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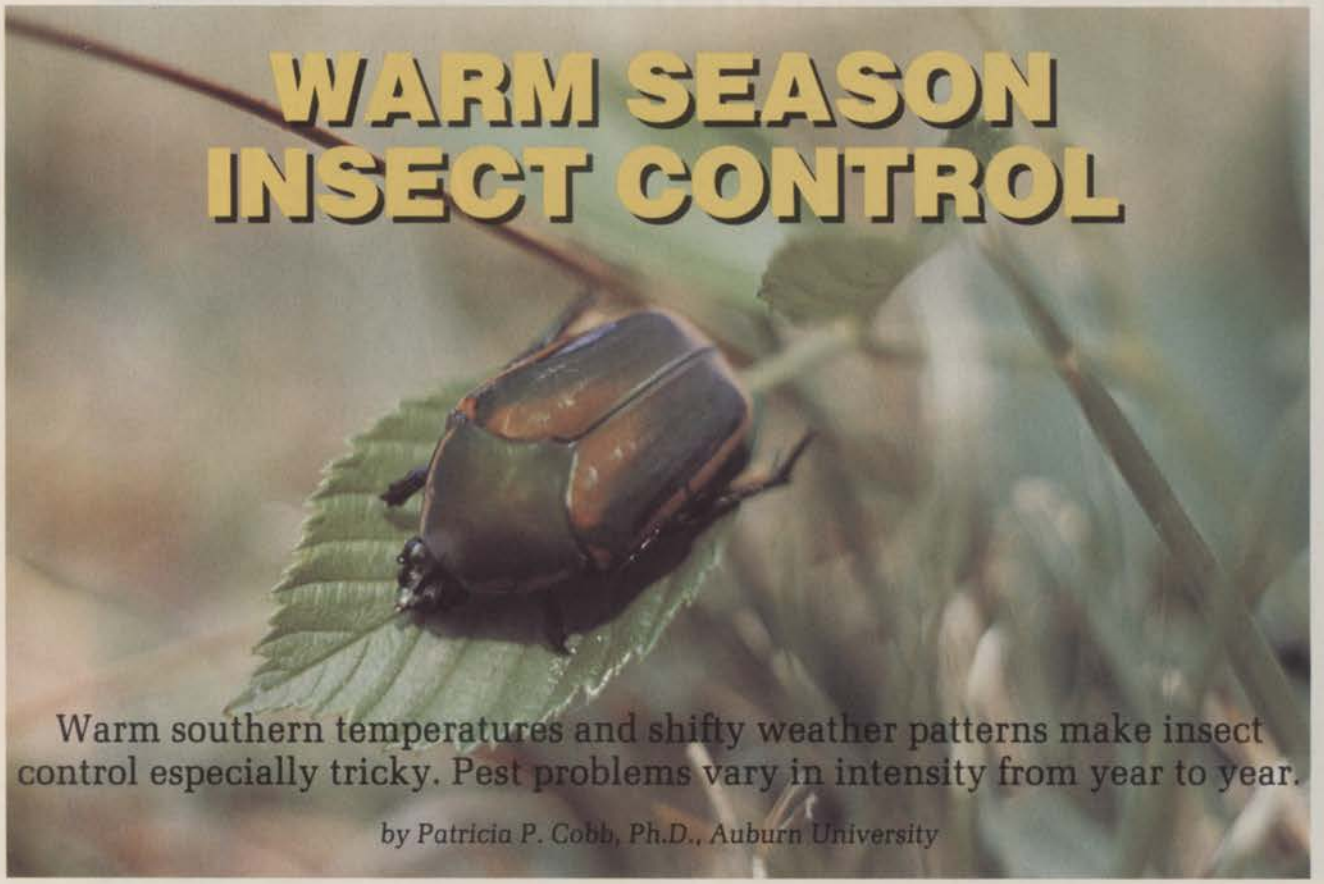

WARM SEASON INSECT CONTROL

Warm southern temperatures and shifty weather patterns make insect control especially tricky. Pest problems vary in intensity from year to year.

by Patricia P. Cobb, Ph.D., Auburn University

Managing turfgrasses in the south is a great challenge. The wide variety of grasses now grown in the South brings into focus the diversity of associated pest problems.

The increase in insect problems, coupled with increased environmental concerns and costs of control strategies have caused southern turf managers to take a new look at all aspects of insect control.

Importance of cultural control

Total management schemes are nothing new. However, an awareness of how all aspects of growing and maintaining healthy turfgrass influence pest control strategies continues to increase. Insect control on turf in the South is a year round job. Although actual control efforts can extend from March through November in some areas, most southern turf managers consider insect control to be a part of a total management scheme for growing grass, one that goes on all year.

Each year brings with it a unique set of conditions that contribute to the development of turf pest problems.

