CORNELL UNIVERSITY TURFGRASS TIMES

CUTT

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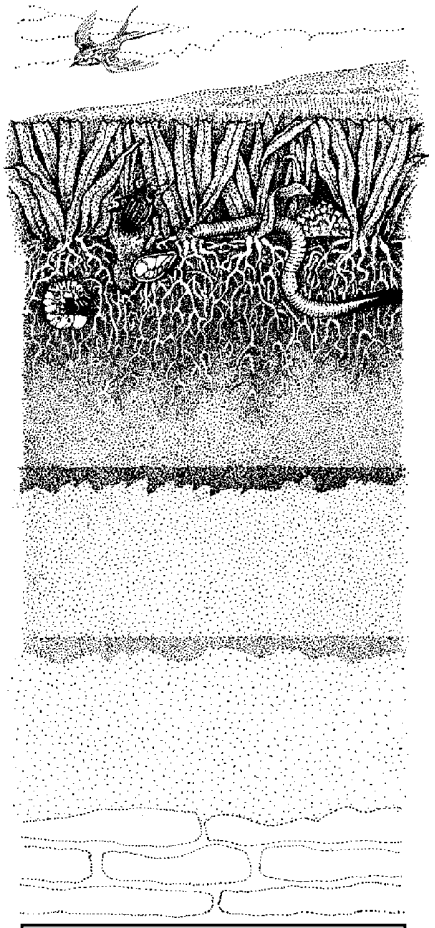

Legal and Effective Early Season Grub Control

Turfgrass managers are becoming aware of the possible impact of the Food Quality Protection Act (FQPA), a new federal law governing pesticide usage in the United States. Turf managers ignored the FQPA, enacted to determine how much pesticide residue will be tolerated on agricultural products, because at first reading this bill seems to focus on agricultural commodities rather than turf. However, two provisions of this law may have profound effects on the availability of older organophosphate and carbamate insecticides that are traditional products used in turf insect management programs. ■

The first issue is that the cost of reevaluating older products falls not on the government but on the chemical companies that wish to manufacture and market these products. This reevaluation expense that may cost millions of dollars may not be economically feasible for pesticides that are not used on major agricultural commodities such as corn or cotton. Moreover, the EPA judges the impact of any one pesticide over all of the commodities it might be applied to including ornamental plantings. To protect their products to their largest markets, chemical companies may voluntarily give up registrations on minor crops to lower the overall usage of a particular product. Minor use insecticides, including many insecticides used primarily by the turf and landscape market, may not be unsafe but could be dropped by chemical companies for economic reasons.

The second issue is an acknowledgment of the suspected increased sensitivity of small children to pesticides. The EPA will most likely decrease the residue tolerance on all agricultural crops by a factor of ten to ensure the safety of children. Chemicals that were considered safe under the older guidelines may not pass the new, more stringent tolerances. Products that are not considered safe for major agricultural commodities might not be supported for registration for minor crop used by chemical companies.

Although turf managers are rightly concerned about the possible loss of insecticides that they have depended upon for may years for pest control, the Food Quality Protection Act provides for a streamlined (less costly and less delay) registration process for certain environmentally-friendly products. These products are

continued on page 4

This Times

Short Cutts

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Frank Rossi Named One of Golfweek's "40 Under 40"

Golfweek recently honored 40 young turf professionals who they consider "most likely to shape the game" over the coming years. *CUTT* Editor Frank Rossi was among them. Frank also is an assistant professor of turfgrass science at Cornell and New York State Extension turfgrass specialist.

Frank became enamored with turfgrass at the tender age of 11 while mowing lawns. As he grew, he worked at golf courses while obtaining his education. He obtained his BS in 1984 and an MS in 1987 from the University of Rhode Island. His first association with Cornell was as a doctoral candidate, earning his Ph.D. in 1990. Though never straying far from the golf course—he's been a golf turf manager as well as being part of maintenance crews—Frank joined the ranks of academia, holding professorial appointments at Michigan State and the University of Wisconsin. He returned to Cornell as a faculty member in 1996.

His research focuses on turfgrass ecology and stress physiology. He has numerous scientific papers, research proceedings and popular articles to his credit. With a grant from the NYS Department of Environmental Conservation in 1999, he is writing the *Best Management Practices Guidebook* for golf courses in the environmentally and politically sensitive New York City watershed.

Widely sought after as a speaker and consultant due to his knowledge, experience, engaging personality, and infinite energy Frank has advised major industry associations, including serving as visiting scientist for the USGA Turfgrass and Environmental Research Committee, which evaluated and distributed over $5 million in funding.

While Frank has been editor, CUTT has grown in size and readership and won a Certificate of Excellence from the American Society of Agronomy in 1998. Also in 1998, the Cornell Turfgrass Team, under Frank's leadership, began the Turfgrass Hotline, now known as *Turfgrass ShortCUTT*, a weekly, two page newsletter delivered each Monday during the growing season via email or FAX to get timely information out as quickly and efficiently as possible (see page 15).

NYSTA Grants Cornell $50K

The Cornell University Turfgrass Team, an interdisciplinary research and education program, received a $50,000 grant from the New York State Turfgrass Association. NYSTA has been a committed supporter of turfgrass research and education at Cornell University for over 50 years. Each year the $50K support is matched dollar for dollar by the College of Agriculture and Life Sciences. The NYSTA funds are deposited directly into the New York State Turfgrass Research Foundation, a long term endowment to support turfgrass research in New York State. The College then distributes another $50K to members of the Turfgrass Team.

This year funds have been distributed more widely among members of the Cornell Turfgrass Team and include Karen Snover and Andrew Landers. Karen will be using the funds to conduct nematode sampling on golf courses to determine population dynamics of plant parasitic nematodes on golf courses. Andrew is continuing the development of a direct injection sprayer to reduce hazards associated with pesticide application.

continued on page 7

CORNELL Turfgrass

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Topdressing to Manage Thatch

The perennial nature of a turfgrass system includes the regular creation and degradation of organic matter, i.e., leaves, stems and roots. Organic matter accumulation is a common occurrence in the turfgrass system and except for grass clippings, which by their chemical nature rarely accumulate in the soil, dead stems (stolons and rhizomes) and roots result in the formation of thatch. Strictly defined, thatch is the accumulation of decomposed or partially decomposed organic matter between the grass canopy (verdure) and the soil surface. Thatch provides unique benefits such as insulating the soil, absorption of pollutants, and surface resiliency. However, excessive accumulation results in significant reduction in infiltration due to layering, as well as the potential to harbor turf pathogens.

A report from the International Turfgrass Research Journal, published in 1998 investigated the influence of topdressing material, frequency and rate on thatch. Straight sand was compared to peat and sand, and peat and soil mixes at 2 rates and either every three weeks or two times per year. Applications were made to a 10 year old Penncross creeping bentgrass area maintained as a putting green. Topdressing materials included a medium-fine sand, reed sedge peat, and a sandy loam topsoil where treatments required. Thatch samples were measured by weight loss on ignition at 600˚C and reported on a weight per unit volume basis.

