Maine Organic Farmers and Gardeners Association

Common Ground Country Fair

Testimony of MOFGA before Maine's Board of Pesticides Control
Regarding Proposed Changes To Chapter 27 – Standards for Pesticide Application and Public Notification in Schools
by Heather Spalding, Deputy Director of MOFGA
September 7, 2012

Good Chairman Jemison and members of Maine's Board of Pesticides Control. My name is Heather Spalding and I am the Deputy Director of the Maine Organic Farmers and Gardeners Association (MOFGA). I am here today to thank you for evaluating the standards for pesticide application and public notification in schools, and to encourage you to prohibit the use of synthetic pesticides on playgrounds and ballfields for cosmetic purposes. This was the original impetus for this broader discussion when a group of concerned citizens brought LD 837 - An Act To Protect Children's Health and Promote Safe Schools and Child Care Centers by Limiting the Use of Pesticides to the Legislature in 2011.

MOFGA has members in almost 7,000 homes and businesses in Maine and beyond. Almost half of our memberships are family memberships – families who love what MOFGA does, who grow, purchase and consume Maine's organic bounty, and who want to protect Maine children from the harmful effects of pesticides.

There is a growing awareness of the threats to kids health from pesticides exposure, and a corresponding increase in learning how to farm, garden and maintain beautiful lawns without the use of pesticides. Every April, MOFGA volunteers teach Grow Your Own Organic Garden classes simultaneously at more than 30 venues throughout the state, and most of them sell out. Almost all of our classes are selling out regularly. And of course, tens of thousands of people come to the Common Ground Country Fair each year, thirsting for knowledge about managing their property organically, and protecting their children from the harmful impacts of pesticides.

MOFGA supports restrictions on the use of pesticides in schools and daycares. We also support an organic land care requirement for management of playgrounds and ball fields. Although MOFGA does not offer an organic land care certification program, we do work closely with the Northeast Organic Farming Association of Massachusetts (NOFA-MA), which does run such a program. Maine's knowledge base among organic land care specialists is expanding rapidly. There are more than 20 NOFA Accredited Organic Land Care Professionals in Maine.

These businesses know how to manage turf organically, without the use of synthetic and hazardous pesticides. They know how to control broadleaf weeds and grubs without spreading herbicides and larvacides on fields where children will be playing. Proper watering, top dressing of compost, aeration, and use of natural microbial insecticides such as Milky Spore will do the trick. Another method, which we employ on the fields in my hometown of Palermo, is to organize field cleanup days and get families to hand-pull patches of dandelions and other broadleaf plants.

The Board of Pesticides Control's Chapter 27 regulates the use of pesticides in schools and mandates an integrated pest management (IPM) approach. Implementation of IPM can vary widely but it is our understanding and expectation that responsible pesticide use in any IPM program should include the safest, effective materials, biological and mechanical controls. Organic land care systems should be the standard on school playgrounds and ball fields in our state. Maine

294 Crosby Brook Road, P. O. Box 170, Unity, Maine 04988 • ***Phone:*** *(207) 568-4142*
Fax: *(207) 568-4141* • ***Email:*** *mofga@mofga.org* • ***Web:*** *www.mofga.org*

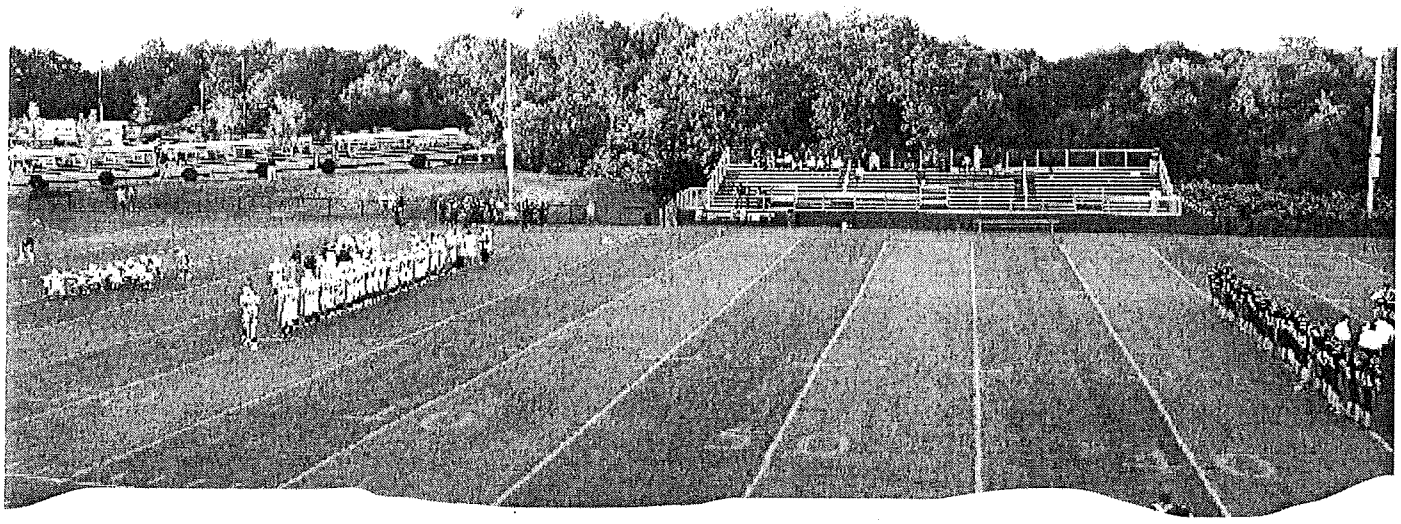
should also promote organic methods at school gardens, as well as local, organic foods in school cafeterias.

