

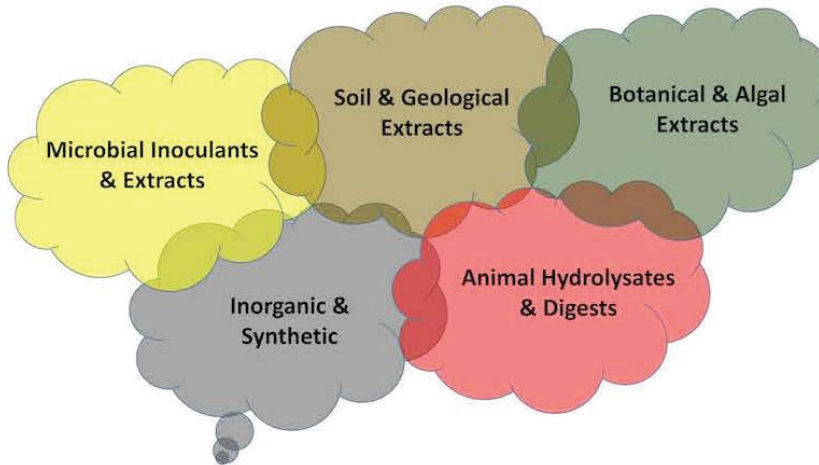
# TALK TURF

Official publication of the Wisconsin Sports Turf Managers Association

VOLUME 20 ISSUE 3 | WINTER 2019

## BIOSTIMULANTS - BOOM OR BULL?

Bryan G. Hopkins, PhD



“Biostimulants” are taking turfgrass and other plant disciplines by storm. Most green industry retailers sell biostimulant products with a wide range of claims. We surveyed major fertilizer companies asking, “What are the main trends you see in industry?” Without prompting or exception, they answered biostimulants are one of the top trends, with millions of dollars invested and billions in sales.

This investment wouldn’t likely occur

without something valuable behind it. However, there is significant misguided and missing information. We don’t have all the answers, but the following serves as a general guide with suggested readings for those that want to explore more deeply.

### WHAT IS A BIOSTIMULANT?

Most major dictionaries and encyclopedic references do not define “biostimulant.” The USDA National Agricultural Library does not list it in their glossary of terms. A definition was added to the current farm bill that a biostimulant is “a substance or micro-organism that, when applied to seeds, plants, or the rhizosphere, stimulates natural processes to enhance or benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, or crop quality and yield.”

This definition is too vague because it fails to exclude traditional products. After reviewing the definition in various scientific papers and company web sites, we propose the following definition that biostimulants are microorganisms and/or chemical substances which enhance plant growth and quality, often due to abiotic stress tolerance; excluding traditional pesticides, fertilizers, and soil amendments, such as limestone and gypsum. Biostimulants generally fit into five categories.

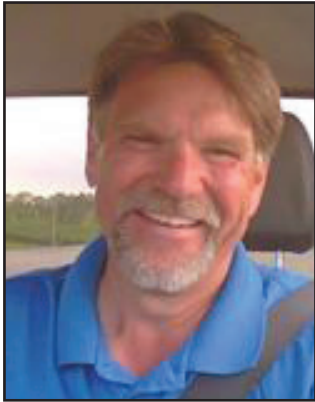
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# PRESIDENT'S MESSAGE



Greeting All!

I hope you are all enduring the cold slap in the face we have gotten over the last couple of weeks. As I was speaking to various turf managers and other members of the turf management industry, it's kind of the frosting on the cake of a challenging year. Whether it's the challenge of getting Fall turf maintenance jobs done, finishing renovation or field building projects, or in the case of some, tournament games that still need to be played on already tired fields. I have a response to you all, "great

job working though a challenging turf season" and also to many I work with, just know when to say, "the turf season is over." We may get a few good days yet, but all in all, I think winter has arrived.

Speaking of the Fall Conference, a big thanks to Mike Miller and his Assistant Gary Smale for not only the fantastic job they did hosting the Conference, but also the job they do managing a huge Athletic Facility. It was exciting to show the work it takes to manage turf at a Division III University that is very often in the spotlight. Mike blends the fundamentals of turfgrass management with advanced turf technology and research to produce excellent turf conditions for the UW Whitewater Athletes.

