

*Government entities maintains millions of acres of athletic fields in parks and schools.*

*Compost created using municipal sludge offers one way to help keep the fields green and playable.*

*By Ron Alexander*

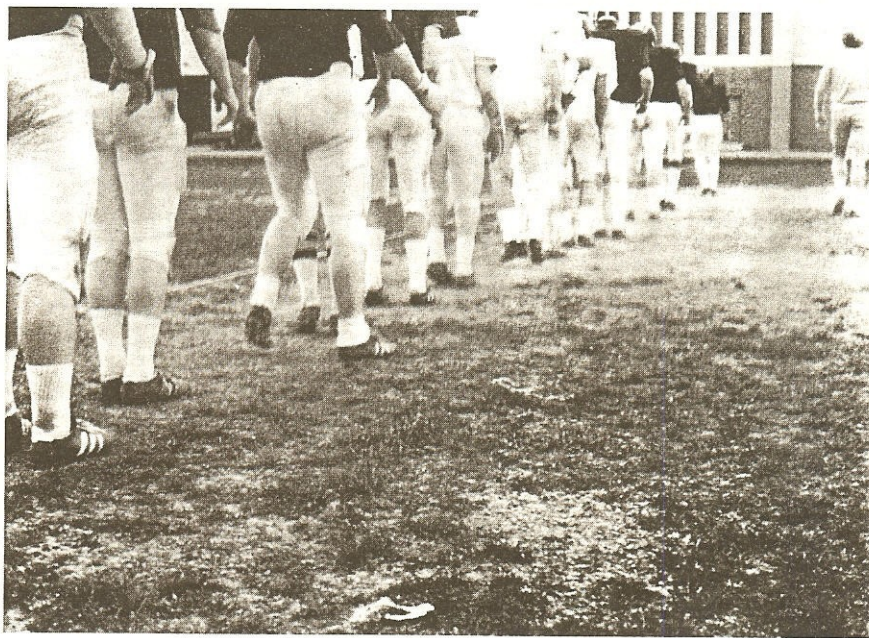
**L**arge cities have the seemingly impossible task of maintaining a thousand or more athletic fields throughout their school and parks and recreation facilities at any given time. And, more often than not, the athletic fields aren't adequately managed.

In a time of decreasing budgets, it's time to consider the cost effective use of sludge compost on athletic fields. Not only will municipalities be aiding the cause of recycling, but they will also make fields safer to play on.

Today, athletic field safety and the issue of liability on poorly maintained athletic fields is getting increased media coverage. Accentuating the issue is the national exposure given to professional athletes who have received artificial turf related injuries.

Quantitative studies at Pennsylvania State University, University Park, show that properly maintained athletic fields are in fact safer to play on than fields which are not adequately maintained. They also find that the more use a field gets, the more care it needs. Indeed, many natural turf athletic fields

# Composting With Sludge



*Athletic fields in parks and schools take serious punishment from players.*

have been shown to be harder than artificial turf fields.

Researchers at Penn State believe that better fields possess smoother surfaces, lower bulk densities (less compacted soil), more vegetative cover and a denser turf cover. Sludge compost enhances all these conditions.

Penn State research also indicates that the soil's properties, as well as field maintenance practices, greatly influence athletic field safety. In one study, it was discovered that 21 percent of athletic field injuries were "definitely or possibly field related." Consequently, if a player gets hurt and it's proven that the athletic field was not properly maintained, someone may be held liable.

At the same time, our supply of organic matter has been on the increase throughout the United States. The supply is being influenced by cities which have found an environmentally sound method of turning ordinary sewage sludge into a high quality compost product. Through composting, this organic waste material is now manufactured into a high-quality, inexpensive source of organic matter.

So what does all this mean? The use of composted-sludge-based materials in the maintenance, renovation and construction of athletic fields has tremendous potential. This outlet could allow a municipality to use huge quantities of compost to improve the quality of turf areas currently being ignored.

This leads to an often asked question, "Is sludge based compost safe to use on athletic fields?" Yes. Sludge compost which meets federal standards created by the Environmental Protection Agency is without a doubt safe to use on athletic fields. Nevertheless, it remains a commonly asked question by the general public.

Common fears are related to the heavy-metal content and bacteria, fungus and virus levels in the compost. When discussing these safety related issues, it is important to know that only compost produced from clean sludges or low-metal sludges can be marketed to the general public. In addition, current composting methods are designed to create temperatures high enough to destroy potentially harmful organisms.

