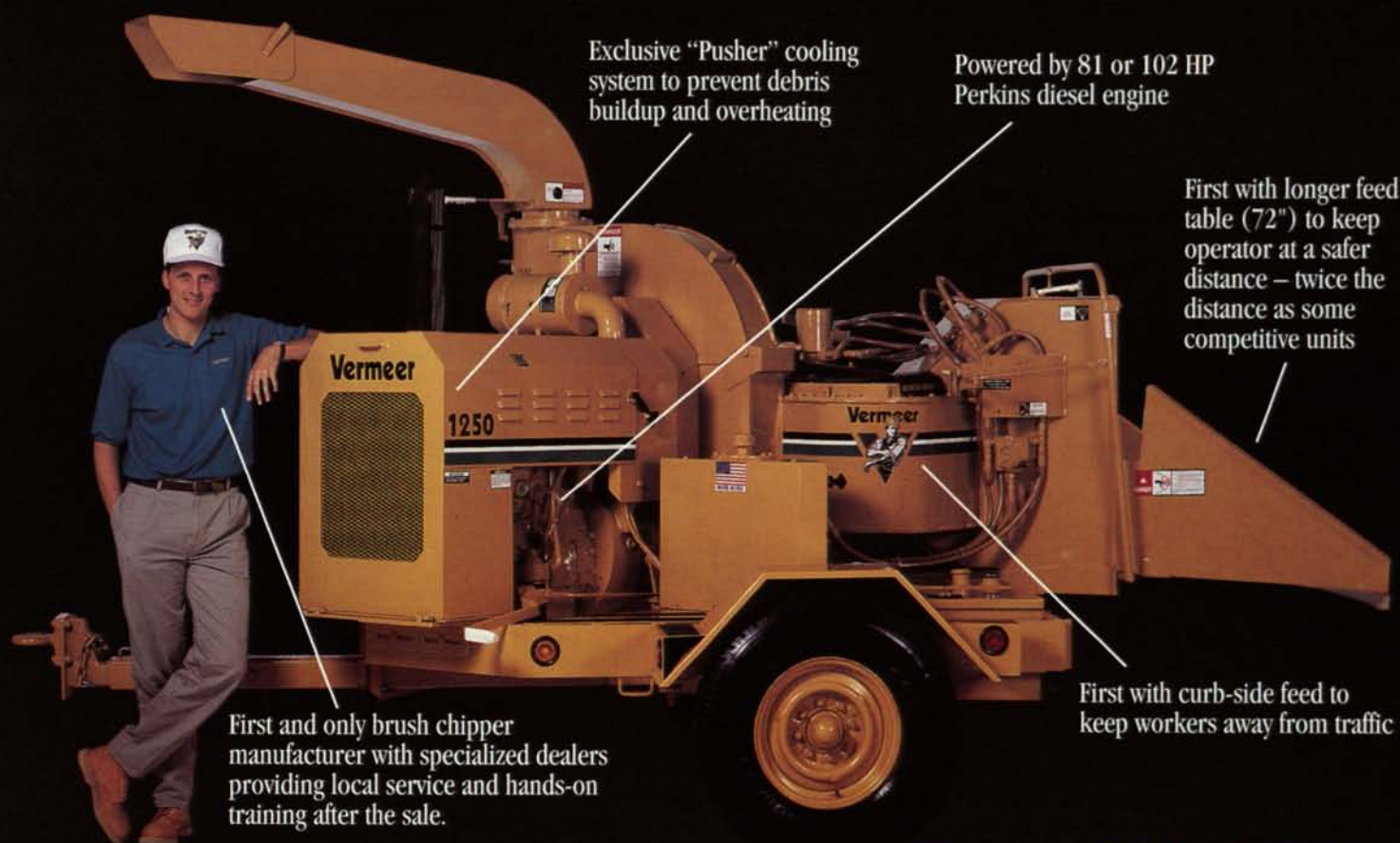




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Chippers and Shredders

Chippers used to be the type of equipment reserved for the arbor industry, but no longer. Recognizing the need of the landscape industry to reduce and mulch yard trimmings less formidable than the average tree limb, manufacturers have designed multi-use machines capable of turning small tree limbs, shrub clippings and leaves into a manageable mulch that can be used as-is or composted for later use.

