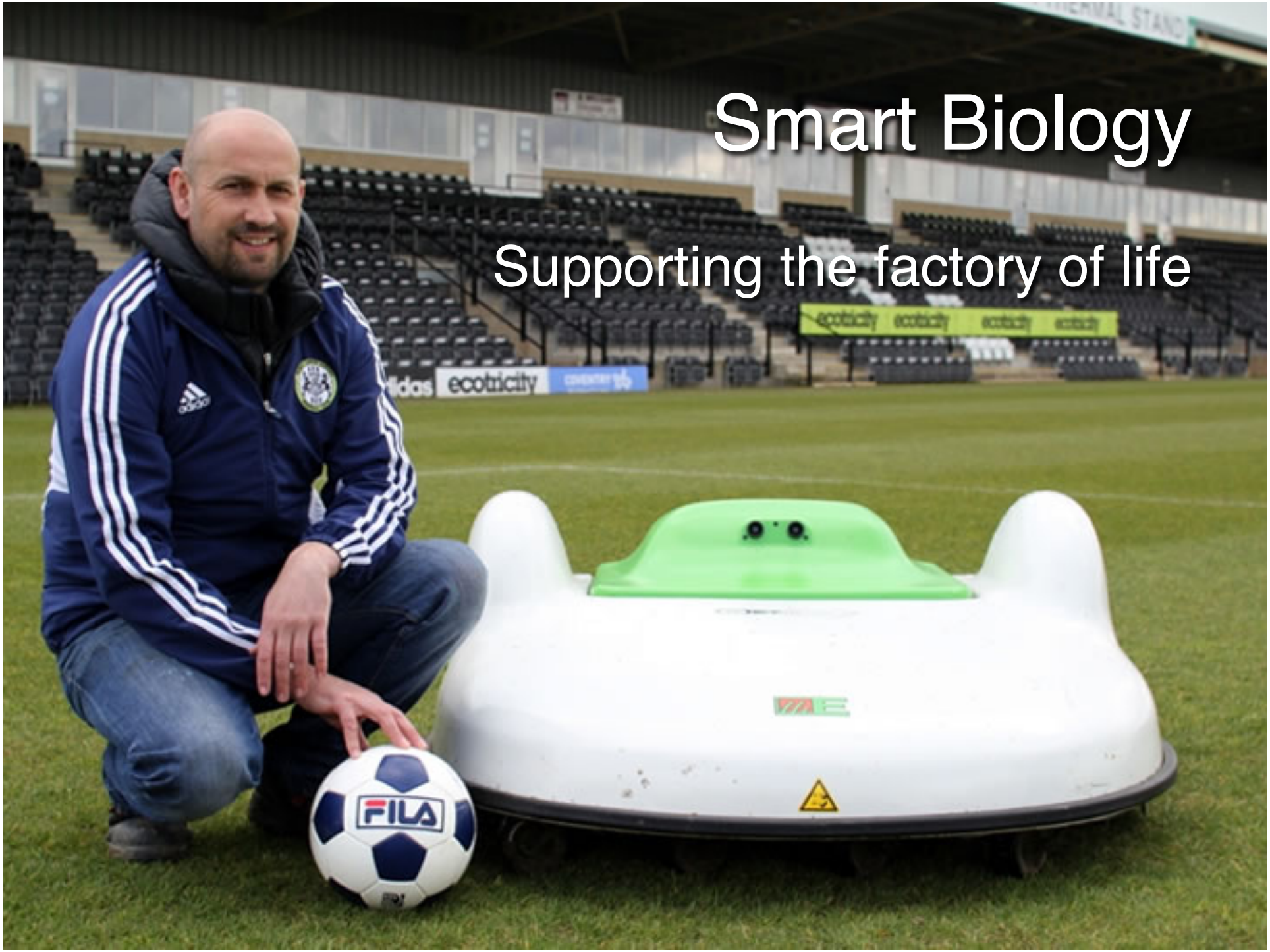

Do our neighbors know something we don't?
Chemical Fertilizer/Pesticide Bans

Long View

Create a healthy ecosystem

Systems Ecology Approach

- Site design + plant selection
- Soil management
- Nutrient management
- Cultural practices
- Irrigation management
- Integrated pest management


