



A sign of dull mower blades, shredded grass blades like this are more susceptible to disease and other stresses. Photo courtesy: Jim Puhalla.

# Sports Turf Basics — Beyond IPM

By Jim Puhalla

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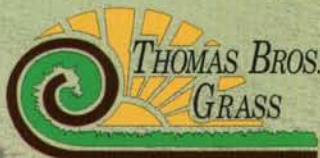
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**I**ntegrated Pest Management (IPM) marked a great leap forward from the previous approach that depended heavily on chemicals. But I suggest turf managers go another small step forward and adopt ICM — Integrated Cultural Management.

By this, I'm suggesting that we shift our focus away from the negative aspect of "managing pests" toward the more positive aspect of managing the culture of the turfgrass to keep it healthy. Healthy turf naturally resists pests — thus reducing the temptation to overrely on chemicals.

So what does good ICM consist of?

## Stresses

First, ICM gives close attention to the stresses placed on turf. The reason? Pests and other problems usually happen because we've failed to respond to some form of stress. Stresses generally fall into three categories:

- environmental (temperature, water, light, air, etc.),
- mechanical (foot traffic, cleats, mowing, vehicles),
- pests (weeds, insects, disease, nematodes).

The greatest dangers to turf occur

when more than one type of stress is present. For instance, there's the onset of insect infestation during a summer dormancy period. To make matters worse, the dormancy will often mask some insect problems that burst out full-blown when the rains return. If you can keep your turf *actively growing* by seeing that it gets at least one inch of water a week, it will resist stresses much better.

### Turfgrasses

Selecting proper turfgrass varieties is one of the best ways to guard against stress. All too often, species are chosen without regard to the sport played on the turf — a mistake in managing the culture. Take football — probably the most turf-destructive sport that doesn't involve horses. Football turf should:

- be dense;
- have a solid thatch layer to cushion falls and keep players out of the mud when it rains;
- recuperate quickly after stresses.

In the South, that usually means a hybrid bermudagrass. In the North, bluegrass has strong recuperative

potential. In the transitional zone, it could be either bermudagrass or tall fescue. Properly maintained, these varieties will tend to compete successfully with weeds and resist disease with minimal chemical applications.

Before you install the turfgrass you've selected, be careful to prepare the soil properly. It's not uncommon to see fields with sub-soils so overly compacted that water won't drain. When that happens, the water stays in the topsoil and you have a muddy field.

If the whole field is compacted too much, you get a tight soil layer that makes it difficult for new plants to become properly established. ICM considers the interaction of the turf as a complete system — as a culture — and plans each step of installation and establishment from that perspective.

### Fertilization

Unless you conduct a soil test every year, your fertilization program probably amounts to guesswork. With accurate information about what's going on in your soil chemistry, you can achieve a nutrient and a pH balance that will let your grass start thickening. Thick

turf tends to crowd out weeds. In fact, I've seen fields that were converted from nicely mowed weed patches into lush, healthy turf just based on more accurate fertilization.

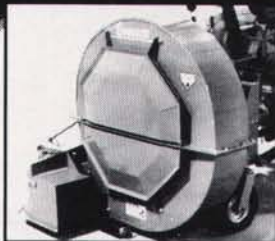
Of course, that doesn't work all the time, but even when you're using a herbicide on your turf, it's equally important to create conditions for the grass to thicken itself. IPM calls for the careful choice and precise application of a herbicide. But if you just manage the weeds (the pest) and don't improve the culture of the turf, they will be back next season. An ICM approach includes steps — such as improving fertility — to thicken the stand of grass.

### Aeration

Heavily used fields tend to become overly compacted, probably more than many managers realize — especially in the middle of a football field. The bare spots aren't just caused by mechanical stress from cleats; they're also caused by extreme compaction that makes recuperation nearly impossible. The roots can't get the

*Continued on page 26*

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**SPORTS TURF BASICS**

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oxygen they need. Plus, extreme compaction becomes a physical barrier to root penetration.

The first step in an ICM approach is to realize the effects of all that foot traffic (including a band's marching feet). A good next step is to identify a time for aeration — a time that would best enhance the turfgrass culture.

Since aeration temporarily stresses the turf in order to provide long-term benefits, it's important to aerate while the grass is actively growing. That allows plants to recuperate quickly and strongly.

In the North, you can aerate just about any time in the spring or fall. In the South, it's best to aerate in the late spring or late summer. Transitional zone fields should be aerated according to the type of grass you're using — aerate warm-season varieties according to the southern schedule, cool-season varieties as in the north.

Keeping in mind the mechanical stresses that players create for turf, you'll probably find it best to aerate a

**Recommended Mowing Height**

Type of Grass	Lowest to Highest	Spring	Summer	Fall	Winter*
Bluegrass	1-1/2 - 3"	1-1/2 - 2"	3"	1-1/2 - 2"	
Ryegrass	1-1/2 - 3"	1-1/2 - 2"	3"	1-1/2 - 2"	
Tall Fescue	1-1/2 - 3"	1-1/2 - 2"	3"	1-1/2 - 3"	
Bermudagrass	3/4 - 2"	3/4 - 1"	3/4" - 1"	1 - 2"	1 - 2"

\*Overseeded Bermudagrass

Note: A reel mower should be used for cutting heights less than 2".

couple of weeks before using a field, particularly for football. That allows the turfgrass culture to recover from one stress (aeration) before it has to deal with another (players).

