

Some overseeding mixtures contain chewings fescue. The fescue does not spread like *Poa trivialis* can. In the spring, the upright growth habit provides less shade to the bermuda allowing warmth and sunlight to penetrate the canopy. Chewings also transitions fairly rapidly in the spring.

Chewings fescue and *Poa trivialis* can serve as nurse grasses to creeping bentgrass in overseeding mixtures. Bentgrass takes longer to establish in the fall. "Creeping bentgrass provided superior putting quality in March and April in Florida tests," comments Mike Robinson with Seed Research of Oregon. "The demand for creeping bentgrass for winter overseeding continues to grow. You might want to mix bentgrass with *Poa trivialis* or chewings fescue for fall density."

As with improved perennial ryegrasses, there is some concern over slow spring transition with bentgrasses. In fact, bentgrasses are gaining acceptance as a permanent greens turf further South each year. It small seed and high seed count (nearly five million seeds per pound) are potential benefits.

Scotts offers an overseeding mixture with 10 percent Kentucky bluegrass and 90 percent perennial ryegrass. Like bentgrass,

it is slower to establish in the fall. A member of the *Poa* species, Kentucky bluegrass contributes to density and color in late winter because it can spread.

One important key to spring transition is density, explains Robinson. "Cool-season turfgrasses transition easier in the spring if they are immature. If you give them too much room by seeding at a low rate, the plants mature more quickly. Higher seeding rates produce more immature stands of grass and better transition."

"The turf manager needs to focus on seed count more than price per pound," says Dimatteo. By adding *Poa trivialis* to an overseeding mixture you get the seed count up. You may be able to reduce the number of pounds used by a third and keep the density of the stand roughly the same."

Lofts' Dunn suggests using treated seed for greens to protect against seedling diseases. "Treating the seed with Apron may add a few pennies to the cost per pound, but it provides 21 days of systemic protection." Gustafson, which markets the seed treatment, credits the product for higher survival rates.

One consideration of higher cut turf, such as roughs and athletic fields, is stemminess as the overseeded ryegrass be-

comes reproductive in the spring. "Ryegrasses get stemmy as they try to grow seedheads," explains Steve Tubbs with Turf Merchants. "By using a blend of ryegrasses only a portion of the stand will be stemmy at any one time. The overall quality of the turf is better with blends."

All seed companies report the demand for overseeding mixtures and blends has become very regional in nature. Turf managers compare notes and learn from their seed suppliers what worked well the previous year or two. Overseeding trials are also providing helpful information. Based on this information, custom blends and mixtures, including treated and untreated seed, are now available throughout the South.

Overseeding is becoming less an option and more a necessity. Golf courses and athletic facilities are used year-round. While bermudagrass is recognized as a superior surface for the summer months, it is becoming unacceptable during the winter. Athletes are not willing to accept lower turf standards for four months out of the year. The obvious solution is to manage two different types of turfgrass and overseeding's role in the future looks bright. ●



