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Rain Bird — the choice from coast to coast
GAINESVILLE — A fungus that naturally occurs in fire ant nests in Brazil is extremely effective against the ants in lab tests here, making it a good biological control agent candidate, says a scientist at the Institute of Food and Agricultural Sciences (IFAS).

In lab tests, the fungi have killed 95 percent of the ants, says Dr. Jerry Stimac, IFAS insect ecologist. "The fungi appear to be a timebomb in the nests," he says. "We've isolated several virulent strains of the fungi. When conditions are right, they may act as a plague in fire ant populations." Stimac has been working on the fungi for several years with Brazilian scientists in Sao Paulo and Mato Grosso, two Brazilian states.

Because of their aggressive nature and survival-oriented biology, fire ants are difficult to control with chemicals. "Over $200 million has been spent in an unsuccessful attempt to control or eradicate them in the Southeast," says Stimac.

The ants only have to come into contact with the fungi for it to work, says the IFAS entomologist. "The fungal spores fuse to the ant's body, penetrate the body cavity, reproduce and burst back outside to form spores," he explains. The fungi are non-toxic to humans and other vertebrates.

Brazil is the presumed homeland for fire ants, and in areas where the fungi are found in nests, the ants are under control, notes Stimac. Stimac is currently working with Dr. Sergio Alves of the University of Sao Paulo to regularly monitor fire ant nests in the Mato Grosso in hopes of observing the plague-like quality of the fungus.

"Our next step is to find out if the fungi are suitable as a biological pesticide," says Stimac. Toward that goal, he and IFAS colleague Dr. Drion Boucias are culturing the fungi for treatment of fire ants in the laboratory.

Many fire ant colonies have multiple queens, all of which must be killed to kill the nest, Stimac notes. IFAS scientists will apply a solution of spores as a drench or powder over soil containing nests in the lab to discover what, if any, protection the colony uses to shield the queen against fungal contact. The big question is whether the fungus spreads within the nest to make it an effective control of multiple queen colonies.

"We have some reserved optimism because we've gotten such good first results, but ants are social insects. You never know how they'll act. But we're hopeful. These fungi seem to be the most promising development on the research horizon right now." •

GAINESVILLE — The polluted waters that allow blue-green algae to flourish may also support viruses which kill the algae, says an aquatic microbiologist with the Institute of Food and Agricultural Sciences (IFAS).

Dr. E. J. Phlips, a researcher in the Fisheries and Aquaculture Department, collects water samples from sewage systems, polluted lakes and waterways throughout the state searching for viruses which kill only blue-green algae. Phlips tests these viruses with the algae in his lab, since the two rarely exist together in the water.

A grant from the U.S. Department of Agriculture is directed at Lyngbya, one type of blue-green algae found in Florida. "It forms a very dense, thick mat on the bottom of lakes, produces a bad odor and is reputed to produce toxic substances," Phlips said.

Florida's growing population, coupled with its naturally warm climate and high rainfall, has increased the probability of blooms, Phlips said. The algae blooms (high concentrations of algae) can physically clog lakes and waterways, emit foul odors, cause a bad taste to drinking water, and in some cases produce toxins dangerous to animals and man.

Algae breeding grounds are enhanced by sewage, runoff and industrial waste dumpage into lakes and canals. Light intensity, rainfall, temperature, carbon dioxide and oxygen levels also affect the algae.

Phlips hopes viruses will biologically control the algae and replace or reduce the present use of herbicides and harvesting.

"A lot of blue-green algae are tolerant of herbicides, so a high concentration is used to achieve effective control," Phlips said. "Herbicides are also general in their action, so they kill off good blue-green algae with the bad," he said.

Phlips plans to expand the project to test other algae types. "We anticipate that through the course of the year we'll find a number of viruses that work on different species," Phlips said.

Most lakes and waterways support different types of algae at the same time, Phlips said. "For example, several dozen type of blue-green algae have been found in recent samplings of Lake Apopka, and Lake Okeechobee," he said.

"Our ultimate goal is to establish a collection of the major bloom forming species of blue-green algae," Phlips said, "and use this as a basis for work on the development of biocontrol technologies." •
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What Do You Do When Your Best Employee Flies the Coop?

By Mary Ann Allison and Eric Allison

What you don't have to do is panic. Even if there isn't a successor in sight, there are six steps you can take to smooth the transition.

When Russell James, vice president of corporate communications for Avis, lost one of his top training directors, he was left with a huge hole in his organization. A replacement was waiting in the wings, but James felt he needed mother six months to a year to groom the person for the job. He didn't have that time.

James figured he had two choices: bring someone in from outside or do the job himself until the internal candidate was ready to step in. Both options seemed equally unattractive.

If you're lucky enough to have a well-groomed successor for every key position on your staff, then you'll probably never find yourself in a bind like James did. But even if you do end up at a temporary impasse, you needn't feel your hands are tied. There are a number of strategies you can put into action to keep the department on a steady course.

1. TAKE THE PROVERBIAL BULL BY THE HORNS. The departure of a key employee often brings out the deepest insecurities of those who remain. Some are afraid of losing power in an organizational reshuffle; others may fear that you'll bury them under a load of new assignments.

   "The best way to handle the situation is to tackle it by communicating regularly with your staff," recommends Dr. Lynn Diamond, president of Innovative Information Techniques, Inc. As soon as the resignation is official, rally everyone affected. Round up the departing manager's peers, his or her staff, and any others within or outside the department who worked closely with the person.

