

LANDSCAPE MANAGEMENT

New For
94

W E K N O W Y O U R T U R F



KNOX FERTILIZER COMPANY, INC.

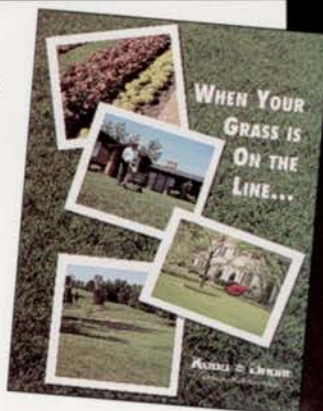
Formulators and packagers of quality plant food products for home and industry. If your present supplier is not providing you with a foolproof pest and weed control formula, call on the SHAW'S TEAM! They're fully loaded, on target and ready to BLAST your weed and insect problems away!

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KOOS/SHORE

Koos/Shore can help you develop annual fertilization programs for turf, trees and ornamentals, plus we can combine pre or post emergence herbicides or insecticides with dry fertilizer products to save you time and money. Koos/Shore manufactures fertilizer many ways, including homogeneous mini fertilizers, granular fertilizers, blended mini fertilizers, and more.

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LOFTS, INC.

Southshore Creeping Bentgrass, available from Lofts Seed, was developed through a breeding program of Dr. Richard Hurley, Lofts' Research Director, in cooperation with Rutgers University.

Southshore produces a dense, upright turf and exhibits a medium-fine texture that produces less grain. In NTEP trials, Southshore displays excellent resistance to brown patch and excellent overall turf quality.

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SANDOZ AGRO

Sandoz Agro's Barricade provides turf managers with season-long control (up to 26 weeks) of the most weeds of any leading preemergence herbicide — at rates three to four times lower than other products. Water soluble and dry granulated, Barricade is effective on turf and in and around more than 200 species of landscape ornamentals.

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SANDOZ AGRO: Mavrik Aquaflow

Sandoz Agro's Mavrik Aquaflow offers immediate and effective control of a broad spectrum of damaging insects and mites in turf and plants. Mavrik eliminates a variety of pest, including whiteflies, aphids, caterpillars, flea beetles, mealybugs, mites and thrips. However, the product's low toxicity to small pets, birds and wildlife makes it one of the most gentle insecticides available.

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WELLS CARGO

Wells Cargo's newly designed "wide axle" landscape trailer adds the advantage of an extended 102" track width for added road stability. In addition, you get a spacious 6'9" wide Interior Floor with no wheel boxes inside. This unit is perfect for larger motorized lawn and landscape equipment.

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Publishers of LANDSCAPE MANAGEMENT, PEST CONTROL, and DVM NEWS magazines.

Getting customer feedback



Robertson: 'potentially dangerous'

■ Jack Robertson of Robertson Lawn Care, Springfield, Ill. has a unique comment card that helps his customers relay their satisfaction or dissatisfaction directly to him.

"This isn't just to get a pat on the back," Robertson says. "We did it at a potentially dangerous time of the year. We prefer getting customer comments *this way*; *another way* they can tell you is to cancel and go tell somebody else their problems."

Hey Jack!

- I'M IMPRESSED
 I'M PLEASANTLY SURPRISED
 I'M SATISFIED
 I'M A BIT ANNOYED

Your Name

Address

Dear ROBERTSON LAWN CARE Customer:

We pledge our total commitment to your service. We need the benefit of your viewpoint, needs, observations and impressions. Your opinion is of great value to me, as owner of ROBERTSON LAWN CARE, in setting policy, designing services and updating our commitment to you.

If we have let you down, please tell us about it. If you are pleased with us, we would like to hear that too. If you have special needs or would like us to modify any of our services, let us know.

We are proud to have you as a customer — and — we care.