There was no significant influence of topdressing rate and frequency on thatch accumulation. However, visual observations noted significant layering when infrequent topdressing was performed. Experimental sampling differences were used to explain the lack of difference associated with rate and frequency.

There was no significant reduction in organic matter (OM) from the 100% sand topdressing, when compared to peat and soil treatments, however, there was a significant reduction when compared to the control plot. Interestingly, the OM content of the peat and soil treatments was calculated and measured to be significantly lower in the thatch than what was applied, indicating enhanced biodegradation of OM associated with the addition of OM. This study concluded that topdressing is an important means for managing thatch, and that the dilution of OM and the biodegradation of thatch are both important to reducing overall OM levels.

From: Couillard, A., A.J. Turgreon, and P.E. Rieke. 1997. New insights into thatch biodegradation. ITRJ, 8:427-435.

Biological Control of Dandelion

Turfgrass areas throughout cool humid regions are regularly infested with dandelion. While there is limited data on the agronomic and functional performance issues associated with weed invasion, the reduction in visual quality is well known. Concern over herbicide use has forced many turfgrass managers to restrict weed control programs, resulting in significant reduction in visual quality. In addition, traditional turf management programs reliant on herbicides for weed control are being asked to explore alternatives. However, there has been limited success with the use of alternative measures to control weeds.

Researchers at the University of Guelph have identified a common soil borne fungal pathogen that infects dandelion as a potential Biological Weed Control Agent (BWCA). However, there is little information on how to most effectively utilize and enhance the effectiveness of this BWCA. As a result, the researchers investigated the use of various spray adjuvants that are carbon based products to serve as a nutritional source for the organism. Results concluded that durum semolina, guar gum and gluten flour enhanced the effectiveness of the BWCA.

It was speculated that applying BWCA with plant derived substances such as the gum, gluten and semolina in this trial, stimulates fungal compounds required for degrading cell walls, improving infection, and thereby enhancing control. Still, there are many environmental conditions that must be explored before this technology will be considered effective. Until then, we must be mindful of the subtleties of this technology that will require us to understand more about the biological system we are managing.

From: Neumann, S. and G.J. Boland. 1999. Influence of selected adjuvants on disease severity by Phoma herbarium on dandelion. Weed Tech. 13: 675-679.

Scanning the Journals

A review of current journal articles

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Applying BWCA with the plant derived substances tested in this trial, stimulates fungal compounds required for degrading cell walls, improving infection, and thereby enhancing control.

Early Season Grub Control

continued from front cover

There is great potential for abuse of this product if turf managers use it indiscriminately, that is without regard to the likelihood of having damaging population of insects on treated areas some time in the future. For this reason Imidacloprid should be used before egg hatch only in those turfgrass areas that consistently have high grub populations.

The use of an IGR on scarab grub populations late in the fall as they prepare to move down into the soil for winter as well as the application to grubs in late spring as they prepare to pupate is ill advised for this reason.

considered compatible with IPM principles including biologically based products and new chemistries.

New Chemistries

Imidacloprid is a new chemistry, broad spectrum, long residual insecticide registered by Miles to control soil and crown inhabiting insects in turfgrass. This includes scarab grubs such as Japanese beetle, European chafer, Asiatic garden beetle, May and June beetles, Oriental beetle, northern and southern masked chafer, green June beetle and black turfgrass Ataenius and turfgrass inhabiting weevils such as billbugs and annual bluegrass weevil. Imidacloprid has low mammalian toxicity and carries a "Caution" label. This newly registered insecticide that has shown sufficient residual activity in turfgrass to control the fall brood of annual scarab grubs when applied the previous spring or summer.

There has been considerable debate among turfgrass entomologists about the use of insecticides such as Imidacloprid that are designed to be used before the size and damage potential of the insect population is known. That is, these produces are applied before insect eggs are hatched and many times, several months before they are laid. There is great potential for abuse of this product if turf managers use it indiscriminately, that is without regard to the likelihood of having damaging population of insects on treated areas some time in the future. For this reason Imidacloprid should be used before egg hatch only in those turfgrass areas that consistently have high grub populations.

Insect Growth Regulators

As part of normal growth and development, insects molt regularly. This process is governed by several natural hormones, which regulate the production of new chitin, destruction of old chitin, and the development from immature to adult. Insect Growth Regulators (IGR) are insecticides that interfere with the normal molting process. Some IGRs accelerate the molting process, while others signal the insect to remain in an immature stage. Halofenozide (Mach 2) is the first of a novel classes of compounds with unique mode of action that interferes with the normal insect molting process by mimicking the action of the natural insect molting hormone ecdysone. High doses of these IGR products typically cause rapid insect mortality, while sublethal effects include rapid maturation to the adult stage, larvae showing deformities, and larvae undergoing additional larval molts instead of changing to pupa. Specific IGR products have shown activity against scarab grubs, cutworms and sod webworms.

Insect growth regulators typically require ingestion for optimum activity so it is important that the target insect is actively feeding when they are applied. The use of an IGR on scarab grub populations late in the fall as they prepare to move down into the soil for winter as well as the application to grubs in late spring as they prepare to pupate is ill advised for this reason.

Laboratory Data

Laboratory studies suggested that early larval stages are susceptible to insect growth regulators. However, there is a fairly wide range of activity among closely related insects such as different species of scarab grubs. For example, Figure 1 shows the cumulative mortality of small, first instar (just after they hatch from the egg) Japanese beetle, oriental beetle, and European chafer grubs placed in soil with Halofenozide applied at a rate of 3 ppm. Notice that there is rapid mortality of Japanese beetle grubs starting at week 2, with 100% Japanese beetle mortality occurring 3 weeks post treatment. By comparison, oriental beetle grub mortality was reduced and delayed, with final cumulative mortality at 6 weeks reaching 98%. First instar European chafer grubs appeared to be relatively insensitive to Halofenozide with cumulative mortality not exceeded 25% over the duration of the study.

Figures 2 and 3 show the results of identical laboratory studies against large third instar grubs in late fall (Figure 2), and again in early spring (Figure 3). These studies also suggest that Japanese beetle grubs are more sensitive to Halofenozide, followed by oriental beetle and then European chafer. Older, larger grubs of all three species appear less sensitive to Halofenozide than are first instar grubs. This difference may be less critical against Japanese beetles where grub mortality ultimately reaches 100%, however, notice that significant mortality is delayed and fall grubs may move down into the soil to escape the cold and spring grubs to pupate (see mortality at 3 weeks).