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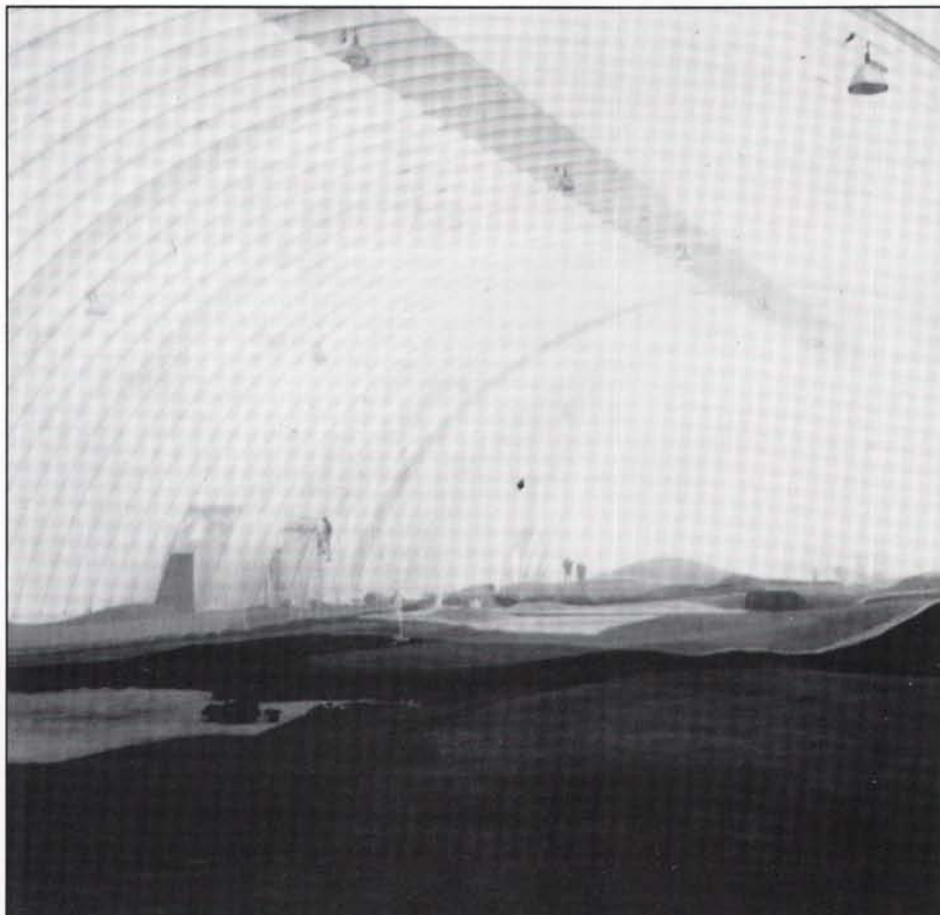


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# Growing Natural Turf Indoors: Prototype Looks Promising

By J.N. Rogers and B.F. Branham



Indoor par 3 golf course which opened in January 1991 in Flint, MI.

One of the limitations of turfgrass is its inability to recover in cold weather. When air and soil temperatures fall below 50 degrees, cool-season turfgrass activity declines quickly and recovery from traffic ceases.

We can't change the weather. Instead, the logical question is how to feasibly grow natural grass indoors. Although the question has been posed by many researchers, it has been difficult to answer because there are few sufficient testing facilities.

When Michael Thompson, an Englishman now living in Detroit, announced plans to build a golf course under a dome, his

question was not "Can it be done?" but "What will it take to do it?" In November 1989, he met with Michigan State University turfgrass researchers Dr. Paul Rieke, Dr. John (Trey) Rogers III, and Dr. Bruce Branham.

We were skeptical initially, but willing to pursue a project. After all, we had wanted to try something like this for a long time, and here was someone who was willing to build a facility to carry out the experiment! We discussed the idea at length and Thompson agreed to build a prototype at the Hancock Turfgrass Research Center on the Michigan State University campus to an-

swer questions on growing grass indoors.

Naturally, there were several important questions to be answered, but the problem was there were more questions than square footage in the translucent facility. We boiled down these questions to an outline of major objectives.

The first objective was to determine the effects of cutting height, fertility, and traffic on grass grown under a translucent cover. The second objective was to determine the effects of the cover on light intensity. The final objective was to observe possible disease or soil moisture problems.

## The Tent Takes Shape

In January 1990, a half-cylinder domed facility was erected over a two-year-old stand of Pennlinks creeping bentgrass (*Agrostis palustris*) that had frozen to a depth of 12 to 18 inches. The 20-x-40-x-nine-foot facility had a double layered cover to provide insulation, and the air in this space between the layers was continually exchanged with air inside the facility. The outside layer was a fabric from Dupont, which was translucent yet strong enough to prevent damage from wind and rain. The inside cover was a polyvinyl transparent material for insulation only.

The facility was heated by three- to 10-kilowatt heaters at each end. Five feet above the ground, the air temperature was maintained at 68 degrees F (20 C).

Because of the frozen turf and soil, mowing did not begin until mid-January. The whole area was first clipped at .375 inch. On February 2, the west half was cut and maintained at .188 inch so that separate but identical experiments were carried out on both cutting heights.

