The Benefits of Turf

THE OHIO STATE UNIVERSITY EXTENSION

BUCKEYE SPORTS TURF

The Benefits of Turf

Pamela Sherratt
(sherratt.1@osu.edu)

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BuckeyeTurf (http://buckeyeturf.osu.edu)
Department of Horticulture and Crop Science
The Ohio State University
2001 Fyffe Court
Columbus, OH 43210

Contributors:

Karl Danneberger, Ph.D.
danneberger.1@osu.edu

David Gardner, Ph.D.
gardner.254@osu.edu

Deborah Holden
holden.27@osu.edu

John Street, Ph.D.
street.1@osu.edu

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Table of Contents

Introduction

Turfgrass defined is a ground cover composed of close cut, thickly growing, intertwining stems and leaves of grass plants. The distinguishing characteristic of turfgrasses is the ability to withstand close mowing and still provide a functional, dense and healthy ground cover and that is what sets it apart from other plants. The turfgrass industry in the USA is valued somewhere between forty and sixty billion dollars, with over fifty million acres of turf. In Ohio alone, according to a 2007 survey (below), the turfgrass industry accounts for $4.6 billion in total economic impact ($3 billion in annual expenditure) with 42,000 people employed in the industry and over four million acres of turf grown in the state.

2007 Ohio Turfgrass Industry Survey

Population in Ohio & Turf Acres	**Turf Expenditures ($3 billion/annually)**	**Employment (42,000 people total)**
Homes - 3 Million 2.3 million acres	Homeowners 41 %	Golf Courses - 18,000
Lawn care companies - 3,306 1.1 million acres	Golf Courses - 36%	Lawn care companies - 8,000
Municpalities - 2,151 School Districts - 614 220,000 acres (34,000 acre in athletic fields)	Lawn Care Companies - 16%	Municipalities - 5,000
Golf Courses - 738 110,000 acres	Municipalities (parks) & others - 7%	Churches, Schools, & others -11,000

Reference: Economic impact of Ohio's turfgrass industry (2007). Prepared by The Strategy Team Ltd. Columbus, OH for The Ohio Turfgrass Foundation

Carbon Storage (Sequestration)

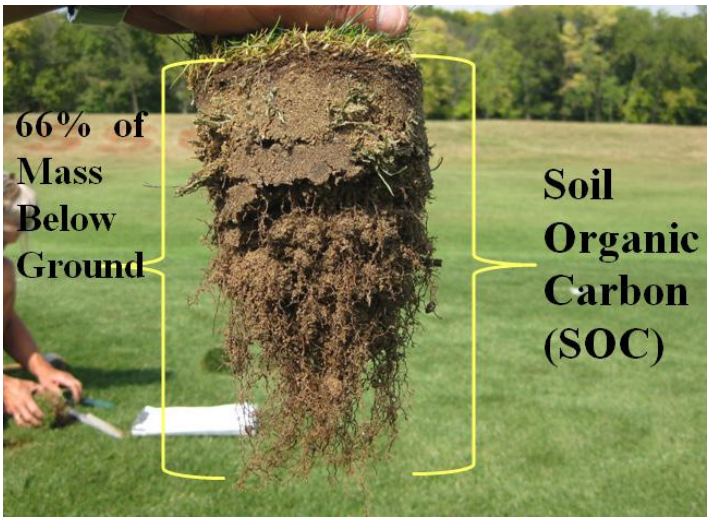
Turfgrasses, like all plants, capture atmospheric carbon dioxide and use it via photosynthesis to create usable energy in the form of sugars and carbohydrates. With increasing levels of atmospheric CO_2 associated with the greenhouse effect (global warming); turfgrasses serve as a source of carbon storage, or sequestration.

