

LASER

Poa trivialis

IS PROVING ITSELF...

Over

At Arnold Palmer's Bay Hill Club, Orlando, FL

"I've been overseeding with 100% Laser since it was first introduced. Now I wouldn't use anything else. It really does an excellent job for us at Bay Hill." Dwight Kummer


BAY HILL CLUB

and Over

At Buck Creek Golf Plantation, No. Myrtle Beach, SC

"Using Laser in conjunction with perennial ryegrass has enabled me to reduce the total poundage, counter the wear associated with heavy play, provide an ultra smooth transition in fall and spring, and provide our golfing guests with an outstanding putting surface. I've heard many comments such as, 'Best bent greens we've played here on the beach'." John E. McWhite


BUCK CREEK
GOLF PLANTATION

and Over

At Bonita Bay Club, Bonita Springs, FL

"I have used Laser *Poa trivialis* for the last several seasons and I have been very pleased with its color, texture, establishment, spring transition and especially with its durability. It's definitely part of my future overseeding plans." Mark Black


Bonita Bay Club

and Over

At Grayhawk Golf Club, Scottsdale, AZ

"At Grayhawk Golf Club we use an 85/15 blend of Palmer II/Prelude II/Laser on our fairways, roughs, and tees. The high seed count of the Laser blend allows us to reduce our seeding rates and prep work while providing a superior playing surface compared to straight perennial rye." Mike Pock


Grayhawk
GOLF CLUB

and Over

At Lake Nona, Orlando, FL

"I normally utilize a 50/50 blend of bentgrass/*Poa trivialis* for my greens overseeding program. This year however, because our tournament schedule dictated a later overseeding window, I will use straight Laser *Poa trivialis* at a slightly higher rate. This will be the fourth year I've used Laser. During those years, we've experienced a variety of weather conditions and traffic challenges. Laser has consistently exhibited good color and the drought tolerance that is so important in achieving a smooth spring transition. That was the reason I tried Laser in the first place and it has performed very well." Ken Glover


LAKE NONA

and Over Again

At Hunter's Creek Golf Course, Orlando, FL

"For the past five years, we have overseeded our greens with straight Laser. Year after year, Laser has out-performed the other *Poa trivialis* varieties we've compared it against. It has consistently proven to have better color, quicker establishment, better disease resistance and better durability under high traffic. Laser produces an excellent putting surface. Our observations have convinced us that Laser is the superior choice of *Poa trivialis*." Craig A. Shelton


HUNTER'S CREEK
GOLF COURSE



Tournament-quality greens are expected at **Arnold Palmer's Bay Hill Club**. Overseeding with 100% Laser every year helps Dwight Kummer meet those expectations.

Let Laser prove itself again...on your golf course.



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The Sanctuary Golf Club

Above are Superintendent Tim Sever (right) and Assistant Superintendent Kyle Sweet. Right is The Sanctuary golf and landscape staff.



Location: Sanibel Island, Florida.
Ownership: Sanctuary Golf Club, Inc.
Playing policy: Private — 350 equity memberships
Management: Project Manager, Paul Scoggins; Golf Professional, Art Smithwick; Club President, Jeffery J. Milton; Chairman of the Board, John Nauman; Food and Beverage Manager, David Williford.
Designed by: Arthur Hills
Opened: 1993, 18 holes.
Acreage: Total turf = 88 acres. Lakes = 10 acres.
Tees: 5 acres, Tifway 419. HOC = .438. Overseeded w/ Sabre Poa trivialis.
Greens: 3 acres, Tifdwarf. HOC = .157 (During season = .125). Average size = 6,000 square feet. Overseeded w/Cobra creeping bentgrass @ 4 lbs. per 1,000 square feet and Sabre Poa trivialis @ 6 lbs. per 1,000 square feet. Green speed 8 - 10.
Fairways: 40 acres of Tifway 419, HOC = .625.
Roughs: 41 acres of Tifway 419, HOC = 1.00 summer, .500 November - April.
Irrigation: Source: Deep wells. Salt concentration 1200-2900 ppm. Controls: Network 8000 computer system.