Chip Osbourne's comparison of conventional and organic turf management on school athletic fields shows that Maine can have its beautiful school grounds and play safely on them too. We are disturbed by the apparent attitude of Maine's conventional land care professionals who argue that organic fields are not safe and cause more sports injuries. As Mr. Osbourne says, "The safety of a field is not dependent on whether there is an organic versus chemical-based maintenance program, any turf that has an irregular surface can lead to falls or twisted ankles. In fact, chemical turf is generally hard and compacted because there is not much soil biology. Organic management focuses on cultural practices, such as aeration, that alleviate compaction and provide a softer, better playing surface."

MOFGA is far more concerned about kids getting lymphoma and leukemia from pesticides exposure than we are about slipping on dandelions. There is absolutely no reason for schools and daycare centers in Maine to use hazardous, synthetic pesticides for cosmetic purposes.

Organic landcare at schools will help protect the health of Maine kids, it will reduce Maine's reliance on hazardous landscaping chemicals, it will improve the health and quality of Maine schools' playgrounds and ball fields, it will encourage land care professionals to learn about viable alternatives to conventional turf management, and, over time, it will reduce the amount of taxpayer dollars going toward school grounds maintenance.

Thank you.



A pesticide-free football field, managed by Chip Osborne, in Marblehead, MA.

Pesticides and Playing Fields

Are we unintentionally harming our children?

By Eileen Gunn and Chip Osborne

Parents and teachers spend a lot of time ensuring the safety of children. Yet, the common, everyday practices used to maintain our children's playing fields are unintentionally and unnecessarily exposing them to carcinogens, asthmagens, and developmental toxins.

The typical soccer field is deluged with a mixture of poisons designed to kill fungus, weeds, and insects. A conventional maintenance plan includes the use of a fungicide on a regular basis to prevent fungal pathogens, a post-emergent herbicide (such as 2,4-D) to kill crabgrass and dandelion seed, a selective herbicide (such as Trimec or Mecoprop) to kill clover and other broadleaf weeds, and an insecticide (such as Merit or Dylox) to kill insects such as grubs. These are all pesticides, whose health effects are discussed below, and their use on playing fields is particularly troubling because children come into direct contact with the grass, and have repeated, and prolonged exposures. While much is known about the effects of individual pesticides and products, the health effects of the mixtures, described here, on children are not evaluated by the U.S. Environmental Protection Agency (EPA).

Many people think that the pesticides "wear off," and that children are not being exposed. However, the Centers for Disease Control (CDC) found multiple pesticide residues, including the herbicide 2,4-D, in the bodies of children ages 6-11 at significantly higher levels than all other age categories. Herbicides such as 2,4-D and Mecoprop, chemicals tied to respiratory ailments, are found in 15 percent of children tested, ages 3 to 7, whose parents had recently applied the lawn chemicals. Breakdown products of organophosphate pesticides are present in 98.7 percent of children tested. Additionally, scientific studies show that herbicides, such as 2,4-D, are tracked indoors from lawns where residues may remain for up to a year in carpets, dust, air and surfaces.

More reasons to be concerned?

Children are especially vulnerable to pesticides

- The National Academy of Sciences reports that children are more susceptible than adults to pesticides and other environmental toxins. This is because pound for pound children take in more pesticides relative to their body weight, their detoxification system is not fully developed, and their developing organ systems are more vulnerable.
- EPA concurs that children take in more pesticides relative to body weight than adults and have developing organ systems that are more vulnerable and less able to detoxify toxic chemicals.

