

CHEMICAL LOG

Managing Insect Outbreaks

By Dr. Mark S. McClure

One of the most difficult tasks facing sports turf managers and golf course superintendents is protecting trees from insect outbreaks. Insect outbreaks come upon trees quickly with little or no warning, and the damaging effects are often immediately apparent and quickly irreversible.

Many of the most damaging insect outbreaks involve species that were accidentally introduced from other areas of the world. Perhaps the most conspicuous and familiar of all introduced insect pests of trees in the Northeast is the gypsy moth. Indeed, outbreaks of this insect, which tend to occur on an eight- to 10-year cycle, are quite dramatic. Substantial economic and aesthetic losses often result in thousands of acres of urban and rural forests and shade trees.

On the positive side, mortality to deciduous trees following a single gypsy moth attack is uncommon. Instead, individual trees generally survive defoliation and subsequently re-foliate with little or no lasting ill effects. However, repeated defoliation does greatly increase tree mortality.

Far more destructive and potentially threatening are the less familiar piercing and sucking insects that were accidentally introduced from Asia during this century. They have become destructive pests of hemlock, pine and several other trees in both forest and ornamental settings in the East.

Insects, such as the hemlock woolly adelgid, the elongate hemlock scale and the red pine scale offer unique and difficult challenges because of their persistently high population densities and their sudden and severe impact on their new host plants. Even vigorous hemlocks and pines have shown no resistance to the buildup of injurious adelgid and scale populations. Important natural enemies in Asia have been ineffective in North America.

The **elongate hemlock scale**, *Fiorinia externa*, feeds on the needles of hemlock by sucking cell fluids from the mesophyll. In the United States, its densities often increase rapidly to levels that cause needles to discolor and drop prematurely, resulting in branch dieback. Hemlocks infested with these scales for five years supported only one-third the total foliar biomass, and they produced

only half as much new growth as their uninfested counterparts. Five to 10 successive years of this photosynthetic deficiency usually kill the tree.

The **red pine scale**, *Matsucoccus resimosae* and the **hemlock woolly adelgid**, *Adelges tsugae*, feed on the young twigs of pine and hemlock. They suck sap from the phloem parenchyma. The adelgid probably also injects a toxic saliva while feeding. This feeding causes rapid desiccation and drop of needles, dieback of main limbs and usually death of the tree within two to four years.

Effects of Fertilization

Changes in the quality of hemlock and pine feeding sites as a result of the insect damage has been shown to have a profound effect on insect population levels. As the insects injure their host trees by repeated feeding, their performance on these trees decreases. Fewer nymphs survive overwinter and during the growing season. This produces fewer offspring. Reduced performance has been linked to nutrition.

The nutritional quality of food for piercing and sucking insects generally is related to the quantity of organic nitrogen available to nymphs. Extensive studies have demonstrated the importance of nitrogen to the performance of these species on pine and hemlock.

For example, fertilization experiments revealed that nymphs of elongate hemlock scale incurred 13 percent less mortality and each adult produced 45 percent more offspring on hemlocks whose foliar nitrogen concentrations had been elevated only one percent above the unfertilized controls.

The performance of hemlock woolly adelgid also was enhanced by fertilization. Nymphs incurred 48 percent less mortality and each adult produced twice as many offspring on fertilized trees as on unfertilized ones.

Evidence from other studies suggests that fertilization with nitrogen may be of some use in an integrated management program for chewing insects, such as beetles, caterpillars and sawflies. However, piercing and sucking insects, such as adelgids, aphids and scales generally are favored by an increase in the nitrogen concentration of plant sap, thereby aggravating the problem.

Control Options

Although healthy trees are often susceptible to these outbreak insects, populations are generally higher and more destructive on stressed trees. Therefore, maintaining tree vigor is an important component of any pest management program.

Chemical control of many outbreak insects is possible in ornamental settings where you can thoroughly drench the trees with pesticides. This requires early insect detection and quick action. You need to apply controls before trees become severely or irreversibly damaged.

Horticultural oil, insecticidal soap and several petrochemical pesticides, such as diazinon and malathion, are effective in controlling adelgids and scales on hemlock. As yet, there are no effective controls for pine scale.

Spray-applied control is virtually impossible on very large trees or in forested areas because you can't spray the trees thoroughly. Incomplete pesticide spraying usually results in the rapid resurgence of pest populations.

