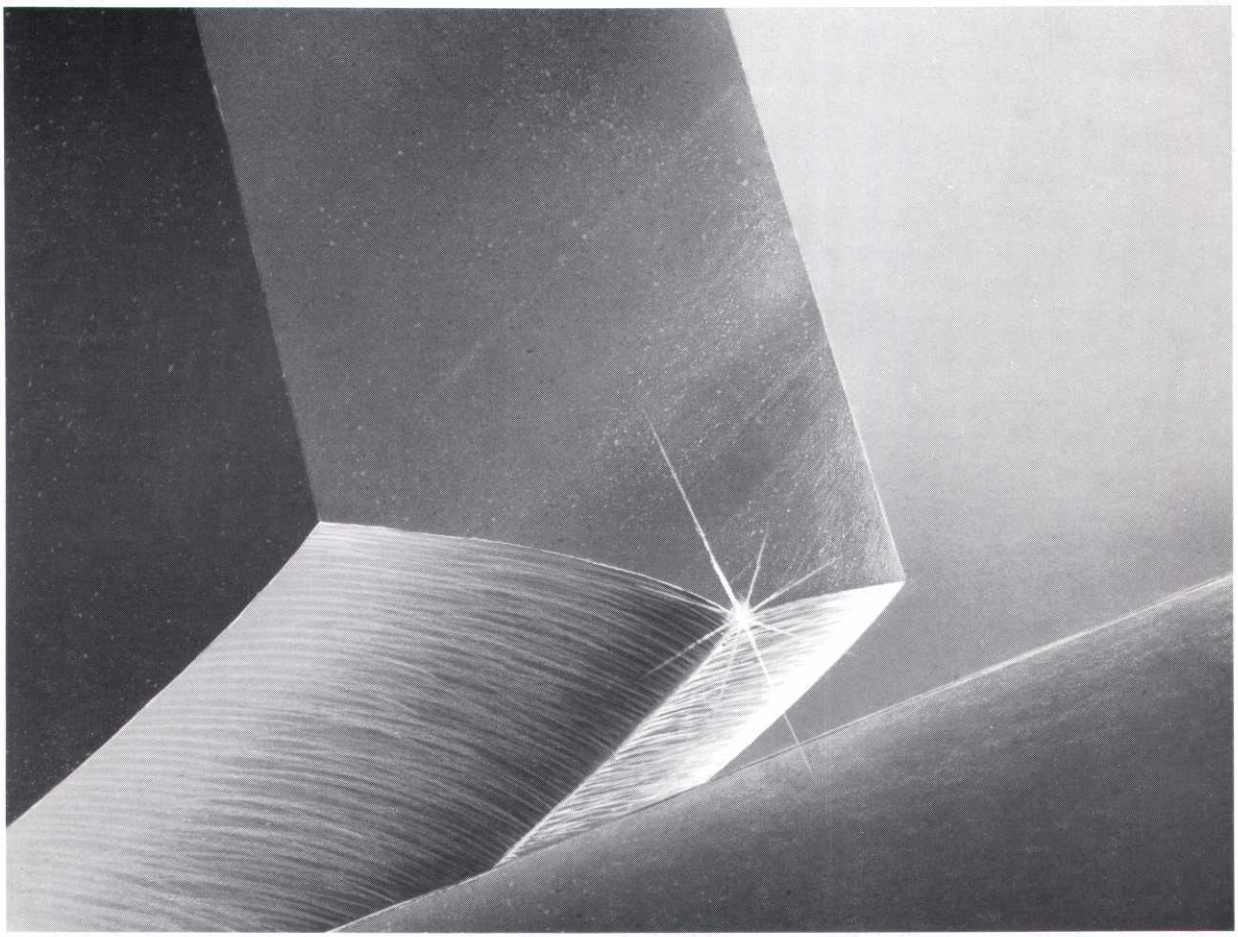
REEL



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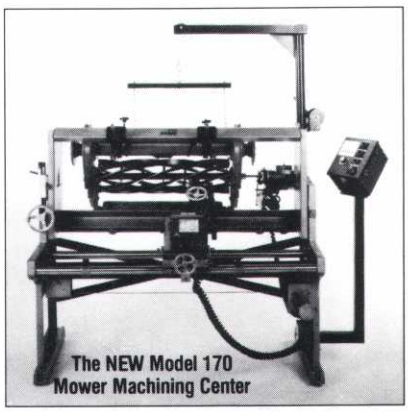