Children, cancer and pesticides

- Of all 99 human studies done on lymphoma and pesticides, the Lymphoma Foundation of America found 75 show a connection between exposure to pesticides and lymphomas.
- A study published in the *Journal of the National Cancer Institute* found that household and garden pesticide use can increase the risk of childhood leukemia as much as seven-fold.
- A study published by the American Cancer Society found an increased risk for non-Hodgkins Lymphoma (NHL) for

Yes! Organic Playing Fields Are Possible

Five myths about problems with organic playing field management

Have you ever tried suggesting eliminating pesticide use on children's playing fields in your community and been told it is not possible, it would cause more injuries, or it just costs too much? Chip Osborne, a horticulturists living in Marblehead, Massachusetts, has been told all of these things and more in his quest to transform 15 acres of playing fields to organic management. He recently spoke at the Beyond Pesticides 24th National Forum, shared his experience, and disputed the unfounded statements you often hear.

Myth 1: Organic turf management puts fields "at risk." Opponents, or uninformed turf managers, claim that organic management will put the fields at risk for disease and weed infestation, however, in a Cornell University study of turf, chemically maintained turf is more susceptible to disease. The reason was found to be very low organic matter content and depleted soil microorganisms.

A key component of organic management is topdressing with compost, adding a steadily available source of nutrients, adding thousands of beneficial microorganisms that help fight disease. Research at Cornell University demonstrates that topdressing with compost suppresses some soil-borne fungal diseases just as well as conventional fungicides.

Myth 2: Organic athletic fields are not "safe" and cause more injuries. This myth often preserves dandelions and tufts of plants that children may trip on. But organic practices can ensure control of unwanted plants in the turf. Moreover, these injury claims are not substantiated. The safety of a field is not dependent on whether there is an organic versus chemical-based maintenance program, *any* turf that has an irregular surface can lead to falls or twisted ankles. In fact, chemical turf is generally hard and compacted because there is not much soil biology (life in the soil). Organic management focuses on cultural practices, such as aeration, that alleviate compaction and provides a softer, better playing surface.

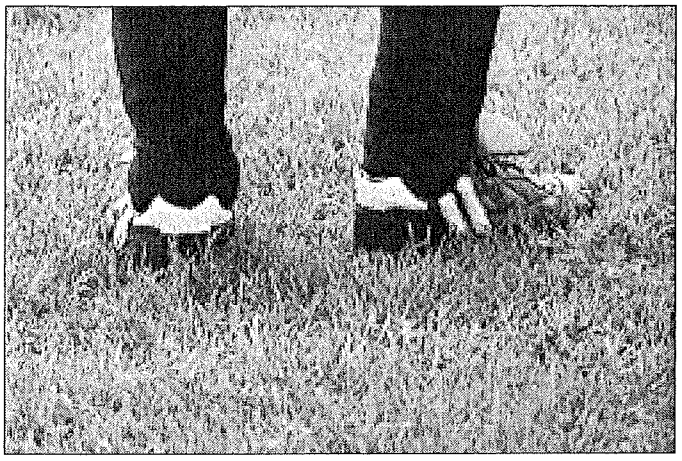
Myth 3: Organic fields always have clover problems. Excess clover is an indicator of the soil condition. Clover is found in fields with low nitrogen levels, compaction issues, and drought stress. It is an issue in large patches because it can be slippery when wet. However, clover is a beneficial plant that "fixes," or transforms, free nitrogen from the atmosphere into the turfgrass. Clover roots are extensive and provide significant resources to soil organisms, and it is extremely drought resistant, staying green long after turf goes dormant.

The organic turf manager recognizes the value of clover and other unwanted plants, sets a reasonable tolerance level, and uses sound horticultural practices such as pH management, fertilization, aeration, overseeding with proper grass seed, and proper watering to control them.

Myth 4: Organic turf management is prohibitively expensive. This is another unsubstantiated, anecdotal statement by many naysayers, but when asked for hard and fast budget numbers to prove these claims, they are not available. Most municipalities do not have accurate figures on the costs of their chemical programs. The question really is -What is the cost of NOT going organic? What is the cost of exposing developing children to known cancer causing, endocrine disrupting, and asthma triggering chemicals where they play for long hours?

Over the past five years, Mr. Osborne transformed 15 acres of playing fields to organic care, now at a cost of $2400-$3000 per 2 acre playing field, not including mowing costs. A conventional fully chemically-treated athletic field by TruGreen ChemLawn for the same area is estimated at $3400. While initial costs to transition a chemical-dependent turf to organic care can be higher, in the long-run costs will be lower as inputs, like fertilizer and water, decrease. You are also no longer paying for annual chemical treatments.

