

New horizons in disease control

New formulations, packaging and use rates make control products easier to use and more effective, as the green industry charts its course into the new century.

Control product manufacturers and end-users continue to find better product formulations and new strategies for prevention at lower rates.

Here's an exclusive look at some of the people—from manufacturers, to research professionals, to superintendents—who are finding new ways to get the job done.

—Terry McIver, Managing editor

Summer decline less complex with new control combination



The edict that golf greens be "short and fast" puts added stress on turf root systems, which adds to disease control problems.

■ Just three years ago, few people understood what caused summer decline complex on bentgrass golf greens. Even worse, no one knew how to control it.

In 1992, North Carolina State University researcher Dr. Leon Lucas found that 4-8 oz. of Chipco Aliette WDG and 4-8 oz. of Fore WP brand fungicides—applied every 14 days—provided excellent control.

Tests conducted in South Carolina by

Dr. Bruce Martin and research in other states have confirmed Dr. Lucas's results.

"We're seeing more evidence that high levels of fertilizers and especially potassium fertilizers, contribute to the onset of pythium diseases," says Lucas.

"For years there has been a move toward using more potassium because many people feel it helps turf tolerate heat and drought better. This seems like the ideal thing to do if you want to help cool-

season turf hold up better during the summer.

"But the levels of soluble salts are climbing too high, and we're seeing a clear connection between high amounts of salts from fertilizers and disease damage. These high salt levels can develop quickly on new, high-sand-content green mixtures with low cation exchange capacities.

"Applying high levels of potassium can cause direct damage to roots and stolons, making them more vulnerable to infection from pythium and rhizoctonia species," Lucas explains.

"In addition, it is believed that potassium may create a favorable environment in which pythium species can more easily reproduce."

Lucas recommends using potassium at rates of 5-6 lbs./1000 sq. ft. each year, provided potassium levels are monitored through soil tests and tissue analyses.

"In many of the cases where we see summer decline complex being most severe, we also see high levels of soluble salts in the soil," reports Lucas.

"Roughly 150-250 parts per million should be sufficient for optimal plant growth. As an extra precaution, I recommend one-half the recommended rate twice as often to further protect against injury. When I find salt levels above 300 ppm during dry weather, root rot and decline of bentgrass is more severe."

It is important to note, Lucas emphasizes, that the same soluble-salt fertilizer levels that are completely harmless during wetter weather may actually cause injury during drier periods. The only way to remove the high salt levels is to apply enough water to leach the salts deeper into the soil. Applying this extra water during hot weather, however, can actually encourage disease development.

New formulations—One new tool

superintendents now have for enhanced protection from summer decline complex is the option of using the flowable formulation of Fore fungicide.

Because of earlier difficulties with maintaining a suspension of the formulation, recommendations initially called for Chipco Aliette WDG fungicide to be mixed

remain healthy throughout the summer."

According to Lucas, the combination has been used on bermudagrass, with good results.

"We don't fully understand all the synergistic effects of combining Chipco Aliette and Fore just yet," says Lucas, "but it does provide enhanced disease control. We also see improvements in turf quality that cannot be attributed to disease control alone."

Despite the enthusiastic reports from superintendents throughout the U.S., Dr. Lucas still stresses the importance of accuracy in applications. Of critical importance with the Aliette/Fore combination is timing. For best results, apply the combination in early summer, when daytime temperatures reach the high 80s or low 90s, and when night time temperatures remain near 70 degrees.

"It's also important that superintendents continue making the applications at 14-day intervals throughout the summer as long as heat and humidity remain high," says Lucas. "Some people have waited until later in the season, or have tried applying the combination every four to six weeks when they see clear symptoms of decline. They do get significant curative effects but not nearly the dramatic improvements in turf quality and disease control that you get from being on the regular program."