Third instar grubs appeared much more tolerant of this growth regulator than first instar oriental beetle grubs making early application of Halofenozide critical for reasonable control. Grub age and size did not affect the activity of Halofenozide against European chafers, as all stages tested appeared relatively insensitive to this product.

Figure 1

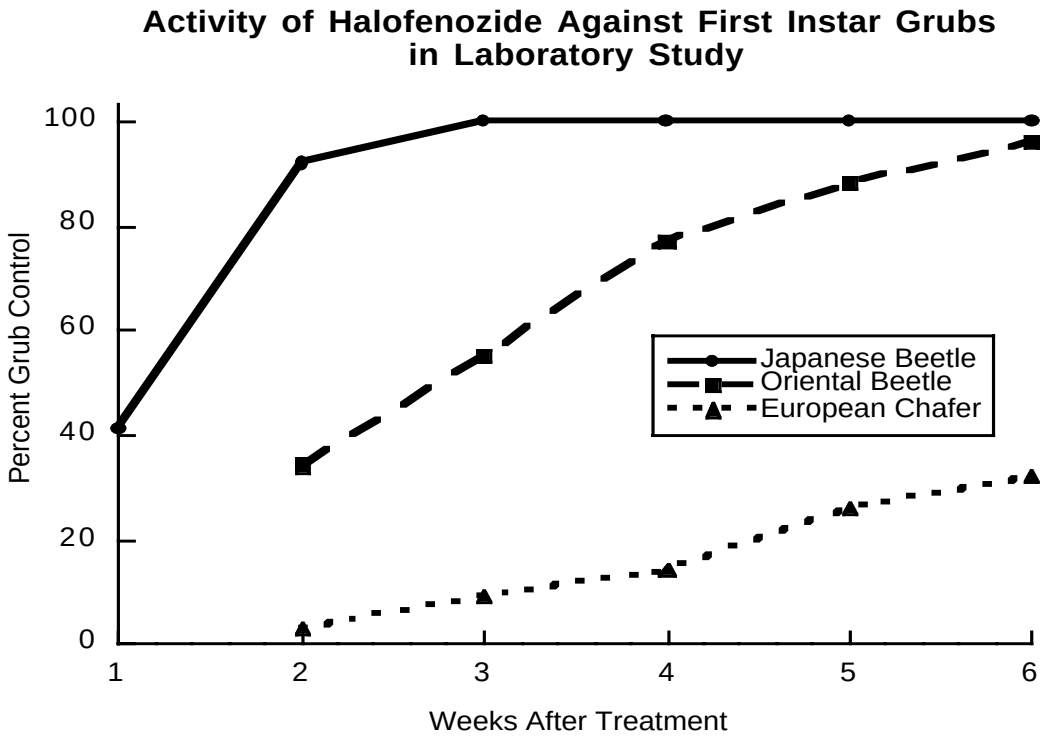

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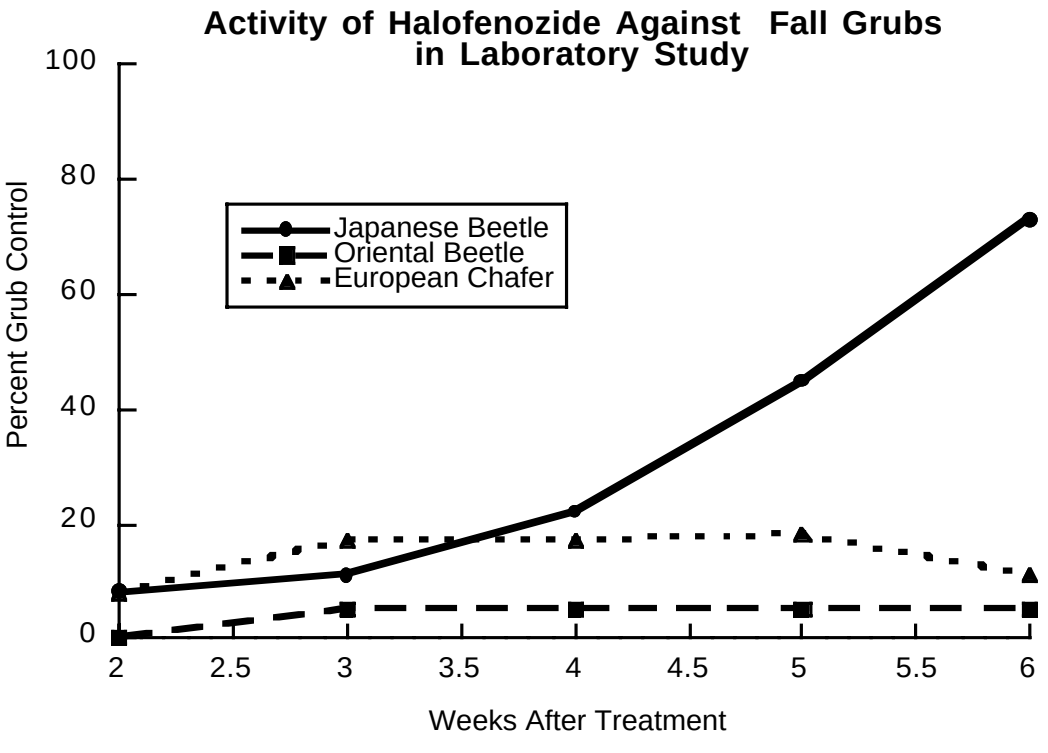
Figure 2



Grub age and size did not affect the activity of Halofenozide against European chafers, as all stages tested appeared relatively insensitive to this product.

continued on page 6

Early Season Grub Control

continued from page 5

Notice that high Japanese beetle grub mortality was recorded using either Halofenozide or Imidacloprid at all three application dates. Imidacloprid was also effective against oriental beetle regardless of application timing.

Our research suggests that for these three grub species early applications of Imidacloprid while convenient may not have minimal impact on success if grubs are feeding on the surface.