Myth 5: Organic fields need to be rested. Once again, this is not a chemical versus organically-managed field issue. All fields ideally should be rested for recuperative growth. Athletic activity naturally tears up turf from the soil, especially football, leaving open areas for opportunistic weeds to grow. Prepping the area and spreading a repair mixture of compost and seed that quickly establishes as soon as possible will fill in the area and negate the need for herbicides down the road.



subjects exposed to common herbicides and fungicides, particularly Mecoprop (MCPP). People exposed to glyphosate (Roundup) are 2.7 times more likely to develop NHL.

Children, asthma and pesticides

- Pesticides, along with other environmental factors, cause and trigger asthma.
- Common herbicides, 2,4-D, Mecoprop, Dicamba, (often found together as Trimec) and RoundUp (glyphosate) are respiratory irritants that can cause irritation to skin and mucous membranes, chest burning, coughing, nausea and vomiting.
- A 2004 peer-reviewed study found that young infants and toddlers exposed to herbicides (weed killers) within their first year of life are four and a half times more likely to develop asthma by the age of five, and almost two and a half times more likely when exposed to insecticides.

Children, learning and developmental disorders and pesticides

- A report by the National Academy of Sciences indicates that as many as 25 percent of all developmental disabilities in children may be caused by environmental factors.
- A 2002 peer-reviewed study found children born to parents exposed to glyphosate (Roundup) show a higher incidence of attention deficit disorder and hyperactivity (ADD and ADHD).

For references on the above facts, see Children and Pesticides DON'T Mix at www.beyondpesticides.org/lawn, or contact Beyond Pesticides.

Alternatives to pesticides

The Cornell University *Athletic Turf Study*, whose funding was pulled before completion, sampled soil at five Orange County, NY, public school playing fields and analyzed the samples for pH, nutrients, and soil compaction. Weed populations were also mapped. Cornell researchers note the common trends as lack of adequate topsoil, soil compaction, overuse and multi-purpose fields, limited funds for maintenance, and limited maintenance staff and equipment. Cornell researchers also state, in addition to building and ground personnel, it became apparent that school administrators, funding sources, athletic directors, coaches, teachers, parents, and students all need to be educated on maintenance issues. We add that they should be educated on the health effects of pesticides as well.

There is not a quick and easy step-by-step formula for maintaining every sports field because there are site-specific conditions and varying sports needs. It is necessary to utilize information gathered in site analysis to develop a site-specific management plan. As Paul Sachs states in his book, *Managing Healthy Sports Fields: a guide to using organic materials for low-maintenance and chemical-free playing fields (2004),*

> "Ecological turf maintenance calls for the manager to consider all of the organisms in the turf ecosystem, because most of them are allies. It also means expectations may have to be adjusted to a more realistic and practical threshold where a natural equilibrium can be maintained."
>
> "There is a fear of failure," says Mr. Osborne, "but actually the organically maintained fields are relatively easy to keep in good shape."

What you can do

You do not have to be an expert on athletic turf management or the health effects of every pesticide used on playing fields. What you do need to know is that children are being unnecessarily exposed to chemicals that can impair their health, and that a safer, proven way exists to manage turf. Your school can have dense, vigorous, and well-groomed organic playing fields that are the pride of your community.

Thirty-three states have laws and over 400 school districts nationwide have policies or programs requiring integrated pest management, pesticide bans, or right-to-know provisions in schools. These laws or policies are not necessarily well-known or satisfactorily implemented.

- Determine whether your state, school or community has a law or policy governing pesticide usage in and around schools, or on public lands. Find out if, and how well it is being implemented.
- If you do not have a law, call for an organic land care policy in your community.
- Petition the school and the town parks department to convert the playing fields to organic care.
- Require that the grounds maintenance director, or contracted professional, be trained in organic land care.

For a referenced copy of this article, see www.beyondpesticides.org/lawn.

A Cost Comparison of Conventional (Chemical) Turf Management and Natural (Organic) Turf Management for School Athletic Fields

A report prepared by
Grassroots Environmental Education
A non-profit organization

Written by
Charles Osborne
& Doug Wood

March, 2010

A Cost Comparison of Conventional (Chemical) Turf Management and Natural (Organic) Turf Management for School Athletic Fields

Introduction

The mounting scientific evidence linking exposure to pesticides with human health problems, especially in developing children, has increased the demand for non-chemical turf management solutions for schools. One obstacle commonly cited by chemical management proponents is the purported higher cost of a natural turf program.