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HOLE NOTES

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FROM YOUR PRESIDENT'S DESK

Wayzata C.C. Hosts A Great Championship

The MGCSA Championship has come and gone. Bob Distel, the association thanks you for holding the tourney at your beautiful course. I didn't get a chance to play, but Kevin Clunis, along with many others, assured me the course played as great as it looked.

* * * *

On August 15-16 Kevin Clunis, Tom Johnson, Dale Parske, Bob Frank, Dr. Ward Stienstra and I attended the Wisconsin Turfgrass Field Day at the O.J. Noer Turfgrass Research & Education Facility in Madison.

There was more electricity in the air than during a lightning storm. I was very impressed, as were the other members of our group. When I saw Dr. Stienstra on his hands and knees. I knew he either wanted to go home or was really into it. Of course, I asked him, and if you want the answer, ask him or anyone else who attended.

* * * *

Dr. Frank Rossi and Julie Meyer were very happy to see us and gave us a very personal walk-through. That's not easy when there were in excess of 700 people in attendance.

* * * *

I spotted a distinguished looking gentleman that looked a lot like Jim Latham. Sure enough it was.

* * * *

In the past I have had mixed thoughts on needing a research facility in the metropolitan area. However, after realizing how far south geographically Madison really is, and talking to a lot of researchers, I have come to believe, without any doubt, we are in great need of a facility such as the O.J. Noer.

I didn't think Madison falls somewhere between Austin and the Iowa border geographically.

* * * *

After hearing the background of the W.T.F., I am positive that the great turf people of Minnesota will be able to merge into a very strong Minnesota Turf & Grounds Foundation.

* * * *

I learned a few other interesting things while in the Madison area. Yes, golf courses have a dress code. I wouldn't have believed it, but Tom was good enough to prove it to me. Thanks Tom. I would also like to thank Ward for his advice about hitting into the sun. I hope this will help my game in the future.

— Joe Moris
President

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HOME OF NOVA TEE

The Annual Bluegrass Population in Golf Greens— It Comes, Goes, Then Comes Back Again...

By Van Cline

(Editor's Note: Van Cline is currently pursuing a Ph.D. in Horticulture at the University of Minnesota and specializing in turfgrass science. His research is related to the ecological genetics of annual bluegrass in golf courses as affected by high temperature stress. Van is Manager of Customer Education for the Toro Company in Minneapolis, reporting to Dr. Jim Watson, where he is involved in a variety of customer relations activities with users of commercial mowing, irrigation and fertilizer products. He served on the Landscape Architecture faculty at the University of Minnesota, and consulted in landscape design and natural resource planning before joining Toro. Van holds a Bachelor of Science degree in Forestry, and a Master of Landscape Architecture degree from Iowa State University.)

* * * *

Annual bluegrass (*poa annua L.*) is one of the five most widely distributed plant species in the world, according to Dr. Michael Fenner, author of *Seed Ecology*. Dr. C.H. Peel of the Sports Turf Research Institute in Great Britain has described annual bluegrass worldwide as "absent only from areas of high temperature and low rainfall, from highly competitive plant communities such as tall grasslands, above the altitude of 1300m and on highly acidic soils." A species achieves this prevalent status in the plant world only by developing an extremely adapatable strategy to perpetuate itself. In other words, annual bluegrass has become very good at reproducing in a wide range of environments.

Golf course superintendents in the Midwest know what a successful and opportunistic species annual bluegrass is in golf turf. Its persistence in golf courses is testimony to its competitiveness, and provides a snapshot of its notable adaptability. Superintendents are well aware that once it invades a golf course, it is nearly impossible to get rid of it in any practical way. Despite the fact that it is never intentionally planted, annual bluegrass is inevitable in the golf business in the Upper Midwest.

