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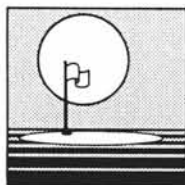
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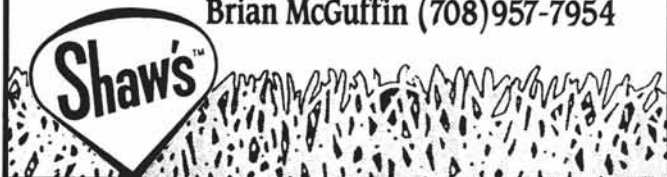
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(Math Quiz continued)

5. Determine how many pounds of active ingredient (a.i.) are in each formulation (4), then calculate the cost of each pound for the formulation (4).

4A formulation: 5 gal x 4 lb a.i. per gal = 20 lb a.i.

$\frac{\$540.75}{20 \text{ lb. a.i.}} = \$27.03 \text{ per lb a.i.}$

20 lb. a.i.

50 WP formulation: $12 \text{ lb} \times \frac{0.5 \text{ lb a.i.}}{\text{lb. formulation}} = 6 \text{ lb a.i.}$

$\frac{\$192.50}{6 \text{ lb. a.i.}} = \$32.08 \text{ per lb a.i.}$

6 lb. a.i. (Note: WP is in water soluble packets)

6. To use the formula provided, you must calculate the GPM (gal per minute) of the nozzle (3), then calculate the GPA (gal per A) (3)

8 oz from nozzle in 10 seconds means 48 oz per minute

$\frac{48 \text{ oz} \times 1 \text{ gal}}{\text{minute} \quad 128 \text{ oz}} = 0.375 \text{ GPM}$

$0.375 \text{ GPM} \times 5940 = 37.125 \text{ GPA}$

3 MPH x 20 inch spacing

Therefore, adjust pressure down.

7. Determine how many square feet were sprayed in test run (3), calculate how many square feet would be covered per tank load (2), then calculate how much Embark in put in tank (3).

$100 \text{ ft.} \times \frac{10 \text{ inches}}{12 \text{ inches per foot}} = 83.3 \text{ sq ft sprayed with 16 oz spray}$

$\frac{83.3 \text{ sq ft} \times 128 \text{ oz per gal} \times 2 \text{ gal per tank}}{16 \text{ oz spray}} = 1333 \text{ sq ft. per tank load}$

$\frac{1333 \text{ sq ft per tank} \times 4 \text{ ounces Embark}}{1000 \text{ sq ft}} = 5.33 \text{ ounces of Embark per tank}$

A video, "Calibrating Golf Course Boom Sprayers" has been developed by the University of Illinois Agricultural Engineering Department. Rhone-Poulenc Turf Division supported this project with funding. The video can be used in training pesticide applicators in the proper use of powered-boom sprayers. Nozzle selection, calibration, electronics, PPE and safety are topics included in this 26 minute presentation.

Anyone interested in receiving a copy could contact Robert Wolf, 217/333-9418 or fax 217/244-0323.

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II Annual Musser Turf Foundation Golf Outing

by Mike Bavier

The second annual Midwest Musser Turf Foundation golf outing was held at the Naperville Country Club on June 6, 1994. A big thanks to our host, Dave Blomquist. Dave and his assistant, Tim Anderson, sponsored a great skirt steak lunch, along with Rolling Rock beer and soft drinks.

We had a beautiful day on a super golf course. The number of players was down some this year, but I guess some of the guys were home working their own courses. We were all praying for rain this year — last year, we were rained out. As most of you know, the Musser Foundation sponsors scholarships for those in their final year of the Ph Degree. They need not be from Penn State. In fact, I'm quite sure none have been from Penn State, so far.

We need support from all of you, that is if you think you want to improve the profession. The Watson's, Daniel's, and Beard's, need to be replaced. Send your blue tags and checks made out to the Musser Foundation c/o Dudley Smith. Your help is appreciated.

