

Wetland Policy Issues

This new report from the Council for Agricultural Science and Technology (CAST), Ames, Iowa, discusses the basis for the ongoing controversy surrounding wetland regulation. The task force synthesized, sifted and summarized the voluminous data, divergent perspectives and existing philosophies into this single manuscript. Several suggestions, conclusions and implications for the various entities in the wetland issues are offered.

Suggestions

Wetland scientists should

- recognize the legitimate bounds of their disciplines and the proper role of science in policymaking,
- interact with agricultural and ecological interests and the public to support the development of public policy and
- devote more attention to the relative values of nonwetland landscapes.

Wetland policymakers/regulators should

- recognize that not all wetlands are equal,
- resolve the property rights issue,
- define wetland more clearly,
- recognize that nonwetland landscapes have value too, and
- recognize that wetland can be valuable for more than its natural functions.

The agricultural community should

- know that the world is changing, especially with respect to the assignment of "rights,"
- appreciate the other side(s) of the wetland issues, and
- recognize that trade-offs are necessary in a world of increasing scarcity.

The environmental community should

- recognize that government is anthropocentric (like it or not),
- acknowledge that money is the common denominator for exchange,
- recognize that trade-offs are necessary in a world of increasing scarcity,
- appreciate the other side(s) of the wetland issue, and
- encourage efforts to identify values of nonwetland landscapes to the degree of effort expended on wetlands.

The public should

- not rely on science or public officials to determine what they want protected; they should become informed and get involved.

Conclusions/Implications

- Debates over the use and allocation of wetlands continue.
- Although approximately half of the lower-48's wetlands have been converted to other uses, that alone is not justification for preserving all of the remaining half.
- There is scarce middle ground in the discussion of wetlands—or at least few are willing to occupy it. Those

informed and interested enough in the subject to take a position usually end up at one or the other extreme in the debate.

- While wetlands perform numerous useful functions, quantification, elaboration and enumeration of wetland values in the absolute are of little use; what is needed are estimates of the relative values of wetlands and all other landscapes or alternative uses, which may have to be given up to protect wetland. Unless similar evaluations of forest land, agricultural land, grassland and urban land are available, no meaningful relative basis exists on which to suggest land management or allocation policies.

- The public is largely oblivious to wetlands and the wetland debate. The combination of distance from the public's everyday focus and the technical nature of wetland issues contributes to confusion about the real problems that exist.

- One of the principal constraints to resolving wetland debates is agreeing on what constitutes a wetland. Science alone cannot decide for society what is and is not wetland. Wetland is as much a social construct as a topographic feature; therefore the public policy arena rather than the academic laboratory is the proper focus for defining wetland.

- Existing wetland legislation leads to confusion because many of the terms (e.g., mitigation, restoration, creation or no-net-loss) are not defined clearly.

- Wetlands are dynamic components of the landscape and dynamic in the way society perceives them.

- Social value, an appropriate common denominator for social decisionmaking, frequently is confused with ecological value and function of wetlands. For there to be social value, wetland function must lead to some potential perceptible change in human well-being.

- There are many well informed, rational people who place higher values on alternative uses of wetland than on "natural" wetland.

- All wetland regulations affect the economic decisions of individuals, firms and the public. Regulation also affects the distribution of income among present generations and between the present and future generations.

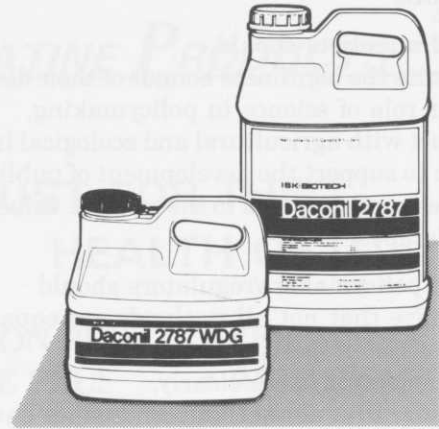
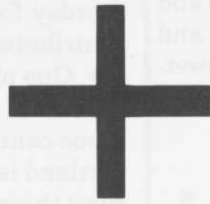
- Science will not, and should not, be the last word on wetland issues.

