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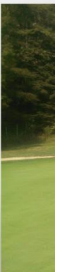
FRIDAY, 24 APRIL 2015

Is Phosphite an Environmentally Friendly Alternative to Traditional Pesticides?

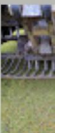
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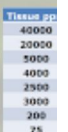
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This week I had a discussion on Twitter about a statement made that phosphite use will help reduce the environmental impact of pesticides on the golf course. The guru of phosphite in turf, John Dempsey, stated this in his thesis abstract.

Worldwide, turfgrasses provide surfaces for numerous sports and recreational facilities and disease control is vital in their successful maintenance. *Microdochium nivale*, an ascomycete fungus, is a ubiquitous and damaging pathogen of these turfgrasses. Fungicides are the main means of control, making alternative methods desirable. Phosphite, an anion of phosphorus, has proven efficacy in reducing susceptibility to phytopathogens, the aims of this research therefore, were to determine if phosphite suppresses *M. nivale* incidence and to identify the processes involved. Field trials determined significant suppression of *M. nivale* incidence and enhanced fungicide efficacy in phosphite treated turfgrasses. Analyses of treated tissues determined rapid *in planta* accumulations, symplastic mobility and no conversion to phosphate. *In vitro* inhibition of mycelial growth and disruption of hyphal morphology were determined, with phosphite concentrations of 100 µg/ml⁻¹ fully inhibiting growth. It was also determined phosphite was fungistatic, not fungicidal, and that phosphite in the growth media significantly inhibited conidial germination. Assessment of *M. nivale* turfgrass infection incidences determined hyphae as source of inoculum and that infection was by means of stomatal penetration, conidia via sporodochia are the means of propagation and dispersal. Analyses of infected turfgrasses confirmed that increased generation of phenolic compounds and hydrogen peroxide are components of defence responses and that phosphite pre-treatment, enhanced these responses. This work has shown that phosphite suppresses *M. nivale* incidence, and increases fungicide efficacy. These results will lead to changes in turfgrass management procedures, benefits being reduced requirements for fungicides, cost savings and a reduced environmental impact.



Dr John Dempsey 🏌️🔬
@J_J_Dempsey



250 word abstract with 2 words to spare :)

♡ 7 12:36 PM - Apr 22, 2015

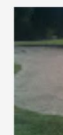
See Dr John Dempsey 🏌️🔬's other Tweets

I have done quite a bit of work looking at the environmental impact of different products that we apply on the golf course using Cornell University's [EIQ calculator](#). The EIQ calculation is, in my opinion, the most comprehensive and meaningful way to measure the impact of certain products used for pest control on the golf course. I wrote about this in a blog post "[Sustainable Pesticide Use: Tracking Pesticide Cost and Environmental Impact](#)." I also shared my observations after tracking my EIQ for an entire season in a post "[EIQ Tracking, My First Year](#)." Tracking the EIQ has been an enlightening experience for me and has really helped changed my perspective on the impacts that certain products have on the environment. It is usually impossible to determine the exact impacts each product has but the EIQ equation takes a lot of the measured impacts that we are aware of and puts it into a format that is easy to understand. The higher the number, the worse the product is for the environment.

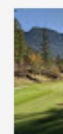
With my extensive pesticide EIQ records it was easy to break the EIQ apart into categories to see how much the of my total EIQ was a result of my phosphite applications.

In 2014 (first year of tracking as I go and using the EIQ to make application decisions) my EIQ was as follows.

Total EIQ for year on putting greens adjusted to account for spot spray applications.



