



What to Do with the Compost at the Zoo

The Brookfield Zoo Turf Program incorporates the use of compost, supplemental fertilization, herbicide usage, and insect control using Integrated Pest Management. Under the direction of Gail Gorski, Manager of the Grounds Department, work began on this program in 2001.

With people making use of the lawns at Brookfield Zoo, we wanted to improve the overall safety of the turf program. The main objectives were to decrease fertilizer and herbicide applications and to increase compost use in the mall areas of the park. We considered the many activities, including Special Events, that occur on our malls throughout the spring and summer season. We determined that decreasing fertilizer and herbicide use by using compost as an organic fertilizer could be both environmentally friendly and safer for our visitors. Public education could be increased with signage in our turf grass areas. New compost and chemical strategies could be promoted for use in the home environment.

In 2002, with consultation from the University of Illinois, Professor Henry Wilkinson and the Chicago District Golf Association, (CDGA), we began implementing changes in the program. The changes included cultural, mechanical, and chemical practices to maintain turfgrass health. Ultimately, we recognized that fewer chemicals will be safer for the zoo environment.

There are four graphs presented here to explain the organic turf program. These are broken down into applications of compost, fertilizer, herbicides, and insecticides. We evaluate the collective data and determine the results over the last six years.

Changes implemented after initial research determined that our program goals were to increase composting and decrease chemical usage. Dr. Wilkinson was sent this information. He then visited the zoo along with members of the CDGA, including Dr. Randy Kane and Lee Miller. Cultural factors such as mowing, watering, aerating, and composting were

discussed.¹ The first thing noticed was that soil compaction was negatively impacting turf health. Cultural practices to improve turf health were recommended. Aeration would add more oxygen to the soil and also result in a deeper turf root system. Mowing heights were also increased because increased height provides more leaf area for photosynthesis. The turf population was increased by over seeding with a 100% Bluegrass mixture.

The zoo's composting program is run by Dave Micheletti (Lead Groundskeeper) and under the direction of Gail Gorski. The compost consists of plant and bedding material and animal manure. A sample of our compost was delivered to the University of Illinois for analysis. By weight, it had an N-P-K percentage rating of 6-3-6. The compost is similar to milorganite, produced from solids after treating activated sludge in Milwaukee, with an N-P-K analysis of 6.2-5.17-2.63. Milorganite has been in use since the early 1900s,² thus we knew our compost could be successfully used as a fertilizer.



Compost Trends (Figure 1)

The West mall was composted for the first time in the fall of 2002. A total of 30 cubic yards was applied to an approximate depth of ¼" on the surface of the turf. The program grew in 2003 with the addition of the East mall. A total of 60 cubic yards was applied. The North mall was added in 2004 and an additional 12 cubic yards was applied. There was a slight decrease in composting in 2005 because mechanical problems prohibited fall composting. The South mall was used as a test comparison until

(continued on next page)

2006; no compost was applied there. The South mall turf did not look healthy when compared to other areas receiving compost. The turf color was pale green, and the turf density was thin. This increased the number of broadleaf weeds. Overall, it indicated a need for increased nitrogen.

Areas receiving compost-fertilizer have been adjusted at times. During the 2006 Season, the Carousel was under construction in the North mall. Areas were newly sodded in late May, and no compost was added to the North mall that year. Also in 2006, the South mall, which had been a control area, began to receive compost fertilizer. During the 2007 season, the Stingray Bay exhibit was constructed on the East mall. Construction degraded the overall appearance and condition of the turf. No compost was added to the East mall at that time.

