BY **SAM FERRO**

MAKE YOUR SOIL SAMPLE COUNT

When you are having troubles with a field or doing some routine monitoring, it's probably time to send a sample into a laboratory for testing. Do you ever wonder if the testing results you get from the lab really represent what's present at your site? They may not if the sample wasn't taken correctly.

The most important role that the turf manager has in the testing process is insuring proper sample collection. Since all analyses and recommendations are based on the sample received in the lab, it is very important to take a representative sample. The ability to extrapolate the laboratory results to the field depends on how representative the sample is to the bulk material.

Sample collection procedures vary based on the location of the material during sampling (i.e. stockpiles, sports fields, etc.). Because of the variability in proper sampling techniques, the following outlines some general sampling techniques. For special issues not covered here, consult with your testing lab for advice.

The following sampling procedure is primarily for evaluation of existing sports fields, native soil, and turf areas in order to document the physical or chemical properties of the soil. Recommended tools for sample collection are a clean soil probe or shovel, a tarp or piece of canvas, and a plastic bucket.

Large areas should be divided into separate sampling units based on topography, vegetative cover, previous use, soil color and other visual differences. Small, non-uniform areas such as wet, rocky, or eroded spots should always be a separate sampling unit. One sample can be submitted from each sampling unit and should consist of a composite of numerous randomly collected subsamples. The subsamples can be collected with a soil probe or a shovel and combined in a plastic bucket.

While the whole bucket can be sent in, a better approach is to portion out and remove one gallon as follows. Dump the bucket out on a tarp or canvas and mix thoroughly. Split the material into quarters and discard opposing quarters. Mix thoroughly, split and discard again. Continue to do this until one gallon remains and bag it.

For physical testing procedures, the average sample depth is 12 inches, but in some cases, it may be necessary to sample deeper. For chemical tests the appropriate sample depth is usually 4-8 inches. Any time there is a difference observed in the soil layers, it should be noted and the layers divided into separate samples. Record the depth of sampling. Label each sample appropriately with a permanent marker, and maintain a record or map of sample locations.

Diagnostic or profile core

This sample procedure is primarily for evaluation of existing sand-based sports fields in order to document the profile and/or diagnose physical problems.

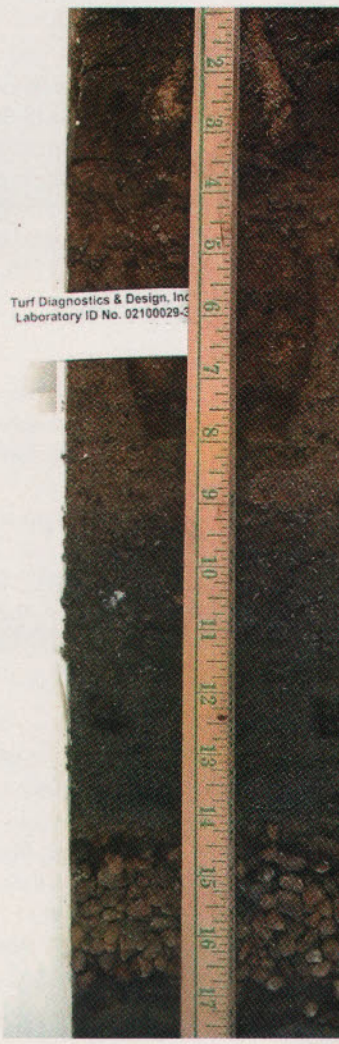
A 2-3 inch diameter schedule 40 PVC pipe should be cut about 24-30 inches long to extend down through the profile into the sub-grade. Bevel the outside of one edge to provide a sharper end to cut into the green. Drill two opposing holes into the other end into which a metal rod or rope can be inserted to help pull out the core.

Drive the beveled end of the PVC pipe into the field far enough to reach sub-grade. Sub-grade is needed at the base of the core in order to hold in the gravel and/or choker layers. Pull the core out. Pack the ends with newspaper to prevent shifting and tape shut. Label the sample appropriately with a permanent marker.