   Explain why the employee is leaving and where he or she is headed. Keep it upbeat. If you don't have a replacement for the job, announce that you will be setting up temporary reporting lines. Outline a timetable for reassigning tasks and responsibilities. And by all means, address any concerns that may crop up during the meeting; you don't want to fan any mutinous rumblings.

2. DON'T LET THE LAME DUCK PERFORM LAMELY. With the proper monitoring, a great deal can be accomplished in the short time the departing employee still has on the job.

3. PART ON AMICABLE TERMS. No matter how aggravated or snowed under you feel, fight the temptation to vent your frustrations on the "traitor" who's responsible for the headaches. After all, that person may someday become a valued addition to your professional circle.

4. CONSIDER THE OPTION OF JOB REDESIGN. Before making major staff changes or additions, seize the moment to evaluate whether the job description needs revamping.

5. DIVIDE UP THE PERSON'S TASKS AND TEMPORARILY PARCEL THEM OUT TO OTHERS. Analyze the departing person's attributes, skills, and knowledge as unique and separate elements, advised Diamond. Then canvass your department for people who can pick up the pieces.

6. DON'T LET THE SEAMS SHOW. If your department works closely with other groups within the organization, make sure everyone in those areas knows what is going on.

A final recommendation from Diamond: "Guard against magnifying the contributions of the person who has left." There's a strong tendency for the "halo effect" to materialize, whether the person resigning is a former U.S. president or an ex-employee. The sins or weaknesses of the former job occupant are forgotten while his or her strengths are put on an altar.

The physiological trap can make all applicants look inadequate or sabotage the new person on the job. It's all too easy, even during a well-planned transition, to feel that "we can't live without so and so." It isn't true, but the belief can make it reality.

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Attention — SUPERINTENDENTS!

The Florida Turfgrass Association (FTGA) has a Superintendent Affairs Advisory Group! Let your voice be heard! Already information between the FGCSA and FTGA is being exchanged more freely. We encourage your participation. Any time you have questions or ideas, we want to know about them. Contact your local external vice president or any member of our advisory group. Any of these people will carry your message to the Superintendent Advisory Group Meetings.

Your state President and Secretary Treasurer have already been participating in our Research Development Council and recent Board of Directors’ meetings.

We will keep The Green Sheet and The Florida Green informed on our actions affecting the superintendents.

There is something you can do now. Promote our Association membership to the FTGA non-members in your local chapter. They can benefit from the information we have to offer. Tell them we will contact them by mail soon. With the additional staff we have planned and well defined guidelines for our funding we can help you even more.

We are indebted to the superintendents for their work and contributions to FTGA! Mole Cricket research is currently underway by your efforts. $20,000 has just been paid toward an ongoing University of Florida research project by Dr. G.C. Smart. The project is for an evaluation of natural enemies of mole crickets as biological control agents, including additional wasp species and parasitic nematodes. Total amount of money required to complete this two year project is $80,000.

Superintendent Advisory Committee: Chairman Larry Livingston, Jeff Hayden, Mark Jarrell, John Luper, FGCSA External Vice Presidents.

Research on Biological Control is Goal of Cooperative Agreement with Brazil

By Julie Graddy

GAINESVILLE — The Institute of Food and Agricultural Sciences (IFAS) has signed a five-year memorandum of understanding with the Brazilian Enterprise for Agricultural Research (EMBRAPA) for scientific and technical cooperation in biological control and related fields.

Dr. Ormuz Rivaldo, President of EMBRAPA, received a copy of the memorandum, in Gainesville recently (4/6). EMBRAPA is the equivalent of the United States Department of Agriculture’s Agricultural Research Stations.

WE’LL BE LOOKING FOR NATURAL ENEMIES IN THE BRAZILIAN HOMELAND TO CONTROL PESTS IN FLORIDA.

The memorandum is an umbrella agreement that enables IFAS researchers to work in EMBRAPA facilities throughout Brazil on any agricultural pest, according to Dr. James Davidson, IFAS Dean of Research. The agreement permits exploration for biological control agents in both countries and provides for the exchange of parasites, predators and pathogens of agriculturally important pests, he adds.

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WEEVIL TO CONTROL WATER LETTUCE
Will Be Released at Lake Okeechobee in April

By Darcy Meeker

GAINESVILLE, Fla. — Troubled Lake Okeechobee will be the first place scientists will release a weevil to help control water lettuce.

Water lettuce (Pistia stratiotes L.) clogs some 7,300 acres of Florida waters, especially canals in south Florida, the Oklawaha River, the Rodman Reservoir, Lake Rousseau and Lake Okeechobee.

Australians already control water lettuce using the weevil (Neohydronomus pulchellus), which is native to Brazil, said researchers at the Institute of Food and Agricultural Sciences.

At IFAS on the University of Florida campus and in Ft. Lauderdale at the USDA Aquatic Plant Management Laboratory, scientists are rearing water lettuce weevils for release in late April.

“We ought to see a difference within a year,” says research leader Dale Habeck, acting chairman of the IFAS entomology department. “It takes about a month for a weevil to go from an egg to an egg laying adult, so we'll have six to eight generations a year.”

Young weevils tunnel through water lettuce leaves, turning them into lace, and adults also eat the weed.

“You wouldn't think such a tiny insect could make such a big difference,” Habeck said, “but it does.”

While water hyacinths and many other noxious water weeds had no natural enemies to keep them in balance when they came to Florida, water lettuce has been around at least since 1765 when biologist William Bartram noticed that they were common in the Florida waterscape.

Need to control water lettuce has come to a head recently because of Florida's increased population.