The design, a complete randomized block, included four fertility levels with two traffic levels (high and low), and a split plot on fertility levels. There were three replications. The fertility levels were .375 lb. N and .375 lb. K/1000 square feet, .375 N and .75 lb. K/1000 square feet, .75 N. and .375 lb. K/1000 square feet, and .75 lb. N. and .75

*continued on page 24*



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Traffic is applied to plots inside structure at Hancock Turf Research Center.

### Natural Turf Indoors

continued from page 22

lb. K/1000 square feet. Fertility treatments were applied on January 23 and February 16. The individual plots measured 1.22 by .53 m (four-x-1-3/4 feet). Traffic was applied by individuals walking on the plots in tennis

shoes. High traffic equaled 100 passes per week and low traffic equaled 50 passes a week for the period of January 22 through February 4. For the remainder of the experiment, February 5 through March 16, these trips were doubled.

Visual ratings for turfgrass quality and

color were taken on February 9 and 26 and March 9 and 30. Turf quality and color were on a scale of 0 to 10, with 0 equaling bare ground and 10 equaling ideal turf. Impact absorption measurements were taken with a Clegg Impact Tester and a 2.75 kg. hammer on the plot maintained at .19 inch on March 6. Light intensity measurements were taken for a four-day period, February 20-23, inside the dome along the south wall, in the center of the dome, and outside the dome. Carbon dioxide measurements were made on February 15-20 at ground level in the center of the dome, seven feet above the ground, and outside the facility.

The areas were mowed three times per week throughout the experiment. The clippings were removed. Individual plot clippings were not recorded.

### Results

Fertility treatments had no significant effect on turfgrass color ratings or impact absorption measurements ( $g_{max}$ ). At the .19 inch cutting height, the fertility treatment of .375 lb. N/.75 lb. K had the highest quality rating during the wear period. The need for potassium to provide more wear-tolerant turf is extremely important for high-traffic areas. It is just as critical in light-restricted environments to maintain

Table 1. The effects of fertilizer and traffic on turf color and quality of 'Pennlinks' creeping bentgrass maintained under a translucent structure. Michigan State University - 1990.

Fertility Treatment (kg)	Cutting height (inch)														
	0.19							$g_{max}^3$	0.38						
	Color <sup>1</sup>			Quality <sup>2</sup>					Color			Quality			
	2/9	2/26	3/9	2/9	2/26	3/9	3/30		2/9	2/26	3/9	2/9	2/26	3/9	3/30
1. 0.17N 0.17K	6.0	6.2	4.5	5.3	5.5	4.7	4.3	121	7.5	7.7	6.5	6.5	7.1	5.2	6.2
2. 0.17N 0.34K	6.0	6.5	4.8	4.7	5.5	4.7	3.8	126	7.0	7.0	6.5	6.8	7.0	5.7	6.7
3. 0.34N 0.17K	5.8	5.7	4.3	4.7	3.7	3.2	3.2	125	7.2	7.1	6.8	7.0	5.2	5.8	7.0
4. 0.34N 0.34K	6.2	5.8	4.7	5.3	4.7	4.2	3.3	125	6.8	7.7	7.0	7.0	6.3	5.3	6.7
LSD (0.05)	NS	NS	NS	NS	1.6	0.7	0.7	NS	NS	NS	NS	NS	1.9	NS	NS
Traffic															
1. High	5.6	5.8	4.7	4.5	4.2	3.5	3.3	127	6.6	6.8	6.5	6.3	5.5	4.8	6.4
2. Low	6.4	6.3	4.5	5.5	5.5	4.8	4.0	122	7.7	8.0	6.9	7.3	7.3	6.3	6.8
Sig. diff. (0.05)	*	NS	NS	*	*	*	NS	NS	*	NS	*	*	*	*	NS

<sup>1</sup>Color rating on a scale of 0-10 with 0 = brown and 10 = darkest green (6 = acceptable color).

<sup>2</sup>Quality rating on a scale of 0-10 with 0 = bare ground and 10 = ideal turf (>7 = acceptable quality)

<sup>3</sup> $g_{max}$  measured with 2.25 kg hammer and Clegg Impact Soil Tester.

Table 2. Fertility x traffic interaction quality ratings of 'Pennlinks' creeping bentgrass maintained at 0.38 inch under a translucent structure. Michigan State University - 1990.

