FOUNDATION NEWS

A PUBLICATION OF THE TRI-STATE TURF RESEARCH FOUNDATION SPRING 2011 VOL. 14 NO. 1

PRESIDENT'S MESSAGE

2011: A BUILDING YEAR

In 2011, the Tri-State Turf Research Foundation is continuing to fund four worthy research endeavors. At URI, there's Dr. Stephen Alm's search for alternative controls for the pyrethroid-resistant annual bluegrass weevil; at UConn, Dr. Jason Henderson is working to define the ultimate fairway topdressing program; and at Rutgers, researchers have two important studies underway: Dr. James Murphy has been working long and hard to develop a viable method for improving the uniformity of golf course fairway turf, and joining forces with Dr. Bruce Clarke, Dr. Murphy is also looking at nitrogen programming's role in anthracnose control. You'll read about the researchers' latest findings in this issue of *Foundation News*.

Though the foundation typically supports at least one new project each year, the board voted this year to invest any extra funds raised to building our endowment fund. The endowment fund was created with the hope that, someday, we could support research largely with the interest generated by the fund. We are a long way from that goal. The board of directors also wants to be prepared to fund research in the event of a sudden insect or disease outbreak that could seriously threaten our golf courses in the Met area. These are just two of the many reasons to donate to the Tri-State Turf Research Foundation.

BACK TO DOING WHAT WE DO BEST

It 2012, we plan to go back to business as usual. In fact, by the time you read this message, Tri-State Research Chair Scott Niven will have sent out a call for proposals to area universities for 2012 research projects. In December, the board will meet to review all submissions and vote on which, if any, to support. This is what the Tri-State Turf Research Foundation was established to do:

John Carlone, CGCS, President
Tri-State Turf Research Foundation

Fund research targeted at protecting—and enhancing—our golf courses and environment.

It's always been easy to find worthy research endeavors. The difficult part has been raising the funds to support them. If your name is on the list of contributors on pages 6-7, we thank you and hope we can count on your continued support. Your annual contribution of $200 goes a long way toward ensuring the health and welfare of our golf courses.

If you have yet to add your name to the list of contributors, we hope you will join fellow superintendents, vendors, and allied associations in seeking to better golf course turf in our area by completing the donation form enclosed with this newsletter and submitting it to your club for payment.

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TRI STATE

URI Researchers Continue Pursuit of Ultimate ABW Control

With the discovery in 2007 that the annual bluegrass weevil (ABW) was showing signs of resistance to the once highly effective synthetic pyrethroids (bifenthrin and cyhalothrin), this insidious pest has become all the more threatening to golf course turf across the Northeast.

Known among researchers as *Listronotus maculicollis*, the ABW is particularly troublesome on close-cut annual bluegrass (*Poa annua*) where young larvae like to tunnel into the grass plant's stems, causing the central leaf blades to yellow and die. Older larvae feed externally on crowns and roots, often killing the grass plant by severing the stems from the plant's roots.

While in some locations, pyrethroids still provide adequate control of adult weevils as they emerge from overwintering sites and before they begin to lay eggs, resistance to this insecticide class has forced many superintendents to seek other strategies. Among them:

» The use of a pyrethroid or chlorpyrifos early against overwintering adults

» Neonicotinoid/pyrethroid combinations—e.g., Aloft and Allectus—during peak adult emergence to control both adult weevils and first-generation larvae.

» Primarily preventive larvicidal compounds, such as Acelepryn and neonicotinoids, including the newly registered dinotefuran (Zylam) for first-generation larvae.

» Curative larvicidal compounds—e.g., Dylox, Conserve, Provaunt, or a pyrethroid—for control of fourth- and fifth-stage larvae.

Some locations need to use two or more of these strategies to prevent turf damage or increased resistance. *(See inset on right for links to company-sponsored control recommendations.)*

Recognizing the need for a new, more reliable approach to ABW control, the Tri-State Turf Research Foundation has supported University of Rhode Island's Dr. Steven Alm and his team of researchers in their pursuit of more effective alternatives to the commonly used ABW controls.

In the fourth year of their trials, the URI research team is continuing to put to the test various chemistries, rates, and timings both on golf courses and in the lab, in an attempt to find that winning combination.

What follows is a look at the researchers' work in progress: what they've learned—and still hope to learn—about combating the ABW.

