

Introducing  
**DIMENSION<sup>®</sup>**  
Stay a step ahead





...by stretching your application time for crabgrass treatments.



**Break-through chemistry allows preemergence and postemergence crabgrass control.**

New DIMENSION® turf herbicide helps you take your busiest season in stride. Break-through chemistry makes Dimension the only herbicide on the market with both preemergence and postemergence activity. This wider application window gives you up to 13 weeks to apply Dimension, instead of the normal five to seven.\*

No other herbicide gives you so much flexibility. With Dimension, you'll have more time to serve more customers — more efficiently.

**Season-long crabgrass control with one application.**

Advanced chemistry also makes Dimension the first turf herbicide to allow true season-long control of crabgrass. Unlike competitive products, Dimension keeps working, month after month. So you won't have to waste time on re-treatments to maintain great-looking turf. Plus, you'll have happier customers and fewer call-backs.

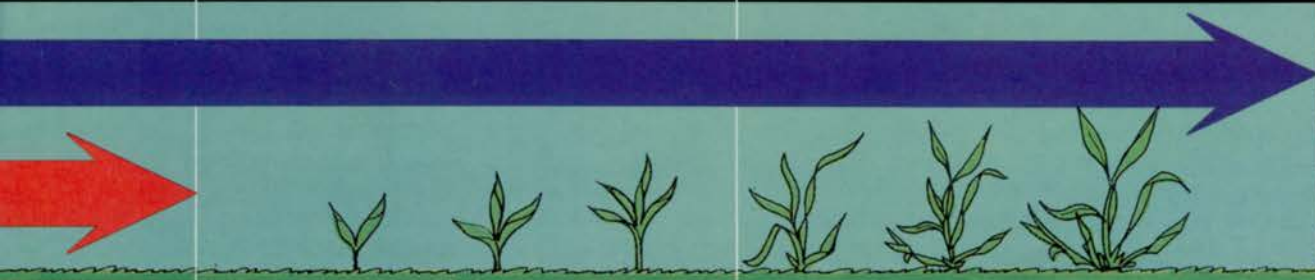
\*Based on a single application. \*\*For control of tillered crabgrass, tank mix Dimension with Acclaim¹ or MSMA.





**POSTEMERGENCE—PRE-TILLERED**  
3 weeks

**POSTEMERGENCE—TILLERED\*\***  
3 weeks



Foxtail

Goosegrass



Spurge

Oxalis



### Controls more than crabgrass.

Dimension herbicide doesn't stop with crabgrass. Its broad-spectrum activity targets a variety of annual grasses and broadleaf weeds. This control includes foxtail, goosegrass, spurge and oxalis.



**DIMENSION**<sup>®</sup>  
Turf Herbicide  
by Monsanto

### Easy on turf, permits fall overseeding.

A wide variety of cool- and warm-season turfgrasses show exceptional tolerance to Dimension. When used according to label directions, this herbicide does not cause injury to turf or a reduction in turf quality. You can also overseed with confidence three months after an application of Dimension.

### Low rates, easy handling.

Dimension does not require you to put down as much herbicide as you would with other pre-emergent herbicides. That means there's less material to mix. And there's no settling in liquid fertilizer.

You'll also like the fact that Dimension is compatible with all common herbicides, insecticides and fungicides. And, unlike other postemergent products, it is not affected by temperature at application time. In addition, Dimension does not stain.



# Join the professionals who have stepped up to Dimension.

**David Hanus**  
Herwald Lawn Care  
Bryan, TX



"Dimension works very well for me on crabgrass, mainly because it is flexible. The wider window allows us to visit a customer in March or April with a one-time application and get lasting control. Having that flexibility is a big benefit."



**Mike Kowalchuk**  
Owner  
Gro-Control Inc.  
Westland, MI

"I like Dimension because there is no staining and it mixes easily. Also, you can spray it late in Round 1 and kill any emerged crabgrass, while putting a barrier down for the rest."

**Randy Zweifel**  
President and Owner  
Lawn Managers  
St. Louis, MO



"We used Dimension on lawns with crabgrass in the two- and three-leaf stages and were very pleased with the results. The one application eliminated the existing plants while keeping the new ones from emerging. It's nice to have the option of applying a product with both preemergent and postemergent activity."