Fertility Treatment (kg)	Date			
	2/9		2/26	
	Traffic			
	High	Low	High	Low
0.17N/0.17K	6.3 <sup>1</sup>	6.7	6.0	8.3
0.17N/0.34K	7.0	6.7	6.0	8.0
0.34N/0.17K	6.3	7.7	5.0	5.3
0.34N/0.34K	5.7	8.3	5.0	7.7
LSD (A) <sup>2</sup>	1.0		1.2	
LSD (B)	1.0		1.3	

<sup>1</sup>Quality rating on a scale of 0-10 with 0 = bare ground and 10 = ideal turf (>7=acceptable quality).

<sup>2</sup>LSD (A) = least significant difference at 0.05 level between traffic treatments on same fertility level.

LSD (B) = least significant difference at 0.05 level between fertility levels on same traffic treatment.

adequate levels of nitrogen, without excess growth. These effects of fertility on turf quality were more apparent at lower cutting height (.19 inch).

As expected, the amount of traffic directly affected turfgrass quality, regardless of the cutting height. General observations indicated that effects of traffic on turf quality were less severe at the greater height. For the .19 inch height, there was a significant difference in turfgrass quality between traffic treatments at all fertility schemes, except at .375 lb. N/.75 lb. K. This same trend was evident at .38 inch height on the February 9 rating. For the February 26 rating on the .38 inch height, the interaction was caused by the lack of difference of quality levels between the traffic treatments for .75 lb. kg. N/.75 lb. K fertility plots. The reaction of the turf under the cover was not far from that of a turf grown under the partial shade of a tree. Potassium and nitrogen must be monitored closely under shaded conditions, including translucent covers.

Inside and outside light measurements were taken for both sunny and cloudy days. Peak light levels were reached at 2 p.m. for the sunny day measurement and 1 p.m. for the cloudy day measurement. The amount of light measured inside the facility at 2 p.m. was only 44 percent of that light measured outside the facility. The amount of light inside the facility at this time was 52 percent of the light saturation point for photosynthesis. The proportional difference between inside and outside the dome

was less for cloudy days than sunny days. It should be noted that the duration of light during the winter in mid-Michigan is very short. Light levels were not appreciable until 9:30 a.m. and dropped to near-zero by 5 p.m. Also, because of mid-Michigan's proximity to large bodies of water, cloud cover is more normal during the winter months than sunny days.

Carbon dioxide levels averaged 385 ppm at ground level inside the dome, 378 ppm at seven feet above the surface inside the dome, and 366 ppm outside the dome. Carbon dioxide is critical in the photosynthetic process. An increase in carbon dioxide might partially offset the absence of light. Further studies are needed in this area. No irrigation was required to maintain the turfgrass during this study. (The fertilizer was watered in following both application dates.) There were no visual disease symptoms throughout the period.

From this study, it appeared that fertility requirements are similar to that of turf in partially shaded environments. While more research is needed in the area of light quality, species adaptation, and carbon dioxide effects in any attempt to grow turfgrass indoors, *light* is the limiting factor and other conditions such as soil type, fertility, and turf species must be optimized.

In January 1991, Thompson opened a Par 3 golf course under a translucent cover near Flint, MI. For the first time, Michigan golfers were able to test their playing prowess in mid-winter, indoors on natural grass.

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## MASTERS IS TALAMORE SUPERINTENDENT

Chandler Masters has been selected as golf course superintendent for Talamore at Pinehurst in Southern Pines, NC. The course is slated to open in September.

"We needed a superintendent with experience and one who could hit the ground running," said John Musto, general manager of Talamore at Pinehurst. "We found these qualities in Chandler Masters."

Masters, formerly with Woodside Plantation in Aiken, SC, will be responsible for the grow-in process of the course, as well as its maintenance after opening. His grow-in experience was a factor in his selection. In addition to his involvement in construction and grow-in at three other courses, he helped prepare Augusta National for three Masters Tournaments.

Designed by Rees Jones, the course features bentgrass greens. Masters said he has worked with Jones and his staff before and is excited to be working with them again.

"My biggest responsibility is to ensure the bentgrass greens get up and make it through the summer," added Masters. "The job becomes more manageable once the greens grow in."