TIMING IS EVERYTHING

To combat pyrethroid resistance and ensure maximum chemical efficacy, the researchers continue to emphasize the importance of carefully monitoring weevil activity to ensure timing of treatment coincides with the various ABW life stages: adults and early-stage or late-stage larvae.

DETECTING OVERWINTERING ADULTS

The best line of defense, according to the researchers, is to control overwintering adults. At this stage, the ABW still has little effect on the grass plant's vitality but is responsible for all subsequent generations of ABW.

The researchers recommend several methods to predict adult weevil activity:

» *Paying attention to plant indicators:* Forsythia to Dogwood full bloom generally signals the primary migration period of overwintering adults to tees, greens, and fairways.

» *Soapy flush:* Because Forsythia may be in bloom nearly the entire month of April, a more reliable method for monitoring adult activity is the soapy flush in which 2 ounces of lemon-scented dish liquid is combined with 2 gallons of water and then poured over an 8-square-foot area. The soap irritates the adult weevils lying deep within the turf thatch layer, causing them to rise to the surface within 5 minutes.

» *Pitfall Traps:* These traps are also an option, but they seem to work best to monitor overwintering adult movement into fairways and are not as effective in monitoring first- or second-generation adults.

ABW Control Recommendations

Several companies have websites outlining viable control methods for the annual bluegrass weevil.

The companies and their links are provided below:

» DuPont outlines "Optimum Control Programs" at http://www.weeviltrak.com/

» Arysta discusses "Performance Guarantees" at http://www.totalinsectcontrol.com/

» Bayer offers "ABW Control With Allectus GCSC: A New Way of Thinking" at http://www.bayerprocentral.com/

URI Researchers Continue Pursuit of Ultimate ABW Control

CATCHING ABW IN THE LARVAL STAGE

If you fail to curb adult populations, larval control is crucial. First-, second-, and third-stage larvae feed inside the plant stems, and though they can result in significant turf loss, they are considerably less of a threat to the turf than the late-instar—fourth- and fifth-stage—larvae. At this later stage in the weevil's evolution, they make their way from the plants' stems into the crowns, where, if left untreated, they feed until the grass plant dies.

Monitoring for larval activity, therefore, is essential. The methods the researchers recommend:

» *A saturated salt solution:* Make up 3 cups of salt to a gallon of water. Then pull plugs, break them apart, and submerge them in the salt solution. If you have larvae, they will float to the surface. Early-stage larvae feeding inside the plant stem will take longer to emerge and float.
Note: Third-stage larvae begin to emerge from plant stems when *Rhododendron catawbiense* is in full bloom.

» *Inspecting turf plugs:* To detect late-stage larvae, cut a wedge of turf with a knife or use a cup cutter to remove plugs; then search the turf crowns, thatch, and soil for the creamy white, legless larvae.

TRIALS IN 2010

During this past year, the researchers spent at least four days a week monitoring ABW populations at five golf courses in Rhode Island, Massachusetts, and Connecticut. Their monitoring efforts were incorporated into DuPont's WeevilTrak website, http://www.weeviltrak.com/, which allowed superintendents to see what stages of ABW were present at any given time.

Also in 2010, the researchers replicated trials at four golf courses and conducted 10 laboratory experiments testing the effects of new chemistries, synergists, and various volumes of carrier water on weevil control.

Here's what they discovered in their trials.

EXPERIMENT #1: EARLY-STAGE LARVAE CONTROL

The researchers' first experiment for 2010 was designed to test various chemistries, rates, and timings to determine maximum efficacy in early-stage larvae control. *(See Table 1)*

» While all treatments provided significant control of first-generation larvae, the two Allectus and single and double applications of Aloft were the most effective.