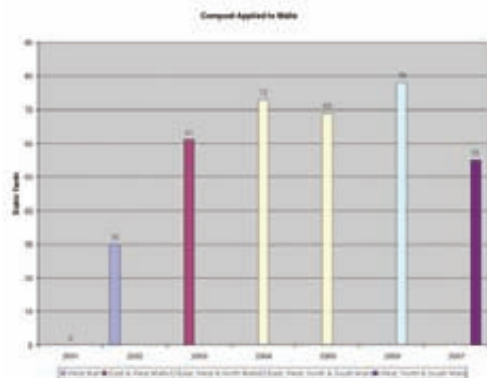


Figure #1

Integrated Pest Management

Integrated Pest Management is a very important component of the Organic Turf Program. Through scouting, we can identify potential problem areas and areas in need of treatment. The malls are scouted on a weekly basis. When a problem in the turf is spotted, cultural and mechanical controls are tried first to remove the weeds. The control of weeds is an integral part of IPM. Knotweed and spurge occur in areas with compacted soils. Mechanical controls used on the turf grass will decrease the potential for compacted soils and indicator weeds. Aeration helps the turf grass by allowing for increased oxygen in the soil and a stronger root system, thus minimizing the need for herbicides. Clover is another indicator weed showing that the turf is lacking in N. Applying a compost-fertilizer will add the N to the soil without the need for urea-based fertilizers. Spot herbicide treatment is done only when cultural and mechanical controls are impractical due to the size and area of the control site. An example of this is our west mall, where there is a problem with ground ivy. Because of stolons, this weed is difficult to control, making cultural and mechanical controls impractical. Overall, through the use of IPM, we have decreased chemical usage and increased our use of cultural and mechanical controls at the zoo.

Fertilizers (Figure 2)

Several trends in fertilizer use have occurred at the zoo. Spring and fall applications and the use of 32-3-10 led to an increase in N use from 2002 to 2004. The use of 32-3-10 occurred because we needed to decrease our existing inventory of old material. On average, fertilizer usage has decreased from 600 lbs in 2001, to an average of 430 lbs throughout 2002 to 2007. This is a 44% decrease. The decrease is more substantial

for nitrogen use, because we are phasing out urea-based fertilizers in lieu of our compost-fertilizer. At 46% N, urea contains the highest levels of nitrogen for turf grass use.

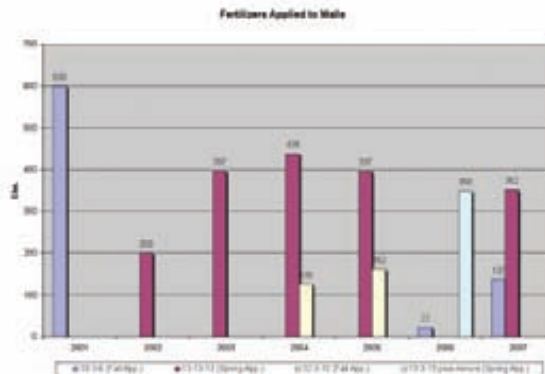


Figure #2

Herbicides

Because of the program we have shifted from broadcasting granular herbicides to spot spraying liquids. The liquid herbicide we are using is more effective, since it contains MCP, Dicamba, and 2,4-D. Using a three-way herbicide helps control the various weeds in our malls. This reduces the use of chemicals. Figure #3 shows the amount of herbicide used from 2001 to 2007. During 2001 and 2002, granular herbicide was applied to the malls. The rate decreased from 350 to 40 lbs, an 88.5% decrease in granular usage. In 2003 we started liquid applications. The amount applied went from 150 gallons to a 90 gallon average in the period 2004 to 2006. This is a 40% decrease in herbicide usage.