Smart Biology
Supporting the factory of life
ecotricity
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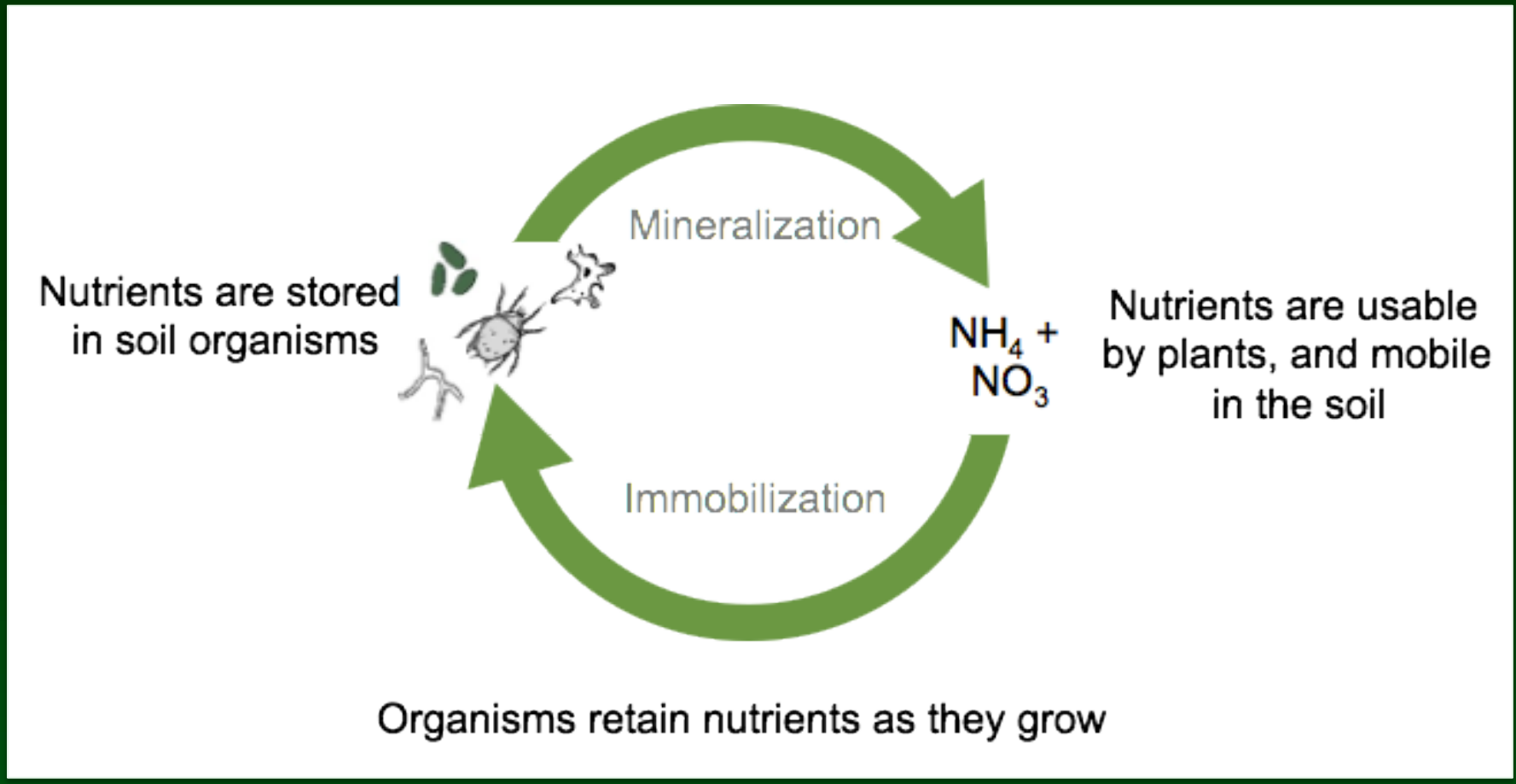
How Nutrients Cycle Organically

