

Integrated Pest Management

FRONT COVER ARTICLE CONTINUED

effectiveness. Core cultivation or aerifying is a necessary practice to relieve compaction and is a way to improve soils by topdressing immediately afterward. Last, but most important, is proper mowing, using a mower with sharp blades and the removal of a third of the grass blade at a time.

When a field is in the planning stage, we need to look at cost, not price. By cutting a contract down hundreds of dollars we may spend thousands of dollars in future maintenance. There are for example 'endophyte enhanced' varieties of perennial ryegrasses and tall fescues. Endophytes are fungi that live in the plant which have been found to be helpful to the health of the grass plant. These are not that much more expensive than regular varieties and are well worth the extra initial cost.

So have we wandered off the IPM topic? I do not think so. Is the technology to best implement IPM practices available to us? Environmental monitoring and weather forecasting technology help to minimize turf stresses and pest forecasting. The OMAFRA Turf Hot Line run by Pam Charbonneau at the Guelph Turfgrass Institute and the *GTI Advisor* are useful tools that are available. Alternative control strategies such as entomogenous nematodes (tiny eel-like worms), various bacteria and fungi and natural insecticides have been tested and proven effective. New programs, databases and formulas to select the appropriate pesticide are now more readily available and useful in the planning strategies and result in the least amount of environmental disruption.

If you are not already using some form of IPM, training is necessary to inform employees of new policies and procedures. Communication as to who is doing what, record keeping and an evaluation process to review the results of the program and make any changes necessary are also key.

In conclusion, with increasing numbers of cities and towns where pesticides are



New programs, databases and formulas to select the appropriate pesticide are now readily available.

banned, we as managers of sports fields should be embracing better cultural practices not only for field safety but also to lessen the need for pesticides in the future. Also keep in mind that IPM is flexible – it may be implemented in a variety of ways with different levels of commitment. ♦

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Words of Wisdom ...

"Whenever an individual or a business decides that success has been attained progress stops." *Thomas J. Watson*

"Part of our time is snatched from us, part is gently subtracted, and part slides insensibly by."

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New Turfgrass Faculty Member Appointed

DR. JULIE DIONNE JOINS THE UNIVERSITY OF GUELPH

The Guelph Turfgrass Institute at the University of Guelph is pleased to announce the appointment of Dr. Julie Dionne to the position of Turf Management Faculty with the Department of Plant Agriculture.

Dr. Dionne completed her Ph.D. in Plant Science at Laval University, Quebec, in the spring of 2001. She also received her B.Sc. from Laval in 1993. Julie grew up in a horticultural family. Her parents owned a garden centre, nursery and landscaping company and her grandparents were greenhouse flower growers.

Since 1999, Julie was the coordinator of the turf program at the Horticultural Research Centre at Laval University. She currently co-supervises five graduate students working in Quebec on different aspects of turf management - two of which will be joining Julie at Guelph in January.



Julie looks forward to working with the Guelph Turfgrass Institute's research team and developing a strong research program addressing both applied and basic research challenges. Her research interests include the physiology and ecophysiology of turfgrass species in relation to environmental stress tolerance to extreme temperature, drought and anaerobic conditions.

"I think it is very important to work closely with the turfgrass industry", says Dionne, "and there is tremendous potential for the development of on-site research projects that provide both important information and an educational opportunity for participating industry professionals."

Julie will divide her time between an office in the Bovey Building on the University of Guelph campus and the Guelph Turfgrass Institute. She can be contacted by telephone at 519-824-4120 (x 2232) or by e-mail at jdionne@uoguelph.ca. ♦



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I have almost always started out by recapping the weather and the work it allows us to carry out. Not to break tradition, for my final President's Message, I shall do the same. Is this not the best weather for field renovations? We have been able to overseed, topdress and sod almost all of the fields we had scheduled. The rain has been well timed for us in Oakville, but after speaking with Gord Dol, he certainly did not agree. I hear the rain has been too frequent and heavy for some.