Chippers come in two basic types, drum and disc. Drum chippers have been around the longest and are capable of higher chipping rates than the newer disc-style chippers. For recycling purposes, the disadvantage of the drum chipper is the size of the chip produced. They are generally not as suitable for mulching or composting because their larger size requires further reduction or longer composting times. Often, the chips from larger drum chippers are stockpiled for processing in tub grinders, which can turn it into a suitable mulch.

On the other hand, disc chippers produce much more suitable chips for mulches and composts. If you are selling your chips, this will be a factor. The smaller units, which have the word "shredder" somewhere in the name, are designed not only to chip wood, but to cut and shred leaves and brush clippings that might pass uncut through larger units. At least one company has designed a combination chipper-grinder unit. This medium-sized unit is specifically designed to produce a fine mulch from whatever you put into it, while maintaining a high processing rate.

Some of the features to look for in a chipper are:

- Discharge chutes that rotate so chips can be blown in any direction and/or chippers mounted on turntables that allow brush to be fed in from any direction without moving the machine.
- Chippers and chip boxes that mount on the same trailer to ease storage problems and reduce

the number of towing vehicles. Once at the site, the truck can be un-hitched for other uses.

- Look for chipper knives that cover the entire width of the feed opening.
- On disc chippers, look for multiple knives that make more than one cut per revolution of the flywheel. The more productive the chipper, the more productive you are.
- Ease of maintenance and easy access to the chipper blades for sharpening. Maintenance will be reduced and engine life increased on the larger units if you opt for a diesel engine, making diesel worth the additional cost. Fuel efficiency is also greater with diesel.

One last option: some chipper/shredder units are built with vacuums that allow vacuumed material to be mulched on its way to a collection bin or bag. Depending on the landscaping job at hand, these units could result in a considerable manpower savings.

Tub-Grinders

The "Big Brother" of the chipper is the tub-grinder. These units come in a variety of sizes starting at big and progressing rapidly to *really* big. The large ones can handle stumps up to four feet in diameter and come with their own crane to load the material into the hopper. In addition to stumps, they can process wood pallets and other "soft" material at rates of up to one-ton per minute.

Variable screen sizes control the size of the processed chips and allow you to custom grind mulch to fit your needs. Soil can even be added during grinding to mix with green waste.

When, and if, you decide to get serious about green waste recycling, you should look into the purchase of a tub grinder. If you have enough space, you may even wish to start your own composting operation and begin processing waste from other landscape operations. A tub-grinder will be necessary to do it cost-effectively.

Log Splitters

For those that have to handle log disposal on a regular basis, a log splitter could be

the way to go. Rather than making chips for compost, you could produce firewood, which will increase your market for wood waste.

There are two basic configurations for log splitter: vertical and horizontal. Horizontal log splitters require the log to be lifted and centered on the log rack — all cuts must be made down the centerline. A vertical splitter requires much less lifting, since the log is set on a base plate resting on the ground.

Log splitters use one of three methods to split logs: screw, hydraulic and mechanical. The screw type, which is not being produced much anymore, uses a long worm screw driven by an engine to force a cone or wedge into the log to split it.

Hydraulic splitters are the current standard in the industry, but have certain disadvantages of their own. The main one is they're slow, relatively speaking. Cycle times range from 10 to 30 seconds and some models require the ram to be manually returned to the start position.

