

tilizers on turf in fall and is the link between phosphorus and turfgrass stress tolerance. However, applying phosphate to turfgrass growing in soils well supplied with P *will not* result in greater root growth.

In certain situations, the potential for significantly enhancing turfgrass stress tolerance through phosphate fertilization is substantial. A prime example is golf putting greens where soil P levels are deliberately kept low to discourage growth of *Poa annua* and N rates are kept low in the interest of maintaining fast greens. This combination of management practices has led to P deficiency in bentgrass during periods of prolonged heat stress. What these temporary P deficiencies mean in terms of

turfgrass heat or moisture stress tolerance is unknown at this time. It is, however, logical to assume that the condition delays bentgrass recovery from heat and moisture stress.

ROLE OF POTASSIUM

Potassium ranks second only to N in terms of its influences on the stress tolerance of turfgrass. Low levels of potassium in plants have long been associated with high disease susceptibility. Thus, when high temperatures and humidity favor growth of disease-causing organisms, potassium becomes an important factor in the stress tolerance of turfgrass.

Potassium also influences the response of turfgrass to moisture stress.

High annual rates of K markedly reduce the wilting tendency of turfgrass and can offset the adverse effects of high N rates on moisture stress tolerance.

The mechanisms whereby K increases the stress tolerance of turfgrass are largely unknown at this time. They may be related to the fact that soluble carbohydrates accumulate in K-deficient plants and such plants are not fully turgid and bruise readily. Whatever the mechanisms, the fact remains that turfgrass that is well supplied with K is best able to tolerate stress. This is why recommendations for annual rates of K application on golf greens now are the same as for N.

SUPPORT

THE O.J. NOER CENTER FOR TURFGRASS RESEARCH

Send Your Pledge In Today!

**Scotts most
successful product is
not available for sale...**

**only for advice and
support... your ProTurf Tech Rep.**



Dick Evenson
Senior Technical Representative
ProTurf Division
O.M. Scott & Sons

443 Woodview Drive • Sun Prairie, Wisconsin 53590
Telephone: (608) 837-6563

Con't. from page 1

research activities from its headquarters to different regions where peculiar problems may occur. This "direction change" was merely a continuation of decentralization to give more emphasis on direct service to member clubs.

Today, the Green Section maintains six regional offices, as well as its national headquarters based at Golf House in Far Hills, New Jersey. Regional directors and staff agronomists make approximately 1,300 annual visits to subscribing clubs. Its sole mission is, and always has been, to distribute the best possible information to help in the pursuit of the best possible golf

turf.

The USGA Green Section remains active in support of turfgrass research with its proposed multimillion dollar, ten year research program. It will be overseen by the Green Sections Turfgrass Research Committee. This committee is comprised of some of the nation's leading turfgrass experts. Bill Bengeyfield is chairman of this committee.

The primary purpose of the program is to develop minimal maintenance turfgrasses. Emphasis will be placed on salt tolerant, water conserving, heat and cold tolerant, disease and insect resistant grasses with low nutritional needs.

The ultimate goal is a wear resistant turf with the minimal maintenance

qualities that provides excellent playing surfaces.

The Research Advisory Committee serves without compensation at the pleasure of the USGA Executive Committee. It will coordinate and watch over the entire project to insure that these essential goals and proper progress are being met for the future of excellent golf turf.

It is easy to see that for 68 years, the USGA and its Green Section have provided for some of the best turf research and the most efficient dissemination of that information to Golf Clubs around the nation. How appropriate then, that the WGCSA can help support their goals and share in this celebration of excellence in the "Year of the USGA".

POST EMERGENCE BROADLEAF WEED CONTROL IN TURFGRASS

By Dr. Robert Newman
Horticulture Department
University of Wisconsin-Madison

Before you do anything else, please read the following sentence which appears on almost all herbicide labels. "It is a violation of Federal Law to use any herbicide in a manner inconsistent with its labeling." Having read and vowed to observe the laws, we can proceed.

Most broadleaf weed herbicides are applied with a sprayer. Herbicide drift is a very common and serious problem when herbicides are sprayer-applied when there is any appreciable wind. The question of how much wind is too much isn't easy to determine. Spray drift due to wind is influenced by both wind speed and wind direction and several other factors. Obviously don't spray when there are a lot of sensitive plants downwind from the area you wish to spray. Sprayer pressure affects spray drift. At higher pressures more very fine droplets are formed at the nozzle tip leading to more drift. Nozzle tip size plays a role in drift. In general, the smaller the nozzle tip the more fine droplets and the greater potential for drift. Boom or nozzle height affects drift. The higher the boom or nozzle the greater the potential for drift. Flat fan nozzle tips are available to spray at a 65°, 80° or 110° angle. When 65° spray angle tips are spaced every 20 inches on a boom, the suggested boom height is 22"-24" above the ground or above the turf-weed canopy. At 20 inch nozzle spacing on a boom, and using 110° spray angle tips, the suggested boom height is only 10"-12".

Spray angle (of nozzles)	Spray height 20" spacing of nozzles on boom
65°	22-24"
80°	17-19"
110°	10-12"

Various thickeners are available to add to the sprayer tank. Thickeners reduce the number of very small sized spray droplets hence reduce the potential for drift.