Stem injection of Bidrin and Metasystox and stem implantations of Acephate may provide six months control of adelgids and scales on hemlock. These methods can be impractical when large numbers of trees are involved.

A successful program for managing insect outbreaks may ultimately require the identification or development through genetic manipulation of effective natural enemies and more resistant host trees.

The subject of insect outbreaks remains complex and highly controversial. Entire volumes have been devoted to a discussion about the nature, the causes and the effects of insect outbreaks, including **Insect Outbreaks** by Barbosa and Schultz published in 1987 by Academic Press. This book is recommended for anyone who would like more in-depth information on the general nature of insect outbreaks. □

Dr. Mark S. McClure is chief scientist of the Valley Laboratory of the Connecticut Agricultural Experiment Station, Windsor, CT. His search for a solution to introduced pest problems has taken him on extensive study tours in Asia.

STMA IN ACTION

ASSOCIATION NEWS

STMA—Chapter News

With the official formation of the Northeast Chapter on August 12, STMA now has seven regional chapters. We'll use this space each issue to alert you to news you can use—special meetings and events, chapter happenings, member activities. Regional meetings help STMA members keep up-to-date on the latest in sports turf management and provide a forum for interaction between individuals facing similar problems.

Chesapeake Chapter: STMA—As part of the Chesapeake Chapter's outreach to sports turf managers throughout the area, a quarterly meeting will be at the Reading Phillies Baseball Stadium, Reading PA, from noon to 3 p.m. on September 23. All members, potential members, and those curious about what STMA might offer them are invited to attend. This meeting will be an informational session, covering details of the chapter's current position and sharing plans for the future. It's a great opportunity to find out more about the chapter and its goals—and to make connections with other sports turf professionals.

For specific information on this meeting, contact Dan Douglas, head groundskeeper at (215) 375-8469.

For additional information on the chapter and its programs, contact Ray Flood at (301) 405-3320.

STMA Florida Chapter #1: The Florida Chapter meeting originally scheduled for August 11 was postponed. The new date will be announced in the near future. The event will still be held at the South Campus of Florida International University in South Miami from 9 a.m. to 2 p.m. The meeting educator will be Mary Lambert of the Dade County Cooperative Extension Service. Sprayer calibration is the topic. Carol Cloud Bailey, FIU, will host the meeting.

A meeting will be held from 9 a.m. to 2 p.m. on November 3 at Pompano Stadium in the City of Pompano (the North Fort Lauderdale area). Topics to be covered include: pitchers' mound and

homeplate building, field dragging techniques, the use of Turface on ball fields, and how to make and use stencils. Tom Curran will host the meeting.

For information on the benefits of involvement with the South Florida Chapter, or for details on meetings and chapter activities, contact John Mascaro (305) 938-7477 or Ed Birch (305) 938-0217.

Colorado Chapter Sports Turf Managers Association—Will your fields be the site of a cold-weather sporting event? Plan to attend the CCSTMA "End of the Seasons" Workshop on September 24, from 9 a.m. to 4 p.m. at the City of Greeley Parks. Part of the program will focus on hints for handling late fall and winter events, such as Thanksgiving, Winter, or "Snowball" Tournaments. Also covered will be the multiple aspects of putting fields to bed for spring play, including aeration, fertilization, and cover. Contact Marl Leasure of the Colorado Springs Sky Sox at (719) 338-0381 for details on this workshop.

For further information on the Colorado Chapter, contact Bill Whirly at (303) 221-6660.

Midwest Chapter: STMA—The Midwest Chapter is in the midst of planning new programs and activities. Watch for specific details in next month's report.

For information on the chapter and its goals, contact Mike Trigg, Waukegan Park District (708) 360-4750.

Iowa Sports Turf managers Association—For information on the Iowa Chapter and pending activities, contact Gary Peterson at (515) 792-6433.

Carolina Chapter: STMA—With multiple planning sessions taking place during August, the Carolina Chapter is laying the groundwork for future special events. For information on the Carolina Chapter and its activities, contact Marc Farha (Facility Manager of the Charlotte Knights) at (704) 332-3746.

The Northeast Chapter: STMA—The newest edition to the STMA regional chapters, this organization was offi-

cially formed on August 12.

For further details on the new chapter and its pending activities, contact Bernie Keohan, Department of Facility Maintenance, Harvard University, at (617) 495-5929.

California Institute Set For Santa Anita

Speaker and topic line-ups are set for the California Sports Turf Institute at Santa Anita, which will be held September 29. The program is as follows:

8 a.m.—Registration and Morning Workouts (horses in training).