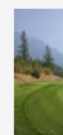
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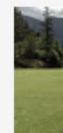
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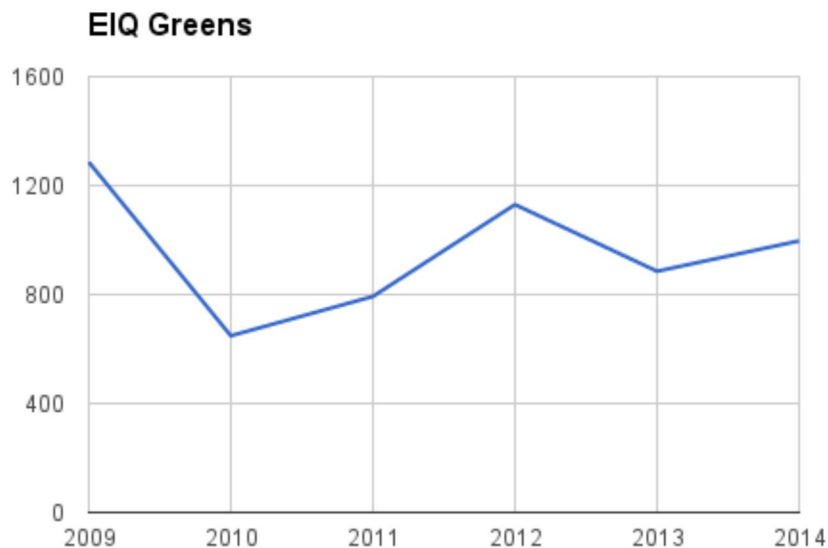
EIQ for phosphite on greens also adjusted for area

440

Therefore phosphite accounts for a total of 46% of my total EIQ.

ALMOST HALF.

Last year I looked back on my records as far back as 2009. I wanted to get an idea of what my average EIQ was over the years so that I could set realistic goals.



The average EIQ over the years was about 950. I started using phosphite in late 2011. For the ease of calculations lets just call it early 2012. The rate over the years has remained constant year over year as recommended by John's research at 0.35g/m² every month. I tighten up the intervals but adjust the rate accordingly during the summer as the turf growth increases. Basically the rate stays the same each year.

	2009	2010	2011	2012	2013	2014	Average
Traditional EIQ	1286.38	648.65	792.94	1130.25	885.41	997	956.7716667
phosphite EIQ				440.00	440.00	400.00	
Phosphite percent of total				0.39	0.50	0.40	0.43
Traditional Pesticide EIQ reduction				690.25	445.41	597.00	577.55

As you can see since I started using phosphite for disease control on my putting greens I have reduced the EIQ of traditional pesticides by an average of 43%.

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Here's the thing,

EIQ DOESN'T CARE WEATHER YOUR PRODUCT IS A TRADITIONAL PESTICIDE, INDUCED SYSTEMIC RESISTANCE, ORGANIC or whatever!

It is a measure of the environmental impact of the product no matter how it works, or is marketed as.

My average EIQ before using phosphite was 908. The average decreased about 50 since I started using phosphite or about 5%. So yes, technically my environmental impact has reduced since I incorporated phosphite into my disease management program, but not by much.

Now John's research has shown that when using phosphite the fungicide efficacy is increased and rates can be reduced. This would in turn reduce the total EIQ. The only problem with this is that I almost always apply fungicide at the lowest label rates. It is simply illegal to apply fungicide at lower than label rates.

So from my observations and data collection I have to say that in my circumstances, phosphite does not reduce the environmental impact of my disease management program on my putting greens. It does, however, reduce the EIQ of traditional fungicides which is a meaningless statement. It does however make me feel warm and fuzzy inside for some reason that most people choose organic products over non organic even though they are often just as bad. My greens have also never been better and the disease has never been easier to manage. The traditional pesticide applications just seem to work better. I can't measure that though.

Now I don't want to say that phosphite will not reduce the EIQ for everyone. For some it will probably have a bigger impact than it did for me. For those that require higher rates of traditional fungicide to get control, or those that are having resistance issues, I would highly recommend phosphite be incorporated into your programs. And for those that already have a low EIQ, the use of phosphite has other benefits for turf as well, namely an increase in general turf quality.

So technically John isn't wrong to say that the use of phosphite can reduce the environmental impact of pesticides, but it won't always be the case and wasn't for me.

To measure is to know.



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Posted by [Jason Haines](#)



Labels: [EIQ](#), [phosphite](#)

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