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ABOUT THE COVER

No place in the world of golf in Wisconsin exemplifies the autumn season more than the Pumpkin Hollow Country Club, located in beautiful southwest Wisconsin. Red maples and sugar maples bring bright colors to the golf course, and corn stalks and piles of big, orange pumpkins remind everyone of fall in Wisconsin. Jennifer Samerdyke has captured it beautifully on our cover.

"For man, autumn is a time of harvest, of gathering together. For nature, it is a time of sowing, of scattering abroad."

- Edwin Way Teale

THE GRASS ROOTS

THE GRASS ROOTS is a bi-monthly publication of the Wisconsin Golf Course Superintendents Association, printed in Waunakee, Wisconsin by Kramer Printing. No part of THE GRASS ROOTS may be reprinted without expressed written permission by the editor.

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An Eventful Summer in Wisconsin

By Marc Davison, *Golf Course Superintendent, Green Bay Country Club*

The PGA Championship recently swept through Wisconsin. What an exciting event to host in our state. The crowds were tremendous and the feedback has been very positive. Competition at that level is very exhilarating and to finish playing 72 holes with a three-way tie is almost hard to believe even possible. Kohler has hosted two major championship tournaments so far and both have ended in ties during regulation play.

Whistling Straits proved to be the perfect test for the top professional golfers in the world. There was much concern prior to this event on whether the course would be accepted by the players and the fans. Is it too hard, too long, and too tough? Remember the first professional tournament at PGA West? The pros did not like that course and said they would never return and they haven't.

Weather was definitely a factor each day. It is clear to see that the wind direction has a huge effect on how the course plays. Thursday produced some very low scores. I know this was a big concern for Mr. Kohler and Mr. Dye. The mighty length did not seem to bother the pros one bit. Only one player in the top 12 managed to improve on their Thursday score in subsequent days. The scores continued to go up each day for the top players. Vijay's rounds continued to climb each day with his worst score on Sunday. He shot the highest round out of the top 40 players Sunday and still won.

Mike Lee, David Swift, Grant Davey, Tony Rzadzki and the entire staff at Whistling Straits have to be commended for an outstanding job during the Championship. The time involved in producing a golf course of that magnitude for an event like the PGA Championship is tremendous. Congratulations, men; you did a great job and made a great statement world wide about great golf in Wisconsin. From the sound of it, this is only the beginning of major tournaments for the Kohler courses.

The WTA recently held its annual field day at the O.J. Noer Facility in Madison. The day turned out to be a perfect one. Attendance was good (remember how long you stood in line for lunch?) This event seems to grow each year. The plots are very interesting and always expanding. The professors, graduate students, Tom Schwab and staff members do a great job at the Facility. We should be very pleased and proud to have such a wonderful facility in our state. Take advantage of the research going on there.

In July the Wisconsin Department of Commerce and Wisconsin Agribusiness Council hosted their annual Ag tour in Wisconsin. The purpose of this tour is to get legislators out "in the field" to view different aspects of the agriculture business. This year's tour included stops at Accelerated Genetics, Equity Livestock, Walsh Farms, a lumber business, an apple orchard and the tour concluded with dinner at LaCrosse Country Club. The entire day is sponsored by organizations and businesses involved in agriculture in some way or another. Our organization was contacted and asked to help out. The turf industry sponsored the evening meal and program at LaCrosse CC. With the help of some of our allied turfgrass association friends, money was donated to pay for the meal. Thanks to the following organizations for contributing to this event: Wisconsin Landscape Federation, Wisconsin Sod Producers, Sports Turf Managers, WTA, Wisconsin Grounds Managers and WGCSA. Dr. John Stier and Brian Swingle presented a short program after dinner explaining the impact the turfgrass industry has on our state's economy. Dr. Stier also addressed pesticide, fertility and water issue concerns. What a wonderful opportunity to address influential politicians on issues that are very important to our industry. Thank you very much, John!

Enjoy the fall!