What many superintendents don't know is that annual bluegrass is more prevalent in their turf at certain times of the growing season. Since 1988, we have monitored several mixed annual bluegrass - creeping bentgrass golf greens in the Twin Cities area. Population counts throughout the season have revealed a predictable fluctuation in the two species.

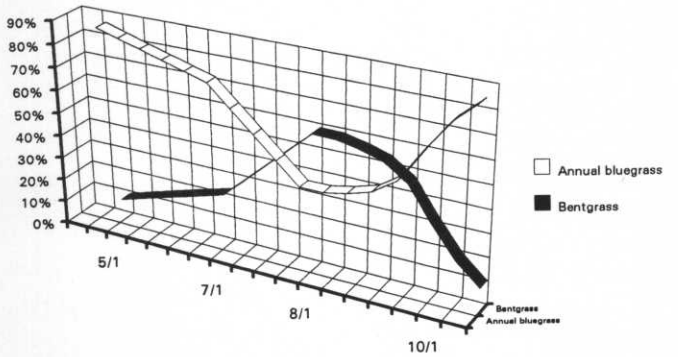

Fig. 1: A representation of population dynamics in golf greens
(fluctuations are exaggerated)

Annual bluegrass dominates the turf in the spring, by mid-summer the annual bluegrass population has declined and the creeping bentgrass population has increased, and during the fall the annual bluegrass comes on strong again as the creeping bentgrass population declines. The obvious queestion is: "Why?"

Many factors could influence this rhythmic population shift in greens. More than likely, a combination of several are in control of this dynamic. It could be due to the reproductive biology, or what is known as the life history, of annual bluegrass. The decline corresponds generally to the period following heavy flowering, starting mid-to late-June. Typically, weed species with annual life cycles put their energy and resources into flowering and seed production. Once they have accomplished that goal, the plant naturally declines and dies. The seed is left to germinate the next growing season and perpetuate the species by repeating the same cycle year after year. On golf greens, therefore, the natural death of tillers with an annual life history that have flowered and produced seed could be a reason for the mid-summer decline in the annual bluegrass population. Since plants are of different ages and don't all flower at the same time, there is a constant cover of annual bluegrass even though the proportion of plants to creeping bentgrass is less after the intense June seed production period. A qualifier to this theory, however, is the belief by many that annual bluegrass in golf greens is more perennial than annual. Perennial turf would be expected to provide a more consistent cover throughout the growing season. The belief that annual bluegrass in greens is perennial is only informed speculation at this point. The opposing theory is that most annual bluegrass plants in greens are truly annual, but because they are of different ages due to continuous germination of seed, the cover is continuous giving the turf the appearance of perennialty.

The other set of factors that could control the predictable fluctuation in annual bluegrass and creeping bentgrass populations is environmental. The growth of plants is determined by the internal biology or genetics of a species *and* by the environmental conditions in which they live. In the case of a golf green, the mid-summer decline of annual bluegrass generally corresponds with the hottest time of the growing season. It is possible that annual bluegrass' lower tolerance of heat stress could cause an overall reduction in vigor and competitiveness (or death in extreme heat)

(Continued on Page 40)

Some Thoughts to Consider about PVC Pipe

The piping industry was revolutionized by the introduction, in the 1940s of polyvinyl chloride (PVC) pipe and fittings.

Piping system components manufactured from PVC exhibit excellent corrosion resistance, are light weight, have high strength-to-weight ratio, are exceptionally durable and have good resiliency.

The use of PVC has grown steadily since the introduction, to the point where about 100,000 miles of PVC pipe is installed each year in North America. The growth of the industry has been due, in part, to the availability of a wider range of PVC pipe sizes and compatible fittings that are inexpensive and easy to install.

No portion of the piping industry has been affected by PVC pipe and fittings more than the irrigation industry. The large quantity of pipe and the numerous fittings required made PVC a natural choice. The relatively low cost of the materials, the ease of installation and the corrosion resistance nature of PVC have made PVC irrigation systems the choice for golf course installations, home and commercial systems.