Precautions—Research in 1994 showed a potential for phytotoxicity and thinning on high sand content greens when using the combination at the 4- and 8-oz. rates on newly-emerged bentgrass seedlings. Thinning was not observed on plots treated with Aliette alone. Based on these preliminary observations, caution should be used when treating newly

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Turf Quality and Color of Bentgrass Tests Conducted at North Carolina State University

Pesticide(s)	Turf Quality (Scale: 1-9)	Turf Color (Scale: 1-9)
CHIPCO® ALIETTE® WDG (4oz.) + Fore® FLO (13fl. oz.) + Blendex (1.25oz.)	8.5	7.8
CHIPCO® ALIETTE® WDG (4oz.) + Fore® WP (8oz.)	7.8	7.5
CHIPCO® ALIETTE® WDG (4oz.) + Dithane WP (8oz.)	5.8	6.0
Control	3.3	4.0

Note: Rates are in oz./1,000ft. Fungicides were not washed off of leaf surfaces (watered in) after application. Blendex® was used at a rate of 0.5 oz./gal. of mix; 2-5 gal. of water used/1,000ft. Turf quality rated 1-9, with 9 being best. Turf color rated 1-9, with 9 being the darkest green. July, 1994 - NCSU

Chipco Aliette and Fore: data from research of Dr. Leon Lucas.

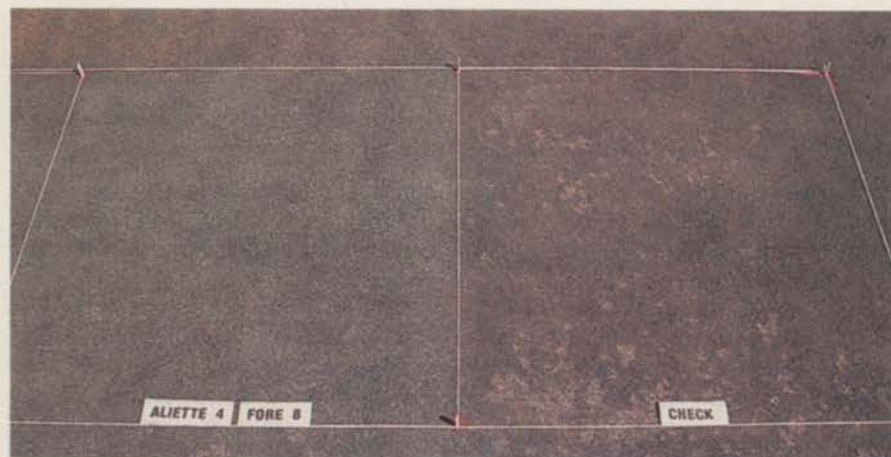
with Fore WP.

But research conducted by Dr. Lucas in 1994 shows that Chipco Aliette WDG can be mixed with Fore Flowable, provided that a compatibility agent is also used.

"We wanted to make sure this combination with Fore Flowable was safe and effective," explains Lucas. "What we found was that it actually provided even better turf quality than with Fore WP."

Superintendents have also begun using the fungicide combination on other grasses. Although formal scientific research is just getting started for many of these applications, reports from superintendents so far have been very positive.

"Some people have used the combination on other cool-season grasses such as tall fescue and had excellent results," reports Lucas. "I've personally seen two cases where the combination was used on home lawns—one with tall fescue and one with zoysia grass—and there was a dramatic improvement in the grass' ability to



The Aliette/Fore combination performs well on test plots in North Carolina.

Product mix proves two can be better than one

■ When dollar spot got in the way of his brown patch research, Dr. Pete Dernoeden tried a product mix that today is a new product for disease control.

The University of Maryland professor of agronomy was testing AgrEvo's Prostar 50 WP fungicide. "Before we could collect our brown patch data," remembers Dernoeden, "dollar spot would appear and wipe out our plots."

improved control of both diseases, with brown patch control going from 14-21 days to 21-28 days.

"The product combination appears to have an additive effect," says Dernoeden. "In other words, mixing the two products together provided better control of brown patch (rhizoctonia blight) than would have been expected with a normal use rate of Prostar alone."

Symptoms

■ On bentgrass golf courses, rhizoctonia blight symptoms first appear as tan blotches or lesions with reddish-brown margins.

The foliar blighting caused by rhizoctonia has a distinctive brown cast surrounded by a smoke ring effect when grass is wet. Large areas become blighted very quickly.

Rhizoctonia blight can often be misdiagnosed as pythium blight.

Couch recommends the Agri-Diagnostic kit now available to turf man-



agers. The chemical test is easy to administer and provides results in 20 minutes.

