Spreader and sprayer calibration

Settings are there for a reason: they guarantee accurate and prescribed product application.

by Steve Griggs,
TruGreen/ChemLawn

■ Accurate settings of spreaders and sprayers are based on rates determined through extensive research and testing to be the most effective for the job at hand.

Using less of a control product may make a second application necessary, which is more expensive than doing it right the first time. Using more of the product may cause damaging side effects, which will also be more expensive.

Hand-pressurized and powered sprayers both operate on the same basic principles. Start with clean and well-maintained equipment prior to calibration on both types of sprayers. Calibrate both types using plain water.

Make sure spray tips are clean. Spray water through the tips to visually check the delivery pattern. On individual tips, check for clogging or uneven delivery of material. On sprayer booms, check to be sure that all tips are operating in the same spray pattern. Change those tips showing a significant variation in the pattern.

Drop spreaders deliver material along the base of the hopper directly to the ground below.

Centrifugal spreaders deliver granular material from the base of the hopper onto a dispensing device that rotates, throwing the material in a curving pattern over a distance to the right, front and left of the spreader hopper.

When calibrating either type, always start with clean, well-functioning equipment.

Have a pre-measured area of known dimensions. Calibrate the equipment with the material that will be applied. Use an amount of material realistic for the size of the spreader, enough to achieve a proper flow.

Large, pull-behind spreaders are calibrated in the same manner as smaller, walk-behind units, but on a bigger scale. Because it's difficult to empty a bigger hopper, the material that's left in the hopper usually can be determined from measurement markings inside the hopper or from the difference in starting and ending weight of the total unit.

Because each person walks at a different rate of speed, each sprayer operator should calibrate walk-behind spreaders or hand-carried sprayers individually to arrive at an accurate calibration. Using a tonal stopwatch can help set a more consistent walking speed for all personnel.

Once calibrations are set, cross check them throughout the day. Ideally, this would be done at the beginning of each application. Realistically, check once or twice during the day on areas where landscape measurements are known to ensure accuracy.

Accurate application is to everyone's benefit. Proper applications correspond with researchers' best advice. Doing it right the first time will reduce call-backs, and dollars will not be wasted.

—The author is branch manager of the TruGreen/ChemLawn San Diego branch, and a member of the California Association of Production Agriculture and the Southern California Turf Council. Stephen Guise of the STMA helped arranged this article.

Hand-pressurized sprayers

1) Fill the "hand can" sprayer tank with a premeasured amount of water, generally from ½ to one gallon.

2) Pressurize the unit. And, be consistent. Always pump 15 times.

3) Once the unit is pressurized, start spraying in a premeasured area of known size. (For hand cans, the best size for a premeasured area is 1000 sq. ft.)

4) Spray the entire premeasured area.

5) Pour the remaining water in the sprayer into a clean container, and measure the amount.

6) Subtract the remaining liquid from the initial volume. The difference is the amount of material actually sprayed, based on the walking speed of the person doing the spraying and at the pressure level at which the sprayer was set. This determines the amount of liquid sprayed per the premeasured area of the site.

Repeat the procedure three times to develop consistent results. Always calibrate and spray under standard conditions, (i.e., wind speed at 10 mph or less).

Power sprayers

The area to be pre-measured for calibration of power sprayers should be based on the width of the spray boom. The measuring area should give the equipment a "straight shot" run for at least a 50-75 foot length, a span appropriate to the type of sprayer being calibrated.

1) Set the machine to the proper spray pressure. (Use a measuring container to determine the output of each nozzle at pressure. Write down the output of each spray tip over a specific period of time, such as 10 seconds.)

2) Compare the recorded output figures. Replace any tip that has a variance of plus or minus 10 percent, and repeat step one. Continue changing tips until all are within the acceptable less than 10 percent range.)

3) Check the sprayer to assure proper operation. Then power up the equipment so it is running at proper spraying speed by the time it enters the premeasured area.

4) Drive the unit over the area, turning the sprayer on and off while at operating speeds. Set the speed on the equipment drive, then drive the equipment over the designated area and time the spray interval from the beginning to ending point.

5) Repeat this procedure three times to ensure accurate measurement of time and distance.

