through on-campus interviews held in February and October, set up separate on-campus interviews, interview students at the work location, set up telephone interviews with students, or any combination of these. Employers may send photo brochures or videos of their operations to give students an overview of what to expect.

At MSU, placements are not made by assignment but rather by mutual agreement between the employer and student employee. All offers must be submitted in writing, and MSU must be informed of all arrangements. Maynard focuses on placement of co-op students, both during the work semesters and following graduation.

MSU sets no parameters for student compensation, but common sense dictates that salaries and related benefits be competitive with those of other employees at similar skill levels. If the student will be moving out of the region during the co-op semester, housing assistance programs — in the form of no-cost, on-site housing or low-cost/subsidized off-site housing — may be a deciding factor.

The Employer's Role

Does the co-op program require extra work from the employer? Sure it does. Teaching takes more time than telling. Answering questions about the why and how is very demanding as is developing a program for teaching what the student needs to learn and conveying that information in a concise, understandable form.

MSU recommends diversification of job assignments to afford the student with a wide range of training and experience. The technical level and degree of complexity increases as the student demonstrates competency and progresses through the program.

Often a student may be paired with a crew supervisor on a tough technical project. Students may also participate in facility inspection tours to learn exactly what to look for and why it matters. Some paperwork is involved in analyzing and reporting a student's performance. Students are rated in the following areas: relations with others, judgment, ability to learn, attitude and application to work, dependability, quality of work, attendance and punctuality. Generally, a staff member will visit the student on the job.

Employers are encouraged to develop their own training program, providing the student with learning opportunities in as many areas as possible. Students are expected to do their fair share of downright hard, often dirty grunt work. But students are more than just laborers. The experience employers provide will be evaluated. Students are required to rate their employers and give a verbal report of the co-op session once they're back in the classroom.

Employers are asked to think of the student as a potential long-term employee and encouraged to question the training they provide. What new skills can the student tap into to do a better job right now? What skills will give that person the ability to do a better job in the near — and the long-term — future? In what areas can this person move a step or two up the ladder of necessary skills? In what areas can he or she climb all the way to the top? Where did the student fall short? Where did the student excel — and why? Would changes in the work-training or other parts of the program be beneficial?

The Student's Role

Students in the co-op work program put their own knowledge, expertise and work

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Mississippi State

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ethic on the line and become instrumental in the development of the employer's and co-workers' perceptions of the sports turf management program at the school. Ideally, students learn much about the science and art of sports turf management — and about their own aptitude for and attitude toward it.

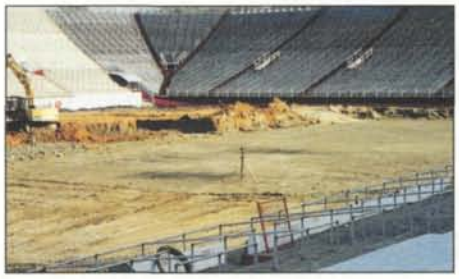
Most employers have developed a broad-based program that offers the "feel" of the job and the opportunity to fine-tune existing skills and learn new ones. But none of this is served on a silver platter. It's up to the student to get the most from this hands-on experience.

As in all employment situations, students must adapt to the working situation. Some working conditions may be less than ideal; after all, sports turf needs attention when conditions are too hot, too cold, too wet and too dry. Some tasks are repetitive, others challenging. Students will succeed at some and fail at others. During all this, students are evaluated — formally by the employer and other supervisory personnel, informally by co-workers. Meanwhile, the student evaluates the quality of the program, the intent of the employer, and his or her own expertise, abilities and shortcomings.

Students have the opportunity to see different segments of the profession, to try them on and find out how they feel, to shift focus or change directions altogether. The program offers students the opportunity to network and meet people who may become mentors, job search consultants or life-long friends.

Welcome to the Real World

Participation in the program takes extra effort — from both the employer and the student — but both reap the rewards. Maynard says, "Employers receive immediate benefits in the form of productive work by the students. These students are hard working and eager to learn all aspects of golf and sports turf management. Long-term benefits include more effective recruiting and training programs at a substantial cost savings. Also, statistics show a lower turnover rate in permanent employees who have had co-op experience." Students enter the work force armed with an education tailored to their specific field, with skills gained from on-the-job experience, with a supportive network of contacts and references. The industry moves one step higher in professionalism. ❑



When MSU student Bart Prather had finished overseeing the reconstruction of the stadium in Little Rock, AR, the surface of the new natural field was three feet lower than that of the old artificial turf.

Steve and Suz Trusty are partners in Trusty & Associates, a consulting firm located in Council Bluffs, IA. Steve is executive director of Sports Turf Managers Association.

