

# TEE TO GREEN

By DAVE BAILEY

The following is an interview with B. J. Johnson. He is an associate professor of agronomy with the University of Georgia. He was the education guest speaker at the July meeting of our association.

Question: What area is your research work?

Johnson: I deal primarily in herbicide treatment.

Question: What is the best new herbicide chemical in the last ten years?

Johnson: The best product researched and now on the market in recent years is Metribuzin. (4-Amino-6-(1,1-dimethylethyl)-3-(methylthio)-1, 2, 4-triazin-5(4H)-one

Question: This active ingredient translates into what product trade name?

Johnson: Mobay Chemical Corporation calls their product SENOR. Dupont Chemical Corporation calls their product LEXON.

Since only Mobay is actively selling their product from this point on in the discussion only Sencor will be referred to. Sencor is a 50% wettable powder herbicide.



Dr. B. J. Johnson

Question: When did you first start working with Sencor?

Johnson: In 1973, it was labeled in Florida and Georgia in 1978.

Question: Where has your research been done?

Johnson: On test plots and at seven golf courses over a three year period of time. The location is about forty miles south of Atlanta.

Question: Upon what weed is Sencor most effective?

Johnson: Your greatest problem weed, goosegrass and crowfoot.

Question: What application rate is giving the best results?

Johnson: Remember the best rates mean weed killing with as small amount of damage as possible. To achieve this goal the best test results are as follows. Mix MSMA (monosodium acid methanearsonate) and Sencor. On a one acre basis use 2.0 pounds active ingredient MSMA and 1/8 pound active ingredient Sencor.

(Continued on Page 12)

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Remember this means ACTIVE ingredient. That will become a tank mix of 1-2/3 quart per acre of MSMA if you use 6.0 active MSMA. The total ingredient of Sencor product from the bag would be 1/4 pound or 4 ounces per acre. Higher rates of Sencor have been used in the past when not mixed with MSMA. If EPA takes MSMA off the market we may be left with Sencor as our base material.

Question: Do you use a sticker?

Johnson: If you can afford to do so. The work I have done shows no improvement with a sticker since MSMA has some. But I never get a Florida style summer rain. The important time factor is to get about four hours absorption after the spray application.

Question: What is the time interval between applications?

Johnson: Seven to ten days works best.

Question: How many applications?

Johnson: Generally two applications will be sufficient.

Question: After the weeds are killed off and the next generation occurs when should you spray?

Johnson: As soon as the turf is healthy. Here you will need to make your own good field judgement for south Florida. Fertilize weak areas then spray once and evaluate timing from there. Remember herbicide programs are only effective if you continue to keep your turf healthy. Dead areas do no one any good.

Question: Another product of great interest in south Florida is BASAGRAN herbicide, can you give us any data on this subject?

Johnson: Yes, I started working with it also in 1973 and like Sencor it received a label in 1978. Basagran is the trade name for BASF Wyandotte Corporation. The active ingredient is sodium salt of bentazon.

Question: Upon what weeds is Basagran most effective?

Johnson: Basagran is aimed at the nutsedges with better results on yellow than purple.

Question: What rates give best results?

Johnson: One to one and half quarts per acre.

Question: How many applications?

Johnson: Many times two applications are needed.

Question: When can Basagran be applied?

Johnson: Basagran is very selective on sedges in bermuda greens. It can be used all year with no bermuda damage.

Question: What is the best herbicide for Poa Annua in our area?

Johnson: Kerb 50% wettable powder gives the best results on bermuda grass and is very selective. It is a product of Rohm and Haas, the active ingredient is 3, 5-dichloro-N-(1,1-dimethyl-2-propynyl)-benzamide.

(Continued on Page 13)

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Question: We often criticize researchers for working only on test plots what is your comment?

Johnson: We do hear that often, that is why I worked with Sencor for three years on seven golf courses.

Question: What is your main message to us?

Johnson: Often chemical salesmen are to influential on rates and not on purpose. Always use test plots yourself. Do not spray the entire golf course and then be sorry. It is very important to keep good records on all your spraying. Local people need a good current education on weed killing. Always understand your rates and keep good calibration of application. Our work is only as good as your application.

## PALM BEACH GCSA



George Cavanaugh is shown giving a check of \$500.00 to Palm Beach Association Treasurer Billy Wright. This check was a donation from the South Florida Chapter to the newly formed Palm Beach Chapter to further their establishment.

## PALM BEACH ELECTS OFFICERS



Newly elected officers of Palm Beach Golf Course Superintendents Association. Left to right: Tom Burrows, Kevin Downing, Bill Kriegel, George Cavanaugh, David Bailey and Billy Wright. Not present when photograph was taken, Otto Schmeisser, President and Bill Wagner, Vice President External Affairs.