Sincerely,

Jack



YOUR COMMENTS PLEASE

PLEASE RETURN IN THE ENCLOSED ENVELOPE — THANKS

The card is simple and direct. It features four boxes: "I'm impressed," "I'm pleasantly surprised," "I'm satisfied," and "I'm a bit annoyed," plus room for writing comments (see above).

The cards were dropped off with each summer application, and more than 100 have been returned so far. Ultimately, Robertson expects to get 1,000 back.

An earlier customer reply card that was mailed along with a postage-paid return envelope garnered a 72 percent response rate, and 93 percent of Robertson's customers rated the company at "satisfactory" or above.

"The players are going to be the companies that go that extra mile for the customer," Robertson says.

LM GRAPEVINE

Still no word from the Golf Course Superintendents Association of America (GCSAA) as to who its new CEO, Deputy CEO and Financial Director will be. Via the phone as this issue hit an early deadline (Nov. 12), **Scott Smith** of the GCSAA Communications Department said selection of the three key people were imminent, but still pending. We should have an update for **LM's** January issue, which is—coincidentally—our Golf Course Show issue. We'll keep you informed.

Congratulations to **John Prusa**, who purchased the Lawnmark operations in Youngstown, Ohio, and Erie, Pa. Prusa, who has been with Lawnmark since its inception, maintains an ongoing contractual relationship with the parent company, located in Peninsula, Ohio, just a few miles from **LM's** offices. Lawnmark owner **Marty Erbaugh** is a past president of the Professional Lawn Care Association of America.

There has been a lot of coming and going in **LM's** hometown of Cleveland, what with the departure of Browns quarterback Bernie Kosar and Cleveland Stadium groundskeeper **David Frey**, who is now in business for himself. The former president of the Sports Turf Managers

Association now operates Field Specialties out of his office in Chardon, Ohio. He is an athletic field design consultant and also hawking two of his inventions, a tarp roller and the "Mound Meter." For more info, call Frey at (216) 635-0282.

The New York Turf and Landscape Association has named **Frank Claps** its Man-of-the-Year, according to a press release received by **LM**. Claps, a past president of the organization, has been a landscape contractor for 48 years, devoting much of his time to industry education. He will be honored with a dinner/dance in Scarsdale on Dec. 12.

You'll be seeing **Arnold Palmer's** face in **LM** for another three years, according to Lofts Seed. Palmer's contract with the marketer of "Palmer" perennial ryegrass has been extended for another three years, says Lofts director of research **Dr. Richard Hurley**.

READERS! Got an item for "LM Grapevine?" Call us at (216) 826-2830 between 8:30 a.m. and 5 p.m. Eastern Time.



The first flotation

You never have to worry about sinking below the surface when you're in a John Deere Gator™ Utility Vehicle.

The reason is quite simple: high-flotation/low-compaction tires. They're standard features on both the Gator 4x2 and the

Gator 6x4. With only 7.1 to 7.5 pounds per square inch, these utility vehicles will barely bend the blades on your delicate turf.

This low psi also helps the Gators out in muddy, swampy situations. And when extra traction is called for, simply reach

down for the differential lock, conveniently located next to the shift control.

You'll also appreciate the fact that the Gator Utility Vehicles go easy on the ears as well. Large capacity, one-piece mufflers, lower engine rpm's, and, on the



device for land

6x4, a liquid-cooled engine, result in extremely low sound levels.

And as light as the Gators are on their feet, they possess solid bodies. A heavy-duty, arc-welded frame. Bolt-on cast-aluminum rear axle housings. Internal wet-disk brakes. And

a rugged front suspension.

They're not lightweights when it comes to towing, either. The 4x2 has a 900-pound capacity; the 6x4, 1,200 pounds.

To see firsthand why a Gator Utility Vehicle rises above the rest, visit your local John Deere dealer.



**NOTHING RUNS
LIKE A DEERE®**

Winter weed control

Weed control varies depending on whether winter turf is overseeded or non-overseeded. Use these guidelines.

by Bert McCarty, Ph.D.
University of Florida

■ Weeds in winter are unsightly due to their green color and leaf textural differences compared to brown-colored dormant turf. In addition, weeds shade the dormant turf, and thus may delay spring green-up.