Weather patterns this past season provided conditions which favored development of various pests. Abundant spring rains in the Southeast contributed to optimum requirements for two-lined spittlebug survival at this time. Damage on lawns in many areas was first reported in May rather than mid-June. Later, extreme drought conditions in these same areas discouraged spittlebug survival, but favored the buildup of fall armyworms and chinch bugs.

Fire ants establish colonies most frequently after spring and fall rains, and were numerous again last season during these times. During drier months last year, fire ants were sometimes found in equipment and structures. Fire ants infest the Southeast, but potentially can spread to areas along the Pacific coast.

Return of the webworm

The "usual" turf pests—grubs, mole crickets and fire ants—continue to be the "big three" in the Southeast. However, this past season was the second year tropical sod webworms were reported to be damaging turf in areas along the Gulf Coast westward into Louisiana.

These pests are typically found in central and south Florida and are resistant to most insecticides. They were controlled with formulations of *Bacillus thuringiensis* varieties such as Javelin WG.

Biological control agents continue to hold promise for controlling some pests. Insect-attacking nematodes and parasitic red-eyed flies have been released in Florida to help in the battle against mole crickets. Prior nematode releases resulted in mole cricket supression in test areas to the degree that mole crickets at those research sites were not a damaging problem. In addition, tests with parasitic nematodes for control of surface feeding caterpillars are under way. Also in Florida, a fungus—if application tech-

The TOP 10 Warm Season Insect Targets

Pest	Spring March-May	Summer June-August	Fall-early winter Sept.-Dec.
1 Mole crickets 	Map areas of overwintered mole cricket activity for treatment of nymphs in May-July. Treatment of overwintered populations is optional in most areas, and does not replace treatment of nymphs. Tunneling can be reduced with Orthene sprays (3.5 lb. ai/acre). Keep grass roots in contact with the soil, fertilize, and water grass as recommended. Monitor areas mapped weekly with soap flushes to determine when hatching begins. If hatching occurs before June treat as recommended for summer.	Apply one of the following within six weeks after first observed hatch: Mocap (7.5-10 lb. ai/acre), Oftanol in areas where used no more than two years (2 lb. ai/acre), Triumph[2] (2 lb. ai/acre/season), Turcam (2 lb. ai/acre) or Sevimol (6-8 lb. ai/acre). Spot or area treat later in the summer with Orthene (2·6-3.5 lb. ai/acre) or Dursban bait (75-150 lb./acre).	Spot treat with Orthene of Dusban bait or Triumph (if not used earlier) as recommended for summer.
2 Grubs 	Map areas of spring damage and monitor later in summer for reintestation control during late March-early April is "second-best" and does not extend to new generation grubs in late July-August.	Map grub infestations and treat these areas. Late July-August treatments may include Turcam (2-4 lb. ai/acre), diazinon[3] (4 lb. ai/acre), Triumph[2] (2 lb. ai/acre) or Mocap[1] (5 lb. ai/acre). Irrigate before treatment in hot, dry conditions.	Treatments are effective most years through Sept. Proxol (8 lb. ai/acre) or Triumph[2] (2 lb. ai/acre) are effective for late-season control. For green June beetle' registered formulations of carbaryl (Sevin, 2 lb. ai/acre) are effective.
3 Fire ants	Area treat April through May infested turf of an acre or more with a broadcast application of a fire ant bait: Amdro (1.5 lb. bait/acre); Affirm (1 lb. bait/acre); Logic (1-1.5 lb. bait/acre). Wait a week, mound treat visible mounds with a registered formulation of a contact insecticide such as diazinon[3], Dursban or Orthene.	Treat mounds as reinfestation occurs as recommended for spring. 	Area and mound treat as described for spring in heavily-infested areas. Apply controls when worker ants are actively foraging. Irrigate before treatment if drought conditions exist.
4 Chinch bugs (Southern)	Replace susceptible turf with resistant or non-host varieties. Treat overwintered adults when they become active in March or nymphs in April-May with diazinon[3] (4 lb. ai/acre); Dursban (1 lb. ai/acre); Triumph (1 lb. ai/acre), Tempo 2[4] (.14 lb. ai/acre); or Oftanol (2 lb. ai/acre). Control thatch as recommended.	March-May treatments usually prevent summer damage. Wet springs may delay population buildup, and therefore treatment. Treatments delayed till summer are as recommended for spring. Damage limited to sunny areas.	Spring or summer treatments usually make late season applications unnecessary. 
5 Two-lined spittlebugs 	Monitor turf and landscape areas for nymphs. Infested turf is "squishy" when walked on. Some years nymphs are present in spittle masses in May. Control thatch as recommended.	Mow, irrigate several hours or the day before treatment. Diazinon[3] (4 lb. ai/acre); or Dursban in less thatchy turf (1 lb. ai/acre) are effective controls. Damage resembles chinch bug damage, but usually first appears in shady areas.	Treat reinfested areas in early September as recommended for summer. Further fall treatment is not required.
6 Sod webworms	Common sod webworms emerge as adults in most areas in April. Time treatments of infested turf two weeks after peak moth flight. Turf moderately damaged will usually grow out, and treatment can be delayed until the summer generation (S). Diazinon[3] (4 lb. ai/acre); Dursban (1 lb. ai/acre); Proxol (6 lb. ai/acre); Orthene (1/3 lb. ai/acre); Tempo 2[4] (.09 lb. ai/acre); or b.t. formulations may be used when larvae are present.	Treat when larvae are present or as described for spring. Tropical sod webworms should be controlled as young larvae with b.t. formulations such as Javelin WG. 	Treatment in early September in more southerly areas may reduce overwintering populations.
7 Cutworms 	Treatment is not usually necessary until late March or April. Apply insecticide late afternoon and irrigate as label requires. Treatments include Dursban (1 lb. ai/acre); Proxol (6-8 lb. ai/acre); and Sevin (2-4 lb. ai/acre).	In the South, cutworms are usually a spring (and sometimes fall) problem. If summer infestations occur, treat as recommended for spring.	Treat as recommended for spring.
8 Billbugs 	Treatment of adults can be done when they become active. These include diazinon[3] (4 lb. ai/acre), Dursban (1 lb. ai/acre), Oftanol (2 lb. ai/acre), or Triumph[2] (1 lb ai/acre).	Treat billbug grubs with grub rates of Turcam or Triumph (if not used earlier), or diazinon[3].	Billbug infestations discovered now are more difficult to control.
9 Fall armyworms 	Treatment not needed at this time.	Populations usually develop during July-September. Treatments are most effective in early morning or late afternoon. Use Dursban (1 lb. ai/acre); diazinon[3] (4 lb. ai/acre); Proxol (6-8 lb. ai/acre); or Tempo 2[4] (.09 lb. ai/acre).	Apply as directed for summer. Fall armyworms are usually a greater problem in September.
10 Ground pearls	Fertilize, dethatch, lime, etc. as recommended. No insectcide has been found to be effective.	Avoid drought stress, disease and other pressure. No insecticide has been found to be effective.	Avoid drought or other stress.