That was a good way to describe the day, new ideas and turf fundamentals. The talks on the use of PGR's and Wetting agents/surfactants are, in my opinion, integral in introducing some, and refreshing others on what other tools are available to help make Sports Turf managers successful. In my years as a Golf Course Superintendent, these were tools I wouldn't be without, and I'm thrilled to see them making progress in the Sports turf world.

Upcoming is the Winter Conference on February 19th, once again at Timber Rattlers Stadium in Appleton. Please mark your calendars. We already have some great presenters lined up and it looks to be another great educational event. Tell all turf managers you know!!

Finally, watch for Scholarship information from the WSTMA. Our commitment to growing the industry starts with new, young and talented individuals. Let's help them whenever possible!

May your Holiday season be full of rest, relaxation, and most of all, sharing quality time with those you love.

May your roots be healthy....

*Michael Krupke*



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## SAVE THE DATE 2020 WSTMA WINTER MEETING

This year, as in previous years, our Winter Meeting will be held at the Neuroscience Group Field at the Fox Cities Stadium, home of the Timber Rattlers. The Timber Rattlers are the Midwest Class A team of the Milwaukee Brewers, located in Appleton, Wisconsin.

The date for the event is Wednesday, February 19, 2020. The event will include morning coffee and bakery items, plus an excellent lunch. The theme for the event is "Turfgrass 101" emphasizing some of the basics of turfgrass management.

Topics for presentation include; Pesticides/Herbicides, Fertilizers, Weed Control, Seed Selection, and Scheduling. Perhaps this will present some new ideas, perhaps these topics will reinforce your knowledge, but both are valuable to our members.

The website: <https://wstma.wildapricot.org/> will provide information for registration, or contact Chapter Manager, Pete Bemis, at [pbemis@wstma.org](mailto:pbemis@wstma.org).

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## **DO THEY WORK?**

The answer is “it depends.” There are several reviews on biostimulants listed below. Yakhin et al. (2017) shows more than 100 sources with over 300 ingredients and bioactive compounds that have been studied. Many are currently in the marketplace. The Hopkins research lab has conducted 178 field and greenhouse biostimulant trials, on a variety of plant species, over the past two decades. The average yield/quality increase was 0.9%, which was not statistically significant. When separating by type, the only category showing a significant response was the soil and geological extracts, with all of these applied as humic or fulvic acids. However all categories had at least one trial with a positive response. This shows potential for biostimulants, but also suggests caution due to so many trials not showing a positive response.

For humic and fulvic organic acids, we found they worked consistently when mixed with phosphorus fertilizer and applied to soil with low soil test phosphorus levels and generally with low organic matter and high pH. Theoretically, sites with strongly acidic soil pH would also be responsive. It is imperative to cut the fertilizer rate by a third to half to prevent toxicity. The mode-of-action we have shown for these organic acids is that phosphorus is more soluble in soil solution and, therefore, more mobile. We show the effect was likely due to this and not some other biostimulation. However, the work of Olk et al. (2018), conducted in an environment very different than ours, suggests stimulation in other ways.

In field trials with microbes (bacteria or fungi), we recognize the potential for these to be beneficial, but we didn’t measure such in our trials. The main problem was that the microbes originally in the jug were dead on arrival. A large percentage of the products we tested were packaged with fertilizer and, as such, had extreme pH and/or salt content, killing the microbes. Additionally, an important fact when considering microbial biostimulants is that soils are highly microbially active—even with applications of fertilizers and pesticides. There are more than a trillion microbes in a teaspoon of soil. Adding a few more typically doesn’t work, although we do have proven success when inoculating legume seeds with *Rhizobium* to facilitate nodulation and nitrogen fixation and when adding Mycorrhizae fungi to soils, especially those with low fertility and/or water supply. The potential is there, but largely unsuccessful in our trials.

In the case of silica, it is not an essential nutrient, but it

is known to be beneficial to plants. However, the average soil is comprised of 28% silica. Most of this is in a solid form that is not accessible immediately by plants, but there is ample soluble silica floating in soil solution. Not surprisingly, we did not measure any plant response or increase in silica content in plant tissues in our research trials.

We tested dozens of products claiming to loosen soil compaction. None of them improved the compaction, which is not surprising. Compacted soil is a physical problem that is not likely solved with a chemical solution. Rather, aeration and topdressing continued to prove effective.