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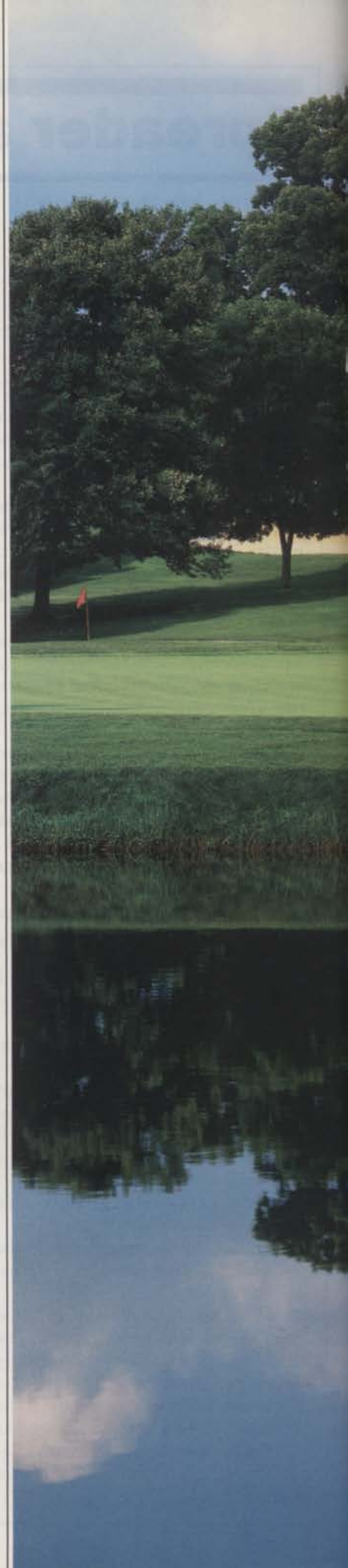