**Ray Sammis**  
Technical Manager  
Professional Grounds  
Lorton, VA

"The worst time of the year for every LCO is the spring burst; trying to get the pre-emergent down with a very narrow window. Dimension doubles that window. It takes you out of the push, saves you overtime and saves wear and tear on your equipment. It literally takes the pressure out of the chemical maintenance program."

Call Monsanto toll-free 1-800-323-1421



**DIMENSION**<sup>®</sup>  
Turf Herbicide  
by Monsanto

**The toughest thing to emerge since crabgrass.**

ALWAYS READ AND FOLLOW LABEL DIRECTIONS FOR DIMENSION TURF HERBICIDE.

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<sup>1</sup>PreM is a trademark of LESCO, Incorporated. <sup>2</sup>Team is a trademark of DowElanco. <sup>3</sup>Acclaim is a trademark of Hoechst AG.

DMP-1-257



the plan is to lay low.

"During (recession)," says Peter, "instead of experimenting, and expanding into areas that compete with established businesses, we're better off identifying what our particular niche or niches are, and developing them to the highest degree."

### Getting together

It's time to talk. "We feel that a real failing in our profession up here is that we don't get together as a group in the off-season," says Peter, who would like to see more discussion among competitors. "A little talk could go a long way. Sit down and discuss pricing. I think people should bare their souls a little bit. If somebody is sitting there who is (pricing) so ridiculously low, some of us should be able to ask: how do you come up with your prices? What's your goal? Where do you want to take your business?"

"I'm partially to blame for not taking it to the next step and doing something about it. Now, during the '90s, I'm going to have to. Nobody wants to get together and say, 'this is what our rate should be.' A lot of companies will chase 1000 accounts for \$10 each, because it's impressive to say, 'I do 1000 accounts.'"

### Other ways to beat the competition

#### 1. If you plow, make it pay.

Snow plowing shouldn't come cheap. "The man in the truck is worth over \$100 an hour," Peter asserts. "There's liability, wear and tear on the truck, the driver, I may have to come back a second time and clean up something I missed. You don't go out and plow for \$10 or \$15."

Oil is changed on all trucks after every big plowing run. Peter says he wonders if people realize how many miles are put on a truck in reverse during snow plowing season. "Then there's the equipment and maintenance: sanders, cutting edges, hydraulics; changing the plows when it's 10 degrees below zero, and we have to bring torches out to loosen the fittings. Changing a flat in 18 inches of snow at 3 a.m."

Which is why landscapers are exasperated when people want work done for nothing. "We read *Condo* magazine," says Peter, "and a writer says to condominium boards, 'play one landscaping group against the other.' You can't be in this business and do the snowplowing for nothing."

#### 2. Be environmentally diplomatic.

Vermont has its share of rules and regulations on pesticide use, and is

## Bigger jobs can bump lowballers

Robby Mazza, president of All Seasons Landscaping, Colchester, Vt., also sees his share of price-cutting.

He recently put in a bid of \$6500 for a grounds facelift at a low-income housing project. He estimated the work would require five or six men and take five days to complete. The job went to a competitor for \$2500, which Mazza calls "totally impossible; it can't be done."

How does it happen, these shamelessly low bids? Mazza believes there are a number of factors: "People pay under the table, there's no workmen's compensation, no one pays liability insurance, there's no payroll tax. (Customers) don't ask for proof of insurance."

In business for five years, All Seasons' specialties include landscape design/build, snow plowing, material hauling, excavating and land clearing.

Mazza's background includes experience in earthmoving, which makes him feel right at home around the big equipment. His inventory includes two bucket loaders; a bulldozer; 16 trucks; a Bob-Cat skid-steer; turf aerators; a parking lot sweeper; International dump trucks; and John Deere, Toro, Ransomes and Gravely mowers.

Heavy work provides an extra advantage: more time to work. "You can work later in the fall," Mazza explains. "If you're ever going to have anything, you're going to have to be able to work year-round.

"In the winter time, there are too many guys who can buy a pick-up truck with a snow plow and do driveways for \$25. When you start moving up into the heavier work, the overhead (between companies doing the heavy work) is pretty much the same, so you don't see a lot of cutthroat stuff."