We tested dozens of products claiming to alleviate salt stress. Again, none of them worked, although there are many reports in the literature declaring biostimulants help with drought and salt stress. In contrast, salt problems were effectively alleviated with leaching with non-saline water. Keeping the soil relatively moist, blending saline water with non-saline water, and/or using salt tolerant species/varieties are also known to be effective. We recommend these solutions as first choices before trying biostimulants. Again, we had at least one statistically positive response for all of the biostimulant categories. And, there are many reports in the scientific literature of documented benefits. Thus, we do not want to be too pessimistic despite the majority of our studies failing.

## **BUYER BEWARE**

There is potential for biostimulants to be effective. In the case of organic acids, the research is a bit further advanced than the other categories. We generally know how to use organic acids in crops, although there is more to learn. Although we’ve measured many positive responses to organic acids in row crops, we have only rarely



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(twice out of 18 studies) measured it in turfgrass. We feel the reason for this is that the roots of turfgrasses are exceptionally efficient at finding phosphorus in the surface soil. Also, over 95% of turfgrass soil samples coming to the BYU Environmental Analytical Lab have enough phosphorus in them to last over 5 years without any additional phosphorus fertilization. According to this, adding organic acids and expecting a benefit is a bad bet if there is ample phosphorus already.

Another consideration is that informal observations suggest that biostimulants do not hold much promise for a well-managed turfgrass that is not in distress. The likelihood of biostimulants working is slim if plants have near optimal conditions, including light; water; oxygen in the rootzone; mineral nutrients; temperature; and minimal presence of toxins and pests.

Admittedly, the majority of our studies occurred under good conditions, which may be a reason for so few showing a positive benefit. More work is underway to evaluate their response when under stress.

William Edwards Deming, a major player in the Japanese post-World War II economic boom, is famous for saying “In God we trust, all others must bring data.” He attributed his success to listening to “experts,” but not just believing them blindly unless they had data to back up their claims.

In some cases, biostimulants work. In many others they do not. It is the responsibility of the companies selling these products to provide third party independent testing and reliable management guides. If they are proven, the next question is when and how do they work? Under what conditions? Stress? If a product looks promising and has this data backing it up, conduct your own trials by partnering with a scientist that can help set them up correctly. Be sure to compare it to both a negative and a positive control, as in the “Beware of false data” sidebar. Biostimulants are an exciting trend with lots of promise. However, don’t abandon proven practices for promises that seem too good to be true. Be optimistically pessimistic. Keep an open mind, but realize that most of these won’t likely work, especially if the turf is well managed and healthy. In the meantime, independent and industry scientists will continue to search for reliable products and ways to manage them. We advise to not be on the cutting edge of the biostimulant world to the point of throwing caution to the wind and chasing every new product with miracle claims. On the other hand, don’t be so pessimistic that you miss good quality products. Remember, fertilizer used to be considered a “snake oil.”

## **BEWARE OF FALSE DATA**

We ran across a company sharing some of our data. Unfortunately, they were only showing part of the data to shed a more positive light on their product we had evaluated. Yes, their product showed improved rooting and color in comparison to the negative control without anything added. However, it didn’t show any difference compared to the positive control. When we ran our tests we were aware that their product had fertilizer nutrients in it. Thus, we crafted a treatment that had equal fertilizer (positive control) amounts using more traditional sources.

Both our version and the biostimulant we were testing performed well, although the cost of the biostimulant was exorbitantly higher. In this case, there was no measurable biostimulation. Rather, it was simply a fertilizer response.

Bryan G. Hopkins, PhD, is a Certified Professional Soil Scientist (CPSS) and a professor in the Plant and Wildlife Sciences Department in the College of Life Sciences at Brigham Young University. Elisa A. Woolley is a graduate student at BYU.

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## **WSTMA FALL CONFERENCE A LOOK BACK**

Michael Krupke

The WSTMA Fall Conference was held on October 22nd at UW-Whitewater. A big thanks to Mike Miller and his Assistant Gary Smale for not only the fantastic job they did hosting the Conference, but also the job they do managing a huge Athletic Facility.