"Once turf managers know they have rhizoctonia blight, we suggest they spray with Prostar or Prostar Plus the first time that nighttime temperatures remain above 70 degrees," says Couch. "Temperature is the real key to rhizoctonia control, but when it also becomes humid, the fungus starts colonizing and you can get some serious disease outbreaks."

To gain control of the dollar spot problem, Dernoeden mixed Bayer Inc.'s Bayleton turf and ornamental fungicide with the Prostar. The combination

"A rate of two ounces of Prostar WP and one ounce Bayleton 25 DF per 1000 square feet provided a level of control equivalent to four ounces of Prostar."

emerged bentgrass greens. Tests are scheduled for this year to further verify any potential problems.

Lucas emphasizes the need for continued sound management practices, including fertilization levels, soil aeration as needed and air circulation around the greens.

"To get the best results, you have to look at the big picture and consider the entire biological system in which grass is grown."

On the market—The combination control product is now available as a "twin-pack," under the name Prostar Plus. After more than 50 university trials in 10 different states over seven years, brown patch control is consistent even under high disease pressure, according to AgrEvo.

Prostar Plus is packaged in water-soluble bags containing the lowest rates of both products. Each twin-pack covers 12,000 sq. ft. of turf at the normal usage rate. In addition, the combination provides control of 17 other turf disease, including pink and gray snow mold, summer patch, pink patch and Southern blight.

Another researcher who tested the product combination is Dr. Houston Couch of Virginia Tech. Couch described control of brown patch and dollar spot on a tall fescue sod farm as "extremely effective." An advantage of the tall fescue test was that researchers were able to count diseased leaves rather than estimate the percentage of blighted areas on bentgrass.

Couch recommends turf managers follow a preventive program of disease control rather than take a curative approach.

"They'll actually use less product this way," says Couch. "But the first step in proper disease management is accurate disease identification. Managers need to make sure which disease they are spraying."

Both Dernoeden and Couch suggest preventive brown patch control, during the first or second week in June on cool-season turf.

Superintendent takes preventive measures

■ An integrated management approach based on preventive disease control measures works wonders for golf course superintendent Scott Werner, CGCS, of the Lincolnshire Fields Country Club, Champaign, Ill.

Werner's success begins with a turf foundation based on proper fertilization. By stimulating a healthy turf, Werner believes he wards off diseases and weeds that usually accompany stress conditions.

"Our goal is a fairly moderate rate of growth," says Werner. "We don't want any excessive periods of heavy growth which stress the turf and detract from playing conditions."

The greens at Lincolnshire are fertilized every two to four weeks, depending on conditions. Werner uses low rates of N, which means he can make applications more frequent without paying for it with rapid growth.

The fertilizers are high in potassium, to promote turfgrass vigor and stress tolerance, and a healthier, more vertical and upright growing plant.

Soil problems—The golf course that is Lincolnshire Fields was carved out of what Werner calls "good 'ol central Illinois dark, heavy loam." It retains water, drains poorly, and is prone to compaction in heavy traffic areas. After a heavy rain, the ground becomes water-logged or the water just sits on the surface.

"The soil type has a great effect on disease problems, particularly pythium blight, which is a water mold disease," says Werner. "We have a difficult time controlling diseases in those areas that don't drain well."

Dollar spot and brown patch frequently appear on the course, and Werner does his best to combat them. Subsurface drainage tiles have been installed, and he aerifies often with a Cushman GA60.

When necessary, preventive fungicides are brought into play.

"When you detect disease," says Werner, "a certain amount of damage has already been done."

"Given the fact that we work around play schedules and golfers, it would take us days to treat for a widespread outbreak.

By that time too much damage is done. We feel we can be more successful, cost-effective and use less total fungicide each year by treating the course preventively."

Greens are treated on a two-week rotation. Tees and fairways are covered every three to four weeks.

Tank mixes—Werner tank mixes systemic and contact fungicides, using several different products that complement each other's strengths and weaknesses. Though he follows label recommendations, he prefers the low-end rates and looks for synergy between products.

