(Continued from page 9) Glyceria maxima Variegata' Hakonechloa macra 'Aureola

Holcus lanatus 'Albovariegatus'

Juncus effusus 'Spiralis'

Juncus effusus Juncus inflexus (glaucus) Luzula luzuloides Miscanthus sinensis 'Autumn Light'

Miscanthus sinensis 'Graziella'

Miscanthus sinensis 'Morning Light'

Miscanthus sinensis Purpurascen's'

Miscanthus sinensis 'Yaku Jima'

Molinia caerulea 'Skyracer' Molinia caerulea Variegata' Molinia caerulea arundinacea

Panicum virgatum 'Cloud Nine' Pennisetum alopecuroides 'Moudry'

Scirpus lacastris 'Albescens' Typha minima variegated manna grass golden variegated hakone grass 'Albovariegatus' velvet grass corkscrew rush, spiral rush soft rush rush woodrush 'Autumn Light' Japanese silver grass 'Graziella' Japanese silver grass 'Morning Light' Japanese silver grass flame grass, purple silver grass 'Yaku Jima' Japanese silver grass 'Skyracer' tall moor grass variegated moor grass tall moor grass, tall purple moor grass 'Cloud Nine' switch grass black-flowering pennisetum\* 'Albescens' bullrush dwarf Japanese cattail ₩



## Spray in the wind with the WINDFOIL





Commercial Turf Equipment and Supplies® 1-800-292-3628 (414-782-8869) "DEMONSTRATION DRIVEN"

- Reduce Environment, Public Pesticide Exposure
- Increase Productivity / Stay on Schedule
- Maintain on Target Applications
- Increase Public Confidence
- Adapt to your Current Sprayer
- Current Customers Thru-out Wisconsin





# **Good September for the Station**

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

The Noer Facility is constantly evolving. That is what makes this job so interesting for everyone who works here. The two big things we accomplished in September were to expand our irrigation system and to install a bunch of new investigations. We have been quickly running out of irrigated plots for research projects. Previously there were 81 irrigated plots at the Noer Facility, and almost all of the unoccupied plots were taken with the installation of eight new studies this fall. The new irrigation will provide twelve new irrigated plots, easing some of this overcrowding for 1999.

Installing the new investigations took precedence over the irrigation project this September. We were battling the clock trying to get the plots planted before the September 15 seeding cutoff date for southern Wisconsin. Everyone contributed many late nights and long weekends to get the plots in. Several nights involved using utility vehicle headlights to do seeding well past dark. The seed for all the plots germinated and were established guicker than I have ever seen before. All conditions were suitable for fast germination including warm soils and air temperatures in September, good supplemental irrigation, and available fresh seed. We also used various turf covers to speed establishment. The new investigations that were installed include:

- \* Aggressiveness of bentgrass clones
- \* Different seed mixtures for athletic field use
- \* Evaluation of new bentgrasses, sand green
- \* Homeowner turfgrass mixture demonstration
- \* Regional Kentucky bluegrass demonstration
- \* Three different National Turfgrass Evaluation Program: fine fescue, fairway height; bentgrass, push up green; and bentgrass, tee/fairway height

There were many challenges installing each of these new projects. The 'aggressiveness of bentgrass clones' project will observe how the bentgrasses compete with *Poa annua*, however we didn't have continuous plots of *Poa annua* to test against at the Noer Facility. We discovered that Clark Rowles was rebuilding some greens at Nakoma Country Club, because they were largely populated with *Poa annua*. So we relocated the sod from two of his greens to the Noer Facility. The challenge of a few of the other investigations involved fumigating the soil to lessen weed competition. The fumigant works well but is dusty, smelly, and difficult to apply. Seven of the eight new investigations presented the challenge of seeding them with shaker jars since the plots are too small for conventional seeding equipment. Each investigation averaged about 100 separate small plots. The extensive handwork is why seeding continued well into the night and dur-



Tammy and Jim Krieger treated us like royalty.