Weed identification is the first step toward understanding why weeds occur and how to control them.

Understanding the biology, growth and reproductive characteristics of a weed is the second-most important step in developing a weed control strategy. Turf weakened by improper cultural practices, pest invasion, or excessive traffic is much more likely to become weed-infested and will take longer to recover.

Post-emergence broadleaf weed control—Broadleaf weeds such as chickweed, henbit, clover and dandelion have traditionally been controlled with single or combination applications of 2,4-D, 2,4-DP, MCPP, MCPA or dicamba (Table 1).

Several considerations before using one or more of these materials:

- Most broadleaf weeds, especially perennials, generally need a two- or three-way herbicide combination for satisfactory control.
- Younger weeds are easiest and cheapest to control. Applications should ideally be made in December. Waiting until March or April requires sequential applications 10-14 days apart. This: increases labor and herbicide costs, increases equipment wear-and-tear; may delay green-up; and may require longer for herbicides to work.
- New chemistry such as triclopyr

(Turflon) and metsulfuron (DMC Weed Control) can be alternatives to the traditional materials. However, economics and turf tolerance must still be considered before use.

Post-emergence grassy weed control—In winter, the predominant annual grass weeds are annual bluegrass and clumps of ryegrass that escape from the intended overseeding site.

Annual bluegrass can be effectively controlled with post-emergents, assuming the turf is not overseeded with ryegrass or other cool-season grasses. In non-overseeded turf, atrazine (AAtrex), simazine (Princep) or pronamide (Kerb) will provide excellent control of annual bluegrass and ryegrass.

The first applications should be applied in middle to late fall; a second application in late January or early February will control the second flush of germination that normally occurs at this time.

Atrazine and simazine have the added benefit of controlling many winter annual broadleaf weeds such as lawn burweed, chickweed and henbit (Table 2). However, if control is attempted later in March or April, herbicide effectiveness is reduced, the time needed for weed control is greater, spring green-up may be delayed, and turf may be injured.

Non-overseeded turf—Chemically controlling winter weeds in non-overseeded turf is generally much easier and effective than weed control in overseeded turf because of a wider range of available herbicides.

In bermudagrass, centipedegrass, St. Augustinegrass and zoysiagrass, atrazine and simazine provide the widest spectrum of weed control at the most effective cost. These materials have pre-emergence activity, and they are just as effective on newly-germinated weeds. Applications should be in mid-fall and repeated 6-8 weeks later.

Atrazine and simazine provide good to excellent control of annual bluegrass and most winter annual broadleaf weeds on

dormant bermudagrass or zoysiagrass. These materials are not recommended for early spring use. If a hard-to-control weed persists, Prompt (a pre-packaged atrazine/bentazon combination) can be used. Repeat applications 4-6 weeks later are recommended.

Annual bluegrass in non-overseeded bermudagrass and zoysiagrass is generally controlled by most pre-emergents. Or, early post-emergence control of annual bluegrass should be made in mid-fall with Kerb, atrazine or simazine. Applications should be repeated in 60 days for season-long control.

Post-emergence broadleaf control should also begin in mid-fall when weeds are small and easiest to control, and when temperatures are still relatively warm. A combination of 2,4-D plus 2,4-DP, MCPP, MCPA or dicamba will provide a wider spectrum of control. Repeat applications 7-14 days apart will be necessary.

Overseeded turf—Weed control in overseeded turf is more difficult because the growth habit and herbicide susceptibility of the overseeded ryegrass and annual bluegrass are similar. Until it is fully established, ryegrass is somewhat sensitive to many post-emergents.

