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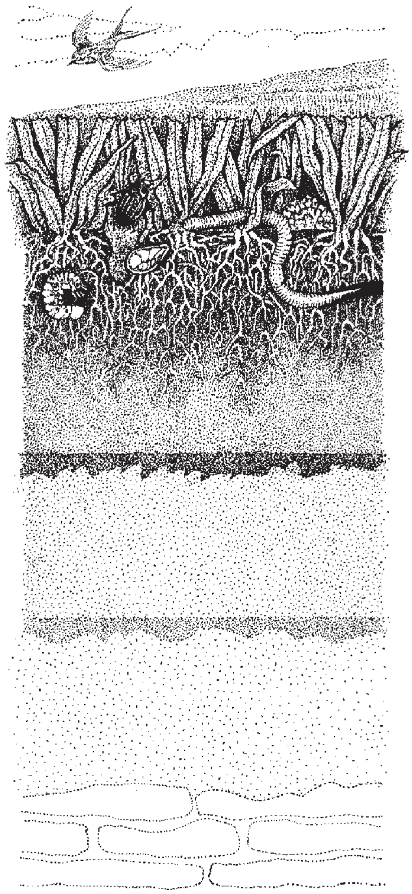

Subsurface Placement of Pesticides

Sometimes when a turf manager uses a pesticide and it does not meet his expectations, he thinks the material has "failed". In fact, there are many circumstances when the material was not used appropriately – the wrong rate, the wrong time of year or even the wrong time of day, the wrong use of water before or after the application, the wrong material for the pest, or the wrong formulation for the conditions. ■

One insect pest which causes headaches to turf managers is the white grub complex. The damaging stage, the white grub, is active at or below the soil-thatch interface. Insecticides which are applied to the turf surface must be moved down into the thatch or the grubs must be drawn higher into the thatch so that the grubs come in contact with the insecticide. In most cases post-application irrigation (or rain) is used to initiate that movement, but often the water is not put on quickly enough after application or it is not put on in sufficient quantity to accomplish the job.

High Pressure Liquid Injection

The challenge faced by northern turf managers regarding white grubs is virtually identical to that faced by southern turf managers when dealing with mole crickets, which are very mobile soil insects. Several years ago some engineers in the Southeast came up with a concept of using very high pressure and small nozzle tips to drive materials deeper into thatch than a conventional surface application. They built a prototype "high pressure liquid injection" (HPLI) unit which was used to make small research plot applications. This unit had four separate 15 gallon tanks which could be used independently or in combination. The delivery system included two independent two foot booms, with nozzles placed at three inch spacing. The booms rode directly on the ground with the nozzles projecting a few degrees forward of vertical, and the nozzle tips were no more than 0.5 inch off the ground. The technology used in the research unit is available on commercial units with as large as 1,000 gallon tanks with 16 foot booms.

This unit was used to apply numerous field trials testing control of mole crickets. Many of those trials were conducted under the direction of Dr. Pat Cobb at Auburn University in Alabama. Preliminary indications were that the technique had tremendous potential and certainly had many advantages over a conventional surface application. Environmentally, the surface exposure to pesticides was reduced considerably. (One study on warm season grasses showed that surface residues were reduced up to 90%.) In addition there was virtually no drift during the application, because the nozzles rode so close to the ground. In certain circumstances the rate of application could be reduced 50% using HPLI and still provide the same level of control as a conventional application at the full rate.

The same prototype unit was brought to Massachusetts in the spring of 1989 to put out some Japanese beetle grub trials. Several of those trials looked at Triumph 4E® (primarily because we

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This Times

Scanning the Journals

A review of current journal articles

Wear tolerance of creeping bentgrass was improved by the higher rate of N application.

The best choice for the second application of pre-emergence herbicides is more of whatever worked best the first time.

Although ELISA was useful for detection, verification, and population monitoring of the pathogen, disease outbreaks were not foreseen by ELISA as hoped.

Wear Tolerance of Bluegrass and Bentgrass

The wear tolerance of turfgrass can be influenced by management practices (for example, mowing height). Data in the literature suggest that nitrogen applications improve bentgrass wear tolerance and recovery time, but there are conflicting reports regarding the usefulness of potassium for this purpose. To further document the effects of fertilizers on turfgrass wear tolerance, a four year study was undertaken by two Cornell researchers, Mark Carroll and Marty Petrovic.