EXPERIMENT #2: LATE-STAGE LARVAE CONTROL

The researchers' second field experiment involved testing Talstar Xtra (a combination of Zeta-cypermethrin and bifenthrin *not* yet registered for golf courses) for control of late-stage, first-generation larvae. *(See Table 2)*

(continued on page 4)

Treatment	Rate (product/acre)	Timing	$\bar{X}$ ± SEM live larvae/0.1 ft² June 3	Percent Control
Talstar SC	19.19 fl oz	April 20	0.8 ± 0.6bc	83
Acelepryn SC	12.0 fl oz	May 4	0.6 ± 0.2bc	87
Talstar SC + Acelepryn SC	19.19 fl oz 12.0 fl oz	April 20 May 4	0.8 ± 0.6bc	83
Arena 50 WDG	6.4 oz	April 20 + May 13	1.6 ± 0.8bc	65
Arena 50 WDG	12.8 oz	May 13	2.2 ± 1.5b	52
Allectus GC	64 fl oz	April 20 + May 13	0.2 ± 0.2c	96
Aloft SC	14.4 fl oz	April 20	0.4 ± 0.2bc	91
Aloft SC	11.65 fl oz	April 20 + May 24	0.2 ± 0.2c	96
Control	---		4.6 ± 0.8a	---

TABLE 1
Efficacy of Talstar, Acelepryn, Arena, Allectus, and Aloft for control of annual bluegrass weevil larvae in a golf course fairway, Seekonk, MA, 2010.

Treatment	Rate (lbs. product/ 1,000 ft²)	Timing	$\bar{X}$ ± SEM live larvae/0.5 ft² June 1	Percent Control
Talstar Xtra G	2.3 lbs	May 25	9.8 ± 2.3de	66
Talstar Xtra G	4.6 lbs	May 25	7.5 ± 2.7e	74
Talstar Pro	0.5 fl oz	May 25	18.8 ± 5.4bcd	35
Scimitar CS	7 ml	May 25	22.0 ± 4.8bc	24
Control	---		29.0 ± 4.1ab	---

TABLE 2
Efficacy of Talstar Xtra, Talstar Pro, Scimitar, and experimental compounds for control of annual bluegrass weevil larvae in a golf course fairway, Hartford, CT.

Treatment	Rate (lbs. product/ 1,000 ft²)	Timing	$\bar{X}$ ± SEM live larvae/4 ft² July 26	Percent Control
Talstar Xtra G	2.3	July 23	17.8 ± 4.3a	24
Talstar Xtra G	4.6	July 23	16.8 ± 2.1a	29
Dylox 6.2 G	3.0	July 23	25.5 ± 6.1a	0
Control	---		23.5 ± 4.9a	---

TABLE 3
Efficacy of Talstar Xtra and Dylox for control of annual bluegrass weevil adults in a golf course fairway, Norwich, CT, 2010.

URI Researchers Continue Pursuit of Ultimate ABW Control

» Talstar Xtra at the higher rate was the most effective treatment in this experiment.

» Because there are differences within the pyrethroid group, the addition of the Zeta-cypermethrin may have been instrumental in the increased control.

EXPERIMENT #3: TARGETING ADULTS

The third field experiment was designed to target ABW adults. *(See Table 3)* The researchers used all granular formulations, hoping it would distribute the active ingredients into the thatch where ABW adults hide during the day.

Unfortunately, 1.55 inches of rain fell from the time the treatment began, right through to evaluation. A certain amount of rainfall and/or irrigation would have been necessary to move the chemical off of the granules and into the thatch. The amount experienced during this experiment, however, appears to have been excessive as there were no significant differences between treated and control plots.

FUTURE PLANS

In 2011, the researchers plan to continue:

» Monitoring weevil activity using pitfall traps, turf plug sampling, and degree-day calculations

» Laboratory experiments with synergists and various volumes of carrier water

» Field experiments with new chemistries and biocontrols

» Replicating methods of control charted in 2010 as new generations emerge during the summer

Dr. Steven Alm is available to answer any questions concerning his research or your insect control plans. He can be reached at stevealm@uri.edu.

Insecticides Available to Combat ABW

To prevent, slow, or even overcome resistance when combating ABW on your course, the researchers recommend switching modes-of-action or using more than one mode-of-action. What follows is a comprehensive chart listing the insecticides—and their modes-of-action—available to combat the ABW.

The list was compiled by the Insecticide Resistance Action Committee (IRAC), an international group of 150-plus members of the crop protection industry organized to advise on the prevention and management of insecticide resistance (http://www.irac-online.org/).