Looking forward to the day, we were excited about not only the thought of bringing new turf management tools to our membership, but also showing, through our afternoon facilities tour, the success of those time-tested turf management processes that are so successful on the fields Mr. Miller and his staff manage.

The day started with Justin Olmstead, Turf Product Manager at Precision Laboratories talking about the use of Wetting Agents, Hydration and Infiltration Surfactants to efficiently manage water on turf. As we know, water management can be a challenge on so many levels when managing turf. While these tools have been widely used in the Golf industry for years, the Sports turf industry is just now, in most instances, using these to manage water. In taking to many attendees after the presentation, there was excitement from many field managers in trying out some of these products next season.

*Continued on page 14*

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# SCHOLARSHIP OPPORTUNITIES - APPLY NOW!

## The Roy Zehren Student Scholarship

This year the WSTMA Board of Directors is offering a scholarship opportunity for a student with the award being a \$2000.00 check. This award has been around for two years and has been handed out to one, or two, students each year.

This scholarship is to be awarded to students who are actively engaged in academic studies and active in work experiences in the field of Sports Turf management or related to turfgrass management. Students must be enrolled in a university, college, or technical degree program. Students must have at least one semester of study remaining. This \$2000 scholarship will be awarded on an annual basis to a student who has exhibited an interest and commitment to sports turf management or a strongly related field. Student applications should include; a current resume, a letter of recommendation from one faculty member; letters of recommendation from employers/industry professionals are recommended, but not mandatory. **The deadline for submission is January 15, 2020. Students are expected to attend the February 19, 2020 meeting at Appleton to receive their scholarship check.** The application form and information are at this website: <https://wstma.wildapricot.org/Students>

## The Board of Directors Member Scholarship

This year the WSTMA Board of Directors have created a scholarship for a member to attend the national Sports Turf Managers Association meeting in West Palm Beach, Florida from January 13 - 16, 2020 in West Palm Beach, Florida.

This scholarship will be awarded to one member of the Wisconsin Sports Turf Managers Association to attend the national conference. The scholarship includes the cost of air fare, lodging, and registration to the event. The cost of food and incidentals are the responsibility of the member. **Members need to have their application into the Chapter Manager no later than December 15, 2019.**

The application for and information is at this website: <https://wstma.wildapricot.org/Students>

## Waupaca Sand and Solutions and the WSTMA Board of Directors Sponsorship Program

Waupaca Sand and Solutions together with the Board of Directors are sponsoring ten (10) memberships to the Wisconsin Sports Turf Managers Association for 2020. This award is for people who are currently not members of the WSTMA and need assistance to become involved. The award includes the annual membership for 2020 plus paid attendance at the 2020 Winter Meeting in Appleton on February 10, 2020. **Applications will be open until the first ten sponsorships are awarded.** The application form will be posted on the website: <https://wstma.wildapricot.org/Students>



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# Off Season Equipment Care

Mark Robel - Reinders, Inc.

An ounce of prevention is worth a pound of cure, pay me now or pay me later. We have all heard these phrases that basically tells us it is easier in the long run to do something preventatively vs curatively. This is especially true of equipment maintenance.

Once the season is over it will pay huge dividends to your operation to take the time to do a good preventative maintenance service to your fleet. I have seen a large operation with over 200 pieces of equipment cut their repair cost by 40%+ (over \$20,000 annually) when they hired a new mechanic that instituted a good PM program. Other benefits are increased reliability, increased equipment lifespan and better operational results. The following is a general recommendation for winter service.

First give the unit a good cleaning. After a season of cutting/painting/etc. in dirty wet conditions a thorough cleaning will allow you to inspect the machine. Blow the unit off with air then a nice hot pressure wash if possible. Removing all the residue will allow you to get a good look at the machine.

Once you have the unit clean visually inspect the unit for anything that may be wearing. If you can get the machine on a lift to inspect underneath that is even better. Check belts, pulleys, hydraulic hoses, bearings and generally look the unit over. You may catch a simple repair at this step that can prevent something major later. A worn hydraulic hose repair now can save a costly hydraulic leak repair later, a pulley bearing repaired now can save a deeper motor shaft repair later and so on.