Thanks again to Dave Blomquist, Dave Louttit, Mike Sauls, Ed Fischer, Don Maskey, Rich Kensinger, Joel Purpur, Fred Opperman, Mike Bavier and Dennis Solleto (Tyler Enterprises) that attended the event. Also, thanks to Tom Rodems, Len Berg, and all the others who have promised to send a donation.

News Around Town

by Les Rutan

Beverly Country Club Renovation

Oh no, not another article on bunker renovation! But yes, we are undergoing complete greenside bunker renovation (or restoration) with the back nine virtually completed and the front nine scheduled for September.

Midwest Golf was contracted to remove old sand, reshape and soil flash faces and surrounds, install drainage, edge, and install new sand (8"). They used a stone slinger truck (with flotation tires) with a sixteen foot conveyor boom to add the new sand and we experienced virtually no tracking from the fifteen ton/load capacity that the slinger held. Pretty slick and efficient!

In addition to the back nine bunker renovation, we added a 20 yard back extension to the twelfth tee, reshaping of one fairway bunker, a chipping green facility with two greenside bunkers and a 20 to 30 yard bentgrass approach and a 6500 sq. ft. practice green. Midwest Golf has completed their phase of these construction projects and we are now in the process of installing irrigation and preparing to sod the whole complex. Approximately 12,000 sq. ft. of washed Penncross sod (from Huber) will be used for the chipping and practice green and the twelfth tee extension. We have already installed around 10,000 sq. yds. of bluegrass sod with approximately 5,000 sq. yds. to go.

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Upcoming Events — Mark Your Calendar

- July 3-9 — Western Open at Cog Hill
 - July 11 — MAGCS Meeting at Orchard Valley G.C.
 - July 11-17 — Ameritech Open at Stonebridge G.C.
 - July 14 — University of Illinois Field Day
 - August 3 — ILCA Field Days, Wilson Nurseries, Hampshire, IL
 - August 13 — Family Picnic & Kane County Cougar Ball Game
 - August 15-21 — LPGA Chicago Challenge at White Eagle G.C.
 - August 18 — Michigan Turfgrass Field Day, Hancock Turfgrass Research Center at Michigan State University.
 - August 29 — John Deere Team Championship at Naperville C.C.
 - September 12 — MAGCS Meeting at Seven Bridges
 - September 26 — ITF Golf Day at Ivanhoe Club & Conway Farms
 - October 3 — Pro/Superintendent at Glenview Club
 - October 10 — MAGCS Meeting at Oak Brook Hills C.C.
 - October 21 — MAGCS Dinner Dance, River Forest G.C.
 - November 28-30 — NCTE at Pheasant Run Resort
- All meetings starting in March 1994 will require advance paid registrations.

Congratulations to Tony Rzdzki on becoming a Certified Golf Course Superintendent recently. Tony is the golf course superintendent at the Cantigny Golf Club in Wheaton and has been a frequent writer for the **Bull Sheet**.

The Lake Shore Country Club locker room building burned on Saturday, June 4. For those of you not familiar with the layout there, the clubhouse is on the lake shore, with the locker room building across the road next to the golf course. Bill Aiston reports that they will be setting up trailers to serve the members for this coming season. A new building was scheduled to be constructed late fall this year. Looks like that date will be moved up now.

On the Lake Shore C.C. scene, Adolph Bertucci has been up and around after his heart surgery. Playing golf and running errands for Bill and the staff at the club. Adolph, it is good to have you so fit and well.

Dick Trevarthan, Prestwick C.C. is looking for a #2 assistant, student trainee, someone who desires to be a golf course superintendent. Call 815/469-5903.

At our July meeting, Dr. Randy Kane will be speaking of what is happening at the time on the courses. (We all know that he is the happiest when everyone else isn't ...). The August meeting will have Bob Vavrek, Jr. speak to us on what the USGA is seeing and an update.

Must be something about heights that Joel Purpur likes, deep rapids while white water rafting, high mountains when skiing, bungee cord jumping off 175' towers, and now he is taking flying lessons. Sky diving has got to be next and I hope it doesn't go along with the flying lessons.