- Science has made contributions toward resolving the issues, but, despite decades of excellent wetland science, the issue remains largely

- an issue of philosophical and ethical value differences,
- a political-legal issue of explicitly assigning property rights,
- a social-technical issue of defining exactly what a *wetland* is,
- a largely regional-local issue most often discussed at the national level, and
- a matter of having to make decisions today in spite of not resolving the above four points.

Wetland Policy Issues was written by four scientists and two technical assistants chaired by Jay A. Leitch of the Department of Agricultural Economics, North Dakota State University, Fargo.

When It Comes To Dollar Spot Control & Brown Patch Control



The #1 Sterile Inhibitor

The #1 Contact

Tank-mixing even at the lowest label rates of Banner and Daconil expect great control!

Proven Synergy

= The Best Control!



WILBUR-ELLIS

IDEAS TO GROW WITH®

FOR MORE INFORMATION, CALL
LARRY THORNTON
1-800-642-2736 or 612/723-0151

TEE TALK

By
Scott Turtinen
Executive Director, MGCSA



The MGCSA's always-popular Turf Tourney will be held June 17 at 19 courses in the Twin Cities area.

Entry forms have been mailed, and we urge you to pass the word out to your members and other friends to get them involved.

By the telephone calls we get at our office from so many golfers — even way before there's any announcement — we're confident they really enjoy playing the outstanding golf courses that are available each year.

* * * *

1994 MGCSA Rosters were mailed in April. If your information needs updating or if it is incorrect in any way, please call or write our office so that the appropriate changes can be made. Please note that Larry Vetter's business phone should be 612/476-1650.

* * * *

MGCSA scholarship applications are available. Just call 612/473-0557 or 1-800-642-7227, and we'll respond promptly.

* * * *

Our thanks to Dave Sime and his crew for their outstanding cooperation in advance of the April meeting as well as the most enjoyable day at their club.

* * * *

Scott Austin called to let us know that he has a new assistant, **Jeff Johnson**, a graduate of the University of Minnesota, at Midland Hills. **Dr. Don White** at the University of Minnesota reports that **Brian Netz**, an MGCSA scholar who worked at Interlachen while going to the U, has

been hired as an assistant superintendent at Wakonda in Des Moines, Iowa.

* * * *

Did you notice that the April issue of Hole Notes had 40 pages, and this month we have a 44-pager? Thanks to the much-appreciated advertising support of so many associate members, these larger and informative issues are possible.

And thanks, too, to the increasing number of MGCSA members, who are submitting stories for publication. If you have something interesting happening at *your* course, let us know.

Update on Human Resources Library

Are you in the process of hiring your seasonal crew? Do you need guidelines for interviews? How about job descriptions? Do you or any one in your family have a disability or personal problem and are in need of help or guidance? These are concerns that we as Golf Superintendents are faced with periodically.

Starting in 1994, a new committee was created to give us information when we have a need. Presently, the Human Resources Committee is being formed, and in this process we are gathering information from the GCSAA and various other sources. If you have a concern or need information along this line, you can call our MGCSA office at 1-800-642-7227 and hopefully they can give you copies of what we have on file. Please call any of the committee members if you have a concern regarding our Human Resources Committee.

Below are the names and phone numbers of Committee members and an Index of materials on file at the MGCSA office in Wayzata.

Human Resources Committee

Tom Kientzle - Co-Chair218-963-7732
Cary Femrite - Co-Chair612-261-4656
Steve Schumacher612-532-4284
Patty Knaggs612-448-3626

The following is information on file in the MGCSA Human Resources Library.

1. Personnel Handbook - General policy guidelines
2. Sample Job Descriptions
3. Employee Rights
4. Preparing a resume'
5. Career development
6. Coping with unemployment
7. Selecting a Golf Superintendent
8. Associations to help you or your family deal with accidents or disabilities
9. Community summer programs for disabled children

(Continued on Page 38)

Still Simply The Best Greens Fertilizers You Can Use Today

You can count on Par Ex® Greens Grade Fertilizers with IBDU® slow-release nitrogen to deliver what you're looking for in a greens fertilizer.