The investigators used 2 rates of nitrogen and 4 rates of potassium, applied to creeping bentgrass and Kentucky bluegrass, and a rotating, motor driven pneumatic tire to simulate wear. After 200-300 passes, plots were evaluated visually for injury and cores were taken within and adjacent to the wheel track for biomass determinations. Recovery was evaluated for 8 to 14 days following episodes of wear.

The researchers found that wear tolerance of creeping bentgrass was improved by the higher rate of N application (48kg/ha, four times per year), but recovery from injury was unaffected by treatment differences. Kentucky bluegrass did not respond to treatment differences with regard to either wear tolerance or recovery time. Neither turf species showed any response to increased K levels, a result believed to be related to the relatively low levels of nitrogen used in these tests.

(From: M.J. Carroll and A.M. Petrovic, 1991. Wear Tolerance of Kentucky Bluegrass and Creeping Bentgrass Following Nitrogen and Potassium Application. HortScience 26(7): 851-853.)

Sequential Applications of Preemergence Herbicides

Is it a good idea to follow an application of one preemergence herbicide with another of a different kind? Probably not, say researchers at the University of Purdue, who studied the control of goosegrass and large crabgrass using different preemergent herbicides for an initial and follow-up application.

The control of annual grass weeds in turf with preemergent herbicides usually requires more than a single application for season-long effect. To see if there was a benefit in using a different material for the second application, the investigators applied a primary treatment of pendimethalin, followed six weeks later by a secondary application of benefin, benefin/trifluralin, bensulide, dithiopyr, oxadiazon, prodiamine, and pendimethalin. One treatment of dithiopyr alone at the six week interval was also tested.

The best large crabgrass control occurred in the pendimethalin/pendimethalin, pendimethalin/dithiopyr, and dithiopyr alone treatments. The best goosegrass control was provided by oxadiazon. The workers conclude that the effects of unlike herbicides are not additive, even when related, and the best choice for the second application is more of whatever worked best the first time.

(From: Z.J. Reicher, C.S. Throssell, and J. L. Lefton. 1991. Annual Grass Control in Cool Season Turf with Sequential Applications of Unlike Preemergence Herbicides. Weed Technology 5:387-391.)

Please note that dithiopyr is not registered for use in the state of New York.

ELISA to Monitor Pythium Blight

Pythium blight can strike quickly and with devastating effect during hot, humid weather, killing bentgrass, perennial ryegrass, and annual bluegrass. Developing forcasting aids for disease outbreaks, researchers at Ohio State University investigated the use of enzyme-linked immunosorbent assays (ELISA), utilizing pathogen-specific antibodies to monitor disease populations.

In a three year study, grass samples were collected from the university golf course on a Monday-Wednesday-Friday schedule and checked for the presence of Pythium using standard laboratory procedures in addition to ELISA. Although ELISA was useful for detection, verification, and population monitoring of the pathogen, disease

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Turfgrass Varieties and Species for 1992

The 1992 turfgrass cultivar recommendations are a minor revision of the 1991 recommends. No cultivars have been dropped and only a few have been added. Any differences in the environmental adaptations and disease tolerances reflect the addition of one more year's data. The major difference in the 1992 recommends is organizational in that the ratings have been tabled. This should make the comparison of varieties easier.

The ratings reflect the data collected from the National Turfgrass Evaluation Program (NTEP) trials conducted at Ithaca and on Long Island as well as data from NTEP trials conducted elsewhere in the Northeast. The varieties recommended are ones for which there is a substantial performance record. The absence of newly released varieties on the list should not be interpreted as a critical judgement of those varieties but rather reflects the situation of having too little data to make a recommendation with any confidence. New fine fescue and Kentucky bluegrass trials are currently under way and will result in changes in those recommendations as the data accumulates.

The rating of each cultivar is best used to compare to other cultivars within the same species. While some scales are broadly equivalent across species, such as the ratings of Kentucky bluegrass and perennial ryegrass, others are not. One important example of a different scale of measurement is found in the leaf texture ratings between tall fescues and Kentucky bluegrasses. Fine textured tall fescues are fine in comparison to other tall fescues but are still relatively coarse textured when compared to bluegrasses.

