In summary it must be emphasized that materials to directly alter the pH should never be applied unless a pH determination has been made. Furthermore the pH should seldom be a concern for the turf manager. If it becomes excessively high (over pH 7.8) then be alerted to the possible requirement for a higher phosphorus test to satisfy the requirements of the grass. If the pH falls below 5.5 be prepared to apply some limestone during coring. In between enjoy a good night's sleep.

The Sports Turf Association welcomes new members:

Don Bridgman
Cambridge Parks

J.T. Dawson
McMaster University

Andrew Gaydon
Shemin Nurseries

Larry Glover
Belleville Parks

John Gravett
Turfecs, Guelph

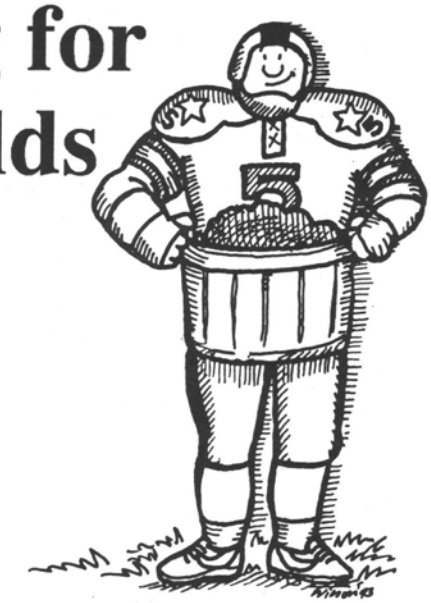
Russell Loney
Loney Landscaping

Robert MacAuley
Univ. of P.E.I.

Christian Prud'homme
Pelouse Sante, Que

Dennis Weagant
Belleville Parks

Composting for Athletic Fields



Michael J. Bladon
Grounds Dept., Univ. of Guelph

Benefits of Composting

The principal benefit of composting is to recover or recycle biodegradable materials from agricultural, industrial and municipal waste streams in an environmentally acceptable manner to produce a useful, marketable product.

A second benefit is that the end product (compost) is a safe material which may easily be transported using regular commercial vehicles. The resulting material has many advantages and can be used in many ways.

For example, there is now evidence that compost can be used to suppress plant diseases, stabilize soil pH and impede the movement and uptake by plants of toxic metals such as cadmium and lead.

Furthermore, reclamation of strip mines, mine tailings and the rejuvenation of salt-damaged soil along roadways may be aided. In addition, compost recycles the plant nutrients so less fertilizer is needed.

Finally, the use of compost on sports fields for topdressing, construction or renovation instead of peat moss is important in two ways. It will help to preserve wetlands from which peat is harvested. Generally this harvest is a irreversible process with the destruction of the wetlands. The destruction of wetlands is now a serious environmental issue, especially among the wildlife people.

Peat moss is very expensive - compost is a much more reasonable economic alternative, in fact some landscape architects are including compost in their specifications. In a survey conducted by the lawn and landscape industry, the respondents categorized themselves as:

- 71.3% being generators of lawn waste (clippings, leaves, branches,
- 34.8% being collectors of lawn waste, and
- 33.0% being composters of lawn waste.

Of those contractors that were surveyed who collected waste and generated compost, 66% indicated they use it themselves, 26.3% gave the material away, and 7.3% sold the compost.

Getting Started

First of all, depending on where you live, obtain a copy of the Provincial Government Guidelines for aerobic composting. It will be apparent from reading these guidelines that in order to generate good compost you need a recipe which includes: air, moisture, correct C:N ratio, temperature and pH balance. Finally you will need at least an acre of land for every 1,000 tonnes of yard waste.

Air: The bacteria which break down organic matter are called aerobic because they need oxygen. Lack of aeration, because the pile is too wet, packed to tight, or is too large, can cause it to become anaerobic which can create odours objectionable to neighbours. Furthermore, anaerobic composting does not create sufficient heat (min. of 55° C) to kill weed seeds and various pathogens. So turning, and hence aerating, the pile during the composting process will provide the oxygen necessary for the aerobic bacteria.