“In addition to increasing evaporation from waterways, and interfering with recreation, irrigation and water flow,” Habeck said, “water lettuce hosts the larvae of a mosquito (Mansonia titillans) that is a particularly ferocious biter of man. These mosquitoes are potential transmitters of diseases.”

The weed has been making headway wherever water hyacinths have been knocked back by chemicals and, recently, by biocontrols.

So water lettuce biocontrol research got funding from the U.S. Army Corps of Engineers, both from the Jacksonville district office and from the Waterways Experiment Station in Vicksburg (Miss.).

By September 1985, the researchers had some of the weevils in their quarantined lab. In November 1986, permission came through for them to release the weevil in Florida.

“All we're waiting for now is to build up the population enough that we can release a significant number of them,” said Habeck, collecting editor for the free IFAS publication “Biocontrol: Fighting Pests Nature's Way.”

Weevil release will be coordinated by the Army Corps of Engineers.

Clearance to release water lettuce weevils came from a national review panel made up of representatives from USDA and other government agencies.

To get clearance, researchers had to demonstrate that the weevil would not turn its ravenous appetite on desirable plants in Florida's ecology.

“In view of the host-specificity exhibited in Argentina, Australia and in our labs, we feel that the weevil is safe to introduce into Florida,” Habeck said. “When offered a choice, the weevils always fed on water lettuce. And eggs laid on other plants failed to hatch or the larvae died shortly after hatching.”

Involved in the Army Corps of Engineers-sponsored project with Habeck are Catherine Thompson at IFAS in Gainesville, F. Allan Dray and Joe K. Balcunas at the IFAS Research and Education Center in Ft. Lauderdale, and Ted D. Center at the Agricultural Research Service USDA Aquatic Plant Management Laboratory, a Ft. Lauderdale branch of the Agricultural Research Service.

The next water lettuce enemy the researchers plan to investigate as a biocontrol is a moth whose caterpillar eats water lettuce. Host-specificity testing in quarantine has already begun.

Source: Dale Habeck, acting chairman, IFAS Entomology & Nematology Department, (904) 392-1901. Ft. Lauderdale contact; Ted Center, (305) 475-0541, USDA Aquatic Plant Management Laboratory. Army Corps of Engineers: Al Cofrancesco, (601) 634-3182, Waterways Experiment Station, Vicksburg, Miss. Juan Colon, (904) 791-2235, Jacksonville district P.A.O.
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(See the Groundsmaster 300 Series literature for 72" cutting unit and accessory information.)

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**Groundsmaster® 300 Series Specifications**

**GROUNDSMASTER 327 PRIME MOVER — GAS (MODEL NO. 30781)**

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<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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<tbody>
<tr>
<td><strong>ENGINE</strong></td>
<td>Continental 4-cylinder, 4 cycle, water cooled, forced recirculating system, 27 hp, electric start. 51.6 cu. in. (846 cc) displacement. Gear driven oil pump for full pressure lubrication and replaceable oil filter. 3 quart (2.8 liters) oil capacity with filter. Forged steel connecting rods, replaceable cast iron wet cylinder liners. External mechanical governor provides rapid load response, maintains speed to 3200 rpm. Mechanical fuel pump, heavy duty remote mounted air cleaner. Extra large muffler for reduced noise level. Optional Spark Arrestor Muffler, Part No. 84-8610.</td>
</tr>
<tr>
<td><strong>FUEL CAPACITY</strong></td>
<td>8.5 gallons (32 liters) gasoline.</td>
</tr>
<tr>
<td><strong>GAUGES &amp; ENGINE PROTECTION SYSTEMS</strong></td>
<td>Hand operated throttle, choke, PTO and hydraulic implement lift. Hand operated throttle, PTO, glow plug switch and hydraulic implement lift.</td>
</tr>
<tr>
<td><strong>ELECTRICAL FEATURES</strong></td>
<td>12 volt, 42 plate, 45 amp-hour capacity battery. Dash mounted ignition switch, 30 amp alternator, seat switch, PTO and traction interlock switches.</td>
</tr>
<tr>
<td><strong>WEIGHT</strong></td>
<td>1240 lbs. (562 kg) prime mover.</td>
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**GROUNDSMASTER 322-D PRIME MOVER — DIESEL (MODEL NO. 30782)**

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<tr>
<th>Feature</th>
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<tr>
<td><strong>ENGINE</strong></td>
<td>Mitsubishi, Model K3D-61TG, 3-cylinder, 4 cycle, 59.7 cu. in. (979 cc) displacement. Vertical cylinder overhead valve water cooled diesel engine with centrifugal water pump. 22 hp at 3600 rpm. Three stage assist glow plugs, heavy duty 12 volt gear reduction starter. Forced feed lubrication with Trochoid oil pump. 4 quart (3.8 liters) oil capacity with replaceable filter. Forged 1-piece connecting rod, cast iron cylinder head and block. Bosch M type fuel injection pump, 12 volt electric fuel pump, hand primer pump. Internal self-lubricating mechanical governor provides rapid load response, maintains speed to 3500 rpm. Rossa-Master water separator, heavy duty remote mounted air cleaner, and extra large spark arrestor muffler for excellent silencing.</td>
</tr>
<tr>
<td><strong>FUEL CAPACITY</strong></td>
<td>8.5 gallons (32 liters), No. 1 or No. 2 Diesel Fuel.</td>
</tr>
<tr>
<td><strong>GAUGES &amp; ENGINE PROTECTION SYSTEMS</strong></td>
<td>Hour meter, ammeter, water temperature gauge and high temperature engine shut-off. Oil pressure warning light and buzzer. Glow plug indicator.</td>
</tr>
<tr>
<td><strong>ELECTRICAL FEATURES</strong></td>
<td>12 volt, 550 amp, cold cranking performance at O°F (-18°C), maintenance free battery. Dash mounted ignition switch, 35 amp, alternator, 40 amp, manual reset circuit breaker. Seat switch, PTO and traction interlock switches.</td>
</tr>
<tr>
<td><strong>WEIGHT</strong></td>
<td>1000 lbs. (454 kg) prime mover.</td>
</tr>
</tbody>
</table>