KEY Color: Li - light; MLi - medium light; M - medium; MD - medium dark; D - dark green; VD - very dark. **Density:** M - medium; MH - medium high; H - high; VH - very high. **Texture:** VF - very fine; F - fine; MF - medium fine; M - medium; MC - medium coarse; C - coarse. **Growth Habit:** VL - very low; L - low; ML - medium low; Er - erect; U - upright; S - slow; Vi - vigorous; NGr - non-grainy. **Establishment Rate:** S - slow; Mo - moderate; G - good; VG - very good; R - rapid; VR - very rapid. **Performance:** P - poor; Mo - moderate; G - good; VG - very good; E - excellent.

Creeping Bentgrass

Creeping bentgrass is recommended for golf course greens, tees, and fairways, as well as bowling greens and grass tennis courts. Creeping bentgrass is not recommended for home lawns. Seeded cultivars other than those tabled below include: Emerald, Seaside and Prominent. The cultivars recommended below have been shown to have superior quality. Other varieties have not been adequately tested in New York.

Variety	Description			
	Color	Texture	Growth Habit	Establishment Rate
Cobra	D	MF	-	-
Penncross	M	M	Vi	R
Penneagle	M	F	S	S
Pennlinks	M	MF	NGr	-
Providence	D	MF	U, NGr	VR
Putter	M	MF	Vi	-

Fine Leaf Fescues

Fine fescues perform well under low moisture and low maintenance (fertility, mowing) and should be maintained as such. Fine fescues may not do well under high maintenance conditions. Most cultivars and varieties perform well in shade. Fine fescues are best used in mixtures with shade tolerant bluegrasses.

Variety	Description		Adaptation					Disease Tolerance§			
	Color	Texture	Winter Color	Spring Green-up	Shade	Establishment Rate	Recuperative Potential	Leaf Spot	Red Thread	Dollar Spot	Powdery Mildew
Chewings											
Agram	MD	F	G	G	-	G	G	Mo	Mo	E	P
Atlanta*	M	F	Mo	Mo	VG	-	-	P	G	VG	Mo
Checker	M	VF	G	G	G	Mo	Mo	Mo	Mo	E	P
Enjoy	D	F	P	Mo	VG	-	-	Mo	G	E	Mo
Highlight*	M	VF	VG	G	Mo	-	-	P	G	VG	P
Jamestown*	MD	F	Mo	G	Mo	-	-	Mo	P	VG	P
Longfellow	D	F	G	Mo	Mo	-	-	G	G	G	Mo
Victory	MD	MF	Mo	G	VG	-	-	P	G	G	G
Creeping Red											
Flyer	D	F	G	Mo	VG	VG	-	P	P	P	VG
Hard											
Aurora	MD	VF	G	G	VG	-	G	G	VG	VG	Mo
Biljart	D	F	Mo	G	VG	Mo	-	Mo	E	E	Mo
Reliant	MD	F	Mo	Mo	G	Mo	Mo	E	E	E	G
Scaldis	D	F	G	G	VG	Mo	Mo	Mo	VG	VG	G
Spartan	D	F	G	G	E	Mo	-	G	VG	Mo	G
SR 3000	D	F	G	G	G	-	-	G	E	VG	G
Waldina	D	VF	Mo	G	G	G	G	G	E	VG	G
Sheep											
Bighorn†	VD	F	Mo	Mo	VG	-	P	G	E	VG	G

* Varieties not recommended for Long Island.
† Bighorn sheep fescue has a very slow growth rate and is a good choice for difficult to mow areas. Bighorn is also a good choice, in combination with forbs, for natural meadow settings.
§ Where a specific disease resistance is desired, select cultivars with a rating of G, VG or E.

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Subsurface Placement of Pesticides

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The most important aspect of HPLI is the reduction of environmental problems related to surface exposure.

were reluctant to use wettable powder formulations with such sensitive nozzles). We looked at 2.0, 1.0, and 0.5 pounds active ingredient (AI) per acre using HPLI compared to 2.0 or 1.0 pounds AI per acre for conventional application. In every case the 1.0 and 0.5 pound rates with HPLI performed as well as the 2.0 pound rate applied conventionally. That performance often was statistically significantly better than the reduced rate applied conventionally.

