



Can Spray Volume Influence Product Performance?

By Dr. R. Chris Williamson, Department of Entomology, University of Wisconsin-Madison

Spray volume or flow rate can vary dramatically among applicators, pesticide type and formulation, application site (i.e., putting green, fairway, athletic field, lawn, etc.). Spray volumes > 4 gallons per 1000 square feet were not uncommon less than a decade ago. However, spray volumes have since been reduced dramatically to rates as low as 0.5 gallons per 1000 square feet (about 22 gallons/Acre). This dramatic change to lower spray volumes is likely due in part due to convenience (i.e., fewer tank mixes and

application) as well as development of improved pesticide formulations and nozzle types that deliver pesticides more effectively. Time is often associated with money, thus pesticide applicators are continuously looking for ways to save time (money). Consequently, turf manager have quickly identified that reducing spray volume is an effective way to reduce the number of tanks required to spray respective areas of turf, thus theoretically saving valuable time. In addition, pesticide manufactures have made a con-

certed effort to develop pesticide formulations that enable pesticide applicators to dramatically reduce spray volumes.

Depending on the pesticide type (i.e., fungicide, insecticide, herbicide, plant growth regulator, etc.) and flow rate, performance (i.e., efficacy) can be significantly influenced. Most herbicides can effectively be applied at relatively low spray volumes (< 1 gallon per 1000 square feet) compared to other types of pesticides such as fungicides and insecticides. Depending on the mode of action (i.e., contact,

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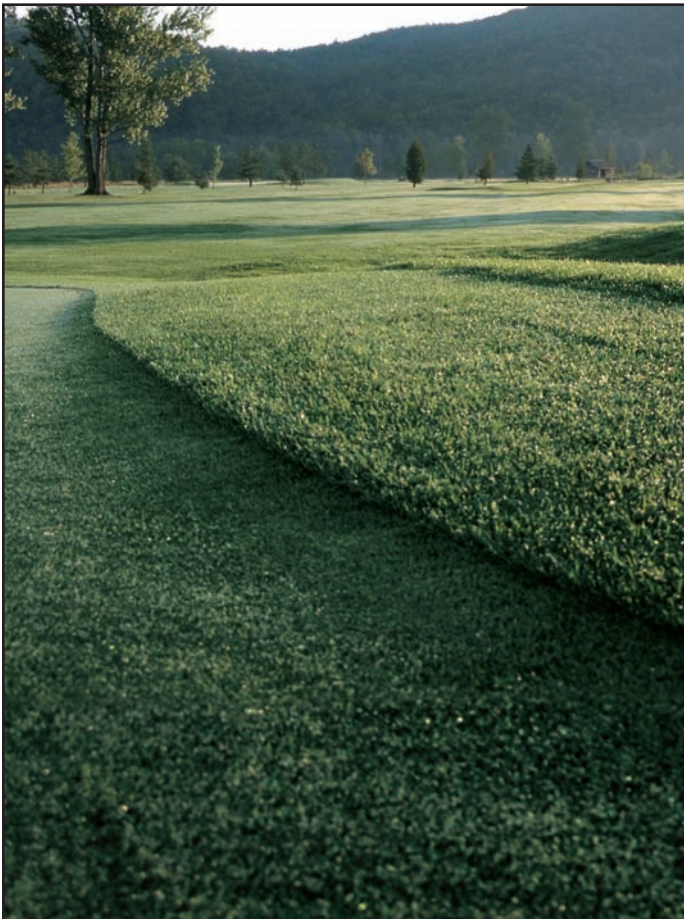
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systemic, translaminar, etc.), most fungicides should be applied at spray volumes between 1-2 gallons per 1000 square feet. While some insecticides, especially white grub control products, should be applied at dramatically higher spray volumes, ideally 2-4 gallons per 1000 square feet to maximize efficacy.

Many turfgrass managers prefer to tank-mix combinations of control products (e.g., insecticides, fungicides, wetting agents, micronutrients, etc.) as a time-saving means. In theory, this approach appears rational or justified; however, it can potentially result in poor control product performance. Rarely do product manufacturers provide information regarding tank-mix compatibility or performance (i.e., efficacy) unless there has been a problem of incompatibility. This important type of information is occasionally provided by university researchers or more commonly determined by turfgrass managers through trial and unfortunately error as a result of previous experience. Certain control products require specific application spray volumes, and when they are not applied accordingly, their performance is jeopardized! Thus, it is critical to understand the appropriate spray volume of respective control agents (pesticides) as well as any potential incompatibilities.