8:30 a.m.—Opening Remarks, Dr. Gil Landry (STMA President).

8:40 a.m.—"Soil Amendments, Take Control!" Lou Haines, Innova Corp.

9 a.m.—"In-Season Maintenance on an NFL Field," Steve Wightman, Jack Murphy Stadium

9:30 a.m.—"California Fertility Schedule and Material Choices," Jerry Brown, Lesco, Inc.

9:50 a.m.—Break, coffee and pastries.

10:05 a.m.—Turf Course Workouts (horses in training on turf course).

10:20—"Dirt Track Construction and Maintenance," O.M. Matkin, Soil and Plant Labs and Steven Wood, Santa Anita Track Superintendent.

10:50 a.m.—"Turf Course Construction and Divot Replacement," Dr. James Beard, International Sports Turf Institute, Stephen Guise, Turf Course Superintendent.

11:30 a.m.—"Irrigation Audits: Where To Start?" Don Ackley, Coachella Valley Resource Conservation District.

12 noon: Lunch and Trade Show in Plaza de la Fiesta.

12:30 p.m.—Equipment Demonstrations and Workshops.

1:30 p.m.—"Irrigation Repair: Know The Basics!"

For more information contact Stephen Guise, (818) 574-6378, fax (818) 445-4202.

PRESIDENT'S MESSAGE

Dr. Gil Landry, Jr.

The Sports Turf Managers Association (STMA) has encountered and conquered several significant challenges through the first three quarters of this year.



All organizations face challenges on a daily basis, just as we do individually. Challenges spur change. We have worked hard to meet the challenge of change and we will continue to do so.

Our number-one challenge as we enter the fourth quarter of this year is the success of the Fourth Annual Sports Turf Managers Association Conference at the Indianapolis Convention Center and Hoosier Dome in Indianapolis, IN, December 13-15.

As many of you already know, this year we are hosting our conference in conjunction with the 23rd Annual National Federation Conference of High School Directors of Athletics. The benefits of a concurrent meeting and exhibition are numerous. Registered delegates from both organizations may attend any STMA or National Federation workshops, seminars, and/or general sessions. Besides sharing programs, we also are sharing the exhibition hall.

STMA member David Minner has teamed with our Executive Director, Bret Kelsey, and the National Federation's Assistant Director and Show Manager, Brad Rumble, to concentrate on conference logistics. These three individuals are working diligently to develop a valuable and enjoyable conference. Exhibitor and registration materials are forthcoming. If you are interested in more immediate information, feel free to contact Bret at (312) 644-6610. Otherwise watch for these materials, complete them, and send them back to STMA headquarters.

Sports Turf Managers Association

July was an especially active month for our chapters around the nation. The South Carolina, Midwest, and Colorado chapters held institutes that featured everything from renowned sports figures, such as Chip Toma, Danny Ford, and Irv Brown to facility tours of impressive structures, such as Furman University's Paladin Stadium and the U.S. Air Force Academy's 178-acre Multi-Use Athletic Facility. In addition, the University of Portland played host to the Northwest Regional Sports Turf Institute, which was spearheaded by Tom Cook.

More than 300 sportsturf professionals across the nation participated in the workshops and tours offered by these institutes. Credit is due to those individuals who took the lead in organizing these programs. Special thanks to Bucky Trotter, Mike Trigg, Bill Whirly, Tom Cook, and their assistants. Your work is a shining example of the need this professional organization is dedicated to fulfilling.

Please take a moment to review the Calendar of Events listed in this magazine. You'll see more institutes scheduled for this year: the California Regional Sports Turf Institute coordinated by Stephen Guise and the Northeast Regional Sports Turf Institute coordinated by Mary Owen.

As President Teddy Roosevelt said, "Every man owes part of his time and money to the business or industry in which he is engaged..." The sports Turf Managers Association exists to, among other things, enhance sports turf managers' professionalism. Education is an integral part of being a professional. All the people mentioned in this column are professionals dedicated to fostering professional development through education. I encourage you to mold your professional image through STMA.

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JACKLIN DONATES EQUIPMENT TO BEIJING UNIVERSITY

Jacklin Seed Company has donated seed testing equipment to the Seed Laboratory of Beijing Agricultural University. The equipment includes a MI S-100 microscope inspection station, a Unitron ZSM microscope, and a 150W Halogen fiberoptic light.