Staff: Assistant Superintendent, Kyle Sweet (2 years).
Equipment Technicians: Head Technician, Tony Hansard (2 1/2 years); Assistant Technician, Rex Schad. Pest Control Technician, Brian Johnson. Irrigation Technician, Scot Marion (2 1/2 years). Administrative Assistant, Joni Stokes (2 1/2 years). Foreman, Tom Wesendorf. Landscape Supervisor, Frank Delatorre.
Total Staff: 24, including superintendent and landscape crew.
Wildlife Inventory: Mammals – river otter, raccoon, wildcat, skunk, opossum, armadillo, Florida panther (probable, but unproven). Reptiles – alligator, American salt water crocodile, diamondback rattlesnake, coral snake, gopher tortoise, eastern indigo snake. Birds - bald eagle, pileated woodpecker, red-shouldered hawk, kestrel, moor hen, blue and green-winged teal, mottled ducks, pied-billed grebe, great horned owl, wood ibis, white ibis, brown pelican, sandpipers, plovers, knots, gulls, terns. Migratory birds include all the ducks, loons, white pelicans, sharp shinned hawk, red tail hawk, and peregrine falcon. And all of the warblers and other song birds.

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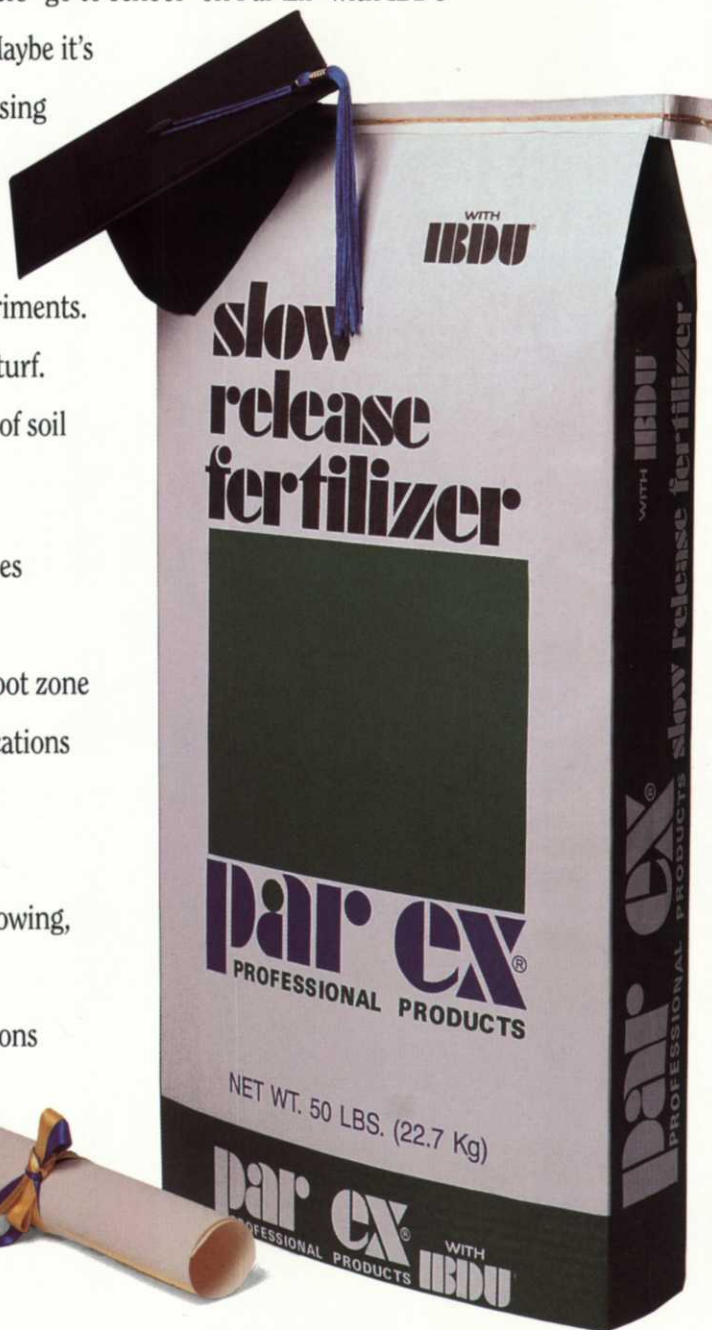
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OF SLOW-RELEASE NITROGEN**

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New engine. New drive. New reels.
Everything's new except the basics of the
renowned Reelmaster family.



