Because land doesn't come with a manual...

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Eco-turf

Until man duplicates a blade of grass,
nature can laugh at his so-called scientific knowledge.
Thomas Edison

ECOLOGICAL TURF MANAGEMENT

Michael Talbot

New approaches to designing and caring for our lawns, gardens and landscapes, whether they are called "plant health care programs," "integrated pest management," "organic lawn care" or "xeriscaping," are part of a growing nationwide movement away from conventional landscape management. More and more there is recognition that lawns and landscapes overuse water, energy, pesticides and fertilizers. Ecological approaches to designing and caring for landscapes seek to meet the public's desire for an attractive outdoor environment while also minimizing adverse health and environmental impacts.

"Ecological landscaping" derives from our understanding of sustainability, interrelatedness and balance in naturally occurring ecosystems. The principles apply to every phase of landscaping: design, plant selection, installation, maintenance, and pest management—including turf management. Environmentally friendly lawns — including residential lawns, athletic fields, and even high-end commercial turf — using little or no synthetic pesticides and with environmentally sensitive use of fertilizers are growing in number around the country.

What follows is a synthesis of ecological landscaping as applied to turf management.

Assess the site and choose appropriate plants and components. Thorough assessment of the landscape is a primary concept of ecological design. Look at site characteristics (sun, shade, wind exposure, existing plants), soils (texture, structure, depth, drainage, pH), microclimates and other site variations. Evaluate land use and cultural care (play, degree of maintenance desired). Then choose suitable plants and landscape components. By evaluating these

Continued

within:

Winter Conference Review

Chris O'Brien, ELA President

The 2005 Winter Conference & Eco-Marketplace, held March 4 and 5 in Marlborough, Massachusetts, featured 21 knowledgeable and engaging speakers.

Reviews of the lectures of the Winter Conference will be integrated into other issues of newsletter so as to focus on those topics in depth and to enhance the educational aspect of our organization.

The success of the ELA's 2005 Winter Conference and Eco-Marketplace on March 4 and 5 in Marlborough was not mere happenstance. A large group of dedicated board members and volunteers, assisted by woefully underpaid staff, smoothly produced and ran this year-long effort.

Special recognition must go to the Conference/Marketplace Planning Committee. Education Committee Chair Nancy Askin and the educational committee maintained ELA's standards by finding knowledgeable, respected speakers. Eco-Marketplace Chair M. L. Altobelli provided the drive to put together the Eco-Marketplace; this is the third year that conference guests have been able to meet with vendors of landscaping

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"Gramma said when you come on something good, first thing to do is share it with whoever you can find; that way the good spread out where no telling it will go. Which is right."
—*Little Tree in* The Education of Little Tree*, by Forrest Carter*

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Talk to us! We welcome comments, letters, articles, ideas, and opinions. Contact Fran Gustman, Editor, at fgustmaneditor@juno.com or 617-787-4274, with newsletter content.

Send all other ELA business, including address changes, to the Concord address above.

The ELA board meets throughout the year in various locations in eastern Massachusetts. All members are welcome. Contact us for specific dates and locations.

Turf *continued*

components in advance, we avoid putting turf in unsuitable areas, like those with heavy shade, poor drainage, poor soil, excessive tree root competition, southern slopes, or high traffic.

Seek more diversity in the landscape. Diversity may be the most important principle of ecological landscaping. It can be as basic as including many varieties of turfgrasses in the lawn seed mix and as radical as replacing lawns with mixed plantings of trees, shrubs, groundcovers and other plants.

Accept and appreciate plants that improve a lawn's adaptability and ease of care, like white clover. Avoid monocultures with significant pest problems — all-bluegrass sod, for example. Reducing lawn areas and planting a variety of trees, shrubs, and herbaceous plants leads to an increase in the diversity of animal life, including beneficial micro- and macro-organisms.

Choose plants that reduce the need for input. Cut down on caretaking by using low-maintenance and drought- and pest-resistant plants. For cool-season lawns, this means using a seed mixture high in fescues, especially fine fescues (as in shade mixtures) and endophytically enhanced grasses, which repel many turf pests and are more tolerant of stress and neglect. [Endophytically enhanced grasses should not be used where they will be eaten by grazing animals. —ed.] Avoid drought-sensitive grasses to reduce the amount of irrigated lawn. Avoid grasses that are susceptible to pests, like all-bluegrass and all-ryegrass lawns.