We are still edging infields on the diamonds and are actually checking tarps we put down a month ago for turf growth. I suppose the down side is we are also continuing to cut grass the second week of November, and on our well fed, irrigated fields the end is not yet in sight. I do hope everyone is making the best of this outstanding weather and getting a jump on Spring 2002's work.

As I sat sorting the contents of this message, I could not help but realize how fast these past two years have gone by. When I first accepted this privilege, I thought two years would last forever and the task would be daunting. Well, two years have flown by and being a part of

this Board has been anything but daunting.

Your Association has increased membership and had record attendance at two very successful field days. Industry support of our Association is at an all time high. We have adopted a new *Strategic Plan* to carry us through, with focus, the coming years. The *Membership Roster*, again with industry backing, is now being printed annually. We have partnered with the Ontario Recreation Facilities Association and presented two joint educational workshops. With Lee, our Executive Manager, at the helm, we now have a one page marketing brochure available to suppliers for general advertising and marketing opportunities, as well as ones for specific support options.

We continue to be a presence at the Ontario Turfgrass Symposium, Landscape Ontario Congress and ORFA's Exhibition. In addition, this year we participated in the Atlantic Turfgrass Conference in Halifax and assisted with the International Turfgrass Research Conference in Toronto. Chris Mark partnered with PLCAO, composing a Sports Turf Association Position Statement in response to Bill C-388. Mike Bladon continues to drive this publication at the highest level of profession-

alism, as does Dr. Sheard with his representation on the OTS Executive Committee.

Without question, the main achievement during my term is the successful publishing and marketing of Dr. Sheard's book *Understanding Turf Management*. This tremendous contribution by Dr. Sheard will stand as a testament to the Sports Turf Association and I am thrilled that I was a part of the Board which made it available to everyone.

To be able to list these achievements shows the dynamic group of individuals who sit on the Sports Turf Association Board. Everyone plays a part, and everyone has a voice. It has been enlightening, it has broadened my knowledge, it has increased the circle of those I call friends and without a doubt, made me a better turf manager.

Lastly, my thanks to the Corporation of the Town of Oakville, especially Murray Cameron and Chris Mark, for all of their support and allowing me the time needed to fill the President's position. With all respect, thank-you to the entire Board, present and past, for the opportunity to work with each and every one of you. ♦

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ATTENTION MEMBERS

Do you have something to contribute to the next newsletter? Deadline for the March 2002 issue is January 14.

Surfing for Turf

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A Breakthrough in Organic Turfgrass Management

DR. WILLIAM A. TORELLO, DR. HAIM B. GUNNER AND DR. MING J. COLER, ECOORGANICS, INC.

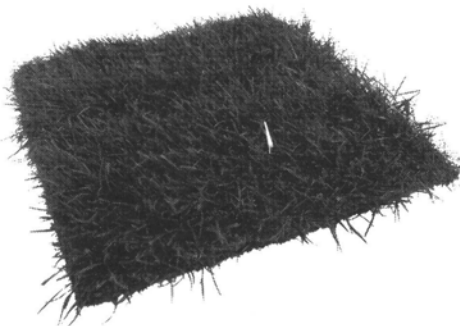
Integrated Pest Management (IPM) programs have been developed for almost all agricultural and ornamental crop production systems over the past two decades but only recently have IPM and organic management systems been considered a truly primary approach in professional turfgrass management. The reasons for the dramatic increase in organic approaches are centred upon public concern for the environment which has resulted in legislation at both the state and federal level in reducing or eliminating pesticide and synthetic fertilizer usage.

Although the industry has been 'pushed' into using IPM and organic approaches, a multitude of research reports as well as on-site experiences have shown that switching partially or even wholly to organic management techniques has resulted in renewed and greatly increased turfgrass performance while reducing or eliminating pesticide and synthetic fertilizer usage.

One of the more significant problems associated with organic turfgrass management programs, particularly in the golf course and sports turf industry, has been the inability to develop and maintain the high levels of overall turf quality and aggressiveness (recuperative potential) with natural organic fertilizers that are now expected.