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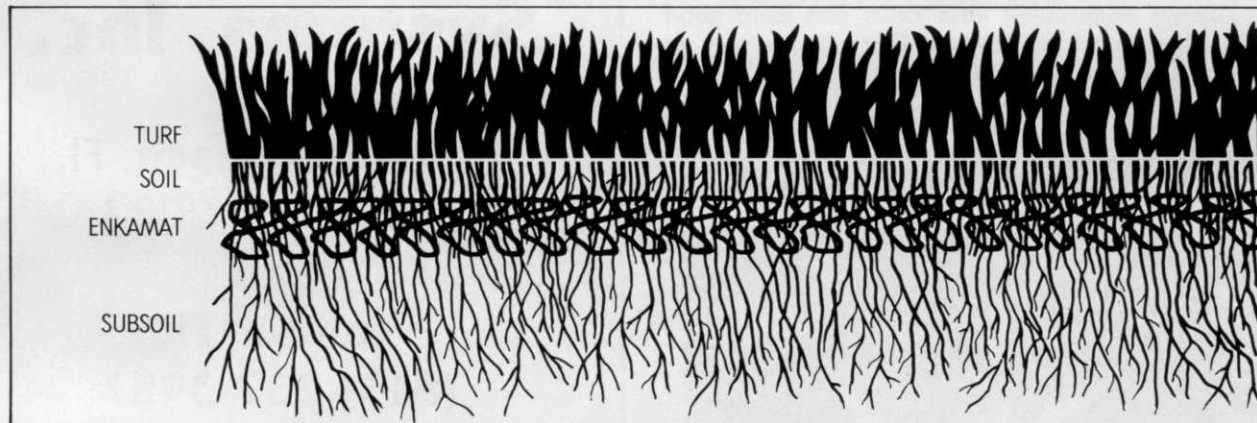
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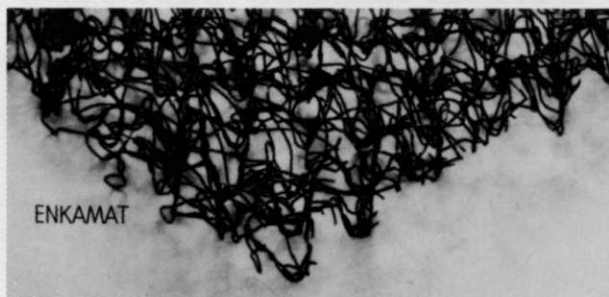
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Enkamat can be installed quickly and easily. Simply lift the sod, lay down Enkamat and then replace the sod over Enkamat. Once in place, the continuous three-dimensional Enkamat webbing will: (1) increase the structural strength of the sod; (2) distribute weight of traffic, minimizing compaction; (3) al-

low air, water and nutrients to move freely into the soil, minimizing maintenance costs.

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TOM MASCARO MANAGER

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# UNITY IN SOUTH FLORIDA

The golf industry had tremendous growth in the past decade. No area in the nation can match the growth of the southern three counties of Florida's east coast. Dade, Broward and Palm Beach counties are now nearing the three hundred mark for number of courses. For decades South Florida GCSA was the only local association. But as the area grew, needs and desires changed. In 1976 the Tri-County GCSA was founded. Both associations are now affiliated chapters of the national GCSAA. The national GCSAA does not establish defined areas for a local organization. The overlapping of territory between the two local associations was a matter that needed to be resolved. Both groups were functioning in Palm Beach, Martin, and St. Lucie counties. Thus diluting the effectiveness of both associations.

A review of events in recent months is in order. South Florida GCSA suggested to its members in November 1978 that a decision was needed about a defined boundary line. South Florida GCSA would be located in Monroe, Dade, and Broward counties. Tri-County changed its board of directors in January to comply with national standards. Now all officers are golf course superintendents. February saw Tri-County become an affiliated chapter of the national GCSAA. In May Tri-County voted to change its name. The new name is Palm Beach Chapter GCSA. The word "chapter" was included to show support and affiliation with the state association. Also defined was a territory of Palm

Beach, Martin, St. Lucie, and Indian River counties. In June South Florida GCSA officially approved their territory as the three southern counties previously mentioned. This becomes effective January 1980 for South Florida GCSA, the end of their fiscal year.

Now that you understand what happened let's evaluate it for you individually. You as a golf course superintendent have been assigned a local association to be a member of. Which one depends upon where your club is located. Your home residence has no bearing. You can vote and hold office only in your local association. Anyone can always attend any meeting no matter where it is located. Commercial members can join any association they desire with no voting privilege. Any superintendent that joins either local association automatically becomes a member of the state association.

The decade of the 80's will see the golf course superintendent continue to be a proud profession. Management assignments will continue to broaden beyond our previous duties. The leadership displayed of a smooth mutual division of local territory by the two associations will be a successful kickoff for the future. Now we all know where the term "grassroots politics" comes from. We are all ready to move forward together and concentrate on just the "grassroots".



Participants in serious presentation of division of South Florida Golf Course Superintendents into two associations. Shown above left to right top row: Dan Jones, Leroy Phillips, Phil Amman, Bill Wagner. Second row: David Bailey, Tom Burrows and Alan Weitzel, Dick Lemmel and Fred Klauk.

# WHAT'S INSIDE IT A BET

If you're hardnosed about business decisions, you want to get the in-depth facts on a product before you buy. That's why we've put together this head-to-head comparison between the insides of an E-Z-GO and a Cushman. We took comparable top-of-the line models, E-Z-GO's GT-7 and the Cushman Turf Truckster. Here's what we found.

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**Power Source:** 18 horsepower OMC engine, tightly compartmentalized. Ground speed 0 to 22 mph.

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**Braking:** Hydraulic internal expanding.

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**Payload:** 1000 pounds.

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**Suspension System:** Torsion bars, leaf springs, front and rear shocks.

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**Dump Construction:** Single wall.

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**Headlights:** Single.