A second way herbicide can move out of the target area is by vapor drift. Volatile ester formulations may evaporate at high temperatures and the vapor can drift downwind. Ester formulations of herbicides are volatile and there are lots of them in the market place. You can purchase 2,4-D, Trimec, Weedone DPC, Turflon D and others in either the ester or amine form. Ester formulations work better because they are oil soluble and penetrate the waxy leaf cuticles better than water soluble amines. Esters can be used in spring or fall when temperatures don't reach 80°F but should never be used in summer when it is hot or may get hot within a day or 2 after application. There are low volatile and high volatile esters available. Both are volatile and too dangerous to use in the heat of summer.

I think we can safely say that there is a certain amount of risk associated with the application of post emergence herbicides that are just as effective in causing injury to grapes, tomatoes and petunias as to dandelions, plantains and other common broadleaf turf weeds. It is up to us to reduce the risk factor as much as possible. Here are

a few suggestions.

1. Spray when it isn't windy.
2. Use low pressure wide angle nozzle tips on boom sprayers.
3. Keep the sprayer pressure low.
4. Product labels often suggest a range of water per acre - perhaps 15 to 40. Use more than the minimum amount of label-suggested water.
5. Consider using thickeners to reduce fine droplets.
6. Keep the boom low by using wide (110°) angle nozzles.
7. Never use ester formulations when ever there is even a remote possibility of temperatures in the 85° or above range.
8. Apply herbicides for broadleaf weed control in early May before the last spring frosts and before people transplant herbicide sensitive bedding plants in their gardens.
9. Or apply the herbicides in fall around the time of the first killing frost that will kill frost intolerant flowers and vegetables.
10. If you must spray next to or very near shrubs, there is less potential for injury in fall when the conifers have stopped growing and the broadleaved shrubs are about to drop their leaves compared to June when growth is very active.

Herbicide application failures result in the need to reapply which increases the "risk" factor. To reduce the potential for herbicide failure:

1. Identify the weeds you intend to eliminate so that you can choose

the correct herbicide or herbicide mixture.

2. Spray when weeds are growing actively as opposed to when weeds are semi-dormant due to drought, heat, cold or flooding.
3. When dealing with annual weeds, they are more easily killed when they are small rather than large and mature.
4. Biennial weeds, bull thistles, burdock, wild carrot, wild parsnip, are easily killed in their 1st year of growth when they are low-growing rosettes. They are difficult to kill in their second year—the flowering year—of their life.
5. Some perennial weeds, Canadian thistle, field bindweed, and milkweeds, are more easily killed if herbicide application is delayed until early flowering.

Now lets look at the herbicides available for post emergence application for selective control of broadleaf weeds. The 3 most widely used herbicides are 2,4-D, MCPP and dicamba. These 3 herbicides are available alone (2,4-D alone, etc.) or as combinations of the three. 2,4-D is very effective in control of common turf weeds such as dandelion and plantain. It injures but does not kill other common turf weeds such as white clover, chickweed and ground ivy. 2,4-D is not recommended for use on bentgrass putting greens. low-mowed bentgrass under heat and/or drought stress can be severely injured or killed by 2,4-D. The bentgrass warning on 2,4-D labels suggests to some people that 2,4-D can be used to kill bent patches in bluegrass lawns. My experience strongly suggests that 2,4-D amine causes little if any serious injury to bentgrass mowed 1.5-2.5" high.

MCPP or mecoprop as it is also called is safe to use on bentgrass putting greens during periods of cool weather. MCPP is fairly effective in control of white clover and chickweeds as well as dandelions. MCPP is frequently mixed with 2,4-D as a general turf herbicide for weed control in lawns.

Dicamba (Banvel) is usually available in a 3-way combination with 2,4-D and MCPP or as a 2-way combination with 2,4-D. The 3-way combination is a very effective herbicide mixture that controls most common turf weeds. Dicamba is somewhat volatile and should not be used alone or in combination with other herbicides when air temperatures are or may reach 85°F. Under no circumstances should the application rate of dicamba exceed 1

lb. of active ingredient per acre per season. Also keep dicamba away from the root zone of trees and shrubs.

The 3-way combinations of 2,4-D, MCPP and dicamba often contain about 2 lbs. of 2,4-D, 1 lb. of MCPP and .2 lbs. of dicamba per gallon. The recommended application rate is 3.5-4 pints per acre which results in application of approximately .1 lb. of dicamba per acre. The low application rate of .1 lb. dicamba in the 3-way combinations per acre reduces its potential for injury to desirable plants. Dicamba may be used on golf course fairways, tees and roughs at rates of .5 lbs. ai/acre or less. It is not recommended for use on bentgrass greens.

The PBI Gordon Company and perhaps others market a 3-way combination of 2,4-D, MCPP and dicamba for use on bentgrass. The product contains less 2,4-D than many of the 3-way combinations labeled for general turf use.

2,4-D and dicamba are fairly effective pre-emergence herbicides. Do not apply either one to newly seeded turf areas. Apply only after grasses are well established and mowed several times.

Bromoxynil is safe to use on newly seeded grasses for control of seedling broadleaf weeds. For best control, apply when weeds are in the 3-5 leaf stage.