REELMASTER® 2300-D: *All new from top to turf.*



They keep raising the bar on beauty and playability. So Toro helps you leap over it with innovations like our Reelmaster® 2300-D trim mower. All new in design, engine, drive, reels, main-frame and more. For matchless trimming performance all around the course. Round bunkers and greens. Tees, collars, approach areas too. An excellent choice for intermediate roughs.

It's also ideal for sports fields.



Hydraulic Reels

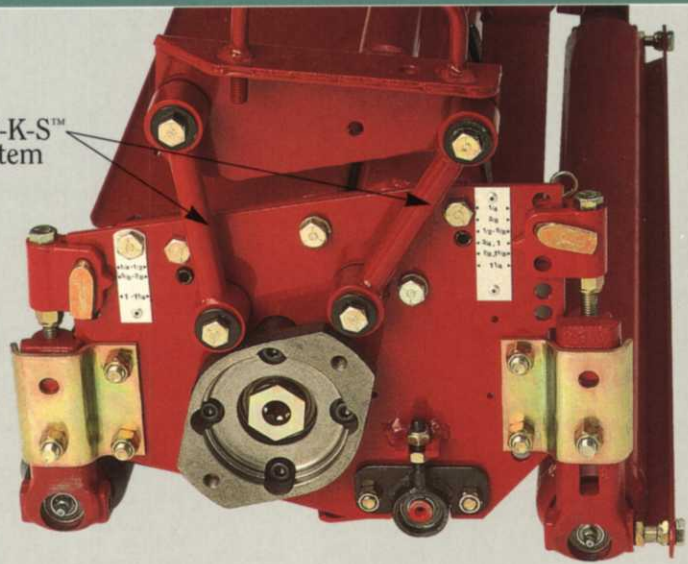
You need high torque reels with variable reel speed to work in all kinds of grass and terrain, including early morning, wet grass. The 2300-D delivers with a new hydraulic reel system with three interchangeable reels, that you set: fixed or floating. These 7" diameter, 26" wide reels together provide a productive 72" cutting width.



The Cutting Edge

A superb quality of cut is a given at Toro. The 2300-D takes that tradition a step farther with its new patent pending suspension system called L-I-N-K-S™. The L-I-N-K-S system and an adjustable spring counterbalance dramatically enhance ground contour following with no extra down pressure. The result is quality at the cutting edge.

L-I-N-K-S™
System



Nimble Maneuverability

Its lightweight, balanced design makes Reelmaster® 2300-D remarkably maneuverable. The two outer cutting units positioned out front, afford the operator a clear view for close trimming. And steering is virtually effortless.

Power To Spare

The power behind the 2300-D is a new 18 hp Perkins diesel engine. Teamed up with efficient hydrostatic traction, hydraulic oil cooler and 3-wheel drive, it generates reserve energy for really tough jobs.



Reelmaster® 2300-D Specifications* (cont.)