Chemical Class	Mode-of-Action Classification	Active Ingredient	Trade Names
Organophosphates and carbamates	1A and 1B acetylcholinesterase inhibitors	chlorpyrifos, trichlorfon, carbaryl	Dursban, Dylox, Sevin
Pyrethroids	3A sodium channel modulators	bifenthrin, cyhalothrin, cyfluthrin, deltamethrin	Talstar, Scimitar, Tempo, DeltaGard
Neonicotinoids	4A nicotinic acetylcholine receptor mimics	clothianidin, dinotefuran, imidacloprid	Arena, Aloft, Zylam, Merit, Allectus
Spinosyns	5 nicotinic acetylcholine receptor allosteric activators	Spinosad	Conserve
Indoxacarb	22A voltage dependent sodium channel blockers	Indoxacarb	Provaunt
Diamides	28 ryanodine receptor modulators	Chlorantraniliprole	Acelepryn

Rutgers Researchers Offer New Hope for Anthracnose Disease Control on Putting Green Turf

Anthracnose, caused by *Colletotrichum cereale*, is still among the most-dreaded—and destructive—turf diseases in the U.S. Preying on annual bluegrass putting green turf, the disease continues to plague golf course superintendents across the country.

Hoping to put the breaks on this seemingly unstoppable disease, the Tri-State Turf Research Foundation has, for the past three years, supported Rutgers' Drs. James Murphy and Bruce Clarke, along with a team of graduate students, in their pursuit of reliable anthracnose control.

After searching high and low for the culprits in this elusive disease, the researchers were able to determine, with some certainty, that both granular and soluble nitrogen fertilization play a significant role in anthracnose activity. What they're hoping to learn, now, is just when and how to apply these fertilizers for the greatest effect.

More specifically, their objectives are to:

1: Identify an optimum frequency/rate of soluble-N fertilization for suppressing anthracnose disease.

2: Evaluate the N rate effect of early- or late-season granular fertilization on anthracnose disease severity.

3: Determine whether early- or late-season granular-N fertilization alters the effect of frequent, low-rate soluble-N fertilization during mid-season on anthracnose.

4: Determine whether N sources differ in their ability to suppress anthracnose disease severity.

What follows are the latest outcomes of the researchers' trials, along with their prescriptive advice for preventing anthracnose from gaining a foothold in putting green turf.

EARLY- AND LATE-SEASON NITROGEN FERTILIZATION

In September 2008, the researchers initiated a nitrogen program study to examine the N-rate effect of spring and autumn granular fertilization on anthracnose severity, while looking at whether granular fertilization alters the effect of frequent low-rate soluble fertilization on the disease during the summer. The trials revealed:

» Spring applications of granular-N were more effective in reducing anthracnose severity than were autumn applications, on all but two rating dates.

» The application rate of granular-N played a significant role in disease severity. As you might expect, plots treated at the higher annual rate of 4.5 lbs. N per 1000 sq. ft. had less disease than those treated with 3, 1.5, and 0 lbs. N per 1000 sq. ft.

» Lower rates of granular-N were required in the spring to reduce disease severity than in the autumn.

» Soluble-N applied during the summer always reduced disease regardless of the granular-N fertilization regime.

» Soluble-N applied at 0.375 lbs. per 1000 sq. ft. per month had the greatest reduction in anthracnose severity compared to N fertilization at 0, 0.094, and 0.188 lbs. per 1000 sq. ft. per month.

THE NET

The best approach to suppressing anthracnose is to implement a routine N fertilization program throughout the growing season. Summer N fertilization will be most effective in keeping anthracnose at bay if preceded by a course of N fertilization in the spring.

OPTIMAL USE OF SOLUBLE-N

In 2009, the researchers set out to identify the rates and frequency of soluble-N fertilization that would be most effective in suppressing anthracnose disease during the growing season. The trials revealed:

(continued on page 8)

Anthracnose Control: What We Know

» Early in the season (spring), increases in the rate of N fertilization up to 0.4 lbs. per 1000 sq. ft. per week dramatically decreased anthracnose severity. However, continued use of this rate (0.4 lb) through the growing season *increased* disease severity by August.

» Soluble-N fertilization of 0.2 lbs. per 1000 sq. ft. per week through the entire growing season provided the best overall suppression of anthracnose disease severity.

» Granular-N fertilization of 2 to 3 lbs. per 1000 sq. ft. during the spring provided better anthracnose suppression than the same rates used during autumn.

» Soluble-N applications during the summer always decreased anthracnose severity regardless of granular-N fertilization rate and timing.