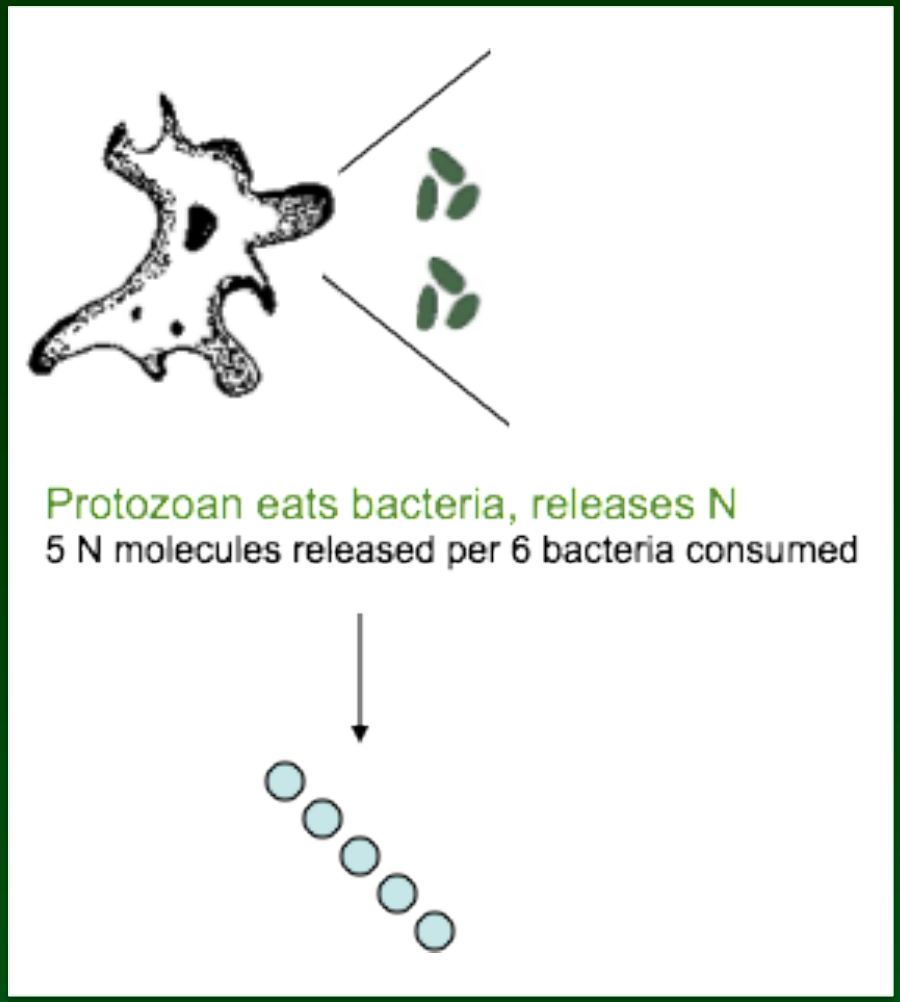
Mineralization and immobilization in healthy soil



CREDIT: *Soil Biology Primer* by Elaine R. Ingham, NRCS, ncrs.usda.gov.