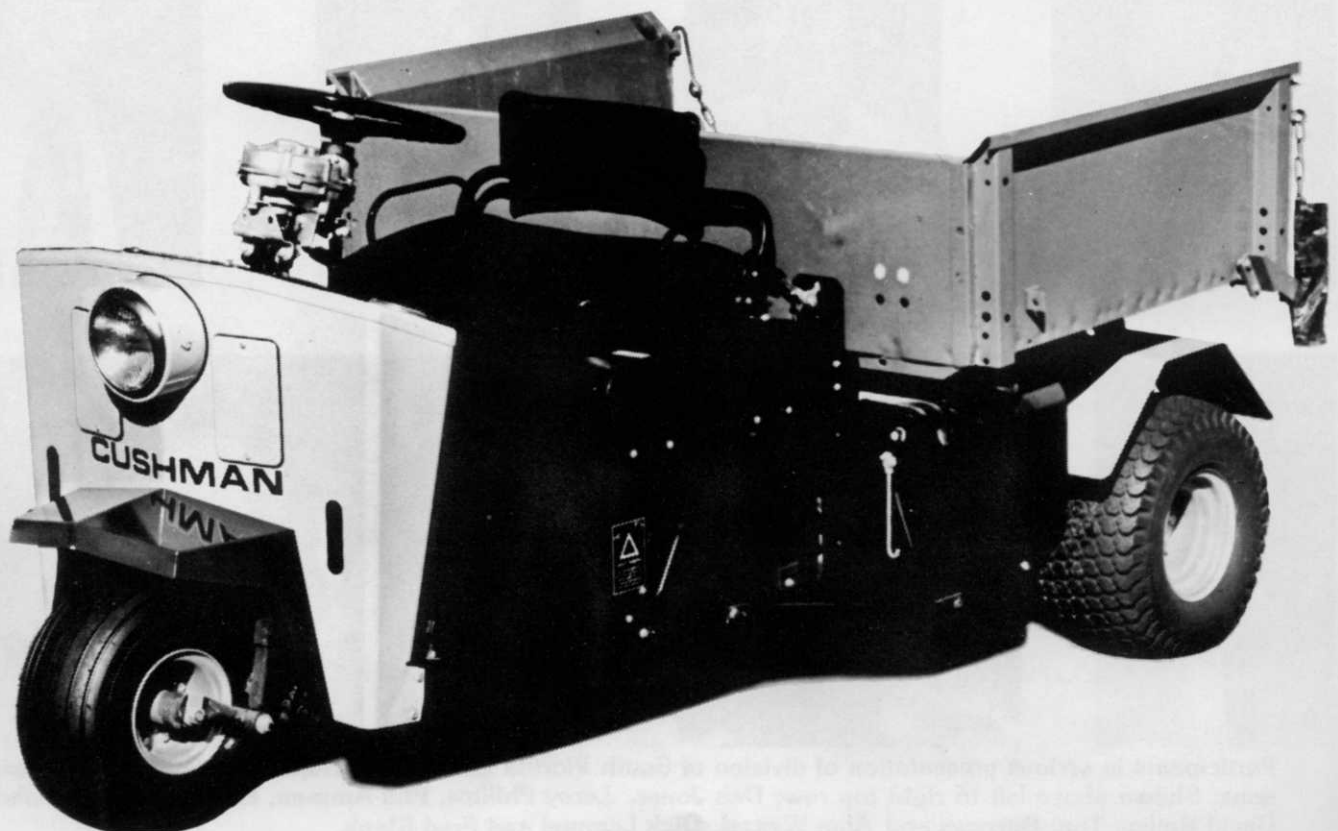
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**Seating:** Single seat for one passenger with back rest and hip restraint.

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**Price:** Virtually the same.

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# AN E-Z-GO MAKES TER BUY.

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**Power Source:** A rugged, reliable 18 horsepower Onan engine with the power to carry a full payload up to 24 mph. Substantially larger engine compartment for easier maintenance.

---

**Braking:** Improved hydraulic internal expanding.

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**Payload:** 1500 pounds. A massive 50% greater carrying capacity than Cushman. More cubic space for greater material volume.

---

**Suspension System:** Heavy duty torsion bars, leaf springs, front and rear shock absorbers, designed to support the bigger payload.

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**Dump Construction:** Heavy duty diamond plate steel with rugged rear bumper for heavier loads and longer life. Easily convertible to flat bed.

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**Headlights:** Dual lights for greater night vision.

---

**Seating:** Dual seats for two passengers with individual back rests and hip restraints, constructed for larger men, greater comfort.

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**Price:** Virtually the same.

---

**Summary:** E-Z-GO carries a greater payload, is easier to maintain, is larger, more durably built, and safer with a wider wheel base. E-Z-GO uses top quality components from companies such as Bendix, Borg Warner, Dana, Onan, and Rockwell International.

For the complete story on the E-Z-GO GT-7, a demonstration on your course, contact your E-Z-GO distributor. For his address check your Yellow Pages or call or write Mr. William Lanier, E-Z-GO, P.O. Box 388, Augusta, Georgia 30903, at (404) 798-4311.



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# FRESH WATER

By DEBORAH ERICKSON  
Staff Writer  
Fort Lauderdale News and Sun Sentinel

Southeast Florida's fresh water supply won't meet the demands of residents, agriculture, and industry in the next 25 year if the area continues to grow at its present rate.

This projection by the South Florida Water Management District came only months before the release of an area water-use management plan.

The plan — the result of five years of research — examines alternative ways of providing a balance between increasing consumption, steady supply, rising consumer costs and the environmental impact of various storage facilities.

Although the final results of the study are not available yet, some details on consumption and storage alternatives in the past and their effects on the environment are.

Over the past 15 years, the amount of water consumed in Fort Lauderdale has doubled. In Hollywood, the amount has increased 310 per cent; in Pompano the increase has soared to 365 per cent; and in Boca Raton consumption has increased 285 per cent in one decade.

While the amount of consumption steadily climbs each year — often surpassing population increases — the amount of available fresh water has remained the same.

Florida depends solely on rainfall for its fresh water.

"We receive an average annual rainfall of 60 inches, but are only able to use 12 to 18 inches. The rest is lost through evaporation or into the ocean because we have no way of storing it," Stan Winn, water-use plan manager, said.

Water management district figures show that during the past decade, Fort Lauderdale experienced the largest amount of rainfall, 79 inches, in 1966, and smallest amount, 38.7 inches, in 1971.

Currently, all of the area's fresh water is stored in Lake Okeechobee, three conservation areas covering half the original Everglades and the Biscayne aquifer which lies 2 to 100 feet underground.

According to Winn, Southeast Florida's future water shortage problems can be solved now by developing new methods and facilities to capture, store, treat and transport all the rainfall the area receives.

At present the most economically and environmentally feasible alternatives are:

● Desalinization which would involve forcing brackish water in the Floridian aquifer 1,000 feet below the ground through a tightly woven plastic membrane, allowing only water molecules to pass through and keeping bacteria, fungi and salt out.