Figure 3

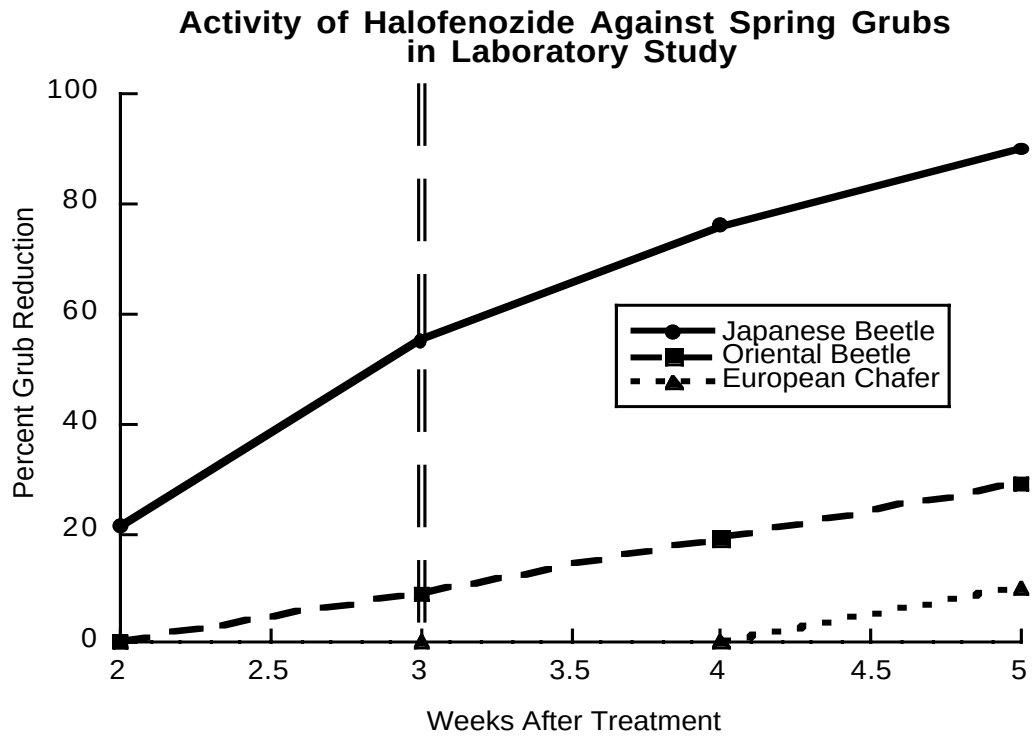
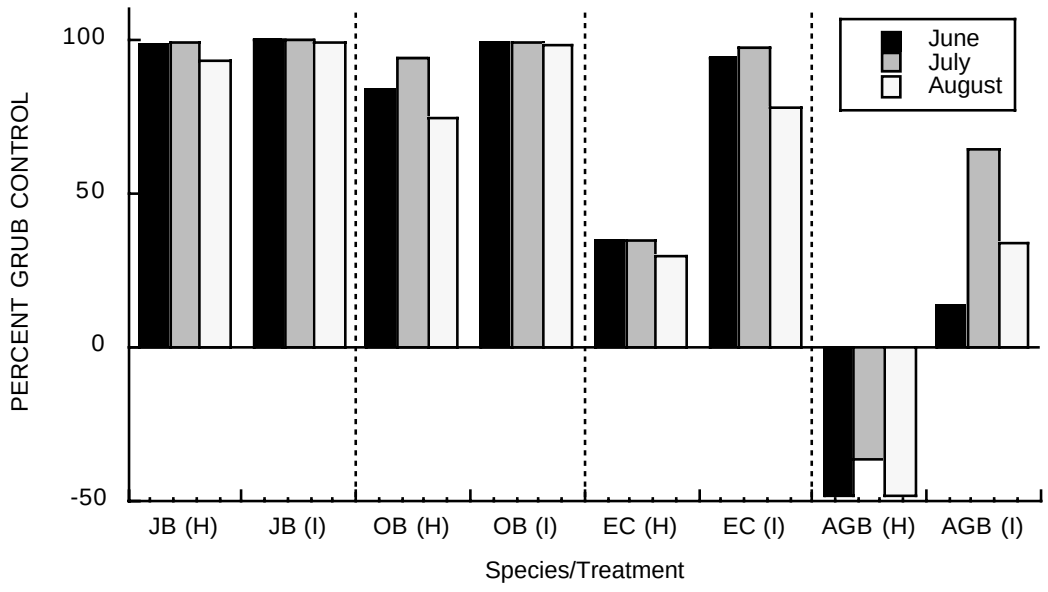


Figure 4



In the Field

Laboratory studies while interesting can only be used as a guide to what might be expected in the field. Field studies were conducted in New York (M. Villani), Rhode Island (S. Alm), and Connecticut (R. Cowles) against Japanese beetle, oriental beetle, European chafer, and Asiatic garden beetle grubs in turfgrass plots. These plots were treated with a 1 lb./acre rate Halofenozide and a field rate of Imidacloprid in mid June (about 1 month before grub eggs could be expected to hatch in the plots), mid July (just as grubs were hatching from their eggs) and mid August (the conventional application time when a mixture of first, second, and third instar grubs might be expected in the plots. Figure 4 is a summary of the effect of application timing and grub species on the field activity of these two products.

Notice that high Japanese beetle grub mortality was recorded using either Halofenozide or Imidacloprid at all three application dates. Imidacloprid was also effective against oriental beetle regardless of application timing. There was a slight but significant decrease in European chafer mortality at the August application date when compared with early application dates. Our research suggests that for these three grub species early applications of Imidacloprid while convenient may not have minimal impact on success if grubs are feeding on the surface. The early or late applications of Halofenozide were somewhat less effective than applications timed with egg hatch. As in our laboratory studies Halofenozide provided marginal reduction of European chafer grubs regardless of application date.

Asiatic garden beetle grubs were tolerant of application of Imidacloprid at the field rate with marginally adequate control when applied at egg hatch and poor control when applied in June or August. Plots in which Halofenozide was applied actually had 35-48% more Asiatic garden beetle grubs than did surrounding untreated plots. This unusual situation may have occurred if Halofenozide was not toxic to Asiatic garden beetles but reduced other grub species in the Halofenozide plots thus reducing competition for grass roots. Alternatively predators and parasites that reduced Asiatic garden beetle grubs in untreated plots may have been reduced in plots treated with Halofenozide and Imidacloprid.

MIKE VILLANI
CORNELL UNIVERSITY TURFGRASS TEAM

Alternatively predators and parasites that reduced Asiatic garden beetle grubs in untreated plots may have been reduced in plots treated with Halofenozide and Imidacloprid.

Short Cutts

continued from page 2

National IPM Grant Received by Cornell

Cornell Turfgrass Team member, Frank Rossi, and the Director of Northeast Regional IPM Program in NY, Jim Van Kirk, received a grant from the National Science Foundation Center for Integrated Pest Management (CIPM) to develop elements of a golf course IPM program for the Northeast Region. This grant will fund a regional conference on golf course IPM principles, so that criteria can be agreed upon to recognize the variety of management activities implemented on golf courses to minimize pesticide use.

The CIPM grant is for one year to bring regional turfgrass specialists and leaders in the golf turf industry together. Specifically, the project will explore the development of a points rating system that accumulates with each action taken by the turf manager, so that the total score demonstrates the commitment to implementing IPM programs. Industry support for the funding was received from the Northeast Golf Course Superintendent Association, the Metropolitan gold Course Superintendents Association, and Audubon International. Steering committee meetings will be held this summer and the IPM Principles Conference is expected to be held next fall or winter.