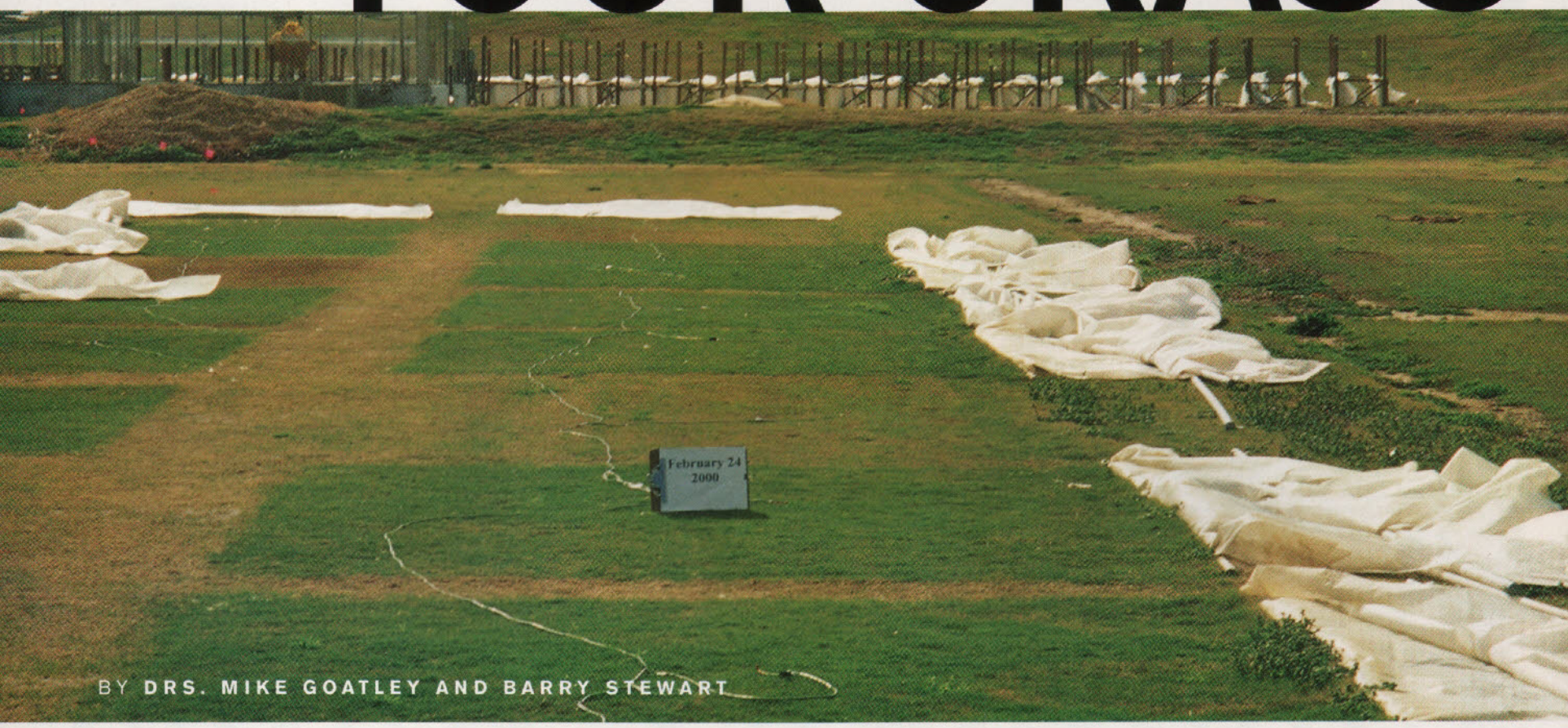
Stockpiles

Stockpile sampling is performed during construction and renova-

(continued on page 27)



COVERING YOUR GRASS



BY DRS. MIKE GOATLEY AND BARRY STEWART

Bermudagrass is an excellent choice for football fields in the warm climates of the United States. Yet a major concern is that the grass often loses color and enters dormancy well before the game season ends. To improve field appearance and playability, many bermudagrass turfs are overseeded with perennial ryegrass so that play continues on a green, actively growing turf. However, the competition between the ryegrass plants and the bermudagrass will at the very least lead to a severely weakened bermudagrass turf just before it enters winter dormancy.