SAFETY - HIGH WIN LEVELS - CONSISTENCY

For more information contact:

Precision Turf & Chemicals
3145 Sycamore Lane
Plymouth, MN 55441
612/559-5293

Turf Supply Company
2797 Eagandale Boulevard
Eagan, MN 55121
612/454-3106

Vigoro Industries, Inc.
Specialty Products Division
800/767-2855

par ex
THE EX STANDS FOR EXCELLENCE

Par Ex® and IBDU® are registered trademarks of Vigoro Industries, Inc.

A Superintendent's Rules Test

By James E. Sweeney, Regional Affairs Manager
North Central Region - United States Golf Association

(Editor's Note: Those of you who attended this year's USGA Green Section Seminar at Westmoor Country Club had a change to meet Jim Sweeney. Jim has held his current position with the USGA for nearly three years. Previous to that, he was the Executive Director of the Sun Country Golf Association, a job he had for three and a half years.

Jim is a 1984 graduate of the University of New Mexico where he earned a BA degree in Economics. He was a member of the UNM golf team for the years 1980-1983. He has played competitive golf at all levels, including the USGA Amateur and the USGA Mid-Amateur.

The subject of the rules of golf is one Jim understands very well; his experience runs to five USGA/PGA rules schools along with officiating at numerous local, state and national championships.

Jim and his wife Mary have two daughters—Kathleen (8) and Caroline (3). They reside in Crescent Springs, Ky.

1. A legal hole location
 - a) is at least 4 paces from any fringe area
 - b) must not have more than a three-to-one slope
 - c) is not defined in the rules of golf
2. A player's ball lies in a lateral hazard. How many options does the player have?
 - a) three
 - b) five
 - c) one - stroke and distance
3. A player's ball rolls into a hole made by a greenkeeper. It is not marked "ground under repair." What should the player do?
 - a) declare the ball unplayable and drop within two club lengths of the spot where the ball lay, not nearer the hole, and add one penalty shot to his score
 - b) play it as "ground under repair"
 - c) put another ball into play under stroke and distance
4. During a stroke play competition, the green crew wants to get a head start on preparing the course for the next round. They may:
 - a) mow fairways or roughs but not greens between groups
 - b) mow anywhere on any hole behind the final group, keeping distance between themselves and the players
 - c) do any necessary maintenance without regard to the players
5. During play of a hole, the cup is damaged so as to make it unplayable. Who may fix the hole?
 - a) any player
 - b) a member of the green crew
 - c) a tournament official
6. The right side of a hole is densely wooded with thick underbrush. Lost balls in this area slow down play. The green committee can:
 - a) declare that any ball hit into that area is automatically lost
 - b) encourage use of the provisional ball rule
 - c) mark the area a lateral hazard
7. The teeing ground is defined as:
 - a) the area between two tee markers
 - b) an area measured from the outside edge of two tee markers which is two club lengths in depth
 - c) a closely mown area specially prepared for teeing the ball
8. Under the rules, the major areas of the golf course are:
 - a) the teeing ground of the hole being played; the putting green of the hole being played; any hazard on the course; all other areas in play which are termed "through the green"
 - b) tees, greens, hazards and grassed areas
 - c) tees, greens, water hazards, bunkers, fringes, aprons, rough, fairway, waste areas, woods and obstructions
9. Out of bounds is an area from which play is not permitted. In order to protect oncoming golfers on an adjacent hole, the committee erects in course out of bounds on a hole. The O.B. applies only to the hole being played. The committee:
 - a) acted in accordance with the rules
 - b) acted outside the rules; in course O.B. is illegal
 - c) acted outside the rules; the O.B. must apply to both holes
10. A mysterious disease has attacked the fringes around all the greens on the course. The city championship begins play tomorrow. The committee should:
 - a) mark all the affected areas "ground under repair"
 - b) do nothing; the areas of concern are so widespread that they have become part of the course condition
 - c) adopt a local rule prohibiting play from the fringes
11. A water hazard is so situated that a player's options under the water hazard rule are limited. The committee elects to install a ball drop behind the hazard. The player:
 - a) must use the ball drop if his ball goes in the water
 - b) must use the ball drop only if he elects to drop behind the hazard
 - c) may consider the ball drop as an option in addition to those provided in the rule

(Continued on Page 35)

Rules Test —

(Continued from Page 34)