The contestants for the first Noer Open.



Professor Doug Maxwell puts on a clinic for the young pups.

ing some long weekend days this September. Protecting these valuable investigations from erosion also presented a challenge. Many types of turf covers were utilized including Futerra, Curolex, and Evergreen mats as well as marsh hay.

The irrigation project could now commence after the new seedings were successfully installed. Jeff Gregos wanted to test his irrigation design knowledge by drawing up the irrigation system. A quick check with Phil Zastrow and Dan Bilski from Reinders Irrigation checked out that the system was designed perfectly. Funds were quickly procured, parts ordered, and installation begun. Reinders helped out once again by donating a trencher for installation. As of this writing the system is now pressurized, and partially cleaned up. The only work left to do is finish cleaning up, level heads and boxes, repair four leaks, and wire the system to the satellites.

These projects were not without some entertainment. We managed to squeeze in the first-ever Noer Open Golf Invitational in early September. The Faculty and staff at Noer were all invited to enjoy the golf and cui-

sine of Windy Acres in Monroe. We could not have had better hosts than owners Jim and Tammy Krieger. We were just planning on walking nine holes but Jim insisted we ride carts complete with refreshments. The course was so much fun that we had to play another nine holes. Jim then invited us to dinner for Friday night fish fry. He gifted the golf to us but we were firm that we'd pay for dinner which he agreed to. But he lied. After the wonderful fish fry, he would not give us the bill, and after some arguing would still not let us pay. Our first crew outing will not only be remembered for the fun golf course but for the gracious hospitality of our host.

We also had another diversion in September when working one night. A visitor stopped by to see if he could practice tennis on some of our grass. The visitor was former UW-Madison basketball and tennis coach, John Powless. John was recently rated the top grass tennis player for his age group in the country. He had an upcoming tournament in New York and wanted to get the feel for playing on short grass of which there isn't any in Madison. Luckily we had some bentgrass plots that were scheduled to be torn out in a couple days so we let him play. I even tried to volley with him — and quickly learned why he is top rated!

The faculty and staff accomplished a lot at the Noer Facility in September and had some fun while working hard. The addition of the new investigations and more irrigated plots for future studies will help us add to our base of local turfgrass knowledge. We hope you had a good September too.



Top rated John Powless pays a visit to the Noer Facility.



Headlights were needed to seed into the night.



Irrigation for the 12 new plots were installed this fall.



1830 Executive Drive Oconomowoc, WI 53226

Don't let your equipment sit idle while you wait for engine parts! Depending on your needs, we will take care of you direct or help you find your local engine dealer. Let the engine experts help you! We carry a full parts inventory. Ask for our parts department.

414-567-8575 or 800-242-2289 (phone) 414-567-2256 or 800-897-8999 (fax)







Kubola

### Soylent Green



## **Kusa None and Godzilla Patch**

By Steve Millett Department of Plant Pathology, University of Wisconsin-Madison

Developing a business network was an important part of the 1998 National Science Foundation's Summer Institute in Japan program. This summer, I spent one week travelling across the lavender covered slopes of Sapporo and through the volcanic mountains of Morioka meeting with professionals in the turfgrass industry. The trek included stops at two of Japan's most prestigious golf courses and a visit to the site of Godzilla patch.

I wanted to present the Japanese superintendents with gifts (a very important part of Japanese culture) and Monroe Miller was kind enough to give me copies of The Grass Roots. I wasn't sure how to present them and turned to my well-used English-Japanese dictionary. Under "grass roots" I found two definitions: *n. 1. Ordinary people* - *ippan taishuu (ee-ppa-n ta-eesh-ew); 2. Roots of turf-grass - kusa none (coo-sa no-nay)*. I penned these two definitions in Japanese kanji on the front cover of The Grass Roots journals and presented them to the superintendents. Even though the language barrier slowed down our conversation I sensed a mutual understanding of the double meaning title - ordinary people working with grass roots. It

was an extraordinary day with ordinary Japanese turfies.