July 11 — Orchard Valley — L. Strojny, L. Wesson. Senior Championship. Three divisions, regular flight, senior flight (50-59 years), super senior (60 and over). All retired seniors play free and receive a prize. Individual play with prizes for low gross and net.

Timber Trails C.C. in La Grange, IL is looking for a foreman/assistant. Please contact Don Hoffman at (708) 246-0281.

Bruce Birchfield has resigned at the Ivanhoe Club. He is staying on through October 31.

A BIG THANK YOU to the sponsors for the meeting held at Aurora C.C. on June 20th. They were: Cannon Turf Supply, Nadler Golf Carts, BOJO Turf Supply, Hollebeak Excavating, Nels Johnson Tree Experts, and J. W. Turf.

Once again Joel Purpur and Dan Murray were in the great Midwest Canoe Race on June 5. The weather was great for spectators, but tough on the paddlers due to low water and a strong head-wind. Of course paddling with Dan is always tough and Joel is always the bowman who paddles to the count of the sternman — Dan. When Dan was asked if he is ever the bowman, his comment was, "Heck no, then I'd have to paddle every stroke."

Wanted: Vintage Turf Equipment — The Pennsylvania Turfgrass Council and the Pennsylvania State University have announced they are seeking additional vintage turfgrass equipment for the Mascaro/Steiniger Turfgrass Museum scheduled to open on August 10, 1994 during the Penn State Turfgrass Field Days.

A sizable amount of equipment has already been assembled and presently being refurbished. An appropriate name plate placed on each contribution to the donor will acknowledge the gift to the museum.

A list of the current equipment is available to potential donors so that duplication will not occur. If donors can call, fax or write to the following, they will send you a listing of the equipment:

George W. Hamilton, Landscape Management Research Center, Orchard Road, University Park, PA 16802. Phone 814/865-3007, Fax 814/863-3479 or
Christine E. King, Pennsylvania Turfgrass Council, P. O. Box 417, Bellefonte, PA 16823-0417. Phone 814/355-8010, Fax 814/355-7240.

All vintage equipment should be shipped to the Landscape Management Research Center, Pennsylvania State University, Orchard Road, University Park, PA 16802.

This is an opportunity for people in turfgrass management to become a permanent part of this Museum.

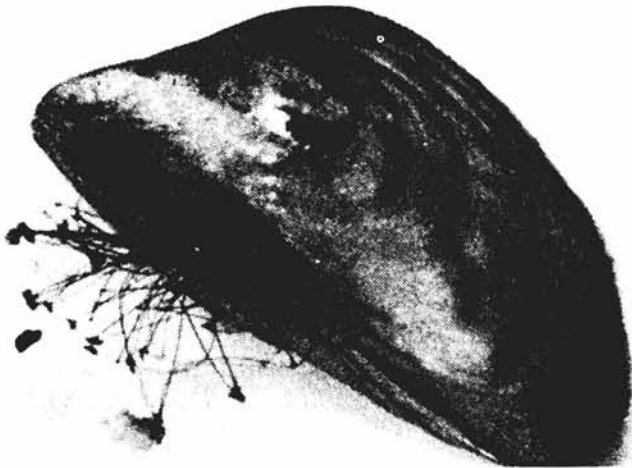
A Pest That is Muscling It's Way Into Our Waters

by Dan Dinelli, North Shore Country Club

Many golf courses use ponds, creeks or rivers as a water supply or reservoir. These waters are vulnerable to an invasive pest, the Zebra Mussel.

In 1989 Zebra mussels were found in Lake Erie. Zebra mussels have now been reported in all other Great Lakes as well as the Mississippi River. Experts predict Zebra mussels will spread beyond the Great Lakes. They pose a threat of colonizing most lakes and rivers in the United States.