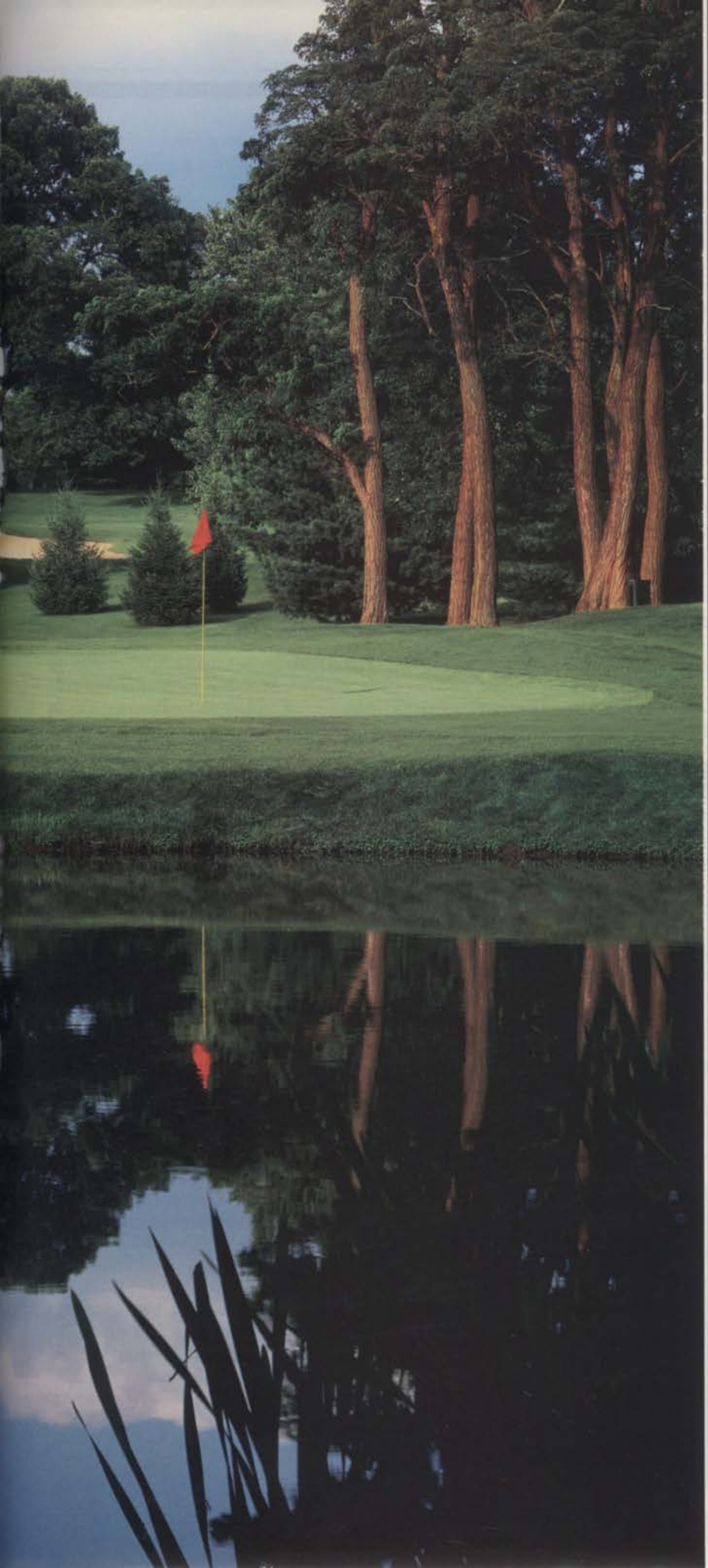

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CALIBRATION *continued from page 21*

6) Now that you have determined the time it takes to cover the premeasured area, measure the volume of output from each spray tip for that same time interval. Add the total output from each of the tips to find the total liquid spray rate. That total is the volume of spray that actually will be delivered over the designated area.

Repeat the procedure to ensure consistency and accuracy.

Now that you know the calibration volume, you can mix according to the calibration rate. To fill a power sprayer with a known output, say 100 gallons per acre, read the product label to find the amount of material that should be applied per 100 gallons or per acre.

Drop spreaders

1) Place the material in the spreader hopper. Start with some calibration number or letter. This will be easier if you have some experience with the material, or if the product label gives a suggested calibration setting. Otherwise, the starting point is a random choice.

With drop spreaders, there are devices that can be attached to the base of the spreader to collect output to measure for calibration determination.

Without such a device, use plastic sheeting or butcher paper to collect the material.

2) Walk a known, premeasured distance over this material, opening and closing the spreader while walking at a normal, steady pace.

3) Gather the material spread; pour it into a measuring device and weigh it. Be sure to deduct the weight of the measuring device from the total.

Once you know the rate at which the spreader is delivering material, you can compare that rate to what the rate should be. Use the following formula:

rate x area ÷ analysis of material

4) Adjust the calibration number or letter up or down until the proper output rate is achieved. Once that calibration has been reached, repeat the measurement process two or three more times for consistency and accuracy.

Centrifugal spreaders

Several types of centrifugal spreaders have varying kinds of adjustments of distribution. The distribution pattern should be consistent, not skewed to the right or left. The peak of the pattern should be aligned with the center of the spreader.

It may be difficult to determine if a spreader is throwing more heavily to the left or right by sight alone. There are more kits available to measure the patterns of some spreaders. For an accurate check without using a kit, run the spreader across a series of grids that reach across the distribution swath to catch the material delivered. Measure the material caught in each container to determine inconsistency.

Most centrifugal spreaders will have some form of adjustment to correct pattern skew.

1) When checking calibration, use a sufficient amount of material to ensure proper flow. Weigh the amount of material put into the hopper. Make a "best guess" on calibration setting, starting with product label recommendations if these are available.

2) To cover the premeasured area, work from the outside pass to the inside pass. Open and close the spreader while moving at a normal, consistent rate. With centrifugal spreaders, the speed of movement is important. The faster the spreader moves, the farther the material is thrown. At a slower rate of movement, less area is covered with each pass and a heavier rate of material is applied. The average swath—and, therefore, the average pass—is six to eight feet.

Position each pass so that the leading edge of the swath of the material applied is thrown back to the wheel prints of the previous pass.

3) Once the area has been covered, pour what's left in the hopper into a measuring device and weigh it (subtract the weight of the container).

4) Subtract the amount of material remaining from the amount initially placed in the spreader. Compare the amount of material actually applied to the label application rate. Use the formula shown for drop spreaders.

5) Reset the application rate up or down to get proper calibration rate for accurate distribution.

6) Once the accurate setting has been reached, repeat the procedure two or three more times to ensure accuracy.

Because material will be applied with each checking process, have multiple premeasured areas on which to apply products.

If a deflector shield is to be used for the outside pass with a centrifugal spreader, *check calibration with the deflector attached,* and make any needed adjustments.

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TECH CENTER

Disease control in cool-season grasses

New fungicides and disease prediction models highlight this year's cool-season disease control update.

by Gail L. Schumann, Ph. D., University of Massachusetts

■ Before the current wide selection of fungicides was available, cultural methods were the mainstay of disease management. Today, cultural practices are still the foundation of disease management. Keep in mind, however, that resistant cultivars and biological controls will always perform best when integrated into a sound cultural program.