Perhaps the fastest and most efficient splitters on the market today are the mechanical splitters. These use the stored energy of a flywheel to engage a rack and pinion gear assembly attached to a splitting ram. When the pinion gear is engaged, the flywheel (powered by a small gas or electric motor) drives the ram forward at about two feet per second. Total cycle times are as fast as 2 to 3 seconds.

Skid-Steers and Front-Loaders

If you are going to get into recycling on a large scale (or even a medium scale), a good front loader will be very useful. For composting they will be necessary for moving, mixing and aerating larger compost piles. When using tub-grinders without a built-on crane, a front loader of some sort will be needed to load material into the grinder's tub.

For sheer versatility, skid-steer loaders are probably the best bet, and offer the widest array of options due to the number of manufacturers. Attachments make them cost-effective, because they can perform many different tasks for contractors, reducing the need for different, specialized machines.

Another option for larger jobs is an articulated-steer loader. They are generally capable of lifting heavier loads than skid-steers and are more stable in most situations. Articulated steer loaders are hinged in the middle of the chassis and steering is accomplished when the chassis flexes at this hinge.

Safety

Only properly trained and instructed personnel should be allowed to operate these machines. Eye protection should be considered a must for anyone working with or near these machines, since flying chips and debris are major hazards. Bystanders should not be allowed, or should be kept at a safe distance, even with mowers. Ear protection should also be used, since these machines generate a lot of noise. Gloves and work boots should be standard to protect against cuts caused by machinery or wood splinters.

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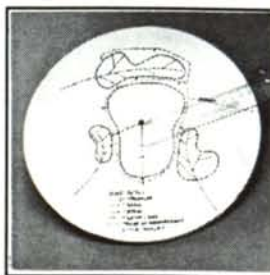
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COMPOSTING BASICS: BRINGING ORGANICS TOGETHER

By J. Howard Garrett

The word compost comes from two Latin words meaning "bring together." The best composts are those that are made from several ingredients.

There are many acceptable ways to build compost piles, but the simplest systems are usually the best. I just pile the material on the ground or on a concrete slab. If you choose to use a container, you can use hog wire, lumber, wooden pallets, cinder blocks or any materials that will hold a volume of about 4 by 4 feet with a height of 3 feet.

Many materials can be used to make compost. Some include grass clippings, leaves of all kinds, sawdust, spent plants, weeds, tree chips and pine needles. The materials should be chipped or shredded in various sizes and thoroughly mixed together. Compost piles that contain nothing but one particle size will not breathe properly.

Layering the ingredients, as most books recommend, is unnecessary unless it will help get the proportions right (about 75 percent carbon, which is woody waste, to 25 percent nitrogen, such as grass clippings). After the first turning, the layers won't be there anymore.

It's a good idea to add some native soil (a couple of shovels full) to each pile to inoculate the pile with native-soil microorganisms. To thrive, microorganisms need:

1. An energy source, which is any carbon material such as leaves or wood.
2. A nitrogen source, such as manure, green foliage, or fertilizer.
3. Vitamins, which are stored in most living tissue.
4. Moisture.

Watering the pile thoroughly is important and best done while mixing the original ingredients together. The proper moisture level is between 40 to 50 percent, similar to the wetness of a squeezed-out sponge. Piles that are too wet will be anaerobic and not decay properly. Piles that are too dry won't compost properly or fast enough. Once the pile is evenly moist, it's easy to keep it there. Give it a little water during dry periods. If you have ants in your compost pile, it's too dry.

Turning the pile is important. Turning keeps the mixture aerobic by helping oxygen penetrate the material. Turning also ensures that all the ingredients are exposed to the beneficial fungi, bacteria and other microorganisms that work to break the raw material

down into humus. In a properly "cooking" compost pile, the heat of approximately 150 degrees kills the weed seed and harmful pathogens but stimulates the beneficial microorganisms.

The entire process takes anywhere from two months to a year, depending on how often the pile is turned. If the ingredients contain a high percentage of wood chips, the process may take even longer. It's interesting that softwood sawdust and chips break down more slowly than hardwood.