Establish adequate depths of amended loam topsoil. Turf and many ornamentals prefer a minimum of four inches of sandy loam topsoil, although six to twelve inches is better. To supplement topsoil, look for a compatible mixture of loam and compost, which is superior to what is often sold as "loam." Avoid heavy clay soils, especially over sandy subsoils, and mix layers to avoid interfaces. Better yet, till 2-4 inches of compost into the top 6-8 inches of existing soil. Even a sandy subsoil can become an acceptable growing medium.

Establish proper soil pH. Testing for pH may be the most important step to improving the sustainability of plantings, yet it is often overlooked. Never apply limestone without first doing a soil test. Turf prefers a pH of 6.4-6.8. Use calcitic limestone to raise pH and elemental sulfur to lower pH.

Enhance the mineral balance of the soils. A soil test is your guide to a proper mineral balance. Once pH is appropriate, compost and rock minerals may be added to increase plant health. Add gypsum (calcium sulfate) to add calcium without raising pH; the balance should be eight parts calcium to one part magnesium (based on percent base saturation). Other rock minerals are phosphate (for new lawns), sul-po-mag and Jersey greensand, or a well-balanced organic lawn fertilizer.

Proper mowing is essential. It is hard to overstate: lawns that are

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properly mowed are superior to other lawns, almost regardless of management. Mow 3 inches or higher in spring and fall (3.5 inches is ideal) or as high as possible on sports turf. High mowing increases turfgrass drought-, stress-, and pest-tolerance and enhances root growth. It significantly reduces infestations of light-requiring weeds, like crabgrass, and broadleaf weeds, such as dandelions. Mow often — cut off only one-third of the leaf blade in any one cutting. Keep mower blades sharp to reduce tearing and subsequent disease infestations. To reduce water requirements in the heat of summer, mow *irrigated* lawns at 2.5 inches.

The research is incontrovertible that lawns with clippings left on them are superior to lawns where clippings are removed in all measures of turf beauty, health and sustainability.

Grass clippings. *Horticulturist Paul E. Rogers says that grass clippings left in place take the place of lawn feedings and, because the clippings are organic, the nutrients will be released slowly.*

The numbers on a package of fertilizer stand for the ratio of three chemicals: nitrogen, phosphate and potassium. The grass plant contains within itself a one-to-one ratio of these chemicals but most lawn fertilizers have a first number that is two to six times as great as the third number. A 10-10-10 fertilizer mimics nature more closely than a 36-3-6 or similarly unbalanced fertilizer.

Feed the soil and the soil will feed the plants. Over time, natural-based fertility programs reduce the need for use of outside fertilizers. As soils become more biologically active, they suppress disease and insect pests naturally. Organic matter (composts, organic mulches, rock minerals, and fertilizers with slow-release organic nutrients) enhances mineral balances and increases biological activity and water-holding capacity. Natural organic nutrients are used more efficiently, requiring less fertilizer for better results, and plants do not grow to be too lush, a condition that makes them vulnerable to drought and pests.

Be careful adding nitrogen. Use natural organic fertilizers that add organic matter and carbon to soils or, where there is a need to be more competitive with conventional programs, use natural organic nutrients blended with slow-release synthetic nitrogen sources.

Use nitrogen (N) sparingly in spring and/or in early and late autumn, when turf can utilize it best. A high-quality fescue lawn requires only one pound N added per 1,000 square feet per season, with clippings providing another pound; all-bluegrass lawns require only three pounds N with clippings. Two-thirds N in a fertilizer blend should be "water insoluble nitrogen" or "slow release nitrogen."

Overseed turf. A dense, 3.5-inch-high turf with a strong root system is the best defense against weeds. Where turf is sparse, overseeding may be the only pest management strategy needed. Overseed with a diverse, endophytic mixture in late summer (mid-August to late September in most of New England). In spring, patch with a mix that includes 20% fast-establishing ryegrass. Apply phosphate whenever seeding.

Water properly, if at all. It is estimated that 30% of our municipal water is used to irrigate lawns and landscapes. Supplemental watering is not needed on a mature lawn mown properly and composed of drought-resistant fescues, and where the soil is organically rich and moisture-retentive.

Automatic sprinkler systems often water improperly; daily irrigation increases weeds, diseases, and other problems. If irrigating, water every 3 to 7 days to a depth of 4 to 6 inches, depending on the site and soil. If the lawn sprinkler also irrigates woody plants and perennials, water every 5 to 7 days for 45 minutes to an hour to properly water the woody plants.

Reduce or eliminate stress caused by people. A decline in the lawn is often caused by people pressure — from high traffic and use of heavy equipment or from poor maintenance, such as improper mowing, watering, and fertilizing.