[1] Golf courses and sod farms. [2] See soil restrictions; use only 2 lb ai/acre/season. [3] Not for use on golf courses or sod farms. [4] Home lawns only.

The two-lined spittlebug may become established deep within the turf during May.

Cultural strategies

Equipment repair, records and inventory review, and continuing educational opportunities for staff during winter months are all important aspects of pest management.

Mapping areas of pest activity may narrow both treatment area and amount of pesticide.

A knowledge of pest history at a site and knowledge of potential insect pests specific to location are important only in the context of frequent inspection of the turf. Proper fertilization, mowing and water usage promote healthy turf which can recover quicker from pest damage. Thatch management may discourage development of some pests or enhance pesticide performance when properly timed treatments are necessary.

Watch pH breakdown

The pH of the spray water may influence the effectiveness of insecticide spray applications. Some insecticides break down in high pH water. Trichlorfon (Proxol), acephate (Orthene), and isazophos (Triumph, 9 or above) are some examples. Chlorpyrifos (Dursban) generally does not. Usually, the more water-soluable materials are more susceptible to breakdown at high pH. Pretreatment irrigation may make the difference between success and failure during dry, hot periods. Pretreatment watering does not replace watering after insecticides are applied. Rather, pretreatment watering moves soil pests closer to the surface because they are more active in moisture than dry soil. This makes contact with the insecticide or survival of biological control agents more a possibility.

No endorsement or exclusion of registered products is intended.

—*Dr. Cobb*□

niques can be developed—may be useful in combating fire ants.

Biological reminders

What has been learned from the use of "milky spore" for Japanese beetle and nematodes for mole cricket control can serve as reminders:

1. Susceptible pests must be present in great enough numbers for biological control agents to become established.

2. Environmental requirements (moisture, temperature, etc.) for establishment of pathogens must be met.

3. Control may be slow and result in supression rather than elimination of the pests. Supression is a more long term solution, however, if situations such as pest resistance are to be avoided.

New insecticides

Insecticides are important components of southern turf pest management strategies. A few additions provide new choices for turf managers. Crusade 5G (fonofos) will be marketed on a limited basis this year for soil insect control. Mocap 5G has been discontinued and a new formulation (different granule) of Mocap 10G will be available for golf courses and sod farms. Orthene Turf, Tree and Ornamental Spray has a label expansion which includes chinch bugs. Tempo 2 has effectively controlled surface feeders on home lawns.

New delivery systems

New methods for delivering insecticides more precisely to pests are of particular interest. New technology continues to focus on subsurface insecticides for grub and mole cricket control.