The playing season for most football teams ends the first weekend in December. Therefore, the necessity of overseeding for possibly one or two late season games is a question that warrants careful consideration regarding the expense in establishing and maintaining the ryegrass and the competition it creates with the bermudagrass. Painting the bermudagrass is one alternative to gain color, but what about another approach? At Mississippi State we have researched the application of turf blankets on a temporary basis to maintain bermudagrass color through the end of the season.

Research method

A Tifway bermudagrass turf maintained at 0.75 inches represented our football field over the fall and winter months of 1998-2001. The grass was fertilized regularly throughout the growing season to promote density and desirable color. Beginning the first week of October, one-half of the turf area was sprayed with chelated iron at the level of 2.5 pounds Fe/A, and the applications continued on a weekly basis for that month. A non-woven turf blanket (white, spunbonded polypropylene #32N01) was used for the covering treatments based on predicted nighttime temperatures from the National Weather Service. The turf blankets were applied according to four temperature covering treatments: no covers applied, or covers applied when temperatures were predicted to be 59, 49, or 39 degrees F.

If daytime temperatures the following day were not predicted to reach at least 60 degrees F, the covers remained in place. When the temperatures finally got cold enough to result in killing frost under the blankets, the covers remained in place until complete green-up occurred next spring. Rhizomes were sampled from all plots in November, January, and April of the 1999-00 and 2000-01 seasons to determine what effect the use of turf blankets had on levels of stored total nonstructural carbohydrates (TNC).

Research results

The average date for a killing frost on the Mississippi State campus is November 6, and during the three years of our research the first killing frost dates were Nov. 5, Nov. 3, and October 24. All cover treatments prevented any visible frost damage on these dates. However, there were few differences in turf color between any of the covering temperature treatments, indicating application of the covers for frost protection was not necessary until the temperatures were forecast to be at least 39F. This is a very desirable aspect of a covering program due to the time and labor involved in blanket application. For climates similar to Mississippi's, night temperatures below 39F will

not regularly occur until very late in the football season.

As expected, turf color was improved by foliar Fe applications. This micronutrient continues to be an excellent tool to promote late season bermudagrass color without a surge in shoot growth. However, the Fe treatment alone did not prevent killing frost damage, and resulted in no visible turf response the following spring.

We observed acceptable bermudagrass color under the temporary covers until nighttime air temperatures fell to approximately 22F. The dates when these temperatures occurred in the three years' trials were January 3, December 22, and December 12, respectively. In all trials, the turf color was acceptable for the duration of the fall football season (see photo on previous page).

Keeping the covers on the plots during the winter months resulted in spring green-up 4-6 weeks earlier than uncovered turf the following spring. Completely green turf was observed in the covered plots by March 16, March 2, and April 2 from 1999-2001, respectively (see photo this page). The uncovered plots reached complete greenup by May 2, March 30, and May 5 over the same time frame.

The only negative covering responses that we observed were an increase in winter annual weed pressure and fire ant activity, both primarily because of the soil warming. There was no evidence of increased disease pressure, though we anticipate this could be a problem. We saw no visible evidence that bermudagrass survival was altered because the grass was not adequately hardened off. Instead, we found that the turf apparently benefited from the extension of the growing season in each year's trial. The TNC levels in bermudagrass rhizomes were actually higher in the covered turf plots in January and April of each year as compared to the uncovered turf, indicating that the maintenance of a photosynthetically active turf allowed the grass plant to store more food reserves.

Applications

The primary benefit of the turf blanket application was frost protection and maintenance of a green canopy. We are not suggesting that the use of temporary turf blankets can encourage enough bermudagrass regrowth to withstand heavy field use during the fall season. However, we do anticipate there is potential for some enhancement in turf recovery earlier in the season when both day length and temperatures are not quite so limiting. This must be further researched. Bermudagrass athletic fields in more northern climates will logically face earlier killing frost dates and anyone considering the use of blankets in these areas should carefully consider their average weather data to see how covers might fit their program.