Ecological Pest Management of Turf. Turf is a complex ecosystem involving plants, soil, and a remarkably large and diverse population of soil micro- and macro-organisms, such as bacterium, yeasts, fungi, algae, nematodes, earthworms, insects, big-eyed bugs, predatory ants, and spiders. The vast majority are beneficial.

Use of pesticides, especially insecticides but also fungicides, nematicides, and herbicides, can lead to "pest rebound." Because pests tend to recover more quickly than their natural controls, there may be a more severe outbreak of the pest the following year.

A "secondary pest outbreak" is different from a pest rebound. An example is an increase in sod webworms that follows a treatment for chinch bugs that killes off predatory ants; the predatory ants would have consumed up to 98% of sod webworm eggs within 48 hours after they were laid.

Excessive use of herbicides is common in conventional turf management; “weed and feed” products especially add materials that are not needed throughout the lawn. Even herbicides that are selective can

Continued

Turf *continued*

stress turf plants. Stress predisposes a lawn to greater injury from pests, environmental impacts, and people pressure.

I strongly recommend ending the use of preventative insecticides, which impacts turf ecology adversely, may endanger pets, (especially dogs), and inevitably leads to pest resistance. Synthetic pyrethroids and other insecticides applied to prevent chinch bug damage and *imidacloprid* (Merit) or *halofenozide* (Mach II) applied to prevent white grub damage are now used routinely, often in combination with a fertilizer. These grub preventative products have a place in an IPM program but only when applied for a year or two to specific areas of turf with a history of grub damage; these areas are generally quite limited. Use grub preventatives to allow grub damaged turf to become sufficiently established to allow natural deterrence.

Adopt a careful IPM approach. Apply pesticides only when needed. Monitoring is necessary to anticipate pest imbalances so that controls may be used when they would be most effective. In an ecological turf management program, once tolerance levels are established, action is taken only when the pest reaches the tolerance "threshold." Tolerance levels should be set as high as possible. Use the least toxic material and spot treat only pests that are clearly identified as objectionable. In this way pesticide use can be greatly reduced or even eliminated.

Weeds. An ecological turf management program first determines which weeds exist and at what populations in specific areas. Help your clients understand that weeds are not true pests of lawns as they do not actually kill lawn grasses (except, perhaps, in a limited way from heavy crabgrass infestations). Determine which weeds are objectionable to the client and at what population level. Weeds may be less tolerated in highly visible areas but acceptable in less visible areas. Use this information to develop a customized weed management program.

Weeds in turf fill niches in what is otherwise a very aggressive and competitive planting. And, as weeds have specific site and soil requirements, they are indicators of conditions that are unsuitable for lawns. In some cases, weeds actually support the growth of lawn grasses through beneficial relationships. Here is a discussion of some specific weeds:

•**Clover.** White Dutch clover (*Trifolium repens*) in lawns improves soil fertility and turf health by fixing nitrogen from the air through its roots. It significantly reduces the need for nitrogen fertilizers and crowds out less desirable weeds, especially in very sandy soils. Before the 1950's when selective

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broadleaf herbicides were developed and clover was marketed as a weed, white clover was an important part of every fine lawn. Encourage clients to tolerate clover populations or spot treat with a selective broadleaf herbicide.

•**Crabgrass.** Crabgrass (*Digitaria* spp.) is among the most hated weeds in the home lawn but it is one of nature's ways of colonizing bare soils to prevent erosion. Correcting conditions that lead to thin turf and mowing high is the best way to manage crabgrass, an annual that requires light to germinate.

As crabgrass does not grow in shade, only treat sunny areas. For fussy clients, consider application of corn gluten for 50 - 90% crabgrass reduction. Use Dimension™, the best and least toxic of synthetic pre-emergents for very fussy clients.

•**Moss, spurge** (*Euphorbia* sp.) and **hawkweed** (*Hieracium* sp.)**.** Moss indicates compacted soil of low fertility and thin turf. Spurge and hawkweed are found on poor, sandy, acidic soil where there is weak, thin turf. By correcting the soil and renovating the turf areas, these plants can be crowded out. Spot treatment is only moderately effective for hawkweed or moss.

•**Dandelion.** Another hated lawn weed, despite its beauty in bloom, dandelions (*Taraxacum officinale*) are among the most beneficial. Their deep taproots aerate the soil and accumulate important minerals from deep below the grass roots, especially the essential nutrient potassium. Important nutrients are made available to grass plants by leaving the clippings from mowing. Dandelions are an important source of nectar for early-season beneficial insects and a traditional food for people.