REELMASTER 2300-D, DIESEL 2WD, MODEL 03421 4WD, MODEL 03426										
MAIN FRAME	Frame consists of formed steel, welded steel and steel tubing components.									
BRAKES	Service braking accomplished through dynamic characteristics of hydrostat. Parking brake is actuated by ratchet hand lever on the operator's left hand side.									
STEERING	Pinion and sector gear with solid drag link to rear steer wheel arm.									
CONTROLS	Foot operated traction pedal and traction pedal stop. Hand operated throttle, ignition switch, reel engagement switch, reel unit lift lever, parking brake and seat adjustment. Model 03426 only: 2-position selector valve for 2- or 3-wheel drive selection.									
GAUGES & PROTECTION SYSTEMS	Hour meter, temperature gauge. 4 light warning cluster gauge: oil pressure, water temperature, amps and glow plug. High water temperature shut-down. Electric traction pump de-clutching switch for cold start. Engine pre-heat incorporated into ignition switch.									
SEAT	Optional Cushion Seat (Model 30796) or Deluxe Suspension Seat (Model 30797) adjustable to operator weight, fore and aft, w/removeable fold-up armrests.									
ELECTRICAL FEATURES	12 volt, Group 55, 450 cold cranking amps at 0°F (-18°C), 75 minute reserve capacity at 80°F (27°C). 14 amp alternator with regulator/rectifier. Seat switch, PTO and traction interlock switches. Indicator light when cutting units are running.									
OVERALL DIMENSIONS	Wheel tread width: 54.5" (138 cm). Wheelbase width: 55" (140 cm). Overall length (includes out front hoses): 98" (249 cm). Overall width: 76.5" (194 cm). Transport width: 72" (183 cm). Overall height (top of steering wheel): 44" (112 cm).									
WEIGHT (WET)	<table border="1"> <thead> <tr> <th></th> <th>5 Blade w/Wiehle rollers</th> <th>8 Blade w/Wiehle rollers</th> </tr> </thead> <tbody> <tr> <td>Model 03421 (2WD):</td> <td>1475 lbs. (669 kg)</td> <td>1495 lbs. (678 kg)</td> </tr> <tr> <td>Model 03426 (3WD):</td> <td>1505 lbs. (683 kg)</td> <td>1525 lbs. (692 kg)</td> </tr> </tbody> </table>		5 Blade w/Wiehle rollers	8 Blade w/Wiehle rollers	Model 03421 (2WD):	1475 lbs. (669 kg)	1495 lbs. (678 kg)	Model 03426 (3WD):	1505 lbs. (683 kg)	1525 lbs. (692 kg)
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Model 03426 (3WD):	1505 lbs. (683 kg)	1525 lbs. (692 kg)								
OPERATOR TRAINING VIDEO	Standard Operator Training Video demonstrates procedures for safe operation and daily maintenance; English and Spanish versions.									
WARRANTY	One year limited warranty. Refer to the Operator's Manual for further details.									
CERTIFICATION	The Reelmaster 2300-D complies with the American National Standards Institute (ANSI B71.4-1990) and European Community (CE) specifications with required kits and ballast installed.									

5 AND 8 BLADE CUTTING UNITS										
TYPE OF CUTTER	Three 27" (68 cm) cutting units supported by equal length independent lift arms; interchangeable to all three cutting unit positions.									
CUT WIDTH & HEIGHT	72" (183 cm) width of cut. Height of cut (HOC) range: ¼" – 1¾" (6.4 mm – 44.4 mm).									
HOC ADJUSTMENT	Positive position settings with separate fine adjustments for leveling either end of roller, or extending height range.									
CONSTRUCTION	5 or 8 blades, 7" (18 cm) diameter, welded to 5 stamped steel spiders. Reels mounted on greaseable self-aligning ball bearings.									
FREQUENCY OF CLIP	<table border="1"> <thead> <tr> <th>Reel speeds shown are at variable speed set to maximum rpm:</th> <th>5 Blade @ 880 reel rpm</th> <th>8 Blade @ 880 reel rpm</th> </tr> </thead> <tbody> <tr> <td>@ 4 mph (6.4 km/h)</td> <td>.96" (24.4 mm) clip</td> <td>.60" (15.2 mm) clip</td> </tr> <tr> <td>@ 5 mph (8 km/h)</td> <td>1.19" (30.3 mm) clip</td> <td>.75" (19.1 mm) clip</td> </tr> </tbody> </table>	Reel speeds shown are at variable speed set to maximum rpm:	5 Blade @ 880 reel rpm	8 Blade @ 880 reel rpm	@ 4 mph (6.4 km/h)	.96" (24.4 mm) clip	.60" (15.2 mm) clip	@ 5 mph (8 km/h)	1.19" (30.3 mm) clip	.75" (19.1 mm) clip
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BEDKNIFE TO REEL ADJUSTMENT	Single knob screw adjustment for bedknife to reel, located at center of bedbar. Adjustment knob detent with .001 movement of bedknife for each indexed position.									
SUSPENSION SYSTEM	Fully floating with adjustable spring counterbalance. Patent pending L-I-N-K-S™ cutting unit suspension system provides fore and aft oscillation. Main center pivot allows side-to-side oscillation. Cutting units can be locked into fixed (fore/aft) position for use without front roller.									
CUTTING UNIT LIFT	Hydraulic cutting unit lift with automatic reel shut-off. All 3 units are controlled with one lever.									