Editor's note: This article was adapted with permission from J. Howard Garrett's "Organic Manual," published by The Summit Group, Fort Worth, TX.



"Greenwaste" can be processed and used as mulch or composted to make a valuable soil amendment. Photo courtesy: Romer Brothers Tree Service

SOURCE REDUCTION BEGINS WITH PROPER PRACTICES

In the recycling industry, "source reduction" has become a major buzzword, similar to "IPM" in the landscape profession. "The most practical and economically feasible way to reduce greenwaste is by lessening its production at the source," says Tom Larson, president of Integrated Urban Forestry in Laguna Hills, CA.

"Proper source reduction techniques can prevent remove up to 30 percent of potential greenwaste from entering the solid waste stream," Larson explains. "With source reduction, landscape maintenance costs are reduced without compromising landscape performance."

As a horticultural professional, there are several ways you can reduce green waste at the source. Appropriate plant selection, proper irrigation, precise fertilization, grasscycling and sound pruning techniques all will help you minimize biomass, growth that needs to be pruned, mowed, hauled, composted or discarded.

Overstimulating growth occurs after fertilizing with soluble sources of nitrogen, such as sulfate of ammonia and ammonium nitrate. Soluble nitrogen, while appropriate for a quick green-up during cool weather, should be used judiciously.

Slow-release fertilizers, such as sulfur-coated urea and many of the newer polymer-coated fertilizers, offer an even release of nitrogen without excessive growth. Organic fertilizers, based on substances such as animal manures, sewage sludges and compost, are a "natural" way to get a slow release of nitrogen, sometimes throughout the entire growing season.

Grasscycling is becoming an option for more and more companies that offer lawn maintenance services. Although early mulching mowers had problems with clumping and uneven distribution, new technology has made the mulching mower a viable way to reduce green waste at the source.

"Our company first began using mulching mowers three or four years ago," says Bob Thompson, manager at BLT Landscape in Dallas, TX. Headed by Texas Association of Landscape Contractors Past President Larry Brinkley, the installation/maintenance company "saw the writing on the wall."

"We had to sneak the mowers in with our first accounts," laughs Thompson. "But last year, we converted totally to mulching mowers. We still have clients that say they don't do as good of a job, but the vast majority can't tell the difference."

Proper pruning is a major step in reducing green waste at its source. Although selectively pruning back individual branches to a growth bud initially can take more time, your investment will be rewarded with less greenery generated on a regular basis and a healthier shrub in the long run. If you have shrubs that *must* be sheared, plant growth regulators can help slow down new growth and resultant biomass.

"Certainly, there is a tremendous reduction in biomass using proper pruning practices," says Eric Ulrich, manager of forestry for the Metropolitan Edison Company in Reading, PA. Ulrich points out that utility arborists are now "sold" on directional pruning, target pruning, and natural pruning, as opposed to the "rounding" and topping practices of the past. Directional pruning simply means removing major branches (to a crotch or another branch) instead of simply leaving a stub at a certain height.

Greenwaste is estimated to be anywhere from 15 to 30 percent of total landfill space. If source reduction can reduce green waste by 30 percent, landscape professionals can decrease the pressure on our existing landfills by almost 10 percent. This can be accomplished painlessly, cost-effectively and easily, merely by following proper landscape maintenance practices.