Mazza never burns bridges, and he never forgets how he started. "Sometimes, when we're doing the big work," he says, "I get calls for small jobs. But I remember when we had the one pick-up truck. That's what got us here."

All Seasons sells topsoil and mulch—two popular items—to walk-in customers. It's a great way to advertise.

—Terry McIver □



**Robby Mazza: Heavier jobs give a company more time to work.**

active in the environmental movement.

Knowing that an overly defensive posture can hurt a company's image, the Levinskys have a "live and let live" philosophy. "We're going to have to accommodate a certain percentage of the population," says Peter. "We're not going to win (environmentalists) over to our camp. Personally, I have no problem with them and I feel I can accommodate them. From a professional standpoint, we have to present an image that we appreciate where they are coming from. If somebody can show us a better way; if there is a safer way, less toxic, less harmful, more environmentally friendly, we're willing and capable of incorporating it into our business."

"We don't have a problem with the people who are against herbi-

cides and pesticides," adds Jonathan. "It's just that we're the ones that have to deal with the people when their lawns are full of crabgrass, chinch bugs and sod webworms. Then what are we supposed to say to (customers)?"

But the procrastination so characteristic of anything legislative can go only so far. Then, it's time to get to work, and negotiate later.

"A lot of the people on boards of condominium associations take an active interest, they will listen to the pros and cons (of pesticide use)," says Jon. "But as the lawns become more visibly effected, there is a clamor for action. They say, 'enough talk; let's continue the program until something better comes along. Until there is a more effective or safer way of doing things.'" **LM**





The importance of timing: fertilizing less than 30 days before a frost will result in low temperature kill, left, and spring dead spot, right.

## LATE-SEASON FERTILIZATION

Objectives of proper fertilization include year-round turf production, adequate vegetative growth and quality shoot growth.

by L.B. McCarty, Ph.D., University of Florida, Gainesville

**L**ate-season fertilization helps maintain turf color and density longer. Improved turf density promotes a more competitive turf that can better crowd out weeds, and helps turf recover from summer heat or pest damage.

Fall fertilization was not previously widely used due to the concern that excessive shoot growth would deplete root carbohydrate reserves and reduce the turf's cold tolerance. New research suggests an opposite trend—if appropriately timed and moderate nitrogen amounts are used. The ratio of nitrogen to other nutrients such as phosphorus and potassi-

um also influences root growth and temperature tolerance.

### Spring green-up

Proper late-season fertilization also provides spring turf recovery by promoting earlier spring color, increasing turf density, and improving turf appearance. Less follow-up spring fertilization is required since the fall-fertilized turf has a more desirable appearance following winter. In many instances, proper late-season fertilization also increases the plant's ability to withstand heat and droughty conditions the following summer.

### Cool-season turf needs

Maximum fall fertilization effects are obtained with the cool-season turf-grasses grown in the transition zone.

Add the majority (approximately 80 to 90 percent) of the total annual nitrogen applied during fall and winter months. Reasons for this are related to the temperatures that affect turf growth. Cool-season grasses have optimum top growth when temperatures are in the middle 70s to low 80s and optimum root growth when soil temperatures are in the high 50s.

The amount of sunlight plants receive is also important. In fall, days



become shorter, light intensity becomes brighter, and night temperatures become cooler. These three variables, when combined, encourage production of storage carbohydrates that accumulate in the roots and discourage production of leaf tissue. These stored carbohydrates provide the energy for new top growth in early spring and reproductive (seedhead) tissue in late spring. Adequate fall root carbohydrate production also enables plants to withstand winter temperatures and, surprisingly enough, provides much of the vigor and warm temperature stress resistance the following summer. Research indicates that if fall root carbohydrates are not present in adequate quantities, long-term damage due to these reasons can be expected.

### Warm-season grasses

Benefits of late fall fertilization of warm-season turfgrasses are less understood than with cool-season grasses. Growth of warm-season grasses start to decline once temperatures drop below 78 degrees.

General fertilization of non-overseeded warm-season grasses usually consists of applying 10 to 20 percent of the total annual amount of nitrogen during the fall months. This amount promotes desirable turf density and better recuperative ability in spring without sacrificing cold tolerance. A balance must be made between retaining desirable green color in warm-season grasses as late as possible without over-stimulating succulent grass growth which is more susceptible to low temperature damage.