I purchased my own research unit, virtually identical to the original unit, and continued studies in the fall of 1989, and in 1990 and 1991. We have subsequently looked at Diazinon® (because the application technology may well be appropriate for use in home lawns or athletic fields), Dursban®, Tempo and Turcam®. The Turcam® trial will not be sampled until early October 1991, but the results of the other studies were fairly consistent. In each case (except with Triumph®) the subsurface placement of material did not enhance the performance of the material (lower rates using HPLI did not perform any better than lower rates applied conventionally). However, many turf researchers feel that the most important aspect of HPLI is the reduction of environmental problems related to surface exposure, so any reduction in application rates would be "gravy".

There is at least one other kind of high pressure liquid injection equipment currently available which, like the equipment we use for our trials, does not slice the turf. This unit, available on a contract basis in parts of the Northeast, uses a computer-driven micro-plus system. The depth of penetration into the turf can be set by adjusting the length of each micro-pulse, the pressure, and/or the ground speed. The unit seems to be the "second generation" of HPLI and has lots of application possibilities.

Some golf course superintendents may be thinking that the Toro HydroJect™ unit might be used to deliver liquid insecticides below the surface. In fact the HydroJect™ was not built with the purpose of applying pesticides in mind, so the seals and delivery systems are not designed to handle pesticides. In addition the purpose of the HydroJect™ is to shatter the soil structure using even higher pressures than the systems so far described. Studies conducted by Dr. Harry Niemczyk at Ohio State University indicate that placing insecticides BELOW the point where grubs are active is just as ineffective as not moving them down from a surface application. Placing materials as little as an inch below the thatch-soil interface results in their failure to perform.

HPLI — High pressure injection unit, Bolton, MA. (Photo by Patricia J. Vittum)

Turf Slicing Systems

Another approach to subsurface placement of pesticides involves slicing the turf, in a manner similar to an overseeder, and dropping the material into the slice. There are several companies working on variations of this theme, including large tractor driven units and smaller walk behind units. In each case the concept is the same – slices are cut in the turf, tubes deliver pesticide (through gravity feed) into the slice, and a plate "tucks in" the turf around the slice. There are at least two obvious advantages to such a system. First, there is no high pressure system with the inherent dangers of blown lines. Perhaps even more importantly, the depth of application can be set very accurately – often within 1/8 inch. As a result the unit can be adjusted to handle the conditions of each given turf area.

Slicing units can deliver pesticides to areas with thick (more than one inch) thatch just as effectively as to areas with less thick thatch. (NOTE that the main drawback to the systems I have observed so far is that the slicing process does pull out a lot of thatch and generate lots of “hay”. This hay must be disposed of in some fashion in a large scale operation to prevent the machine from clogging up.) At least some of these units have liquid adapters so that they can be used to apply liquid formulations into the slices. I have just obtained a slicing unit which was used to put out two trials (looking at full and half rates of Turcam®, Mocap®, Crusade®, and Triumph®). Those trials were sampled in early October and the results were reported at the New York State Turfgrass Association Conference in Rochester in November. The technology of sub-surface placement of pesticides has expanded tremendously in the past couple years. It appears that the technique reduces surface exposures tremendously. (One trial we are currently conducting at University of Massachusetts is looking at the surface residue of Diazinon® and Triumph® using HPLI v. conventional application. The laboratory analyses of that trial will not be completed until early January but we are reasonably confident that the results will mirror those of similar studies done on warm season grasses, which indicated substantial reductions of surface residues.)