**SPECIFICATIONS COMMON TO GROUNDSMASTER 327 AND 322-D**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RADIATOR</strong></td>
<td>Mid-mounted industrial radiator with tube and fin construction; 7 fins per inch. Approx. 6 quart (5.7 liter) capacity. Stamped brass top and bottom tanks.</td>
</tr>
<tr>
<td><strong>TRACTION DRIVE</strong></td>
<td>Variable speed, axial piston hydrostatic transmission mounted on Dana GT20 axle — 9.9:1 ratio. Single foot pedal control of forward/reverse ground speed. 25 micron replaceable filter. Lubrication. SAE 10W30 SF-SC engine oil, approximate 5 quart (4.7 liter) oil capacity.</td>
</tr>
<tr>
<td><strong>GROUND SPEED/CLEARANCE</strong></td>
<td>0-9.5 mph (0-15.3 km/hr), infinitely variable. Ground clearance 7.5&quot; (19 cm).</td>
</tr>
<tr>
<td><strong>TIRES/WHEELS/PRESSURES</strong></td>
<td>Two rear steering tires 16 x 6.50 x 8, tubeless ribbed, 4-ply rating. Two front traction drive tires 23 x 8.50 x 12, tubeless, 4-ply rating. Demountable drop center rims. Recommended tire pressure 10-15 psi (69-103 KPa) depending on mowing conditions. Optional extra width 23 x 10.50 x 12 tubeless 4-ply rating tire and rim. Part No. 36-1650, applicable only to side discharge cutting unit, Model No. 30721.</td>
</tr>
<tr>
<td><strong>MAIN FRAME</strong></td>
<td>All welded formed steel reinforced with square and rectangular tubing.</td>
</tr>
<tr>
<td><strong>BRAKES</strong></td>
<td>Individual 7&quot; x 1.75&quot; (17.8 x 4.4 cm) drum type wheel brakes and parking brakes on front traction wheels. Dynamic braking through traction drive.</td>
</tr>
<tr>
<td><strong>STEERING</strong></td>
<td>Automotive steering gear assembly. 15&quot; (38 cm) steering wheel.</td>
</tr>
<tr>
<td><strong>IMPLEMENT DRIVE</strong></td>
<td>1½&quot; (2.9 cm) - 20 splined PTO shaft is driven by a tight-snap double &quot;A&quot; section, torque team V-belt.</td>
</tr>
<tr>
<td><strong>CERTIFICATION</strong></td>
<td>Certified to meet ANSI specifications B71.1b-1977, and applicable Federal and State OSHA regulations based thereon.</td>
</tr>
</tbody>
</table>

**Triflex™ 88” Cutting Unit, Model No. 30715**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TYPE</strong></td>
<td>88 in. (224 cm) width of cut, five blade, front mounted rotary. 54 in. (137 cm) width of cut, three blade center section. Two 17 in. (43 cm) width of cut wings. 71 in. (180 cm) width of cut with one wing up. Rear discharge; three chutes, right, left, and center. Disperses clippings around and between the cutters.</td>
</tr>
<tr>
<td><strong>MOWING RATE</strong></td>
<td>Mows up to 4.9 acres/hr (1.98 hectares/hr) at 5.5 mph (8.9 km/hr). Up to 22% more productivity than current 72 inch (183 cm) cutting units.</td>
</tr>
<tr>
<td><strong>TRIMMING ABILITY</strong></td>
<td>Trims on both sides, zero uncirc circle to right and left (with wheel brakes). Deck offset from outside of wheel to trim side of wing deck is 23 in. (58 cm) on the right, 20 in. (51 cm) on the left to allow alternate tire track position. Deck is offset 1.5 in. (3.8 cm) to the right of centerline.</td>
</tr>
<tr>
<td><strong>HEIGHT OF CUT</strong></td>
<td>1-4 inches (2.5-10 cm) adjustable in ½&quot; (1.3 cm) increments with spacers on the castor shafts.</td>
</tr>
<tr>
<td><strong>CONSTRUCTION</strong></td>
<td>11 gauge steel, 5 in. (13 cm) deep, welded construction and reinforced with 10 gauge channel.</td>
</tr>
<tr>
<td><strong>CUTTER DRIVE</strong></td>
<td>PTO driven gearbox with 1.26:1 spiral bevel gears. &quot;BB&quot; section belted to center deck spindles, &quot;A&quot; section belted to each wing deck. 1 in. (2.5 cm) diameter cast iron spindles mounted in two greaseable tapered roller bearings (preassembled from top of deck).</td>
</tr>
<tr>
<td><strong>BLADES</strong></td>
<td>Five 19 in. (48.3 cm) long, ¾ in. (19 mm) thick, 2½ in. (6.3 cm) wide, heat treated steel blades.</td>
</tr>
<tr>
<td><strong>BELT IDLERS</strong></td>
<td>Self-tensioning idlers.</td>
</tr>
<tr>
<td><strong>WING DECKS</strong></td>
<td>Wings can be raised individually from the operator's seat for transport or cutting with either wing and the center deck only. Wings cut from level to approximately 15 degrees up. Further lift disengages the blade and applies a blade brake.</td>
</tr>
<tr>
<td><strong>CASTOR WHEELS/ANTI-SCALE DEVICE</strong></td>
<td>Two 10.25 in. (26 cm) front castor wheels and two 6 in. (15 cm) rear castor wheels. Wings equipped with adjustable skids. Anti-scale cup located on each blade. Three anti-scale rollers on center deck. Optional: Pneumatic Wheels, P/N 54-8810.</td>
</tr>
<tr>
<td><strong>COVERS</strong></td>
<td>Easy to remove shields. No tool hand knobs provided.</td>
</tr>
<tr>
<td><strong>COUNTERBALANCE WEIGHT</strong></td>
<td>105 lbs. (46.9 kg) total weight required. (Rear Weight Kit, P/N 24-5780; 35 lb. (19.9 kg) weight per kit).</td>
</tr>
<tr>
<td><strong>WEIGHT/DIMENSIONS (APPROX.)</strong></td>
<td>500 lbs. (228.9 kg) plus tractor belly shield and three rear weights. 93 in. (236 cm) width overall, 75.6 in. (192 cm) in transport.</td>
</tr>
<tr>
<td><strong>BELLY SHIELD</strong></td>
<td>Belly shield included to deflect clippings from the tractor radiator.</td>
</tr>
<tr>
<td><strong>CERTIFICATION</strong></td>
<td>Certified to meet ANSI specifications B71.1b-1984 and applicable Federal and State regulations based thereon.</td>
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</table>