STATE-BY-STATE GREEN-WASTE LAWS

State	Reduction Goal/ Action Taken	By Year			
Alabama	25% with 10% composting	1995	Kansas	Local recycling programs	
Alaska	Local recycling programs		Kentucky	25% waste reduction	1997
Arizona	Local recycling programs		Louisiana	Local recycling programs	
Arkansas	Green waste banned	1993	Maine	Local recycling programs	
California	25% of all solid waste	1995	Maryland	Mandatory composting of green waste	
	50% of all solid waste	2000	Massachusetts		
Colorado	50% recycling goal	2000		Green waste banned	1992
Connecticut	Leaves banned	1991	Michigan	Green waste banned	1994
	25% of all solid waste	1994	Minnesota	Green waste banned	1992
Delaware	20% composting target		Mississippi	25% waste reduction	1996
District of Columbia			Missouri	Green waste banned	1992
	Green waste banned	1989		40% waste reduction	1998
	45% reduction	1994	Montana	25% waste reduction	1996
Florida	Green waste banned	1992	Nebraska	Green waste banned	1994
	30% reduction	1994		waste reduction 40%	1997
Georgia	25% reduction	1996		waste reduction 50%	2000
Hawaii	All solid waste 50%	2000	New Hampshire		
Idaho	Local recycling programs			Green waste banned	1992
Illinois	Green waste banned	1990		40% waste reduction	2000
	15% waste reduction	1998	New Jersey	Leaves banned	1988
	25% reduction	2000		60% waste reduction	1995
Indiana	35% reduction	1996	New Mexico		
	50% reduction	2001		25% recycling goal	1995
Iowa	Green waste banned	1991		50% recycling goal	2000
	50% waste reduction	2000	New York	Green waste banned	1993
				10% waste reduction	1997
			North Carolina	Green waste banned	1993
			North Dakota		
				40% waste reduction	2000
			Ohio	25% waste reduction	1995
			Oklahoma	Local recycling programs	
			Oregon	50% waste reduction	2000
			Pennsylvania		
				Leaves banned	1990
				25% waste reduction	1997
			Rhode Island		
				Green waste banned	1994
			South Carolina		
				Green waste banned	1993
				30% waste reduction	1999
			South Dakota		
				Green waste banned	1995
				50% waste-reduction goal	2005
			Tennessee	Local recycling programs	
			Texas	Local recycling and composting	
			Utah	Local composting encouraged	
			Vermont	40% waste reduction	2000
			Virginia	25% waste reduction;	1995
			Washington		
				50% waste reduction	1995
			West Virginia		
				Green waste banned	1993
				waste-reduction goal 30%	2000
			Wisconsin	Green waste banned	1993
			Wyoming	Local recycling and composting	



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WORLD CUP SILVERDOME

continued from page 18

The turf spent the winter in Michigan, outdoors in the Silverdome's parking lot. Rogers and his staff covered the turf December 10 to help prevent winter damage, and removed the covers March 13. The turf was still dormant when the covers were removed, and frost heaving had caused some unevenness. A Jacobsen Greens King IV triplex greens mower with QuickRoll greens rolling attachments was used to smooth out the bumps.

The turf is mowed with Jacobsen Tri-King triplex reel mowers with five-blade reels, and Greens King IV triplex greens mowers with nine-blade reels. Turf Groomer conditioners are used to help promote a denser, more vertical stand of grass. The greens mowers are used to cut the grass at less than 1-1/4 inches; the other triplex mowers used to cut the grass at heights greater than 1-1/4 inches. For World Cup play, the height of the cut will be somewhere between 7/8-inch and one-inch, but a specific height of cut is not set by FIFA.

"Everybody we asked from FIFA has always given us a different answer on the height of cut," says Stier.

"The temperature and humidity are fairly consistent — very consistent," he adds. "It's mild temperatures and relatively high humidity that promote disease."

World Cup games are scheduled at the Silverdome June 18, 22, 24, and 28.

The most difficult task, however, for Rogers, Stier and the entire crew from Michigan State University may come when the turf is removed from the Silverdome for the final time. "We're all going to be looking for a support group," Stier laughs. "It will be hard to top this, it really will."

But the project is far from over. "We're trying to focus a lot of our research effort toward the management and use of natural grass indoors, or in reduced light conditions," says Stier. "If other covered stadiums want to do this on a permanent basis, we'll be ready."

At Michigan State University's simulator dome, built in August 1992 to simulate conditions inside the Silverdome, advanced research is already under way.