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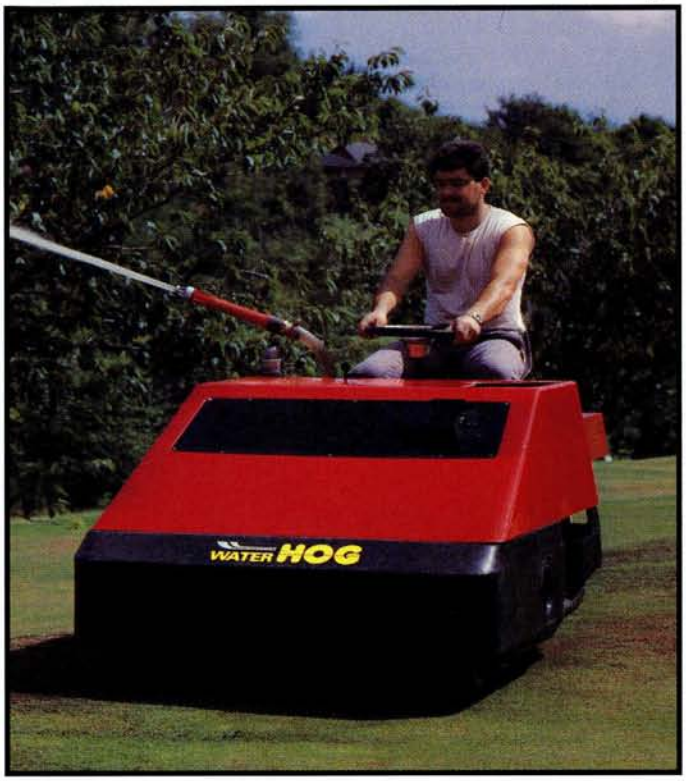

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Although herbicides can be helpful tools in turf management, their use should be integrated with good cultural practices.

Integrated Weed Management — Natural Turf Management, Part 4

By Pam Elam

Obviously, a dense, vigorously growing, competitive stand of turfgrass will resist invasion by weeds. Even so, all athletic fields are susceptible to weeds. While it is difficult to eliminate all weeds from turf, except if the turf is resodded constantly, turf managers can prevent large patches of weeds. Optimum turf management practices and an integrated weed management program are the key factors in preventing weed infestations.

The objective of an integrated weed management program is to reduce the natural pressure of succession within a particular turf site. In other words, the idea is to keep weed populations below levels that are incompatible with the purpose of the turf.

The first step in an integrated weed management program is preparing the site properly and choosing an appropriate turfgrass species for the location, followed by cultural practices that contribute to turf vigor, such as proper irrigation, mowing, fertilization, thatch removal and aeration. Increased vigor allows turf better to withstand insect, disease and nematode damage and permits quicker recovery from any stress as well. Healthy turf can out-compete weeds and reduce the chances of weed establishment. Herbicides may be used as tools in turf management where high quality turf is required; however, herbicide use should be integrated with good cultural practices.

The concept of succession in turf is relatively simple. When a new field is sodded, it looks perfect. Over time, however, the turf is subjected to stress pressures, and weed species begin to invade. The stress comes from management practices as well as the environment. All management practices bring stress to plants. These stresses include drought or irrigation, fertilization, pesticides (specifically herbicides), mowing height and frequency, verticutting and other practices.

The turf adjusts to most of these management stresses. Each management strategy may favor a certain species over another. Several specific studies have illustrated how certain cultural practices may favor the invasion of weeds. Turfgrass specialist J.H. Madison studied the invasion of cool-season grasses by bermudagrass and found more rapid invasion with close cutting. The late V.B. Youngner, a turfgrass researcher and breeder at the University of California, Riverside (UCR), looked at the effect of verticutting during the germination period and found increased *Poa annua* invasion. Dr. Vic Gibeault, Cooperative Extension specialist in environmental horticulture at UCR, investigated watering and mowing height on crabgrass and prostrate spurge invasion and found more rapid succession of these weeds with close mowing and shallow, frequent watering.

Drought has always been a primary stress in turf. This particular stress accelerates succession in cool-season turfs. Certain weed species become more apparent under drought conditions, including dandelion, bur clover, white clover, bermudagrass and knotweed. Excessive shallow irrigation, on the other hand, encourages invasion by annual bluegrass, bentgrass and crabgrass.

Herbicides are used as a means of slowing the succession process. However, some studies have shown that the use of certain herbicides may increase the opportunity for succession of other weeds. For example, when 2,4-D was used on turf for broad-leaf weed control, the weed species that increased included oxalis and clovers. If a mixture of 2,4-D and dicamba or mecoprop was used, the clovers were reduced, but the oxalis remained and became a serious problem. Sometimes maintenance equipment, such as mowers, can actually spread weed seeds around.