My travels took me to Hokkaido, the northernmost of Japan's four islands. Hokkaido is a geological wonderland, half-covered in forests, lava-seared mountains and crystalclear lakes. Sapporo is the largest city with 1.7 million people. It has almost the same latitude as Madison (43 N) so the weather is similar, but with more snow and warmer winter temperatures. One of my first stops was the very

> grass roots n. (ordinary people) i<sup>r</sup>ppan taishuu 一般大衆; ku<sup>r</sup>sa no ne 草の根.

# Introducing Country Club<sup>2</sup>.

Country Club<sup>2</sup> contains short-chained water-soluble methylene ureas that deliver nitrogen consistently — even in sandy, low temperature or low moisture areas — providing up to 95% of its

nitrogen source in 12 to 16 weeks. That's because Country Club<sup>2</sup> doesn't rely on microbial action alone. It also releases nitrogen through controlled solubility in the presence of water. So it works efficiently in any soil type providing noticeable green-up within days and sustained feeding for weeks. For more information on Country Club<sup>2</sup>, contact your authorized Lebanon Turf Products distributor or call 1-800-233-0628.

Available in greens of fairway grades.

Frank Baden Territory Manager Bettendorf, IA (319) 332-9288





Godzill patch near Morioka, Japan.



Arnold Palmer's signature #8 hole at the Washington Club.

beautiful Arnold Palmer course, the Washington Club Sapporo Golf Course. This five-year old course, nestled in a rugged region near the Sapporo-dake mountains, has majestic pine trees lining the meticulously groomed fairways. The Palmer signature #8 of the Nishi course is a botanical work of art. A round of golf costs 15,000 yen, approximately \$115 U.S. dollars. Despite its beauty, this course is fighting a case of take-all, fairy ring and black layer. Fortunately the damage wasn't too severe.

Our next stop was the host of the ANA Open: the Wattu course of the Sapporo Golf Club, where a round of golf costs 23,000 yen, (approximately \$175 U. S.). On Wattu, I diagnosed brown patch, take-all and pink patch. Both courses were immaculate and heavily staffed. Their equipment was the same as in the U. S. but with some brand names I've never heard of before. I was expecting the courses to be vastly different than ours, but that wasn't the case. The turfies in Japan, much like the turfies back home, made me feel comfortable and welcome.

The next stop was Morioka, located in the northern part of the main island. Morioka is a bustling center of commerce and industry, surrounded by volcanic mountains. Mt. Iwate, which became active this February, dominates the skyline. The researchers I met were very hospitable. One of the highlights of this stop was witnessing the biggest



Nanida Shigi, the Washington Club superintendent.



Yamamoto Kiumi, the Wattu Club superintendent.

snow mold patch I've ever seen. I coined it 'The Godzilla patch.' This patch was discovered in a timothy and ryegrass pasture located in a mountainous dairy region. The patch was over 50 meters in diameter! *Typhula ishikariensis* was the fungus that caused this huge patch. One of the most interesting findings about the "Godzilla patch" was the discovery that it was caused by several different kinds of *T. ishikariensis*. At first we thought the patch was caused by just one clone. Let's hope Wisconsin superintendents never see patches this big!

It was a summer full of amazing experiences. I experienced seven earthquakes, bathed naked in a coed hot spring near an active volcano, and I practiced Za Zen meditation in a Buddhist temple where a monk beat us with bamboo sticks. I ate raw horse soaked in ginger sauce (shinbashi), went kayaking and white water boating and survived Japanese language classes. One of my favorite experiences was playing baseball for the Kanken Dragons in the Institute League (although I fractured my thumb tagging a runner out at third).