Dandelions tend to appear in quantity only in compacted soils with weak turf. They and other broadleaf weeds are gradually crowded out in dense turf. Hand pulling while in bloom or hoeing during the season will kill many. If clients are fussy, spot treat.

Use a "least-toxic" pest management strategy. Prevention is the best control for disease, weeds, or insects. When further treatment is deemed appropriate, choose the least toxic. Only move to more toxic controls if the control has failed to limit (not eliminate) the pest at an acceptable level. Here is a list of pest control measures for lawns, from least to most environmentally damaging:

•**Cultural controls.** This is the key to preventing pest problems. Using pest-resistant seed and good maintenance, overseeding damaged turf areas could be the only pest management needed. For example, dense turf is enhanced by mowing high

Continued

Ridding prairie grass of weeds

ARS weed ecologist Roger Sheley has been conducting experiments on "seed source islands" for four years as a way to revegetate rangelands overrun by invasive weeds. Near the Northern Cheyenne Reservation in Montana, he plants and fences a small plot of a desired species, such as purple coneflower or cudweed sagewort, in the middle of a weedy area. Outside the fenced area, the weeds are removed by various methods, including grazing by livestock. When the fence is taken down, the desirable plant moves outwards naturally. Desirable plants have spread as far as 100 feet from the islands. Seed source islands keep costs down because only small areas are planted and they require fewer chemicals than other revegetation methods. For more information, see Agricultural Research, November: http://www.ars.usda.gov/is/AR/archive/nov04/plants1104.htm.

Carex appalachica
Barry Glick

In the wild, Carex appalachica favors dry woodland conditions but is quite adaptable to just about any garden setting. I've planted this useful sedge on a west-facing hillside on a 45-degree slope. The super-fine texture of 12- to 24-inch Carex appalachica cascading from the top adds a remarkable grassy dimension that needs no mowing; it swirls around tree trunks and rocks, giving the impression of the movement of wind and water.

C. appalachica is hardy to zone 5 and maybe to zone 3. It likes full shade to dappled sunlight and average to well-drained soil. It makes a 4- to 8-inch clump and blooms early- to mid-spring.

As with most carex species, propagation is quite easy. A mature clump will yield many divisions, which can be replanted or potted up and grown on. Wash off all of the soil and trim the long, fine textured roots and the tops back to about 2". Repot them and new roots will appear at the bottom of the pots within a few weeks.

Barry Glick grows over 10,000 kinds of plants at his 60-acre garden and nursery, Sunshine Farm & Gardens, in the mountains of Greenbrier County, West Virginia, zone 5. He welcomes visitors and correspondence: 304-497-2208, fax-497-2698, barry@sunfarm.com.

Chinch Bug: the sneaky lawn pest

Bruce Wenning

The hairy chinch bug (*Blissus leucopterus hirtus*) is in the order, Hemiptera, and family, Lygaeidae (seed bug). The hairy chinch bug is the same chinch bug that is a pest living in the thatch of turfgrass in New England. Kentucky bluegrass, red fescue, perennial rye, and bentgrass lawns are most susceptible to chinch bug damage especially those in sunny locations on sandy soils that have been fed high-nitrogen fertilizer.

The chinch bug is a surface feeder that uses its piercing-sucking mouthparts to suck sap from turfgrass crowns, stems and blades. While feeding, both adults and nymphs inject toxic saliva into the grass plant, causing yellowing and wilting, browning, and eventual death. Adults are 1/5 inch long with black and white overlapping wings. The immature state, the nymph, has five instars, or stages; they look similar to adults.

Hairy chinch bugs tend to aggregate, or group, when feeding, causing irregular patches of wilting yellow and brown grass. If the grass remains brown, it has been killed. The damage resembles that caused by white grubs.**Damage frequently goes untreated because the browning occurs mainly in July and August and is attributed to summer dormancy or drought stress. It is for this reason that I call the hairy chinch bug the sneaky lawn pest. By the time you notice that your lawn has been killed, it's too late to save it.**

Monitoring. Weekly monitoring starting in late June will give you an edge over these "sneaky" insects.

One method is to remove the ends from an empty two-pound can, slicing the turf to insert one end into

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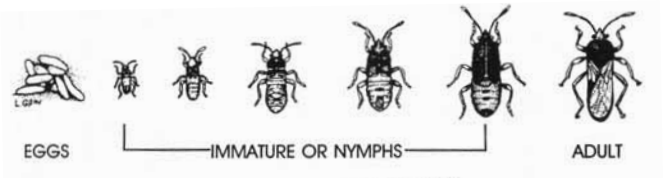

Gradual metamorphosis: eggs, nymphs (larvae), adult. The nymph goes through five instars (growth stages) to reach adulthood. Nymphs do not have fully developed wings nor can they reproduce but feed like adults.