**Thatch Management**

One aspect of sports turf management that cries out for ICM thinking is thatch management. Too much thatch (more than 1/2 inch) can be a haven for insects and disease and can aggravate the stress caused by dry spells. But a thin layer of thatch can

help cushion the soil against foot traffic and compaction. On a football field, as mentioned earlier, thatch cushions against falls and helps keep players out of the mud on a wet field.

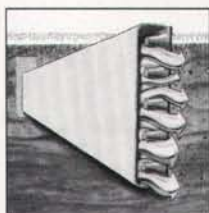
If your field has one of the aggressive, heavy-thatch species (bermudagrass or bluegrass), it will probably produce too much thatch each growing season. That's especially true if you fertilize and irrigate regularly. Taking core samples twice a year will tell you the thickness of your thatch layer. If it's not more than 1/2-inch thick, don't

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automatically dethatch unless you're preparing to overseed a field in the warm-season zone.

Probably the most common dethatching device is the vertical mower. When you're using a vertical mower, remember that it doesn't just rake up thatch; it also severs lateral plant stems. So do the field at least twice in different directions to get the most benefit. As an ICM practitioner, check to see if the turfgrass culture needs fertilization or irrigation afterward to help in recuperation.

If your turf has an especially heavy thatch layer, you may want to consider a biological control treatment, which relies on microorganisms to break up thatch. Some of these treatments use the microbes that are already present in the soil in concentrated numbers to break down the layer.

### Mowing

One of the most overlooked practices is effective mowing. At many fields, mowing is conducted by a part-timer with headphones and a glazed expression. But, if you do it right, mowing can help greatly to support the turfgrass culture.

In the warm-season zone, mow up to an inch shorter in the spring and summer than in the fall. In the North, mow an inch higher in the summer than in the spring and fall.

As far as we're concerned, there are four hard-and-fast rules about mowing to support the culture:

1. Always have a sharp blade.
2. Always cut off no more than one-third of the blade each time you mow.
3. With rotary mowers, use the highest possible blade speed.
4. Keep ground speed low.

Some turf managers are starting to take mowing seriously, keeping one mower for use *only* on fields. They're also having the operator take off the headphones so they can explain that mowing is one of the most important parts of the ICM process.

If you have any doubt about the mowing tips above, try them at home first. Mow your front yard the way you normally do, and the back yard our way. You'll be surprised at the difference.

### Drainage

Based on renovation work I've been called upon to do, I would say that improving drainage can be the single most important way to improve the

turfgrass culture on many fields. Most managers think of sloppy turf only as a hindrance to play. But poor ICM in the area of drainage can lead to all kinds of diseases and other problems.

The complete reconstruction needed to assure good surface drainage may lie beyond the means of many programs. Internal drainage can help, but may be too expensive in its own right.

If a complete system is out of the question, consider a *targeted* internal system to attack problem areas. Or design a complete system that can be installed in *stages*, and let the boosters get to work raising the money for part of the work each season.

As you can see, what I describe as "Integrated Cultural Management" is really just a comprehensive, broad-

based program that tries to keep the big picture in mind instead of focusing on specific, narrow problems. A stand of turfgrass is a culture, with many interconnected characteristics. The more of those factors we keep in mind, the better our chances of maintaining a healthy, competitive, pest-free stand of sports turf.

*Jim Puhalla is president of Sport-scape International Inc. of Boardman, OH, and a coauthor (with Mississippi State University professors Jeff Krans and Mike Goatley) of a forthcoming book, Sports Fields — A Manual for Design, Construction and Maintenance, copyright 1997, Ann Arbor Press Inc., Chelsea, MI.* □

#### Sample Integrated Cultural Management Maintenance Schedule

(Cool Season)

Name of Field:	Hubbard Stadium Field	Address:	350 Hall Ave.
Type of Field:	Football Game Field		Hubbard, Ohio
Condition:	good	Compaction:	yes - middle & bench
Type of Grass:	blue/rye	Drainage:	has internal drainage
Type of Soil:	clay/loam	Thatch:	½" sides - 0" middle
Soil Test:		Notes:	knotweed (middle & bench area)
Year:	1996	Phosphor:	85
pH:	6.5	Potassium:	350
			some clover - crabgrass (N.end)
			check sprinkler head elevations

Time of Year	Fertilization	Aeration	Topdress	Slit-seed	1/3 Rule Mowing Ht	1" Week Watering	Weed Control
April	18-24-12 ½ lb N 50% SRN	core entire field	for surface leveling	bluegrass middle & bench areas	2"		
May	24-5-11 ¾ lb N 50% SRN	12" solid tine aeration		blue/rye touchup spots	2½"	light frequent intervals	
June		core 50' each side			2½"	deeper less frequent	
July	16-0-31 ½ lb N 25% SRN				2½"	deeply	spot treatment
August		slice middle		primed ryegrass middle	2"	deeply	
September	32-5-7 1 lb N 50% SRN				2"	cautiously	
October	20-5-10 ¾ lb N 50% SRN				2"	cautiously	
November	1 lb N after last mowing	core entire field	for surface leveling	now or April	2"		