Nutrient Volume

How microbes produce 35x the amount of Nitrogen plants need



Five (5) N molecules released for every six (6) bacteria consumed

One Protozoan eats 10K bacteria per day ➔ releasing 8,000 N molecules per day per protozoan

Healthy soils contain 50K protozoa per g

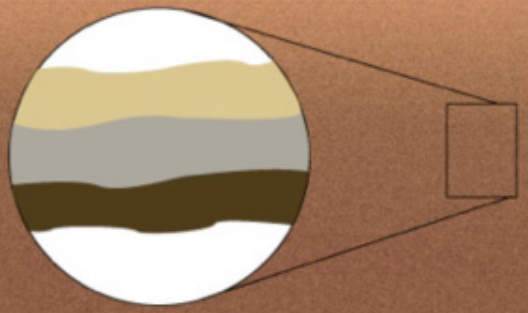
Protozoa eat 500 million bacteria per g of soil per day ➔ releasing 400 million molecules of N per day, or 7 ng of N per cubic cm of root soil per day

Plants only require 0.2 ng per cubic cm of root soil per day

That's 35x the amount of N needed

Healthy Plants Build Soil Structure

Helping plants build structure in deficient, disturbed, and engineered soils.



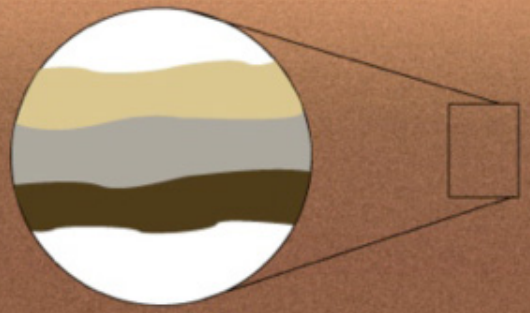
Disaggregated sand, clay, organic matter, and mulch/compost in soilless mixes contain no living mycorrizhal fungi

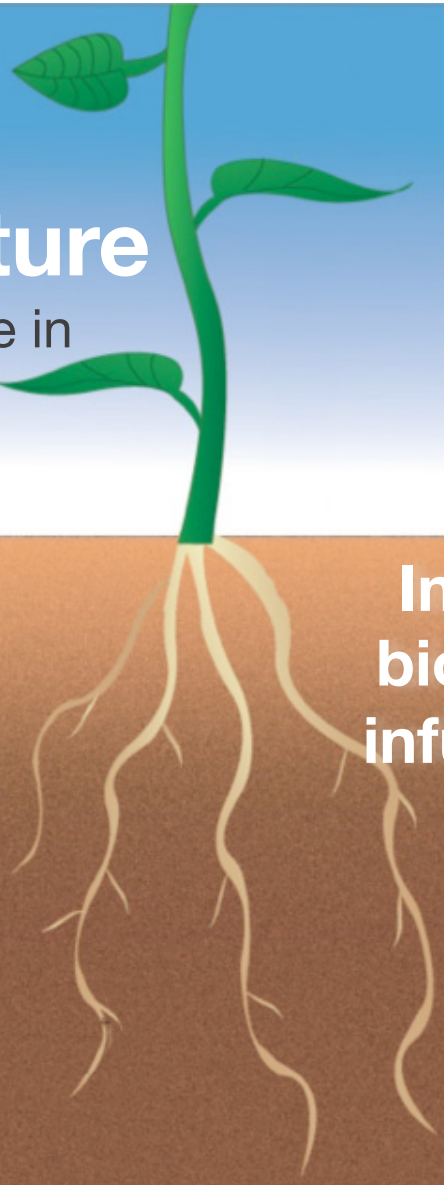
Impaired soil contains no intrinsic nutrient cycling system.

Deficiencies in bacteria, protozoa, nematodes and fungi render plants incapable of healthy, organic growth.

Healthy Plants Build Soil Structure

Helping plants build structure in deficient, disturbed, and engineered soils.