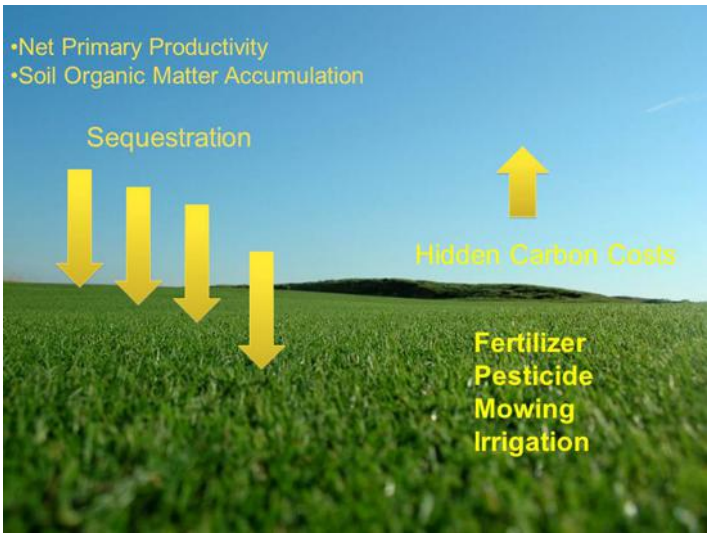
Most of the turf volume, or biomass is below ground. Given the perennial nature of turf, the storage of carbon in root mass and organic matter development in the soil, turf is a significant carbon sink. An average-sized healthy lawn is a carbon sequestering system that can capture as much as 300lbs carbon per year and a golf course fairway can capture 1,500 lbs. carbon per year.

Research has also concluded that carbon storage in turf is comparable to the rate of carbon storage in land situated in the Conservation Reserve Program.

A practical example of carbon sequestration is that one soccer field can offset the carbon produced by a car driving 3,000 miles. Although positive carbon sequestration does occur in a turf system, some of the benefit is reduced by maintenance practices (hidden costs) that require fossil fuel use such as mowing and the production of fertilizer. Reducing carbon emissions during turf management is a consideration for both professional turf managers and homeowners alike.

Nevertheless, research over the last few years has concluded that practices like mowing, returning clippings, feeding and watering actually increases the turf's ability to sequester carbon. Basically, the healthier the turf, the more carbon it can store.





Soil, Water & Nutrient Stabilization

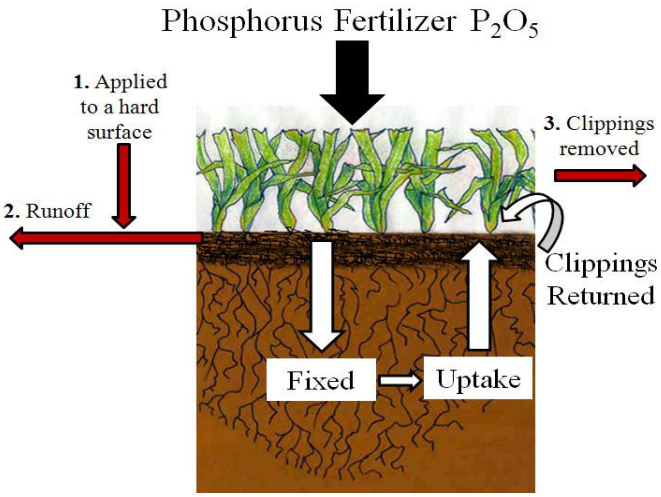
Turfgrasses also play an important role in soil erosion, dust control and water runoff by holding the soil in place. The fibrous root systems of turfgrasses form excellent soil "netting" that reduces dust and stabilizes soil on both flat and sloping areas. Healthy turf has the ability to absorb and conserve water, filter water and prevent run-off, which is why turf is often used on slopes, roadsides, and around parking lots. Since turf is a perennial and stable ground cover that is not cultivated, it slows storm water runoff reducing erosion potential and also improves the likelihood of the water infiltrating down through the soil.

Run-off and erosion of soil is considered to be one of the primary causes of nutrient contamination in our water systems. Reducing storm water run-off from impervious surfaces is a relatively new concept in landscape design, with rain gardens being developed in some residential neighborhoods. Some researchers are also recommending designing turf areas to serve as catchments and filtration zones for polluted runoff water.

Turf systems are not only efficient at catching and filtering water, but are also very efficient at holding on to nutrients. Nutrients like phosphorus are fixed onto soil particles or taken up by the plant and they do not leach out readily.

The bottom line is that fertilizers applied to a healthy lawn are held in the soil and utilized by the turf plants.

Figure Description: Three means by which phosphorus and other nutrients leave turf system: **1**. If the fertilizer is misapplied to a hard surface like a driveway and not swept up, **2**. If the fertilizer is applied to bare soil or frozen soil it could be washed away with the rain, and **3.** If grass clippings are removed or swept onto the driveway/road etc.