Next the actual preventative maintenance steps. The best place to find out the service intervals is to be found in the specific operation manual for the machine. Equipment manufacturers will generally supply you with a schedule of when fluids and filters should be changed, which fluids to use and any other machine specific requirements. I highly recommend using the proper filters and fluids as these machines are expensive to purchase and are engineered with specific needs. Well fit filters and general purpose fluids may not have the right specs and affect lubrication. This could cause a performance issue or in some cases cause catastrophic damage. If you have to pay \$100-150 more a year to buy the right filters and fluids vs something that could cause \$5000+ in engine or hydraulic system damage it is worth it. This is especially true during the warranty period.

Here is a general check list for every piece of equipment that can supplement (not replace) the manufacturer equipment service schedule:

- Check for any leaks
- Check operation of all attachments / decks
- Check all safety functions
- Check that all lights and accessories work
- Check unit can climb slope forward and back with no unusual issues
- Use trailer or steep slope
- Check charging system and battery power
- Check and clean battery connections
- Check coolant level and quality
- Check all belts and hoses – Cracked, glazed, and tensioned
- Check all drive line, PTO shaft, and steering joints for need of repair
- Shake them and check for play in joints
- Check tires and report wear
- Check spindle and/or reel bearings
- Check blade and/or reel size and if replacement is needed
- Check all deck and/or reel lift and pivot points for wear
- If a 5000 series FW mower cut both hydro filters and look for any debris
- Check for any hours-based maintenance needed
- DPF clean out
- Injectors
- Timing belt replacement
- Gear box oil

Lastly before putting the machine to bed a good waxing will help keep the unit looking great and keep debris from sticking to the units in season. Another trick is to spray WD-40 on the metal areas and wiping it down. Re-apply in season on rain days and it will make daily inspection easier all year.

Taking a little time in the offseason to do the equipment maintenance will help you do your job in season.



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## SHARE WITH US!

The WSTMA is always seeking input from our members on topics to present. Name the topic, such as fall fertilization, how to buy fertilizer, soil testing, etc. and we can find a speaker or write an article for the newsletter. Send you ideas to Chapter Manager Pete Bemis at [pbemis@wstma.org](mailto:pbemis@wstma.org).



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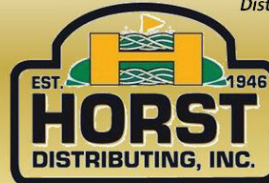
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Dr. Paul Koch, Pathologist in the Department of Plant Pathology for the University of Wisconsin gave us an overview of the new edition of the “Compendium of Turfgrass Diseases” being published and to which the WSTMA has donated \$3000.00 to for publication. This is a great resource for any turfgrass manager, and we will have copies available when completed.

Dr. Koch also spoke about the formal education opportunities now available for Turf Managers who want increase or enhance their turf knowledge. You may go to our website to learn more!

Next up was a presentation on Plant Growth Regulators by Dr. Bill Kreuser, Ph.D. who is a turfgrass Extension Specialist and Assistant Professor at the University of Nebraska-Lincoln. Once again, turf growth regulators are becoming a more widespread tool used by sports turf managers. While many have been using it in their field painting procedures for years, the use of growth regulators as an overall tool for managing turf growth et. al. is somewhat new in the Sports turf realm in this area. With budgets becoming tighter, the turf condition expectations are still high (much like golf) and growth regulators give turf managers an option to mow less, battle annual bluegrass, establish sod, and on and on.... Again, more tools for the sports turf manager to use to be successful.

Throughout the morning, we gave our Vendor Partners each 3 minutes to tell us about themselves. We, as an Association, owe them so much for their support. Please make sure you reach out to them when you can.

After lunch, we were treated to a walking tour of the Athletic Facilities at UW-Whitewater by Mr. Miller. If you remember, the tour of UW Whitewater that afternoon was a bit brisk and chilly. I’m sure the folks that couldn’t attend would agree if they were trying to get anything done outside that day. Regardless, we got to see what goes into managing the fields at an upper level Division III University is like and the new facilities UW Whitewater has added for both Athlete and fan comfort and convenience. By using a blend of turfgrass management fundamentals and new technologies, Mr. Miller and his staff have given their athletes and supporters sports fields they can all be proud of. Also be aware, UW Whitewater has a blend of artificial and natural turf fields, so we got to see and hear input on managing both. Kudos to Mr. Miller and staff for a successful day!



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