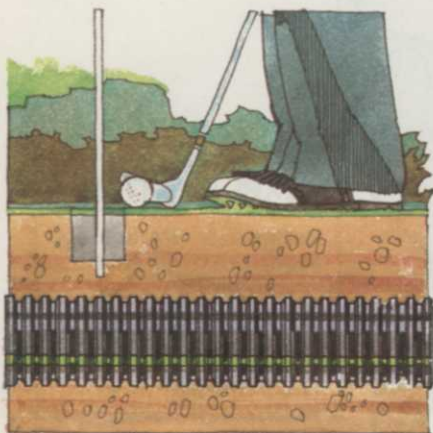


# ADS Drainage Tubing

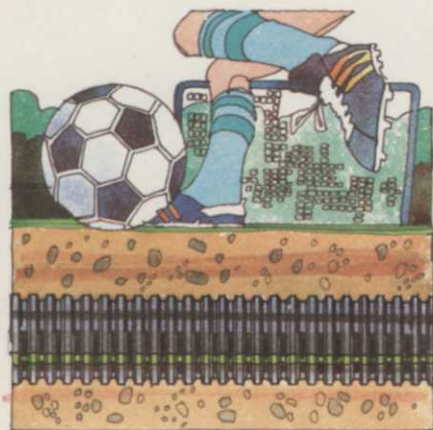
## It's dependably tough for your toughest turf jobs.



Flexible ADS drains your greens.



ADS helps maintain beautiful landscapes.



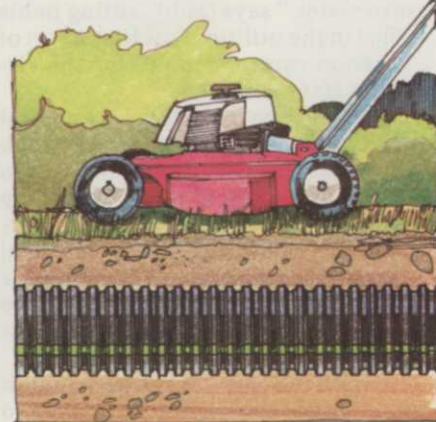
ADS keeps your athletic fields dry.



ADS controls water runoff in heavily trafficked areas.



Sandy soils call for ADS Drain Guard®—the nylon filter that won't block or clog.



ADS tubing—a small part of your turf care budget.

Whether you buy or sell turf care products, you want quality. That's why ADS polyethylene tubing is your best bet. For healthy soil, drainage is important. Strong and durable, ADS tubing provides years of trouble-free drainage, and helps maintain stable soil systems.

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At a cost of just pennies per foot, ADS means quality AND value.

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#### SPECIFICATIONS

**ASTM F-405**, Standard Specification for Corrugated Polyethylene Tubing and Fittings. **SCS**, National Engineering Standard, Code 606. **ASTM F-667**, Standard Specification for 10", 12" and 15" Corrugated Polyethylene Tubing.

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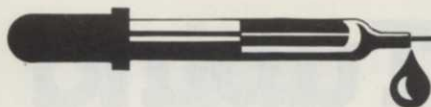
For additional product and technical information, contact your nearest ADS sales office.

To serve your drainage needs, ADS operates 21 manufacturing plants nationwide, and the eight regional sales offices listed below:

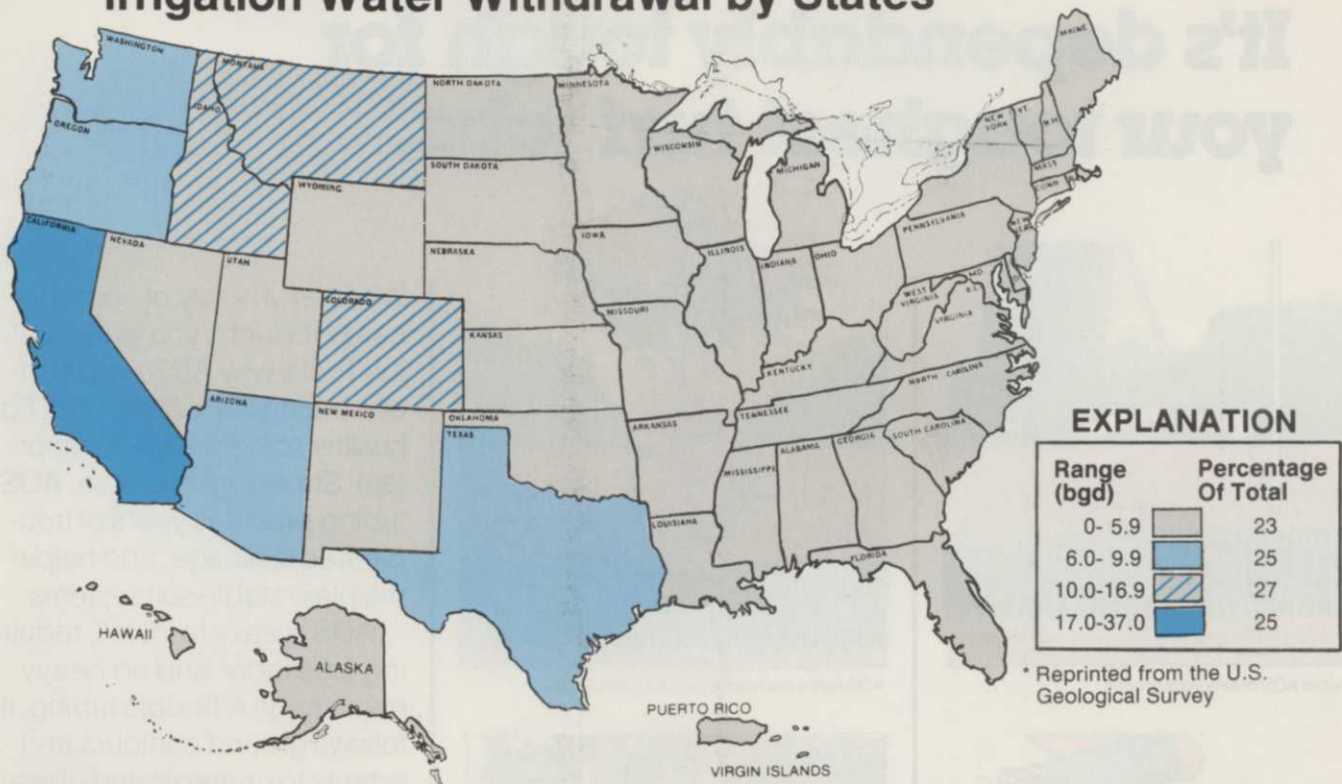
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Bellevue, WA	206-643-2770

Monticello, IL	217-762-9448
Atlanta, GA	404-393-0602
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Livermore, KY	502-733-4324
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## Irrigation Water Withdrawal by States\*



### TEXAS

# Salt and supply make water problems as big as the state itself

**T**exas is another Pandora's box of water problems.

More pressing is the issue of having enough water. Some suggestions for bridging that problem have been a little grandiose—such as building a canal from the Mississippi River to the high plains of Texas, or pumping water from Canada to replenish dwindling Texas aquifers. Sodium problems are also at the top of the list, especially in the El Paso, Midland, Odessa and Lubbock areas.

Texas has also had to bear a phenomenal increase in growth over the past 10 years, adding another burden to an overtaxed water supply.

One barometer of that growth is the 18,000-acre Dallas/Ft. Worth Airport, the sixth busiest airport in the world.

Jim Dalby is the utilities service coordinator for DFW airport.

"We're doing everything we can to

save water," says Dalby, sitting in his office in the utilities building, a sort of "mission control center" for the airport water operations.

Not far from his office is the central utility plant computer console which keeps tabs on every drop of the nine to 10 million gallons of water used a day by the different functions of the airport. The monster computer terminal can even monitor the depth and flow of the 320-acre-foot Trigg Lake, the airport's major runoff collection reservoir.