Landscape maintenance professionals must have enough technical knowledge to address the public's concerns. The benefits and actual dangers of using sludge based materials must be understood if that information is to be conveyed to the general public.

Back in February 1987 rumor had it that Milorganite, a fertilizer derived from dried sewage sludge, was linked to Amyotrophic Lateral Sclerosis, commonly known as Lou Gehrig's disease.

It was assumed that because Milorganite was used on the San Francisco 49er's football fields, and that three members of the 49er's were afflicted with ALS (two died from it), that Milorganite caused the ALS. This situation got national exposure through the news media, but after a short period of time, Milorganite was cleared by a distinguished panel of federal and state health officials.

Stating that "there is no evidence to indicate an increased incident of ALS" in areas where Milorganite was used or manufactured, and that "associating the disease with Milorganite was

## TOPDRESSING

- Heavily core the aerate entire athletic field, concentrating on most heavily trafficked areas.
- Apply approximately a 1/2-inch layer of compost or 50/50 sand/compost mixture. The most uniform and efficient way to apply the compost is with a topdressing unit or manure spreader.
- Smooth the turf surface using a raking device or using a weighted drag mat. The raking/dragging will break up the soil plugs, mix it with the compost and backfill the holes.
- Seed and water the topdressed area. It is important not to leave the grass seed on the soil surface. It should be mixed into the soil/compost layer.

premature and speculative," Milorganite's reputation was upheld.

Unfortunately, these types of unsubstantiated attacks often occur in the recycling or "waste-to-resource" industry. That is just the nature of the beast. Unfortunately, only time and continued public education will change the negative image toward recycled products.

Though extremely versatile, sludge compost is primarily used in three ways: as a turf topdressing, to help maintain the quality of the turf surface; as a soil

amendment, used in the renovation of athletic fields; and as a component to athletic field mixes, used in the construction of new fields.

Topdressing has long been a reliable turf maintenance practice in the golf course industry. The practice entails applying a thin uniform layer of topdressing material over an established and usually declining turf area.

Topdressing is performed for many reasons including: promoting seed germination, increasing the organic matter content of soil and leveling the surface of turf areas. It is usually done in conjunction with aeration and reseeding. After aeration, the topdressing material is applied and through mechanical dragging, the holes are refilled with the topdressing material.

When topdressing is performed along with aeration many other benefits are obtained including: improving soil drainage, increasing the water holding capacity of soil and reducing soil compaction. Commonly used topdressings are topsoil, compost, sand and sand based mixes.

Topdressing is often used as a maintenance practice on turf areas which are overused or on the decline. When topdressing is applied in conjunction with seeding, seed germination will be improved. Because the topdressing improves the environment for seed germination, both the speed and percentage of seeds germinating will be improved. (See "Topdressing" on page 38.)

When using compost as a topdressing, the finer the compost is, the better. Most professionals prefer a topdressing material which is screened through a 1/4-inch screener. The best equipment to use to apply topdressing are units which apply compost directly onto the soil surface and not up in the air (like manure spreaders do). By applying compost directly onto the soil surface you will achieve better uniformity, while creating less odor and mess.

## SLUDGE-COMPOST CHARACTERISTICS

Sludge compost is an inexpensive source of high quality, bulk organic matter. Commonly its price is half that of peat moss and peat humus. In addition:

- Sludge compost is uniform and consistent. Its organic matter content, pH, nutrient content, etc., will remain extremely consistent from load to load; unlike many sources of topsoil.

- Sludge compost contains large amounts of plant nutrients. It is rich in macronutrients such as nitrogen, phosphorous and potassium, as well as essential micronutrients. The compost usually contains 1 percent to 2 percent nitrogen, which is probably the most commonly applied plant nutrient (fertilizer). Much of that nitrogen is in an organic form, which remains in the soil for long periods of time. Sludge compost is also rich in micronutrients, which are not contained in many common fertilizers and are expensive to purchase.

- Sludge compost is also rich in organic matter. Commonly, the organic matter content of sludge based compost is between 50 percent to 70 percent. Organic matter does many things to benefit soil. It lowers the bulk density of heavy soils, increases the water holding capacity of lighter soils, make the soil more friable or workable, increases the cation exchange capacity and increases the soil percolation or drainage rate of the soil. Organic matter is also rich in humic acid, which converts nutrients in the soil into plant available forms of food. Humic acid is formed when organic matter is broken down by certain microorganisms.