Another important factor to consider is the selection of spray tip or nozzle. Nozzle size directly effects droplet size, which in turn influences flow rate as well as coverage of control product. Consequently, the performance a control product can be dramatically impacted by nozzle selection. The majority of nozzles used in agriculture can be classified as producing either fine, medium, course or very course droplets. The most common nozzles used in the turfgrass arena are those nozzles producing medium sized droplets, they can be used for contact and systemic herbicides, pre-emergence surface applied herbicides, insecticides and fungicides. When choosing a spray nozzle that produces a droplet size in one of the aforementioned categories, it is important to consider that one nozzle can produce different droplet size classifications at different nozzle pressures (psi). For example, a nozzle may produce medium droplets at low pressure, while producing fine droplets as pressure increases. Spray nozzle selection information (i.e., drop size, output, etc.) can be obtained from respective manufacturers.

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January February 1990

Compiled by David Brandenburg, Editor, *The Grass Roots*

This month we are going back to January of 1990 and the beginning of the Rod Johnson WGCSA Presidency. In many ways 1990 seems like it was only a few years ago not 20 years. Gas was \$1.34 per gallon and the Simpsons made their TV debut on the Fox Network. Windows 3.0 hit the shelves and the Hubble Space Telescope was put into orbit.

The cover story of this issue penned by editor, Monroe S Miller covered the new WGCSA President, Rodney Johnson. Rodney took the helm of the association at age 35 as Superintendent of Pine Hills Country Club in Sheboygan where he still resides today.

After obtaining an associates degree in Horticultural Production from Gateway Technical College in Kenosha, Rod's career took him to

North Hills as an assistant superintendent and Clifton Highlands Golf Club and Thunder Mountain as superintendent.

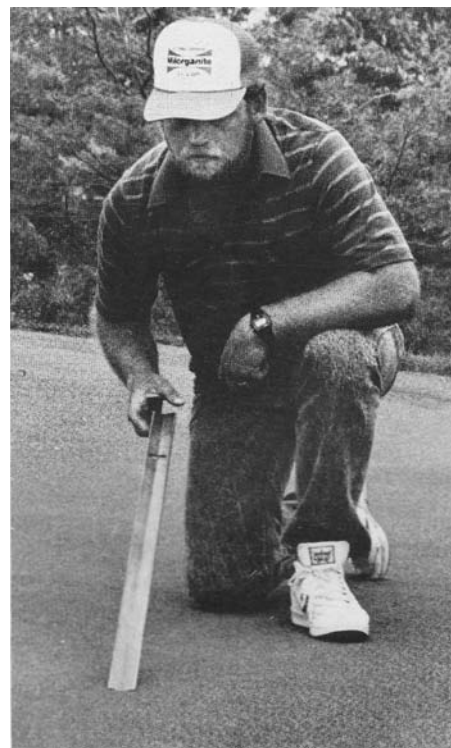
Johnson grew up in Osseo where he met and married his high school sweetheart Janell. The couple has two boys - Brent and Joey. Rod became interested in golf course management at the age of 14 when his father was president of the Osseo Golf Club. It was at that time the course was being renovated and switched from oil-sand greens to new bentgrass greens. The course also put in a new irrigation system and several tees for the bargain price of \$50,000 along with donated member labor. Rod was volunteered to learn how to fill trenches!

When asked about his role as president Rod expressed he felt he was a spokesman for the membership and in turn the board of directors. His items of importance included:

- Completion of the OJ Noer Center for Turfgrass Research
- Continue the WGCSA relationship with the WTA while solidifying the WGCSA identity.
- Improving member understanding of AG 29 and the effect it will have on golf operations.
- Continue the successful publication *The Grass Roots* and our relationship with Milorganite and the Wisconsin Golf Turf Symposium.



The Campus Connection penned by Mario Tiziani was titled natural Variation in Putting Green Speed. At the time Mario was a sophomore at the University of Wisconsin-Madison and a member of the UW Golf Team. He preformed his



Rod Johnson from the January 1990 *The Grass Roots*

research under the guidance of Dr. Wayne Kussow, UW-Madison and Michael Semler Superintendent at Cherokee County Club. Tiziani used stimpmeter reading on 4 greens at Cherokee Country Club over a 4 week period to track how uncontrollable factors influenced green speed.