For further information on Toro Groundsmaster 322-D and Groundmaster 327, its deck options and accessories, refer to the Groundsmaster 300 Series sales specification. (Not retrofittable to Groundmaster 72, Model No. 30773.)

*Specifications and design subject to change without notice. "Toro" and "Groundsmaster" are registered trademarks of The Toro Company, 8111 Lyndale Avenue South, Minneapolis, Minnesota 55420.

COMMERCIAL PRODUCTS

THE PROFESSIONALS THAT KEEP YOU CUTTING.

Form No. 87-55-T ©The Toro Company — 1987 Printed in U.S.A.
ORTHENE®
75 S Soluble Powder

Now Labeled for Mole Crickets on Turf

Keep mole crickets off your turf
Now ORTHENE 75 S Soluble Powder, the spray that's been effective for years against a broad spectrum of foliage-feeding insects, has been cleared for control of mole crickets on turf under a Federal label.*

Fight pests that bug you most
If you're responsible for the care of a golf course, park, playground, polo field or picnic area, ORTHENE 75 S Soluble Powder can arm you and your turf against the pests that bug you most.
Round out your turf insect program by controlling leafhoppers, fire ants and mole crickets all with one spray—ORTHENE 75 S.

Give turf two kinds of fighting protection
ORTHENE 75 S kills turf pests on contact and by ingestion. Then, working as a systemic, it gives long-lasting protection by eliminating insects as they feed.

Easy to use
ORTHENE is packaged in convenient 12/1 lb. packages per case and 4/10 lb. packages per case.
ORTHENE mixes readily with water, and flows through application equipment without clogging or settling out. Always use enough water to cover treated area thoroughly.
ORTHENE can be used without wearing protective equipment, and once the spray dries you can re-enter the treated area immediately.

* except California
Effective
ORTHENE gives broad spectrum control of turf insects.

Economical
ORTHENE is the most economically-priced product per acre of any product currently available for insect control on turf, regardless of the pest.

Versatile
ORTHENE is labeled for many uses.

Compatible
ORTHENE mixes with most insecticides and fungicides.

Easy to Use
ORTHENE is packaged in convenient 12/1 lb. packages per case and 4/10 lb. packages per case. And ORTHENE can be applied without any protective equipment.

Broad Spectrum
ORTHENE gives effective broad spectrum control of turf insects.
Controls tough turf pests

**Mole Crickets**
- Apply as mole crickets begin to appear.
- Apply ORTHENE at 2.66 - 5.2 lbs. per acre.
- Apply after an irrigation.
- Apply in late afternoon or early evening hours.
- Apply in sufficient water to cover.
- Do not irrigate after application.

**Sod Webworms**
- Apply as sod webworms begin to appear.
- Apply ORTHENE at 1 1/3 to 2 3/4 lbs. per acre.
- Apply in sufficient water to cover.

**Leafhoppers**
- Apply as leafhoppers begin to appear.
- Apply 2 3/4 lbs. per acre.
- Apply in sufficient water to cover.

**Imported Fire Ants**

**Dry Method—Mound Treatment**
- Evenly distribute 1 to 2 teaspoons over mound.
- Apply early morning or late afternoon.

**Drench Method—Mound Treatment**
- Mix 1 oz. in 5 gallons of water.
- Apply 1 gallon of mix to each mound area by sprinkling the mound until wet and treat a 4 foot diameter circle around the mound.

**Cutworms**
- Apply as insects begin to appear.
- Apply ORTHENE at 3 1/4 to 6 2/3 lbs. per acre.
- Apply in sufficient water to cover.
Read entire label. Use strictly in accordance with precautionary statements and directions, and with applicable state and federal regulations.

Do not allow livestock to graze treated areas and do not feed treated grass to livestock.

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All rights reserved. 8717 ORT-45.
The best-looking fairways start with XL preemergence herbicide. Because to apply XL is to excel in your weed control.