There is no pupa stage.

Complete metamorphosis, for example in butterflies, moths, and many beetles: egg, larva (different in form and sometimes mode of feeding from adult), pupa (transition stage to adult), and adult (could feed on completely different plants and have different mouthparts than larval form). A butterfly egg hatches into a caterpillar (chewing mouthparts), transforms into a pupa (inside a casing), then into a nectar-feeding adult butterfly. —BW

Illustration from Shurtleff, Fermanian, and Randell,

Winter Conference *continued from p. 1*

products with an ecological bent. Cathy Rooney brought years of experience with trade shows and event management to professionalize our operations. Pat MacAlpine, ELA's administrative assistant, provided support to all. No detail was to small to escape the attention of Kathy Sargent-O'Neill, former ELA president.

These individuals are the backbone of the effort and are responsible for the reputation ELA has acquired for a worthwhile Winter Conference and Eco-Marketplace. Please extend thanks the next time you see them. ❋

Turf *continued*

and leaving clippings, and the density then helps prevent the germination of many weed species, particularly crabgrass. Corn gluten significantly reduces the germination of many weeds, including crabgrass. Watering lightly in the middle of hot, dry days reduces chinch bug damage in lawns, while endophytic turf is essentially free of chinch bug damage. Compost fertilizers and tea can suppress certain fungal pathogens.

•**Mechanical controls.** Many broadleaf weeds can be managed by careful hand weeding. Digging dandelions in bloom will kill most of them, even if you only remove a portion of the root. Other mechanical controls are planting groundcovers, using mulches and weed barrier cloths, sealing cracks in pavements where weeds grow, and altering edges and fence lines to prevent weed growth. Mechanical controls are effective, efficient and very environmentally sensitive — and are not used enough.

•**Biological controls.** Natural enemies of pests (predators, parasites, and pathogens) can be attracted and conserved. Some may be purchased and released, like predatory (or "entomopathogenic") nematodes; use the *Heterorhabditis* genus for lawn grubs. Monitor in late summer while soils are still warm and apply in late afternoon while soil temperatures are above 60°F; keep turf soils moist for one to two weeks.

•**Low impact sprays and dusts.** "Biorational" pesticides include horticultural oils, insecticidal soaps, spinosads, *Azadirachtin* (Neem), botanicals, and mineral fungicides. These pesticides tend to be less destructive to "non-target organisms," a euphemism for us, our pets, beneficial pest control organisms, and other creatures. These should be the materials used first for most treatment programs, although few are clearly effective against typical lawn pests.

Continued

Chinch bug *continued*

the soil. Add water and continue to add water as needed to keep the can almost full. Let the water sit for 10 minutes and then count the chinch bugs that have floated to the surface.

A second method is to put a section of turf in water for 10 minutes and then count the chinch bugs on the surface of the water. A golf course cup cutter works well to remove a plug of turf.

My favorite method is to drench a square yard of turf with soapy water (one ounce detergent to a gallon of water). Next, place a white cloth over the area. In about 20 minutes, insects will leave the turf and cling to the underside of the cloth to escape the irritating soap. Turn the cloth over and count the chinch bugs. If you use white flannel, their feet will get caught, which makes for easy counting.

For each method do at least five samples and average the counts. Sampling during July and August should be done on the edge of damaged turf, the zone of heavy feeding, to include healthy and damaged sections together or just outside the zone of damage.

The approximate threshold for damage per square foot on non-irrigated turf is 30 to 50 chinch bugs per square foot. Irrigated, well-maintained turf could sustain a higher chinch bug population without showing much stress. Chinch bug populations can increase rapidly so continue to monitor weekly.

Practice proper cultural practices to ensure a dense, high quality lawn. [See article on Eco-turf, p. 1.] Implementing Integrated Pest Management practices will help safeguard your lawn from extensive damage done by chinch bugs.

Turf *continued*

•**Synthetic chemical pesticides**. Such products should be the last choice for pest control, yet in the U.S. they are generally used first. They tend to have the harshest impact on the environment, adversely affecting beneficial organisms and causing damaging rebounds and secondary pest outbreaks. Professionals can successfully manage entire landscapes, including lawns, without them.