The changes in piping materials have been followed closely in irrigation systems, especially golf course systems, by substantial changes in sprinklers and control equipment. The advent of valve-in-head sprinklers and computerized control systems in the last 20 years has provided nearly unlimited flexibility in system operation.

In early golf course systems, the design consisted of the main line system and lateral system, with a control valve separating the two. The pipe, fittings and sprinklers down stream of the control valve were pressurized only when the block valve was operating. Operating four to six sprinklers, covering a large area off a single block valve considerably reduced the systems flexibility. Also, low head drainage through the sprinklers allowed air into the pipe, causing potentially damaging surge pressures the next time the block valve turned on.

Surge pressure or water hammer is created any time the flow rate changes in piping systems. Typical causes include rapidly closing valves, pumps starting or stopping, line breaks or entrapped air rapidly escaping. As water moves through pipe, kinetic energy is created in relation to the mass of water moving and the velocity in which it is moving. When the flow is stopped rapidly, this kinetic energy exerts itself in the form of a momentary increase in pressure above the normal static pressure, resulting in a surge. This surge can be damaging to PVC pipe and fittings.

Early irrigation systems were constructed mainly of steel pipe, especially in the smaller diameters. Sprinkler swing joint assemblies were nearly always constructed with steel

(Continued on Page 7)

PVC Pipe —

(Continued from Page 6)

components. From a pressure capacity standpoint, the components had strength well beyond the stresses put on them. With PVC, although the strength-to-weight ratio is fairly high, a given fitting or pipe used in an irrigation system is not nearly as strong as the steel counterpart it replaced. Because of equipment changes which resulted in added flexibility, we are placing extra stresses on systems while we are using components with less strength. This combination can lead to component failure unless careful consideration is given to system design and operation.

PVC pipe is produced in pressure ratings from 100 PSI through 315 PSI and in sizes from ½" through 12". 100 PSI and 125 PSI rated pipe is not recommended for irrigation application. Usually 160 PSI and 200 PSI rated pipe is used or irrigation systems.

PVC pipe is produced to standards such as ASTM (American Society for Testing Material). These standards insure products that have uniform characteristics and, in most cases, allow each manufacturer's material to be used with another manufacturer's product. This feature insures product availability and competitive pricing to the end user.

PVC pipe is manufactured in standard 20 ft. lengths with some manufacturers making 40 ft. lengths on special order. The pipe is made with one end belled for solvent welding or for gasket joint connection. For golf course systems sizes 2½" or 3" and larger is usually gasket joint. Gasket joint connections are easy to assemble and the rubber gasket provides for expansion and contraction that takes place in the pipe with temperature changes.

Thrust blocking is required on all gasket joint pipe installations. Because the gasket allows the pipe to move at each joint, it could also be pulled apart by thrust forces. Water under pressure exerts thrust forces in piping systems at changes in pipe size or direction, dead ends and valves. The size, shape and type of thrust blocking required depends on the maximum system pressure, pipe size, type of fittings and soil type. Refer to the manufacturer or system designer's recommendations for thrust blocking.

If solvent welded pipe is chosen, care must be taken when making the solvent connection. Improper application of the cement or primer can result in failure of the joint. Refer to the pipe and solvent manufacturers for their recommendations on proper solvent welding techniques.

PVC piping offers many advantages over other types of piping to the irrigation industry. If the systems are carefully designed, installed and maintained, the piping will give years of satisfactory service. However, inadequate consideration of potential hydraulic situations, faulty installation or improper operation can lead to significant problems, if not immediately, then at some time in the future.