The equipment will assist with the development of seed testing standards and procedures, which will be standardized by United States rules, and facilitate joint seed trade between China and the U. S.

Jacklin Seed Company was selected to be the first honorary member of the China Pratacultural Association. The C.P.A., which is comprised of more than 6,000 seed producers and marketing companies involved in seed production and reclamation throughout China, is directed toward controlling China's seed quality standards; encouraging the planting of improved turf; forage and reclamation grasses; improving the quality of membership; encouraging forage grass production for improved animal nutrition; and promoting the growth of reclaimed grasses for deserts and eroded areas.

RUTGERS GOLF TURF MANAGEMENT SCHOOL ACCEPTING APPLICATIONS

Applications are being accepted for the two-year Rutgers Professional Golf Turf Management School. The program covers turfgrass establishment, maintenance of greens and tees, plant pathol-

ogy, entomology, weed identification, as well as management and writing skills.

The course is recommended for superintendents, assistant superintendents, greenskeepers, irrigation technicians, and mechanics who have a minimum of two years experience working in turf management.

The winter session will be held January 4 through March 12. Applications must be received by October 30.

For more information, contact the Office of Continuing Professional Education, Cook College, P.O. Box 231, New Brunswick, NJ 08903 or call (908) 932-9271.

DYE BEGINS CONSTRUCTION IN EUROPE

Perry O. Dye Designs International, Inc. broke ground on its first project in Europe—Schloss Seltenheim Golf & Country Club near Klagenfurt, Austria. The company will be collaborating with Kanovsky Golf construction of Klagenfurt and G & G Hauser Golf & Landscape of Vienna, Austria.

The 18-hole championship golf course will be designed around Schloss Seltenheim, baronial home of the Hapsburg family. Dye will also provide other services, including construction, supervision, shaping, and maintenance consulting beginning with grow-in.

Klagenfurt is Austria's southernmost "provincial" capital and a resort area centered around Lake Worthersee. With the establishment of a site office at seltenheim, Dye expects to coordinate all other European business from this centralized location.

WARREN'S TURF NURSERIES ACQUIRES TURF MERCHANTS

Warren's Turf Nurseries of Crystal Lake, IL has acquired Turf Merchants, Inc.

Warren's Turf Nurseries has been involved to a small extent in the turf seed business for nearly 30 years. The company became more directly involved with the acquisition of Davenport Seed Corp, a producer and processor of both turf and reclamation seed.

Customers and growers should expect "business as usual" in their dealings with TMI. The management, sales, and operations employees are expected to stay with the ongoing operation.

HILLS IS ASGCA PRESIDENT

Arthur Hills of Toledo, OH, was elected president of the American Society of Golf Course Architects during the organization's annual meeting at the Southampton Inn on Long Island, NY.

Hills has designed more than 100 courses and renovated more than 70 others throughout the United States and abroad during the past 25 years. His designs include Eagle Trace, Coral Springs, FL; The Champions, Lexington, KY; Shaker Run, Middletown, OH; and Stonecreek, Paradise Valley, AZ. His firm has also been responsible for extensive remodeling work, including the University of Michigan Golf Course originally designed by Allister Mackenzie in 1930.

HALE IRWIN TO DESIGN THE MEADOWLANDS

Hale Irwin Golf Services, Inc. has been commissioned to design the golf course planned for The Meadowlands Golf community, located in Davidson County between Winston-Salem and High Point, NC, a 600-acre master planned golf community that will include a residential development, a tennis club, a swim club, and an equestrian center.

The course is planned to be an 18-hole par 72 semi-private country club.

Currently Hale Irwin Golf Services is designing clubs in Colorado, Florida, South Carolina, California, Illinois, and Idaho.

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PRODUCT UPDATE

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The Dakota Topdresser Model 220 can apply seed, fertilizers, chemicals, sand, peat or other soil amendments. It will meter, mix, and topdress four of these products into one application. It has a built-in stacking conveyor to stockpile different mixes for renovations or divet mixes.

The unit has eight independent smooth turf tires to minimize compaction of sports turf facilities or golf greens.

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The Zig-Zag six-foot brushing unit consists of four two-foot-long brush sections mounted on a main frame so that each brush is operating at an angle.

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ment of top dressing materials down to the base of grasses with very few passes. It is also effective for "working in" sand on an artificial turf.

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Because of its stability on soil surfaces, pendimethalin is capable of working on germinated weeds throughout the season.

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