"With all the new construction here, we're looking for new ways to impound water with the help of the U.S. Geological Survey," he said.

There are currently five runways with a sixth under construction.

Currently, the Department of Water Resources allows the airport to impound 108 to 120 million gallons of water. With the increasing water de-

mands, the department is petitioning the DWR to impound more because all the concrete in the airport makes the runoff rate much higher.

The runoff water that is collected in Trigg Lake provides the one million gallons a day need to irrigate Bearcreek Golf Course at the Amfac Hotel at the airport's south end. The north end of the airport is slated to get a lake for impounding, but currently uses potable water for irrigation. That water is supplied from Dallas and Ft. Worth.

Dalby and his associates have also been seriously looking at using effluent from industrial waste.

"The more we can reuse, take from the ground and use from Mother Nature, the cheaper it will be for the cities," Dalby said.

In his 11 years with the airport, Dalby has seen "amazing changes."

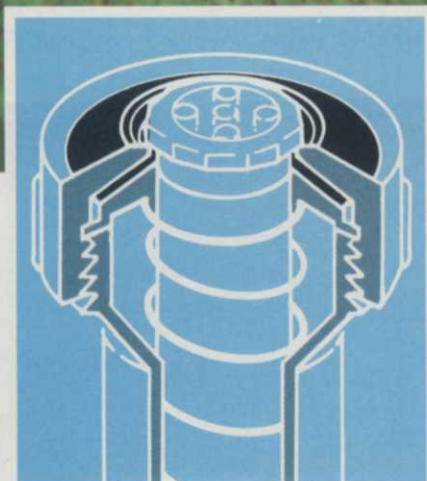
*continued on page 56*

# Now Toro's popular 570 Family gives you even greater flexibility



## New 570-4P spray head clears taller grasses

With a full 4 1/4" pop-up to the nozzle, Toro's new 570-4P spray head effectively clears tall grass and low ground cover, making the 570 Family more versatile than ever. Now you have a full range of pop-up sprinklers: 2", 3", 4 1/4", 6" and 12", plus shrub risers. The new 570-4P has superior, positive retraction, with a stainless steel spring to make sure it pops down completely out of sight when not in use. And it's designed to handle all kinds of water sources, thanks to new, improved seal and minimal self-flushing action. An all-new body design includes Toro's exclusive "Conilip" seal and cap configuration. The screw-on cap makes it repairable from the top of the sprinkler. It accepts all 570 nozzles and filter screens, including Toro's full-range of nozzle angles: 0°, 10° and 35°. Now, more than ever, you'll find the answer is Toro!



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In less than 20 years, turf-type perennial ryegrass has grown from obscurity to become perhaps the most important turf species used in the U.S.

**P**rior to the mid-1960's, ryegrass was a derogatory term reflecting cheap seed mixtures and poor turf performance. Today, some of the finest turf in America is composed of pure stands of turf-type perennial ryegrass.

The ryegrass revolution began in the mid-1960's when NK100 was developed by Howard Kaerwer of Northrup King. Acceptance was slow to develop, except in Long Island, NY, where Bob Russell of J. L. Adikes found NK100 to be well adapted as a turfgrass. A strong local market developed.

Pelo, a Dutch variety originally bred to be a pasture grass, was found to have improved turf properties and became the second turf-type variety. Work by Kaerwer showed that Pelo and NK100 made an improved combi-

nation for southern overseeding. This blend became Medalist 2 and started the winterseeding revolution which has since converted most of the south to perennial ryegrass for use as a fine winter turf, particularly on golf courses.

Next came Manhattan developed by Dr. Reed Funk of Rutgers. Manhattan was the first modern turf-type and represented a giant advancement. The parent material was selected from old turf areas in Central Park, NY in 1964.