### The importance of timing

In general, cool-season grasses should be fertilized between mid-October and mid-November in northern areas of the transition zone and between mid-November and mid-December in southern areas of the transition zone. Late fall fertilization needs to be supported with early fall fertilization to provide adequate green tissue for the second application.

Warm-season turfgrasses such as bermudagrass and zoysiagrass should be fertilized no later than 30 days prior to the first anticipated frost. Fertilizing closer than 30 days to this frost date, especially with heavy nitrogen rates, results in succulent shoot growth at the expense of root growth. If such is the case, the plant is generally much more susceptible to problems such as direct low temperature kill and spring dead spot.

Warm-season grasses to be over-

## The prime nutrients

Nitrogen is generally the most important turf nutrient. It is a major constituent of plant proteins and is vital for chlorophyll production. Most naturally-occurring nitrogen in turf soils is released in inadequate amounts for turf needs. In addition, this nitrogen is in a soluble form enabling it to move below the turf-grass rootzone out of the plants' reach.

Turf managers must constantly add some nitrogen on highly maintained turf, especially when clippings are routinely removed.

Phosphorus is a building block in photosynthesis and in the formation of necessary proteins. It is also involved in a complex carbohydrate transport system which moves energy to all parts of the plant for vital growth processes.

Phosphorus availability is highly dependent on the soil pH,

with the range of 6.2 to 7.0 being optimum. Most sandy soils are inherently low in available phosphorus. A difficulty when dealing with phosphorus fertilization is its lack of mobility into the rootzone.

Potassium is essential in the transport of carbohydrates. It serves as a catalyst in numerous plant processes, and promotes sturdier plants with increased stress tolerance. Available soil potassium is held on the surface of clay and organic matter particles. It is less affected by soil acidity than either phosphorus or nitrogen. Almost as much potassium is needed for optimum turf health as nitrogen. High organic soils such as mucks and peats as well as sandy soils are typically low in potassium.

—Dr. McCarty □

seeded should not be fertilized for at least 30 days prior to overseeding. Fertilizing warm-season turf to be overseeded closer than 30 days to the first anticipated frost also encourages excessive turf growth that does not allow good ryegrass germination and establishment. Once the overseeded grasses germinate, at least two weeks should elapse before fertilizing. Do not exceed 0.5 pound of actual nitrogen per 1000 square feet until the warm-season grass goes completely dormant.

### Rates and ratios

Research indicates that excessive nitrogen use in late fall contributes to problems previously mentioned. It has also been demonstrated that the relationship of nitrogen to phosphorus and potassium will influence these problems. Late fall fertilization should not exceed 1 lb. of actual nitrogen per 1000 square feet per application. This is especially true when quickly-available nitrogen sources are used. In this case, a split application of 1½ lb. actual nitrogen per 1000 square feet may be more beneficial than the single full rate.

A 1:1, or even better, a 1:2 ratio of nitrogen to potassium has consistently been demonstrated as the optimum. Excessive phosphorus at this time neutralizes the beneficial effects of the potassium and nitrogen resulting in less cold hardy plants. This is especially true for St. Augustine-

grass. Therefore, late-season phosphorus applications are recommended only if soil test results indicate a deficiency. In addition, research suggests that a 4-1-6 ratio fertilizer is most desirable for late fall fertilization of bermudagrass. A 1-0-1 or 1-0-2 (such as a 15-0-15 or 15-0-30) ratio fertilizer has been successfully used on other warm-season as well as cool-season turfgrasses.

### Other N sources

Nitrogen sources dependent on soil microbes to release nutrients are less effective for late fall fertilization since temperatures are not high enough for microbial activity. Soluble sources such as ammonium nitrate or ammonium sulfate and certain slow-release fertilizer sources such as IBDU are not temperature dependent, thus are able to release the nitrogen easier during late fall. If other nitrogen sources are chosen, use finer or microprilled grade fertilizer forms.