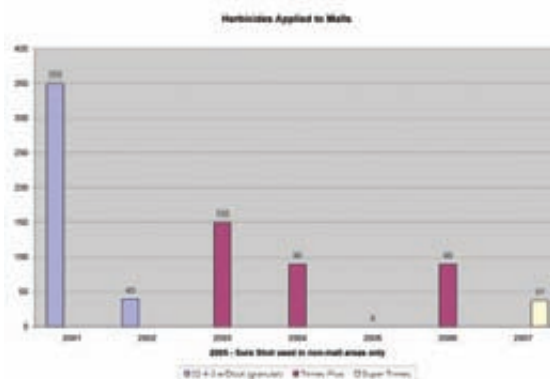


Figure #3

Turf Grass Diseases

We have not experienced many diseases on our turf. There have been cases of Pink Snow Mold (Fusarium Patch) due to wet weather and the absence of snow. Patches may increase if snow falls on unfrozen ground. The fungus turns pink with light exposure.³ This was found in a small area of the East mall, but warmer weather brought an end to this problem in the spring. We have also had areas of rust on the turf. This is due to humid but dry periods, when grass has slowed in its growth due to the heat.⁴ We can normally treat this problem with irrigation controls. No fungicides are needed to control either problem.

Insect Problems (Figure 4)

The only problems we have had with insects are with the larval stages of the Northern Masked Chafer and the Japanese

beetle. Mapping is used as part of the IPM program. Mapping allows us to see where problems have occurred in the past. The grubs have occurred in only two areas requiring controls, these are in the North and West malls of the park. Beetle eggs are generally laid after the fourth of July, and grubs normally start feeding on turfgrass roots from late August to early October. After scouting and determining threshold counts, Dylox® 6.2G is used. The threshold is 10 to 12 grubs per square foot. In 2004 and 2007 we had very low grub populations because weather conditions were likely too wet (2004) or too dry (2007).

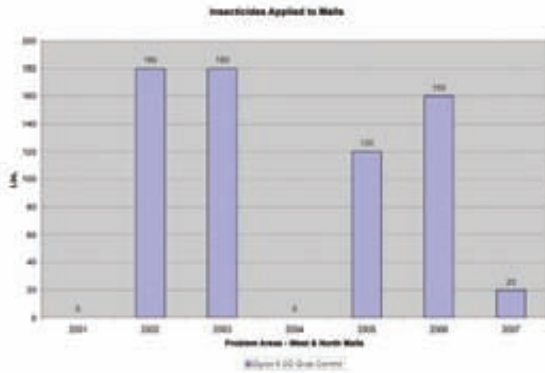


Figure #4

Conclusion of Changes (Figure 5)

In summary, inorganic fertilizer usage has decreased. When needed, a 13-13-13 fertilizer is applied at a rate of ½ lb N per 1,000 square feet to supplement the compost-fertilizer. The use of herbicides has also decreased. Herbicides are now used only when other IPM controls are exhausted. Turf grass disease problems have been minimal; most are fungal problems. Insect problems have been related to beetle larvae. The grub populations requiring treatment have affected only the North and West malls. Compost-fertilizer use has greatly increased on our mall areas. It provides both necessary nutrients and helps build desirable soil characteristics at the zoo.

The new compost program and other cultural changes have allowed turf density to increase (Figure 5). Changes in mowing frequency, mowing height, soil aeration, and Kentucky

bluegrass over-seeding have improved plant health. This has also helped to decrease the weed population – the main difficulty in the zoo mall environment. At Brookfield Zoo, the lawns are looking good, with a decrease in chemical usage and implementation of a compost-fertility program.



Figure #5

Overall, it appears that the Zoo's Organic Turf program has been quite successful, and should continue along this path in the future. -OC

Bibliography

- Illinois Pesticide Applicator Manual 39-1. Turf grass. University of Illinois Board of Trustees, 1996.*
- Milorganite, Milwaukee, WI 53204. info @ milorganite.com, 2008.*
- ¹ *Illinois Pesticide Applicator Training Manual 39-1, Pgs 4-8. University of Illinois Board of Trustees, 1996.*
- ² *Milorganite, Milwaukee, WI 53204. info@milorganite.com, 2008.*
- ³ *Illinois Pesticide Applicator Training Manual 39-1, Pg. 45. University of Illinois Board of Trustees, 1996.*
- ⁴ *IBID Pg. 48.*

715-258-8566 • www.WaupacaSand.com