Pre-emergence herbicide control choices are limited; each herbicide has its strengths and weaknesses:

Kerb provides good to excellent pre-emergence annual bluegrass control, but must be used 60-90 days before overseeding—mid-summer in most areas. High rates (2.5 to 4 lbs./1000 sq.ft.) of charcoal are necessary. Disadvantages of using Kerb are the inability to re-establish the ryegrass when the charcoal treatment fails, and activated charcoal is messy to handle and apply.

Rubigan, a fungicide with selective herbicide activity, also is available for pre-emergence annual bluegrass control without adverse effects to overseeded ryegrasses or bermudagrass. Best bluegrass control results from a series of two or three applications. The last application

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Positive results reported from study of IPM on home lawns

A two-year project by the North Dakota State extension service proves lawn care customers will change bad habits if you show them how.

by Ronald C. Smith, Ph.D.

■ A two-year study of Integrated Pest Management (IPM) on 20 homelawns by the North Dakota University extension service has proven the effectiveness of IPM when it's done right.

The project was started in conjunction with two local lawn care companies, ChemLawn and Outdoor Services.



Ryobi Mulchinator runs 90 minutes on a full charge. Ryobi is in Anderson, SC.

EXCLUSIVE BIOTURF NEWS CASE STUDY REPORT

Clients were picked based on their willingness to cooperate with extension service recommendations.

Test lawns were equally divided between the two companies because of other clientele commitments, and the time required to begin the program. Some customers expressed concern that IPM would cost more and yield poor results, and at first were suspect of company motives in the project.

After being assured that the objective was mutual education, they were willing to change past bad habits.

Understanding IPM. Integrated Pest Management involves the consideration to pest control and turf management. Pesticides are not eliminated, but are a part of the management scheme to achieve the desired outcome: a healthy, functional and attractive turfgrass system.

Since the lawn care companies did not provide turnkey services, the homeowner was made to realize that their practices of mowing and watering could negate the best efforts of these professionals.

IPM programs start with an inventory of the property. This includes:

- a list of problem areas;
- client concerns and desires;
- a soil test, the linchpin for most initial decisions apart from mowing and watering.

Proper turfgrass mix. Turfgrass species in our region are all cool-season grasses: Kentucky bluegrass, creeping fescues and perennial rye. Some lawns are sodded with three or four cultivars of elite bluegrass; one is a monoculture of *Touchdown* Kentucky bluegrass, and another was a tall fescue blend.

One of the challenges in lawn care is to find a mix of grass seed that will be a good overseeder without differing substantially from the existing turfgrass. Since most of our clients had elite turfgrass mixes, an "IPM Mixture" was developed that met most of those needs and differing conditions. The mix contained three bluegrass cultivars: *Glade*, *Cynthia* and *Rugby*, and a single cultivar of perennial ryegrass, *Regal*. This mix provided quick germination growth in sun or shade and tolerance to a variety of conditions.

New mowing practices. Clients were instructed in the proper way to mow:

- mow at three inches high to keep weeds down;
- keep the blades sharp;
- mow frequently, based on turf growth rates, not a calendar;
- leave the clippings.

Customers were also encouraged to alternate mowing patterns to minimize compaction and encourage more upright growth.

The program used a Ryobi Mulchinator—a rotary mower powered by a 24-volt battery. It runs quieter than a household vacuum, mulches turf clippings and leaves, and can run

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INSIDE

- Follow nature's formula for best compost
- Nematodes vs. Florida mole crickets
- Teaching IPM to your crews
- Predator wasps at work out West

IPM study from page 27

90 minutes on a full charge (about 20,000 sq. ft. of turf).

Leaf removal was emphasized as an important part of preparing the lawn for winter. In autumn, turf needs maximum sunlight to photosynthesize and translocate the carbohydrates to the crown, roots and rhizomes for winter storage.



Thatch layer of 2.25 inches, too much to remove at once with a dethatching unit.

Heavy clay soil. Most of the problems were caused by heavy clay soil that was stratified with subsoil of nearly equal density. Compaction, low infiltration and low percolation were all problems. Compaction was verified with a Dickey-John unit that convinced every client that their lawns needed aeration.