There may be circumstances where a synthetic pesticide is the only effective treatment. In that case, choose the least toxic material registered for that pest, like non-arsenate, post-emergent crabgrass herbicides, non-2-4D/dicamba post-emergent broadleaf herbicides, and sterol inhibitors for fungal diseases. Time carefully and spot apply them only to areas with significant pest populations, and when there is no evidence of natural control.

Preventative and broad-scale pesticide applications often do far more harm than good, and their use is encountering more and more public resistance. Those who adapt to using ecological methods are in the vanguard of the lawn industry.

References. For more information, the following sources for this article are highly recommended:

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BARLEY STRAW FOR CLEAN PONDS:

habitat and budget-friendly algae control

Paul Kwiatkowski

During the past decade, interest has grown in the use of barley straw as an alternative to chemical control of nuisance algae blooms. The reasons behind this trend are simple. Barley straw is much cheaper than buffered alum or algaecides and, also, poses no threat to wildlife.

Mount Auburn Cemetery in Cambridge, Massachusetts, is an arboretum and garden landscape of 175 acres, with three small ponds and a vernal pool. The three ponds have each recently undergone some form of restoration work to deal with water quality or invasive aquatic plants. Nuisance algae blooms have been a problem each year with the arrival of summer. Our staff has worked with aquatic biologists in recent years to control the problem. The results have been mixed. With buffered alum applications, clarity has been improved for the short term but has not been sustained and many applications were required, increasing the cost of maintenance enormously. Algaecides were proven to be ineffective as well, and, in one instance, the application resulted in a fish kill. The costly and rather ineffective pond maintenance history of Mount Auburn provided the motivation to consider alternative treatments.

Barley straw is very inexpensive and environmentally safe. A bale of barley straw can be obtained for roughly $35. The straw takes nearly six months to thoroughly decay in a water body, although it will decay more rapidly in warmer temperatures than in cooler regions. The control of algae increases opportunity for the growth of submerged vascular plants, which provides a safe habitat for invertebrates to breed, which, in turn, provides more food for fish and birds.

To plan my experiment with barley straw, I searched for sources experienced with small pond applications. I found a wealth of information from the Centre for Aquatic Plant Management in England (IACR_CAPM@compuserve.com). In 1980, a British farmer discovered the algae-controlling capability of barley straw. Much experimentation had taken place since. I also wanted information about experiments closer to home and found fact sheets from Ohio State University (//ohioline.osu.edu/a-fact/0012.html) and Purdue University (www.agcom.purdue.edu/AgCom/Pubs). Through the University of Massachusetts, I tracked down a project conducted by Bill Clark of UMass Extension at the Cape Cod Cooperative Extension in Barnstable.

I contacted Bill in April of 2003 and he conducted "Barley Straw 101." In a nutshell, as barley straw decays, its cell walls decompose and release lignins into the water. The lignins react with oxygenated water and sunlight to form hydrogen peroxide. The peroxide is very short-lived but continuously produced by the rotting straw. It is this compound that inhibits the growth of algae.

The amount of barley straw to apply is based on the surface area of the pond, used in previous studies at a rate of one bale per

Continued

Paul Kwiatkowski attended Evergreen State College in Olympia, WA, and joined the Horticulture Department at Mount Auburn in 1999. He currently works in the greenhouse, designs perennial gardens, and, in addition to working on ecological problems like pond habitat restoration, has created a rainwater harvesting system to help with irrigation.

quarter-acre of surface area. The bales were broken apart for good aeration and the straw was then placed into netting or a bag; Bill Clark used Christmas tree wrap, a water resistant netting used when transporting trees for Christmas sale. The straw was then anchored in the upper twelve to eighteen inches of water where the most oxygen is and where sunlight can combine with the oxygen to decay the straw. The prevailing view is that barley straw will not eradicate a nuisance bloom that is already exists but is effective as a preventive.

Bill Clark's Cape Cod Cooperative Extension experiments began in 1995. Barley straw was applied to fifteen freshwater ponds. The results varied considerably from no apparent difference in color and clarity to excellent clarity. In no case was barley straw found to have a negative impact on a pond ecosystem.

In 2003, at the end of May, I purchased ten bales of barley straw from Hardwicke Gardens Statuary and Water Garden Center in Westborough, Massachusetts. It had taken me a good deal of time and effort, contacting numerous garden centers and farms, to find a supply source. It was then more than a month past the early spring/post-thaw period during which I had hoped to anchor the straw in the ponds. Nevertheless, I decided to go for it. I purchased pond netting, cut it into strips and sewed the strips into bags with a spool of string-trimmer line. I anchored the bags to cinder blocks. The bags were quite large and, I found to my dismay, very heavy and unwieldy when waterlogged. I found it impossible to keep them from sinking below the top twelve to eighteen inches of water. I decided to try another sort of bag for the straw. A local fruit and vegetable distributor donated fifty fifty-pound onion bags that proved to be much more manageable.