Inoculation of soil with biological amendments infuses it with microbes

Healthy Plants Build Soil Structure

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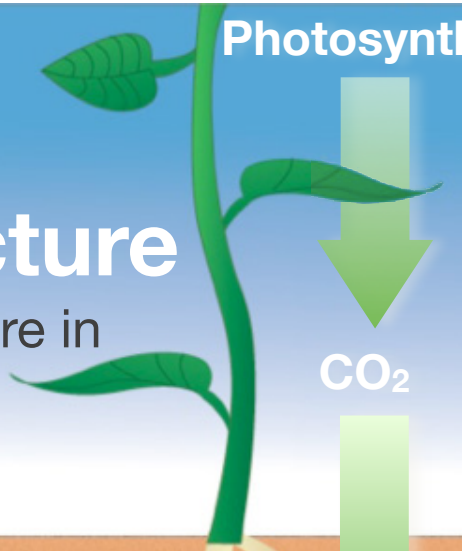
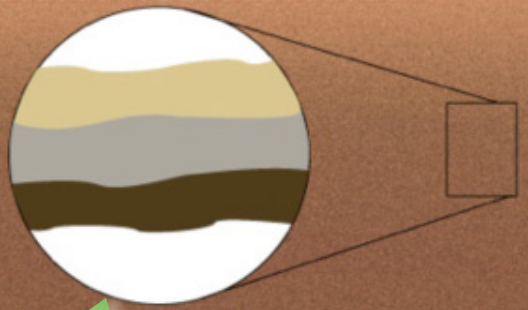


Plants transform carbon into a food source for microbes.

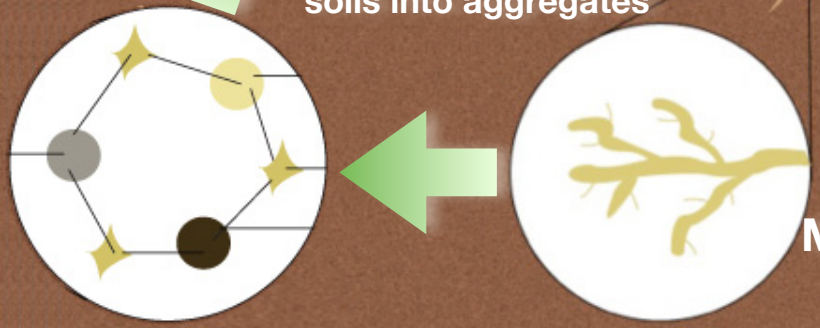
Microbes cycle nutrients to build soil structure and protect plants.

Bacteria and fungi produce “glues” that bind soil particles.