(Patch diseases during hot spells were also thought to be caused by the poorly drained soils.)

Poor oxygen diffusion into the soil caused problems during the cool, wet summers of 1992 and 1993. While aeration is not a substitute for decent weather and proper fertility, it did improve the appearance of every lawn; in fact, the effect was essentially equal to that of a fertilizer application.

Irrigation schedules. Most clients were unaware of the importance of proper irrigation for healthy turf. Noting our weather pattern for the two years under study, they simply needed to be turned off.

But then, with the limited rainfall from August through September of 1993, some people opted to not activate their systems at all. This created drought stress, putting the turfgrass

system at a disadvantage going into the winter months.

Basic watering advice was to irrigate twice a week, making sure the moisture reaches the root zone completely. This means homeowners have to water .33 to .50 inches each time, depending on exposure, slope, soil type, wear, etc. The most common fault was over-watering, especially where automatic irrigation systems existed.

After mowing heights were raised to three inches, customers realized that a more extensive root system requires less water.

Fertilization tips. A basic application of sulfur coated urea—a slow-release form of 36 percent N—was applied at a rate of 2.7 lbs. per 1000 sq.ft. One pound of nitrogen was delivered on normally sunny sites, with the rate being cut in half for two sites where heavy tree shade existed over the turf canopy most of the day.

In a few instances where the turf did not respond favorably to this standard treatment, a non-ionic



Before (above) and after. The difference a higher cut makes.

wetting agent (Noburn) was applied, with good results. The Noburn apparently released some of the micronutrients in the soil, —most notably iron— that was previously unavailable because of high pH or bicarbonates making them unavailable.

Pest control. Weeds were controlled with Trimec or Confront. Where drifting or leaching danger to surrounding ornamentals existed, Confront was the chemical of choice.

Insects were monitored by using pitfall traps, yellow sticky traps and pheromone traps. For turf purposes, the pitfall traps worked most effective-

ly. Pests collected were cutworms, armyworms, sod webworms, billbugs and chinch bugs.

The presence of June beetle adults indicated egg-laying activity in the lawn. The turf quality was monitored closely; some insect damage was noted, but not enough to warrant any insecticide use.

It was found that fungicide use could also be significantly reduced if the homeowner were to allow annual aerations, thereby increasing the competitive activity of other microbial populations which reduce the number of potentially destructive fungi.

Thatch control. Where thatch exceeded 0.5 inches in thickness, homeowners were advised that thatch reduction would make water, fertilizer and pest control more effective. Some opted to remove the excess thatch themselves, and rented aerators. Spring and fall aeration was advised for lawns that had a very thick thatch layer (2.5 inches).

IPM=Common Sense. IPM begins with a change in mowing and watering practices, and evolves into other cultural practices such as aeration and dethatching. Appropriate pesticides are never eliminated; rather, depen-



ency on them is reduced.

A program of inspection and inventory, regular monitoring and perhaps preempting a potential problem with a selected application of the appropriate pesticide will result in satisfactory results over the long term.

—Ronald C. Smith, Ph.D., is an extension horticulturist at North Dakota State University.

Nature provides best compost formula

Pay attention to soil temperature, pH levels and nitrogen content.

by Paul D. Sachs

■ Soil temperature can have a profound effect on the rate of organic matter decomposition.

At a soil temperature of 88 degrees F, with adequate air and moisture, organic matter is destroyed faster than it can be produced. This is a common condition on tropical soils where high temperature, moisture from tropical rains, and an abundance of air from extremely sandy soils are all at an optimum level for bacterial decay.

Shading the soil can reduce soil surface temperatures and slow down the decomposition of organic matter. Turf stands, for example, that are mowed at maximum height during the hottest part of the year can shade the soil and reduce soil surface temperature by as much as 20 degrees.