Environmental Concerns

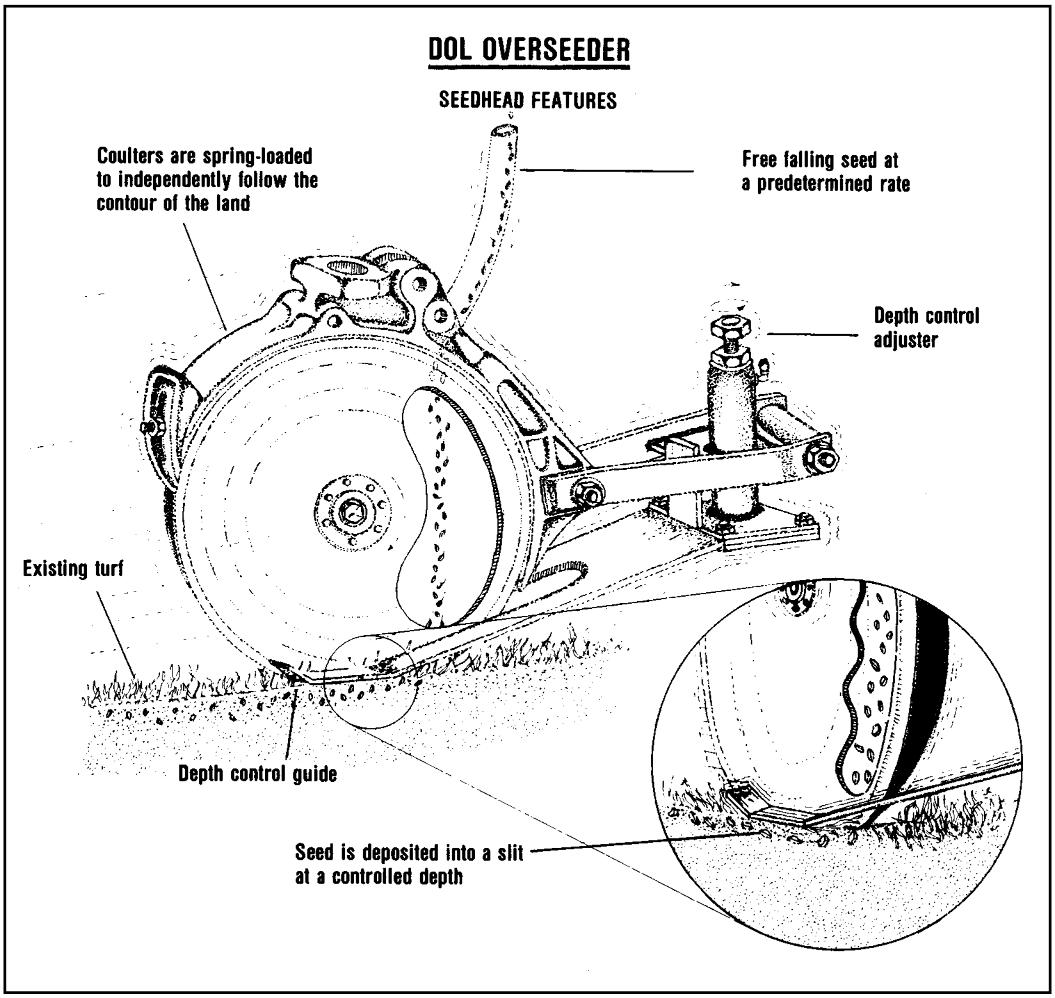
Risk of drift is reduced considerably, particularly with the HPLI technique. As a result turf managers could make applications during mildly windy conditions when conventional applications would not be an option. In addition subsurface application techniques MAY provide an applicator with a longer window during which post-application water can be applied. (Results of some of our trials suggest that delays in post-application watering are less crucial in subsurface applications than in conventional applications. These results are definitely still preliminary, and studies will be expanded in 1991.)

Subsurface placement of pesticides is a technology whose time has come, particularly in areas of the country (like the Northeast) where environmental concerns are paramount. Availability of subsurface application technology will only increase in the next few years. Some units (including HPLI and slicing units) are already available on a contract basis. If you are interested in contacting these companies, please contact me (Dr. Patricia J. Vittum, Department of Entomology, Fernald Hall, University of Massachusetts, Amherst, MA 01003) and I will send you the names of companies of which I am aware. Many developers are designing units for golf course/athletic field use OR for use by commercial lawn applicators, so there should be something for everyone.

Patricia J. Vittum,
Dept. of Entomology, University of Massachusetts

Please note that Triumph® and Crusade® are not registered for use in the state of New York.

Turf slicing systems have the advantages of no high pressure lines and very accurate application depth.