Iron applied in late fall often provides desirable green color and can favorably influence turf tolerance to cold temperatures. Benefits of iron applications are usually seen in soils with high pH (>7.0), high available phosphorus, or when turf rooting is restricted. One to two ounces of an iron source such as ferrous sulfate in one gallon of water is normally applied per 1000 square feet of turf. Chelated iron sources also are used.



## 'Bridge products' for late-season fertilization

Two concerns often voiced by landscapers and lawn care companies regarding late-season fertilization are:

- higher precipitation and decreasing nutrient uptake by the plant during this time of year create a potential for leaching and run-off of soluble fertilizers; and
- soil micro-organisms and macro-organisms don't react well to harsh chemical changes in their environment, so heavy doses of soluble salts in the soil can have detrimental effects.

Landscape professionals might respond to these concerns by using chemicals more judiciously and by exploring alternative products and technologies.

Until recently, landscape professionals had to choose between synthetic fertilizers and natural (organic) products, each with its own set of strengths and weaknesses. But a new category of fertilizers called "bridge products" combine organic material with a moderation of environmentally-safe synthetic ingredients. They have all the safety and benefits of natural fertilizers without sacrificing the high nitrogen and lower cost of synthetics.

Bridge products are an advantageous choice for late-season fertilization. In addition to providing nutrition for the plant, fall fertilization benefits soil life: bacteria, protozoa, nematodes, earthworms, insects, fungi and algae.

Bridge products provide a combination of water insoluble nitrogen (WIN), quick-release nitrogen and organic material to create the optimum soil condition for fall and winter. The quick-release nitrogen in bridge products is available to the plant immediately, regardless of temperature. Yet the amount of quick-release nitrogen is balanced with slowly-available organic sources in order to minimize waste or leaching.

The long-term benefits of bridge products lie in the slow release, water insoluble nitrogen. WIN breaks down gradually through microbial activity and thus will not leach excessive nitrogen. If temperatures fall below those required for organic breakdown, unused WIN is stored in the soil until microbial activity resumes in the spring.

Results of late-season fertilization can be observed in the head start it gives in spring. The stores of nitrogen and other essential nutrients enhance root growth and promote early spring green-up.

Bridge fertilizers are made from materials that

enhance macro- and micro-organisms in the soil, each of which plays a synergistic role in plant life functions. For example, the earthworm—probably the single most important macro-organism in soil—keeps the soil aerated and creates channels for water distribution and root growth. Bacteria and fungi are also necessary to maintain balance in the dynamic soil environment.

Bridge products work well with IPM, a system that allows for reduced and more efficient usage of pesticides and other chemical products. Through agronomic practices—such as judicious use of chemical treatments and close monitoring of turf—IPM promotes healthy, fertile soil. By promoting a balanced soil and turf environment, bridge products can reduce the need for more frequent application of ecologically harmful chemicals to control insects and weeds.

Beneficial nematodes, bacteria and fungi help keep their turf-damaging close cousins in check. Soil micro-organisms also break down organic and mineral materials in the soil, making them available to nourish plants. Keeping this dynamic environment in balance is the secret to successful, economical turf management.

A two-year study by Dr. Charles Peacock, associate professor of crop science at North Carolina State University, found that bridge products are effective fertilizers. Organic materials used as fertilizer bases provide an energy source for soil micro-organisms, enabling them to continue their soil-building activity; this in turn provides optimum conditions for plant growth.

—J. Mark Nuzum □



J. Mark Nuzum is president of Harmony Products, Chesapeake, Va., a leader in developing bridge products. Formerly a division of Nitrex, Harmony was formed in January 1989 to research, develop and market environmentally sound products for professional and consumer use.

Iron application is preferred for providing late fall green color for warm-season grasses such as centipedegrass, bahiagrass, and St. Augustinegrass.

### Consider the species

Not all turf species should be fertilized late in fall due to excessive damage that often occurs during the winter.

Centipedegrass and bahiagrass should not only be fertilized earlier in the season; annual nitrogen rate should be minimum for both turf species. Problems such as centipedegrass decline have consistently been

associated with heavy annual nitrogen use and late fall nitrogen fertilization. Potassium fertilization of these species is, however, recommended in fall to promote rooting and cold hardiness. One to two pounds of potassium should be applied 30 to 45 days prior to the first killing frost.