"Precision placement," as termed by one turf scientist, includes high pressure injection of liquids, and more recently subsurface application of granular formulations. Both systems have the advantage of placing insecticides directly into the zone of pest activity. There is less surface residue, therefore less ULV breakdown. Drift is essentially eliminated, and reduced rates of effective insecticides provide control equivalent to full rates of these same conpounds surface-applied.

There are still questions to be answered about both systems: Which insecticides are most effective? What are critical soil moisture and irrigation levels? How do these techniques affect the "window" for optimum application timing?

The potential for environmental and personal safety with such systems are major reasons why this concept will continue to be an active area of application technology research.

Locale and turf considerations

What your most important turf insect pest is depends on where you are located and what grasses you manage. Mole crickets are considered primary pests in Florida, south Georgia and other southeastern areas. Grubs and fire ants are of great importance in Texas; chinch bugs in Louisiana; grubs in California.

In addition, how and when you control insect pests will also vary regionally. Do not expect insecticidal, biological or cultural efforts to work well in controlling insect pests if not timed properly. Find out from extension and research scientists in your area what are proper timings for control of specific pests in your area. Control strategies also depend upon clientele acceptance of damage levels, scheduled events, and maintenance practices. **LM**

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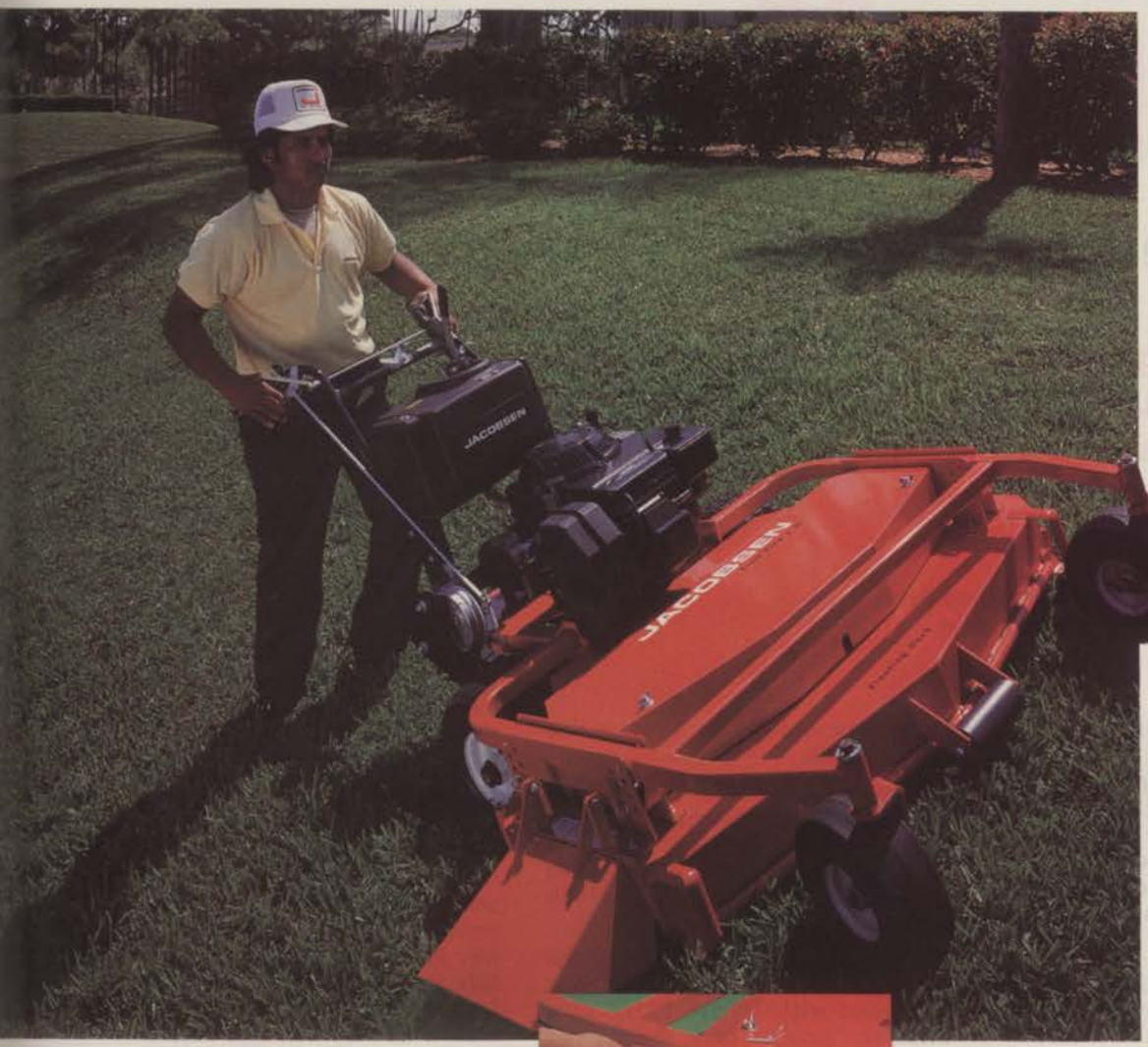

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Everett Mealman, President
PBI/Gordon Corporation

Yellow nutsedge can be devastating if it gets out of hand because of the way it spreads from its roots. Just ask Lentz Wheeler, superintendent of the Hidden Creek Country Club in Reston, Virginia, which is recognized as one of the better maintained courses in the Washington D.C. area.