I focused my experiment on two of the three ponds at Mount Auburn, leaving one pond untreated as a control. The largest pond has 1.48 acres of surface area. The second pond is 0.9 acre.

Because of the lateness of the season and the algae already growing, I was concerned about the pond deoxygenating as the straw decomposed, so I reduced the amount of straw to roughly two-thirds of the basic application rate. I submerged four bales in the larger pond and 3 1/2 bales in the smaller pond. After filling the bags, I tied them together in groups of four with polypropylene rope and anchored them with snow stakes. Hip waders allowed me to adjust the depth to which the bags submerged as they took on water. Also, later in the season, in a period of drought, when the bags rose above the receding water, I untied, resubmerged, and and re-secured them in the upper 12-18 inches of water.

South Florida Periphyton Research: http://serc.fiu.edu/periphyton/

This remarkably useful algae site emphasises *periphyton*, the algae that grow attached to underwater surfaces. Two databases dominate the site: a browsable inventory on diatoms and a search-driven database on "soft" algae (non-diatoms). Both are quite complete, including systematics data, habitat information, microscopic images, references and more. Research pages highlight projects on nutrients and *periphyton* response in the Everglades, mangrove *periphyton*, and paleoecology of Biscayne and Florida Bays. Site by Southeast Environmental Research Center, Florida International University, Miami. —BOTLINX@lists.ou.edu, February 14, 2005

Unfortunately, the barley straw did not seem to control the algae, as neither pond had better color or clarity than the control pond.

In 2004, I had two barley straw bales left over from the previous year and ordered eight more. I also acquired 100 fifty-pound onion bags. I was able to anchor the bags by mid-April. The 0.9- acre pond had undergone a significant restoration project and I wasn't able to use it for the experiment. In the 1.48-acre-pond, I secured sixty bags, or six bales. In the control pond from the previous year, .95 surface acres, I secured four bales, or 39 bags.

The largest pond, 1.48 acres, did not maintain clarity or color. In the .95-acre pond, however, clarity and color were quite good, much improved from 2003. It appears that the barley straw was successful in this case. In comparison, the largest pond suffered from persistent nuisance blooms, which should rule out cooler temperatures and significant rainfall as the reason for success in the other pond. Different algae are involved and it is possible that more barley straw would be required to inhibit their growth. We are also investigating the possiblility that the largest pond is being recharged by the heavily nutrient-laden waters of the aquifer.

In 2005, I plan to continue the barley straw experiment. Hopefully, the results will provide evidence that barley straw is an inexpensive algae growth inhibitor. More trials by other people would also help determine the effectiveness of this approach.

gleanings

Sara Stein, acclaimed author of *Noah's Garden: Restoring the Ecology of Our Own Backyards* (Houghton Mifflin, 1993) and other books about using native plants, died of lung cancer on February 25, at her home in Maine. She was 69. A memorial fund has been established by the family for the Vinalhaven Public Library Native Garden in her home town.

Recycling. San Francisco diverts 63% of disposable material from landfills, compared to New York's 20%, sorting glass by color and paper by type. It collects 300 tons of food scraps and garden waste daily. The compost is sold to organic farms and garden suppliers. See: http:///temp.sfgov.org/sfenvironment. —*Sierra*, March/April 2005

MIT Environmental Classes. http://enviroclasses.mit.edu/browse/index.jsp.

Alien Plant "Least Wanted" Calendar for 2005: www.nps.gov/plants/alien.

How Green is Your Car? http://www.epa.gov/greenvehicles

Atrazine pesticide kept on market. Minnesota lawmakers made the first attempt in the U.S. to ban Atrazine. The pesticide, commonly used on corn, has been directly linked to cancer, low sperm counts and deformities in frogs, and is showing up increasingly in water supplies. However, other lawmakers claimed that Atrazine is safe, and that a ban would negatively impact profits of pesticide makers and farmers. —http://www.organicconsumers.org/toxic/atrazine031705.cfm, March 2005

Plant Conservation Alliance — Seeds of Success. Information about grants, projects, events, publications: www.nps.gov/plants.

Chemical lawn-care rebuffed. Quebec province and nearly 70 cities in Canada have banned or restricted the use of pesticides for lawn care. In the U.S., 20 states require public notification of pesticides applications on lawns and many communities are initiating such policies on public property.