There are some weeds that are just plain hard to kill. Among them are violets and ground ivy. Two very effective broadleaf weed herbicides are now available for control of hard-to-kill weeds. They are Turflon, a combination of 2,4-D and triclopyr and Weedone DPC, a combination of 2,4-D and 2,4-DP. Both are available in either amine or ester formulations. Both are effective for control of brush and brambles.

The herbicide 2,4-D tends to have a bad name among certain groups in our society. Are there substitutes for 2,4-D? A person could mix MCPP and dicamba to produce an effective broadleaf weed herbicide. MCPA can be substituted for 2,4-D. The PBI Gordon product Encore Trimec is a 3-way combination of MCPA, MCPP and dicamba. MCPA is somewhat less effective than 2,4-D in control of turf weeds.

Another herbicide which is used as a substitute for 2,4-D for turf weed control is chlorflurenol. My experience with chlorflurenol is limited but suggests that it is not as effective as 2,4-D and probably should be mixed with another herbicide.

The following is a list of common and

chemical names of herbicides labeled for broadleaf weed control in turfgrass.

Common Name	Chemical Name
2,4-D	2,4-dichlorophenoxyacetic acid
MCPP	2-(2-methyl-4-chlorophenoxy) propionic acid
Dicamba	3-6-dichloro-0-anisic acid
MCPA	2-methyl-4-chlorophenoxyacetic acid
2,4-DP	2-(2,4-dichlorophenoxy) propionic acid
Triclopyr	3,5,6-trichloro-2-pyridyloxyacetic acid
Bromoxynil	3,5-dibromo-4-hydroxybenzotrile
Chlorflurenol	methyl 2-chloro-9-hydroxyfluorene-9-carboxylate

For non-selective grass and broadleaf weed control before seeding or sodding, apply glyphosate (Roundup or Kleenup) to actively growing weeds. Do not disturb the site for 7 days. Then prepare the seedbed via tillage.

For weed control in a gravel parking lot and similar sites, apply glyphosate tank mixed with a pre-emergence herbicide.

Remember these things:

1. In most turf areas the only real reason to kill weeds is to have them replaced by more desirable plants—the turfgrasses. So kill weeds in the cool spring and/or the cool fall when turfgrasses actively grow to fill in areas formerly occupied by the weeds you killed.
2. Water tends to run downhill and carry with it anything in its path. Before applying a herbicide, take a look at what's downhill from it. Assess its replacement value and act accordingly.
3. The prevailing winds in Wisconsin are from the west. Be very careful when there are sensitive plants east of the spray target area.
4. Granular herbicides reduce the herbicide drift problem but do not eliminate the volatility problem. Ester formulations of dry herbicides will volatilize when temperatures are high and when the herbicide particle or granule is moist.
5. How much wind is too much? The Banvel label book makes the following statement: "Do not spray near sensitive plants if wind is gusty or in excess of 5 mph and moving in the direction of nearby sensitive crops." Prepare to spray at sundown or sunup—the 2 times during the day when winds are often calm.

The use of trade names in the text does not imply endorsement of that product over others with similar ingredients.



A SENTIMENTAL STORY

By Rob Schultz

My buddy, Gus, stands 5-foot-6 or so, but he seemed 12 feet tall when I was a kid.

Gus lived three houses away from me when I was growing up in Oshkosh. Gus was a great athlete and he had two brothers who were equally as talented. Everything I learned about sports, I learned from Gus, his brothers and their endless supply of friends.

For some reason, even though I was always getting in the way, Gus and his friends took me under their wing. I was eight or nine years younger than most of them; a skinny, pigeon-toed kid with buck teeth who yearned to learn everything I could from them. I never tired of watching them play basketball, baseball and touch football, run track or lift weights. As soon as I could rub the sand out of my eyes in the morning, I'd run over to their house to find out what they were doing.

Gus and his friends played every conceivable sport in their backyard. In the winter, their backyard turned into a hockey rink. They played basketball in the attic of a neighbor's garage. They called it dunkball, since they used a rubber kickball and shot at a basket about 7 feet off the floor. The greatest collegiate athletes from the state all came to play there. Ron Hayek, Myles Strasser, Greg Seibold, Randy Wade. Some intense basketball was played there; years later the floor sagged from the pounding it took over all those winters.

During the summers, pole vaulting was the main sport. Gus used his parents' driveway as a runway and built an incredible pit out of old mattresses and foam rubber. Incredibly, they'd jump 14½ feet in their backyard. That was quite a feat 20 years ago. Gus set the state record in pole vault as a senior in high school. A few years later, his brother, Bill, broke his record and went on to represent the state, along with Stu Voight and Mark Winzenreid, at some national high school track meets.

Nothing, it seemed, fazed these guys. Nothing, it seemed, could scare them. Except, that is, for a certain golf course located about 35 miles away from Oshkosh. I listened to them talk about it while laying in the pole vault pit one summer day. They spoke of it in awe, as if it was Augusta National, Pebble Beach and Pine Valley all rolled into one.

"Lawsonia Links," Gus told me, "is where God lives."