"We had two years of drought," says Wheeler, "followed by a year of excessive rain, and it brought on an undesirable infestation of yellow nutsedge" — totally unacceptable for a course like Hidden Creek.

Wheeler goes on to say that he tried several post-emerge herbicides but, in his words, "the main thing we got from them was a lot of phyto, which I wish had been on the nutsedge rather than on our fairway grass.

"Trimec Plus turned out to be the product that came to our rescue. One treatment with Trimec Plus," says Wheeler, "gave us back the type of fairways we could be proud of."

Lentz Wheeler, superintendent of Hidden Creek Country Club in Reston, Virginia, savors his handiwork on an immaculate fairway that once was plagued with yellow nutsedge. Wheeler says that Trimec Plus did a thorough job of cleaning out the nutsedge, and the cost was surprisingly low. Wheeler was equally impressed by the fact that Trimec Plus also did an excellent job on the few tough broadleaves that were present.

So Trimec Plus gets yellow nutsedge, and it is economical. But how about crabgrass?

"If you want to talk about crabgrass, talk to us," say Ted Davenport and Gerald Krohn, of Bay Landscaping, Inc., Essexville, Michigan (Saginaw, Midland, Bay City).

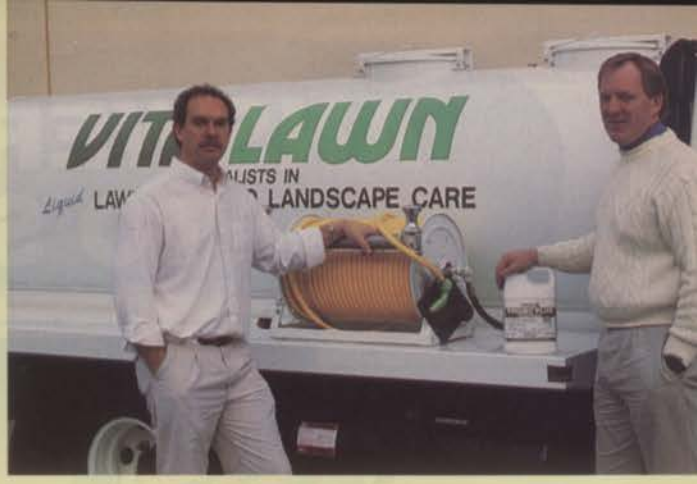
To fully appreciate what they have to say about Trimec Plus and crabgrass, you need to know that the residential division of Bay Landscaping mainly services upscale homes, most of which they originally landscaped. They have their own pride in those lawns, and they can't abide even the slightest blemish.

"We nearly always have excessive spring moisture," says Davenport. "It tends to leach out the pre-emerge and when the hot weather hits, so does the crabgrass, right along with the summer annual broadleaves. To be on the safe side, our program consists of a broadcast treatment of Trimec Plus for the second and third applications.

"This will be our fourth year with Trimec Plus," continues Krohn, "so you know what we think of it . . . It does a beautiful job of controlling crabgrass and other course grasses, along with every conceivable type of broadleaf."

So Trimec Plus gets yellow nutsedge; it gets crabgrass; it gets broadleaves; it's economical. But how fast does it work?

Ted Davenport, left, lawn care applicator of Bay Landscaping, Essexville, Michigan, and Gerald Krohn, in charge of lawn service. They always carry an SP1E Back Pack Sprayer loaded with Trimec Plus. They have found that the SP1E and Trimec Plus are the ideal combination for spot weeding. Not only does Trimec Plus get grassy weeds and nutsedge, but broadleaves as well. The SP1E Back Pack Sprayer is a $100.00 value, but you can receive one for only $49.95 when you buy Trimec Plus.



Reed Hull, left, president of Vita Lawn Corp., Rancho Cordova, California, and Bradley Belcher, general manager, say that Trimec Plus often knocks out crabgrass in one application without any phyto or discoloration to their Bermudagrass turf. Before the advent of Trimec Plus, Vita Lawn used 6-lb. MSMA, which usually required three or even four treatments to get crabgrass without phyto. They are also very pleasantly surprised by the control of dallisgrass they are getting with Trimec Plus.

You want fast results — you want to talk to Reed Hull and Bradley Belcher of Vita Lawn Corp., located in the Rancho Cordova surburb of Sacramento.