Until recently this process was considered too costly, but studies have shown the cost would be comparable to that of a chemical treatment plant, Winn said.

This process is not the same as the distillation plant in Key West which takes salt water from the ocean and purifies it. Such plants are more costly to construct and require more energy to complete the purification process than desalinization.

Desalinization is not used by any public water plants. But one West Palm Beach company manufacturing the facility has sold it to area condominiums unable to hook up to city water lines.

Bill Wigglesworth, general manager of the basic water division of Basic Technology, Inc., said the process can produce thousands of gallons of fresh water daily from otherwise unusable water by removing all of the chlorides, chemicals and organics at a cost ranging from 20 to 80 cents per 1,000 gallons.

● Deep well injection, which would require the water management district to pump fresh water into the Floridian aquifer for storage. Because the water in this aquifer is brackish and denser than the fresh water being pumped in, the fresh water would form an impermeable bubble and float on top of the aquifer similar to the way oil floats on water.

The water would remain in the aquifer for a period of up to one year and would be used during Florida's dry season in late fall and winter. One official said there would be some mixing of the waters at the bubble's perimeter, but that the bulk of the water would remain pure. He added that because the water would be pumped into the aquifer under pressure, the water could easily be retrieved by relieving the pressure and letting the water flow freely upward.

● Backpumping, which would allow the water management district to pump rainfall from urban areas to the conservation areas. The main drawback is that it would allow urban nutrients such as chemical sprays and fertilizers to enter the Everglades, possibly causing damage to wildlife and vegetation there.

*(Continued on Page 19)*





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Lush, green turf and beautiful landscaping in parks, school grounds and around public buildings say a lot to the people of a community.

For example, they invite people to enjoy their facilities.

They tell them that the public administration wants to help make their community a nicer place to live.

And the more beautiful the grounds the more beautifully they say it.

### Grow grass better and save money, too.

The most positive single step you can take to assure that the grass is always greener at your facilities is to install a TORO automatic sprinkler system designed expressly for public areas.

#### Here's why:

**A TORO automatic system puts total irrigation control at the grounds superintendent's fingertips.**

TORO offers a variety of components to meet the exact requirements of any size automatic irrigation system.

- Series 170 Monitor II is a 23-station controller for systems employing up to 92 electric valves. Dual programming for watering some areas more frequently than others. Also available in an 11-station version—electric or hydraulic.

- Solid state controllers are also available from TORO. The IC 1200, which is fully solid state, controls up to 12-stations. It can be programmed to water up to 6 times per day on any combination of days in a 14 day schedule.

With TORO automatic systems you can control the days in a two-week period and the time of day your sprinklers come on.

You can also control the running time of each group of sprinklers. Or, with our valve-in-head sprinklers, you can exercise the same degree of control over each individual sprinkler.

Dual programming features let you water one area more often than another. Like heavily used areas vs. lightly traveled ones. Or sunny areas vs. shady ones.

- If the area you wish to water is large and spread out, then a central Satellite system may give you the control you need from one location. The solid state VT II and the Vari-Time 4000 provide the features you need for this application.

- Series 216 heavy duty Brass Valves in sizes 1" through 3" are available for the most demanding applications.

- Series 232 Plastic Valves ranging in sizes 1" through 2", built from tough glass-filled nylon and Cyclocac®, are perfect for residential and commercial systems.

- With TORO valves, TORO sprinklers, and a TORO automatic controller you have the combination that will provide the exact amount of water at the exact time for more beautiful lawns and landscaping.

### Plants grow better and you save water.

TORO total sprinkler control means you can regulate watering precisely for even distribution, according to need. That produces vigorous growth and beautiful expanses of healthy, green turf.

But of equal importance, precise control also means never over watering. For example, you can water low spots less than high ones and slopes with short bursts to minimize runoff. You also can accurately reduce watering by small percentages when shortages require it. And when you add it up you have real water savings. An important consideration today.

#### • You water at night and get maximum utility.

Your automatic system normally is set to turn on in the early predawn hours when the air is still and the rising sun will soon dry grass and leaves. So sprinkler water doesn't blow away, moisture-induced plant diseases are minimized and your facilities are ready to go when the first users of the day arrive.

#### • You save time and money.

With a TORO automatic sprinkler system you can forget about quick couplers and other manual watering methods. And this lets you virtually eliminate night crews and use that manpower more efficiently.

TORO systems also cost less to maintain than other sprinkler systems. Because of features like surface serviceability, long-life components and vandal-resistant design.

The rising cost of water makes water savings an important cost consideration, too.

And the improved vigor of your landscaping means big down-the-road savings in grounds maintenance.

Now you can see why the cost of a TORO sprinkler system is amortized so quickly.



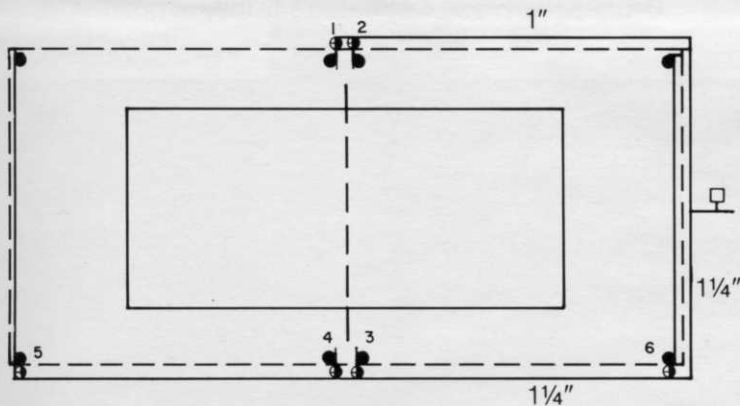
# Examples of athletic field installations.