REELMASTER 2300-D ACCESSORY MATRIX				
	5 Blade, Model 03461	8 Blade, Model 03462	Cushion Seat, 30796	Deluxe Seat, 30797
Traction Units, Model 03421 and 03426	Opt.	Opt.	Opt.	Opt.
Armrest Kit, Model 30707	—	—	Opt.	—
Full Front Roller Kit (3), Model 03440	Opt.	Opt.	—	—
Sectional Front Roller Kit (3), Model 03445	Opt.	Opt.	—	—
Wiehle Front Roller Kit (3), Model 03450	Opt.	Opt.	—	—
Anti-scalp Front Roller Kit (3), Model 03447	—	—	—	—
Roller Scraper Kit (3), P/N 60-9560	Opt.	Opt.	—	—
Comb Kit (3), P/N 67-9400	Opt.	Opt.	—	—
Grass Basket Kit (3), Model 03443	Opt.	Opt.	—	—
Skid Kit (3), P/N 70-1410	—	—	—	—
Rear Weight ¹	Opt.	Opt.	—	—
Rear Weight/Grass Basket ¹	Opt.	Opt.	—	—

*Specifications and design subject to change without notice. "Toro" and "Reelmaster" are registered trademarks and "L-I-N-K-S" is an unregistered trademark of The Toro Company, 8111 Lyndale Avenue South, Bloomington, Minnesota 55420-1196. Products depicted in this literature are for demonstration purposes only. Actual products offered for sale may vary in use, design, required attachments and safety features. Consult your local Toro distributor.

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Operator Friendly

Forward, reverse and braking all with one pedal. A single lever lowers, engages, disengages or raises all cutting units. Deluxe suspension seat. Removable armrests. Fingertip controls. Intelligent instrumentation, including an electric de-clutching button for cold starts. Plus operator selectable 2 or 3-wheel drive on the go.

Simple Service

All maintenance components like engine oil and air filters are within easy reach. The hydraulic reels of the 2300-D permit on board backlapping. No removal or replacement required.

Custom Cutting

You can customize your Reelmaster® 2300-D with 5 or 8 blade floating cutting units that can quickly be converted to a fixed position. Other options include full, sectional and Wiehle front rollers; a comb kit, and baskets.



Reelmaster® 2300-D Specifications*

REELMASTER 2300-D, DIESEL 2WD, MODEL 03421 4WD, MODEL 03426	
ENGINE	Perkins, 4 cycle, 3 cylinder, liquid cooled, vertical OHV, diesel engine with centrifugal water pump. 18 hp (13.4 kW); governed to a maximum speed of 3200 rpm. 41.2 cu. in. (676 cc) displacement. Forced lubrication gear pump. Mechanical centrifugal governor. Mechanical fuel transfer pump. Fuel filter/water separator with replaceable filter element. 12 volt (0.7 kW) starter. Heavy duty remote mounted air cleaner. Spin-on oil filter. Side mounted industrial radiator, 7 fins per inch. Approx. 5 quart (4.7 liter) capacity.
FUEL CAPACITY	6.5 gallons (25 liters).
TRACTION DRIVE	Model 03421 (2WD): Hydrostatic, closed-loop drive; variable displacement piston pump, infinitely variable in both forward and reverse direction. Two high torque hydraulic wheel motors. Front mounted oil cooler and shuttle valve provide positive closed-loop cooling. Model 03426 (3WD): Three high torque hydraulic wheel motors. 3-wheel drive; two position selector valve located below seat, push for 3-wheel drive and pull for 2-wheel drive. Front mounted oil cooler and shuttle valve provide positive closed-loop cooling.
GROUND SPEED	Mowing speed: 0-5 mph (0-8 km/h); transport speed: 0-8 mph (0-13 km/h); reverse speed: 0-3 mph (0-4.8 km/h).
CUTTING UNIT DRIVE	High efficiency fixed displacement pump and 3 gear motors connected in series. Each gear motor has a crossover relief valve. Backlap capability. Variable reel speed to match cutting conditions.
HYDRAULIC OIL CAPACITY/FILTER	Remote mounted, 2.3 gallon (8.7 liter) oil reservoir. 25 micron remote mounted spin-on filter.
TIRES/WHEELS	Two front traction drive tires, 20 x 10-8 tubeless, 4-ply rating. Rear steering tire and tube; 20 x 8-8, 2-ply rating. Demountable front rims. Recommended tire pressure: 12-16 psi (83-110 kPa).