This report compares the annual maintenance costs for a typical 65,000 square foot high school football field using both conventional and natural management techniques. Both programs are mid-level turf management programs, typical of those currently being used at many schools across New York State.[1]

The analysis of data demonstrates that once established, a natural turf management program can result in savings of greater than 25% compared to a conventional turf management program. (Fig. 1)

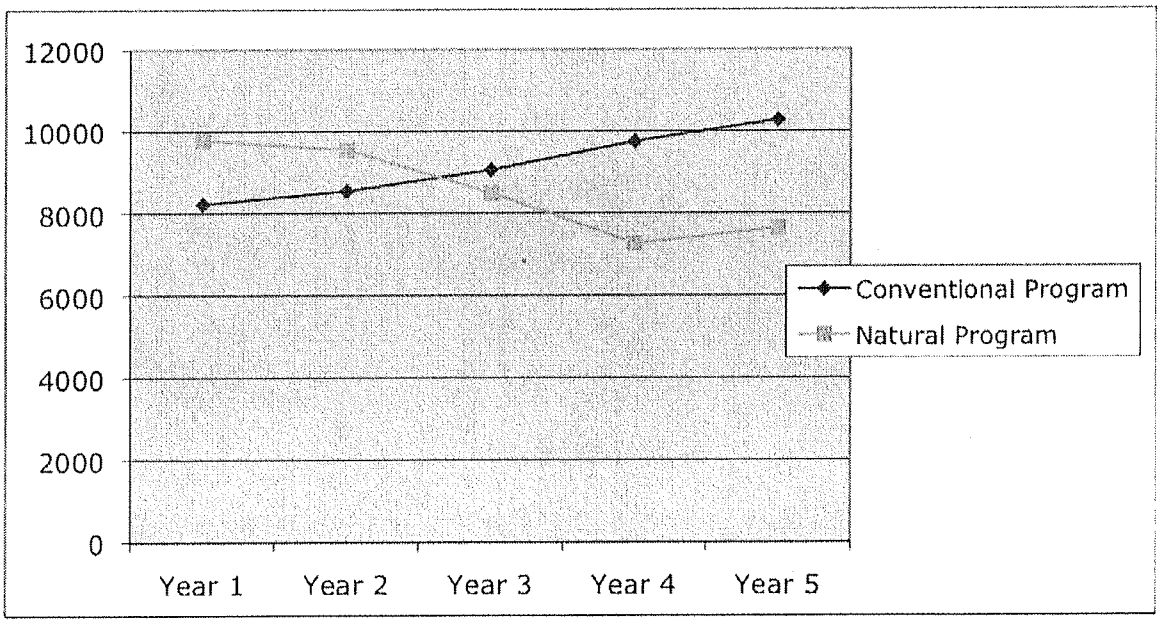


Figure 1: A Comparison of Costs for Conventional and Natural Turf Programs Over A Five-Year Period

[1] We recognize that some schools will spend considerably less for field maintenance than our example, and some will spend much more. The turf management programs chosen for this comparison are designed to yield similar aesthetic results.

Background

Prior to 1950, all school playing fields were maintained organically. The widespread use of chemical pesticides to control weeds, insects and turf diseases on school playing fields began in the post-World War II era, when chemical companies sought to establish markets for their products in the agricultural, consumer and municipal sectors. By the mid-1990s, former New York State Attorney General Robert Abrams estimated that 87% of public schools in the state were using chemical pesticides on their fields.[2]

As awareness of the risks associated with pesticides has grown and demand for non-toxic solutions has increased, manufacturers and soil scientists have responded with a new generation of products and technologies that have changed the economics for natural turf management. Product innovation has resulted in more effective products, and advances in soil science have increased understanding of soil enhancement techniques. Virtually all major turf chemical manufacturers now offer an organic product line. Professional training and education have also increased, with most state extension services and professional organizations now offering training courses in natural turf maintenance.

Sources of Data

The products, costs, application rates and other data for our analysis have been obtained from various sources, including the Sport Turf Managers Association[3], Iowa State University[4], bid specifications from a coalition of public schools on Long Island,[5] bids and proposals from conventional turf management companies, and documented costs for existing natural programs.

Economic Assumptions

This analysis is based on the cost of operating in-house turf programs. Sub-contracted programs typically cost 30-35% more. Both programs include fertilization, seeding and aeration. All product costs are based on quantity institutional purchases, with a calculated 7% annual cost increase. Labor costs have been calculated based on a municipal employee @ $40,000 including

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[2] *Pesticides in Schools: Reducing the Risks*, Robert Abrams, Attorney General of New York State, March 1993.