Pennfine, developed by Dr. Joe Duich at Penn State, quickly followed and became the first turf-type perennial ryegrass protected under the U.S. Plant Variety Protection Act. Pennfine was a huge and immediate success and has since become the most widely used variety ever developed!

The success of Manhattan and Pennfine led to increased public and private breeding efforts in the U.S. and Europe which quickly led to the development of Derby, Yorktown, Citation, Regal, Omega and Diplomat in the early to mid 1970's. Breeding has continued undiminished since then and has led to the abundance of improved types now available.

In 1983, perhaps 50 million pounds of turf-type perennial ryegrass seed was planted in the U.S.

In northern areas the improved cultivars form a dense, low-growing, fine-leaved perennial turf. When overseeded on dormant Bermudagrass, improved varieties establish rapidly and form a dense, attractive turf during the winter months. In the spring and summer the renewed growth of the Bermudagrass overwhelms the perennial ryegrass. Each fall the ryegrass must be reseeded.

The rapid establishment and attractive, but tough, turf formed by improved perennial ryegrass cultivars make them an ideal species for athlet-

## Landscape Manager's Guide to **Perennial Ryegrasses**

by **Gerald W. Pepin**, Director of Research, Pickseed West Inc., Tangent, OR



ic fields and parks. Many sports fields are now wholly or partly perennial ryegrass.

Although ryegrass is a bunch grass and doesn't spread by stolons or rhizomes, it does tiller well and the rapid germination and establishment characteristics of the species make overseeding a very viable solution to bare or worn spots.

Perennial ryegrass mixes well with Kentucky bluegrass. Their similarity in color, texture, and appearance often makes them difficult to distinguish.

Differing resistance to common turf diseases is another big advantage gained by mixing the two species. Perennial ryegrass is rarely damaged by Fusarium blight, stripe smut, and Helminthosporium leaf spot—three of the more serious bluegrass disease problems. Conversely, Kentucky bluegrass is rarely affected by Rhizoctonia brown patch, Pythium blight, and Corticium red thread—three of the more serious ryegrass disease problems.

Improved cultivars are generally winterhardy well into Canada, but also are tolerant of heat and summer stress conditions deep into the transition zone.

### Establishment

The rapid germination and establishment characteristics of ryegrass have been the most important factors in their remarkable success. Good quality seed from all ryegrass cultivars appear to germinate quickly into vigorous seedlings that rapidly establish a mowable turf. Under warm soil and air temperatures and adequate moisture, it is possible to mow ryegrass two weeks later.

There appears to be only small differences in the germination and establishment rates of improved cultivars.

### Leaf texture and mowing quality

Most of the modern ryegrasses have a pleasing moderately-fine texture and mow cleanly. The older varieties released before Manhattan and Pennfine were characterized by broader, often coarse leaf texture and poor mowing quality, particularly during warm, dry weather. Most of the newer cultivars are characterized by fine to

### Overseeded perennial ryegrass green, at Inverrary Country Club, Lauderhill, FL, during the winter.

Southern winterseeding and northern use of perennial ryegrass consumes more than 50 million pounds of seed per year.

moderately fine leaf texture and mow even more cleanly than Manhattan and Pennfine, particularly during hot dry weather.

### Growth habit

The low growth habit of improved perennial ryegrasses enables them to persist at very low cutting heights. For the last 15 years breeders have been quite successful in producing a lower-

---

## Improved cultivars are generally winterhardy well into Canada, but are also tolerant of heat and summer stress conditions deep into the transition zone.

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growing, more dwarf type growth habit in perennial ryegrass.

In many closely-mown golf fairways around the country, improved cultivars are persisting and forming a tough and attractive turf when mown as closely as 1/2- to 3/4-inch.

"Barclay", a Dutch variety, has demonstrated a slight creeping growth habit via prostrate stems that can take root at the stem nodes. Also several selections that "creep" in a similar manner have been found, leaving the possibility that "creeping" perennial ryegrasses are a real possibility in the future.