Factors that are uncontrollable to the maintenance department include rain, humidity levels, temperatures, and time of day. The greens were single cut a consistent height, and received no fertilizer during the test period.

In summary Tiziani found that non cultural changes in putting green speed were found and anticipating those changes puts a golfer at an advantage over his competition. When averaged over the four

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greens, speed rarely changed a significant amount but individual greens did have significant measurable change. The maximum green to green variation was 2.5 feet, while day to day variation on a given green ranged from 0 to 1.25 feet.

When air temperatures exceeded 80 degrees for several days in succession speeds originally were varied green to green but then leveled off to a variation of less than 9 inches. Tiziani stated that a variation of 9" or less is not to be concerned over for the golfer's sake.

Daytime drying of the turf increased green speed only if the bentgrass was not growing rapidly. Normally the grass growth during the day slowed the green to match the speed increase from drying conditions.

Grain had a much greater effect on green speed than did direction of mowing. Grain could reduce speed 20% while mowing direction only had a 6% impact.



In The Wisconsin Golf Course Survey titled Drinking Water on The Golf Course compiled by Monroe Miller and Rod Johnson. They chose the topic based on an increase in golfer demand for ice cold fresh drinking water on multiple holes.

Some course staffs are spending 20 man hours per week to keep up with the demand for water with washing and replenishing 10 gallon Igloo coolers and cup supplies. Monroe noted that the 4oz cone cups supplied for the golfers is often not enough and the players are bringing 16 oz. cups with them.

Monroe went on to say "More than one superintendent has wondered how a 10 gallon Igloo cooler could be empty at 2 pm when it was full at 9 am and yet there are only a dozen cups in the waste container. Wondered, until he saw a player on the next tee soaking a both towel with water from the cooler."

"The complaining from players is aggravating, but not nearly as much as having to send an employee back to the golf course on Saturday and Sunday afternoons - to fill coolers. That's aggravating because there are employees on the property already - clubhouse and pro shop employees. But for us at least, filling coolers isn't their job. So we send someone in, at overtime pay and usually for a three hour minimum, to fill the _____ coolers."

With twenty superintendents interviewed the average number of cooler locations on the course away from the clubhouse were 5. Often two or more holes were served from the same cooler station. Coolers were the most common source of water while a few had a combination of coolers and bubblers. Blue Mound had all piped water.



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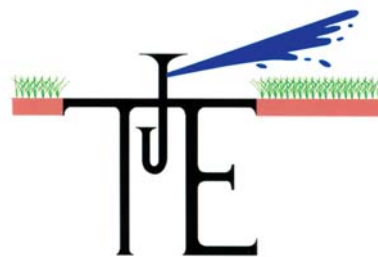
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17 of the golf course superintendents were responsible for maintaining the coolers while two had clubhouse staff to do the work and one had the golf shop staff responsible for cooler maintenance.



In the Wisconsin Pathology Report Dr. Gayle L Worf titled his article Should Mercury Containing Fungicide Use Be Continued. At the time Dr. Worf wrote the article mercury products were under special review to determine if they would be allowed on golf turf.

He started with a review of the cadmium and chromium containing products that came under fire in the 1960's and were later banned. Dr. Worf stated although plants growing in soils high in cadmium

would take up the compound the product when applied to turfgrass was not a threat to citizens unless they smoked tobacco grown in high cadmium fields.

He continued to say despite the direct link from turf to people there are two other tests to consider. 1) Are there safer alternatives available? and 2) What is going to be the perception with its continued use among both golfers and the general public? In other words, on a risk-benefit use, can it be defended?

Gayle did not think its use at the time could be defended. By that time there were new organic fungicides available to replace the cadmium products

Now on to the mercuries. Mercury is a heavy metal, cumula-

tive in the soil where applied and in certain circumstances recognized as hazardous to human health. Methylmercury formulation exposure from fish was the most dangerous form of exposure to humans.

The phenyl and inorganic mercuries used in turf maintenance were considered less toxic. Not to say they were not hazardous as mercuries can be absorbed by the skin or inhaled however, they had much less toxic effects in comparison to other heavy metals and would be eliminated by the body over a 60 to 90 day period.

Testing of golf course waterways after use of mercury products for over 40 years did not show any mercury in the waterways. This was attributed to mercury being

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tied up in the thatch layer of the soil, and not taken up in high quantities in the plants.