Schematic of the DOL overseeder. (Illustration used with permission of Dol Brothers Limited Sodding and Hydroseeding, Toronto, Canada.)

Turfgrass Varieties

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Kentucky Bluegrass

Kentucky bluegrasses are very well adapted to New York conditions and are recommended for home and general lawn areas, athletic fields, golf course roughs, tees and fairways maintained at greater than a 3/4 inch height. Kentucky bluegrasses perform well under a wide range of conditions. However, most cultivars do best in full sun. Use a blend of at least three varieties when using Kentucky bluegrass.

Part 1. Cultivar Descriptions and Disease Tolerances

Cultivar	------------- Description -------------				------------- Disease Tolerance* -------------				
	Color	Texture	Density	Growth Habit	Leaf Spot	Red Thread	Dollar Spot	Stripe Smut	Patch Diseases
Able 1	VD	M	H	L	VG	Mo	G	E	VG
Adelphi	VD	M	H	L	G	E	E	E	E
America	D	F	H	VL	G	Mo	E	E	VG
Aspen	D	M	M	ML	G	VG	VG	G	VG
Banff	MD	M	M	L	G	VG	G	E	VG
Baron	D	MC	H	L	Mo-G	G	Mo	G	VG
Blacksburg	VD	F	VH	L	VG	G	Mo	G	Mo-G
Bonnieblue	D	M	H	L	E	E	E	E	G
Bristol	D	M	H	L	E	E	E	E	E
Challenger	D	MF	H	ML	VG	VG	G	E	VG
Chateau	MD	M	H	L	VG	Mo	Mo	G	Mo-P
Columbia	MD	M	M	L	VG	Mo	Mo	E	E
Eclipse	D	M	M	L	E	E	E	E	E
Enmundi	D	M	M	VL	VG	VG	G	E	VG
Estate	MD	M	H	L	G	P	P	G	VG
Fylking	D	MF	H	L	G	G	Mo	G	Mo-P
Glade	D	M	H	L	Mo-G	Mo-P	Mo-P	E	E
Merit	D	MC	M	ML	Mo	VG	G	G	G
Midnight	VD	MF	H	L	E	Mo	VG	Mo	E
Mystic	MD	F	H	L	Mo-G	P	P	G	VG
Nassau	D	MC	M	ML	VG	E	G	E	VG
Princeton	VD	M	M	L	E	E	E	E	VG
Ram-1	D	MF	H	L	P	Mo	P	E	VG
Touchdown	M	MF	M	Er	G	VG	VG	E	Mo

* Where a specific disease resistance is required, select cultivars with a rating of G, VG or E.

Part 2. Cultivar Adaptation to Environmental Conditions

Cultivar	------------------------ Adaptation ------------------------								
	Winter Color	Spring Greenup	Cold	Heat	Drought	Shade	Close Mowing	Establishment Rate	Low Fertility
Able 1	G	P	-	-	G	G	Mo	Mo	Mo
Adelphi	Mo	G	G	G	G	P	VG	Mo	P
America	Mo	Mo	Mo	Mo	VG	VG	G	G	VG
Aspen	E	E	G	G	G	Mo	G	Mo-G	Mo
Banff	VG	E	E	-	Mo	P	VG	G	G
Baron	Mo	P	Mo	-	VG	P	G	R	G
Blacksburg	Mo	P	P	G	E	G	G	Mo	Mo
Bonnieblue	E	VG	G	-	G	P	G	G	VG
Bristol	G	VG	G	-	E	VG	VG	Mo	Mo
Challenger*	VG	G	G	-	VG	Mo	Mo	Mo-G	P
Chateau	Mo	Mo	M	G	Mo	VG	Mo	G	Mo
Columbia	G	VG	G	G	Mo	Mo	VG	G	G
Eclipse	Mo	G	E	G	G	G	VG	Mo-G	G
Enmundi	Mo	Mo-P	G	G	G	VG	G	Mo-S	E
Estate	Mo	Mo	-	Mo	Mo	P	Mo	Mo-G	G
Fylking	G	Mo-P	G	-	Mo	P	Mo	Mo-G	E
Glade	Mo	G	G	-	G	G	G	Mo	VG
Merit	G	P	VG	VG	VG	P	VG	G	E
Midnight	Mo	P	G	-	G	P	VG	Mo	VG
Mystic	G	E	G	-	G	G	E	VG	Mo
Nassau*	VG	VG	G	G	VG	P	P	Mo-G	P
Princeton	E	VG	G	-	VG	G	Mo	G	G
Ram-1*	Mo	Mo	G	-	E	Mo-G	E	VG	VG
Touchdown	G	Mo	G	-	Mo	G	P	G	VG

* Recommended for Long Island only.