Healthy, structured soil forms from macroaggregates



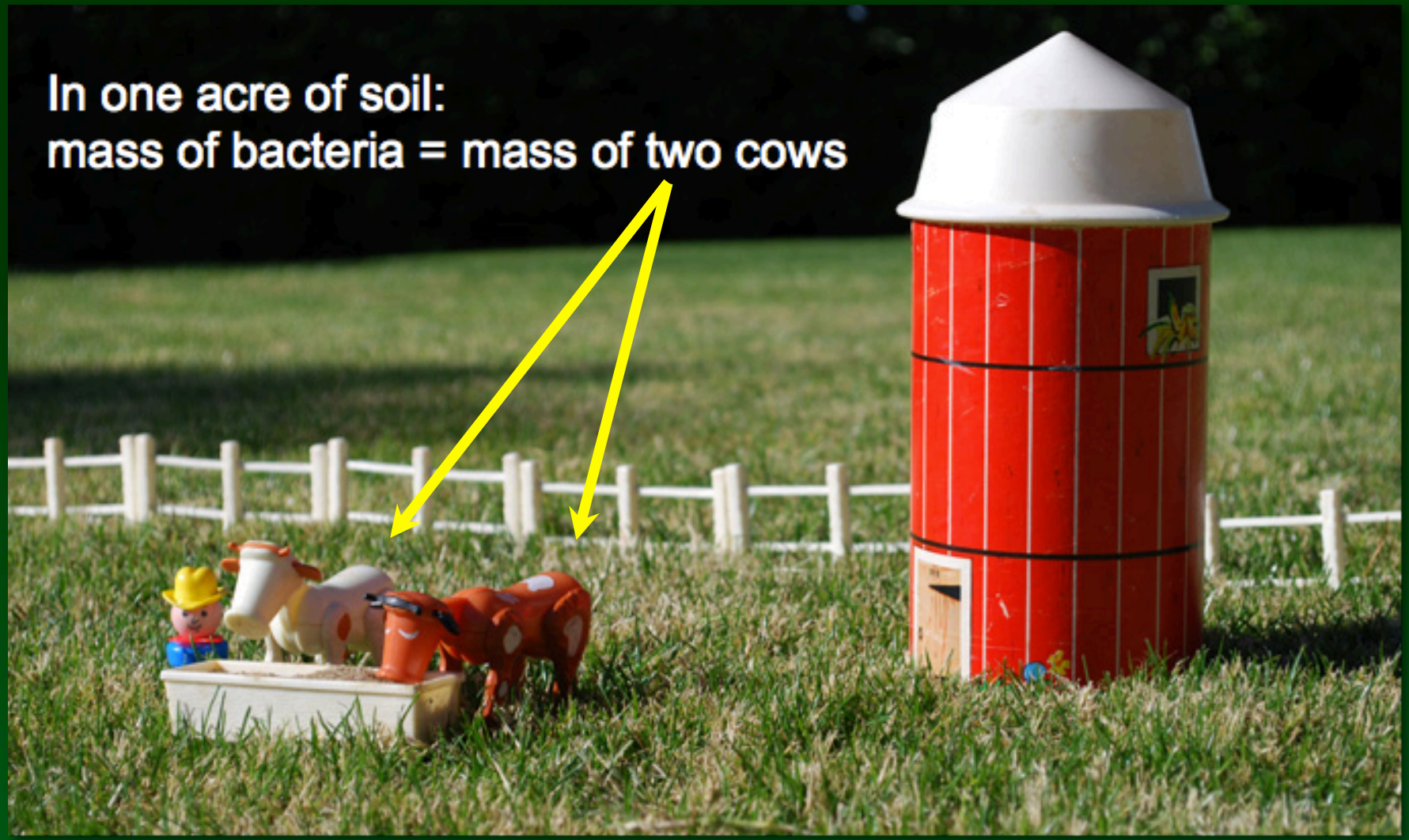
Mycorrhizal filaments exude “glues” that bind soils into aggregates



Mycorrhizae

The Scale of Microbial Populations

One teaspoon of good soil contains 100 million–1 billion bacteria



Benefits of Organic Approach

Eliminates chemical runoff and leaching

Restores ecosystem to its natural state

Reduces risk of harmful pesticide exposure

Reduces water use

Sequesters carbon

Reduces total cost of management

Supports a safer, healthier environment


Cultural Challenges
• Conventional vs. organic
• Trade vs. scientific approach
• Pressures from stakeholders

Practical Challenges

- Adapting operations and workflow
- Changing metrics and measurement
- Procuring equipment
- Training personnel