Now I couldn't believe that such a miraculous place could be located so close to home. I begged Gus to take me there so I could see it. I was 10 years old and golf was a mystery to me. But I had to see this place that my heroes worshipped.

One day Gus obliged and I'll never forget the experience of seeing Lawsonia for the first time.

We drove past the brick walls and wrought iron gates that welcome visitors there and I gasped. With my nose pressed against the window of the car, I could see, in the distance, the hills that accompany the Wisconsin River down its southward trek through the state. From the other direction, I could see Green Lake and all the sailboats that call such a beautiful body of water home.

Then I looked at the golf course. I couldn't believe that a golf course could be such a gorgeous sight. Excuse me for that feeling, I was young. I'd never seen such well-manicured fairways, yawning bunkers, huge greens. I was in awe, even though I hadn't yet seen the great par-3 seventh hole, or the laborious climb up "Cardiac Hill" from the 11th tee to the 11th fairway, or the tremendously long par-5 13th.

My heart started pounding, I began to sweat and couldn't wait to get out of the car. I was in love for the first time. With a golf course. I haven't been the same since.

When I was young, my parents always took the family to Pennsylvania

for a few weeks each summer to visit relatives. Each trip always included a venture to Valley Forge, where my mother spent much of her time as a youngster. At Lawsonia, as Gus and I were walking along in solitude and the only sounds reaching our ears were from birds and the chiming of a nearby carillon, I couldn't help thinking that I was back at Valley Forge. The two places seemed so much alike; so quiet, so breathtaking.

Gus grabbed my shoulder and told me, "You have to be a real good golfer to play here. Maybe some day we can come back and you can play. But you'll have to learn how to play and you'll have to practice real hard."

That was enough incentive for me. My parents bought me a set of clubs and I played and practiced every day. I didn't spend as much time with Gus and his friends down the street anymore, partly because most of them had graduated from college and were off on their own. But I also wasn't around much because I was always on my bike, with clubs in tow, riding the long trip to the local municipal golf course and back. I struggled for a year trying to break 100. But I kept working at my game, praying I'd improve to the point where Gus would take me back to Lawsonia.

The big moment came when I was 14. I remember shivering with fright on the first tee, staring at the big dogleg to the right, to the green with the incredible "cliff" off the left side. "If you go down there," Gus said, "and get up and down in three shots, I'll give you 20 bucks."

I did go off the cliff, but Gus' money was safe.

My memories of that first round at Lawsonia still remain vivid, mainly because I've rarely gone a year without playing there. Talk to anyone about their favorite days of the year and most will bring up a holiday like Christmas, Easter or the Fourth of July. My favorite day is whenever I play Lawsonia.

I remember playing that dastardly par-3 seventh hole for the first time. It's one of the most beautiful holes in the state. From the elevated tee, a golfer looks down at an elevated green with deep woods as a backdrop. In between is Hell's Kitchen. Miss the green here, Bub, and you can pencil in a bogey or double bogey on the scorecard.

That first day at the seventh, Ron Hayek, who was playing with Gus and

me, nearly got a hole-in-one. His ball hit the pin and bounced out by about one inch. I tell the story of Hayek's near-ace every time I walk to the seventh tee there. I saw Hayek for the first time in about 14 years last summer when he was playing in the State Amateur at Maple Bluff and I asked him if he still remembered the near ace. He said he had forgotten about it. That's too bad. But I told him not to worry because I was keeping the story fresh.

My other great story from that first round occurred on the 240-yard, par-3 10th hole. I was amazed that such a long hole could be a par-3. As we stood on the tee, a herd of deer walked out of the woods and began to graze in front of the 10th green. There must have been 30 or 40 deer there. It was the first time I had seen deer out in the wild. We waited 20 minutes for them to leave. Then Gus, all 5'6" of him, up his three-wood and smacked the ball to within one foot of the pin. Easy birdie on one tough par-3. I always tell that story, too, when I walk to the 10th tee every year.

Lawsonia, like most golf courses,

has changed over the years. There is a new 9 there, which I don't like as much as the other 18 because it's so much different. They put in a water reservoir between the 13th and 15th holes many years ago. And the "little" trees they planted on the right side of the 9th hole have now grown up to be "big" trees. I gauge how old I'm getting by those trees. Each year, I look at those trees in disbelief. Then I pull my hair back and look at my hairline in disbelief.

But despite all the changes, Lawsonia's abience remains the same. You can still hear the carillon chiming, the birds singing. You can still see the deer grazing. I even once saw a fox ambling across the second tee into a nearby woods.

The rest of the area where Lawsonia is located—Green Lake Center—has remained basically unchanged. You can't play golf there without taking a tour of hugh Green Lake Center. Lawsonia, you see, takes up only a small portion of it.

I love driving my car on the skinny roads with stone fences that wind their way throughout the grounds. I wave to

the bikers who abound everywhere on these roads. The roads travel to beautiful prairies and thick woods. There are tiny chapels and cottages and beaches everywhere.

Now that the snow has melted and the grass is green, I've circled some dates on my calendar for my return to Lawsonia. That has excited me because Lawsonia is my favorite place in the world. I owe it a great deal. Without seeing it, I might never have taken up golf. And if I hadn't taken up golf, I never would have had the extreme pleasure of writing about it.