Natural organic fertilizers are inherently low in available nitrogen levels ranging, for the most part, between 2 and 8% with only blood meal and bat guano approaching the 10-12% levels. These relatively low nitrogen levels (compared to synthetic sources) make it necessary to apply inordinately high amounts of material to achieve the desired seasonal effects since all natural organics depend upon soil microbial activity for nitrogen/mineral release.

As such, when soil temperatures are low as in the spring and fall, release rates are limited at a time when cool-season turfgrasses are at their peak of perform-



ance and need higher levels of nitrogen in the development of root zones and lateral stems. This is particularly the case when using materials lower than 6% N having a comparatively high C/N (Carbon/Nitrogen) ratio which would result in even slower mineral release.

To overcome this problem, the industry has developed 'organically based' fertilizers that have increasing levels of inorganic nitrogen added to meet the high N demands. These 'bridged' products have been successful but cannot be considered 100% natural organic and can result in increased nitrogen loss through surface runoff and leaching to groundwaters, depending on how high the percentage of inorganic N. Inorganically 'amended' materials also do not have the same ability to stimulate increases in soil microbial activities and populations so necessary for a healthy soil under reduced or limited pesticide programs.

It has been well documented over the years that increased soil microbial populations and activities compete with and suppress the populations and activities of soil-borne plant pathogens resulting in significantly less disease occurrence and subsequent damage (references 1, 2). Aside from temperature and adequate water levels, the amount and types of organic matter and fertilizers will have an extremely profound effect upon nutrient availability as well as disease suppression. Some types of organic amendments, particularly those with comparatively low C/N ratios, have been known to greatly suppress levels of disease incidence (3, 4).

The literature published regarding the

effects and potential use of organic fertilizers and amendments on professional turf, particularly in the last 10 years, is voluminous but can be summarized as follows:

Disadvantages

1. Nitrogen levels too low to maintain higher performance turf requiring a more rapid response.
2. Very high levels of material need to be applied to achieve desired results.
3. Almost all materials are applied in a pelletized, solid application which can easily be picked up during mowing and take considerable time to breakdown and release mineral nutrients.
4. Materials having high C/N ratios have extremely long residual times and may 'bind' available nitrogen.
5. Seasonal effectiveness: organic fertilizers depend upon microbial activities for mineral release and, as such, on irrigated systems, are much more effective during the warm summer months and not adequate during the high growth fall and spring seasons.
6. Bulky to store and transport due to comparatively low nitrogen analysis.
7. May have a naturally foul smell.
8. Usually much more expensive compared to inorganics and urea.

Advantages

1. Environmentally friendly: little or no nitrate leaching or runoff into ground or surface waters.
2. Increased soil microbial populations and activities.
3. Decreased disease incidence due to enhanced competitiveness by increased soil microbial populations.
4. Decreased thatch accumulation due to increased soil microbial populations.
5. Increased nutrient availability due to enhanced decomposition by soil microbial populations.
6. Increased soil water holding capacity.
7. Little to no salt index making high temperature applications safe.

In view of the previously listed disadvantages, the most desirable natural organic fertilizer would have the following properties:

- A. The highest level of nitrogen available, preferably over 12% N.
- B. The lowest C/N ratio possible, preferably under 20 for more rapid microbial breakdown and nitrogen availability, particularly during the spring and fall months.
- C. Easy application, preferably a liquid soluble/flowable spray application to avoid particle pickup during mowing and to enhance response time.
- D. High microbial populations and activities after application.

Until recently, the only way to approach the properties listed above was to blend an amended 'organically based' material which would have a base level of natural organic component mixed with a high N analysis inorganic or urea fertilizer. Un-

fortunately, although these materials meet plant nitrogen demands, they fall short with regard to increasing soil microbial activities/populations and decreasing disease incidence and are not in compliance with 'natural organic' standards. These inorganic/organic blends also have much more potential for eventual nitrogen movement to ground and surface waters. The only 100% natural organic that comes close to the above properties is blood meal which has up to 12% nitrogen and can be suspended in water for spray applications but, unfortunately, blood meal is extremely expensive to produce eliminating any feasible commercial use. Only one recently developed material (spring, 2001) called BioSOF Plus meets all the criteria outlined above. This material has the highest level of natural organic nitrogen to date in the industry at 14.0% which is plant derived from a complex series of extractions from soybeans. The material is composed of approximately 20% free amino