"We see a lot of stadiums where they have trouble keeping turf alive in the corners or on the sidelines because the turf is shaded 90 percent of the day by the stands," Stier explains. "Our research

is directed toward maintaining turf under those conditions. We're also looking at maintaining turf under shade trees in backyards because that, naturally, falls under the realm of reduced-light conditions."

This month, after years of preparation, the natural indoor turf at the Silverdome will be put to the World Cup acid test under the watchful eyes of the world soccer community. Its success will not only reflect on the Michigan State University

team of researchers, but will also in part determine the future of natural turf indoors. □

Editor's Note: For additional information on the indoor turf preparations at the Silver Dome, see "Laying The Groundwork For World Cup Soccer," sportsTURF June 1993, Volume Nine, Number Six.

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Chapter News, continued from page 17

Managers Association is planning a Soccer Meeting for August 4 in Muscatine, IA. More details will be announced soon.

For more information contact Gary Peterson, (515) 791-0765.

Midwest Chapter: STMA — A meeting is in the planning stages for July 19 at Kishwaukee College in Malta, IL. This meeting will center on the turf and floral test plots and turfgrass management. Further details will be announced soon.

For more information contact The Chapter Hotline, (708) 439-4727.

STMA Florida Chapter #1 — The South Florida Chapter has several meetings in the planning stages. A meeting will be held from 9 a.m. to 1 p.m. on July 13 at the City of Pompano Stadium. The prime topic will be aerification. From 9 to 10 a.m., Tom Mascaro, Turf-Tec International, will cover aerification principles. From 10 a.m. to noon, aerification equipment will be demonstrat-

ed. The lunch from noon to 1 p.m. will provide attendees additional opportunities for networking. Tom Curran will host this event. Those wishing to make arrangements to demonstrate equipment should contact John Mascaro.

An August 3 meeting at Floyd Hall Stadium will focus on fertilization and irrigation. The event will be hosted by Kathy Conner.

The chapter also will take part in the Florida Turfgrass Association Conference and Trade Show slated for September 18-21 at the Ft. Lauderdale Convention Center.

Further details on these events will be announced soon.

For more information contact John Mascaro, (305) 938-7477 or Ed Birch, (305) 938-0217.

Chesapeake Chapter: STMA — The Chesapeake Chapter is working on a September Regional Workshop that will be held at RFK Stadium in conjunction with the national STMA.

Board meetings are held the first Tuesday of each month from 4 to 6 p.m. Members are invited to attend. The July 5 board meeting will be held at Camden Yards.

For more information contact the Chapter Hotline, (301) 865-0667.

The Heartland Chapter: STMA — Plans continue to develop for the Heartland Chapter's first Sports Turf Field Day, scheduled to begin at 8:30 a.m. on July 13, at the Heritage Park Softball Complex, Olathe, KS. This event will be co-sponsored by the Missouri Valley Turfgrass Association. MVTGA members can contact President Ty Heidbreder. Further details on the field day will be announced soon.

The Heartland Chapter Board meets the first Wednesday of each month from 4 to 5 p.m. at Heritage Park Sports Complex. All members are invited to attend.

For more information contact Mark Diller, sports turf manager, Johnson County Parks and Recreation, (913) 782-7625 or Jack Schwarz, J.S. Sports Turf, Liberty, MO, (816) 792-2808 or (800) 344-8873.

Colorado Chapter: STMA For more information on the chapter or its future activities contact Joe Adams, Greeley Parks and Recreation, (303) 350-9340.

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Windance is a challenging to maintain as it is to play. "Our biggest obstacle is that we are built on a flood plain," explains superintendent Jim Kwasinski. "In 1993 we had to close the course 17 times due to flooding."