Traction Action

Reelmaster® 2300-D is better balanced with its engine positioned over the front wheels. Making it a reliable hill climber. And large flotation tires not only improve traction but also minimize scuffing. You don't have to sacrifice traction for gentler turf work. The 2300-D is perfect for areas where low compaction is a concern.

Three Wheel Drive

For amazing traction and versatility. Hillside mowing is just one example. Toro's unique 3-wheel drive hydraulic system gives you greater control, going uphill or down, and provides safer operation.



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Integrated Pest Management



ACSP: Part V

In Part 5 of this series on the Audubon Cooperative Sanctuary Program for Golf Courses, ideas for fulfilling the *Integrated Pest Management* are presented.

- ✓ Environmental Planning
- ✓ Member/Public Involvement
- ✓ Wildlife & Habitat Management
- ✓ Water Conservation
- ✓ **Integrated Pest Management**
- Water Quality Management

IPM - Your Key to the Future

BY TOM BENEFIELD, CGCS

Integrated Pest Management — IPM for short — is the golf course maintenance buzz phrase of the nineties. While some groups are just now catching on to this method of controlling pests, we in the golf industry can be proud that we have been pioneering these practices for a long time.

IPM doesn't mean that you eliminate chemical treatments. Rather it means that you use a variety of methods, scouting, and control agents to minimize damage to the turf to an acceptable level. That level of acceptance will vary from course to course and budget to budget. The wholesale application of chemicals is not only a poor management practice, but it is also a tremendous waste of money.

Biological pest-specific products are the new-

est control agents in expanding IPM practices. Biologicals don't always work as fast as the old synthetic chemicals, but they can be just as effective and certainly more environmentally friendly when they are applied correctly. The greatest obstacle to overcome when using biologicals is the old "instant fix" or "immediate results" mind set. Dr. Vargas of Michigan State told me that successful pest suppression only comes from putting out large numbers or colonies of biologicals frequently, at night, and with water.

As we look to the next century which is quickly closing in on us, researchers are giving us hope for new solutions to old problems. I think it safe to say that there are biologicals in your future. As you can see from the following articles, the future is "now" for some of us.



Properly watered turf is more resistant to insects and diseases.

IPM STRATEGIES

for golf course maintenance

BY DR. KIMBERLY ERUSHA

DIRECTOR OF EDUCATION USGA GREEN SECTION

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The ultimate goal of any turfgrass management system is to establish and maintain a high quality turf at a reasonable cost, without being detrimental to the environment. With increasing concerns from regulatory agencies and the public about the environmental impacts of pesticides on surface and ground water, and on people, wildlife and other organisms, an understanding and application of integrated pest management (IPM) principles to turfgrass management programs is essential.

What is IPM?

IPM is a management plan that utilizes a variety of control measures to keep turfgrass pest populations below levels that are economically and aesthetically damaging, without creating a hazard to people and the environment. These control measures include:

1. Inspection and monitoring
2. Proper cultural control methods
3. Biological controls
4. Using adapted species and resistant cultivars
5. Practicing proper sanitation measures to prevent the spread of disease
6. The use of the most appropriate pesticide when necessary

An important point to remember is that an IPM plan does not preclude pesticide use, but seeks to reduce dependency on pesticides. The objective of any IPM program is to reduce pest populations while keeping pesticide applications to a minimum.