12. A pile of grass clippings has been accumulating in a disposal area adjacent to a hole. A player's ball comes to rest next to the pile. The player may:
 - a) take relief under the "ground under repair" rule
 - b) play his ball as it lies or declare it unplayable
 - c) take relief under the immovable obstruction rule
13. When both stakes and lines are used to mark a water hazard:
 - a) the stakes identify the hazard, and the line defines its margin
 - b) the lines identify the hazard and the stakes define its margin
 - c) the lines and stakes are there only as a courtesy to the player; the water hazard margin begins at the water's edge
14. A player's ball comes to rest in a divot hole. The divot is lying, roots up, adjacent to the hole, but still partially attached to the ground. The player may:
 - a) remove his ball from the divot hole, repair the divot and then replace his ball on top of the repaired divot
 - b) play the ball as it lies or declare the ball unplayable
 - c) detach the divot, cast it aside, and then play the ball
15. A violent though brief afternoon storm has left the golf course wet but playable. Some areas have standing water, others are soft but a player cannot see water around his feet when at address. Players:
 - a) will get relief from casual water in both situations
 - b) will get relief from the standing water but not from the soft areas
 - c) will get casual water relief from standing water and relief from "ground under repair" in soft areas
16. A pile of brush in the left rough of a hole will be removed later in the day. A player's ball comes to rest near the pile. The pile interferes with the player's follow through. the player:
 - a) may take relief from the pile, which is deemed "ground under repair"
 - b) must play the ball as it lies or declare it unplayable
 - c) may move his ball only enough to allow himself a free swing
17. Player A's ball comes to rest in a water hazard. The player can play the ball, but an immovable obstruction in the hazard interferes with his swing. Player B's ball comes to rest outside the hazard, and his swing is restricted by the same obstruction.
 - a) both player A and player B get relief from the obstruction
 - b) neither player gets relief from the obstruction
 - c) player B gets relief; player A does not
18. A player's ball comes to rest on a putting green other than the one of the hole he is playing. The player must:
 - a) play the ball as it lies
 - b) drop the ball at the closest point which is off the putting surface and not closer to the hole
 - c) proceed under stroke and distance
19. A player's ball is embedded in rough. The local rule allowing relief in this situation is in effect. The player lifts his ball, drops it in accordance with the rules, and the ball rolls almost two club lengths, coming to rest in the fairway. The ball:
 - a) is in play
 - b) must be re-dropped, and must remain in the rough
 - c) such a local rule is not allowed; the player must replace his ball in its original pitch mark and add one penalty stroke
20. Player A's ball lands short of the green and spins backward, making a pitch mark in the fringe between the ball and the hole. Player B's ball subsequently lands on A's line, also making a pitch mark in the fringe. Player A is entitled to:
 - a) fix both pitch marks
 - b) fix neither pitch mark
 - c) fix B's pitch mark, but not his own

(Continued on Page 38)



8th Annual MGCSA Turf Tourney Set

The 8th Annual MGCSA Turf Tourney is set for June 17, 1994. Participation of MGCSA members and their guests is encouraged as is the general public. Sites for this years' event include:

Brackett's Crossing GC

Braemer CG
Bunker Hills GC
Edinburgh USA
Hillcrest CC
Indian Hills GC
Mendakota CC
Midland Hills CC
Minnesota Valley CC
Minikahda Club
New Richmond GC
North Oaks CC
Rolling Green CC
Southview CC
Stillwater CC
Town and Country Club
Tartan Park

Wayzata CC
Wedgewood Valley GC

The format will be a four-person, two bestball event. All teams are invited to a cocktail hour and dinner at the Sheraton Metrodome in Minneapolis. Cost of the tournament is \$80.00 per person (\$320 per team) which includes golf, 2 golf cars, dinner, prizes and a donation to the MGCSA Research Fund. Club assignments will be determined by the Research Committee.

For more information, contact Scott Turtinen at the MGCSA office or Kevin Clunis at (612) 439-7760.

Where Are They Now? —

(Continued on Page 9)

groceries, housing and clothing.

This arrangement worked out so well that Doug kept it up for six seasons. Finally Northern National Bank of Bemidji wanted him as a full-time banker. Reluctantly, he gave up the job as Superintendent and became a full-time banker. He was with Northern National for 14 years and eventually was recruited by First Federal of Bemidji and in 1993 was promoted to a position with Twin City Federal Mortgage Corp. in the Twin Cities.