Special Thanks to Our 2010/2011 Contributors

We'd like to thank our contributors for their generous show of support to the Tri-State Turf Research Foundation. Your contributions go a long way toward helping the foundation continue its mission "to provide turfgrass research for better golf and a safer environment." We hope those of you on the list will continue to support the foundation's work. We also hope you will encourage more of your fellow turfgrass professionals to add their names to the growing list of contributors.

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Rutgers Researchers Offer New Hope for Anthracnose Disease Control on Putting Green Turf

» During the first half of the season, soluble-N applied at 0.4 lbs. per 1000 sq. ft. every seven days consistently produced the lowest anthracnose severity.

» During the last half of the season (mid-July to mid-August), soluble-N applied at the same 0.4-lb. rate or slightly higher rate of 0.5 lbs. per 1000 sq. ft. every week actually *increased* disease activity. The optimal N rate, it turned out, for reducing anthracnose later in the season was 0.2 lbs. per 1000 sq. ft. every week.

THE NET

Integration of data over the entire season (AUDPC) indicated that 0.2 lbs. per 1000 sq. ft. of soluble-N applied every week would produce the best overall reduction in disease severity.

THE ROLE OF NITROGEN SOURCE

A study was initiated during the summer of 2010 to determine whether N source affected anthracnose severity. Six soluble-N sources (ammonium nitrate, ammonium sulfate, calcium nitrate, potassium nitrate, urea, UMAXX 47-0-0) were applied at 0.1 lbs. per 1000 sq. ft. every week or biweekly for 12 weeks.

As the researchers expected, the first year of data indicated that:

» Nitrogen applied every week, compared to biweekly, reduced anthracnose severity (2 out of 4 rating dates)—regardless of source.

» At the same time, there was some indication that N source could influence disease severity (3 out of 4 rating dates). Though further evaluation is needed, preliminary results showed that plots fertilized with potassium nitrate had less disease damage and dramatically better turf quality.

The researchers will continue to look at N sources' role in anthracnose control and severity. Stay tuned as this promising leg of the research unfolds.

THE TAKEAWAY

The researchers' work to date indicates that anthracnose disease suppression is best achieved by the use of a frequent soluble-N application program of up to 0.2 lbs. per 1000 sq. ft. per week through the growing season.

But they've also found that disease suppression can be further enhanced by making granular-N applications during the spring. Rates ranging from 0.4 to 2 lbs. per 1000 sq. ft. have been effective in suppressing this disease.

FUTURE PLANS

Beginning in 2011, Drs. Murphy and Clarke plan to initiate a new study entitled, *Development of Best Management Practices for Anthracnose Disease on Annual Bluegrass Putting Green Turf*. As the title implies, their goal with this project is to improve on the current best management practices for the control of anthracnose on putting green turf.

They have applied to the Tri-State Turf Research Foundation for funding, a decision that will be brought to vote at a Board of Directors meeting later this year.

For further information on the researchers' trials, you can reach Dr. Murphy at murphy@aesop.rutgers.edu or Dr. Clarke at clarke@aesop.rutgers.edu.

2011: A BUILDING YEAR

THERE'S STRENGTH IN NUMBERS

Before the close of my message, I'd like to leave you with one thought: *There is strength in numbers.*

Quite simply, the more people who donate, the more research we can support, and the more solutions we can achieve to turf-threatening pests and problems that plague our golf courses.

Chances are you've benefited from one of the many successful projects we've supported over the past 20 years ... the groundbreaking study on summer patch, research on grubs, moss prevention, and root zone mixes for greens to name just a few. And to think that a donation of just $200 a year can provide you with information like this, which could save you thousands by sparing you a costly trial-and-error approach to managing new turfgrass ills and maintenance challenges that invariably arise.

So please, help us help you ... by supporting the Tri-State Turf Research Foundation's efforts this year, and every year! Your $200 donation is such a small price to pay for the valuable research you'll receive in return.

UConn Researchers Make Headway in Identifying Viable Fairway Topdressing Program

Fairway topdressing, a practice once confined to the notoriously rainy Pacific Northwest, has gained favor among superintendents across the Northeast hoping to improve the playability and firmness of their fairway turf. Though boasting a host of other benefits—including reduced earthworm activity and disease incidence and faster spring green-up—fairway topdressing has several potentially fatal flaws: It's expensive, labor intensive, extremely time consuming, and tough on equipment.