Stress factors—Cultural practices have two primary goals:

- minimize turf stress
- minimize opportunities for disease-causing pathogens to infect turf.

Stress can be reduced with balanced fertility and special attention to nitrogen levels. Most turf diseases are described as being either "low nitrogen," (dollar spot, red thread, anthracnose) or "high nitrogen" (brown patch, pythium blight, leaf spot). Stress reduction alone can raise or lower disease severity.

Soil factors such as drainage, pH, compaction and thatch are directly and indirectly involved in disease severity. The patch diseases (necrotic ring spot, summer patch, take-all patch) and pythium root disease are all associated with these stress factors. On putting greens, raising the mowing height, even temporarily, will reduce these and other diseases.

Summer patch breakthrough—Recent research at Rutgers University offers a new approach to summer patch control.

Summer patch is caused by a fungus that infects the roots. Ammonium sulfate, which reduces soil pH, reduces summer patch in Kentucky bluegrass and annual bluegrass. Ammonium fertilizers have been recommended for many years to reduce take-all patch of bentgrass, also caused by a similar root-infecting fungus.

Some factors—To achieve the second goal of minimizing disease-causing pathogens, temperature and moisture must be considered.

Many fungi grow best at certain temperatures, so the disease they cause often occurs at similar temperatures. Red thread and leaf spot are most common in cool weather, but pythium blight is observed only in very hot weather. Although turfgrass managers cannot control the weather, they can minimize moisture.

Fungi need water to live. The longer water remains on the leaf blade, the more severe most diseases will be. Here are some additional hints:

- For lawns and larger landscape areas, careful irrigation timing can minimize leaf wetness and reduce diseases. Pruning and thinning trees and other landscape plantings to increase air flow will help to dry turf quickly.
- Mow turf only when it is dry.
- On golf courses, remove dew by whipping or early morning mowing.

New fungicides—Two new fungicides are available for turfgrass. Flutolanil (Prostar 50WP, from AgrEvo) is labelled for diseases caused by basidiomycete fungi such as brown patch, fairy ring, gray snow mold, red thread/pink patch, southern blight and yellow patch.

Cyproconazole (Sentinel 40 WG, from Sandoz) is a new triazole fungicide in the sterol inhibitor (DMI) group. It has a broad label for many important turfgrass disease.

Some familiar fungicides will no longer be available for turfgrass managers after current supplies are exhausted. The makers of anilizine (Dyrene) and the mercury compounds will not seek re-registration.

Mercury compounds have been restricted-use products in a number of states. They were labelled only for snow mold on golf greens and tees.

Benomyl, which has been sold as Tersan 1991 and some other products, is no longer available for use on turfgrass.

Fungicide resistance—Resistance to disease control products is still of concern, even though the problem occurs primarily on golf courses where repeated fungicide applications are made. Resistance has been observed mostly where fungicides from the same chemical family were used repeatedly and exclusively. The most significant problems have been with pythium blight (with metalaxyl), dollar spot and pink snow mold (with fungicides from several chemical groups).

Observations of dollar spot resistance on golf courses to the sterol inhibitor (DMI) fungicides is becoming widespread, especially where DMI fungicides were used exclusively for control. Resistance is usually observed as a shortened control interval. Cyproconazole, fenarimol, propiconazole, and triadimefon—all in the DMI fungicide family—are not suitable alternatives to prevent or delay DMI resistance.

If you want to mix or alternate fungicides from different chemical families, consult specialists in your area. Some long-term studies at Penn State should mean improved recommendations on the use of reduced-rate mixtures of fungicides for improved efficacy and resistance management.

Disease prediction models—Where repeated fungicide applications are routine, such as on golf course greens, using disease prediction systems with computerized weather stations may minimize fungicide applications. Disease prediction models are available for anthracnose, brown patch, dollar spot and pythium blight.

A new brown patch prediction system from the University of Massachusetts uses air temperatures, soil temperatures, duration of high relative humidity and rainfall to predict brown patch outbreaks. Predictions are cancelled when air temperatures fall below 60° F within 48 hours of a prediction. Fungicide applications according to this forecasting system were reduced in university trials in Massachusetts, New Jersey, and Georgia compared to calendar spray schedules. A