Brooklyn Bridge Park BROOKLYN, NY

High-use turf: weekly movie night at Brooklyn Bridge Park

Brooklyn Bridge Park BROOKLYN, NY

Next day application and turf recovery

The High Line NEW YORK, NY

Built on a Green Roof optimized bio-nutrient system

The High Line NEW YORK, NY

Turf has 15–25,000 visitors each weekend

World Trade Center Site NEW YORK, NY

Restoring sacred soil at Ground Zero

World Trade Center Site NEW YORK, NY

Tale of two systems

Conventional tree care

Organic tree care

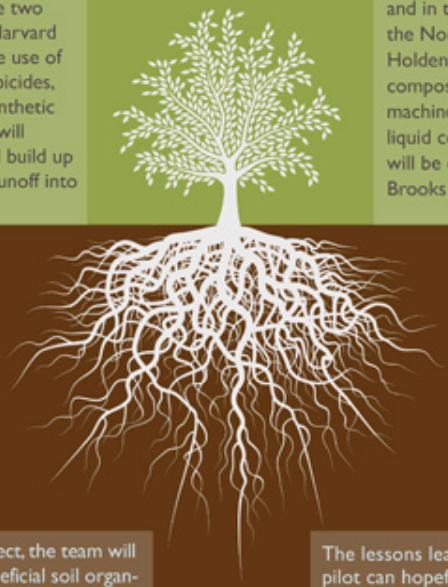
Harvard CAMBRIDGE, MA

Rigorous analysis & comprehensive planning drove success

The Harvard Yard Soils Project:
Piloting **Sustainable Landscape** Management

The Harvard Yard Soils Project is a 9-month effort to manage two "test plots" in Harvard yard without the use of pesticiddes, herbicides, fungicides, or synthetic fertilizers. This will reduce chemical build up in the soil and runoff into watersheds.

The test plots will be located by Johnston Gate and in the courtyards to the North and South of Holden Chapel. A compost tea brewer (a machine that creates a liquid compost solution) will be outside the Philips Brooks House, as well.



During the project, the team will reintroduce beneficial soil organisms, rebalance nutrient levels in the soil, apply organic soil amendments such as compost tea, and aerate the test plots to correct for years of over-compaction.

The lessons learned during this pilot can hopefully be applied across the University to move Harvard towards a more sustainable approach to landscape management.

GLOBAL EDITION

The New York Times

WITH THE International Herald Tribune

IN THE GARDEN

The Grass Is Greener at Harvard

Jodi Hilton for The New York Times

Eric T. Fleisher holding a core sample from the organic lawn at Harvard University.

By ANNE RAVER
Published: September 23, 2009

CAMBRIDGE, Mass.

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Compost 101, Crimson Style (September 24, 2009)

Enlarge This Image

Jodi Hilton for The New York Times

A student in Harvard Yard, a heavily traveled part of campus where the soil

THERE is an underground revolution spreading across Harvard University this fall. It's occurring under the soil and involves fungi, bacteria, microbes and roots, which are now fed with compost and compost tea rather than pesticides and synthetic nitrogen.

The results have so astounded university administrators that what started as a one-acre pilot project in Harvard Yard has spread organic practices through 25 acres on the campus.

"Our goal is to be fully organic on the 80 acres that we maintain within the next two years," said Wayne Carbone,

Harvard CAMBRIDGE, MA

Where turf grew poorly for decades, now compost tea yields robust growth

University of Pennsylvania PHILADELPHIA, PA

Root depth growth of 8” in five months

April 2010

November 2010

Rose Kennedy Greenway BOSTON, MA

One of a handful of 100% organically managed public parks in the U.S.

University of Colorado BOULDER, CO

Entire campus, including athletic fields, managed sustainably with organics

Higher Education Initiatives

Broward College
California State University
Colorado State University
Duke University
Florida State University
Harvard University
Hawaii Pacific University
Macalester College
NYU
Northland College
Roosevelt University
Scripps College
Seattle University
SUNY
Tufts University
Univ of California
Univ of Chicago
Univ of Georgia
Univ of Colorado Boulder
Univ of Maryland
Univ of Nebraska Omaha
Univ of New Hampshire

More at aashe.org

Program process

1 Analysis
Soil sampling, lab testing, and analysis of results. Report of initial recommendations delivered to Client.

2 Design
Develop long-term, ongoing treatment program, including Program Manual with implementation specifications and instructions.

3 Implementation
As specified in the Program Manual: equipment setup, training, treatment oversight, measurement + reporting.

4 Monitoring + Measurement
Ongoing supervision of Client team; measurement + reporting to Client Administration.

Keys to Success

1. Start small with pilot projects
2. Integrate with existing operations
3. Monitor, measure, adapt
4. Integrate with research and teaching missions


"All empirical data supports the notion that the lawn and garden industry will continue to move toward organic protocols until,
one day not far off, organics will be the only game in town."
— Bruce Butterfield, senior researcher,
The National Gardening Association
University of Arizona Mall
Maintained 100% organically

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