Velocity: A Potentially New Herbicide for Selective Removal of *Poa annua*

By Dr. John Stier and Mr. Kurt Steinke, *Department of Horticulture, University of Wisconsin-Madison*

What did you miss at field day this summer? Besides information on new soil test calibration results, nutrient loading into runoff from prairies, breeding of Wisconsin-adapted grasses, and fine fescue/colonial bentgrass fairways, you missed seeing a potentially new means of selectively controlling *Poa annua* in creeping bentgrass.

Velocity, containing the active ingredient bispyribac-sodium, is one of the most exciting herbicide chemistries for turf in the past 10 years. The product was originally developed for and used in rice production in southeast Asia beginning in 1997. Bispyribac-sodium belongs to the class of herbicides known as the ALS inhibitors: susceptible plants turn light brown about 10 days after application because they can't produce several necessary amino acids necessary for proteins. The product has a relatively short half life in soil of about 2 weeks. Combined with its relatively low toxicity, the product offers a potential solution to reducing or eliminating *P. annua* from creeping bentgrass turf with minimal risk of environmental problems. The extremely low use rate, measured in grams per acre, is also attractive from the point of using relatively little chemical.

Materials and Methods

The study was coordinated with Jason Fausey of Valent Corp. in order to develop information required on proper use rates and formulations to support product registration. Treatments were applied beginning 3 June 2004 to a mature mixed stand of creeping bentgrass (*Agrostis stolonifera* L.) and annual bluegrass (*Poa annua* L.). The treatment list and schedule is shown in Table 1. All formulations were wettable powders (WP) except for one wettable dry granule (WDG). Applications were made using a CO_2-powered backpack sprayer and 8004 EVS flat fan nozzles using 2 gal water per thousand square feet. Turf mowing height was 0.5 inch with clippings returned to simulate a typical fairway program. Plots were irrigated twice weekly to avoid drought stress.

Table 1. Application information for testing *Poa annua* control in bentgrass using Velocity herbicide, Verona, WI, 2004. Dollar spot infection data represent the percentage of bentgrass turf area affected by the disease; ratings were collected 56 days after the initial Velocity treatment.

Formulation	Rate (grams ai/acre)	Number of applications	Application interval	% Dollar Spot
80 WP	45	One	---	18.8
80 WP	30	Two	14 day	6.2
80 WP	45	Two	14 day	5.0
80 WP	30	Three	14 day	0.0
17.6 WDG	10	Four	7 day	15.0
80 WP	10	Four	7 day	7.5
80 WP	20	Four	14 day	4.2
Untreated check	---	---	---	27.5
LSD (0.05)	---	---	---	2.1

Plots were rated at 3, 7, 14, 21, 28, 42, and 56 days after initial treatment application. Ratings collected included the percentage of *P. annua* and creeping bentgrass, phytoxicity to both *P. annua* and bentgrass, and turf color. The extent of dollar spot disease in each treatment was rated during epidemics at 21 and 56 days after the initial treatment.

Results

All Velocity treatment programs provided statistically significant control of *P. annua* within 56 days of the initial application (Fig. 1), though initial discoloration occurred within 3-7 days of treatment. The best control was achieved using 30 or 45 g ai/acre at either three or two applications on a 14 day interval (74 and 80% control, respectively). The WP formulation gave much better control (58%) than the WDG (34%) applied at 10 g ai/acre four times at 7 day intervals. A single application at the high rate of 45 g ai/acre gave poor control (28%) compared to two applications (74%).

Velocity caused slight discoloration of creeping bentgrass within one week of application but was within an acceptable range for fairway turf, especially since the discoloration was short-lived. *Poa* discoloration continued to worsen over time until plants were obviously dead within two to four weeks after application, depending on the initial rate and frequency of application.

Data on broadleaf weed suppression was not collected because it wasn't part of the study, but all Velocity applications virtually eliminated any of the broadleaf weeds in the study, including white clover, dandelion, and mouse-eared chickweed. Velocity did not seem to have a noticeable effect on crabgrass, though since no data were collected its possible a rate-response could have existed.

