In Praise of Turf

Lawn Maintenance From an Eastern Homeowner's Perspective

By Richard J. Hull

About three million years ago, our earliest ancestors flourished in the savannas of East Africa. This was a landscape dominated by grasslands and scattered trees. It was a good place for early humans to emerge since the grasslands provided food in the form of abundant game along with grains and other fruits. The trees provided protection from predators and materials for tool making.

Early hominids were encouraged to walk upright so they could look over the grass for danger and this, in turn, freed their hands for activities other than locomotion, such as carrying objects, using tools and weapons and signaling to others. In short, the East African grasslands constituted an environment ideally suite for the emergence of human. Grasslands supplied food, provided protection and encouraged enterprise in the making of tools, clothing, weapons and objects of art.

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When present-day people are given a choice of preferred landscapes, those in which they feel secure, but also find interest, they invariably chose open, park-like settings involving a low, nonrestricting and nonthreatening ground cover and trees (Ulrich 1986). The inclusion of a water feature also increases affinity for the landscape. It appears that we carry within our subconscious an innate appreciation for the landscape that sustained our distant ancestors and promoted the advance of human society. It is, therefore, not surprising that when people design landscapes in which they feel secure and comfortable, they invariably include a broad expanse of closely mowed grassland, tall shade trees and a pond or flowing stream.

The English garden, that reached its fullest development in the 18th Century, faithfully incorporated these basic landscape elements in a highly formal style. A century later, more naturalistic treatments of the same design elements were introduced to America by landscape architects, such as Frederick Law Olmsted. Again, those open, unconfined landscape features that people find reassuring and pleasing were freely incorporated in both formal and naturalized renderings of domestic and public landscape designs.

It should come as no surprise that contemporary domestic landscapes invariably incorporate broad expanses of open lawns with tall shade trees and marginal plantings of shrubs and herbaceous flowering plants. Where individual lot sizes are small, merged front lawns provide broad open expanses and a community landscape emerges. I contend that what some have described as an American obsession with lawns may be, in fact, a response to much deeper fundamental human needs.

People respond favorably to a vegetated environment. The simple knowledge that an area of lawns and trees is in their neighborhood increases people's sense of well being and connectedness to their surroundings (Kaplan and Kaplan 1989). The ability to observe a parklike setting from a hospital window was shown to increase the recovery rate from surgery and reduce the

incidence of postoperative complications (Ulrich 1984). These psychological and physiological benefits of an environment endowed with trees, lawns and ornamental plantings are being recognized. Such planted areas are increasingly being incorporated into the design of office buildings, shopping malls, and urban renewal projects.

In designing the home landscape, these less tangible factors are especially important. There, plants exert their psychological and therapeutic benefits but in a multiple use context. Home grounds serve far more than an aesthetic function. This is where children play, residents relax, families gather and parties are held. For these purposes, the lawn plays a central role.

Lawns are open, unencumbered, nonthreatening and inviting. A broad expanse of lawn virtually calls out to grab a Frisbee, throw a softball, set up a badminton game, etc. Few surfaces are safer for children to play with less chance of injury. A well maintained lawn provides a thick cushioned surface, offers little attraction for bees or other stinging insects, and has even been found to contain many fewer deer ticks than adjacent woodlands or rough, unmown areas (Maupin et al. 1991). Other ground covers may offer a similar aesthetic benefit but none is as suitable for or tolerant of human activity as a well maintained lawn.

Dr. James Beard, the generally recognized dean of turfgrass science, enumerates several practical advantages of turf over other land covers (Beard 1996). These include the cooling effect of transpiring leaf surfaces without obstructing the free flow of air. It has been shown that homes surrounded by lawns and other vegetation have significantly lower air conditioning costs than similar homes surround by paved or sparsely vegetated surfaces.

Lawns capture water and promote infiltration, thereby preventing runoff and contributing to the recharge of underground water reserves. The structure of a dense turf provides innumerable channels by which rainwater will enter the soil. The density of turfgrass plants and surface thatch accumulation increases the retention of water within the turf and reduces runoff.

In a study conducted at Pennsylvania State University (Linde et al. 1998), researchers found that to measure significant runoff from turf covering a 9 to 11 percent slope, irrigation water had to be applied at 5.5 inches per hour. This is equivalent to a once in a hundred year rainfall event. In short, lateral runoff from turf is in most places a rare events and turf is among the most water conserving ground covers known.

The ability of lawn turf to prevent runoff greatly reduces water discharge into storm drains, thereby reducing the incidence of sewage outflow and contamination of streams, ponds, lakes or bays. While comparative research is limited, the structure of alternative vegetative covers is such that their ability to retard runoff would generally be much less than that of a dense turf.

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Turfgrasses build soils. Grasslands have created some of the best soils on earth. Most of the deep fertile soils of the Midwest and Plains states evolved under a cover of perennial grasses that were regularly grazed and burned. A well maintained lawn also has the capacity to improve soil quality. For many residential sites, this may be a lawn's most important function.

A Kentucky bluegrass turf produces up to 14,300 pounds of roots per year, about 50 percent of which turns over and contributes directly to soil organic matter (Beard 1996). The organic components of a soil increase its water and nutrient holding capacity and improve soil structure, which favors increased aeration. This, in turn, promotes further root growth, as well as large populations of earthworms and other beneficial soil animals. You may have noted that sod farmers never appear to reduce their soil level even though small amounts are removed with each harvest. The turf generates more new soil materials than would likely ever be removed by sod harvesting.