The unpredictable, often heavy rainfall that annually inundates the Gulf Coast is difficult enough for Kwasinski, but all that water further challenges his insect control strategy. "Because Windance is a low-lying course surrounded by wetlands and residential areas, we have to be especially cautious when applying pesticides," he says. "Safety is our primary concern."

Forever fine-tuning his insecticide treatments, last year Kwasinski slit-applied Mocap® 10G to control mole crickets. Relatively new to Mississippi, slit application uses a modified slit overseeder to place granular insecticides below the soil surface.

"The treatment creates a barrier that mole crickets have to pass through while tunneling," says Kwasinski. "This ensures that the pests come into contact with the product."

Because slit application places the insecticide below the surface, the risk of exposure to people and wildlife is reduced. In addition, slit application may lower the potential for off-target movement during heavy rains.

Kwasinski first heard about slit application from colleagues in Florida who have used the technique to control mole crickets for several years. "Mole crickets aren't as bad here as they are in Florida, but they are capable of causing considerable damage," he says. "They're our number one pest in southern Mississippi."

Using soap flushes, Kwasinski determined that peak nymphal activity at Windance occurred during late June last year. "It's very important to use the soap flushes to time your application," he asserts. "You want to hit them when they are young because that's when they're most vulnerable."

Before application, Kwasinski irrigated the course. Moist soil is easier to penetrate, he explains, and the moisture helps activate the material.

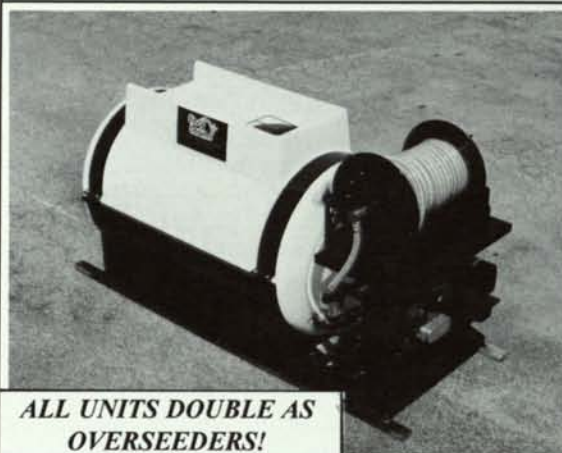
In all, Kwasinski treated 55 acres of fairways and roughs, and almost six acres of greens and tees. The results were impressive. "We found very little mole cricket activity on the fairways for four weeks after treatment, and we experienced no problems with lateral movement of the product from the slit-applied areas, despite heavy rains," he says. □

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16" STEEL BLOWER 18HP KOHLER ELECTRIC-START OHV
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DIGITAL HOUR METER

PICTURE PERFECT FIELD PAINTING AND STRIPING



Game-day field, painted and ready for play, at the University of Arizona. Photos courtesy: Chuck Raetzman.

By Matthew Trulio

Without lines and logos, a healthy, well-maintained field is an empty green canvas, awaiting your “brushstrokes.” Field painting and striping not only complete the play picture, but they challenge your precision as well as your creativity.

Chuck Raetzman, assistant director of operation services at the University of Arizona, and Ron Ramsey, the university’s paint shop supervisor, love to meet those challenges. Working closely

with one another and their crews, they’ve created a strategy that keeps the University of Arizona gridiron, the 1992 STMA Football Field of the Year, looking sharp.

Timing Pays

Including the Copper Bowl, the University of Arizona hosts eight games a year. That’s not an especially high amount of play; however, most of the games are televised. The field has to be “television-ready” for every game.

“Timing is everything,” says Raetzman. “We coordinate with the paint shop during the season, not only with mowing, edging, and sweeping, but also with irrigation, so we’re not stepping on each other’s toes.”

Games are played on Saturdays. After Raetzman and his crew mow on Wednesdays, Ramsey and his team lay out the field and apply the “first coat” of lines, which takes approximately six hours. Thursday evenings, the field receives moderate to light irrigation, depending on the weather conditions.