Tall Fescues

Tall fescues are recommended for lawns, athletic fields, and low maintenance areas. The newer turf type cultivars are much more attractive than their predecessors, although the turf is still much coarser than Kentucky bluegrass. Tall fescues have excellent drought avoidance, and perform well under lower nitrogen fertility regimes. Tall fescues, as a whole, have rapid vertical growth rates. Tall fescues are susceptible to winter kill, so we recommend that they be used only in southeastern New York, and within the immediate vicinity of Lakes Erie and Ontario. Tall fescues should be planted as a monostand. One season of growth is required before it can be used on recreational areas. Seed for some cultivars may not be available for all of 1992. Check with your seed dealer for availability.

Variety	Description					Adaptation		
	Color	Texture	Density	Growth Habit	Growth Rate	Shade	Close Mowing	Brown Patch Tolerance*
Amigo	D	MF	M	ML	S	Mo	G	VG
Austin	D	M	MH	M	-	-	Mo	VG
Bonanza	D	M	MH	MH	-	Mo-P	Mo	Mo
Chieftan	M	M	M	M	-	Mo	Mo	G
Cimmaron	M	M	M	MH	-	P	P	Mo
Cochise	VD	MF	MH	ML	S	Mo-P	Mo-G	E
Eldorado	D	M	M	M	S	P	Mo	Mo
Guardian	VD	VF	H	ML	S	E	Mo	VG-G
Hubbard 87	VD	F	H	ML	-	E	VG	VG
Jaguar	MLi	M	M	VEr	-	Mo-P	P	G
Marathon	M	M	M	M	-	Mo-P	P	-
Mustang	MLi	M	M	-	-	Mo-P	Mo-P	G
Olympic	MLi	M	M	Er	S	G	P	Mo
Olympic II	M	M	H	MH	S	G	Mo-P	VG
Phoenix	M	MC	H	Er	S	Mo-G	Mo-G	VG
Rebel	MLi	M	M	VEr	-	Mo-G	P	E
Rebel II	MLi	F	MH	Er	-	Mo-P	Mo	E
Safari	D	M	MH	M	-	E	VG	Mo
Shenandoah	D	F	H	M	S	G	VG	Mo
Wrangler	M	MF	MH	M	S	P	Mo-G	Mo

* Where brown patch resistance is desired, select cultivars with a rating of G, VG or E.

Perennial Ryegrasses

Perennial ryegrass is an ideal grass where rapid establishment is necessary. Recommended uses include athletic fields, golf course fairways and tees, and in lawn mixtures with Kentucky bluegrass. Perennial ryegrass is adapted to southeastern New York conditions but it is susceptible to diseases and winterkill in the colder areas of uptstate New York. Perennial ryegrass requires a medium level of maintenance.