The writer likes this story. It's a success story that we would all like to live. Congratulations to Doug Mattson and to the many talented Superintendents who sometimes labor in the wrong field but are so dedicated they fail to look at the field instead of the individual grass plants.

Doug may be embarrassed by this story but he did confess to missing the golf industry and would like to know how he could subscribe to *Hole Notes*. In closing it should be pointed out that Doug had done the cartoon letterhead for the first issues of *Hole Notes*. For those of you who were not around back then (about 1961) Doug's cartoon letterhead showed a passive Golf Course Superintendent, standing by a green and observing a frustrated golfer driving his putter into the turf after missing a putt.

Doug's address is 1414 Laurel Ave., Apt. L. 305, Minneapolis, MN 55403.

Sincerely,
Jack Kolb

P.S. I had Doug's permission to write this.

Land —

(Continued from Page 10)

twice the present cropland as ten billion is roughly twice the present population. On the left of the graph at a yield of 1 t/ha. people accounting for 3,000 would spare none, and for 6,000 would take more than 2.8 a negative sparing. Near the middle, a yield of 4 t/ha would spare much of the 2.8 billion ha. If farmers lifted yields to 6 t/ha on the right, they would spare a bit of today's cropland, even if each of the ten billion accounted for 6,000 calories daily.

How Much Land Can Ten Billion People Spare for Nature? was written by Paul E. Waggoner of The Connecticut Agricultural Experiment Station, New Haven. The report was published in cooperation with the Program for the Human Environment, The Rockefeller University, New York, New York. The full 64-page report, R121, is available for \$15.00 plus \$3.00 shipping and handling from the Council for Agricultural Science and Technology (CAST), 4420 West Lincoln Way, Ames, Iowa 50014-3447. Individual and student members of CAST may request a free copy; please include \$3.00 postage and handling.



FAIRWAYS, Inc.

Design and Construction by Contract

Joel Goldstrand

9109 Westmoreland Lane

St. Louis Park, MN 55426

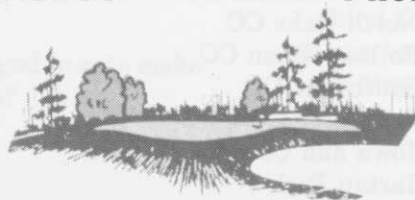
Phone & Fax: (612) 546.3933

Ron Bloom

1972 Hidden Valley Lane NW

Miltona, MN 56354

Phone & Fax: (218) 943.1392



U of M Update —

(Continued from Page 5)

7. Smooth bromegrass
Blades with a constricted "M" or "W", ligule short, creeping by strong rhizomes used for erosion control, annual.
 8. Smooth crabgrass
Tall rounded ligule with long hairs at the collar edges. Plant reddish-purple at seeding time, especially at the base, prostrate. Seedhead finger-like, bunch type annual grass.
 9. Tall fescue
Short ligule, blades broad, prominently veined, leaves rough on the edges, used as a durable turf in transition zones, bunch type grass.
- B. Hairy ligule
1. Green foxtail
A bright green erect plant, blades flat, tapered, seedhead a nodding brush-like spike, bunch type annual grass.
 2. Witchgrass
A coarse plant covered with hairs, leaves broad, sheaths reddish-purple at the base, bunch type annual grass.
 3. Yellow foxtail
Sheaths tinged with red, leaves spiraling upward, seedhead an erect, coarse brush-like spike, long hairs near ligule, bunch type annual grass.

Partially adapted from: Proturf Guide to the Identification of Grasses

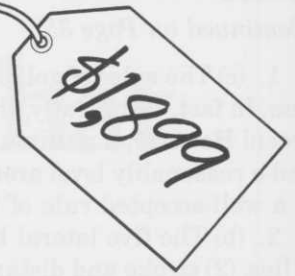
One of my responsibilities as turf specialist is to serve as a liaison between the University and the turf and grounds industry. One way to meet this responsibility is to better communicate to you what is happening at the University and how that information may be of benefit to you. Therefore, as often as possible the *U of M Update* will contain an article or report from one of the faculty, staff or students at the University regarding their turf and grounds work. This month's article is by Paul G. Johnson and Dr. Donald White. Paul is a Ph.D. candidate in the Department of Horticultural Science. His research interests are in turfgrass management, with emphasis in breeding and genetics as well as turfgrass ecology. Paul has a B.S. from Iowa State University in Horticulture and a M.S. from the U of MN in Horticulture. Paul is a 1994 GCSAA - J.R. Watson Fellow. Dr. White is a professor in the Department of Horticultural Science.