What are some concerns of the temporary covering strategy? The cost of approximately 2 acres of turf blanket for a football field and the labor required to install the blanket(s) are very important. If handled and stored properly, most turf blankets tout minimal life expectancies of at least 7 years (many say they **(continued on page 27)**

POROUS CERAMIC

PROFILE is a true porous ceramic soil amendment product engineered to solve and prevent soil problems on sports turf. Profile has 74 percent pore space that allows it to hold water and oxygen in a nearly perfect balance and stores nutrients vital to plant growth.

Profile Products/800-207-6457
For information, circle 083 or
see www.oners.ims.ca/2084-083

FIELD CONDITIONER

MuleMix field conditioners (516 or 816) can be used for soil amendments either on skinned or turf areas. The product is effective in eliminating over-compacted areas, muddy playing surfaces, and giving a year-round playable field. MuleMix can also be used in conjunction with aerification to help nutrients and water movement to turfgrass roots.

Southern Athletic Fields/800-837-8062
For information, circle 084 or
see www.oners.ims.ca/2084-084

SOIL AMENDMENT PROVIDERS

AAdvanced Water Mgmt.	877-994-3494	Novozymes Biologicals	800-788-9886
Aquatrols	856-751-0309	Nu-Gro Technologies	888-370-1874
Beacon Ballfields	800-747-5985	Oil Dri Corp.	800-634-0315
Becker Underwood	800-232-5907	Pacific Earth Resources	805-986-8277
Carolina Green Corp.	704-753-1707	Partac Peat/Beam Clay	800-247-2326
Conserv FS	847-526-0007	PBI/Gordon	800-821-7925
Dakota Peat & Equipment	701-746-4300	Poulenger USA	866-709-8102
Diamond Pro/TXI	800-228-2987	Profile Products	847-215-3470
Eagle Picher	800-366-7606	ProSource One	877-350-3999
EarthWorks	610-250-9560	Roots Inc.	800-859-2972
Fielder's Choice	281-853-4353	Simplot	208-332-0900
Finn Corp.	513-874-2818	Southern Athletic Fields	800-837-8062
Floratine	901-853-2898	Sports Turf One	561-369-7994
Harrell's	863-687-2774	Stabilizer Solutions	602-225-5900
Haydite	888-593-0395	Turf Diagnostics	913-780-6725
Jaitire Industries	303-322-7887	United Hort Supply	303-487-9000
Lebanon Turf Products	724-285-4472	WaterWick Inc.	631-287-1644
Magic Green	573-384-6300	Wessco Inc.	800-650-9322
Nature Safe	859-781-2010		

FIELD TORN UP OR MUDDY?

Terra-Green "Super-Green" dries muddy areas and colors them green. Great for when games must be played in wet weather. Stabilizes wet areas and provides green grass color to damaged turf. Product also improves drainage and aeration in compacted soils. After the game, rake or aerify in to continue improving field.

Partac/Beam Clay/800-247-2326
For information, circle 085 or
see www.oners.ims.ca/2084-085

BIOSTIMULANT

Focus turf biostimulant from PBI/Gordon is recommended for use in all turf management situations, especially where turf is expected to perform under high-stress conditions. Focus 15G can also be used as a topdressing for ornamental landscape plantings and other flower displays.

PBI/Gordon/800-821-7925
For information, circle 091 or
see www.oners.ims.ca/2084-091

MULTI-PURPOSE PRODUCT

Transplant 1-Step from ROOTS has everything you need all in one 4-oz package: Granular version of their organic biostimulant; organic fertilizer; mycorrhiza; and water-holding gels to carry your plants through drought.

ROOTS Inc/816-254-6000
For information, circle 087 or
see www.oners.ims.ca/2084-087

NEW SOIL AMENDMENT

GAME ON is a new sports field soil conditioner that is vitrified and manufactured in a rotary kiln. The lightweight, expanded shale product that absorbs more than 20 percent of its weight in water. Due to its angular shape and pore structure, GAME ON will relieve compaction and significantly increase water infiltration rates. The pores of each particle allow for increased water absorption and water holding capacity.