As mentioned above, iron applications to centipedegrass and bahiagrass often provide the desirable green color without resulting in undesirable effects.

A light fertilization of St. Augustinegrass may be applied in

early- to mid-fall but is not recommended in late fall. No more than 1½ lbs. actual nitrogen should be applied at this time. St. Augustinegrass has less natural temperature tolerance than most other warm-season grasses, therefore, is not normally grown where temperatures fall consistently into the teens. Iron application to St. Augustinegrass also often provides desirable green color without undesirable effects. **LM**

Dr. McCarty is an assistant professor of turfgrass science at the University of Florida, Gainesville.



# Par Ex Keeps Working When Mother Nature Stops Other Fertilizers Cold.

The days are growing shorter, and the first blast of cold weather is just around the corner — perfect conditions for a late-season application of Par Ex.®



*Even when there's a hard frost around the corner, it's the perfect time for late-season fertilization with Par Ex.*

Most competitive fertilizers rely on warm temperatures or bacterial activity to release their nitrogen. So when cold weather hits and bacterial activity stops, they become inactive and ineffective.

But Par Ex with its exclusive IBDU® slow release nitrogen goes on about its business, slowly activating controlled portions of nitrogen until the



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That's because Par Ex releases its nitrogen through hydrolysis, a process triggered by moisture rather than temperature and bacterial activity.

The result is extended greening of your turf into fall and winter. And a healthier root and rhizome system with increased carbohydrates, to reduce the potential for cold damage and stimulate an earlier green-up in the spring.

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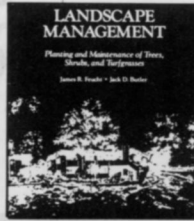
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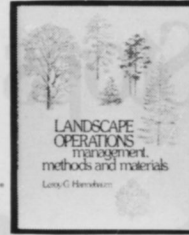
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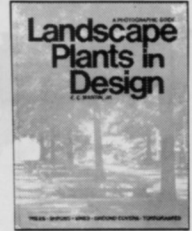
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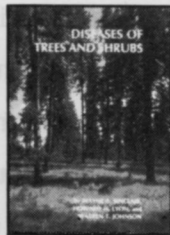
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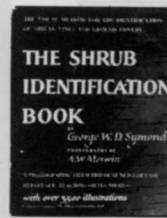
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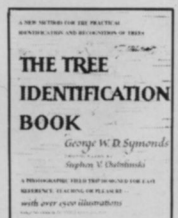
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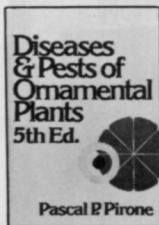
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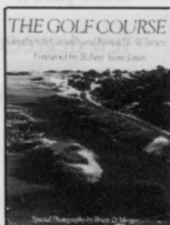
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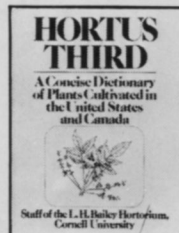
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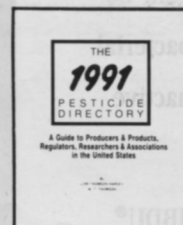
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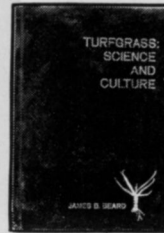
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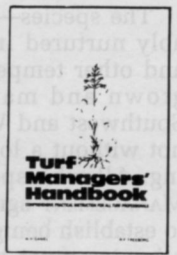
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# SUPERS IN WARM-SEASON AREAS **BEWARE!**

Bentgrass establishment in warm regions has never been, and probably never will be, easy. No matter how many golfers ask for it.

by Jack Simonds, contributing editor

**L**et the golf course superintendent beware: bentgrass—the “Cadillac” of greens turf by many measures—is not, and may never be, adapted for climates south of the Mason-Dixon line.

The species—commonly, comfortably nurtured in the East, Midwest and other temperate climes—can be grown and maintained in Dixie, Southwest and Western settings, but not without a lot of daily handholding. All who spoke with **LANDSCAPE MANAGEMENT** agree that the decision to establish bentgrass greens in warm climates must be carefully considered. Also generally agreed: increasingly, golfers are asking for bentgrass greens over bermudagrass.