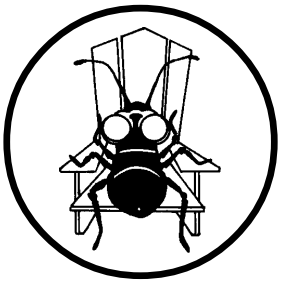
Cornell Turfgrass Team member, Frank Rossi, and the Director of Northeast Regional IPM Program in NY, Jim Van Kirk, received a grant from the National Science Foundation Center for Integrated Pest Management (CIPM) to develop elements of a golf course IPM program for the Northeast Region.

Easy to Read Golf and Wildlife Book

The founder and president of Audubon International, Ron Dodson, has published a book through Ann Arbor Press titled *Managing Wildlife Habitat on Golf Courses*. This is a wonderful book that outlines the basic aspects of managing wildlife habitat on human managed landscapes, in this case golf courses. The book provides an overview of the golf course from a wildlife

continued on page 11

Plant Parasitic Nematodes of Cool Season Turfgrasses



Pest Watch

Over the past few years we have seen high populations of Root Knot* (Meloidogyne sp.) *and Cyst* (Heterodera sp.) *nematodes from New York State putting greens.

Nematode feeding affects the plant by removing nutrients directly from the root, by reducing nutrient and water uptake, by destroying root tissue, by retarding root growth, and by creating entry points for other damaging microbes.

Little is known about the damage potential of plant parasitic nematodes on cool season turfgrasses. Plant parasitic nematodes have been studied to a greater extent in the southern states where nematodes such as the Sting nematode, *Belonalaimus* sp., has been associated with severe damage on golf course putting greens. Since little research has been conducted on nematodes affecting cool season greens, it is difficult to determine when a course of action is required to protect the turf. As we learn more about these pathogens it is important for us to obtain a better understanding of their biology which may lead to the creation of better sampling practices and more effective and safer management strategies. This article will focus on the current knowledge of feeding behavior, how plants are damaged, and current management strategies.

There are approximately 12 genera of plant parasitic nematodes that affect turf grasses. In 1990 a survey was conducted of turfgrass samples submitted to the Plant Disease Diagnostic Clinic at Cornell University to determine the identity and abundance of plant parasitic nematodes. The most commonly found nematodes included Ring (*Criconemella* sp.), Stunt (*Tylenchorhynchus* sp.), Spiral (*Helicotylenchus* sp.), and Lance (*Hoplolaimus* sp.) nematodes. Additionally, over the past few years we have seen high populations of Root Knot (*Meloidogyne* sp.) and Cyst (*Heterodera* sp.) nematodes from New York State putting greens. This information is useful but more is needed to determine the levels at which these nematodes cause damage on our cool season grasses. In the southern states where the Sting nematode is damaging, just one Sting nematode per 100 cc soil is enough to cause damage and to necessitate treatment. At this time not enough is known about how turfgrass species interact with plant parasitic nematodes and how environmental conditions affect this interaction to confidently make decisions about management practices.

Biology of Nematodes

Nematodes vary in the way they feed but most concentrate on the root systems of plants. Migratory parasites, such as the Lance nematode, *Hoplolaimus* sp., probe a plant cell for minutes up to hours and then move onto a new feeding site. Normally the migratory parasites are also ectoparasites (those that feed externally on the outer cortical and endodermal root cells). A few migratory nematodes such as the Lesion nematode, *Pratylenchus* sp., are endoparasitic, entering the root tissue and moving internally as they feed on cells. Sedentary parasites, such as the Root Knot nematode, *Meloidogyne* sp. and the Cyst nematode, *Heterodera* sp., establish feeding sites by injecting unidentified proteins into cells near the vascular system. These proteins induce plant growth hormones to develop a specialized feeding site, drawing nutrients to the nematode.

Plant parasitic nematodes feed on plant roots with a protrusible spear called a stylet. The nematode uses its stylet to pierce the plant cell, inject digestive enzymes into the cell, and remove the contents of the cell through the hollow core of the stylet. Nematode feeding affects the plant by removing nutrients directly from the root, by reducing nutrient and water uptake, by destroying root tissue, by retarding root growth, and by creating entry points for other damaging microbes.

Above ground symptoms vary depending on the site characteristics and turfgrass species but often include stunted growth, chlorotic leaves, and wilting during hot, dry weather. These symptoms are often misdiagnosed and confused with environmental stresses such as drought stress, nutrient deficiencies, and/or insect and pathogen injury. Plant stresses created by nematode feeding may increase disease susceptibility which may be diagnosed incorrectly as the primary causal agent. Nematode feeding also creates wounds that may serve as entry points for other

Nematode trapping fungi at w

pathogens. Root symptoms of nematode damage often appear as galls, tan to dark brown lesions, excessive branching, stubby roots and necrotic root tips.

Survival Strategies

Nematodes can only travel a short distance under their own power. Therefore, the spread of nematodes is often facilitated by factors including wind, rain and irrigation water, insect and animal vectors, and vehicle and equipment parts. In northern climates, survival during winter conditions is important. Nematodes have developed a number of strategies to survive extreme conditions. Many nematodes have a broad host range. When their preferred plant is removed from an area they can gain some nutrients from other plant material and can withstand harsh environmental conditions within the root tissue.

Since turfgrasses are perennial plants, nematodes that affect them have the advantage of a year round source of nutrients and a suitable place for protection against extreme environmental conditions. In the Cyst nematode, the female body fills with eggs during the growing season. At some point the female dies and her body hardens, serving as protection for her eggs. Many nematodes have dormant stages in their life cycle that allow them to withstand extreme temperatures and lower levels of available nutrients. Another survival strategy used by nematodes is migration deeper into the subsoil to avoid environmental extremes.

ork. Note the lasso-type attack.

Management Practices

Management of these damaging pests should not be viewed in terms of eliminating nematodes from the site but in minimizing the symptoms they produce. There are a number of cultural practices that can be employed in minimizing damage. Symptoms produced by a pathogenic nematode infection are more apparent during times of water stress. Just supplying the turf with adequate amounts of water during these periods can drastically reduce the amount of above ground symptoms observed. Fertility needs to be maintained carefully. Adequate amounts of nutrients are needed to avoid stresses to the plant but excessive amounts can cause more damage due to abundant succulent root production that attracts nematodes. Avoiding water stress and maintaining adequate fertility levels are probably the most important factors to address, but also consider stresses produced by soil compaction and low mowing height.

Amending the soil by introducing peat, composts or sludges can greatly improve the structure of the soil. These amendments decompose producing organic compounds that have been found to be toxic to some nematodes. Soils with high levels of organic matter produce plants that are able to avoid many of the stresses previous discussed. They have been found to avoid drought stress more efficiently as a result of the soil retaining water for longer periods of time, being less prone to compaction, more rapid degradation of thatch, and plant developing better root systems. But the most important feature of organically amended soils is the higher populations of competing and predatory microorganisms.