## TUB GRINDER CROSSES COUNTRY TO L.A. SHOW

Passing motorists on the road between the Olathe Mfg., Inc. plant in Industrial Airport, KS and Griffith Park in Los Angeles must have been startled at the sight of a huge Olathe tub grinder cruising down the highway. This bright red recycling machine was on its way to a starring role in a three-day show of recycling equipment in the park.

The Olathe Model 818 Tub Grinder is a compact and portable, yet powerful trailer-mounted machine with a 99-inch wide and 34-inch deep rotating tub with a flared top and an attached hydraulic feed disc chipper. It is designed to reduce branches, limbs, leaves, and brush up to six inches in diameter for compost and other marketable chips. The wood debris can be loaded directly into the rotating tub, or larger material can first be reduced by the attached chipper and blown directly into the tub or into a loading vehicle. The debris passes through sizing screens to achieve the desired usable-sized chip and is removed on the 10-foot, six-inch rubber belt conveyor.

Joe Jacobson, the firm's industrial products manager, recalls, "Olathe Mfg., Inc.,

and Pacific Equipment Company from City of Industry, CA, made a joint appearance in sunny California to introduce this Generation II tub grinder, along with existing models of chippers and other recycling equipment.

"Three days and nights were spent in the L.A. area. The manufacturer sent five representatives there, including President Steve Rogers, engineer Allen Miller, sales representatives George Metcalf and Bud Hamilton, and myself. Pacific Equipment had their president, sales manager, general managers, sales reps, and service rep on hand for the entire three-day show," says Jacobson.

"Attendance during the event varied from 60 to 100 prospective customers, which included officials from the county, municipality, fire department, and private companies in need of recycling equipment," he points out. "Hot dogs, hamburgers, coffee, rolls, and other refreshments were served, and the three-day event was viewed by all as a great success."

## ASGCA ELECTS MEMBERS AND ASSOCIATES

The American Society of Golf Course Architects elected four new Regular Members and three Associate Members at its annual meeting in Canterbury, England.

The regular members are Michael Beebe, Orange Park, FL; Michael Gleason, Pinehurst, NC; David Moote, Brampton, Ontario, Canada; and Gregory Muirhead, Montclair, NJ. The associates are: James Lipe, North Palm Beach, FL; Thomas Johnson, Braselton, GA; and Andrew Raugust, North Palm Beach, FL.

## CERTIFIED SUPERINTENDENTS TOP 1,200

The number of golf course superintendents who have met the toughest professional standards has reached a new mark. With the addition of David R. Schwall, CGCS, of Sky Top Lodges in Sky Top, PA, there are now 1,200 certified superintendents.

To earn the Certified Golf Course Superintendent title, the superintendent must have had five years experience as a golf course superintendent and be employed in that capacity. The candidate must pass a rigorous six-hour examination covering

turfgrass management, pest management, financial and organizational management, and the rules of golf. In addition, an on-site inspection of the candidate's golf course operation is conducted by two currently certified superintendents. Certification must be renewed every five years.

The program is administered by the Golf Course Superintendents Association of America.

## GOLF COURSE EUROPE '91

The third Golf Course Europe conference and trade show will be held October 7-9 in Wiesbaden, Germany.

Outdoor activities will be held, including grass cutting demonstrations. Approximately 125 international exhibitors will present their newest equipment at the trade fair, and speakers from the U.S. and across Europe will discuss topics ranging from design and construction to maintenance and management.

The Rhein/Main Halls, where the show will take place, are only 20 minutes away by train or car from Frankfurt International Airport, and several hotels are within walking distance.

For more information, write to Expoconsult, Golf Course Europe '91, P.O. Box 200, 3600 AE Maarssen, Holland.

## ENVIRONMENTAL DAMAGE INSURANCE

Protection against environmental damage caused by pesticide application has been added to Travelers PGA Edge customized coverage for private, semi-private, and public golf courses and country clubs. The program requires these courses and clubs to have an affiliation with a member of the Professional Golfers' Association of America.

The optional coverage is designed to protect against bodily injury and property damage claims resulting from pesticide application. Coverage is available in all states and written on a claims-made basis for third party liability. Limits are \$250,000, including defense.

Other enhancements added to the PGA Edge program include coverage for building ordinances, computers, bridges, sprinkler systems, signs, and other property, including greens and golf car damage.