An unexpected benefit of the Velocity application was an obvious suppression of dollar spot disease (*Sclerotinia homeocarpa*) as shown in Table 1. The amount of dollar spot control was fairly consistent with rates and application frequency: the greater the rate and/or application frequency, the better the disease was controlled. In fact, no disease occurred when 3 applications were made at 14 day intervals, though all of the multiple applications of the WP formulation gave statistically similar control. Again, the WDG formulation was less effective, as was the single application of the high rate of the WP.

Although it wasn't officially part of the study, we applied Velocity to small areas of perennial ryegrass, fine fescue, and Kentucky bluegrass and found them to be unaffected. These results indicate Velocity may be useful for eliminating *P. annua* in these turf species as well as bentgrass. We have not yet tested it for safety on tall fescue. For those who are interested, Velocity did not appear to harm the one patch of rough bluegrass (*Poa trivialis*) we had in the plots, though this result is not definitive due to the limited treatment rates and small sample size.

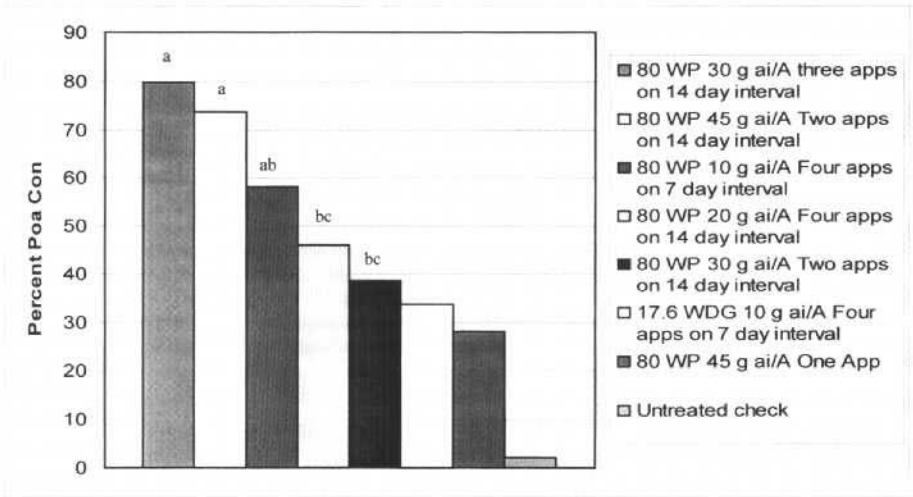

Fig. 1. *Poa annua* control in creeping bentgrass fairway turf using Velocity herbicide in June through July, 2004, at the O.J. Noer Turfgrass Research and Educational Facility in Verona, WI. Treatment means followed by the same letter are not statistically different at $P < 0.05$.

Discussion

Our results show Velocity can be an effective herbicide to remove *P. annua* from creeping bentgrass. Control is best with two or more applications, particularly at rates of 30 to 45 g ai/acre. The WP formulation is vastly superior to the WDG formulation for reasons we have not yet determined. The actual rate and timing interval useful to superintendents may depend on the amount of *P. annua* in the turf stand, the degree of injury/discoloration that can be accepted, and the management practices before, during, and after Velocity application. In our trial we effectively killed up to 80% of the existing *P. annua*, but bentgrass cover did not change during the study, i.e., the bare areas were not filled in by bentgrass. In many situations it will likely be desirable to implement an overseeding or sprigging program which coincides with Velocity application in order to have bentgrass fill in the turf as the *P. annua* dies. Current information suggests Velocity can be applied 7 days prior to overseeding; otherwise Velocity application should be delayed 42 days after seedling emergence.

The dramatic suppression of dollar spot is an unexpected bonus. Part of the application cost of Velocity would likely be offset by a reduction of fungicide cost to control dollar spot as well as broadleaf weeds. Additional information is needed on the longevity of the dollar spot suppression and activity of Velocity herbicide on other diseases. Additional studies are also needed over time and in other locations to ensure our results were not an anomaly.