Variety	Description		Adaptation						Disease Tolerance†			
	Color	Texture	Winter Color	Spring Green-up	Drought	Cold	Heat	Close Mowing	Leaf Spot	Brown Patch	Red Thread	Dollar Spot
Allstar*	MD	MF	G	G	E	G	G	Mo	G	E	VG	E
Blazer	MD	MF	G	VG	E	G	G	E	E	G	G	P
Citation II*	D	MF	VG	G	Mo	G	VG	VG	G	G	Mo	VG
Commander*	D	MF	Mo	Mo	E	E	VG	E	G	G	VG	E
Dasher II*	D	F	G	VG	G	G	VG	G	VG	VG	G	Mo
Derby	MD	F	VG	G	Mo	VG	VG	G	VG	G	VG	VG
Fiesta II	D	F	E	G	Mo	Mo-G	VG	Mo	G	G	Mo	VG
Manhattan II	D	F	G	G	G	Mo	G	G	E	VG	Mo	Mo
Omega II	D	F	Mo	Mo	Mo	Mo	G	E	VG	E	VG	Mo
Ovation	M	F	Mo	Mo-G	Mo	E	G	G	P	Mo	P	Mo
Pennant*	MD	MF	E	E	G	E	G	G	G	E	P	E
Pennfine	MD	MF	E	G	Mo	E	Mo	G	P	G	G	G
Premier	D	MF	E	E	G	G	G	G	G	E	VG	E
Ranger	M	MF	G	G	G	G	VG	Mo	VG	P	Mo	Mo
Repell*	D	MF	VG	VG	G	Mo	G	VG	VG	Mo	G	Mo
Riviera	D	MF	G	Mo	Mo	Mo-G	VG	Mo	VG	G	G	P
Runaway	MD	M	VG	Mo	Mo	G	G	VG	G	P	VG	G
Saturn*	D	M	G	VG	E	Mo-G	E	VG	G	E	Mo	E
SR 4000*	D	MF	Mo	G	Mo	G	VG	VG	G	E	Mo	VG
SR 4100*	M	M	Mo	E	G	G	E	G	VG	E	G	E
Yorktown II	D	F	G	G	G	G	G	G	G	VG	G	VG

* Has shown resistance to surface feeding insects due to the presence of *Lolium* endophyte.
† Where a specific disease resistance is desired, select cultivars with a rating of G, VG or E.

David B. Davidson, Dept. of Floriculture and Ornamental Horticulture

Short Cutts

Potential uses of the facility include pesticide and nutrient leaching studies and water use studies on turf.

AREST Facility

The AREST (Automated Rain Exclusion System for Turfgrass Studies) is located at the Cornell University Turfgrass Field Research Laboratory in Ithaca. The facility allows for relatively controlled studies to be conducted outdoors in a somewhat natural environment. There are three components to the AREST facility: 27 free draining lysimeters, an automated rain-out shelter and a sophisticated system for the collection of data. Potential uses of the facility include pesticide and nutrient leaching studies and water use studies on turf.

Each lysimeter is 12 feet by 12 feet in area and 15 inches deep. Each lysimeter has a separate drainage system and a separate irrigation system. The amount of irrigation applied and the amount of drainage lost can be recorded and subsamples of the drainage water can be collected automatically. The soil moisture potential and soil temperatures can also be measured for each plot.

The rain-out shelter is basically a large roof mounted on rails which can then be moved over or off of the plots. Closing the shelter over the lysimeters can either be done manually or automatically. The automatic closure of the shelter is triggered by an electronic rainfall sensor.

In addition to collecting irrigation and drainage data from each lysimeter, the data acquisition system also records a variety of weather information from an adjacent weather station. Air temperature, surface temperature, rainfall, evaporation, humidity, wind speed and net solar radiation are some of the data which can be collected. The data acquisition system has the ability to scan each of the different data sensors each second.

Currently, research is focussed on the fate of some of the more common pesticides applied to golf courses. The grass growing in the lysimeters is currently Penncross creeping bentgrass which is being maintained at fairway height.

Scanning the Journals

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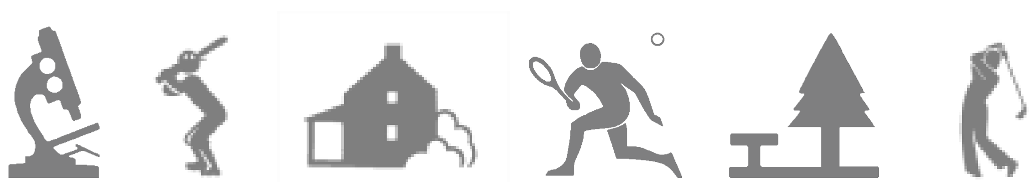
outbreaks were not foreseen by ELISA as hoped. The researchers conclude that a shorter sampling interval (perhaps several times daily) and/or a more sensitive assay may be necessary to produce useful forecasts of outbreaks of Pythium blight.

(From: W.W. Shane. 1991. Prospects for Early Detection of Pythium Blight Epidemics on Turfgrass by Antibody-Aided Monitoring. Plant Disease 75(9):991-925.)



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