I had the honor of working under Dr. Naoyuki Matsumoto, the world's leading Typhula researcher. In his lab, I completed genetic compatibility experiments to further the snow mold work I am doing in Wisconsin. I even saw twothousand year old Typhula sclerotia! Dr. Matsumoto obtained the sclerotia from an archeological dig in Hokkaido. It was carbonized in ashes in what appeared to be an ancient fire pit. Ancient enemy, indeed. However, the thing that stood out the most was the time I spent with ordinary people - ippan taishuu.



# The One and Only.

US 67-95-P354

## HERITAGE\* An Ounce of Prevention...

HERITAGE is a highly flexible fungicide that exhibits both preventative and curative activity against most turfgrass diseases, plus the following advantages:

- · Improves turf quality
- · Controls brown patch, Pythium, take-all patch, summer patch, anthracnose and snow mold
- · Reduced risk to environmental resources
- · Low risk toxicological profile
- · Low rates, extended spray intervals
- · Novel mode of action

Dr. Don Scott, Purdue University, 1995



Also isolated from plots: 2 species Rhizoctonia: 3 species Pythium: and several species Curvularia

Anthracnose<sup>1</sup> (Colletotrichum graminicola) on 80% Annual Bluegrass, 20% Perennial Ryegrass



Once you learn about the powerful, preventative protection and its fit with your best management practices, you'll agree that it's time to change the course of your turfgrass disease management program, with HERITAGE.

For more information, call Daniel Wickham at 714-858-5415, or contact your authorized Zeneca Distributor, or call Zeneca Professional Products Toll Free at 1-888-617-7690. www.zenecaprofprod.com

Pythium Blight (Pythium aphanidermatum) on Perennial Ryegrass



Dr. John Watkins, University of Nebraska, 1996 USNP-96-P030

#### Summer Patch (Magnaporthe poae) on Kentucky Bluegrass

Percent Control	100 80	100%	100%			el 40WG	
	60 40 20 0	HERITAGE 50WG	HERITAGE 50WG	Banner 1.1 EC 🖌	Bayleton 25DF 29	Sentin 25%	Rubigan 50W
Oz./1,000 sq. ft.		0.4	0.2	4.0	4.0	0.33	0.75
Number of Applications		3	4	3	3	3	3
Application Interval (days)		28	14	28	28	28	28
Final Reading		19 DAA 3	33 DAA 4	19 DAA 3	19 DAA 3	19 DAA 3	19 DAA 3

Dr. Bruce Clarke, Cooke College, Rutgers University, 1994

US 66-94-P362



CHANGING THE COURSE OF DISEASE CONTROL

#### Brown Patch (Rhizoctonia solani) on Colonial Bentgrass



Dr. Pat Sanders, Penn State University, 1994

## **ZENECA** Professional Products

Always read and follow label directions carefully. HERITAGE\* and DACONIL\* are registered trademarks of a Zeneca Group Company. Allette\* is a trademark of Rhône-Poulenc Ag Company. Banner\*, Sentinel\* and Subdue\* are trademarks of Novartis Corporation. Bayleton\* is a trademark of Bayer Corporation. Cleary's\* is a trademark of W.A. Cleary Chemical Company. Eagle\* and Fore\* are trademarks of Rohm and Hasa Company. Prostar\* is a trademark of W.A. Cleary Chemical Company. Eagle\* and Fore\* @1998. Zeneca Inc. Zeneca Professional Products is a business of Zeneca Inc.

## Gazing In The Grass



*Poa annua* is arguably the dominant grass on golf courses in Wisconsin. Some superintendents spend years and thousands of dollars combating the grass. Other superintendents have decided to play by the old adage, "If you can't beat 'em, join 'em" and have adjusted their management practices to favor *P. annua*. The greens at Trout Lake are an excellent example of this attitude: properly managed, *P. annua* can produce a remarkably uniform putting surface.