Some readers will undoubtedly question if Roundup-Ready creeping bentgrass is still desirable should Velocity become registered for use. Yes, for two reasons: 1) Velocity is an ALS herbicide, having a fairly specific mode of action which could result in weeds becoming resistant to it unless it is interspersed with applications of completely different chemistry such as Roundup. Herbicide resistance to other ALS herbicides has been previously noted in agricultural settings where the chemicals were used routinely; 2) Roundup will generally provide 100% control of *P. annua* with a single application. In fact, from a turf manager's standpoint, registration of both Velocity herbicide and commercialization of Roundup-Ready bentgrass would be the best of both worlds. For example, Roundup might be used at the beginning of a 5-year program to eliminate existing *Poa*, while Velocity is used once or twice afterwards in the ensuing years to remove new *P. annua* plants. In order to avoid herbicide resistance, Roundup could be used again in the 4th or 5th year, after which the cycle would continue.

Word has it Valent Corp. is seeking EPA registration which would allow Velocity to be used on golf course turf for *Poa* control in the near future. Stay tuned.

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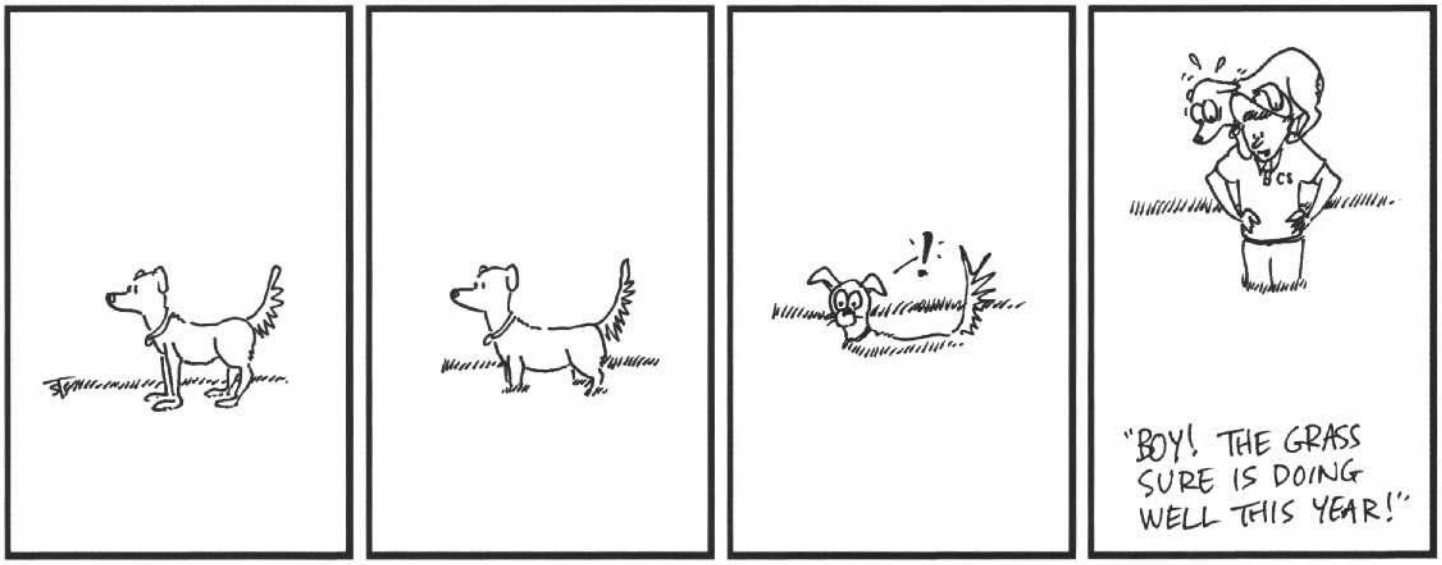
What Affect Does Cold Temperatures and Excessive Amounts of Water Have on Insects?