Hydraulic Press Brick Co./888-593-0395
For information, circle 088 or
see www.oners.ims.ca/2084-088

FIGHT BLACK LAYER

United Horticultural Supply introduces BLT, an advanced greens grade granular product whose ingredients have been proven to combat black layer and its harmful effects. BLT provides an alternative to costly reconstruction, renovation, or ineffective inputs and practices. It will reduce the severity of black layer for several months after application and a regular maintenance schedule will keep susceptible areas from recurrences.

BLT™
BLACK LAYER TREATMENT

United Horticulture Supply/800-847-6417
For information, circle 086 or
see www.oners.ims.ca/2084-086

MODULAR SOCCER GOALMOUTH

by GreenTech

GreenTech's patented modular system is an innovative technology that provides solutions to problems associated with the design, construction, and maintenance of horticultural and turfgrass projects. This picture is an example of the GreenTech Modular System used as a soccer goalmouth. Modular construction allows new, mature, and well-rooted turf to be installed in worn, high traffic areas, such as soccer goalmouths. It eliminates the need to constantly re-grass the area with sod that does not have time to become fully established.

1301 Macy Drive, Roswell, GA 30076 Phone: 770-587-2522/ Fax: 770-587-2445
Email: info@greentechitm.com Web: www.greentechitm.com

Circle **162** on card or www.oners.ims.ca/2084-162

ORGANIC NEMATODE CONTROL

Poulenger USA now has a patent for Ontrol, its new organic nematicide. Produced from 100 percent organic material, Ontrol is considered a minimum risk pesticide and is exempt from EPA registration. The product has no application limitations or restrictions. It is available as a granulated or powdered material.

Poulenger USA/866-709-8102
For information, circle 097 or
see www.oners.ims.ca/2084-097

ONTROL™
ORGANIC NEMATICIDE

MARKING PAINT

Pioneer's Brite Stripe athletic field marking paint produces up to 400 percent brighter than standard paints under UV lights and 25 percent brighter in sunlight because of its formulation of Halogen 2000 and Optiwite optical brighteners, says the company. Product can be applied with any bulk paint striper and dries in less than an hour. It does not harm turf or damage equipment or uniforms.

Pioneer Manufacturing/800-877-1500
For information, circle 098 or
see www.oners.ims.ca/2084-098

IRON CHELATES

For dark green, healthy plants, Becker Underwood's Sprint 330 and Sprint 138 iron chelates maintain and protect plant-available irons in turf, trees shrubs, field-grown plants, and plants in a container. Sprint 330 performs best in slightly acidic to slightly alkaline soils with a pH of up to 7.5. Sprint 138 is preferred in the most challenging soils, which are alkaline and calcareous, including soils with a pH greater than 7.0.

Becker Underwood, Inc/800-232-5907
For information, circle 093 or
see www.oners.ims.ca/2084-093

PREPACKAGED PUMPING SYSTEM

Flowtronex PSI has introduced a new generation of pre-packaged pumping systems that are more efficient, easier to service, and cost less, says the company. The FloBoy skid-mounted, prefabricated pump and control packages for turf applications are sized to be from 3-25 hp at 208/230 and 460 volt 3 phase, and 3-50 hp at 208 and 230 volt 1 phase power.

Flowtronex PSI/800-786-7480
For information, circle 100 or
see www.oners.ims.ca/2084-100

SOIL AMENDMENT

Caltrisal soil amendment overcomes salinity issues in soils by solubilizing calcium in the soil and moving dessicating salts away from the rootzone quickly and efficiently. Caltrisal can be sprayed or injected, and can be applied in conjunction with liquid fertilizers, making application a snap.

Aquatrols/856-751-0309
For information, circle 089 or
see www.oners.ims.ca/2084-089

ASSIST NATURAL PROCESSES

Floratine products assist natural soil processes to deliver turf what it needs. Maxiplex is a carbon rich, low fulvic humic acid. CalpHlex is a proprietary, extra strength, cyclic acid chelated calcium product. Grofax 33 is a premier organic base microbial food source.