With just one application, you can keep your fairways free from crabgrass and goosegrass throughout the season—four months or longer.

Your control's not only longer with XL, it's stronger, too. Stronger than oxadiazon against crabgrass. And just as strong or stronger against goosegrass over a longer time. These aren't just empty claims. They're facts proven by research trials across the country.

And when late summer or early fall comes, you can maintain your high standards of excellence in weed control. Just reapply XL. And keep your fairways free from Poa annua...
and other winter annual broad-leaves.

No other herbicide excels like XL because no other herbicide is formulated like XL. XL stays only where you put it. It won't wash out, even in heavy rainfall. And once activated, it forms a vapor zone just below your turf to prevent weed breakthroughs better and longer than anything else.

Start making your fairways the best-dressed there are anywhere. Excel with XL. Also available in granular fertilizer combinations from leading formulators. See your Elanco distributor. Or call toll-free: 1-800-ELANPRO. In Indiana, call collect: 317-261-6102.

Elanco Products Company
A Division of Eli Lilly and Company
Lilly Corporate Center
Dept. E-455, Indianapolis, IN 46285, U.S.A.

For longer-lasting, broad-spectrum weed control, excel with XL™.
For warm-season superintendents, weed and grass problems come in many forms. They also come at different times of the year. So timely application of an effective broad-spectrum product is vital if problems like crabgrass, goosegrass, *Poa annua*, chickweed and henbit are to be eliminated.

To date, course superintendents throughout the south have discovered that Elanco XL can keep fairways, roughs, green slopes and tees looking good year round. Here’s what three of them had to say about XLs performance this season:

“I never went completely with XL until this year when I incorporated it with 6-9-27 fertilizer. But in past years, I’ve used it by itself in test areas, and the results have been spectacular when you compared the treated areas with the check areas.

“I plan to keep using it as long as it continues to give results.”
Joy Rabon, Superintendent
Azalea Sands Golf Course
North Myrtle Beach, South Carolina

“We use XL for preemergence control of *Poa annua* in the Bermudagrass, but mainly to control the perennial ryegrass that tends to be tracked around.

“Without XL, we’d have trouble. But we put it down in mid- to late-November and get relatively good control through the winter.”
Whit Derrick, Superintendent
Sugar Mill Country Club
New Smyrna Beach, Florida

“I’ve had excellent control with XL. I mean excellent! This golf course has traditionally had a weed problem; and it’s been that way as long as I can remember.

“In fact, I grew up on this golf course so I know its history. And I can honestly say XL has made the difference like night and day.

“I can’t say enough about the way it controls the goosegrass either. This year is the first year I didn’t go with a second application of XL. Instead, I followed it with Surflan, and the program is working like gangbusters.

“Another thing about XL is that it has been cheaper to use than some of the other products on the market that have actually been less effective. It’s unbelievable the way XL has turned this course around.”
Ted Daum, Superintendent
Mayfair Country Club
Sanford, Florida

Whether your situation calls for a spring application of XL for grassy weeds or a late summer/fall treatment for winter annual broad-leaves, why not give XL a try on your turf. It might just turn your course around, too.
When the motion picture "Caddy Shack" blew up a Florida golf course....
DeBRA helped put it back together.

Because that's what we do best. Selecting the right equipment for the right job at the right price.

After other companies have come and gone with a lot of empty promises, DeBRA will still be around helping you with the proper turf and industrial equipment, and people and professional services in the fields of grounds maintenance. A wise man once said, "don't be penny wise and pound foolish." Which means what may appear to be a money-saving decision on your part today, may blow up on you in the future. That's why you need DeBRA. Because we follow through.

The equipment or service you need isn't the same as everybody else's. That's why DeBRA selects the quality equipment you need and backs it up with over $1 million in parts inventory. In addition, DeBRA offers the best equipment consultants in the industry. So you get exactly what you need when you need it. And only DeBRA features 20 trained mechanics with Mobile Service Vans — for on-the-job repairs, thus eliminating down-time. We even offer lease and finance programs to suit your every need.

So when you've got a job to do, call one of DeBRA's 7 convenient Florida locations. We've been around for over 40 years. And we'll help you get it all together.

DeBRA
Slow-Release Nitrogen Fertilizers For Turf

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CLEARWATER, FLORIDA 33516
(813) 531-7171

NORTH & CENTRAL FLORIDA
DWIGHT "BUTCH" SINGO
802 LIVE OAK LANE
OVIEDO, FLORIDA 32765
(305) 365-2923

FLORIDA EAST COAST
W.E. "BILL" RAYSIDE
970 S. PATRICK CIRCLE
WEST PALM BEACH, FL 33406
(305) 684-6958

2121 3rd STREET S.W.
WINTER HAVEN, FLORIDA 33880
(813) 293-3147
1-800-282-9588

ESTECH BRANDED FERTILIZERS
PROFESSIONAL PRODUCTS DIVISION

SELVITZ ROAD
FT. PIERCE ROAD
(305) 464-3511
1-800-432-2661
# Slow-Release Nitrogen Fertilizers For Turf

## DETAILED SPECIFICATIONS

### Fairways

<table>
<thead>
<tr>
<th>PRODUCT ANALYSIS</th>
<th>BAG WT.</th>
<th>FT. COVERS</th>
<th>RATE LBS/A</th>
<th>lbs NPK/M N P K</th>
<th>NUTRIENT SOURCES</th>
<th>SLOW REL. NIT.%</th>
<th>COMMENTS</th>
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### Greens and Tees