Lawn turf also conserves soil. Few ground covers can equal grasses in prevent-

ing soil erosion caused by water flow or wind. Soil erosion can clog drainage systems and disfigure the land and water bodies. Lawns contribute virtually nothing to the erosion load and actually serve as effective buffer zones separating and protecting water bodies from the overland flow of water and sediments originating from upland sites. Dust and other atmospheric particulate matter are readily captured by turf and other vegetation, thereby improving air quality. In urban and suburban areas, this can be an especially valuable function of landscape vegetation.

Lawns along with other vegetation provide a number of useful services, such as noise abatement, removal of gaseous pollutants (carbon monoxide, sulfur dioxide and nitrogen oxides) from the air, wildlife habitat and glare reduction. In the dry western states, lawns have been shown to provide homes substantial protection from wild fires.

This substantial litany of benefits offered by turf must come at some price. There must be a downside to maintaining a lawn. While the negative aspects of home lawns have been much publicized, the reality is actually not all that bad. It mainly comes down to the intensity of lawn management that is practiced, which in turf is based on the standards set for a turf area.

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Those who want a lawn comparable to the turf seen on televised golf tournaments might have to make a substantial investment in materials and labor. On the other hand, a perfectly functional lawn, one that provides all the benefits mentioned above, can be had with comparatively little effort or cost. There is not sufficient space for me to expand on lawn maintenance to support adequately the previous statement, but a few points can be made.

Most well established lawns need little water, fertilizer or pesticides. The validity of this statement centers on two simple practices: leaving the clippings where they lie and mow high (between two and three inches). Many homeowners ruin their lawns by removing clipping and cutting their grass too short. If clippings are retained, nothing is removed from the lawn and therefore little needs to be replaced.

A two- to three-inch cut will provide grass plants large enough to grow a deep extensive root system that will be better able to absorb nutrients and water. Such a lawn will also compete more effectively with weeds and shade the soil surface sufficiently to prevent many annual weed seeds from germinating.

If it fails to rain, water only those lawn areas that are critical, highly visible or heavily used. Even then, water deeply but infrequently. This will promote deeper rooting and conserve what water is present by reducing transpiration. If a lawn is not watered during a drought, it will turn brown, but will green up again as soon as the rains return. A lawn composed of good turfgrasses is rarely killed by drought unless it is subjected to heavy wear or improper irrigation.

Fertilize sparingly, concentrating on the late fall and early spring. One pound of nitrogen per 1,000 square feet per year will normally suffice. Again, this depends on not removing clippings. Such a regimen will not produce the thickest turf in shaded areas but might permit the encroachment of wild flowers, such as bluets and violets, which can be welcome additions. Such plants will not tolerate the use and abuse to which lawngrasses are often subjected. Some restrictions may be in order. Where you want a thick lawn, use ground limestone to bring the soil pH to about 6.0 to 6.5 and use superphosphate to maintain adequate soil phosphate levels. Use potassium and nitrogen in about equal amounts.

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found to be essentially no problem. Nitrate is the most troublesome fertilizer component because it is produced within the soil regardless of the form of nitrogen fertilizer applied (organic or inorganic). It is also highly mobile within the soil and can easily leach into ground water during periods of heavy rain. However, the extensive root system of grasses absorbs nitrate readily and efficiently removes it from the soil water (Petrovic 1990).

Most researchers have found that that only five to ten percent of applied nitrogen is lost from turf via all routes (except clipping removal) and nitrate leaching normally accounts for about half of that. In a comparison of several suburban/rural land uses, Golf et al. (1990) reported that a well maintained home lawn leached less nitrate to ground water than any land use studied with the exception of an unfertilized native forest. Any nitrate contamination of ground water in residential areas is probably derived from septic systems and leach field and not from fertilizer applied to the lawn.

The situation with respect to pesticides is equally encouraging. Most home lawns receive relatively few pesticide applications, mostly herbicides for broad-leaved weeds and crabgrass. Even lawn care companies almost never use fungicides or nematicides and apply insecticides only on an as-needed basis, if at all. Most encouraging is the observation that many pesticides have a strong affinity for the thatch layer found on the soil surface of most turf. Here pesticides are retained and degraded and very little ever actually enters the soil. In the soil under turf, microorganism populations are so active that any pesticides passing through the thatch are quickly decomposed. The net effect is that very few pesticides or their metabolites leach through a turf layer and are rarely found in ground water (Kenna 1995).

A lawn is an important, if not integral, part of the domestic landscape. Most outdoor activities take place on a turf covered surface. These living green carpets not only serve their utilitarian function but also contribute beauty and enhance the environmental quality of the urban/suburban landscape. One can effectively argue that lawns are often too large and domestic landscapes should be more diverse. This is a matter of judgment and taste and I will not challenge such statements.

What clearly is not supported by the scientific record, however, is the notion that lawns and their maintenance are somehow harmful to the environment and should be replaced by safer ground covers. A green living environment enhances the human spirit and provides a feeling of security and tranquillity. Lawns are part of such a setting and those who enjoy them need not be concerned over whether they are personally irresponsible for feeling that way.

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