Limited research has been conducted on the role of biological control organisms as possible management options. When we talk about biological controls in this case, we are talking about organisms that can be applied to the environment, establish themselves, and lower the populations of the pathogenic nematodes. Maintaining a biological system like this is very difficult. As pathogenic nematode populations decease due to the predator, so do the populations of the predatory organism. Many species of microorganisms, such as fungi, bacteria and actinomycetes, have been found to have antagonistic properties against pathogenic nematodes.

continued on page 10

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Nematodes

continued from page 9

Numerous fungi use nematodes as a part of their diet but a few have developed rather complex strategies for the sole purpose of trapping nematodes.

The Pesticide Management Education Program at Cornell also lists the following products as being labeled for nematode control, Ditera (listed as a biological), Amazin, Ecozin, Ornazin (Azadirachtin), Cladosan (Chitin), Champ Formula 2 (Copper hydroxide), and Safe-T Green 18 (Alcohols, C11-15-secondary, ethoxylated).

There are a group of fascinating organisms known as "nematode trapping fungi." Numerous fungi use nematodes as a part of their diet but a few have developed rather complex strategies for the sole purpose of trapping nematodes. Some fungi produce adhesive knobs and sticky hyphal branches that trap nematodes as they swim by. One fungus produces constrictive rings that close around the nematode as it moves through and brushes against the ring. The fungus produces a toxin that paralyzes the nematode and then digests it. One of the most interesting aspects to this story is the fact the these fungi only produce these constricting rings when nematodes are present. Currently there are no known commercially available products.

Chemical Controls

Nematicides are available as a chemical option for control of plant parasitic nematodes. However, the long term availability of these products is in question. Products that are currently registered for use in New York on turfgrass include methyl bromide, which is used as a soil fumigant when preparing a new site. Methyl bromide was scheduled to be phased out by the year 2000 but since no effective substitute is available, the phase out has been extended for a short period of time. For established turf, non-fumigants such as Mocap and Nemacur are available. Mocap works as a contact nematicide that is effective against ectoparasitic species of nematodes. Nemacur is a systemic nematicide that is taken up into the plant and therefore effective against endo- and ectoparasites. The Pesticide Management Education Program at Cornell also lists the following products as being labeled for nematode control, Ditera (listed as a biological), Amazin, Ecozin, Ornazin (Azadirachtin), Cladosan (Chitin), Champ Formula 2 (Copper hydroxide), and Safe-T Green 18 (Alcohols, C11-15-secondary, ethoxylated).

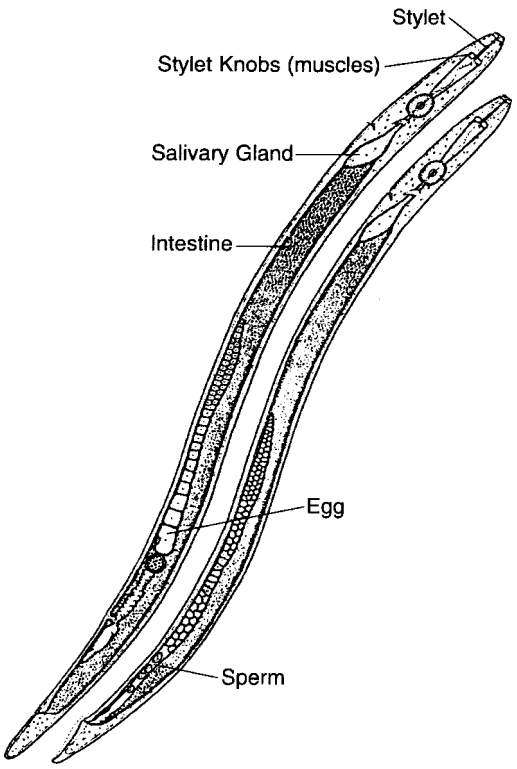
In conclusion, we hope to begin to learn more this summer about this important group of turfgrass pests as we conduct a population distribution sampling on a putting green at the Coun-

Hoplolaimus nematode on a turf root.

Root Knot nematode on a turf root.

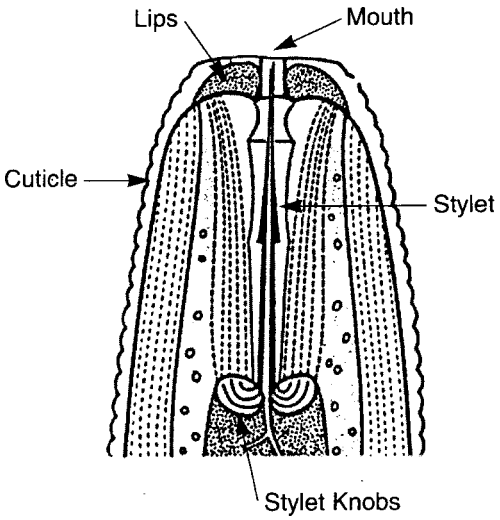
try Club of Ithaca. With the help of D. Cord Ozment and his staff we will collect samples from 115 grids across the putting green at three separate collection periods throughout the growing season. The green shows characteristic symptoms of nematode damage and an assay conducted last fall indicated that high levels of plant parasitic nematodes are present. Our survey will provide valuable information to turfgrass industry members and university researchers by focusing on the distribution patterns and population levels across a putting green to learn how varied the population can be and in turn determine the accuracy of our current sampling procedures.

KAREN L. SNOVER
DIRECTOR, PLANT DISEASE DIAGNOSTIC CLINIC
CORNELL UNIVERSITY TURFGRASS TEAM



Above: diagramatic representation of a typical male and female plant parasitic nematode.

Above right: side view of a nematode head.



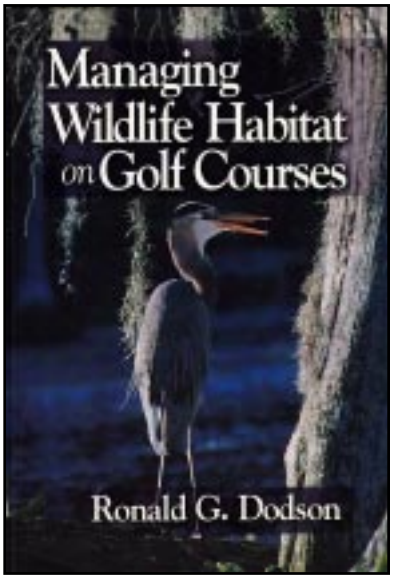
Short Cutts

continued from page 7

habitat perspective, some historical information on how golf and the conservation movement have evolved to a place where they share common interests. The remaining chapters establish a scientific basis for managing habitat and some practical tips for how to get started implementing these tips on your property.