acids and 70% short chain proteins and peptides which makes the material extremely dispersible in water and, as such, very flowable allowing for liquid spray applications or additions to fertigation systems. BioSOF Plus has almost unlimited storage capacity and transport is acceptable due to the solid, powdered nature of the material and high nitrogen content. The protein content of BioSOF Plus is in excess of 90% which gives it the extremely low C/N ratio of 2.2 making it a powerful soil microbial biostimulant. In view of these characteristics, BioSOF Plus represents a significant breakthrough in the organic management of professional turf.

Objectives and Methods

The objectives of this report are to compare BioSOF Plus with a standard and comparable inorganic source having approximately the same analysis and milorganite, a popular composted sludge used extensively in the turf industry. Data



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were taken on overall turf quality every two weeks from experimental field plots of 'Providence' and 'PennCross' creeping bentgrass throughout the growing season of 2000. Microbial activity and population analysis for these materials was obtained by sampling of the soil profile 3, 7 and 10 days after each application of all materials followed immediately by a standard plate count method of quantifying soil microorganisms. Rates of application were 0.1, 0.2 and 0.3 lb N/1000 sq. ft. applied monthly on native soil sites and 0.3 lb N/1000 sq. ft. weekly on standard USGA sand greens and modified USGA sand greens mixed with 30% native soil.

Results

Turfgrass quality ratings between BioSOF Plus and inorganic treatments were surprisingly similar for all three soil types tested. Application rates between 0.1 and 0.3 lbs N/1000/month on native soil resulted in virtually no significant differences between BioSOF Plus and the inorganic treatments over the course of the growing season. A weekly application rate of 0.3 lbs N/1000 sq. ft. on both the USGA sand green profile and the modified sand profile again indicate that there are no observable differences in turfgrass quality between BioSOF Plus and inorganic treatments.

Microbial population counts for all three soil profiles showed dramatic differences between BioSOF Plus, inorganic and milorganite within three days after each application. Applications of BioSOF Plus to the USGA pure sand profile resulted in explosive growth of microbial populations compared to the inorganic and milorganite treatments. BioSOF Plus applications for the modified sand and native soil profiles were similar yielding up to 600% more microbial activity compared to the other treatments within 72 hours.

Conclusions

Turf Quality Ratings

Turf quality ratings for all soil types showed no differences between BioSOF Plus and inorganic treatments indicating, for the first time, that a 100% natural organic material can perform equally as well

as an inorganic during a 'spoon feeding' program, particularly to USGA sand greens. The low C/N ratio of BioSOF Plus (2.2) and the fact that the material is composed of highly degraded short chain protein/peptides and amino acids results in intensive soil microbial activity leading to an extremely rapid mineralization process and nitrogen availability levels approaching that of immediately available inorganic applications.

Soil Microbial Activity

Applications of BioSOF Plus result in extremely rapid and large increases in existing soil microbial populations compared to milorganite and inorganic nitrogen treatments. This rapid response is again due to the low C/N ratio of the material as well as the fact that the BioSOF Plus was applied as a flowable liquid spray (flowable powder) which would carry the material into the soil more effectively as well as have a much larger surface area for microbial activity.

The results obtained during the 2000 growing season clearly indicate BioSOF Plus to be equally as effective as inorganic applications with regard to overall turf quality but much more effective in stimulating existing soil microbial populations, even on a 100% sand profile, compared to inorganic and milorganite treatments. Although turf response was similar to inorganic treatments, there was no observable 'flush' of growth with BioSOF Plus applications and there is literally no chance of foliar burn due to the organic nature of the product. It can reasonably be concluded that soil borne disease activity would be much less on BioSOF Plus treated turf compared to inorganic or even milorganite treated turf due to the explosive increases in soil microbial populations.