[3] "2009 Field Maintenance Costing Spreadsheet" published by the STMA. Available online at www.stma.org/_files/_items/stma-mr-tab6-2946/docs/field%20maintenance%20costing%20spreadsheet.pdf

[4] "Generic Football Field Maintenance Program" by Dr. Dave Minner. Department of Horticulture, Iowa State University.

[5] "Invitation to Bid, Organic Lawn Care Field Maintenance and Supplies," Jericho Union Free School District, Jericho, NY on behalf of 31 school districts.

benefits, calculated at $20 per hour. Indirect costs for pesticide applicator licenses, training, storage/security and DEC compliance costs have been estimated at $500 per year. Fertilization for both programs has been calculated at the rate of 5 lbs of nitrogen (N) per 1000 SF. Grub and/or insect controls may or may not be necessary. Compost has been calculated at a cost of $40 per yard. Seeding rate is calculated at 5 lbs/1000 SF. Cost of water is estimated at $0.003212/gal.[6] [7]

Irrigation

Irrigation costs for turf maintenance are considerable, but are generally less for naturally maintained fields due to deep root growth and moisture retention by organic matter. Estimates of irrigation reduction for natural turf programs range from 33% to more than 50%. This analysis uses a conservative diminishing factor for irrigation reduction for the natural management program, starting with 100% in the first year as the field gets established down to 60% in the third year and beyond. Some school districts may experience greater savings.

Soil Biology

One of the most critical factors in the analysis – and the one most difficult to assess - is the availability and viability of microbiology on fields that have been maintained using conventional chemical programs. The microbiology that is essential for a successful natural turf management program can be destroyed or severely compromised by years of chemical applications. In this analysis, we have assumed a moderate level of soil biology as a starting point; the compost topdressing in years 1-3 is part of the rehabilitation process required to restore the soil to its natural, biologically active state.

Reducing Fertilization Costs

Once playing fields have been converted to a natural program and the percentage of organic matter (%OM) has reached the desired level (5.0-7.0), additional significant reductions in fertilization costs can be realized using compost tea and other nutrients (humic acid, fish hydrolysates) applied as topical spray, rather than using granular fertilizers.

The following chart shows the product cost benefits of switching to an organic nutrient spray program, and amortizing the $10-12,000 capital cost for equipment over three years. (Fig. 2)

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[6] Water usage computed using STMA recommended irrigation rate of one inch/week for Junior High football field. Iowa State University recommends 1.75 inches per week for football fields.

[7] Price computed using NUS Consulting International Water Report for 2008 average US water cost per m3 adjusted for inflation.

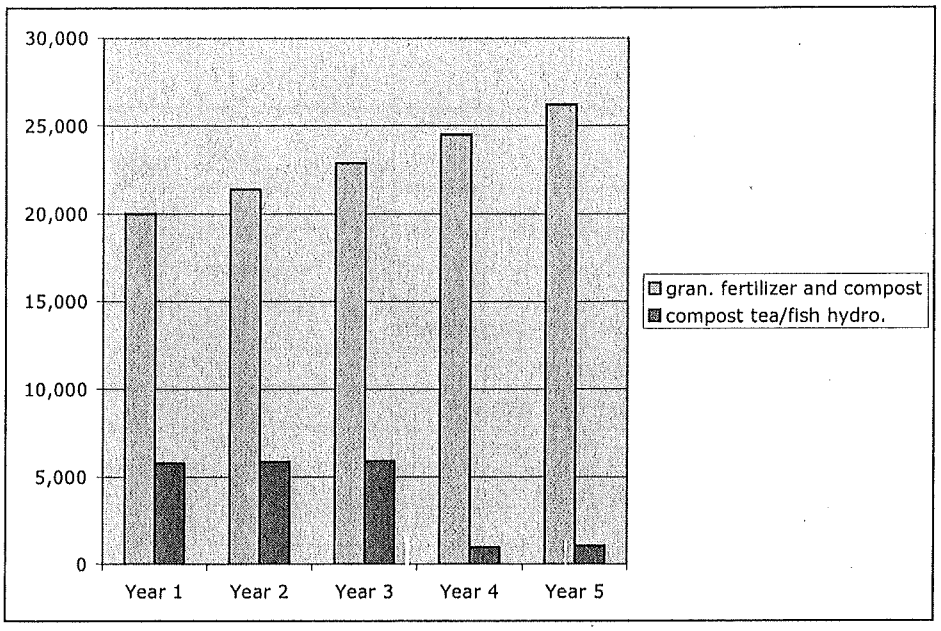

Figure 2: Cost comparison of granular fertilizer and compost compared to spraying compost tea and fish hydrolysates in Marblehead, MA.[8]

Conclusion

This analysis demonstrates that the cost of a natural turf management program is incrementally higher in the first two years, but then decreases significantly as soil biology improves and water requirements diminish. Total expenditures over five years show a cost savings of more than 7% using natural turf management, and once established, annual cost savings of greater than 25% can be realized.