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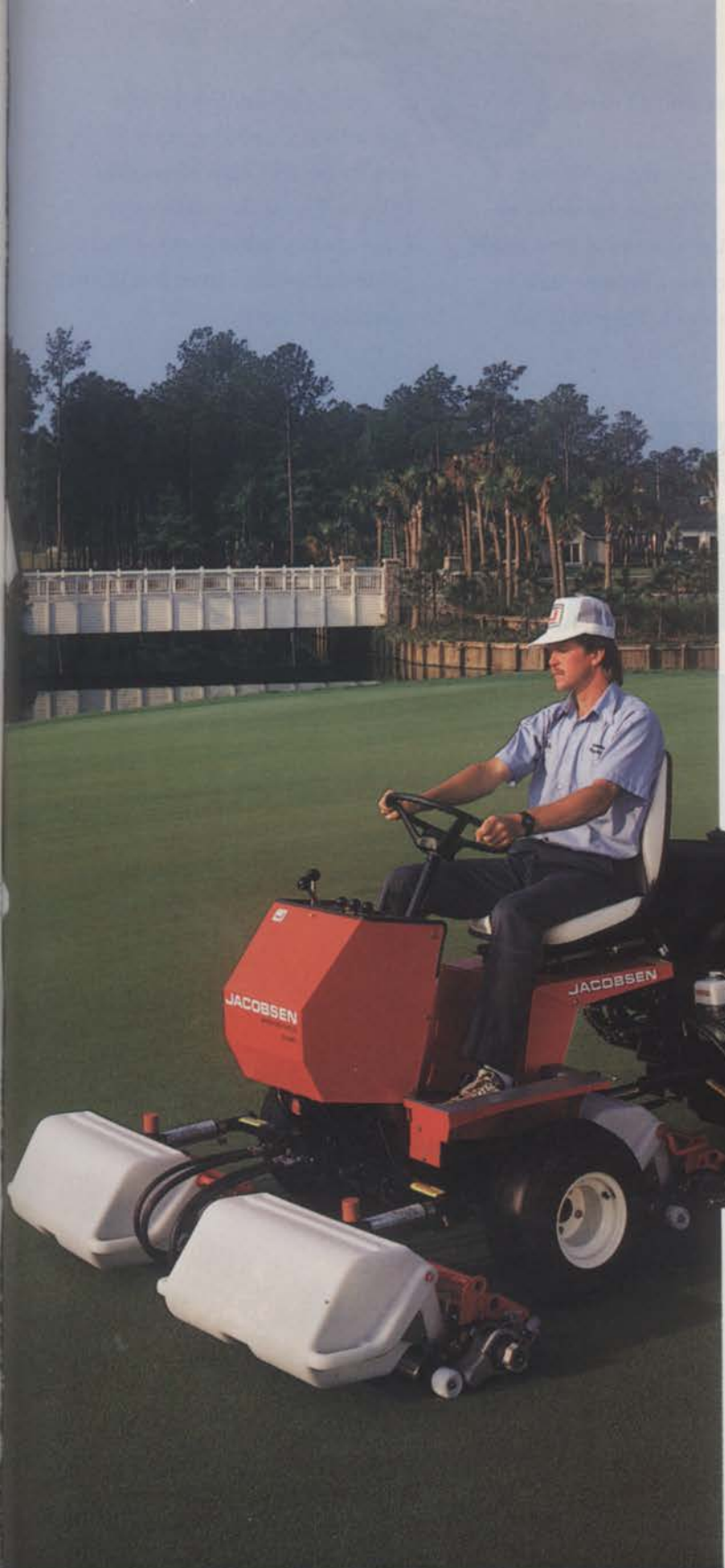

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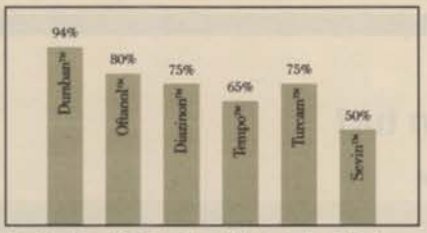
Here's an example. Mixing insecticide with insecticidal soap can reduce the amount of insecticide you need on your ornamentals by about 50 percent. Soap controls most soft-bodied insects and mites. By adding insecticide, you'll also take care of tougher insects, like scales and worms. University studies suggest you may get better control than you get with insecticide alone.

A few ways to bala with your love for the env



Studies show that Dursban delivers better chinch bug control at lower rates than other insecticides.

Knowing exactly when to apply insecticide helps, too. One way to monitor mole crickets, chinch bugs, webworms and cutworms is by mixing 1½ oz. of dish soap in two gallons of water and sprinkling it on a four-square-foot area of turf. If eggs have hatched, this soapy mixture will flush insects to the surface, and you can apply insecticide accordingly.