### Color

Most people in the U.S. have a preference for darker green cultivars, such as Citation, Regal, Fiesta, Prelude, etc. Conversely, the preference in Europe is usually for lighter green types, such as Loretta and Elka. Plant breeders now have the genetic resources to produce cultivars ranging from light to very dark green.

Color is much a matter of personal preference so there is no "superior" color. Most agronomists feel that a medium-dark green color that blends well with other cultivars and doesn't contrast sharply with Kentucky bluegrasses is best. Cultivars with a genetically dark color are important to individuals who want a dark green turf with minimum fertilizer usage.

### Winter survival

In general, the winter survival of improved turf-type ryegrasses has been very good, and certainly much improved over the older "common" va-

rieties such as "Linn". In the early 1970's there was much concern that turf ryegrasses would be damaged by hard winters in the Northeast, upper mid-West and the Rocky Mountain states. These early fears were largely unfounded. Most of the improved cultivars can form a long lived, perennial, winter hardy turf throughout the U.S. and into Southern Canada. Some cultivars appear to have an extra measure of winter hardiness, including Blazer, Delray, Manhattan and NK200.

### Summer survival

Heat and drought tolerance plus resistance to summer turf disease and insect pests appear to be the major factors responsible for improved summer survival of ryegrass cultivars in areas subject to severe summer stress. Many good cultivars are now available that are capable of forming an attractive perennial turf in areas deep in the "transition" zone.

Recent research findings indicate that the presence of a fungus called the *Lolium* endophyte in certain cultivars is strongly associated with improved summer survival. This exciting new development in ryegrass breeding is discussed in greater detail below.

Some of the turf-type ryegrasses that have demonstrated better than average summer survival in stress areas include Pennant, Citation II, Regal, All\*Star, and Repell.

### Winter seeding

Every autumn millions of pounds of turf-type perennial ryegrass are overseeded into dormant Bermudagrass turf on golf courses in the southern U.S. Blends of improved varieties can form a beautiful, dark-green temporary turf during the winter months in the south.

On some golf courses only the greens and tees are overseeded. On others the entire course is overseeded with turf perennial ryegrass blends.

Most of the better turf type cultivars are good winterseeding grasses. To obtain better genetic diversity, many seed companies blend together two or more ryegrass cultivars and sell the blend under a brand name. Often perennial ryegrasses are mixed with other turf species such as red fescue and *Poa trivialis*. Some of the more popular and widely used winterseeding formulations are CBS, Futura plus, Marvelgreen, Medalist, and PHD.

### Disease resistance

Like all other turfgrasses, the perennial ryegrasses are subject to a

**TABLE 1**  
**Characteristics of 34 Perennial Ryegrass Cultivars\***

Cultivar	Color	Tiller Density	Leaf Texture	Winter Hardiness	Mowing Quality	Brown Patch Resistance	Brown Blight Resistance	Crown Rust Resistance	Stem Rust Resistance	Red Thread Resistance	Endophyte Level
All Star	7	7	7	7	6	7	7	6	4	6	6
Barry	8	7	7	7	7	7	6	5	3	5	1
Belle	7	7	6	8	6	7	7	6	2	6	1
Birdie	7	6	6	7	6	7	5	7	2	6	1
Birdie II	7	7	7	5	7	7	7	8	8	8	8
Blazer	7	7	7	8	6	7	7	6	4	6	2
Caravelle	9	4	6	3	3	4	5	4	3	6	1
Citation	8	6	7	7	6	7	3	5	2	7	1
Citation II	8	6	7	6	7	7	8	8	8	8	9
Cowboy	7	6	7	5	5	6	7	7	8	7	6
Dasher	7	6	6	8	6	7	6	7	2	7	3
Del Ray	6	7	6	8	7	7	3	7	5	7	3
Derby	7	6	6	6	6	7	6	4	2	7	3
Diplomat	7	6	7	8	5	7	7	4	3	6	1
Elka	5	8	9	8	8	5	5	9	5	6	1
Fiesta	8	6	7	8	7	7	6	7	2	6	2
Game	5	3	3	4	3	2	5	8	3	5	1
Gator	8	8	7	7	8	7	7	8	4	7	1
Linn	5	2	3	3	1	2	4	6	3	5	3**
Loretta	5	7	8	7	8	5	6	8	5	6	1
Manhattan	6	5	6	8	5	5	6	3	3	5	1
Manhattan II	8	8	8	6	8	7	7	7	8	6	2
NK 200	7	5	6	9	4	5	5	3	3	6	1
Omega	7	6	6	8	5	7	7	4	3	7	1
Omega II	7	7	7	7	7	7	7	7	8	7	5
Palmer	7	8	7	6	6	8	7	7	1	7	3
Pennant	7	6	6	8	5	7	6	7	3	7	8
Penn Fine	6	5	6	6	5	7	3	5	3	7	3
Prelude	8	8	6	6	6	7	7	8	2	7	5
Premier	7	7	7	6	6	7	6	7	2	7	5
Regal	8	6	6	8	7	7	7	4	1	7	8**
Repell	7	7	7	7	7	7	6	5	4	6	9
Tara	8	7	7	6	7	7	6	7	4	6	1
Yorktown II	7	7	8	7	7	7	7	5	2	5	1