Hoping to help superintendents make informed decisions about this increasingly popular cultural practice, the Tri-State Turf Research Foundation has supported University of Connecticut researchers Dr. Jason Henderson and Nathaniel Miller over the past four years in their quest for the ultimate fairway topdressing program.

In a series of field trials, the researchers have sought to:

1: Determine whether particle size distribution and/or application rate will affect turfgrass color, quality, and cover, as well as disease incidence and earthworm activity.

2: Quantify the effects of particle size distribution and topdressing layer depth on moisture retention, soil temperature, and resistance to surface displacement.

3: Use the resulting data to make recommendations to improve the practice of fairway topdressing.

THE METHOD

Field trials were initiated during the summer of 2007 on an L-93 creeping bentgrass (*Agrostis stolonifera*) stand managed as a golf course fairway at the University of Connecticut Plant Science Research and Education Facility. In this portion of the study, the researchers evaluated two factors:

1: Sand Type: Fine, USGA, and Coarse. *(See Table 1)*

2: Application Rate: 4 cubic ft. per 1000 sq. ft., 8 cubic ft. per 1000 sq. ft., and 12 cubic ft. per 1000 sq. ft.

A control that receives no topdressing applications was also included.

Still ongoing, topdressing applications have been applied at a constant rate once a month. In 2007, the process began in July and ended in November; in subsequent years, topdressing applications started in May and ended in November.

This process has allowed the researchers to compare each sand type applied at each of the three rates. The three different rates also enable the development of three different depths of topdressing over time.

Collecting data biweekly, the researchers are looking closely at fairway topdressing's effect on turfgrass cover, color, and quality, along with soil penetration resistance, dollar spot incidence, and earthworm activity.

DISCOVERIES

The field trials conducted in 2010 confirmed the many positive effects associated with fairway topdressing. Though study results are preliminary, it does seem safe to say that application rate plays a more important role than sand type in the effectiveness of a fairway topdressing program. The good news is that this could result in a significant cost savings associated with sand purchases.

More specifically, the study showed the following:

ABOUT TURFGRASS COLOR, QUALITY, AND COVER

Data analysis indicates that fairway topdressing positively influences turf quality, color, and cover.

» Plots receiving higher rates of topdressing generally received higher quality ratings despite the type of sand applied.

» Plots that received higher rates of topdressing exhibited a faster greening response than plots receiving lower rates.

» Greater turfgrass cover was observed on plots topdressed at higher application rates, with sand type showing no effect.

ABOUT DOLLAR SPOT COUNTS

The severity of dollar spot infection was reduced by sand topdressing.

» Plots that received higher rates of topdressing had a lower incidence of dollar

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	Soil Separate %			% Retained						
Treatment	Sand	Silt	Clay	No. 10 Gravel 2 mm	No. 18 VCS 1 mm	No. 35 CS 0.5 mm	No. 60 MS 0.25 mm	No. 100 FS 0.15 mm	No. 140 VFS 0.10 mm	No. 270 VFS 0.05 mm
Fine Sand (Desiato Mason)	97.3	1.3	0.6	0.8	4.4	11.0	31.6	31.1	12.1	7.1
USGA Sand (Holliston #40)	99.3	0.1	0.5	0.1	2.6	20.2	52.3	20.6	2.7	0.9
Coarse Sand (AA Will Mat. 2mm)	99.5	0.0	0.4	0.1	11.0	31.5	42.0	13.0	1.6	0.4
USGA Rec. for Putting Grn Const.		≤ 5%	≤ 3%	≤ 3% Gravel ≤ 10% Combined		≥ 60%		≤ 20%	≤ 5%	

TABLE 1
Particle size analyses of sand types. USGA recommendations for putting green construction are included for reference only.

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spot than plots that received lower rates of topdressing, regardless of sand type.

» The highest rate of application was required in 2007 and 2008 to get a significant reduction in dollar spot incidence. In 2009, dollar spot responded to a medium application rate, while in 2010, dollar spot incidence was reduced at all application rates.

» The implication: As the topdressing layer accumulates, less sand needs to be applied to continue to see a reduction in dollar spot incidence.

ABOUT EARTHWORM CASTINGS

» Topdressed plots exhibited fewer earthworm castings than untreated plots.