- Sludge compost is readily available. Sludge compost, in both bagged and bulk form, has become increasingly available throughout the United States and the world. However, the greatest volume of sludge compost is distributed in bulk form and is available on the East and West Coasts.

- Sludge compost is extremely versatile. Its great variety of uses makes it ideal for use by sports turf professionals. Sludge compost can be used by sports turf professionals as a topdressing, soil amendment, component of athletic field construction mixes, component of divot mixes and as a medium to pregerminate grass seed.

## REJUVENATION

When athletic fields are overused and large portions of vegetative cover have been destroyed, it's necessary to renovate. Renovating the field entails destroying the surviving turf stand in favor of establishing a newer, healthier one.

The quality of an athletic field's turf cover is greatly influenced by how often the field is used and areas of maximum wear. Each type of athletic field has its own wear pattern (areas of concentrated use). On football fields, most of the wear is in the center of the field "between the hash marks." On soccer and field hockey fields, the goal area is the most heavily worn.

These areas are sparsely covered with turf and the soil beneath them is extremely compacted. The renovation process will loosen the soil allowing the grass roots to grow deeply. The addition of compost will improve the characteristics of specific soils in different ways. In heavier, clay-based soils the compost will lighten the soil, improving drainage and slowing compaction. In lighter, sandier soils, the compost will improve the soil's water holding capacity and nutrient use ability. (See "Rejuvenation" on page 40.)

This new compost enriched soil will provide an excellent medium for turf growth. It will also allow the turf stand to survive through more stressful environmental conditions such as drought.

The use of sludge compost in the construction of new athletic fields continues to increase as the popularity of soil-less, sand-based athletic field mixes increases. Because athletic fields are receiving so much use, field mixes are now being designed which do not readily compact.

Recommended mixes for these fields consist mainly of uniform sand, with a small amount of organic matter or topsoil added for good measure. Less and less topsoil is being used because it is

difficult to find large uniform and weed free sources of it. A common mix consists of nine parts sand to one part organic matter (usually peat moss) or eight parts sand to one part topsoil to one part organic matter.

Sludge compost can be used to fulfill the organic matter requirement of this mix. It can also be used to replace topsoil in the mix entirely. Sludge compost will prove to be much more uniform than commercially available topsoils and less expensive than other commercially available bulk organic matter sources. (See "New Construction" on page 40.)

Compost screened through a 3/8-inch screen will work well in athletic field renovation and construction projects. This slightly coarser compost will improve field drainage and slow compaction.

Within a few months a new, densely vegetated, wear tolerant field will be ready to use. The field will have excellent drainage and will not readily compact.

It is becoming increasingly important for our society to reduce the amount of waste it disposes. Technology has allowed us to manufacture high quality products out of many organic waste

materials, while research has developed sound agronomic and horticultural end uses for these products. Only through the use of these newly created products can we close the recycling loop.

According to estimates from the Freedonia Group, a market research firm based in Cleveland, composters generated 700,000 tons of compost last year. That's a 48 percent increase over the 474,000 tons of compost created in 1988, according to the U.S. Environmental Protection Agency, Washington. Projections by the EPA call for an annual compost-generation rate of somewhere between 6.6 million and 10.89 million tons by 1995.

Already, when the total compost generated equals only slight more than 2 percent of the potential from yard waste alone, some in the solid-waste management industry worry about where they're going to put all the compost if the EPA's modest 20 percent to 33 percent goal is reached by mid-decade. (See "Where Will All The Compost Go?" starting on page 34.)

Uses, such as topdressing and rejuvenation, as well as, new construction of athletic fields goes a long way towards finding a home for the material. In the future, observers expect composters and those responsible for the care of municipal green spaces to discover more ways to use the valuable soil amendment. With the number of states enacting legislation banning yard waste, which includes grass, leaves, branches and in some cases whole trees that have been chipped, they have no choice.

The use of these products by the general public, the business community and government institutions is vital. Creativity will allow the use of these products for the betterment of all. ■

## NEW CONSTRUCTION

- Using front end loaders or other bulk blending machinery, manufacture your field mix. To ensure uniformity, manufacture the mix in small controllable batches. Mixing should be done away from the construction site.
- Spread the athletic field construction mix using a grading blade over the entire field, starting from the center of the field and working out. For optimum results, the mix should be spread to a depth of 12 inches.
- Shape and smooth the field using a raking device. Firm the field using a light roller. Establish a crown on the field if desired.
- Seed and water the field. To improve seed germination, incorporate the grass seed into the top 1/4 inch of construction mix.