*P. annua* is stereotyped by a shallow root system, consistently abundant seed heads, and a light green color. The shallow root system predisposes the grass to drought stress, which is indeed one of the tools superintendents use to discourage the grass. The seed heads wreak havoc with play and are easy to spot. The light green color of patches of *P. annua* in a bentgrass green or even Kentucky bluegrass fairway disrupt the appearance of the turf. But as new research is showing, these attributes do not typify all *P. annua* populations. To understand *P. annua*, we have to explore its origin, its tremendous diversity, and its potential for use as a golf course turf.

Where did *P. annua* come from? *P. annua* is a relatively recent species of grass, probably formed in Europe between one of the ice ages during the Quaternary Period. The wide variation of biotypes indicate it is still rapidly evolving. Some researchers have theorized *P. annua* was a product of hybridization between *P. supina* (Supina bluegrass), a stoloniferous perennial native to the mountains of central Europe, and *P. infirma*, a bunch-type annual which is native to the Mediterranean region (Damency and Gasquez, 1997; Tutin, 1957). Evidence suggests otherwise, however, as hybridizations between the two species yield plants which appear to be *P. annua* but do not produce viable seed (Damency and Gasquez, 1997; Pietsch, *(Continued on page 18)* 



17

#### (Continued from page 17)

1989). Pietsch (1989) showed that crosses between P. supina and P. trivialis (rough bluegrass) yielded plants morphologically similar to P. annua which did produce viable seed. All the P. annua plants from the hybridization were tetraploid, with 28 chromosomes (2n=28), a result of the crossing between the two diploid parents, each of which had 14 chromosomes (2n=14).

The Diversity of Poa annua. Superintendents and scientists have been aware of the wide range of P. annua types for decades. Some plants are small, others large. Many are bunch type, although stoloniferous plants are not uncommon. Some plants are self-fertile while others have sterile male flower parts and must be cross-pollinated by another plant. Color and even rooting vary widely. Life cycles range from annual to biennial to perennial (Johnson et al., 1993). First described over a century ago based on erect, bunch type plants with an annual life cycle, taxonomists now largely agree on the existence of at least two separate types (biotypes): P. annua var. annua and P. annua var. reptans. P. annua var. annua are typically bunch type grasses which produce large quantities of seed during the spring and summer before they die. Most P. annua var. annua plants are tetraploid . reflecting their purported origin from the hybridization of two diploid species. P. annua var. reptans, however, has a prostrate, stoloniferous growth habit, a perennial life cycle, and is typically diploid with 14 chromosomes (2n=14). Many P. annua var. reptans plants are fine textured with a dark green color and are often overlooked by turf managers who associate only light green color with P. annua.

Management and ecology. Management practices influence the type of P. annua in turf areas. The annual biotypes are more common in areas which are mowed relatively high, lower nutrient fertility, and irrigated irregularly, such as roughs and fairways (Till-Bottraud et al., 1990). In ecological terms the annual types are known as r strategists: they have short life cycles and produce large quantities of seed in order to persist as a species. A single annual bluegrass plant has been documented to produce 350 seeds during a growing season, with "seed banks" in the soil capable of possessing over two million P. annua seeds per square foot! (Lush, 1988). These strategies allow *P. annua* var. annua to grow and produce seed during spring and summer, die off during unfavorable winter conditions, and develop another generation from seed in the soil when conditions are favorable. (In the northern U.S., P. annua often behaves as a summer annual while in the South it is more of a winter annual). The huge seed banks give P. annua var. annua a competitive advantage over perennial turfgrasses which produce very little seed under mowed conditions. The seed, some of which is viable within 1-2 days following pollination and can remain viable for up to 15 years, can readily germinate any time the soil is exposed by divots, diseases, or other damage. Mosquitoes, rabbits, and crabgrass are other examples of r strategists. On the other hand, the perennial types of P. annua are typical of k strategists. K strategists typically have long life cycles, produce fewer progeny, survive through both ideal and stress conditions, and, in the case



of turfgrasses, often capable of reproducing vegetatively through stolons or rhizomes. Humans, elephants, and creeping bentgrass are examples of *k* strategists. *P. annua* var. *reptans* is confined mostly to greens and similarly close-cut, intensively managed areas. White (1993) reported up to 24% of the *P. annua* on greens were diploids (2n=14) and were fine textured with dense, dark green foliage. No diploid types were found in roughs or fairways, and other studies have yielded similar results. The low height of cut, high fertility and irrigation, and pesticides provided selection pressures which favored *P. annua* var. *reptans*.