» Plots that received higher rates of topdressing had fewer earthworm castings than plots that received lower rates of topdressing, regardless of sand type.

ABOUT SOIL PENETRATION RESISTANCE

One of the primary incentives to initiate a fairway topdressing program is to improve playability and minimize course closures after heavy rains. When measuring fairway firmness, both sand type and application rate played a role.

» Topdressed treatments had higher resistance to penetration than control plots, creating firmer playing surfaces.

» The Fine and USGA sands had the greatest resistance to penetration, followed by the Coarse sand.

» Plots receiving higher rates of topdressing exhibited greater firmness than plots receiving the lower rates.

ABOUT SOIL MOISTURE

Results were not significantly different from previous years, which demonstrated that soil moisture content in the top two inches of the root zone profile was affected by both sand type and application rate.

» Generally, the coarser the sand, the less water is retained.

» Similarly, the higher the topdressing application rate the less water is retained in the upper profile.

FUTURE PLANS

The researchers hope to continue their investigations into this cultural practice, observing the turfgrass management implications as the topdressing layer continues to form. Infiltration rates will be measured again in 2011, as infiltration rates measured in 2009 showed no significant differences between treatments.

In the meantime, the researchers advise superintendents to work closely with an accredited laboratory to conduct all the testing procedures required (particle size analysis, particle shape, coefficient of uniformity, pH, and infiltration rate) in selecting the appropriate topdressing materials.

For further information on the research and future work, you can reach Dr. Jason Henderson at Jason.henderson@uconn.edu.

The picture illustrates the depth of sand accumulating on the plots as a result of monthly topdressing over a three-year period. Application rates from right to left are 4 cubic ft. per 1000 sq. ft. (6.5 cubic yds. per acre), 8 cubic ft. per 1000 sq. ft. (13 cubic yds. per acre), and 12 cubic ft. per 1000 sq. ft. (19 cubic yds. per acre).

Rutgers Researchers Seek Solution to Mixed-Species Fairways

Over the years, even the most pristine fairway turf may lose its uniformity, becoming a mixed bag of turfgrass species that can vary dramatically in growth habit and rate, density, color, susceptibility to pests, and a variety of other important traits. Aside from creating a series of maintenance challenges, mixed-species fairways can lead to inconsistent playing conditions at different times of year.

In an effort to help superintendents improve uniformity of their golf course fairway turf, the Tri-State Turf Research Foundation has supported Rutgers' Dr. James Murphy, Dr. Stephen Hart, and Bradley Park in their search for management tactics to reduce the variability and inconsistency of mixed-species fairways.

THE PRIME OBJECTIVES

Starting in 2009, the researchers conducted trials aimed at:

1: Determining the feasibility of using the herbicide Corsair (chlorsulfuron) in conjunction with creeping bentgrass overseeding to replace perennial ryegrass in mixed-species fairway turf

2: Studying soil acidification's role in reducing annual bluegrass in mixed-species stands.

Here is what the researchers' latest trials have uncovered.

CORSAIR'S ROLE IN PERENNIAL RYEGRASS REMOVAL

In trials conducted primarily on golf course fairways, the researchers looked closely at Corsair's (chlorsulfuron) potential for eliminating perennial ryegrass from mixed-species fairway turf. Their work revealed:

» While Corsair proved effective in killing perennial ryegrass, some perennial ryegrass plants appeared to be more tolerant to the herbicide than others.

» Corsair was more effective in killing perennial ryegrass in September than in June.

» There was some phytotoxicity to annual bluegrass, which appeared greater after late summer and fall applications than after June applications.

More specifically, the researchers observed phytotoxicity to annual bluegrass in the spring following September and October Corsair applications, which were sprayed at ½- and 1-ounce per acre. The ½-ounce application rate was somewhat less toxic than the 1-ounce rate.

» While Corsair had some effect on perennial ryegrass at rates as low as 1⁄64-ounce per acre (full label rate is 1 to 2 ounces per acre), the researchers were unable to determine precisely how effective the application was because the perennial ryegrass population was too low in the fairway trial area. This particular trial was originally targeted at assessing phytotoxicity on annual bluegrass/creeping bentgrass areas.

As a result, the researchers have developed another trial area to further study Corsair's effect on perennial ryegrass at rates of less than 1 ounce per acre. Using lower rates would not only help to preserve annual bluegrass and creeping bentgrass populations, but may also produce a more gradual loss of perennial ryegrass and transition into annual bluegrass and creeping bentgrass.