Flowering Habits in *Poa annua* L. Selections

Introduction

Most of you know that the University has been conducting a *Poa annua* collection, selection and breeding program for a number of years. The project has been supported by

The Mower You Need. At the Price You Want.



Now you can buy a full-featured EagleStar® 36-inch walk-behind commercial mower for as little as \$1899.*

Our mid-sized mowers feature:

- 5 speeds plus reverse
- Kawasaki engines
- New deep V drive belt design



*for 36-in. cutting deck
48-in. models also available.

Call the EagleStar Hotline, toll-free, 800-778-6849 for name of dealer nearest you.



the University, USGA and O. J. Noer Foundation. The philosophy of approach has always been: "When life serves you lemons - make lemonade." In other words we have been trying to make lemonade by working to combine the good characteristics and develop desirable golf turf types. One objective is to develop a variety that flowers and seeds for only a short time and does not affect putting quality. Our primary goal is to produce perennial varieties that will require fewer inputs while providing a better playing surface than the wild type *Poa annua*.

This article describes a portion of an inheritance study of flowering habits in *Poa annua*. The knowledge of how flowering characteristics are inherited is important to efficient breeding and may be useful in management of *Poa annua* turfs. I will first try to classify the flowering patterns in the species, describe the fairly simple inheritance of the characteristics, and finally discuss some implications of this work.

But first, we need to deal with nomenclature. The name "*Poa annua*" is a misnomer. It really only describes a portion of the population on your golf courses. We need a new name because we are dealing strictly with **perennial** types in this project. On that basis we will use the name *Poa reptans* for perennial types. (*reptans* is from the Latin "repto", meaning "creeping".)

Description of the Flowering Types

As most golf turf managers know, *Poa annua* has a repu-

(Continued on Page 40)

Test —

(Continued on Page 35)

1. (c) The rules of golf do not define a “legal” hole location. In fact, technically, the hole doesn’t have to be on the green! However, a minimum of four paces from any fringe and a reasonably level area of six or more feet in diameter is a well-accepted rule of thumb for hole selections.

2. (b) The five lateral hazard options are (1) play it as it lies, (2) stroke and distance, (3) keeping point where the ball last crossed the margin of the hazard between you and the hole, drop behind the hazard in line with the hole, (4) using the point of last entry as reference, drop a ball within two club lengths of that point no closer to the hole, and (5) on the opposite margin of the hazard, find the point equidistant to the hole from the point of last entry and drop within two club lengths of that point, not closer to the hole. (Rule 26)

3. (b) A hole made by a greenkeeper is “ground under repair”, whether or not so marked. (Rule 25)

4. (b) This doesn’t directly relate to the rules, but in stroke play, mowing between groups changes the playing characteristics of the course, and is inequitable. In match play, there would be no problem because each match is a separate competition.

5. (c) Tournament officials should be called in to assess the damage and make repairs. Often a cup cutter is called in to assist. In the absence of an official, the players may attempt to fix the cup. In an extreme case, the hole may be repositioned in a similar area. (Rule 16; Dec. 16-1a6)

6. (b) Lateral hazards are water hazards. (Rule 26). Wooded or overgrown areas may not be marked as lateral water hazards unless they carry water. Losing your ball is, unfortunately, sometimes part of the game. The provisional ball rule helps to alleviate the slowdown of play.