For information, contact: Clarke-Warren, Inc., 301 E. Center St., Manchester, CT 06040.

# ROOKIES

## PRODUCT UPDATE

### IMPROVED FIELD GROOMER



The Diamond Master is a more sophisticated version of the Tru Play Ball Diamond Groomer, which incorporates a sturdy, spring-tooth rake, a leveller, roller and brush, and a ripper blade.

The new unit enables the operator to adjust each tool individually through simple screw jacks. No additional tools are needed.

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### ENVIRONMENTAL MONITORING SYSTEM

WeatherNet is a PC-based, real-time environmental monitoring and control system developed in response to the need to measure and understand elements impacting our environment. Through a joining of software, computer hardware, and instrumentation, it offers a totally integrated system with graphic displays, remote datalogging and programmability.

The system is comprised of software for an IBM PC or compatible, a stand-alone computer, and sensors for measuring environmental variables. The computer can either send data back to the PC for real-time display or operate independently, gathering data and making decisions based on data values. Communications between the PC and the computer are in serial format and can operate via direct connection, modem, radio, or satellite uplink.

When real-time data is sent to the PC for display, this software delivers animated, graphic display screens for clear visual presentation of the information. When data is first stored in the computer and sent back to the PC in a history file, it is automatically stored on disk for immediate or future review.

Programming of the computer is simplified by using a pull-down menu system called Programming by Selection. Once created, the PBS program is compressed and downloaded to the computer. PBS programs enable the computer to automatically upload data to the PC, average input readings, turn on output alarms, send strings of data to the PC, and perform hundreds of other automatic functions.

#### SOLUS SYSTEMS, INC.

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### MID-SIZE FRONT MOWER

The Grasshopper Model 612 mid-size, zero-turn front mower combines a dual-hydrostatic direct drive system with a Briggs & Stratton 12.5-hp Vanguard engine. True zero-turning radius and outfront, PTO-driven, 44- and 48-inch decks enable the mower to cut hard-to-reach areas.



Low-profile deck design allows the unit to reach under obstacles such as trees, shrubs, and split-rail fences. Torsion action enables the decks to float front-to-rear, independent of the tractor, ensuring a level, high-quality cut in undulating terrain.

Foam-padded, adjustable dual levers, control the mower's speed, steering, braking, and forward/reverse motion. The levers spread for easy mounting and dismounting of the unit.

#### THE GRASSHOPPER COMPANY

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### HERBICIDE AND FUNGICIDE

KERB WSP herbicide and FORE fungicide are specialty chemicals made for the turf and ornamental industry. KERB WSP provides use directions for Poa annua con-

trol in bermudagrass, and broadleaf and grassy weed control in woody ornamentals, nursery stock, and Christmas trees.

The FORE fungicide specimen label targets disease control in assorted turfgrasses and ornamental flowers, shrubs, and trees.

The printing on the labels and containers is color-coded, part of a standardized system the company has for packaging different types of turf and ornamental pesticides. Brown is the signal color for the KERB specimen label and package. The FORE label and package are printed in green, and red denotes insecticide labels and packaging.

#### ROHM AND HAAS

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### UTILITY VEHICLE

The GT-1 model utility vehicle features the Turf-Torq KT30 transaxle with rugged construction for tough jobs. The "Z" pattern shift and solid rod linkage add positive gear selection of forward, neutral, and reverse. An integral neutral start switch is standard, with optional starter/generator and pedal start available.

The redesigned air intake, with 50 percent larger air cleaner than the previous model, gives added engine protection along with reduced noise and reduced air cleaner maintenance. The heavy-duty eight horsepower engine includes an adjustable carburetor for smoother engine performance. The 14-gauge cargo box can hold up to eight cubic feet of cargo and haul up to



1,000 lbs. Front suspension design includes dual three-leaf springs with coil springs in the rear, and front and rear shock absorbers.

#### CUSHMAN

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# ROOKIES

## PRODUCT UPDATE

### WEED CONTROL PRODUCTS

Monsanto Company has received registrations in two countries for the first weed control products in its new family of herbicide chemistry. The firm received U.S. Environmental Protection Agency regulatory approval to sell Dimension turf herbicide, a new product providing season-long control of crabgrass and other annual weeds in lawns, golf courses, and other professionally maintained turf.