Opinions are not hard to unearth:

●Mississippi State University agronomy professor Dr. Jeffrey V. Krans: “It’s like taking a fair-haired person, putting him in the desert and expecting him not to get sunburned. It just doesn’t work.”

●Golf Course Superintendents Association of America president Stephen Cadenelli: “You try to locate the proper plant in the proper place. It (bentgrass down South) can be very difficult to deal with. It may be too difficult to maintain and can put a stress on everyone.”

●Superintendent Jerry Lemons of Old Hickory Country Club in Hermitage, Tenn.: “From Memorial Day to Labor Day, it is 90 days of hell. You try your best to keep every bit of grass you’ve got alive. Sometimes it is impossible.”

●Ray Hansen, president of the Florida Golf Course Superintendents Association: “The solution to this question is to educate (Florida) course members that green isn’t always beautiful. Golf courses over the years have become so beautiful that the question becomes: Where do we go from here?”

●University of Florida environ-

## Bentgrass in warm climates? Here’s what they say:



Jeffrey Krans: “It just doesn’t work.”



Dr. A.E. Dudeck: Year-round bentgrass “environmentally unsound.”



Stephen Cadenelli: “It may be too difficult to maintain.”



Ray Hansen: Educate club members: “Green is not always beautiful.”



Jerry Lemons: “Sometimes it is impossible.” Photo by Larry Kassell.



Jim Simmons: “The secret is to keep it growing constantly.” Photo by Steve Alvis.



mental horticulture professor Dr. A.E. Dudeck: "Environmentally, I see it (a year-round bentgrass green) as unsound. (But) it is the Cadillac of putting surfaces and people seem to want it here."

#### A sensitive species

Bentgrass, coveted for its fast putting speed and fine, rolling texture, is also among the most sensitive species; responding both positively and negatively to fertilizers, pesticides, herbicides and fungicides—all necessary "toolbox" items in a warmer climate.

## BENT AND BERMUDA, THE BASICS

<b>Bentgrass:</b>	Cold tolerance: Good to excellent Ideal growing conditions: 60-75 degrees F. More susceptible to disease in warmer climates
<b>Bermudagrass:</b>	Heat hardiness: Excellent Low temperature hardiness: Poor Drought resistance: Excellent Salt tolerance: Good Wear tolerance: Very good
<b>Pest susceptibility:</b>	Sod webworms, armyworms, mole crickets, bermudagrass mite, fruit fly

## A warning against bentgrass greens by the IFAS

Year-round bentgrass greens in the Sunshine State pose difficulties and make the practice difficult, says a June, 1990 report from the Institute of Food and Agricultural Sciences, part of the Cooperative Extension Service at the University of Florida.

Researchers conclude in the four-page report that the institute "does not recommend the use of bentgrass as a year-round putting surface in this state." The recommendation comes after reviewing the species' reliance on precise water requirements as well as dependence on weed, disease, nematode and insect controls and other quality control concerns.

"Bentgrass in Florida, Some Important Considerations" combines the work of the Institute's L.B. McCarty, J.L. Cisar, A.E. Dudeck, T.E. Freeman, G.W. Simone and R.A. Dunn who collectively summarize that bentgrass in Florida "should be considered only as a temporary turf suitable for winter overseeding play."

The research team details that bentgrass grows best in air temperatures between 60 and 75 degrees and soil temperatures between 50 and 65. Many areas of Florida exceed these ranges and although direct-kill temperatures rarely are the isolated cause for failure, elevated temperatures do contribute to the plant's lowered capacity for photosynthesis, leading to diminished root development.

"While direct-kill soil temperatures are rarely achieved or maintained for long periods of time, soil temperatures above optimal for bentgrass does not efficiently

produce carbohydrates by photosynthesis," states the report, adding carbohydrate reserves become depleted and root growth declines.

Other cautionary notes:

- Exact water management—including application amounts and proper drainage—to deter wet wilt and algae layer growth is "the most important key to quality bentgrass production."

- 4 to 8 lbs. of slow-release nitrogen is recommended per 1,000 sq. ft.

- Iron is needed for color.

- Potassium and phosphorus levels are also important.

- Soil pH levels should hover between 5.5 and 6.5.