— Bob Fredericks
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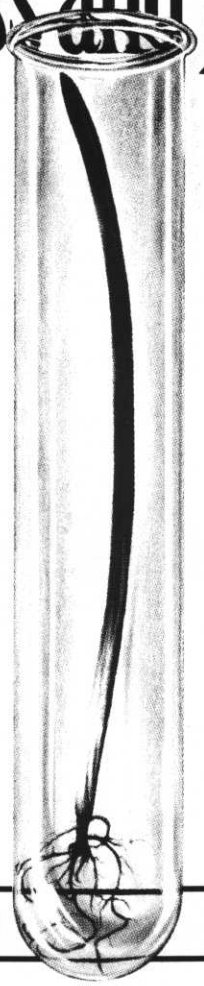

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Facts About Golf Course Pesticides

1. Why do golf courses use pesticides?

Pesticides help to limit the damage that can be caused by insects, weeds and plant diseases. Insecticides, herbicides and fungicides are used very selectively to protect the health of turf, trees and other living things on the course. Fertilizers provide much-needed nutrition for the course's plant life.

It is very important to note that the pesticides and fertilizers are not used primarily for aesthetic reasons. First and foremost, they are tools that help ensure a healthy playing surface for the game. Furthermore, they help to protect a valuable and ecologically important piece of land. Golf courses are tremendous economic assets as well as vital greenspaces for communities. They employ hundreds of thousands of people, enhance local economies through tax revenues and tourism and provide many ecological benefits. For example, golf courses help to filter air pollutants and create fresh oxygen, they are excellent groundwater recharge sites and, most importantly, they are critical wildlife sanctuaries in urban and suburban areas.

2. How does a superintendent decide when to apply a pesticide?

Pest problems on golf courses are often relatively predictable or can be diagnosed as part of an ongoing monitoring program. Once the problem has been identified, the superintendent considers the available options. These could include cultural practices (such as physically removing weeds, changing irrigation patterns or clearing underbrush around a problem area to allow more air movement) or the use of biological controls or chemical products. Once the problem is diagnosed and the right treatment has been selected, the superintendent waits for the ideal time to treat the problem in the most effective and environmentally sound manner available. This approach is often called "integrated pest management."

3. What kinds of products are used?

Most people are surprised to find that the majority of the pesticide products used by superintendents are identical or closely related to those used by homeowners.

4. How do we know that these products aren't harmful to humans or wildlife?

Pesticide production is one of the most highly regulated industries in the United States. Before a product is registered by the EPA, it must be rigorously tested for potential human health and environmental effects. This process can take up to ten years and involve more than 120 different tests and studies. Today, manufacturers often invest up to $50 million in product safety and testing before a new pesticide ever comes to the market.

5. Are golfers at risk?

No. There is no scientific evidence that golfers face any chronic health risks from the pesticides used to maintain courses. Once a liquid product is applied and the turfgrass is dry or the product has been watered in, there is very little chance of exposure to golfers or others who enter the area. It is worth noting that a small percentage of people may be allergic to a particular product, just as some people are allergic to household cleaners, soaps or perfumes. Golfers with possible chemical allergies are always encouraged to contact superintendents to find out what products might be in use.

6. If the products aren't that dangerous, why do professional applicators wear protective gear?

Applicators work directly with pesticides and are exposed much more often than golfers. Consider the fact that it is safe for a person to have an occasional x-ray, but the technician may actually leave the room to prevent repeated exposure. Pesticide label directions (which carry the weight of law) require that applicators take certain precautions based on the assumption that the same person will be repeatedly exposed to the same product over many years. These precautions may include the use of rubber gloves, goggles, respirators or protective clothing.

7. Some media stories suggest that pesticides are linked to cancer. What are the facts?

Most of the product testing required by EPA focuses on this question. Before a product is registered, tests are done (usually on laboratory rats) using exposure rates that are considerably higher than any exposure a golfer could ever receive. Although a recent study commissioned by GCSAA to examine causes of death among its members found some higher rates of certain cancers, researchers said that no cause-and-effect relationship could be established from the data. They also said that lifestyle choices (smoking, diet, stress, etc.) were the most significant factor in the results.

8. Do properly applied chemicals pose a threat to groundwater, lakes or streams?

No. Studies consistently show that a well-managed golf course can actually improve water quality on and around the facility. Research also shows that when pesticides and fertilizers are used properly, they do not tend to seep into groundwater or run off into surface water. Modern products and practices allow superintendents to manage turfgrass so efficiently that there is little chance of harm to our precious water resources.

(Continued on Page 36)

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