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<th>BAG WT.</th>
<th>FT. COVERS</th>
<th>RATE LBS/M</th>
<th>lbs NPK/M N P K</th>
<th>NUTRIENT SOURCES</th>
<th>SLOW REL. NIT.%</th>
<th>COMMENTS</th>
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<tbody>
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**IBDU WIN** | IBDU Water Insoluble Nitrogen  
**UREA WSN** | Urea Water Soluble Nitrogen  
**CSRUN** | Coated Slow Release Urea Nitrogen  
**WIN** | Water Insoluble Nitrogen  
**WSN** | Water Soluble Nitrogen

ASK ABOUT OUR SLOW RELEASE FERTILIZER MIXES WITH ADDITIVES!
Plants absorb sulfur as the sulfate ion. If applied as elemental sulfur it must first be oxidized by solid organisms into the sulfate form before being utilized by plants. Elemental sulfur is also beneficial as an amendment but we will leave that for further discussion. For now just consider sulfur from the nutritional standpoint.

Sulfur deficiency is often mistaken for nitrogen deficiency in areas where it occurs. Plants become uniformly chlorotic, stunted, and spindly. However, since sulfur does not easily translocate, the symptoms are first noticed in the young leaves versus the older leaves for nitrogen deficiency.

Sulfur deficiencies are rare in Arizona since the irrigation water often contains sufficient sulfate ion to supply the plant needs. There are selected areas of Arizona where little or no sulfate is found in the water and response to sulfur has been found.

Since sulfur is a constituent of three essential amino acids — cystine, cysteine, and methionine — and it is necessary for protein synthesis, it is no wonder that a deficiency exhibits the above symptoms. In plant analysis, a ratio of 10:1 for total N to total S is generally considered adequate for best growth.

Sandy soils, low in organic matter are most likely to show sulfur deficiency. Environmental factors can increase or decrease the likelihood of sulfur deficiency depending on circumstances. For example, elemental sulfur will not oxidize properly under saturated (waterlogged) conditions. Instead, hydrogen sulfide (rotten egg smell) may be produced. Temperature, pH, soil organisms, and fineness of the particles or elemental sulfur also influence the ratio of oxidation.

**THIOBACILLUS** organisms are generally the main genus of organisms responsible for sulfur oxidation. Oxygen is an absolute necessity for these organisms in order to change elemental sulfur to sulfate. Even then, the rate of oxidation can vary from 4 to 12 weeks or longer depending on the species present. In other words, all soils do not show different rates of oxidation.

Maximum oxidation of sulfur to sulfate occurs at field capacity moisture. Above or below this level the oxidation of sulfur is impeded. Obviously surface application of elemental sulfur is seriously slowed in its oxidation rate.

Most of the sulfur oxidizing organisms are more active in acid soils than in alkaline soils. Since most of our soils are alkaline, the rate of oxidation will be slower than expected, especially if applied during the cooler part of the year. Optimum temperature for oxidation is between 27° and 35°C.

One of the most important factors affecting the sulfur oxidation is the size of the elemental sulfur particles applied. Large particles of sulfur (5-10 mesh) oxidize very slowly and less than 3% was oxidized after 1 month. Compare this to a nearly 82% oxidation rate for particle size 120-170 mesh.

As a rule of thumb, use sulfur that passes a 16 mesh screen 100%, and 50% should also pass a 100 mesh screen.

There are other products and fertilizers containing sulfur that can be used in place of elemental sulfur. Generally, these products are higher in price but sometimes easier and more convenient to apply. Fertilizers containing sulfate will not affect the pH of the soil like elemental sulfur or the poly sulfides with the exception of ammonium, aluminum, and iron sulfates. Remember, it is during the oxidation process that the pH is lowered. If oxidation does not occur, the pH will not be lowered.

Since grasses can more easily extract sulfate ion than broad leaf plants, sulfur deficiencies will be rare in turf. However, when present, they can be difficult to diagnose visually, since they are not expected. An inexpensive analysis on soil or water can remove this from the unknown list of nutrients that can affect the quality of a course.
I, along with most superintendents, have read several horror stories recently concerning so-called "killer courses" in which superintendents are no better off than the witches of Salem several hundred years ago.

My first reaction to these stories was anger. I still don't understand how such completely erroneous statements could be put in print, not by a scandal sheet, but by a respected golf magazine.

Then, after I had a chance to cool down, it scared me to think of the tremendous up-hill battle we superintendents have facing us. With the ever-increasing emphasis being placed on environmental issues, the public questions everything; and rightfully so. Because our profession deals with chemicals which, if misused, have the potential to do harm to the environment, we can expect to draw a great deal of attention.

It is important, therefore, to get the message across to the public that golf course superintendents are interested in protecting the environment, too. We have to be; we live with the environment on a daily basis. Without good soil, water, air, and beneficial insects, fungi and bacteria, we would be unable to keep our courses beautiful.

Chemicals are a necessary economic tool for the superintendent. Their use is regulated by governmental standards which are set by the Environmental Protection Agency and by the Department of Environmental Regulation. Superintendents must be licensed in the use of chemicals, a written test which requires knowledge of the safe use of chemicals.

Since the superintendent will be held liable for any damage that might occur to the environment as a result of chemical use, it is only natural that he uses his knowledge to prevent accidents. Spray equipment is treated in the same preventative manner that is used to take care of mowing units.

Preventative maintenance is used on hoses, nozzles, and valves. The life of spray nozzles is extended through the use of stainless steel tips. Graphs, made available by the manufacturer, are used which give accurate wear curves at different pressures and hours of use.