Werner mixes traditional sterol inhibitors—such as Banner and Bayleton—with contact fungicides—Thalonil, thiophanate, Chipco 26019, Vorlan and Curalan. He says the results have been favorable, especially in terms of product performance and turf safety. Pythium control was exceptional after applying the combination of Fore and Aliette.

Werner is trying combinations of newer products, such as Eagle fungicide, a newly-registered systemic from Rohm & Haas Co.

Werner looks closely for effectiveness and turf safety in the products he uses. Length of control is also very important. If a product passes his standards, it must then be as cost effective as his current line-up.

The superintendent tested Eagle for three years as an experimental product. Werner compared Eagle in side-by-side comparisons with Banner, Bayleton and Daconil for dollar spot control, one of the worst disease problems at Lincolnshire Fields.

Werner recommends Eagle in the fight against turf disease.



Scott Werner and a view of Lincolnshire Fields. Werner considers product efficacy, safety and length of control.

"We need all the products we can to control diseases and prevent resistance," he says.

Cultural accompaniments—Werner balances management practices to encourage turf vigor and discourage disease.

Werner overseeds perennial ryegrass at a rate of 200 to 300 lbs. per acre for tees and fairways in late summer and early fall. The overseeding contributes to healthier turf at times of heavy disease pressure.

Spring verticutting toughens the turf for the heavy play that summer brings. Grooming reels or turf groomers also provide a very light verticutting with each mowing.

A new computer-controlled irrigation system is almost completely installed.

It uses an on-site weather station to accurately monitor loss from the turfgrass and soil.

With the data, Werner can determine his irrigation needs and schedules. During the stressful summer months, he can let the computer program each day's irrigation automatically. The coverage and control of this new system allows for more accurate and efficient irrigating, which uses less water.

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Spring verticutting prepares greens for heavy play at Lincolnshire Fields.

Taken as an integrated plan, turf aerification, fertilization and irrigation provides the best possible turf conditions, explains Werner.

All of which is important when you consider the speed with which a disease problem can grow.

"If we don't practice good disease prevention and control," says Werner, "in a matter of days an untimely outbreak of disease could ruin all our good work."

Social responsibility results in new 'vision'

■ Turf and ornamental chemical manufacturers must be able to adapt to the continuing changes in product regulations, market needs and technology as the start of a new century approaches.

Those changes include attention to programs for lower product rates, waste water reduction and innovative packaging.

Ciba Turf & Ornamental Products, for instance, has established "Vision 2000," which includes attention to social responsibility, environmental protection and economic growth.

"These elements will enable us to forge partnerships with green industry customers as we move closer to the year 2000," says company director Bill Liles.

Like many companies that manufacture control products for the green industry, commitment to exceeding regulatory standards is one of Ciba's self-imposed mandates.

One Ciba facility began a water recovery program and reduced waste water by 99 percent. Overall, company manufacturing facilities are well ahead of regulation standards which go into effect in 1998.

Membership—and involvement—in professional associations is a key aspect of some companies' commitment to the green industry. Ciba also co-sponsors educational programs such as the Audubon Cooperative Sanctuary Program for Golf Courses and scholarship funds for the children and grandchildren of golf course superintendents (the Legacy Awards).

Ciba and other manufacturers continue to offer products that can be used at low rates, while protecting soil and water resources. Low-rate products from Ciba include Banner, a broad spectrum fungicide.

Closed packaging systems limit user and environmental exposure to turf protection products during mixing. Ciba's turfPak is a returnable and refillable micro-bulk container.

Wettable powder and gel formulations in water-soluble packages are other innovations.



Ciba's Bill Liles: stresses training and continued education.

Economic growth—To ensure economic growth and a strong industry, product manufacturers go beyond simply supplying customers with a product. The next step is to provide customer and industry support.

"When a customer buys our product, they receive much more than just the packaged chemical," says Liles. "Included with that purchase is our guarantee of quality products, training and continuing education and nationwide industry support."

Liles urges customers to continue to support products labeled specifically for the green industry. Otherwise, he fears, "there is a serious risk that companies like ours will no longer be able to afford steep registration costs."

"The journey (a product takes) from test tube to market costs between \$15 million and \$30 million, and takes from seven to 10 years," Liles explains.



The 'turfPak' system as designed by Ciba limits pesticide exposure, speeds application time and ends package disposal problems.