Tough TORO 640 sprinklers are the ideal choice for athletic field irrigation. They hide below ground level where they can't cause accidents or interfere with play. Then they pop up to water the field with the kind of precise, even distribution that helps grow thick, healthy turf.

TORO athletic field systems are installed quickly and easily, too. Facilities are back in full swing before you know it and within a few weeks you'd never know a sprinkler system had been installed except for that beautiful, healthy turf. What's more, a TORO system is easy to operate. Follow the simple programming instructions to set it. Then forget it.

The drawings shown here are some examples of automatic system installations in typical athletic fields. However, there are many other designs that can be developed to suit your individual needs.

All sprinklers on the drawings are 640 Series and the TORO model number for each type of sprinkler required is listed along with pipe sizes, valves, recommended controller and other details. The number beside each sprinkler (or valve in the case of the tennis court) is the controller station controlling that sprinkler. One station operates at a time.



## Tennis Court

- 641-02-42 TORO GEARED ROTARY POP-UP
- ⊕ 216-06-04 TORO ELECTRIC VALVE
- 153-56-14 TORO PEDESTAL MOUNT CONTROLLER

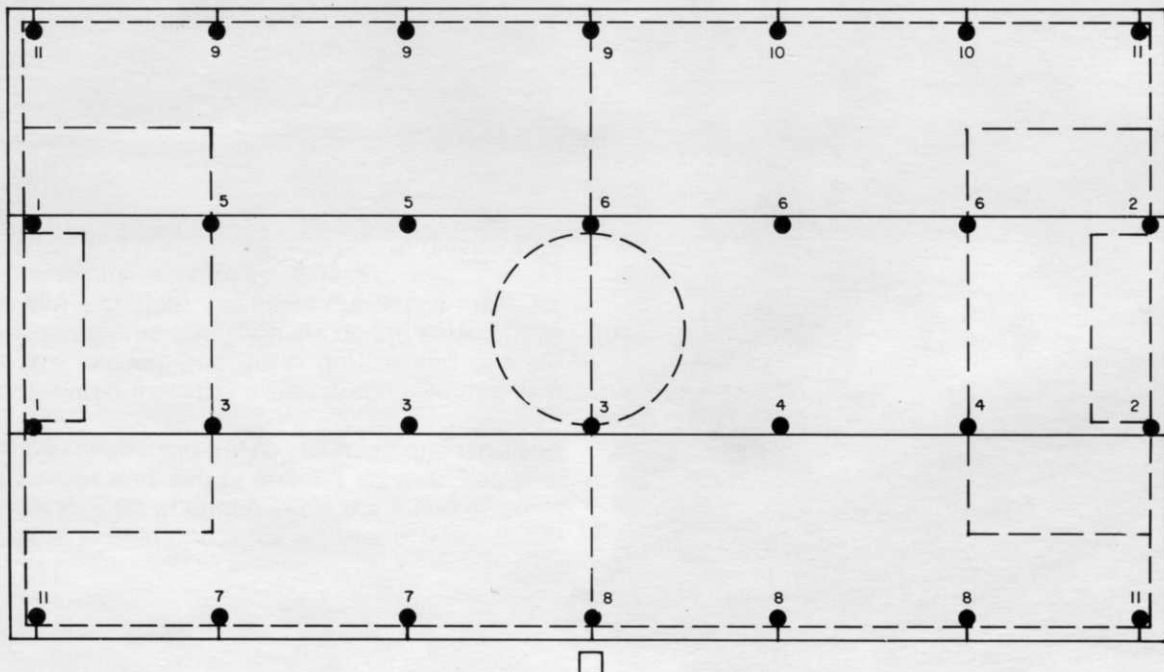
- ALL PIPE SIZED AS SHOWN
- WATER DEMAND 30 G.P.M.
- PRESSURE REQ'D 60 P.S.I.
- OPERATE ONE VALVE AT A TIME
- INSTALL ANTI-SYPHON DEVICE ACCORDING TO LOCAL CODES

## Soccer Field

- 641-01-42 TORO GEAR DRIVEN ROTARY POP-UP
- 642-01-42 TORO GEAR DRIVEN ROTARY POP-UP
- 644-01-42 TORO GEAR DRIVEN ROTARY POP-UP
- 176-51-01 TORO MONITOR II CONTROLLER