Bentgrass has a relatively low tolerance to most post-emergence herbicides, the report states, although pre-emergence products can be effective. When weeds strike, say researchers, hand removal is the only effective method once the turf has been established. Also, broadleaf herbicides can be used at half strength, but only at temperatures below 80 degrees.

Bentgrass is also more susceptible to disease in warmer climates because of its weakened condition in summer heat. Common fungi diseases for bentgrass include dollar spot, brown patch, helminthosporium, Southern blight (sclerotium), fairy wings and pythium.

Other difficulties cited in the report include nematodes, insect infestation, heat build-up, compaction, bermudagrass encroachment and traffic control.

If successfully established and maintained, bentgrass greens in warm climates can be chalked up as a status coup. Success singles out a course from others in the vicinity still with coarser, "slower," more yellow bermudagrass greens.

"But there have been as many failures as there have been people who have been able to pull it off. When you make that decision to go to bentgrass, you have made a serious commitment of time," warns Krans.

Ask Jim Simmons, superintendent at Shoal Creek Golf Course in Shoal Creek, Ala.

Twice the site of the PGA Championship (1984, 1990), the 18-hole Jack Nicklaus course has had Penncross bentgrass greens since 1980, although "the grass just didn't perform" in its first year, according to Simmons.

"The most important thing is to keep that grass growing constantly. If it just sits there, it will slowly fade out over the summer," says Simmons. Krans says Simmons is one superintendent who has consistently come up with formulas for success.

The course, which will expand to 27 holes in November, originally installed bentgrass under direct orders from Nicklaus. Although initially cautioned that bentgrass doesn't grow in the South, designers proceeded with the species, Simmons says, because Nicklaus insisted on only the best greens.

#### Fertilizer regimen essential

Soluble fertilizers are routinely applied, as is a fungicide, Simmons says. Routine supplements of iron and potassium have augmented the stay-green program as well.

"Those are the biggest things that helped our greens," says Simmons. His 17-member crew also overseeds greens every other year.

"When I first came down here, our



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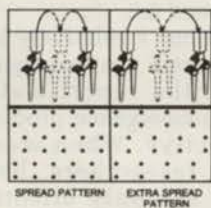
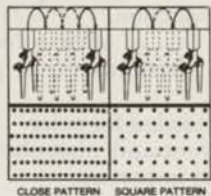
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idea to grow the bentgrass was to not fertilize it; to let it lay dormant and not do anything except maybe use some iron. Well, that didn't work. The grass just didn't perform (and) it became obvious we had to do something to keep grass growing year-round."

The greens also receive a fine fog-like misting on particularly hot days at around 10 a.m. and noon. The syringing technique is accomplished with smaller irrigation heads.

One other ingredient: commercial-styled fans trained over greens to keep a constant air flow, reducing the ravaging effects of 95 degree temperatures and 60 to 70 percent humidity. Dr. Dudeck says hot, stagnant air is equally harmful to bentgrass, and applying moving air currents may be equally important at night. Soil temperatures, coincidentally, which reach and maintain 80 degrees can severely affect bentgrass sod. Ornamentals surrounding greens can contribute to heat build-up.

Keep it going, remain on alert, spot for trouble...all recurring messages from those who have succeeded with bentgrass in warmer months in warmer climates.

### 'Every green, every day'

Lemons, during Nashville's peak golf season, wrestles regularly with high temperatures, high humidity and heavy rainfall.

"The key is daily management. It is not just a matter of checking greens out once a week. You check out every green every day," notes Lemons.

He "waters the dickens" out of the greens, sometimes by hand. He also uses wetting agents. Aerification is performed in stress times, sometimes as late as August. He says he does not overseed nor is artificial air movement needed in his circumstance.

Cadenelli says the GCSAA does not take a formal position on the practice, preferring to support the USGA's continuing research with grasses requiring less water, nutrient supplements and pest and infestation controls.

Hansen says few of the Florida GCSA's 740 member superintendents keep year-long bentgrass greens; with 95 percent opting for an adapted Tifdwarf and other heat-tolerant varieties. Winter overseeding with bentgrass is practiced, but the association president says anticipated water restrictions, along with restrictions on fungicides and pesticides, could make the choice for bentgrass moot in future seasons. **LM**

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