Pesticides are used to manage harmful pests. The key word is manage. We don't eliminate the pest, we just reduce the populations to acceptable levels.

An often overlooked chemical that is used more frequently than any other is fertilizer. As much care is taken when measuring and calibrating for fertilizer applications as is taken when measuring and calibrating for pesticide applications. Too much of one nutrient can cause soils to become so imbalanced that beneficial organisms will not survive.

Or consider, for example, a pond that is constantly getting the excess nitrogen of a fairway that is over-fertilized. The nutrients in the pond will become so high that the aging process becomes accelerated. Soon the pond will become uninhabitable for anything.

Superintendents are aware of the precious balance that nature has created. In the golf course maintenance business, too much of a good thing, i.e. fertilizer, insecticide, fungicide, herbicide, can do more harm than good.

Due to the high cost of chemicals today, many problems on a golf course are treated on a curative basis as opposed to a preventative basis. This has had considerable effect on the amount of chemicals used. Not only do superintendents use fewer chemicals today than 10 or 20 years ago, the products on the market now have lower residuals so the effects are much shorter in duration.

Golf courses are also providing communities with an alternative to dumping treated waste water in rivers and bays. Many courses now use waste water for irrigation, and many more courses will use it in the future.

Superintendent associations around the country create funds for researching safe solutions to problems. Dr. Milch of Igene Biotechnology Inc. in Columbia, Maryland is experimenting with an enzyme from crab shells that he hopes will eventually be used as a biological control for nematodes. There are studies being made with certain harmless bacteria to biologically control the mole cricket. And, of course, the search is ongoing for heartier strains of grasses that are more capable of resisting pests and disease than those grasses being used today.

The Golf Course Superintendents Association of America is on the right road with its new public relations campaign. Hopefully, they will be able to alleviate some of the public's fears and concerns about the use of chemicals on golf courses.

Just because superintendents have to use chemicals to maintain healthy turf doesn't mean we are the enemy. It's time the witch hunt ended.
Helpingstine Named National Sales Manager for Woodace Products

Richard K. (Rick) Helpingstine has been named National Sales Manager for Woodace products by Irven B. Stacy, III, Director of Marketing, Specialty Products division of Estech Branded Fertilizers.

Helpingstine is a native of Centralia, Illinois, and graduated from Southern Illinois University with a degree in Business Administration.

He joined Estech in 1983 as the Product Promotions Manager and was promoted in 1985 as the Woodace Products Manager. Prior to coming to Estech, he had fourteen years' experience in the wholesale nursery and landscape business.

Woodace products are a complete line of ornamental nursery and greenhouse fertilizers featuring long-lasting IBDU Briquettes, IBDU, Estech, and Perk. In his new assignment, Helpingstine will be responsible for the marketing of the complete line of ornamental fertilizers as well as the development of a nationwide sales organization to call on both distributors and growers.

Helpingstine is married and has two children. He will continue to be located at the Estech headquarters in Fairview Heights, Illinois.

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You may remember from history a collection of writings by Thomas Paine entitled, "Common Sense," commenting on the issues of the day. These comments helped shape opinions and decisions which played a major role in the future of a young country and the freedom we enjoy today.

Though not as critical to the liberties of a free nation, the "common sense" I speak of is critical to the "freedom" of all purchasers of turf maintenance equipment. Freedom from expensive breakdowns, lost productivity, idle manpower as well as undue frustration and stress is a freedom we can enjoy with just a touch of common sense.

Most of us are familiar with the term preventive maintenance. Certainly all of us agree with the theory. Where we may differ in application, i.e. when, how often, how much, etc. One thing we should agree on, by virtue of our common sense, is that preventive maintenance is a necessity.

As the representative of a major turf equipment manufacturer, I have the unique opportunity to view and examine a wide variety of equipment. Common problems that I see in our own equipment usually show up in another manufacturer's equipment, all at the same location. Yet, going just down the road, another customer's machines may not exhibit any problems.

What is the difference? Why do machines work well for one customer, problematic for another? "Obviously a lack of preventive maintenance" you say. So why does the customer with the problem swear on his grease gun that he does indeed, perform proper maintenance?

Using our common sense, let's examine and agree upon some simple issues. Before we can find a solution, we must identify and isolate each problem regarding proper equipment care.

ATTITUDE — "What does attitude have to do with preventive maintenance?" you may ask. In one word, everything. How do you (and your crew) really feel about the equipment you are using? Do you view your machinery as sophisticated, well designed proper work tools, or just another object of your day's dreary routine? Do you respect and try to understand your machines, or loathe them?

RECORD KEEPING — Do you, or your mechanic, write down a daily log of the maintenance or repairs done to each machine? If you think you are too busy, or that records are not necessary, consider this. Would you continue to use the services of a doctor who refuses to keep records of your visits or diagnosis?

PLANNING — How would you expect your crew to perform needed work if a plan for each day, week and month were not organized? Just as you plan for tomorrow's work, plan for tomorrow's maintenance.

SERVICE SCHOOLS — Whenever service schools are offered, do you take advantage of them? If so, do you go to participate as well as to learn? Everything we learn, we learn from someone else. Sharing your knowledge with others, as well as learning, makes you a contributor to your chosen profession.

THOROUGHNESS — Most people think changing the oil and greasing the zerk is about the extent of preventive maintenance. Think of your equipment just as an airplane mechanic thinks of his. Every work performed has a life threatening consequence to it. Search the owner's manuals for every possible maintenance procedure recommended.

COMMITMENT — Good intentions are great — but it takes more to do the job. How committed to maintenance (preventive or otherwise) are you? Do you per-