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

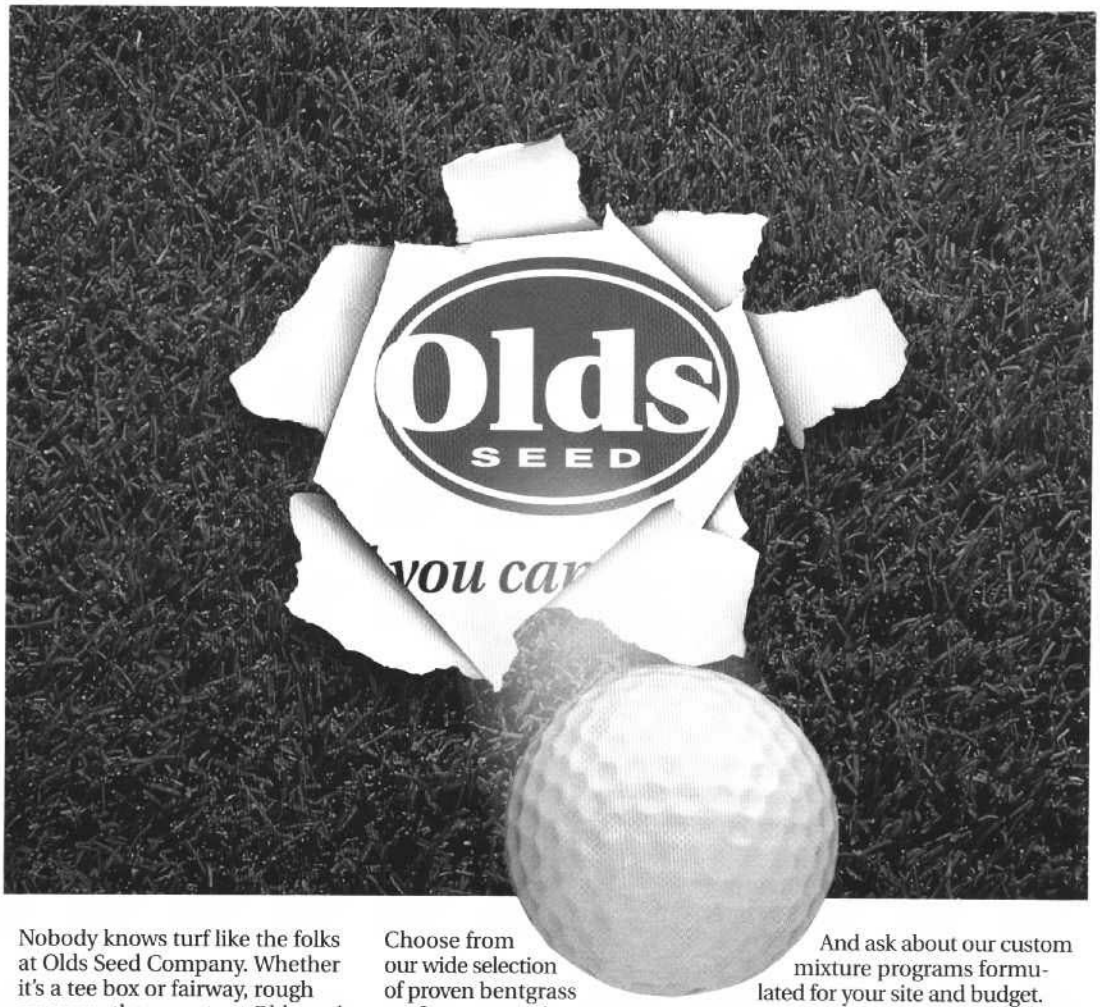
Insects are cold-blooded animals; their physiological development is dependent on temperature. Generally speaking, insect development occurs as the accumulation of heat units occurs above a certain developmental minimum for a 24-hour period. This method of measuring and estimating heat unit accumulation is called the degree-day method. Below this minimum temperature, no physiological development occurs; most (not all) insects have developmental minimum or threshold of 50 F°. To calculate degree-days simply determine the minimum/maximum temperature within a 24-hour period, take the sum of these two values and divide by 2 and compare this value to the developmental minimum (i.e., 50 F°). For example, assuming the minimum temperature was 46 F° and the maximum temperature was 82 F°, the degree-days accumulation would be 64 F° minus 50 F°. Using this example, 14 degree-days would have occurred. Different insect species have varying degree-day requirements for development, thus knowledge of specific biological information is necessary. Such information is available for many insects, but not all.