The Cooling Effect

As communities grow from a village to a town to a city an increase in temperature occurs. In major cities the term urban heat island is used to characterize the temperature increase. On warm summer days, the temperature can be 10° F greater in an urban area compared to the surrounding area. A 5,000 square foot Kentucky bluegrass lawn contains 9 million shoots, while an average creeping bentgrass putting green contains 72 million individual shoots. Each of these plant shoots carries a cooling process called transpiration. Transpiration helps reduce temperatures in the urban environment by dissipating high levels of radiation. To that end, turf is considerably cooler than other common surfaces. Research at Brigham Young University has recorded temperatures on turf twenty degrees cooler than bare soils and forty degrees cooler than synthetic turf.

Surface Type	**Average Surface Temperature (7 am-7pm) degrees Fahrenheit (F)**
Synthetic Turf	117
Asphalt	109
Bare Soil	98
Concrete	94
Turfgrass	78

Reference: Williams, C.F. and Pulley, G.E. (2002) synthetic Surface Heat Studies, Brigham Young University

Transpirational cooling is dependent on an adequate supply of water. In turf areas, water is provided by rainfall and sometimes supplemented by irrigation, depending on length of the growing season, temperature, evapotranspiration rates, soil type, turf species and management practices. It is estimated that turf, including residential and commercial lawns, golf courses, etc is the largest single irrigated crop in the United States. While residential landscapes are typically watered with municipal sources, golf course irrigation water comes primarily from on-site ponds and lakes, wells and streams. Only 9.5% of golf courses use public water exclusively.

Ohio is fortunate to have water as an important natural resource. Bordered by Lake Erie to the north, the Ohio River on the south, and adequate rainfall during the growing season, water availability and shortages are not as critical in Ohio as other places in the United States. Regardless of location though, if supplemental irrigation is needed, there are many university bulletins and factsheets that can be used as a guide. There are standard guidelines on irrigation timing, amount and frequency, to make sure that water is used sparingly.

Sport & Recreation

In addition to environmental benefits, turf is used extensively for recreation and sport. Lawns and other recreational areas are places where adults, kids and pets can spend time outside of the home. Turf is used for play, for places to relax and for entertaining friends. This all contributes to the quality of one's life.

With over 34,000 acres of athletic field turf and more than 700 golf courses in Ohio, sports are important not just to the economy but also to people's health and wellbeing.

Per the census, there are 267 million people in the United States at seven years of age and older. Of those 267 million people, around 80 million people (30 % of the population) play sports on turfgrasses. In the top 5 sports played on turf, it is estimated that golf courses have the most activity at 25.6 million and baseball and soccer have around 15 million regular participants.

The importance of encouraging people to play sports and offering them places to play those sports cannot be down-played, particularly when the Center for Disease Control estimates that 17% of American children and adolescents are obese. Also, and just as important, it is an outlet for children and adults to spend their leisure time in a positive and safe environment.

Activity	Participants (millions)
Baseball	15,166
Football (Tackle)	10,477
Golf	25,620
Soccer	15,492
Softball	12,843
TOTAL	79,598

Reference: Table 1248. Particioation in Selected Sports Activities: 2008. 768 Arts, recreation, and Travel. U.S. Census Bureau, Statistical Abstract of the United States: 2011.

Turf in the Urban Landscape

The last role that turf plays in society is in value to the landscape and urban environment. Turfgrasses help provide a pleasing urban environment through noise abatement, glare reduction, fire protection, and pest reduction. Turf areas like golf courses and parks also protect and foster wildlife. The natural state of these landscapes, coupled with the addition of trees, ponds, lakes and wetlands support a diverse population of birds, animals and plants. Studies looking at landscaping & house values have found that there is a positive relationship between a home's value and the existence of trees, up to a certain threshold. A more recent study suggests that the existence of a lawn also has a positive effect on the value of a home, with a lawn 1/4-1/3 of an acre in size associated with the greatest effect on selling price.

In Summary

Turfgrasses are plants that are used extensively as a stable and perennial ground cover. Turf is a positive carbon sink and it offers many benefits, not just to the environment but also to urban living. 80 million people in the US play sports on turf and over 42,000 people in Ohio alone are employed by turf. Most importantly, turf gives up a place to enjoy our families and spend some hard-earned leisure time, which ultimately improves our quality of life.

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