Vita Lawn is a very highly regarded lawn service company, and when the crabgrass hits in Sacramento, Vita Lawn's phone rings off the wall with homeowners who want to become new customers . . . right now!

"We've traditionally sold these new customers a three-application rescue program for their grassy weeds," says general manager Belcher. "In the past, using 6-lb. MSMA, we had to spread it out over three treatments or more to get the crabgrass without phyto. Trimec Plus often will do the job with just one application and, if we're back two or three times, it is usually because we're after dallisgrass."

What is Trimec Plus?

Trimec Plus is a Complex that was designed by PBI/Gordon research to solve the problem of grassy weeds like crabgrass, dallisgrass and barnyardgrass, as well as nutsedge, in ornamental turf.

In terms of cost and effectiveness, MSMA used to be the herbicide for nutsedge and grassy weeds . . . but it has a major flaw when used in ornamental turf. To get enough of it into grassy weeds requires rates of application that can result in burning and discoloration of the turf.

When MSMA is locked into a Complex with Trimec, you have the ultimate post-emergence herbicide for ornamental turf . . . excellent control of grassy and broadleaf weeds, plus yellow nutsedge, plus maximum safety to Kentucky bluegrass and Bermudagrass. Plus unmatched economy.

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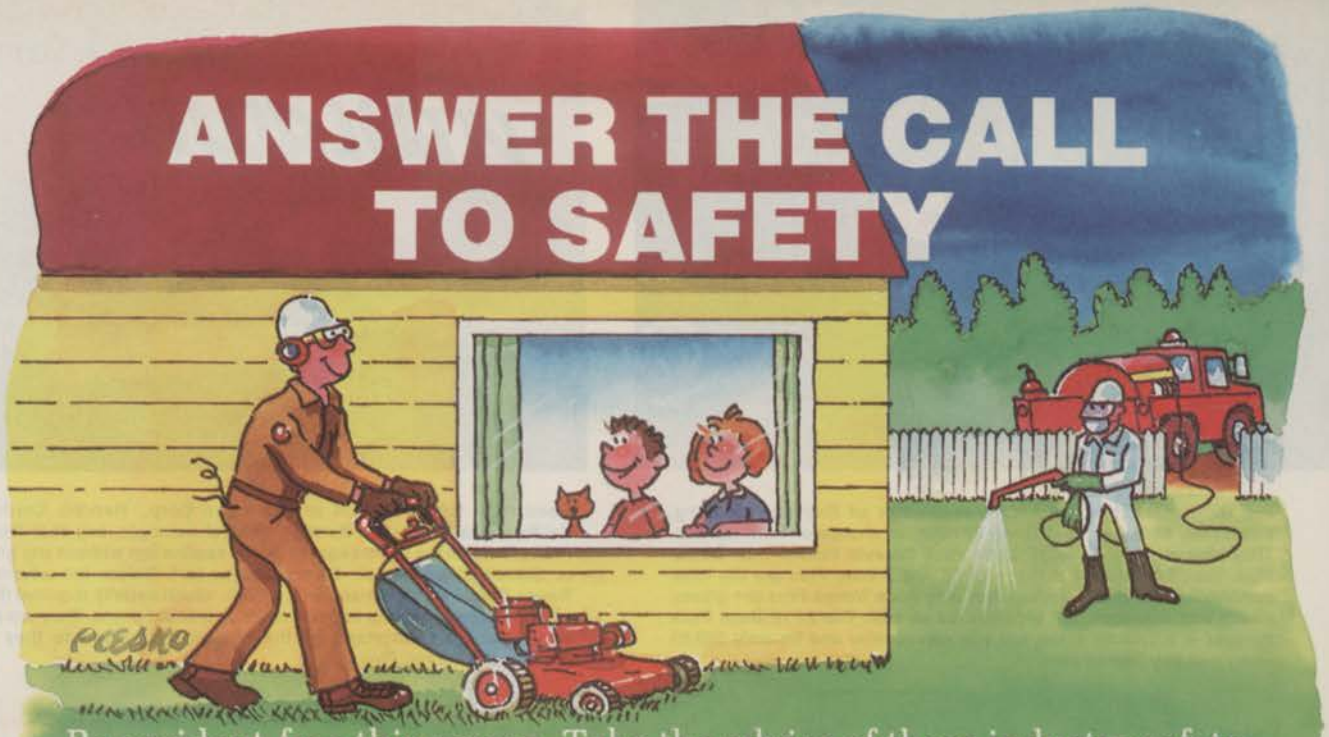


Be accident-free this season. Take the advise of these industry safety experts, and practice what they preach.

by Jack Simonds, contributing editor

Manufacturing company executives often post the safety records of employees near the paths the rank and file take to get to their offices. It is a time-tested way of often calling attention to the number of days without a time-loss injury.