I'll practice hard during the few days leading up to my return to Lawsonia; I never like to play badly there. It's like Gus once said, "You have to be a real good golfer to play there."

And when I'm walking down the fairways at Lawsonia this summer, I'll think back to the wonderful times I spent with Gus and his friends. I'll remember the pole vault pit and the neighbor's garage and the first time he took me to Lawsonia.

Quietly, I'll say, "Thanks, Gus."



E3481 Hwy. 22 & 54 ■ Waupaca, Wisconsin 54981 ■ (715) 258-6566

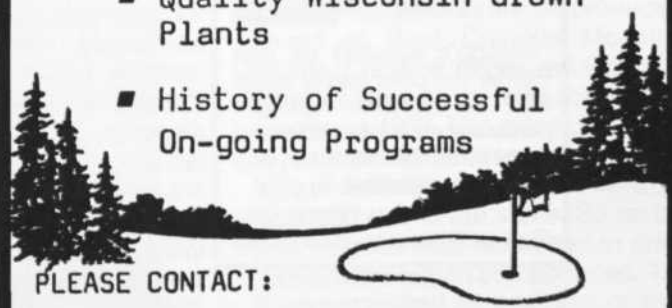


**CUSTOM BLENDED CONSTRUCTION MIXES
FOR GOLF COURSE CONSTRUCTION
JOBSITE MIXING**



OFFERING:

- Site Consultations
- Tree Planting Programs
- Quality Wisconsin Grown Plants
- History of Successful On-going Programs



PLEASE CONTACT:

Jerry Draeger or Bill Baker

BOX 185 WATERLOO, WI. 53594-0185

PHONE (414) 478-2121

ESTABLISHED

1897

Turf-Type
Perennial Ryegrass

Still the Best

That's right. For the second year in a row Palmer turf-type perennial ryegrass scored number one in the National Ryegrass tests conducted by the U.S.D.A. coast to coast:

U.S.D.A. National Perennial Ryegrass Test Turf Quality 1-9 (9 = Best)

Variety	2-Yr. Avg.	Variety	2-Yr. Avg.
Palmer	5.9	Derby	5.5
Gator	5.9	Yorktown II	5.4
Prelude	5.8	Cowboy	5.4
Repell	5.8	Pennfine	5.3
Tara	5.8	Diplomat	5.3
Premier	5.7	Regal	5.3
Citation II	5.6	Barry	5.2
Manhattan II	5.6	Delray	5.2
Blazer	5.6	Omega	5.1
All Star	5.6	Elka	5.1
Ranger	5.6	Manhattan	5.1
Birdie II	5.5	Citation	5.0
Fiesta	5.5	Linn	3.4
Pennant	5.5		

It's no wonder courses like Bay Hill in Florida, Shinnecock in New York, PGA West in California and Sahara in Nevada are only a few of those that are demanding the excellent performance of Palmer.

As a turf professional wouldn't it be nice to know you're using the best? Use Palmer.



"Kellogg's supplied us with Palmer and other quality seeds that we needed. Kellogg's personnel are experienced and their recommendations and service is excellent."

—Wayne Otto
Supt. of Ozaukee Country Club



Kellogg Inc.
Seeds & Supplies
322 East Florida Street
Milwaukee, Wisconsin 53204
(414) 276-0373

1-800-792-3504 ext. 492

PVC Increases — Fact or Fiction?

Submitted By Tom Emmerich
Sales Manager
Reinders Irrigation Division

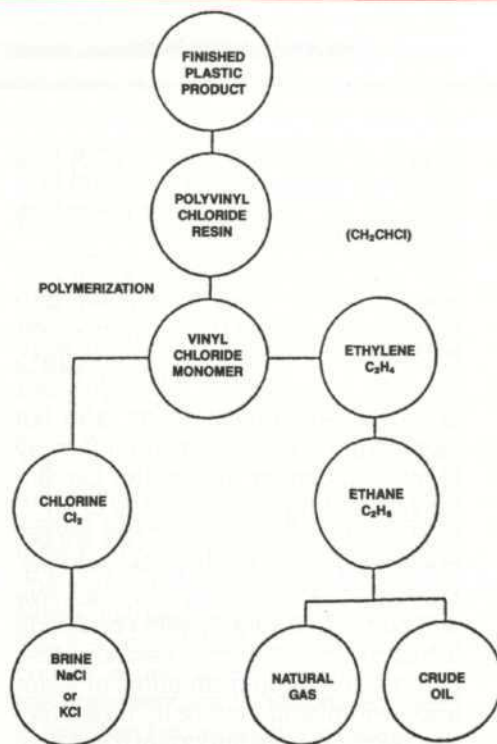
There has been much discussion about the increases we have all experienced in PVC products in the past 8 months. You have no doubt realized that none of the PVC pipe manufacturers are very eager to give you definitive answers as to what PVC prices and availability are going to be 3 months from now. As a matter of fact, I don't believe any pipe manufacturer knows what the price is going to be 30 days from now. Like everyone else, I am not going to attempt to be a fortune teller. We will attempt to give you some statistics and projections which may give you some insight into what has happened and what may happen in the future. Figures for 1987 production and shipments are not available so we will use 1986 figures.