- WATER DEMAND 60 G.P.M.
- PRESSURE REQ'D 60 P.S.I.
- OPERATE ONE STATION AT A TIME

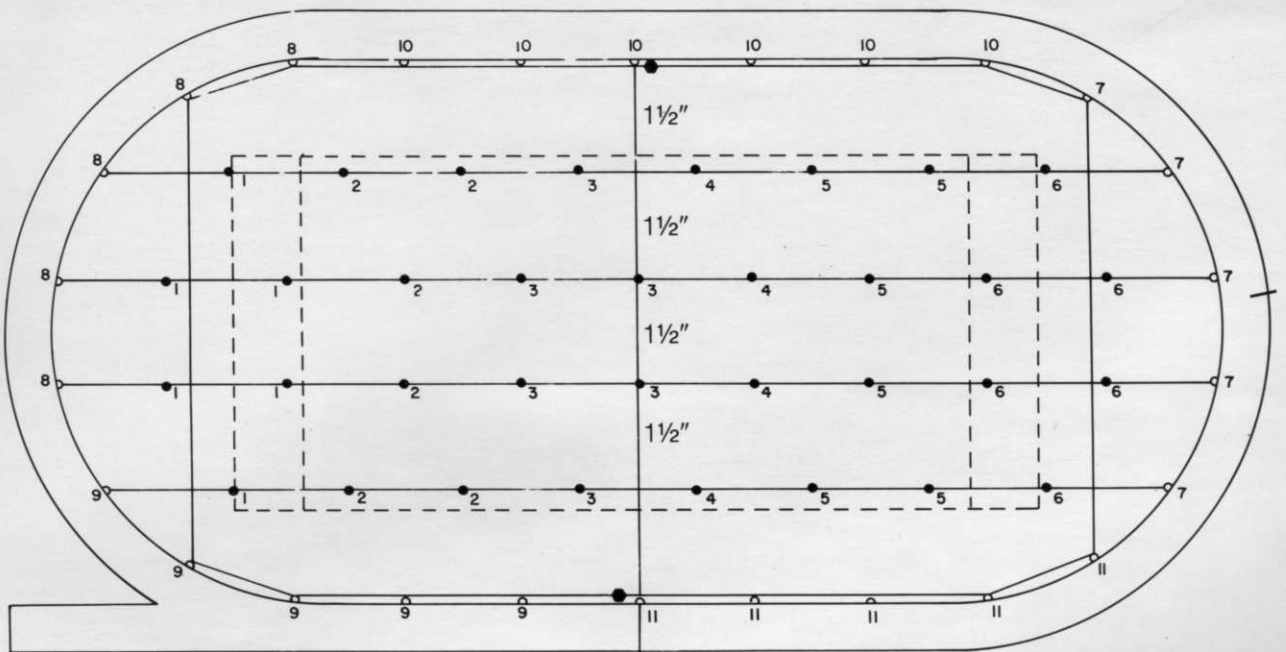
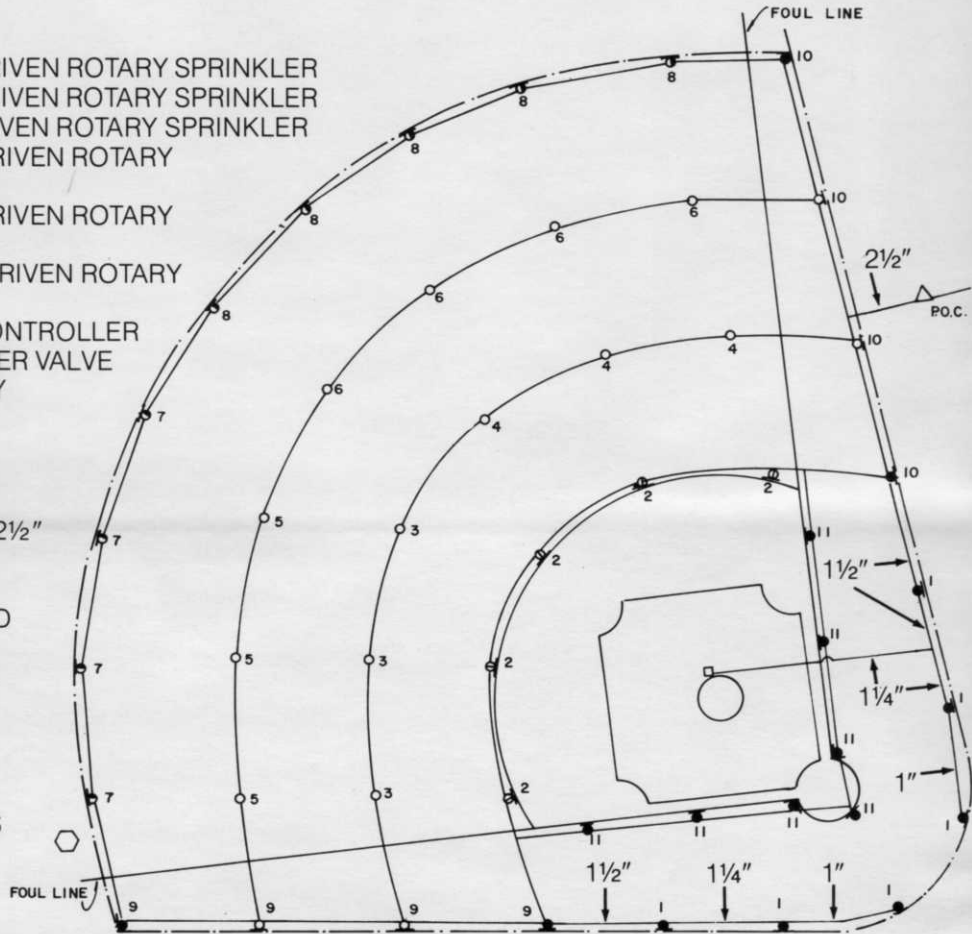
- NUMBER BY EACH HEAD IS THE STATION ON THE CONTROLLER
- TAP ANY PLACE ON THE LOOP WITH A 2 1/2" P.V.C. FEEDER LINE
- INSTALL ANTI-SYPHON DEVICE ACCORDING TO LOCAL CODES
- ALL OUTSIDE ROW OF HEADS CAN BE CHANGED TO PART CIRCLES
- ALL PIPE SHALL BE 1 1/2" P.V.C. LOOPED AS SHOWN



## Baseball Field

- 640-01-42 (173°) TORO GEAR DRIVEN ROTARY SPRINKLER
- ⊕ 640-01-42 (192°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 641-01-40 (90°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 642-01-40 (180°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 642-01-42 (180°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 644-01-42 (360°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 176-51-01 TORO MONITOR II CONTROLLER
- 474-00- TORO QUICK COUPLER VALVE
- NOT SHOWN 900-14 TORO POLY CONTROL TUBING

- WATER DEMAND 75 G.P.M.
- PRESSURE REQ'D 70 P.S.I.
- TAP TO OUTSIDE LOOP WITH A 2½" FEEDER LINE
- ALL P.V.C. PIPE SHALL BE 2" UNLESS OTHERWISE INDICATED
- NUMBERS NEXT TO HEAD INDICATE THE STATION ON THE CONTROLLER
- DO NOT OPERATE MORE THAN ONE STATION AT A TIME
- INSTALL ANTI-SYPHON DEVICE ACCORDING TO LOCAL CODES



## Football field

- △ 642-01-40 TORO V.I.H. GEAR DRIVEN ROTARY POP-UP SPRINKLER
- 644-01-40 TORO V.I.H. GEAR DRIVEN ROTARY POP-UP SPRINKLER
- 474-01 TORO QUICK COUPLER VALVE, 1"
- 176-51-01 TORO AUTOMATIC CONTROLLER
- ⊗ P.O.C. 1½" GATE VALVE

- 900-14 TORO POLY CONTROL TUBING (NOT SHOWN)
- #14 U.F. WIRE (NOT SHOWN)
- P.V.C. PIPE, 1"-1½"
- PRESSURE REQUIRED AT P.O.C. 60 P.S.I.
- WATER DEMAND 40 G.P.M.
- PIPE SIZE NOT SHOWN SHALL BE 1" P.V.C.