IPM control strategies

A variety of control tactics are available to the turfgrass manager. IPM involves understanding how these control tactics interact to influence the overall health of a turfgrass system. The primary objective in any IPM program is maintaining strong, healthy, actively-growing turfgrass that can resist and recuperate successfully from environmental stresses, pest damage, and weed infestations. IPM control strategies include:

Species and cultivar selection

Introducing a species outside its range of adaptation increases its susceptibility to pests and stresses. Turfgrass species and cultivars must be selected to match local environmental and playing conditions. Where possible, select adapted species and cultivars that minimize water and pesticide use.

Mowing practices

Mowing height and frequency are directly related to the turfgrass species and growth rate of the plant. To minimize stress on the plant, no more than 1/3 of the leaf blade should be removed with any one mowing. On greens, cutting heights consistently 1/8 inch or less can place the turf under severe stress during weather extremes. Use of lightweight mowers on greens and fairways tremendously reduces soil compaction effects on turf growth.

Irrigation practices

Properly watered turf is more resistant to insects and diseases. Excessive irrigation is one of the most common problems observed in the field. It is important to survey the irrigation system to ensure that all irrigation heads are working and set



Spot spraying, one form of weed removal, puts the chemical only where it's needed.



Some weeds are best removed by direct pulling.

IPM means using a variety of control measures

properly to obtain uniform coverage.

Irrigation frequency should be dictated by meeting the evapotranspiration (ET) requirements of the plant. Irrigating deeply and less frequently produces a turf with a deeper root system and improved overall turf health. Care must be used when irrigating shallow-rooted turfs. Monitor root depth, soil moisture, ET conditions, and use visual inspection to determine turf irrigation needs.

Fertility and pH management

Fertility is a necessary component of turf management. No one fertilizer program or fertilizer can suit all situations. The type of program must be decided on by the golf course superintendent based on the specific conditions of the golf course.

Fertilization should be scheduled to meet the nutritional and growth requirements of the plant. The frequency of fertilizer application will vary depending on the turfgrass species and the type of fertilizer. Slow release fertilizers such as IBDU, sulphur coated urea, or natural organic materials, should be used on golf courses when possible. Use low rates of inorganic fertilizers with any one application.

A soil test is the best diagnostic tool available for assessing soil pH and phosphorus and potassium needs of the turf plant, as well as other nutrients. Soil test results serve as a guide for proper application of nutrients, avoids the waste of excessive fertilizer applications, and insures that nutrients are applied in the proper proportions. Once the turf has become established, soil tests should be conducted every 1-3 years.

Thatch control

The potential for thatch problems varies with turfgrass species, intensity of culture and traffic. Thatch becomes a problem on fairways and greens when it accumulates to a depth that increases potential for puffiness, mower scalping, disease development, and localized dry spot formation.

Avoiding excessive fertilization is an important consideration for preventing excessive thatch formation. For greens, light vertical mowing at intervals dependent on the growth rate of the plant can be effective in controlling thatch formation. Topdressing is also an effective tool to enhance the rate of biological degradation.

On fairways, excessive thatch can be avoided by preventative cultural practices, such as use of appropriate turfgrass cultivars, maintaining appropriate soil pH, utilizing soil cultivation techniques to enhance soil oxygen levels, proper irrigation, moderate nitrogen fertilization, and use of pesticides only as needed. Corrective measures for thatch control, including verticutting and core aeration must be used if accumulation exceeds 0.5 inch. Verticutting and core aeration are best accomplished during periods of active turfgrass growth.

Rootzone management

Improving soil characteristics can have a positive impact on turfgrass health and can decrease the need for chemical inputs. Proper soil drainage is critical for root growth and overall turf health.

Water movement through the soil is disrupted when layering occurs within the soil profile or when compacted soil conditions exist. There is no single solution to all soil problems. Methods to help solve the problem include core cultivation, high pressure water injection aeration, and deep tine aeration. It is important to determine the cause of the problem and then select the best corrective measure.