In 1986, U.S. resin manufacturers shipped 157 million pounds more than they produced. The additional shipments came out of resin reserves. This went a long way in depleting the available resin in 1987. Resin shipments in 1986 represented 97.4% of Average Effective (resin manufacturing) Capacity.

In 1984, 15.9% more PVC resin was exported by U.S. manufacturers than was imported. In 1985, 22.8% more PVC resin was exported from the U.S. than was imported. In 1986, 40.9% more resin was exported from the U.S. than was imported. 1987 figures will show that U.S. manufacturers continued to export more resin than was imported.

At the end of 1987 there were 9 manufacturers of pipe grade PVC resin. These 9 manufacturers represented 94.7% of the U.S. resin manufacturing capability. One of the largest producers of pipe grade resin in the U.S. has indicated that they intend to quit making pipe grade resin and divert their production to "special-purpose markets where technology, quality and service provide a competitive advantage."

Since 1979, several companies have either sold their PVC resin manufacturing facilities or in some cases they have closed them down. During the same period of time, two foreign manufacturers have built plants in the U.S. The end result is an increase in Average Effective Capacity of 9% between 1979 and 1986. PVC resin ship-



PVC components

ments have increased 17.2% (nearly twice as fast) during the same period of time.

Demand for PVC resin is projected to increase 4%-5% per year over the next 5 years. PVC represents 74% of all plastics used in pipe, fittings and conduit. Because PVC already has 74% of the plastic pipe, fitting and conduit market, the increase or decrease in demand for pipe, fittings and conduit will reflect the strength of the construction market. While PVC pipe currently accounts for 40% of all plastics used in construction, it only accounts for 45% of total PVC resin usage. This percentage is shrinking steadily; panels, siding, closures, containers and film have a projected growth rate of from 50-100% greater than the demand for PVC pipe and fittings. In the future, the demand for PVC pipe will have less of an impact on the price of resin. This is the same thing that happened to ABS when a greater percentage of the resin was being diverted to the automobile industry and other specialized markets.

From 1980 through 1985 the demand for PVC resin rose an average of

6.4% per year. Current estimates are that demand for PVC resin will increase by from 4% to 5% per year for the next 5 years. Manufacturing capacity is projected to increase by 2% to 4% during the same period of time. This increase will have to come from streamlining present facilities. It takes a minimum of two years to bring a new plant on stream and no one has announced plans to build any new facilities to date. Because of new EPA requirements, it is unlikely that any of the facilities that were closed will be reopened. The money people are saying that new plants will not be started until resin increases another 20%.

One last factor: PVC pipe manufacturers are on resin allocation, regardless of what some people would have you believe. Several manufacturers have already announced a reduction in the classes or sizes of PVC pipe they plan to manufacture.

What is going to happen in the PVC market? You have the same information to formulate an opinion from as I do.

I do have one prediction. Some manufacturers of PVC pipe will withdraw from markets they have previously served.

WHAT IS PVC MADE OF?

Over the past several years this question has been asked more than once. When oil prices were dropping, how could PVC go up since it is manufactured from oil?" The fact of the matter is that oil is but one of several PVC components.

Ethylene prices have declined slightly. It takes .48 pounds of ethylene and .61 pounds of chlorine to produce 1 pound of Vinyl Chloride Monomer (VCM). Chlorine prices on the other hand increased over 14% in the last 3 months of 1987. The price of chlorine is projected to increase another 5%-10% in 1988. Ethylene prices were projected to remain the same. So far this year ethylene has increased in price.

PVC resin is then compounded. This is accomplished by adding a mixture of heat stabilizers, light (ultraviolet) stabilizers and a coloring agent plus other additives.

There you have it — PVC compound ready to be made into pipe.

Quality Fairways: Evolution or Revolution? Providing the Best Possible or One-Upmanship?

By Jerry Kershasky

Any way you look at it, fairways have been improving tremendously over the past 10 years. In some cases, you could consider them now equal to some of the greens of 25 years ago. But how we arrived at such quality seems to bother some people in our profession. They fear that we are using machinery and practices on fairways that were designed and meant for greens. Some feel it is wrong that we are able to secure the funds to carry on such intensive maintenance practices from our club members to provide better playing conditions. They fear this will lead to a vicious cycle of constant improvements over too short a time period.

I think there is some confusion here, on two points. The first is that we often say you shouldn't compare one golf course with another one down the road, but we are actually guilty of it. Secondly, our goal always should be to improve each of our programs in every way that we can.

What I mean by comparing golf courses is actually the failure to take into account the physical aspects (soil, terrain, vegetation, weather) of a golf course in the comparisons that are inevitably made. Yet without those major criteria, some try to compare programs and equipment being used on that course with another course which has dissimilar physical characteristics, but has the same final goal for turf conditions.

For example, a golf course very close to Westmoor has excellent and for the most part consistent soil conditions. That course drains very well and subsequently is open before we are every Spring. Also, it can be open long before we are after a heavy rain because of this soil drainage factor. That same course has fantastic fairways which are primarily made up of bentgrass, which it has had for over 20 years. And it has used tractor-drawn pull gangs until only very recently to maintain those excellent fairways. Their pull gangs really did not seem to hurt the bentgrass, nor did the returning of clippings to the surface of the fairways. Also, until only a

couple of years ago, that course had a manual quick coupler irrigation system, yet still had excellent bentgrass playing conditions.