Many golf turf managers hear of the steps being taken by those in the Audubon Program and have a sense that it is extra work to "do the right thing" for water quality and wildlife. This book should inspire those individuals to start doing "little things" to conserve resources and create habitat while maintaining the playability of the golf course. Whether it is adding landscape plantings, preserving nonhazardous tree limbs, encouraging aquatic vegetation, or engaging the community in the efforts, Ron has something in this book for all of us.

My favorite sections of the book are the last two on case studies and "the right thing to do". In these chapters, Ron provides an important call to action for the golf industry (including the golfers) to become conservation minded and promote the attributes of the human managed landscapes that enhance the quality of our life, not juts as golfers, but as members of a community. The case study section provides a nice overview of the various approaches taken by golf course superintendents regardless of the size of their budget. Implicit in this chapter is the sense that anyone can enhance the environmental quality of their landscape; all it takes is some information and a commitment. Ron provides some of the former and inspiration for the latter.



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Human Resource Update

Finding the balance between work and family begins with three Rs: recognize, reflect, and respond. To move toward a balance, you must:

- **recognize** ***the need to establish a healthy balance between work and family***
- **reflect** ***and plan to create alternatives for making it happen***
- **respond** ***and act to make it a reality.***

Healthy Individuals Equals Successful Businesses

Have you come to the end of a long day and still felt guilty about not working harder and longer? Have you felt guilty about not spending more time with your family and friends but still kept working? Have you worked long hours but wondered whether you were making any progress?

If any or all of these are common in your life, ask yourself if you feel that your life is in balance. Many managers working with turf – golf course superintendent, sod producer, landscaper — believe their work is a seven-day-a-week job. The health of the turf is critical to business productivity, but so is your health and that of your family. Research shows that those of us whose lives are in balance are healthier, and healthy individuals are more productive in their businesses. Time for regeneration (refueling your energy level) is important to your health. Vacations are a vital way to refuel, reduce stress, and energize family unity.

Maybe you've heard a story like this: "My dad always bragged that he didn't take a day off in 50 years. But after Mom died, he regretted that they never took that trip she dreamed of. He told me to be sure to get away with my family. I took his advice-and I'm glad I did."

The Three Rs

Finding the balance between work and family begins with three Rs: recognize, reflect, and respond. To move toward a balance, you must:

- **recognize** the need to establish a healthy balance between work and family
- **reflect** and plan to create alternatives for making it happen
- **respond** and act to make it a reality.

Recognize the Need

Different individuals find balance in different ways. What one does to regenerate energy levels and reduce work stress differs for each person. It may mean developing a hobby, getting more exercise, involving yourself in school activities of your children, finding time alone as a couple, socializing with family or friends, or taking a vacation.

In times of rapid change, as managers are currently experiencing, an unconscious voice often kicks in to say that there just isn't time for these activities. There is an unstated belief that if only one works harder, then problems will go away and things will get better.

But it doesn't work that way. Not only do the problems not get better, the stress resulting from the long hours and unsolved problems starts to pile up. That pileup often comes not just from the business but from the family as well, because there is little to no time remaining for the family.

In order to focus, this article will concentrate on the need for vacations. You probably can think of a hundred reasons why you shouldn't take a vacation. Here are some reasons you should:

- to rediscover your spouse and children
- to gain a clearer perspective on the business
- to create memories with your family that last a lifetime
- to catch up on lost sleep
- to develop confidence that this can be done again
- to reduce stress by focusing your energies on something else
- to discover how other people live

Reducing the stress of everyday business life can reduce the potential for accidents, improve communication with family members and employees, increase creative problem solving, and can improve your long-term health.

Reflect and Plan

Where should you go on vacation? When should you go? Who should go? Just as a business plan is needed to make your business a success, vacations will only become reality if concrete planning goes into it. Scientists have found that there are big differences between the genders and the generations with regard to time away from the business, so communication ahead of time is crucial.

Think ahead about what might need to happen to manage the turf work differently.

- Will you need to hire someone? If so, do a trial run ahead of time so you can train, observe, and supervise. We often expect those we hire to meet our standards without giving them proper explanations and directions about what and how we want things done.
- Is it possible with advanced communication and concrete planning to trade with neighboring families or with other members of the business?
- Vacations are sometimes a tool to give greater responsibilities to employees who have earned additional responsibility on a short-term basis.
- Consult with others in the industry about different ways to manage the business workload to create time for a vacation.

Respond and Act

Often part of the stress release of vacations is in the excitement and process of planning what to do. Remember, vacations don't always have to cost lots, particularly if planning goes into it or they are for a shorter amount of time.

Plan for contingencies if something goes wrong while you are gone. But, remember that no matter how much you plan, something unforeseen may occur. When you return, assess with the team you left behind what other problem-solving alternatives might be used next time you are gone.

A change in behavior doesn't occur without first being open to the possibility, talking about it, and then believing it will happen. There is a correlation between healthy individuals and successful businesses. Research indicates that individuals who take time away from work are better family members and better business people.

A 50-year-old golf course superintendent's wife talked about how she viewed the barriers to taking a vacation this way:

"Every time we've taken a vacation, my husband feels better physically and mentally when we return. He's rested, and upbeat. What stops him from planning vacations isn't money or people to fill in-because he has those, at least for the moment. It's this notion that he is indispensable, and no one else can do things quite as well when he's gone. Once we get beyond that, it's no problem!"

Information and communication along with problem solving through shared decision making (among business members, with employees, and with suppliers' personnel) are critical factors for viable turf operations today. To do this well you need energy-physical, mental, and emotional). Taking vacations creates a larger pool of energy from which to build a successful business or manage a successful golf course.

Recognize that vacations are important for maintaining your overall health and to the successful operation of your business. Reflect and plan now to create alternatives that allow that to happen. But, most of all, respond and act to make it become a reality in the near future.

Sharon M. Danes
Professor, Department of Family Social Science,
University of Minnesota
Robert A. Milligan
Cornell University Turfgrass Team

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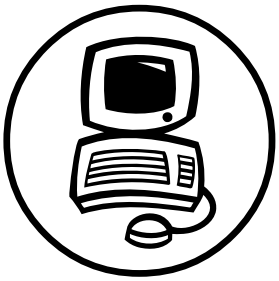
A golf course superintendent's wife reported a common impediment to taking a vacation: "It's this notion that he is indispensable, and no one else can do things quite as well when he's gone. Once we get beyond that, it's no problem!"

Don't Forget the Mini-Breaks!

Vacations are important for maintaining balance between work and other activities. Also important is developing habits that relieve the stress of work and create quality time away from work and with your family and friends. Research shows that ***how*** you spend time with your family is at least as important as ***how much*** time you spend. Try some of the following:

- Schedule time during the day when all family members are together. Talk about the day. Ask each person to share one or two positives from their day-a new friend, an accomplishment, something learned, an exciting experience with an old friend.
- Go for a walk. Don't look for weeds in the turf or problems with the fairways. Listen to a bird sing, watch a butterfly flit by, marvel at a beautiful flower or the quiet of the countryside.
- Read something you enjoy. You need not spend a long time. A chapter or a few pages a day really adds up. A short period of reading or reflection is very important to many very successful people.