To discourage similar policies, the chemical lawn care alliance ran an ad illustrated with heavy men's gardening gloves and headlined with the phrase "The gloves are off." Countering, Beyond Pesticides, an environmental group, ran an ad showing gardening gloves decorated with daisies and a text saying, "Get a Grip. The chemical lawn care industry is worried that the word is getting out on the toxic hazards of lawn pesticides. It is possible to have a green lawn without toxic pesticides..."

un-classifieds

WELL WATER CONNECTION, INC. is a full-service firm providing custom-designed irrigation wells for green industry professionals and their clients. In addition to providing water wells, we offer pump design and installation services, water well design, stain removal and filtration systems, evaluation and repair service, project management and more. For more information, please contact John Larsen at 978-640-6900 or jlarsen@wellwaterconnection.com.

ELA's Guide to Healthy Landscape

The first volume in ELA's *Guide to Healthy Landscape* series, "From the Ground Up: Site and Soil Preparation," is a fine training aid for employees or an educational gift for an enthusiastic customer. Topcs are: managing soil fertility, the importance of the soil food web, protecting site features, managing invasives, and much more. Features are line illustrations, glossary, and a list of resources and organizations. Cost (includes postage and handling) is $25 members, $30 non-members (in MA add 5% sales tax). Inquire about quantity discounts. Send order with payment: Attn.: Guide Order, ELA, 60 Thoreau St., #252, Concord, MA 01742.

ELA news

New England Flower Show, March 2005. The students of ELA member Andrea Knowles, horticulture instructor at Nashoba Valley Technical High School in Westford, MA, were awarded the Massachusetts' Agricultural Award and a bronze medal for their naturalistic design, featuring a garden without a lawn, shredded leaves for mulch, and low-maintenance natives and hybrids. Some of the plants used were white-flowered *Cornus florida* 'Cherokee Princess', *Ilex glabra*, *Fothergilla gardenii*, tiarella, woodland phlox, and *Vinca minor*. The design included stepping stones, two stone benches, and a pond.

ELA President Chris O'Brien is co-owner of Howard Garden Designs, Newton, MA, which received the President's Award for its beautiful and tranquil entry.

Winter Conference Quiz. We were so inspired by Pam Hart's "ID This Twig" quiz last year that we repeated it, matching over 30 samples with the botanical and common names. Kudos to those who participated and especially to winners Bess Coughlin, Mary Tebo, David Barnett, Laura Eisner, and Robin Zitter. (About the mislabeled twigs and missing matches: we were just checking to see if you were paying attention! It was *Viburnum prunifolium*, not *Cornus alternifolia*.) Many thanks to Jane Millon of Van Berkum Nursery for braving the cold to do the collecting and Cathy Rooney for pulling the project together. Prizes were donated by Woodstream and ELA: Sonic Repeller, Deer Away, ELA's *Guide to Healthy Landscapes, Volume 1 From the Ground Up: Site and Soil Preparation*, and a bookstore gift certificate.

ISSN. Thanks to the work of Pat MacAlpine, ELA Administrative Assistant, *The Ecological Landscaper* has been assigned ISSN 1554-656X. The number, equivalent to the ISBN on books, gives the newsletter official status in the Library of Congress database and will bring attention to our publication. The number is displayed on page one of this newsletter in the upper right hand corner.

events

June 2 -4. Native Plants in the Landscape. Millersville University, Millersville, PA. Lectures, native plant sale, tours, workshops, exhibits and networking. Info: 717-872-3030, www.millersvillenativeplants.org.

June 11, 10 AM - 3 PM. New England Wild Flower Society Plant Sale. Extraordinary selection of wildflowers, native trees, and shrubs. Garden in the

Continued

Events *continued*

Woods, Framingham, MA: 508-877-7630, www.newfs.org.

June 16 - 18, 2005. Mid-Atlantic Highlands Biodiversity: Making the Connection in Your Community. University of Pittsburgh at Johnstown, Southwestern Pennsylvania. Conference on biodiversity in the central Appalachian mountain range. Contact 814-532-5049, www.naturalbiodiversity.org/conference.htm.

Job listings. *The Cambridge Climate Calendar lists a large selection of job openings of environmental interest. To subscribe, email CambClimCal-subscribe@topica.com. To read on-line, go to: htttp://www.tufts.edu/tie/tci/Calendar.html. Click on Resources at the left of the screen.*

Annual Appeal 2005

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A big thank you to donors !

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No one thinks of winter when the grass is green. -Rudyard Kipling