Floratine/901-853-2898
For information, circle 096 or
see www.oners.ims.ca/2084-096

ELIMINATE PUDDLES

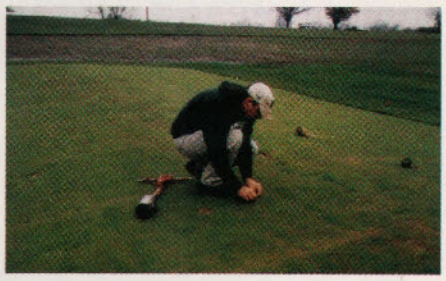
The Klacon family of soil conditioners combat compaction, enhance turf drainage, promote safe play, provide consistent and truer bounce, as well eliminate puddles and standing water fast. From the makers of Klawog mound and batter's box products.

Wessco Inc/330-745-9322
For information, circle 092 or
see www.oners.ims.ca/2084-092

SOIL AMENDMENT

Eagle Picher Minerals has created AXIS, made exclusively of soil grade diatomaceous earth. An incorporation of 10% AXIS by volume to a depth of 6 in. will permanently improve plant growth and reduce water requirements by 30 percent in most native soils.

Eagle Picher/800-366-7606
For information, circle 090 or
see www.oners.ims.ca/2084-090



REDUCE WILT

AAdvanced Water Management says its Hydrozone water-absorbing polymer significantly reduces wilt on high-stress days. A study at Michigan St. showed turf grown with the product was able to go longer periods without watering. The root system also established faster and had greater mass and density.

AAdvanced Water Management/877-994-3494
For information, circle 099 or
see www.oners.ims.ca/2084-099

(continued from page 14) tion and quality control process. Stockpiled materials are tested before shipment to the project site to ensure they meet project specifications. The turf manager or some other owner's representative should be present during any construction materials sampling event.

To aid in sampling, a 2.5 inch schedule 40 PVC pipe about 45-50 inches long should be cut at a 45 degree angle at one end. The pipe acts as a sample collection tube. It is also useful to have a rubber mallet to tap samples out of the pipe.

At least eight sampling locations should be randomly selected for a 1,000-ton stockpile. The locations should vary from the top to bottom and all around the pile. At least half of the samples should be taken from the lower third of the stockpile. Brush away the outer 6 inches of the pile and push the clean pipe as far as possible into the stockpile. Pull the pipe out and tap the sample into a clean bucket. Thoroughly mix the material after all samples are taken. Remove one gallon out of the bucket to fill a zip-lock bag. Label the composite sample appropriately with a permanent marker, and indicate from which stockpile the sample was taken.

To protect the samples during shipment, it's usually best to send the samples in a sturdy box with sufficient packing material included. Sample IDs should always be on the outside of the sample bag or container. A letter or testing request form should also be included with the sample submittal. The letter should include any pertinent sampling information, testing required, information on how to contact you, and info on where to send the report.

Follow these guidelines and you can take comfort in knowing that you have taken a good representative sample. **ST**

Sam Ferro is the president of Turf Diagnostics & Design, a physical evaluation lab and agronomic consulting company (913-780-6725). Company vice president Duane Otto also contributed to this article.

(continued from page 18) last indefinitely), so the investment in the product is long-term. Also, manpower or equipment to install the covers can be a major limitation, in addition to the handling characteristics of the cover in wet, windy, and cold conditions. Covers differ greatly in handling characteristics. Another point to consider is the potential for leaving the cover in place for more than one day during the season. The non-woven turf blanket in this research allowed approximately 70 percent sunlight to pass through the blanket. This amount of radiation resulted in desirable turf color and appearance even when the cover was left in place days at a time. It will not always be possible (and realistically not even desirable) to install and remove a cover on a daily basis. **ST**

Mike Goatley and Barry Stewart are with the Department of Plant and Soil Sciences, Mississippi State University.