Moist, Not Wet: If the pile becomes too dry, bacterial production is inhibited and the composting process is slowed. Forty to 60 percent moisture is recommended. The material should be damp to the touch but you should be able to squeeze only a drop or two of moisture from a handful. Adding water is easy, however, the extraction of it is impractical. The addition of dry leaves, sawdust, newspaper, or simply turning, will help to dry a wet pile.

Temperature: If all of the above has been accomplished then the pile should heat naturally to at least 55° C, allowing decomposition in the shortest period of time. With open piles a minimum of ten days at this temperature is needed; with 'in vessel' (enclosed) operations a minimum of 3 days is needed. Below these temperatures the decomposition will slow. Most harmful pathogens are destroyed and weed seeds are killed at 55° C. The process is self regulating because if the temperature rises above 55° C many microbes will die and the pile will cool down. It may also be cooled down water or by turning.

Carbon:Nitrogen Ratio: The ideal C:N ratio for composting is 25-35 parts of carbon (C) to one part of nitrogen (N), with an average of 30:1. A high C:N ratio will slow the process, due to lack of nitrogen for protein synthesis and bacterial reproduction. A low C:N ratio (less than 20) reduces bacterial reproduction because of a lack of carbon - the energy source for the bacteria. At a ratio of 12:1 further bacterial breakdown of the material ceases.

The following values may be used as a guide for materials to use to raise or lower the C:N ratio of the pile.

Grass Clippings	19:1
Leaves	30-50:1
Leaves (Autumn)	50-80:1
Wood, Sawdust	300-700:1
Paper	150-200:1
Bark	100-150:1
Straw	80:1
Cow Manure*	20:1
Horse Manure*	25:1

* depends on kind and amount of bedding used.

Balancing the pH: pH is very important but very difficult to control particularly once the composting process has begun. Most lawn and garden wastes will result in a neutral pH. High acid pine needles may be added to lower the pH, however, they can also inhibit the growth of some bacteria. Lime may be added to raise the pH, but only under extreme conditions and is seldom required.

Amount of material required for topdressing operations.

Depth (inches)	for 1000 sq. ft. (cubic yards)	for one acre
1/4"	0.78	34
1/2"	1.56	68
3/4"	2.34	102
1"	3.12	136
2"	6.24	272
Area of some sports fields	**acres**	**hectares**
Football	2.38	95
Soccer	2.35	94

Compost as a Topdressing

The first step is to provide a thin uniform layer over the established turf. Any of the commercial topdressers will provide a uniform amount directly to the surface, which produces less odour and mess. It helps to level the surface of the field and aids in seed germination. Hence it is a good practice to apply the compost in conjunction with aeration and seeding. Compost will increase the organic matter in the soil in addition to providing greater resilience and less compaction. It will also increase the water holding capacity of the soil.

It is a good idea to run the compost through a screener to insure a fine material that will not only filter down through the turf to the crown area but also be free of debris and stones which may injure the athlete.

Future for Compost

There are more than 200 municipal waste composting plants in operation in Europe. In North America, however, they are much fewer. In the United States there are about 12 that are turning municipal waste into compost: most of these are small-scale operations. Portland, Oregon and Fort Lauderdale, Florida, started operations last year which will compost 600 tons of municipal garbage per day.

Our landfills are reaching capacity and many are already refusing manures and yard wastes. In Ontario we will see larger, more sophisticated operations. The City of Etobicoke produces some 8,600 tonnes of compost per year. They rent a tub grinder for two weeks every year to process the material. The City of Toronto has a large 'in vessel' (enclosed) operation.

All these operations will be controlled by governments. Composting is new as a commercial venture so the procedures will be subject to regulations for solid waste processing and quality. Because of regulations, new sites will be difficult to establish. However, shredders, tub grinders, mixers, screeners will soon become standard equipment in our cities and towns.

The problem then becomes how to make best use of this material. Certainly dumping it in a landfill site is a waste of a valuable organic material. While much of the volume may be used on home gardens and on sports fields, it may be necessary to utilize a large portion on agricultural land.

(This article is a summary of the address presented by Mike Bladon at the 1993 Turfgrass Symposium at Guelph.)