That brought us back to the same test used for the cadmiums, are there safer alternatives available. Combinations of PCNB, chloroneb, Daconil, thiram or other chemicals would work where snow mold pressures were not high. However where pressure was high snow mold breakthrough was common.

Dr. Worf finished with this. "Of course, if society decides that a lower level of control is acceptable, then we do have alternatives. Our judgment has been based upon the present demand, which is a green coming out of the winter in sound condition without holes that prevent its early springtime enjoyment."

"It will be interesting to see how the mercuries are judged by the new generation.



The Wisconsin Soils Report by Dr. Wayne Kussow was titled Questions From the Floor. Wayne answered questions on the difference in silica and calcareous sands in root zone mixes, ferrous sulfate and chelated iron products for fine turf, fine and normal sized Milorganite products and the benefits of homogenous and blended fertilizers. He also covered the formation of black layer and the question; "is freeze thaw aerification from the expansion of sand, silt, clay or water."

"The correct answer is water, but how much of this natural aerification occurs during a given winter is very much dependent on how many freeze thaw cycles occur. Water expands when it freezes and forces apart soil particles. During

the thaw cycle water enters the new spaces created. Freezing then causes further expansion, and so the cycle goes."

Sandy soils, because of their inherently lower water contents, generally undergo less freeze thaw action than do silt or clay soils. Sands are also the least subject to compaction. Hence, in the final analysis, the importance of natural freeze thaw aerification does not differ greatly among the three soils.

As a reminder to WGCSA members this and all past issues of The Grass Roots can be found online at the Michigan State Turfgrass Information Foundation. (TGIF) Members can get access through the WGCSA website. 

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WTA EXPO Brings Important Turf Research to Industry

By Tom Schwab, O.J. Noer Turfgrass Research and Education Facility, University of Wisconsin-Madison

“Great education” sums up this year’s Turfgrass and Greenscape EXPO held at Boerner Botanical Gardens in Hales Corners on December 8, 2009. The UW-Madison’s team of turf researchers dominated the program and their talks exceeded everyone’s expectations.

Dr. Doug Soldat talked about his new research that dispelled conventional wisdom about best times to fertilize turf. If you missed it you’ll need to talk to Doug sometime before you fertilize this year. His information on rates and timing of fertilizer applications, based on 2 years of research, is unlike what you’ve learned in the past.

Dr. Chris Williamson talked about diagnosis and control of often overlooked insect pests. We’ve all heard about emerald ash borer and cutworms, but how about bluegrass billbug and chinch bug. Although these pests are often overlooked, they can cause considerable damage.

Dr. Jim Kerns talked about newly discovered dollar spot disease factors that influence turf health. Dr. John Stier talked about the impact of the DNR’s new invasive species rule (NR40) on all turf sites including landscapes, golf courses, schools, and sports fields.

In addition to the UW research talks there were two top-rated business speakers. Ms. Angie Chaplin from

the UW-Milwaukee talked about tips for motivating staff, and Ms. Kathy Villars from Northwestern Mutual put on a workshop about winning the budget game. Two other sessions also took place in the afternoon. Dr. Kerns gave a hands-on workshop for diagnosing turf diseases, and concurrently taking place was a turf industry ‘State of the Economy’ round-table discussion.

The talks were complimented by a wonderful trade show where everyone had ample time to discuss all their commercial needs for the coming season. Please see the list of vendors who additionally give financial support to help bring EXPO and all its great education to you every year. 🌱



Dr. Williamson addressed the often overlooked insect pests.

Coming Events

2010

- March 1 MondaySpring Business Meeting, Fond du Lac
- April 19 MondayAbbey Springs GC Fontana, Host - David E Smith
- May 10 MondayWild Rock GC, Wisconsin Dells, Host - Mike Blazich
- June 8 Tuesday.....WI Super/Pro Morningstar GC Waukesha (WI PGA Event) Host - Travis Krauklis
- July 12 MondayWatertown CC, Watertown, Host - Michael Upthegrove
- July 27 TuesdaySummer Field Day at OJ Noer Research Facility, Verona
- August 9 MondayOneida Golf and CC, Green Bay, Host - Mark Storby
- September 20, MondayWee One Fundraiser Pine Hills C.C. Sheboygan, Host - Rod Johnson
- October 8 & 9, Couples WeekendSaddle Ridge GC, Portage, Host - Seth Brogen
- October (TBA)WTA Fundraiser for the Fellowship
- Nov 16-17Wisconsin Golf Turf Symposium, Kohler, (tentative date)