» A note of caution to superintendents: Corsair can be relatively mobile. Adsorption of Corsair to clay is relatively low and somewhat stronger to organic matter. The researchers recommend, therefore, that you avoid spraying Corsair if a heavy rain (runoff) is forecasted. Movement of Corsair is less of an issue once a light rain or irrigation has moved the herbicide into the thatch or soil and uptake into the plants has occurred.

» Though Corsair will degrade more quickly when subjected to higher soil temperatures and lower soil pH, it has a half-life of 1 to 3 months (typically 40 days), which means it has the potential to interfere with overseeding

To gain additional insight into the effectiveness of using Corsair, the researchers would like to begin testing applications of the herbicide on relatively large fairway areas. If you are interested in having the researchers test this product on individual fairways or large areas of a fairway on your course, please contact Jim Murphy at murphy@aesop.rutgers.edu or Brad Park at park@aesop.rutgers.edu.

ELEMENTAL SULFUR'S ROLE IN ANNUAL BLUEGRASS REDUCTION

During trials to reduce earthworm casting activity in fairway turf, the researchers observed that applying elemental sulfur to acidify the soil not only reduced earthworm casting, but also resulted in shifts in turf species populations.

As a result, the researchers have spent the past three years delving into soil acidification's potential for reducing annual bluegrass populations in mixed-species fairways, while continuing to observe elemental sulfur's effect on earthworm casting—another culprit in fairway nonuniformity.

The trials are currently being conducted on two golf courses: Forest Hill Field Club in Bloomfield, NJ, and Forsgate Country Club in Monroe Township, NJ. Here is a look at the trials in progress:

THE FOREST HILL FIELD CLUB TRIAL

During 2010 at Forest Hill, the researchers have been experimenting with applying

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Rutgers Researchers Seek Solution to Mixed-Species Fairways

relatively high rates of a *dispersible micro-granular formulation of elemental sulfur* to predominately annual bluegrass fairway turf.

More specifically:

» They applied a total of 7.2 lbs. per 1000 sq. ft. of the elemental sulfur (8 pounds of product)

» The product was put out in two applications of 3.6 lbs. per 1000 sq. ft (4 pounds of product). One application was made in the spring, a second in the fall.

» Applications were made without adversely affecting turf and playing conditions, despite a very stressful 2010 growing season.

» Because the researchers are also looking at elemental sulfur's effect on earthworm casting, they are withholding pesticides in this fairway trial area.

» They are also withholding preemergence herbicides from the fairway trial to try to determine whether creeping bentgrass overseeding will be more effective at lower soil pH values.

The researchers now have a broad range in soil pH across these plots and are hoping that continued applications will create a similar, lower pH in all trial plots, eradicating *Poa annua* and ryegrass and resulting in a monostand of bentgrass.

THE FORSGATE COUNTRY CLUB TRIAL

During this past year at Forsgate, the researchers have been experimenting with large-scale applications of *a granular formulation of elemental sulfur*. While their primary objective is to suppress earthworm casting, they will also be looking at the applications' potential to reduce annual bluegrass populations. More specifically:

» In early April 2011, the researchers applied nearly 2 lbs. per 1000 sq. ft. of the elemental sulfur product (~87 lbs. per acre or 2180 lbs. per 25 acres) to 18 fairways.

» The researchers have also initiated a smaller trial at Forsgate where plots received an additional 2 or 4 lbs. per 1000 sq. ft. of the elemental sulfur product, establishing turf areas treated with either 2, 4, or 6 lbs of sulfur product per 1000 sq. ft.

» By the month's end, the researchers noted that casting activity appeared to be reduced to "acceptable" levels, especially compared to previous springs.

» Though it hasn't been long enough to note any change in species composition, this aspect of the study will be monitored throughout 2011 at Forsgate.

The researchers plan to make additional applications later this year once summer temperatures have cooled, and they will continue to monitor progress of this program throughout 2011.

For further information on the researchers' trials or to participate in the Corsair leg of the study, please contact Dr. Jim Murphy at murphy@aesop.rutgers.edu or Brad Park at park@aesop.rutgers.edu.

FOUNDATION NEWS is published
by the Tri-State Turf Research Foundation
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