The call-to-safety and its importance to bigger companies is self-evident. Injuries cost time, productivity and insurance entanglements. The common denominators: needless injuries and avoidable losses.

The green industry, measured by smaller work crews dispatched from more modest headquarters, must also turn an active eye toward worker safety. Dangers lurk, but safety can prevail when common sense steps are taken.

The 'smart employee'

Consider the methods Bill Tidwell uses in approaching safety with work crews in Orange County, Calif.

Tidwell, a supervisor in field operations for the county's Environmental Management Agency is directly responsible for maintaining the county's public green areas using 56 regular employees and 50 to 70 inmates from the county jail system for tree trimming, ground clearing, weed control and other tasks.

"The best safety device is a smart employee," says Tidwell. "Safety equipment is only effective if you put it on and you keep it on."

California, which imposes strong licensing standards for workers in the green industry, requires certification for pesticide users, entailing a 20-hour course study and additional 20-hour continuing education coursework every other year.

Those courses, coming from California's OSHA, are augmented with another safety step Tidwell particularly favors.

"It is called a tailgate meeting," explains Tidwell. Under the plan, line workers meet in open-ended discussion every 10 days to discuss safety issues and incidents which actually occurred in the field.

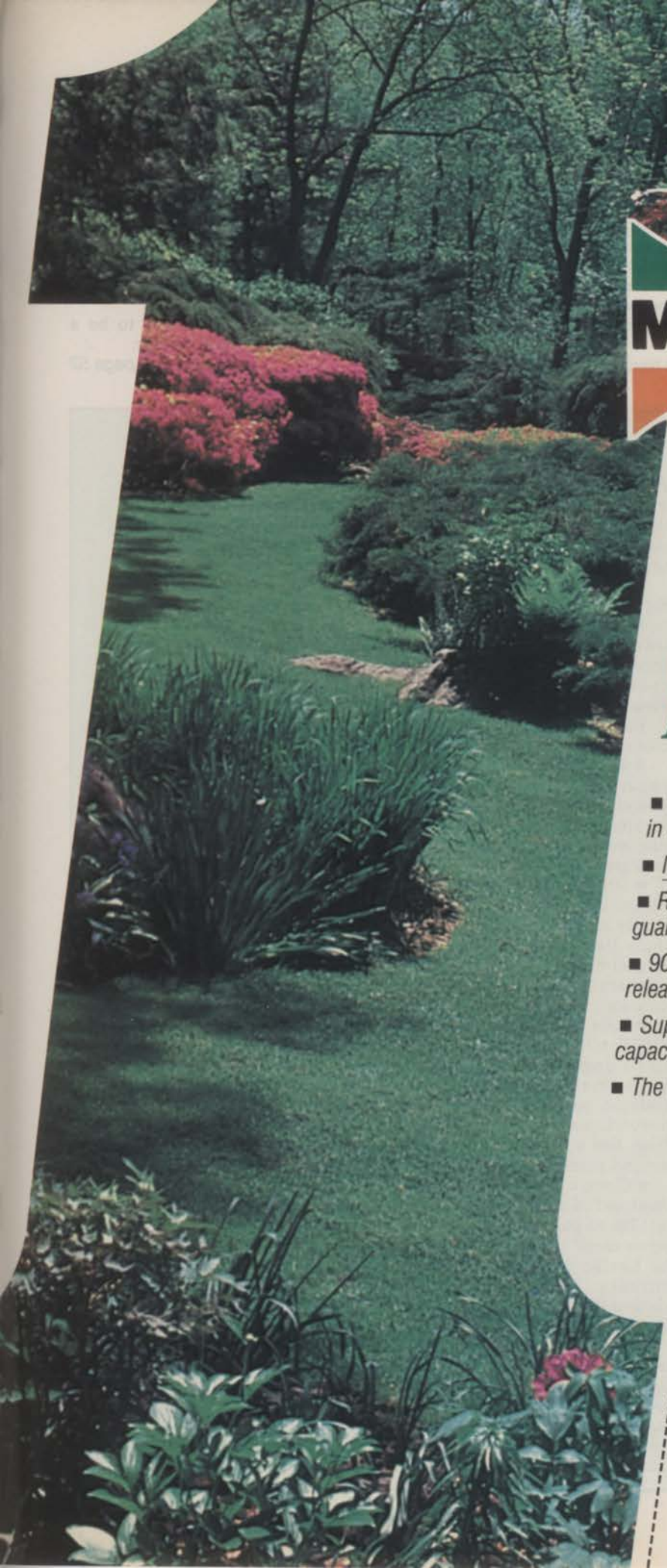
"I like those sessions. We often talk about what went wrong, how someone got into a situation and how to avoid it in the future," says Tidwell.

Injuries are reduced

Tailgate meetings, he believes, pay in dividends which aren't immediately

Bill Tidwell's spray crew meets every 10 days to talk safety.

Tidwell: "The best safety devise is a smart employee."