Good surface drainage through surface contouring alleviates ponding of water created from runoff, although it does not correct underlying soil problems. Properly installed subsurface drainage is an effective way of keeping a golf course in play and avoiding turf damage.

Traffic control measures

With the rising number of golfers on golf courses and the increase in the use of golf carts, traffic must be carefully monitored on the golf course to decrease potential wear and soil compaction problems. Rotate traffic patterns by planned movement of cup and tee markers. Distribute cart and foot traffic over wide areas and use cart paths where traffic is highly concentrated.

Tree management

Trees play a strategic role in golf course design and style and are a valuable asset in the golf course landscape. Tree placement should be carefully considered and turfgrass cultural practices

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Also, TURFGO® Dursban 2CG's active ingredient forms a vapor in the turf's micro-climate, providing control even where sprays can't reach.

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* Dursban is a registered trademark of DowElanco



IPM strategies —

need to be closely monitored in shaded areas. Increase light penetration through the tree canopy by selectively thinning the crown and pruning lower tree limbs. Enhance air movement in pocketed areas by judicious removal of shrubs and trees in the avenue of prevailing winds. Along fairways and greens, root prune trees that are competing excessively with the turfgrass for water and nutrients.

Pest forecasting techniques and equipment

Many tools are now available to the golf course superintendent to aid in forecasting potential problems on the golf course. Weather stations aid in monitoring potential weather conditions that are conducive to disease development. Diagnostic kits are available to the golf course superintendent to provide rapid, on-site test for disease detection and monitoring pathogen levels. New computer forecasting models aid the superintendent in disease, insect and weed control applications.

Alternative pest control measures

Biological controls regulate pests by introducing natural enemies to the turf environment to combat turf pathogens. Some biological products are now available for turf, and research shows that the potential of such products is bright.

Spray only when necessary

There may be times when the use of a pesticide is the most effective way to control a turf problem. Select a pesticide that provides the most effective control of the weed, disease, or insect, while presenting the least possible hazard to people, wildlife and the environment.

Control measures used should be evaluated periodically to determine if the desired results are being achieved, and the control plan should be adjusted if necessary. Diagnosing, evalu-



Consistent cultural programs keeps turf healthier and reduces need for chemical applications.

ating and controlling a turf pest problem follows a logical sequence. Each situation is unique, however, and adjustments should be made to the overall program as circumstances change on the golf course.

Communication and education

Communicate with and educate course officials and golfers about the IPM strategies that are taking place on your golf course and explain why they are being undertaken. Letting golfers know you practice IPM helps them understand and accept your management decisions.

Success with an IPM program depends on being alert to potential problems, following proper cultural practices, carrying through with a well-conceived maintenance plan, and selecting the best corrective measures to ensure the best quality golf course conditions with the least impact on the environment.

The golf course monitoring program

The first step in establishing an IPM program should be developing and maintaining a regular monitoring program to collect information about pest activity occurring on the golf course. Regular monitoring provides a record of active insect, weed, and disease populations, and any resulting damage, and also provides follow-up information on the success of particular control measures. Monitoring can be done by a golf course employee who has formalized training in field diagnosis of weeds, diseases, and insects. This person, often referred to as a scout, examines the golf course on a regular basis and although they may have other duties to perform on the course, the primary responsibility should be the IPM monitoring program.

Monitoring frequency varies for each portion of the golf course, depending on available time and operating budget. The greens and tees usually require the greatest attention and initially should be monitored daily or every other day. Fairways and roughs may be monitored less frequently if labor and time

are a concern. The time spent monitoring will be reduced significantly once indicator areas, or "hot spots," for particular pests are identified. Early morning monitoring is preferred, as disease symptoms and signs are most conspicuous prior to mowing, and this time interferes least with play.

Keep accurate records as each site is monitored. Scouting records can be used to make pest control decisions. Look for trends that suggest pest numbers are increasing to levels that warrant control measures being taken. Early detection can often minimize damage and severity.

Several years of monitoring records will establish pest threshold levels specific to your golf course, further improving pest control decision-making. A monitoring program may not always reduce the number of chemical applications, but it will assure that pesticides are being used in the most judicious manner.

— Dr. Kimberly Erusha