7. (b) It is important to note that tee markers of the hole being played are fixed parts of the golf course, just like an O.B. stake. Tee markers on other holes are moveable obstructions. (Rule 11)

8. (b) The rules may apply differently in each of these areas. (Definitions)

9. (a) Other possible in course O.B. situations include the clubhouse area and the driving range. Although discouraged, in course O.B. can protect golfers and force the player to play the hole as it was designed. (Dec. 33 - 2a12 and 14)

10. (b) “Ground under repair” is an abnormal ground condition. Generally poor conditions, regardless of the cause, are simply that—poor conditions which the golfer must deal with. (Rule 25)

11. (c) The player should always have the option to play the game under the rules. The only exception is for “ground under repair” from which play is not permissible. This may refer to flower beds or newly seeded or sodded areas. (Dec. 33 - 834)

12. (b) Grass clippings or other material which is abandoned (i.e. will not be removed) is not “ground under repair”; it is in play. (Rule 25)

13. (a) In USGA championships, we avoid using stakes where possible.

14. (b) Attached divots are deemed to be fixed or growing. Therefore, the ball must be played as it lies, and the divot may not be fixed. The player should repair the damage after making his shot. (Dec. 13 - 25)

15. (b) In order to get relief, from casual water, a player must be able to see water around his feet or the ball at address. Soft or muddy ground without visible water is not casual water. (Definitions)

16. (b) “Ground under repair” extends vertically downward but not upward. Since the piled material interferes only with the players follow through, which is above ground, the player is not entitled to relief. (Definitions)

17. (c) Relief is granted only if the ball lies outside the water hazard. There is no relief from immovable obstructions if the ball lies in a water hazard. (Rule 24)

18. (b) The player must take relief from the wrong putting green. Wrong putting greens include practice greens, but not turf nurseries. The player may stand on a putting green to play a shot from off the green. A local rule requiring dropping away from a fringe area may be adopted. (Rule 25; Dec. 33 - 833)

19. (a) Both rough and fairway areas are “through the green”; thus, the ball is in play. The ball must be re-dropped if it rolls more than two club lengths, or comes to rest in a hazard, on a putting green, or out of bounds. (Rule 25 - 2; Appendix 1 “Lifting an Embedded Ball”; Rule 20)

20. (c) A player is entitled to the lie and shot which is the natural consequence of the preceding shot. Since A’s ball created a pitch mark off the green, A cannot repair that pitch mark. However, B’s ball altered the conditions of A’s next shot. Thus, A may repair B’s pitch mark. (Dec. 13 - 28)

Human Resources —

(Continued from Page 33)

10. Questionnaire form for telephone reference check
11. Position analysis - Job description, work scope, physical demands, work environments
12. Employment applications
13. Pre-employment inquiry guide - Interview questions - do’s and don’t’s
14. Golf course liability

**1994 SCHOLARSHIP
APPLICATIONS
ARE AVAILABLE
AT THE MGCSA OFFICE**

**Call (612) 473-0557
or 1-800-642-7227**

Finally, A Rotary That Can Rough It.

The Groundsmaster® 455-D is the first rotary mower built for golf course roughs. This 10 ft. mower combines rotary productivity with the consistency and quality of cut you demand.

To make it in the rough you have to be maneuverable. So

Toro put the deck out front for visibility and control. The floating wings follow turf undulations and breakaway so you can trim around obstacles. The 455-D has a zero

uncut circle in 2WD mode and only a 10" uncut circle in 4WD.

Power through 5" tall rough with the low maintenance belt drive that delivers more cutting horsepower to the blades. And

since you can cut roughs in half the time, you can cut more often for more turf consistency.

Call us to bring out a 455-D, or for even greater productivity, the 16 ft. 580-D. Then you can rough it up for yourself.



Groundsmaster 455-D



Helping you put quality into play.™

MTI DISTRIBUTING CO.



14900 - 21ST AVENUE NORTH • PLYMOUTH, MINNESOTA 55447
PHONE (612) 475-2200 • FAX (612) 475-0351

TORO and Groundsmaster are registered trademarks of The Toro Company. © 1993 The Toro Company. No. 94-249-T.

U of M Update —

(Continued from Page 37)

tation of flowering all season long, even under very short mowing heights. However many perennial types of *Poa annua* flower only in the spring. It's these that we favor in our breeding program. There are at least three flowering types of *Poa annua*: 1) a true annual type bunch grass which flowers prolifically; 2) a perennial type with season long flowering, and 3) a perennial type that flowers only in spring. Table 1 summarizes the flowering habit and other characteristics. Most of the *Poa annua* on Minnesota golf courses are of the latter two types.