Does excessive water affect insects? There is no simple or straight forward answer to this question! The effect of excessive water is largely dependent on the insect species. Some insects are considerably more vulnerable to water than others. In some instances water can be used directly for suffocating insects. For example, in a non-turf agricultural situation, flooding of cranberry bogs is an extremely valuable tool for controlling several insect pests of cranberry. Flood irrigation is also effective in controlling white grubs in sugarcane, especially under conditions of high temperature. Conversely, other insects such mosquitoes thrive in water. Nonetheless, we cannot control the weather; when excessive rainfall events occur over continuous periods of time, it is possible that a negative impact on the development and survival of some turfgrass insect pests may result.

All in all, both cold temperature and excessive water can play an important roll in development and survival. Because we have no measurable influence on temperature, and flooding is not a practical control strategy on turf, especially since flooding can be detrimental, these pest management approaches are not relevant.



TURF PROS



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Gray Leaf Spot of Ryegrass: A Masterpiece of Orchestrated Cooperation

By Dr. Geunhwa Jung, *Department. of Plant Pathology, University of Wisconsin-Madison*

Over the past several years, my lab has been conducting research to understand the mechanisms of gray leaf spot resistance in ryegrass using DNA technology as a research tool. This particular project has been funded by the USGA. Recently gray leaf spot (GLS) caused by *Pyricularia grisea* has become one of the most important emerging turf diseases in many states except states in the northern part of the U.S. Due to the sporadic and explosive nature of the disease epidemics, superintendents who manage perennial ryegrass fairways and roughs have extreme trouble battling this disease. Furthermore, fungal isolates are able to fight against fungicides by rapidly becoming insensitive to the fungicides. When you are facing this kind of difficult situation, the only option left is to incorporate plant resistance into the overall disease management. We all remember the disease triangle which consists of three major components; host, pathogen, and environment.

Mr. Joe Curley, a Ph.D. student majoring in the Plant Pathology, has been working hard to unlock a few key genetic questions such as how many genes are involved in ryegrass resistance, where they are located on the chromosomes, and how the defense mechanism(s) in ryegrass are different from ones in rice since the same pathogen can attack both host plants. Through the genetic knowledge accumulated from the well-studied host, rice, and that learned from ryegrass research, we will be able to develop resistant ryegrass cultivars more efficiently. As a result, the disease will be easier to control than before.

So far, we found that there are two or three genes involving in GLS resistance in an interspecific ryegrass population derived from the cross between the perennial ryegrass cultivar 'Manhattan' and the annual ryegrass cultivar 'Floregon'. According to greenhouse inoculation experiments, the resistance appears to originate from the annual ryegrass. At first we thought the results were unexpected, but they make very good sense if you think of how the annual ryegrass was bred.

The Floregon used in our study was bred through a joint breeding program, Dr. Reed Barker at Oregon State University and Dr. Gorden Prine at the University of Florida. In the course of breeding Floregon, unintentional selection for resistance to GLS was successfully made due to natural epidemics in breeding plots. More interestingly, all perennial ryegrass plants tested turned out to be very susceptible to GLS. Resistant plants from our study will surely be incorporated into improving perennial ryegrass via breeding programs. Thanks to DNA technology and genetics tools, we were able to track down the origin of the GLS resistance and the development of improved cultivars is promising.

The next step is to confirm what we discovered from growth chamber experiments under field conditions. In many cases, what was detected in the growth chamber inoculation is not reproduced in a real world situation such as golf courses or athletic fields. Therefore, it is crucial to run the field inoculation experiments to validate what we found in the growth chamber. Thankfully, as you might have already read in some extension articles, no disease incidence has been reported in Wisconsin as of today. Maybe, GLS disease damage has not been high enough to be

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