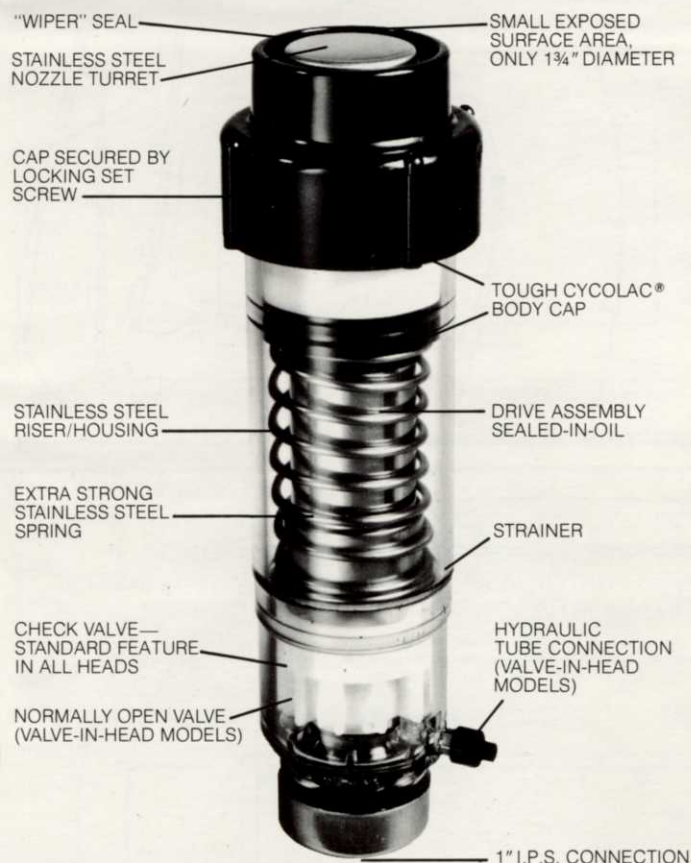
# Out of sight... out of mind.

The TORO 640 head is designed expressly for public grounds with features that make it highly vandal-resistant. In this respect it has no equal among sprinklers designed for park and school applications.

The 640's turret, sheathed in a stainless steel armor jacket, pops up 2 $\frac{3}{8}$ " to operate.

Then when the job is done it ducks for cover—a full  $\frac{1}{2}$ " below turf level where normally it is covered with grass and virtually invisible.

What's more, the turret is held there by a stainless steel spring with such power a tamperer would find it next to impossible to pry up. Even if he did find it.



## Better safe than sorry.

Consider, too, that while 640 sprinklers are hiding from tamperers, they're also ducking out on accidents. A TORO 640 sprinkler-equipped park or athletic field is for all practical purposes just as safe to use as the same area without sprinklers. And you can't say that about other sprinkler systems.

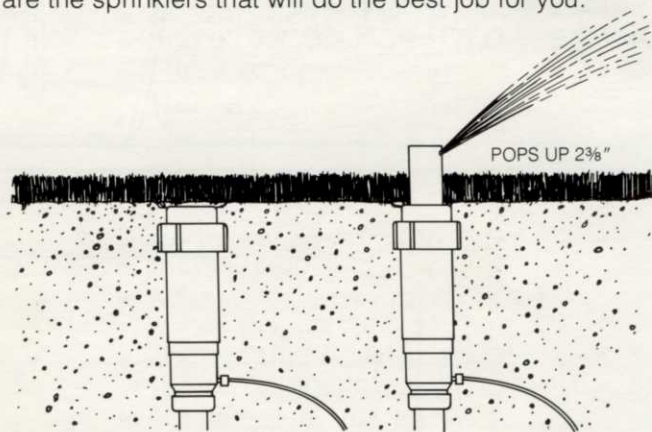
## 600 variations on a good theme.

TORO 640 sprinklers will handle most of the irrigation jobs for parks, school grounds and public building landscapes. And for those the 640 can't handle there are over 600 other TORO sprinklers to choose from.

The versatile 640 comes in either a valve-in-head model for individual control of each sprinkler or in the Checkomatic version for block systems that features a built-in check valve. Both stop over watering and puddling caused by low-head drainage.

Five nozzle designs give the 640 radii up to 65 feet. And 10 arc patterns can fit most grounds configurations.

In all, TORO makes 80 variations of the remarkable 640 sprinkler. Among them and the 600 other TORO heads are the sprinklers that will do the best job for you.



640 sprinklers can be installed as much as  $\frac{1}{2}$ " below grade for maximum security and freedom from accidents. The heads are specially designed to flush dirt out during operation and to seal dirt out the rest of the time.

## Built tough to last.

The 640's casing is made of almost indestructible Cylolac®. This engineering plastic has tremendous impact resistance and it won't rust, corrode or disintegrate because of time or water-carried minerals.

Features like a strainer that filters out debris make for long, maintenance-free operation. As do the sealed drive gears that are vacuum-packed in grease and operate completely isolated from the water stream. So they last and last.

And with 640 heads you get no low-head drainage and the wasted water and soggy areas it causes. Valve-in-head models shut off when the job is done and all other models feature built-in check valves that prevent drainage.





# Easy, painless installation.

Your TORO system can be installed with a minimum of fuss and bother.