If I copied the procedures and programs of my close colleague and neighbor, and used those methods on Westmoor to maintain our bentgrass fairways, we would fail. Why? Because our soils, yes, that's "soils" and not "soil", vary considerably from fairway to fairway, and for that matter can differ significantly from one side of an irrigation head to the other. They are primarily clay loam, but in areas are clay. We know that for bentgrass to survive and compete favorably with *Poa annua* it has to have superior aeration, less compaction, proper amounts of water and even distribution of it. These factors become more important if soil conditions are not uniform.

OK, maybe you're now saying, "Jerry, you missed the boat. You should not be even trying to grow bentgrass in those conditions because the practices you are going to have to implement to make bentgrass prosper are far too expensive in the short and long term. You should have informed your board of directors that you could not have the same turf conditions that your neighbor has because your soil conditions would make it too expensive to maintain."

That is the second point. We are paid to find solutions to problems, even if they are unusual or expensive. We, of course, need to present the cost of both short and long term programs, but when all facts and figures are in, it's the board's or owner's decision to proceed or to ignore your recommendations.

This is what has taken place at Westmoor. Our Green Committee, some eight years ago, wanted to have firmer and drier fairways. They wanted the fairways cut between $\frac{1}{2}$ " and $\frac{7}{16}$ "; they wanted the turf to be green and survive the summer stress without daytime syringing. They wanted consistent soil firmness throughout the fairway and they did not want one spot wetter than another. They wanted to eliminate the taller grass that grew in the undulations in our fairways. Regardless of which

direction we mowed with our gang mowers, they tended to bridge over any undulations, leaving taller unmowed grass in them. And they wanted this all done without major grading of fairways, or changing poor soil areas with better soils, or even chemically killing off all the *Poa annua* with Round-up and starting over. In short, they did not want to reconstruct or kill anything to reach their goal, which was to have fairway conditions as good as that course a few miles away.

Well, it would have been simple to say it could not be done, but we all know there is a solution out there for every problem. What must be pointed out is that we could not give our members the fairway conditions that our neighboring course has at the same price those members pay. We could give our members the same quality but with our soil conditions it was going to cost us more both in the short term (to establish) and even more importantly it would cost us more to maintain the fairways over a long term period.

Our committees chose to spend the extra money for quality. That decision meant different programs and increased equipment needs.

I'll skip the initial seeding procedure — that was explained in a previous *GRASS ROOTS* — and go right to our present maintenance practices. First, we mow with triplex greens mowers. Just last Fall we purchased our first lightweight small-headed five-gang hydraulic unit. We use these light units to reduce the compaction factor on our heavy soils and have found they will get down and mow the grass in the bottom of our small fairway undulations. The side benefit we get from this is that they do a superior job of cutting. The negative is that they are expensive to maintain. But if we want bentgrass fairways, they are presently the only mowers that will help us reach that goal.

Bentgrass also needs good aeration, and that means you need a machine that will penetrate deep into the ground and have a short space between holes with minimal disturbance to the surrounding surface. The more and the

deeper the holes per square foot, the better the chance bentgrass has of prospering on our soils. This of course means coring our fairways with a greens-type aerifier — presently our best choice. It is both time consuming and expensive, but results have proven it is also very successful.

Probably the most crucial job we have is applying water to turf. If done improperly over a period of time we can destroy the soil structure, rob the soil of oxygen, create such things as the black layer, germinate a lot of *Poa annua* seed, create some nice environments for disease, and cause unplayable or unsatisfactory conditions for our golfers. On the other extreme we can cause problems with drought and the loss of turf. What does this irrigation thing mean at our location? Well you cannot just turn on each fairway head for the same period of time because of the varied soil conditions. Also because we have different soils that may surround particular heads we must run those heads only for a period of time to get the fine textured soil moist. If we run it to get the coarser textured soils moist, the finer soils will be saturated. So after a light watering for the fine soils, we must come back

the following morning and hand water those coarser soil areas to get adequate water to them. We have a mapping system that identifies those areas so our hand water people can locate them with a soil probe in short order and water only them and not get excess water on the finer soils. Of course each evening when we plan to irrigate we must go out and probe the fairways to determine how much water they will need and which spots we will need to hand water the next morning. This is very labor intensive. But if you want bentgrass and consistent soil moisture so that no matter where a golfer hits the ball on the fairway it is relatively the same, at our location this practice will have to be carried on until a better method is found.

This program may mean nothing at all to a manager who has bluegrass, *Poa annua* or rye fairways. It should mean little to a manager who has consistent soil conditions from fairway to fairway. It really has little merit to anyone unless that person has conditions similar to those we have. It also means that it is going to cost my friend, whose course is only a few miles away and has consistent soil conditions, a lot less to maintain his bentgrass fairways than

it will cost me to maintain mine, but quality bentgrass is what my membership wants.