Elimination of Poa annua is unlikely. Most superintendents disdain P. annua due to its propensity to die out from summer drought and/or heat stress and anthracnose or from winter cold/freezing stress and snow molds. Getting rid of it is unlikely. Most commonly minimal irrigation, lower fertility, overseeding, seedhead removal, and/or plant growth regulators are used in attempts to reduce or eliminate P. annua from greens and fairways. Such efforts may not be worthwhile. The USGA acknowledges only two or three successful conversion programs from P. annua to creeping bentgrass. A three year study in fairway conditions found that yearly overseeding with 'Penncross' creeping bentgrass resulted in no more than an 8% increase in creeping bentgrass. Mefluidide, a plant growth regulator used to control P. annua seedhead production, actually increased P. annua populations. The most successful management practices involved removing clippings during each mowing (which removed the seedheads), overseeding, and

not using mefluidide: this combination still only reduced the *P. annua* population by 28% (Gaussoin and Branham, 1989). Recently a fair amount of attention has been given to the idea of using a bacterium, *Xanthomonas campestris* pv. *poannua*, as a biocontrol to kill annual bluegrass. In growth chamber tests up to 92% control was obtained. In the field, though, applications had to be made three times weekly to gain 40% control, and the *P. annua* recovered within two to five weeks once applications were stopped (Zhou and Neal, 1995). Nonetheless, the research continues, as recent tests on *P. annua* in bermuda turfs have shown much better control when the bacteria were applied to freshly mowed turf (Johnson et al., 1996).

Breeding programs. The USGA has supported breeding projects since the 1980s with the goal of producing perennial types of P. annua for use as golf course turfs, primarily for greens. The longest running program has been that of Dr. Don White at the University of Minnesota. Dr. White and his assistants have evaluated thousands of P. annua plants for their capacity to bear seed, resist environmental stresses, and produce high quality turf at heights of 1/2" and lower. P. annua plants from many states, and a few from overseas, were evaluated for color, disease and insect resistance, environmental stress tolerance, persistence and quality under putting green conditions (White, 1993). Many crosses were made between likely candidates, and several exceptional lines were developed, particularly from P. annua var. reptans biotypes. Dr. David Huff at the Pennsylvania State University has recently developed a complementary breeding pro-(Continued on page 21)







**GREENSAIRE® 24**—Developed for greens and other fine turf areas, it pulls 100,000 more cores on 10,000 square feet than the competition, making it the ultimate in greens aeration.



**TRACAIRE**<sup>®</sup>—Mount the Tracaire on any tractor with a category "1" 3-point hitch. Cover a 6-foot aerating width with coring, slicing or deep spoon tines.



GA<sup>™</sup> 30—A combination of variable core spacing, speed, and precision coring. Aerate greens, tees and fairways up to a depth of 3.75 inches.



**RENOVAIRE®**—Designed with the "true contour" principle in mind, each pair of tine wheels is independently mounted to follow the contour of the land.

# We cover the hole thing

Make Ryan<sup>®</sup> aerators a part of your hole maintenance program. For small, compact spaces, undulating terrain or wide-open spaces, nothing aerates more effectively than equipment from Ryan. For golf, sports or grounds aeration the only name you need to know is Ryan.



Driven to be the best.

Hanley Company, Inc. 641 W. Main St. Sun Prairie, WI 53590 1-800-279-1422