In fact, utilization of your facilities can be kept high throughout the operation.

Special equipment installs pipe leaving only an incision instead of trenches.

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Dwight Goforth, a fisheries biologist with the Florida Game and Fresh Water Fish Commission, said pumping such nutrients into the area would cause an algae boom.

According to Goforth, the algae would draw on the water's dissolved oxygen supply needed by fish, clams and other aquatic species and vegetation.

Winn said any positive or negative effects of backpumping would depend on how the rain water was distributed and how long it remained in the area.

Too much additional water over the breeding grounds of fish could reduce or result in a change of species of fish living in the conservation areas. Vegetation also could be affected depending on the plants seeding and germination periods, Winn said.

Goforth warned that if the water level were not allowed to naturally fluctuate between dry and wet periods, a thick, oozy sediment called detritus would accumulate at the bottom of the water. Detritus is made up of deposits of the remains of dead animals and plants on the floor of the body of water, and the only way to prevent it is to let the area dry completely so that the deposits harden.

If the area is not allowed to dry out, Goforth said the detritus would have to be removed by dredging.

Another drawback of backpumping may be its effects on land animals.

According to Goforth, many Everglades animals such as deer, roundtail rats and snakes depend on the area for food and breeding grounds. A change in the vegetation and a decrease in dry land could kill many of these animals in as little as two or three years.

Also, reducing the amount of fresh water that reaches the ocean may affect bay areas.

"The increased salinity of the water might be good for some species while damaging to others. Fish that don't like the change will migrate to other areas. Bottom sediment and vegetation unable to migrate will either adapt or die," Winn explained.

- Forward pumping, which would bring water east to the coast to be stored in wells and fresh waters canals. If stored in canals, the water would be prevented from entering the ocean by salinity dams. Such dams also would block all boat traffic between the canals and the ocean.

Keeping this high "fresh water head" near the ocean would also help prevent salt water intrusion. Currently, most wellfields are located near the coast to serve populated areas more easily and cheaply. But such a location poses a daily threat of salt water contamination of the fresh water wells.

Because sea water is heavier than fresh water, it tends to move inland below the ground unless balanced by a fresh water head. When an increased demand is placed on a well that is not being replenished either through groundwater

seepage from the Biscayne aquifer or from direct rainfall, the salt and fresh water mix, making the water unfit for human consumption or agricultural use.

Wells in Pompano Beach and Dania currently are experiencing salt water intrusion. When this happens, the amount of water removed from the well must be reduced. Sometimes the well must be shut down until it can rebuild its fresh water supply.

All wells are checked for salt water intrusion twice a month during the dry season and once a month during the wet season by the United States Geological Survey.

According to a geological survey spokesman, Dania has been constantly plagued by the problem.

Julian Allen, Dania utilities superintendent, said the city was forced to shut down two wells at its treatment plant in 1973. Of two wells being used since that time, one has been closed and the other will be as soon as two new wells are built further inland at a cost of \$275,000.

Winn said an important question that will be answered by the wateruse management plan is: does the amount of water control growth, or does growth control the amount of available water?

Peggy Volke, chief planner in charge of Broward County's comprehensive land-use plan, said the water problem in Broward could be managed. "It just depends on how much money people want to put into various facilities," she said.

While the land-use plan was being drafted, Mrs. Volke said it was presented to the water management district for comment.

The district indicated it would approve one draft which set the county's ultimate population at 1.8 to 2 million.

"Beyond this level it would be necessary to augment existing supplies through importation of water from other sources," the district wrote Mrs. Volke.

South Florida Regional Planning Council member Dorothy Bergamaschi agreed that water plays an important role in area planning.

"We have to be careful that we don't seal up a large portion of the land surface with construction so that water can't penetrate and replenish the aquifer.

"Also, if we strip away too much land and replace it with concrete, we won't have the soil to filter out many of the chemicals and wastes before the water reaches the aquifer," Miss Bergamaschi said.

Dick Clark, Florida Industrial Board member, said that before the board contacts industries to invite them to relocate in southeast Florida, it investigates how much water, electricity and space the company would need and whether it would pollute the environment.

*(Continued on Page 20)*



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Pollution both by individuals and industries also has contributed to the decrease in the fresh water supply.

Despite strict pollution laws, the county's health department warns against bodily contact with any inland waterways.

"Wastewater is dumped into the canals and stormwater runoff carrying pesticides, chemicals and animal droppings also enters canals and lakes. In most cases there is not enough fresh water to dilute the wastewater," said Tom Mueller, a sanitary engineer with the department's environmental division.

Mueller said bacteria counts are taken monthly in the waterways, but "one day the bacteria count could be normal and the next day it could be different. Bodily contact with inland canals poses a risk, especially with hepatitis."

Winn warns that even with all the in-depth planning, a water shortage similar to Southern California's could occur here if the state experienced a drought lasting more than a year.

"The California shortage occurred from a lack of rainfall, not inadequate planning," Winn said.

## WATER USE MAY TRIPLE

WEST PALM BEACH — Southeast Florida residents must be willing to make financial and environmental tradeoffs to ensure themselves an adequate supply of fresh water for the future.

The first draft of the South Florida Water Management District water use plan explained several water storage alternatives and costs — both to the consumer and to the environment.

Although no specific recommendations were made, staff members indicated increased water storage in Lake Okeechobee, back-pumping water from coastal area canals to conservation areas, and increased wellfield development are the most viable alternatives.

The district is responsible for water control and management of 16 South Florida counties, including Broward and Palm Beach.

By the year 2020 the district has predicted fresh water consumption will triple from its current rate, requiring 1.6 billion gallons of water to be pumped daily to individuals, industries and farmers.

All of the area's fresh water is stored in Lake Okeechobee, three conservation areas covering 50 per cent of the original Everglades, and the Biscayne aquifer. District officials said these areas won't be able to store the additional water in future years unless some structural changes are made.