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shown, but can be tracked. He says crew workers also discuss safety equipment—eye protection, special clothing and other gear—which is used in the real work-a-day world.

"Our crews have the safety equipment they're supposed to have. I go out to job sites to see for myself that they're using the equipment. I make sure that happens," Tidwell says.

"We have seen a marked decrease in two years in the number of employees who are injured in a long-term way. We've reduced (those injuries) immensely."

The department, for instance, has not seen a chain saw-related accident in three years.

Tidwell notes however, that safety clothing worn during spraying season holds special challenges for the wearer.

Hot Southern California days, Tidwell says, make it tough for crews to strictly maintain wearing the coveralls.

Other safety gear has improved over the years, Tidwell says. He particularly notes a new hard hat design which stays on the head in a variety of positions, is equipped with lightweight ear protectors and face visor and, most importantly, is favored by line workers because of its ease-of-wear.

Also, Tidwell has equipped his staff with an ankle-high boot with built-in insole that line workers have found comfortable for an entire eight-hour shift.

Company standards higher

As Tidwell contends daily with safety challenges, Ed Neufer, president of Safety Equipment and Supply Co. of Fort Wayne, Ind. sees the advances of gear and clothing and tries to keep pace with what green industry workers want and what works in the field.

Neufer says that in some cases, the industry "has not matured" in its worker protection for employees in daily contact with pesticides. At the same time, bigger lawn care operators and maintenance companies are making great strides to insure worker safety.

Neufer says all gloves and boots today should be made of a nitrile or neoprene compounds, material that can be molded into gear that looks and works like common rubbers, but has stronger resistance powers against skin exposure to chemicals.

The worst footwear—and at times the most common—Neufer says, are tennis shoes and leather boots. Definite industry no-nos; Neufer says chemicals can absorb into both materials, and, even with routine washing, build up over time. The footwear can retain harmful portions of a variety of chemicals used in the industry.

Operating guidelines

During spraying, Neufer echoes Tidwell's standards for turn-out gear: respirators, goggles and a hard hat equipped with a face shield. Clothing, particularly cotton, should be washed daily.

But Neufer sees hope in a Du Pont Co. spun and woven material marketed as Tyvek; particularly when mixing, loading or spraying chemicals.

Tyvek and other gear have disadvantages, too, Neufer says. The fabric does not "breathe" particularly well, making workers hot. Also, the gear, coupled with a respirator and eye goggles, can sometimes have a chilling effect on a homeowner.

"Somewhere, there has to be a happy medium," says Neufer.

continued on page 52

Stock up on safety info

Perhaps the basics bear repeating as, for much of the country, the landscape and lawn care industries gear up for full springtime workloads.

From the Outdoor Power Equipment Institute (OPEI) comes an updated pamphlet entitled "Outdoor Safety Tips," timed with the month for increased on-the-job safety awareness.

Basic tips from the OPEI include:

- Knowledge of the controls, capacities and purposes of power equipment. The OPEI recommends reading the operation manual fully before using new gear.
- Proper dress for the job. Long, close-fitting clothes, sturdy shoes and other protections like safety glass. Other special clothing and protective wear are called for in special situations.
- Safe handling of gasoline. Fill the tank before starting small engines. Also, wipe up spills immediately. Store petroleum products only in approved containers and away from the house. Never smoke around gasoline.
- Clean up the work area beforehand of such potential projectiles as golf balls, rocks and other small items which might be hurled from mowing machinery. Pets and children should be kept away during mowing.
- Follow manufacturers' written procedures. Along with operating procedures, OPEI, along with all manufacturers, strongly recommend keeping up with maintenance. When unclogging, OPEI reminds workers to turn off the engine completely and take the extra insurance step of disconnecting the spark plug line. Keep hands and feet clear of moving parts and do not remove safety devices or safety labels.

For a copy of this safety guide, write to OPEI at 24500 Center Ridge Rd., Suite 250, Westlake, Ohio 44145. The institute also produces safety news, films, checklists, brochures and public service announcements.

Industry insiders, like Joe McDonald, a marketing coordinator at John Deere Co., highlight the importance of maintenance and encourage crew leaders to daily look over equipment, eyeing oil or greasing needs, odd vibrations, noises, excess smoke and other hints.

Paul Loomans, a marketing coordinator at Deere, agrees: "Preventive maintenance is a most important practice (which) can help stop field failure," says Loomans. Quick fixes in the field, he says, "present the greatest opportunity for accidents to happen."

Quick fixes often come as the operator is working under fatigue and using makeshift tools.

Deere, like other manufacturers, installs deadman controls on its walk-behind models, and for mid-size riders (14 hp and up) the company has gone to a two-pedal control system for forward and reverse. Engaging the rider requires a distinctive foot motion which McDonald claims makes the vehicle easier to control in panic situations.

—Jack Simonds□