Table 1. Summary of *Poa annua* and *P. reptans* flowering types

Type	Botanical variety†	Flowering pattern	Growth habit
Annual	<i>annua</i>	Continual: flowers at a young age and continues until death of the plant.	erect, bunch type
Perennial	<i>reptans</i>	Continual: flowers season long with a flush in the spring.	prostrate, stoloniferous
Perennial	<i>reptans</i>	Seasonal: flowers only in the spring of the year	prostrate, stoloniferous

†Botanical variety is a classification within a species.

Poa annua has been the subject of interesting ecological research projects around the world (mostly in Australia, Great Britain and California). They have shown how annual and perennial forms may associate with particular golf course situations. The annual plants (*annua*) are adapted to harsh, unpredictable and frequently disturbed environments. Since seed is a reliable way of avoiding environmental stresses, flowering and producing seed is an important characteristic. Perennial types (*reptans*) reproduce by stolons, and have fewer flowers. The perennial forms dominate in less disturbed locations and are very competitive in areas with compacted soil and considerable foot traffic. Therefore, golf course greens and fairways are nearly ideal for competitive growth of *Poa reptans*. Our research on flowering habits fits into this ecological work.

Inheritance of the Flowering Habit

A primary goal in studying the diverse flowering habits of *Poa annua* is to determine if the different habits are controlled by genetics rather than environmental conditions. If the traits are genetic, we ask how might flowering habit be inherited so the selection of desirable types is more effective? It was clear fairly quickly that the flowering types are indeed inherited. The inheritance between the three, and maybe four, perennial types in our research seems to involve one gene, with the continual flowering type being dominant to seasonal flowering. This means that flowering pattern is a "yes or no" trait.

Now for some genetics. Each plant carries two copies or **alleles** of each gene; one from each parent. Continual flowering is **dominant** and can be represented by "F". Seasonal flowering is **recessive** and is shown by "f". "F"

is **completely dominant** to "f". Since each plant carries two copies of the genes, there are three possible combinations: "FF", "Ff", and "ff". The complete dominance of continual flowering means that if one of the two alleles is "F", the plant will be continually flowering. Therefore "FF" and "Ff" are continual flowering plants, but "ff" individual is a seasonal flowering plant. If two seasonal flowering plants are **crossed** or genetically combined, only seasonal type plants result ("ff" crossed with "ff" can only give "ff" offspring). In general, the flowering habit may not be as simple as explained here, but additional research indicates that the habit involves relatively few genes. Environment also has some modifying effects on inheritance patterns.

What Does This Mean?

"Why not throw away types that flower all season long and only keep those that flower like we want?" In the breeding work it is desirable to cross or combine traits from the various *Poa annua* plants. Even though some plants may flower undesirably, they may have other good characteristics like disease resistance, better seed production, prostrate growth habit, etc. Understanding how the flowering is inherited makes it easier to cross plants and select out the undesirable flowering type, yet keep the desirable traits.

Implications

After studying the genetics of flowering habit, some might ask, "Might a continual flowering type contaminate a seasonal flowering variety?" This is a good question and one we have asked many times. *Poa annua* plants are typically **self-pollinated**, which tends to maintain true-breeding types. The environment on a golf green favors this self pollination even more because identical (or at least similar) plants grow closely together and flowers cannot grow very tall to spread pollen a great distance. Field trials with some selected *Poa annua* selections have shown little if any contamination of plots. In addition, perennial type plants are very competitive and prevent other *Poa annua* plants from gaining a foothold in a colony. Future research may improve the true breeding behavior, as added insurance.

Some *Poa annua* selections are currently in the seed increase stage, and newer types are nearing a point where they may be evaluated for release also. The flowering inheritance information reported here has assisted in the development of these next generation varieties.

Another part of my research involves the physiology of *Poa annua* flowering types. **Flowering requirements**, or the environmental triggers causing a plant to flower, may be important differences between the flowering types. A discussion of this research will be the topic of a future article here in *Hole Notes*.

As I have studied *Poa annua* in my graduate work, I have developed a great respect for the plant and its ability to grow almost anywhere. I also see much potential for improvement as a turf species. Even Linnaeus, the father of modern botany and plant classification back in the 18th century, had a great respect for the plant and wrote that "... this grass makes the finest of turfs."