\*9 = Darkest color, most density, finest texture, most winter hardiness, best disease resistance, and highest endophyte level.

\*\* Endophyte level may vary with different seed lots.

number of turf diseases. However, as a species, perennial ryegrass appear to be less subject to severe disease problems than bluegrass, fine fescue, and bentgrass.

The most serious summer disease problem is brownpatch incited by *Rhizoctonia solani*. Other warm weather disease problems include winter Pythium blight or damping off, dollarspot incited by *Sclerotinia homoeocarpa*, and stem rust *Puccinia graminis*.

Some of the more important cool-season diseases include winter brown blight (also called winter leaf spot) incited by *Drechslera* spp. (formerly *Helminthosporium* spp.), crown rust incited by *Puccinia coronata*, and Corticium red thread and pink patch.

**Brownpatch** is potentially a very

serious problem on ryegrass turf during periods of warm humid weather. It is favored by warm night temperatures, high nitrogen fertilization, and supplemental irrigation. Fortunately, great improvements in brownpatch resistance have been made by plant breeders, particularly Dr. Reed Funk at Rutgers University. Good genetic resistance to brownpatch has probably been the single most important factor in extending southward the usage of turf type perennial ryegrass. Some of the more brownpatch resistant cultivars include Blazer, Citation II, Prelude, Palmer, Pennant, and Premier.

**Pythium blight** or damping off is usually a disease of seedlings or young turf. There is little genetic resistance to Pythium so appropriate

fungicides should be used if it is a problem. Applying supplemental irrigation carefully often helps limit the occurrence of pythium. During warm weather it is very helpful to plant seed treated with fungicides, such as Koban or Apron. This practice is used extensively for winterseeding in the south.

Incidents of **dollarspot** damage on perennial ryegrass turf appear to be increasing. This disease is often seen in shady areas and is favored by low nitrogen levels, dry soil conditions, high humidity, and moderate temperatures.

**Crown rust** usually occurs in the fall and though unsightly is generally not a major problem. It is favored by the cooler temperatures of late summer and is usually seen on turf whose growth is slowed by a lack of adequate fertility or drought stress. It is seldom found on actively growing turf. Some of the more crown rust resistant cultivars include Elka, Loretta, Gator, Prelude, Premier, and Fiesta.

**Brown blight**, or winter leaf spot, is usually associated with cool temperatures and wet or water saturated turf. It is frequently seen in the cooler parts of the year and under short day lengths when turf is growing very slowly.

This disease is a serious problem on winter turf in the Pacific Northwest. Fortunately, many of the newer cultivars have good resistance to winter brown blight. Some of the most resistant cultivars include Prelude, Citation II, Blazer, and Manhattan II.