Updated Web Page Released for the Plant Disease Diagnostic Clinic



New Resource

The updated site was a huge undertaking resulting in the design of 9 host plant pages with 151 images of individual host plants and the creation of 151 individual fact sheet listing pages.

Take a few moments to check out the new site at http://PlantClinic.cornell.edu and pass on any of your comments to the staff.

A new version of the Plant Disease Diagnostic Clinic's Web Page was released on March 21, 2000. This version includes a new approach to viewing the fact sheet database available to visitors. Previously fact sheets were listed alphabetically under commodity type categories. This was difficult for users with little background in plant diseases due to the cumbersome process of trying to narrow down which fact sheets might be useful for their current problem.

The new Website approaches this problem by first listing host plants within larger commodity type groups. For example, if you select "Annuals and Perennials," you will be sent to a page describing how to submit a sample and have other options for proceeding. One option is to select the "Annuals and Perennials Fact Sheets" which will link you to the beautiful, new host plant listing page. Once a host plant is selected, the available fact sheets are listed that may affect that host plant.

The updated site was a huge undertaking resulting in the design of 9 host plant pages with 151 images of individual host plants and the creation of 151 individual fact sheet listing pages. The "Turf" section does not break down the fact sheets by host plant since many pathogens affect many turf species. The fact sheets themselves were redesigned to include colorful images, lifecycle diagrams, and updated information. The new pages are very colorful, inviting, fast to download on most computers, and user friendly. Our next step is to add new fact sheets to the system. Take a few moments to check out the new version at http://PlantClinic.cornell.edu and pass on any of your comments to the staff at the Plant Disease Diagnostic Clinic, 334 Plant Science Bldg., Ithaca, NY 14853, (607) 255-7850.

Turfgrass ShortCUTT: Timely, Easy-to-Use, Research–Based Information

As we are challenged by drought, new diseases (bentgrass dead spot, gray leafspot, etc.) and ever-present environmental debates, the most efficient means of dealing with these issues begins and ends with information and experience. Yet, always there is more new information than we can keep up with.

The Cornell Turfgrass Team has established a long tradition of conducting important fundamental scientific research focused on turfgrass management. We have scientists who are recognized as ***the*** experts in their field. This includes biological control, soil insect management, turfgrass ecology and environmental quality. Still, much of this information is not effectively transferred to you, the end-user, in a form that makes it easy to implement.

In the last few years we have committed significant resources to addressing this information transfer need. In 1998 we initiated the Turfgrass Hotline, now known as *Turfgrass ShortCUTT* (CUTT=Cornell University Turfgrass Times), a weekly, two page newsletter delivered by noon each Monday during the growing season via electronic mail or FAX.

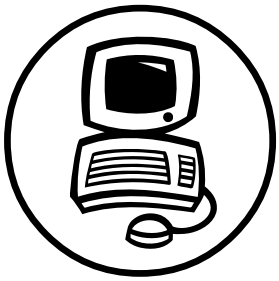
ShortCUTT includes comprehensive regional weather information, including a weekly forecast; regional pest observations available from turf educators throughout the Northeast, including USGA Northeast Regional Agronomists; cultural and pest management recommendations based not only on current weather patterns, but also on the latest research available from around the world; finally, each week a national expert is interviewed on a relevant topic such as nematodes, cutworms, bentgrass deadspot, annual bluegrass decline, etc.

In an effort to get this research-based information into your hands when you can most easily use it, without taking your valuable time, we utilize electronic delivery via email or FAX and synthesize the information into a two page format. We received some grant money to get the project going. Now, as the grant funds are expiring and the publication must become self-supporting, we are offering annual subscriptions for the turf industry. Currently, our pricing is $75 per year via email, $100 per year via FAX. NYSTA members enjoy a 10% discount.

Now is the time to take advantage of this exciting and innovative approach to having the latest research-based information at your fingertips during the growing season. Act now! Send in the subscription form with your payment to obtain *ShortCUTT*, your weekly advantage toward success.

CORNELL Turfgrass Short CUTT

Your Weekly Link to Turfgrass Information!



New Resource

ShortCUTT *is a weekly newsletter delivered each Monday during the growing season via email or fax.* ShortCUTT *includes comprehensive weather information, a weekly forecast, pest observations from turf educators throughout the Northeast, and cultural and pest management recommendations based on the latest research available from around the world.*

YES! Sign me up for the weekly Cornell Turfgrass ShortCUTT

- ☐ $75 enclosed for one year EMAIL subscription (NYSTA members $67.50)
- ☐ $100 enclosed for one year FAX subscription (NYSTA members $90)

Name: _____

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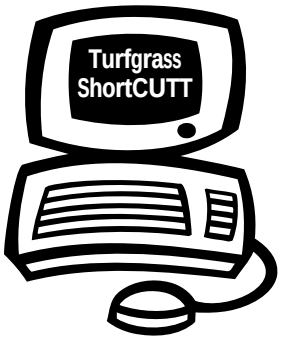

Please send check or money order and return this form to: Cornell Turfgrass ShortCUTT 20 Plant Science Bldg., Cornell University, Ithaca, NY 14853

Grub-X Active Ingredient Changes

IPM Integrated Pest Management

IPM Corner

The active ingredient in Scott's grub control product, Grub-X, has recently been changed. There are several important differences between the products, so be sure to check the bag label before purchasing or using Grub-X.

Be aware that the active ingredient in Scott's grub control product, Grub-X™ has recently been changed. The product was previously formulated with Imidicloprid, the same active ingredient found in the commercial product Merit™. Grub-X produced this year contains Halofenozide, an insect growth regulator, also found in the commercial product Mach 2™. As of the writing of this article, the new Grub-X product has not been registered in New York State, but Scott's will continue to sell their old Imidicloprid stock in New York. There are several important differences between these products, and Halofenozide is not legal on Long Island. Be sure to check the label on the bag before purchasing or using Grub-X™.

Imidicloprid typically provides season-long control of most grub species and other turf feeding insects. A late-spring application should last through the new summer-fall generation of grubs. Halofenoizide has less residual activity than Imidacloprid, and therefore a shorter window of effectiveness. It can be applied late-June through mid-August. Beware that Halofenozide performance is highly dependent on your target grub species. Halofenozide activity is good against Japanese beetles, moderate against Oriental beetles, poor against European Chafers and ineffective against Asiatic garden beetles. Both Imidicloprid and Halofenozide take several weeks after application to become effective, and should be applied no later than first instar grubs.

JENNIFER GRANT
CORNELL UNIVERSITY TURFGRASS TEAM

Details on Turfgrass ShortCUTT can be found on page 15.

CORNELL Turfgrass

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