About the authors:

Charles Osborne *is a professional turf consultant, working with municipalities and school districts in the Northeast to help them develop effective natural turf management programs. A professional grower with more than thirty years of experience in greenhouse and turf management, Mr. Osborne is the Chairman of the Town of Marblehead Recreation, Parks, and Forestry Commission where he oversees the management of the Town's school and municipal fields.*

Doug Wood *is the Associate Director of Grassroots Environmental Education, an environmental health non-profit organization which developed the EPA award-winning program, "The Grassroots Healthy Lawn Program." He is also the director and producer of the professional video training series "Natural Turf Pro."*

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[8] *To address concerns over the potential phosphorus content of compost tea (contained in the bodies of microbes) only high-quality vermicompost should be used for tea production. Animal manure teas, popular with farmers for generations, are not suitable for use on lawns or playing fields.*

COMPARISON OF CONVENTIONAL (CHEMICAL) AND NATURAL (ORGANIC) TURF MANAGEMENT PROGRAMS: YEAR ONE

CONVENTIONAL PROGRAM		Year 1	Year 1	Year 1
		cost	cost	total
		prod	labor	
April	fert/pre-emergent	$250	$95	$345
May	fertilizer	$225	$95	$320
June	grub or insect	$325	$95	$420
June	post-emergent	$90	$150	$240
July	fertilizer	$225	$95	$320
Sep	fertilizer	$225	$95	$320
Nov	fertilizer	$225	$95	$320
June	seed	$700	$150	$850
Sep	seed	$700	$150	$850
aerate	3 times	$0	$375	$375
	irrigation	$3,212	$150	$3,362
	indirect costs			$500
	Total Cost			**$8,222**
NATURAL PROGRAM				
		Year 1	Year 1	Year 1
		cost	cost	total
		prod	labor	
April	fertilizer	$610	$115	$725
June	fertilizer	$610	$115	$725
June	liquid humate	$120	$100	$270
July	fish/compost tea	$100	$100	$250
Sep	fertilizer	$610	$115	$725
Jun	seed	$700	$150	$850
Sep	seed	$700	$150	$850
	aerate 3x	$0	$375	$375
Jun	topdress	$1,300	$350	$1,650
	irrigation	$3,212	$150	$3,362
	Total Cost			**$9,782**

COMPARISON OF CONVENTIONAL (CHEMICAL) AND NATURAL (ORGANIC) TURF MANAGEMENT PROGRAMS: YEAR TWO

CONVENTIONAL PROGRAM		Year 2	Year 2	Year 2
		cost	cost	total
		prod +7%	labor	
April	fert/pre-emergent	$267	$95	$362
May	fertilizer	$240	$95	$335
June	grub or insect	$347	$95	$335
June	post-emergent	$96	$150	$246
July	fertilizer	$240	$95	$335
Sep	fertilizer	$240	$95	$335
Nov	fertilizer	$240	$95	$335
June	seed	$750	$150	$900
Sep	seed	$750	$150	$900
aerate	3 times	$0	$375	$375
	irrigation	$3,436	$150	$3,586
	indirect costs			$500
	Total Cost			**$8,544**
NATURAL PROGRAM				
		Year 2	Year 2	year 2
		cost	cost	total
		prod+7%	labor	
April	fertilizer	$653	$115	$768
June	fertilizer	$653	$115	$768
June	liquid humate	$128	$100	$228
July	fish/compost tea	$107	$100	$207
Sep	fertilizer	$653	$115	$768
Jun	seed	$750	$150	$900
Sep	seed	$750	$150	$900
	aerate 3x	$0	$375	$375
Jun	topdress	$1,390	$350	$1,740
	irrigation	$2,749	$150	$2,899
	Total Cost			**$9,553**