This is not always possible because of use restrictions, such as for golf greens and tees. However, in many instances a tall green stand of turf is much preferred over a short brown one.

Lime can significantly accelerate the decomposition process of humus. The low pH in acid soils inhibits the activities of bacteria. As the pH is raised by applications of lime, bacteria populations grow and a relative increase in decomposition activity occurs.

The right amount of lime can stimulate plant growth to a point where the production of organic residues is at its maximum level. However, excessive lime applications can create conditions too favorable for decay bacteria and hasten the destruction of organic matter at a pace greater than the plant residues can produce it. Chronological scheduling for lime applications without performing periodic pH tests can eventual-

Excess nitrogen can increase bacterial activity and deplete soil oxygen, resulting in slower root growth.

ly lead to a significant loss of soil organic matter.

Measure nitrogen levels. Nitrogen is as vital to the development of decay bacteria as it is to the growth of plants. The ratio of carbon to nitrogen in an average soil is approximately 12:1. At this ratio, populations of decay bacteria are kept at a relatively constant level because there is not enough available soil nitrogen for a rampant population explosion. When large quantities of inorganic nitrogen are added to the soil, the bacteria populations are stimulated and they begin to decompose organic matter.

Stable humus is relatively resistant to further decomposition, when stimulated by added nitrogen, but younger, less decomposed material is not and may never evolve into stable humus if subjected to conditions that are conducive to quick and complete decomposition.

An increase in bacterial activity from excess nitrogen can also mean a depletion of soil oxygen levels which can inhibit root growth and cause slower production of organic matter. Lack of oxygen to the root systems can stress plants which can, oftentimes, increase its susceptibility to disease and insect problems.

Natural organic nitrogen is easier

on soil organic matter because it is organic matter and provides energy needed by decay organisms in the form of carbon compounds. Inorganic nitrogen ignores the energy needs of soil organisms.

Producing organic matter. The largest producers of organic residues in turf grounds are the root systems. The roots of turf plants are essentially annual; every year a new root system emanates from the crown of the plant. It is estimated that 0.5 to 3 tons (dry basis) of organic matter can be added to an acre of soil every year from old roots systems, depending on how much mass accumulated from the previous year of growth.

Changing mowing height can have a profound effect on root growth and, consequently, on the production of organic matter. Roots are not fed directly by soil nutrients. Those nutrients promote top growth which, in turn, photosynthesizes energy for the roots. Obviously, the more leaf surface area exposed to the sun, the more energy will be synthesized by the tops for root production. According to Eliot Roberts, past director of The Lawn Institute, for every eighth of an inch the mowing height is raised there is a 30 percent increase in leaf surface area exposed to the sun. Other research from the institute shows root mass and soil penetration to increase exponentially as the mowing height is increased.

INFLUENCE OF TEMPERATURE ON SOIL ORGANIC MATTER CONTENT

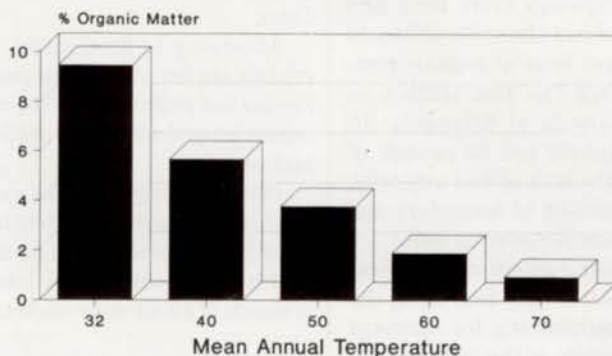


Figure 2

Bagged turf clippings can amount to another 0.5 to 3 tons per acre per year of organic matter on a dry basis. Recent research from the University of Connecticut suggests that leaving the clippings where they fall can improve the quality of turf and even suppress certain turf diseases.