This is not one-upmanship. Rather, it is providing quality conditions at a particular site which has some drawbacks which can be overcome with some extraordinary practices. These practices may not have to be considered at golf courses without these conditions. These are management decisions, decisions we must make as competent managers. You do not have to mow with triplex mowers or aerify with greens aerifiers if fairway conditions do not dictate it for success.

I think this answers the first point I made. The second deals with success and progress. Success is what we are all shooting for; it's the bottom line. So let us not squelch new ideas and new methods. Instead, let's keep experimenting. For indeed, progress is our most important product. Many inventors, tinkers and dreamers have been ridiculed and laughed at over time for trying new things. But if they would have quit, we would be reading by candlelight, getting our communications by Pony Express, and riding to Texas instead of flying.

LESCO ELITE Fertilizers



A complete new line of small-particle sulfur-coated urea fertilizers specially designed for low-cut turf.

(800) 321-5325
NATIONWIDE

ORDER NOW
(800) 362-7413
IN OHIO

LESCO

LESCO, Inc. • 20005 Lake Road • Rocky River, OH 44116
Cleveland 333-9250

NOR-AM INTRODUCES

Turcam 2½G

INSECTICIDE

ALL THE ADVANTAGES OF TURCAM
IN A
CONVENIENT GRANULAR FORMULATION



- FAST ACTING
- GOOD RESIDUAL
- DOESN'T TIE UP IN THATCH
- EASIER TO APPLY
- ADVANCED CARBAMATE CHEMISTRY
- COST EFFECTIVE

Now available in 40-lb. bags

IMPORTANT: Please remember always to read and follow carefully all label directions when applying any chemical.

John M. Turner
Sales Representative
(312) 462-9866

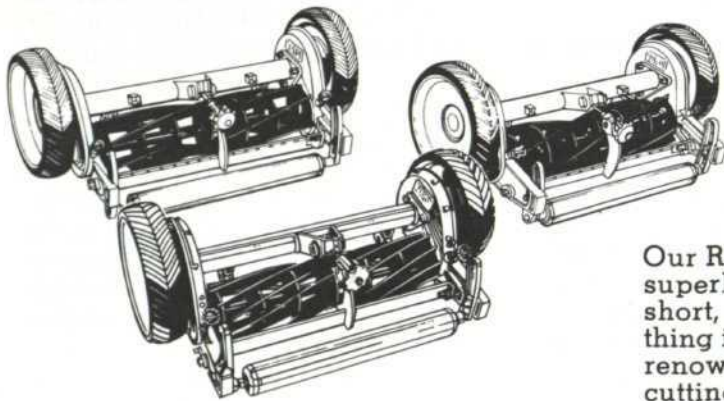
NOR-AM
NOR-AM CHEMICAL COMPANY
2340 Inverness Road P.O. Box 980
Wilmington, DE 19801

Reinders



TURF EQUIPMENT

IRRIGATION SUPPLIES



OUR GANG

Our Reelmaster® 5, 7, and 11 blade gang mowers deliver a superb quality cut and finished look. Whether you need a short, super-formal cut. Or a longer informal cut. Or something in-between. Yet all three also deliver renowned Toro durability to keep you cutting. For more information, contact the Toro distributor listed below.

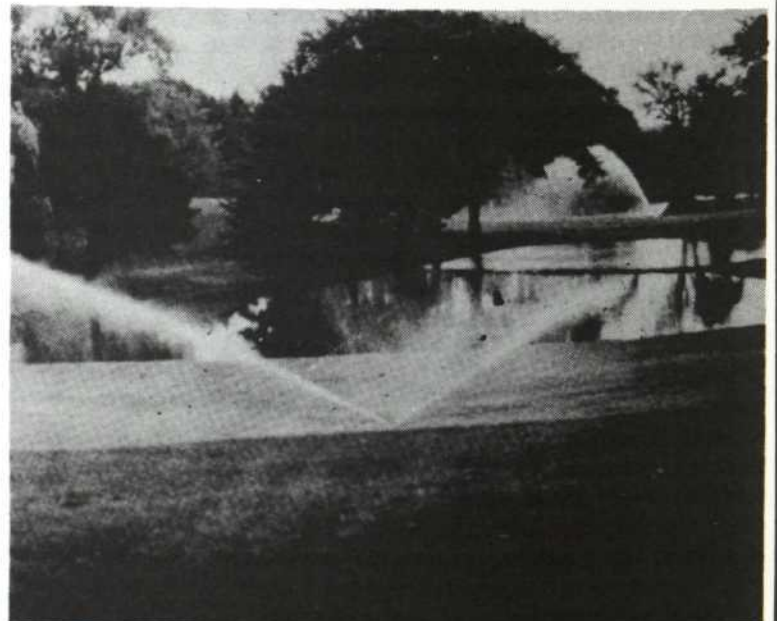
Single Point Adjustment



THE PROBLEM SOLVERS



- FULL LINE STOCKING DISTRIBUTOR
- REPAIR & SERVICE CONSULTATION
- DESIGN & SPECIFICATION
- PUMPS & CONTROLS
- PLASTIC PIPE



Reinders TURF EQUIPMENT IRRIGATION SUPPLY

13400 WATERTOWN PLANK RD., ELM GROVE, WIS 53122

PHONES: LOCAL 414 786-3301 WIS 1 800 782-3300