The most important conclusion is the fact that BioSOF Plus meets all the criteria listed above as the 'most desirable' organic fertilizer source having the highest level of organic N in the industry at 14.0%, flowable characteristics of the material allowing for more effective liquid applications from spray tanks or fertigation systems, an extremely low C/N ratio with rapid and significant stimu-

lating effects on soil microbial populations. The physical characteristics of BioSOF Plus as well as plant and soil responses clearly make this material a breakthrough in organic management of turf as well as other agricultural systems. ♦

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Dr. Ming Coler is an Environmental Microbiologist with extensive research experience in soil and aquatic ecosystems. Dr. Coler is CFO and Co-Director of Research for EcoOrganics, Inc.

Editor's Note: Dr. Brian Holl will be addressing the topic of Organic Amendments, followed by a Panel Discussion on Organics at the upcoming Ontario Turfgrass Symposium. January 22-24, 2002.

Publication of this article does not imply the endorsement of BioSOF Plus by the Sports Turf Association. Availability in Canada will depend on the supplier obtaining registration of the product under the Fertilizer Act.

Selecting the All Important Greensmower

LLOYD WOODS, NATIONAL GREENS ADVISOR, BOWLS CANADA BOULINGRIN

What's New?

There is no doubt that greensmowers have become much more sophisticated than they formerly were. An important feature, the grooming reel, has come into greater use and most manufacturers now offer this device as an option. The groomer is a reel with vertical blades (or tines) located between the front roller and the cutting cylinder. It is used in conjunction with a Wiehle roller (one consisting of a series of disks) and lifts the grass to allow better mowing of the lateral growth that inevitably plagues greens to a greater or lesser extent. Reducing the recumbent growth increases the pace of the green somewhat and also improves the appearance of the turf. It is important to note that the groomer is not capable of removing thatch, therefore does not in any way replace the verticutter.

Secondly, there has been a general increase in the number of blades in the cutting cylinder to give more clips per inch at a given rate of travel and thereby a finer cut. Many manufacturers have embraced this trend. Most also offer a selection of bottom blades. The thinnest ones sometimes termed 'tournament blades,' permit closer mowing which not only improves the appearance of the turf but can also increase the pace of the green to some degree.

Another welcome improvement has been the introduction of better gasoline

engines which are lighter, run more quietly, are easier to crank and start more reliably. Honda and Kawasaki are good examples of the better engines now available.

Many engines also feature low-oil switches which prevent them from running if the crankcase oil drops below a safe operating level.

A Great Deal of Choice

For a number of years, most clubs relied on the Scott Bonnar 'Queen' – an Australian mower specifically designed for bowling green maintenance. This mower has served well and remains the one most frequently used on bowling greens across Canada. It is the heaviest of all greensmowers at about 400 lbs and the only one powered by an electric motor although more recently a conversion kit has become available to fit the Scott Bonnar with a gasoline engine thus removing the inconveniences associated with the long power cord.

Quite a number of clubs are now using mowers other than the Scott Bonnar machine. They are all gasoline powered, lighter, more maneuverable, and some have features not available on the 'Queen.' A lighter mower causes less soil compaction when mowing in wet conditions and requires less strength and agility to operate which could be an important



factor in cases where volunteers, particularly seniors, are called upon to look after the green.

ATCO, Bannerman, Jacobsen (Textron), John Deere, Toro and Thomas Green are some of the manufacturers, in addition to Scott Bonnar, which produce walk-behind greensmowers. All of these mowers (and perhaps other, less well known ones) have their pros and cons and are worthy of investigation.

As an example, the Scott Bonnar has a 30" width of cut while most of the others are only 22" wide. However, due to the ease of operation of the lighter mowers, the mowing time for a green is about the same for either type. Also, using the electric mower requires laying the power cord while the gasoline mowers, of course, do not require this operation.

Is Your Present Mower Satisfactory?

If your present greensmower is doing a good job, it is obvious that you do not need to consider spending the \$6,000 to \$10,000 required to purchase a new one.

If your mower is NOT mowing satisfactorily but is otherwise mechanically sound, a change to your equipment maintenance practices is indicated. You should make certain that:

- the reel is sharp;
- the bedknife is in good condition;

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