Your insecticide itself can also make a difference. After all, different insecticides work at different rates. Which is why Dursban* insecticide could be your best choice.

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Table 1.

Disease control for cool-season turf

Disease name	Cultural control	Chemical control
Anthracnose	Fertilize, aerate, raise mower height, less water on leaf blades.	chlorothalonil, cyproconazole, fenarimol, propiconazole, thiophanate-methyl, triadimefon
Brown patch (rhizoctonia blight)	Avoid excess nitrogen and water; minimize water on leaf blades.	captan, chloroneb, chlorothalonil, cyproconazole, fenarimol, flutolanil, iprodione, mancozeb, maneb, PCNB, propiconazole, thiophanate-methyl, thiram, triadimefon, vinclozolin
Dollar spot	Fertilize, aerate, minimize water on leaf blades; use resistant cultivars.	chlorothalonil, cyproconazole, fenarimol, iprodione, mancozeb, maneb, PCNB, propiconazole, thiophanate-methyl, thiram, triadimefon, vinclozolin
Fairy ring	Core and water; mask symptoms with N or iron; in severe cases, remove soil or fumigate.	flutolanil, (See specialist for information on fumigants)
Fusarium leaf blight, crown and root rot	Avoid drought, minimize water on leaf blades; reduce thatch.	fenarimol, iprodione, mancozeb, thiophanate-methyl, triadimefon
Leaf spot melting out	Avoid excess N and water, minimize water on leaf blades, raise mowing height; use resistant cultivars.	captan, chlorothalonil, iprodione, mancozeb, maneb, PCNB propiconazole, vinclozolin
Necrotic ring spot	Avoid water and fertility stress, aerate. Reduce thatch; use resistant culitvars.	fenarimol, cyproconazole, iprodione, thiophanate-methyl
Powdery mildew	Improve air flow, reduce shade; avoid excess nitrogen.	fenarimol, cyproconazole, mancozeb, propiconazole, triadimefon
Pythium blight	Avoid excess N; improve drainage. Don't water at night or mow in wet weather.	chloroneb, ethazol, fosetyl-Al, mancozeb, metalaxyl, propamocarb
Pythium root rot	Improve drainage, areate, raise mowing height.	ethazol, propamocarb
Red thread/pink patch	Fertilize, avoid low pH, minimize water on leaf blades. Use resistant culitvars.	chlorothalonil, cyproconazole, fenarimol, flutolanil, iprodione, mancozeb, propiconazole, thiophanate-methyl, triadimefon, vinclozolin
Rust	Fertilize, aerate, avoid water stress and mimimize water on leaf blades. Use resistant cultitvars.	chlorothalonil, cyproconazole, flutolanil, mancozeb, maneb, PCNB propiconazole, triadimefon
Slime molds	Minimize water on leaf blades. Hose or rake away mold.	no fungicide necessary
Snow molds		
Typhula blight (gray snow mold)	Let turf go dormant; mow until growth stops; minimize length of snow cover.	chloroneb, chlorothalonil, cyproconazole, fenarimol, flutolanil, iprodione, PCNB, propiconazole, thiram, triadimefon, vinclozolin
Fusarium patch	Same as Typhula blight control.	chlorothalonil, cyproconazole, fenarimol, iprodione, PCNB, propiconazole, thiophanate-methyl thiram, triadimefon, vinclozolin
Stripe smut	Buy smut-free seed. Avoid excess N in spring; avoid water stress in summer. Use resistant cultivars.	cyproconazole, fenarimol, flutoloanil, propiconazole, thiophanate-methyl, triadimefon
Summer patch	See necrotic ring spot. Raise mower height, lower pH with ammonium.	cyproconazole, fenarimol, propiconazole, thiophanate-methyl, triadimefon
Take-all patch	Improve drainage, lower pH with ammonium fertilizers; raise mower height; avoid P and K deficiency. Avoid using lime.	fenarimol
Yellow patch	Minimize water on leaf blades; avoid excess N. Reduce thatch.	flutolanil
Yellow tuft	Avoid excess N; minimize water on leaf blades; improve drainage. Mask symptoms with iron.	metalaxyl

NOTES: List reflects current pesticide labels. Check with your local specialists for specific recommendations. No product endorsement is impled, nor is discrimination intended against any materials. Every effort has been made to provide correct, complete and current information. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. State restrictions also vary. These recommendations are not a substitute for pesticide labelling. Read and follow label instructions.

Source: Dr. Schumann