The company has also received Japanese regulatory approval to sell five new herbicides: Dictran, for weed control in turf, and Lazo, Lyton, Kalcorn, and We Hope for weed control in rice production.

The newly registered products are based on dithiopyr, a compound from Monsanto's new pyridine class of chemistry. The pyridines are known for their desirable environmental properties, including low dosage, low toxicity, low soil mobility characteristics, effectiveness, and flexibility.

#### MONSANTO AGRICULTURAL COMPANY

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### BACKHOE LOADERS

The 410D and 510D backhoe loaders feature a redesigned operator's station and an electrically controlled clutch disconnect added to the loader lever to improve operator control while truck loading.

The operator's station has been enlarged to provide plenty of room to swing freely from forward driving position to the backhoe operating position.

Cab doors in the dual access arrangement open toward the front of the unit. Both open within the width of the machine, a safety feature welcomed in dense traffic areas.



30 Golf & sportsTURF

The station has been raised three inches for better overall visibility. Full length glass on the cab doors improves the view to the front tires. Panoramic-style windshield wipers cover a wider area for better visibility during inclement weather.

The 410D is powered by a 75 hp (56 kW), 276 cu. in. diesel. An optional turbo-charger boosts the power rating to 85 hp (63.5 kW). The 510D, with standard turbo-charger, has a 90 hp (67 kW) diesel. Both engines are by John Deere.

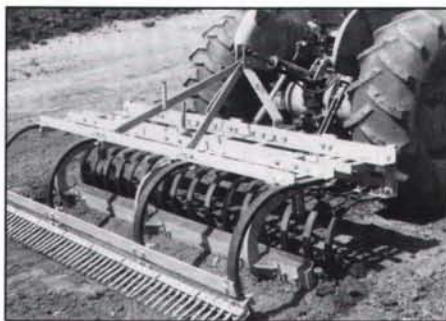
A fully synchronized four-speed collar-shift transmission permits shifting on the go. Both backhoes can be equipped with a new electrically controlled mechanical front-wheel-drive option for improved tractive performance.

The loader lift capacity for the 410D has been increased to 6,700 lbs. and the 510D now has a 6,850-lb. loader lift capacity to full height.

#### DEERE & COMPANY

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### LANDSCAPE RAKE AND GRADING TOOL



The Unique landscape rake and grading tool is suitable for all types of landscape grading. It is used extensively in golf course construction, and in the construction and maintenance of ball fields.

It has a very heavy frame for durability, and double spring teeth in front spaced every six inches for more digging ability.

An adjustable grading blade in the middle adds capacity to move dirt. There are four one-inch-thick springs on the back for positive rake action. The gear blade and shovels are reversible for longer life.

#### TMI

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### CONTROLLER ASSEMBLY



The Hydro-Safe Controller Assembly is a complete vandal and corrosion resistant system for irrigation equipment. It comes with prewired options such as a master relay suitable for two controllers, a pump start relay and a bypass assembly for moisture sensing, rain check devices, radio remote control, and other specially requested features.

The assembly is made from 14-gauge #304 stainless steel. It has a unique safety latch, special louvers, concealed hinges, and slope top design.

#### HYDRO-SCAPE PRODUCTS, INC.

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### RECYCLING SYSTEM

The Water Maze Delta 1000 is a closed-loop system that treats and recycles the dirty washwater from pressure washers and steam cleaners.

The system can clean grease, oil, and other contaminants from water so that it can be safely discharged into the sewer or recycled for reuse in the pressure washer.

The Delta 1000 removes oils and most solids from the washwater, which passes over more than 475 square feet of oil-coalescing surface. A sludge pit collects solids for easy removal.

This unit also has several filtering systems which filter hydrocarbons, dirt, and other contaminants from five to 20 microns. An ozone generator oxidizes bacteria and metals from the water so that it is suitable for reuse or discharge.

The system can fit onto a trailer for mobile operation. It cleans up to 10 gallons per minute, weighs 2,250 lbs., and measures 96 inches long by 60 inches wide by 44 inches high.

#### LANDA, INC.

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