COMPARISON OF CONVENTIONAL (CHEMICAL) AND NATURAL (ORGANIC) TURF MANAGEMENT PROGRAMS: YEAR THREE

CONVENTIONAL PROGRAM		Year 3	Year 3	Year 3
		cost	cost	total
		prod +7%	labor	
April	fert/pre-emergent	$285	$95	$380
May	fertilizer	$256	$95	$351
June	grub or insect	$371	$95	$467
June	post-emergent	$103	$150	$253
July	fertilizer	$256	$95	$351
Sep	fertilizer	$256	$95	$351
Nov	fertilizer	$256	$95	$351
June	seed	$775	$150	$925
Sep	seed	$775	$150	$925
aerate	3 times	$0	$375	$375
	irrigation	$3,676	$150	$3,826
	indirect costs			$500
	Total Cost			**$9,055**
NATURAL PROGRAM				
		Year 3	Year 3	Year 3
		cost	cost	total
		prod +7%	labor	
April	fertilizer	$699	$115	$814
June	fertilizer	$0	$0	$0
June	liquid humate	$137	$100	$237
July	fish/compost tea	$114	$100	$214
Sep	fertilizer	$699	$115	$814
Jun	seed	$775	$150	$925
Sep	seed	$775	$150	$925
	aerate 3x	$0	$375	$375
Jun	topdress	$1,487	$350	$1,837
	irrigation	$2,206	$150	$2,356
	Total Cost			**$8,497**

COMPARISON OF CONVENTIONAL (CHEMICAL) AND NATURAL (ORGANIC) TURF MANAGEMENT PROGRAMS: YEAR FOUR

CONVENTIONAL PROGRAM		Year 4	Year 4	Year 4
		cost	cost	total
		prod +7%	labor	
April	fert/pre-emergent	$305	$115	$420
May	fertilizer	$274	$115	$389
June	grub or insect	$416	$115	$531
June	post-emer	$110	$170	$280
July	fertilizer	$274	$115	$389
Sep	fertilizer	$274	$115	$389
Nov	fertilizer	$274	$115	$389
June	seed	$800	$170	$970
Sep	seed	$800	$170	$970
aerate	3 times	$0	$425	$425
	irrigation	$3,933	$170	$4,103
	indirect costs			$500
	Total Cost			**$9,755**
NATURAL PROGRAM				
		Year 4	Year 4	Year 4
		cost	labor	total
		prod +7%		
April	fertilizer	$0	$0	$0
June	fertilizer	$0	$0	$0
June	liquid humate	$150	$120	$270
July	fish/compost tea	$500	$720	$1,220
Sep	fertilizer	$748	$135	$883
Jun	seed	$800	$170	$970
Sep	seed	$800	$170	$970
	aerate 3x	$0	$425	$425
Jun	topdress	$0	$0	$0
	irrigation	$2,360	$170	$2,530
	Total Cost			**$7,268**

COMPARISON OF CONVENTIONAL (CHEMICAL) AND NATURAL (ORGANIC) TURF MANAGEMENT PROGRAMS: YEAR FIVE

CONVENTIONAL PROGRAM		Year 5	Year 5	Year 5
		Cost	cost	total
		prod + 7%	labor	
April	fert/pre-emergent	$326	$115	$441
May	fertilizer	$294	$115	$409
June	grub or insect	$445	$115	$560
June	post-emergent	$117	$170	$287
July	fertilizer	$294	$115	$409
Sep	fertilizer	$294	$115	$409
Nov	fertilizer	$294	$115	$409
June	seed	$856	$170	$1,026
Sep	seed	$856	$170	$1,026
aerate	3 times	$0	$425	$425
	irrigation	$4,208	$170	$4,378
	indirect costs			$500
	Total Cost			**$10,279**
NATURAL PROGRAM				
		Year 5	Year 5	Year 5
		cost	labor	total
		prod + 7%		
April	fertilizer	$0	$0	$0
June	fertilizer	$0	$0	$0
June	liquid humate	$160	$120	$280
July	fish/compost tea	$535	$720	$1,255
Sep	fertilizer	$800	$135	$935
Jun	seed	$856	$170	$1,026
Sep	seed	$856	$170	$1,026
	aerate 3x	$0	$425	$425
Jun	topdress	$0	$0	$0
	irrigation	$2,525	$170	$2,695
	Total Cost			**$7,642**

[Also included with MOFGA/Spalding comment: 53-page booklet]

Introduction to Organic Lawns and Yards

Plus a Checklist for an Eco-Friendly Property

By Sarah Little, Ph. D.

Northeast Organic Farming Association
Organic Land Care Program (NOFA OLC)

CT NOFA
P.O. Box 164, Stevenson CT 06491
www.organiclandcare.net
info@organiclandcare.net
203-888-5146

July 2011