**Corticium red thread** is becoming an increasingly important turf disease. It appears to be several diseases and plant pathologists now distinguish at least two closely related forms, red thread and pink patch. Red thread and pink patch can be serious problems on turf maintained at low to medium fertilizer levels. It is also favored by cool cloudy weather. Most presently available cultivars have varying degrees of susceptibility. There appears to be some genetic resistance to Corticium and resistant cultivars may be available in the coming years.

### **Insect resistance and Lolium endophyte**

One of the most recent developments in ryegrass breeding has been the release of several cultivars resistant to damage incited by insects such as sod webworms and billbugs.

Just recently, it has been determined that the insect resistance is apparently related to the presence of a fungal endophyte living within the

*continued on page 41*

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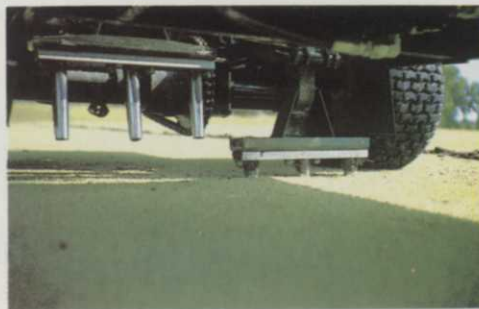


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decreases surface runoff and irrigation frequency. It also breaks up thatch and compaction and brings up soil particles to reinoculate thatch with soil and microbes to enhance thatch decomposition. The Ride-Aire breathes new life into thick lawns and helps prevent the "5-year slump" in turf quality that causes customer dissatisfaction and turn-over. Whether regular turf maintenance or renovation, the new Ride-Aire adds a new dimension to the lawn care service industry.



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**MORE IN '84!** Mark your calendar. It's not too early to start planning for the lawn care industry's biggest week of the year — the Professional Lawn Care Association of America's 1984 Show and Conference.

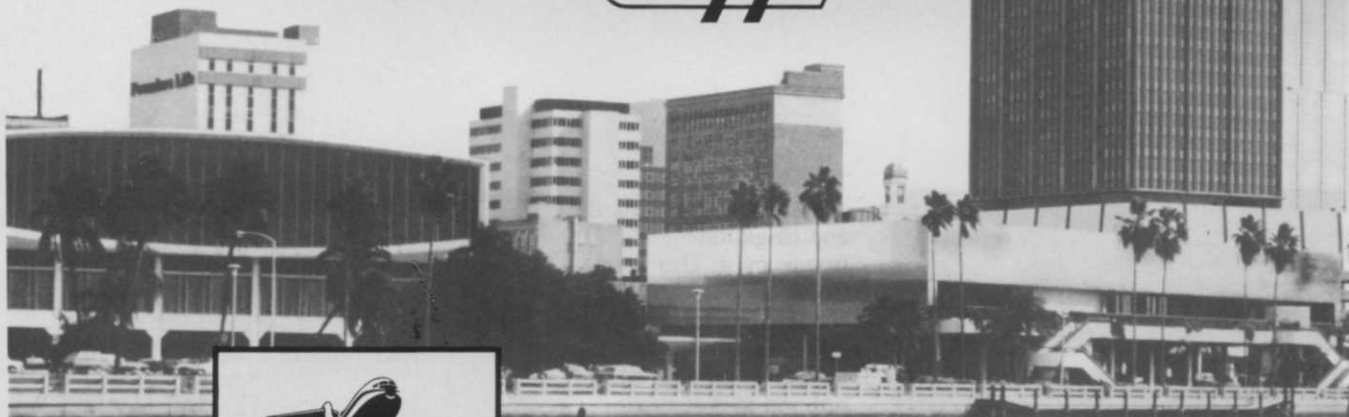
And what a week it will be! PLCAA '84 is shaping up to be the biggest, best gathering of powerhouse speakers and exhibitors in our five-year history. The seminar program has been expanded to offer over 16 hours of educational programming hosted by a new lineup of outstanding speakers, problem solvers all.

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