The Zebra mussel, *Dreissena polymorpha*, was detected in Western Russia in the early 1800's. Europe found the unwelcome migrant in the 1830's. It quickly spread throughout the continent. In the mid 1980's a transoceanic ship discharged ballast water into Lake St. Clair. The fresh water ballast picked up in an European port, contained Zebra Mussel larvae, Veligers. The Zebra mussels found the plankton rich waters to their liking. The prolific mussel produces eggs when water temperature warms to about 54 degrees and continues until the waters cool to below 54 degrees. A mature female mussel can produce over 30,000 eggs per season. In 10 years the aggressive mussel has dramatically taken over the Great Lakes basin.



Close-up of a zebra mussel shows the tuft of byssal threads used for attachment. Particles on the ends of the threads are debris.

The invasion of Zebra mussels has many biological, ecological and economic impacts. The one to two inch long mussel feeds on algae by filtering the water. One mussel can filter about one liter of water a day. The algae and photoplankton it consumes represent the food source for microscopic zooplankton, which in turn are food for larval and juvenile fish. The impacts on the food chain can be devastating.

Another threat is the way they colonize themselves. Zebra mussels generate a turf of fibers known as byssus. These threads attach to hard surfaces with an adhesive secretion that anchors the mussels in place. Any firm surface can be colonized by Zebra mussels, including each other. Beds of mussels in areas have contained over 50,000 animals per square meter. Through this habit, water lines are susceptible to becoming clogged.

To date no toxic control has been found that is not deadly to other aquatic life. Diving ducks have been found to feed heavily on the mussel, consuming up to 90% of a population.

(continued page 20)

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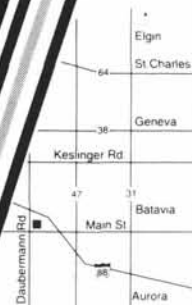
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(Zebra Mussels continued)

However, the prolific mussel breeds itself to staggering numbers when the ducks migrate. Some fish species feed on Zebra mussels. Unfortunately the predation on Zebra mussels is limited, proving little effectiveness in controlling the pest to satisfactory levels.

It seems that it is a matter of time before golf course irrigation ponds and systems fall prey to Zebra mussels. The vulnerability of each system is different, however prevention is the key.

The spread of the mussels occurs in many ways. Scuba divers from infested waters may carry Veligers inside their BC. Veligers can be transported easily in water used in live bait containers. Waterfowl may disperse Zebra mussels by carrying Veligers and or adults in their feathers. Contaminated boots, cages etc. may spread the organism. Veligers die upon drying, however, adults may live for days out of the water.

Zebra mussels look like small clams with a yellowish or brownish D shaped shell. Their name stems from the alternating dark and light bands of color that usually occurs on their shells. They are 2 inches in size or smaller. Normally they are found in clusters. If you find any or suspect an infestation, contact the Illinois Sea Grant Institute at 708/818-2901.



U. of I. Field Day Scheduled for July 14, 1994

The 1994 University of Illinois Turfgrass, Nursery, Landscape, and Trial Garden Field Day has been scheduled for July 14, 1994. Field Day activities will begin at 8:00 a.m. and include viewing ongoing field research and demonstrations in the morning. The afternoon program will feature workshops and classes. This is an opportunity to visit the Landscape Horticulture Research Center, the Hartley Selections Garden, and see the new research and maintenance facility. Watch the mail for Field Day registration announcements.

The new research and maintenance facility at the University of Illinois' Landscape Horticulture Research Center is now in use. The new facility features a laboratory/classroom; employee areas including offices, rest rooms, and break facilities; equipment maintenance and welding shops; and storage areas for equipment and supplies. The new structure provides more than twice the space of the previous building that was destroyed in a 1991 fire.

For Field Day questions or information, contact Tom Voigt, University of Illinois Extension Turfgrass Specialist at 217/333-7847.

Supplied by: Tom Voigt, Extension Turfgrass Specialist, Department of Horticulture, S-410 Turner Hall, University of Illinois, 1102 South Goodwin Ave., Urbana, IL 61801.

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