Removing clippings every time turf is mowed diminishes the soil's ability to maintain a proper level of organic matter. This practice can also remove as much as 80 pounds of nitrogen, 20 pounds of phosphate and 60 pounds of potash from every acre of soil annually. A significant amount of secondary and trace elements are removed as well.

Organic matter content can be measured by most soil testing labs using the same samples submitting for nutrient analysis. The results of the test are usually expressed as a percent of soil content. Five percent is an ideal level but is not always practical to obtain. Under certain conditions, building organic matter levels to 5 percent might be impossible (e.g., in tropical soils).

Figure 2 shows that as the average annual temperature increases, the average level of soil organic matter decreases. This is not a maximum value that can exist in any given environment, but suggests that maintaining organic matter will become more difficult (not impossible) as we move closer to the equator.

Any attempts towards improving organic matter levels will usually cause an improvement in overall soil conditions and a significant reduction in the number of problems a land manager might encounter.

Paul Sachs is founder and president of North Country Organics, a Vermont-based manufacturer and supplier of natural fertilizers, soil amendments and environmentally compatible pest controls since 1983. His book, Edaphos:

Dynamics of a Natural Soil System, examines ways in which Sachs believes human beings are linked to the ecosystem, and how that link determines the future of civilization. To order Edaphos, call (802) 222-4277.



Nematodes work against mole crickets at Florida resort town

PALM COAST, Fla.—Parasitic nematodes are being used in the fight against mole crickets at the Florida community of Palm Coast.

According to BioControl, Inc., mole crickets are the worst of the pests plaguing Florida turf professionals. The mole cricket causes an estimated \$60 million in damages each year.

BioControl says it is the exclusive distributor of the nematodesolution. The spray consists of water and nematodes. The microscopic worms live at least 13 weeks in search of a host mole cricket.

Researchers say the nematodes will live at least 13 weeks as they search for mole crickets.

"We are pleased to be a part of a very active movement toward environmentally integrated pest management," says Brigid Braun, superintendent at Matanzas Woods Golf Course in Palm Coast, where the nematode application was made on April 20. "We'll probably never be completely free of pesticides, but biological control holds a lot of promise."

University of Florida entomologist Dr. Grover Smart developed and successfully field-tested the new species of insect parasites over a seven year time span. The University of Florida received a patent on the species in November of 1992.

BioControl, which has done work in nematode science since 1991, is the exclusive licensee of the University's nematode patent.

Callum Macgregor, president of BioControl, says the company has treated 65 golf courses and a dozen cattle pastures and several county school systems

"We expect to complete around 200 applications by the end of 1993," says Macgregor.

Bioturf News reported in July of the fight against the mole cricket. At the time, about five percent of Florida's 1200 golf

courses were experimenting with nematode control. It is predicted that as many as 60 percent of the state's golf courses will be using some form of biological control in 10 years.

Nema-whats?

Nematodes are tiny roundworms that live in moist habitats.

Nematodes have diverse habits. Many are scavengers; some feed on fungus. Many are plant-parasitic and others parasitize various types of animals. Approximately 20 families of nematodes have insect-parasitic species. Nematodes can attack species within most orders of insects.

These nematodes search out insects, parasitize them, and then reproduce, resulting in more parasitic nematodes that will kill any additional insects they encounter.

Most insect-parasitic nematodes are harmless to other animals and do not attack plants.

Because of their small size and hidden nature, the benefits of naturally occurring insect-parasitic nematodes are not always well understood.

Their benefit in the natural control of plant pests is greatest in areas of continuous moisture rather than in more arid areas.

Even in moist situations, however, they may not be abundant enough to provide significant pest suppression without other control augmentation.

EVENTS

December

12-15: American Entomological Society of America annual meeting, in the Indianapolis convention center.

Program includes information on advances in monitoring turf insects; using pheromones to manage turf insects; the host-plant resistance tactic, genetics and endophytes; and a look at the efficacy of milky spore.

New ways to use IPM technology will also be explained.