Goosegrass has become more apparent in turf which suffers from heavy traffic or divoting and where compacted soil is a problem. Since many preemergence herbicides are removed with divots or are otherwise not present in the soil when the late-germinating goosegrass emerges, it is not controlled.

Turf managers can monitor the process of succession in their turfgrass by simply noting what weed species are present, their approximate population levels and what management practices may be contributing if their populations are increasing. A weed survey form, noting frequency of each species (low, medium or high), can be made easily and can be an excellent reference tool. A written record of the weed history will help you make better management decisions in the future and can help to determine which tools (such as herbicides) or management practices can change the direction of succession to favor your desired turfgrass species. ❑

Pam Elam is an advisor in environmental horticulture for the University of California Cooperative Extension/Fresno County. She can be reached at (209) 456-7554.

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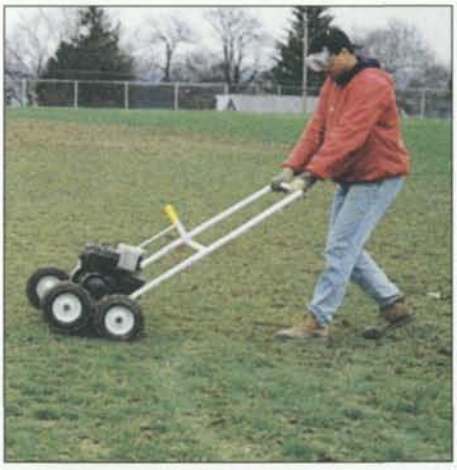

Slit-seeding is just about always part of the prescription for football and soccer fields in the spring.

By Jim Puhalla

With the long, cold winter finally turning into a chilly memory, and the warmth of the sun starting to bring back traces of green to the barren landscape, it's hard to focus your mind on the fall. In fact, there's something downright unfair about skipping past the long hot days of summer and thinking about the time of year when leaves are falling and days are growing short once again.

But if the active fall sports schedule is to be played out on turf that gives the athletes their best shot at greatness (and looks great, too), it's time for those of us in the turf management business to get to work on the football and soccer fields. University programs may be holding spring football practice in coming weeks, and in some areas soccer competition includes spring games, but most of us have the opportunity to perform at least some of the renovation operations that lead to lush, beautiful turfgrass in the autumn.

Soil Testing

If you haven't done a soil test in the last three years, that's a good place to start. Before you apply any fertilizer, send your soil sample to a reputable lab. Without the kind of information these test results can supply, you're "flying blind" on your fertilization program, and on issues like the pH balance of your soil.

In a surprising number of cases, correcting soil deficiencies and pH levels with the appropriate nutrients will play a major role in turning a barren, weed-infested field into tough, durable sports turf. Take 30 samples — every ten yards down the middle of the field and at each hash mark. Mix them together and submit a pint (or whatever the lab requests) for testing.

If you haven't been testing regularly and find your soils in need of substantial nutrient improvement, make a note to test again next year. Some nutrient problems can take up to three years to correct.

Renovation

Assuming that the condition of the field is good enough to allow for renovation instead of complete reconstruction, a good first step is to inspect the field carefully. I like to have a rough diagram of the field with me as a worksheet, and I'll draw in any problem areas I discover in performing the inspection.

By the time the inspection is done, you should have a diagram that shows areas of thin or worn turf; low, rough or uneven surfaces; areas of thatch or compaction; outbreaks of weed, insect or disease infestation; and elevated sprinkler heads, quick couplers and catch basins. It's a good idea to continue this inspection for about 20 feet beyond each field boundary, since players frequently end up outside the field boundaries during the course of a football or soccer game.

The high-stress areas in the middle of football fields and at the goal area of soccer fields should almost always be overseeded a few months prior to the start of competition. And in many cases, those areas also have been worn into low spots, which will need the addition of soil to bring them back to proper contour in time for the season.

With the luxury of some time to plan, you can also make prudent decisions about how to allocate your budgetary resources for the field. Unless a crisis of some kind has struck the field, you should probably deal with the problems in the same order we used when talking about things to look for during an inspection, beginning with thin, worn turf and working your way down. (Obviously, elevated irrigation fittings must be corrected to prevent a safety hazard.)

Once you've identified the problem areas, start your field renovation (and we could just as well refer to this step as "rejuvenation"). We like to aerate first, but since this operation should be performed when the turfgrass is actively growing, aeration may need to be postponed in some areas of the country. Before seeding, it's a good idea to verti-drain or sub-aerify to relieve the deep, heavy compaction that's often the cause of water that lies on the surface.

Fill any low spots with appropriate soil and level to match the surrounding contour. You can perform this operation by hand or by using a tractor with a level bar. Remember to account for settling.

A good next step is slit-seeding to strengthen the turf. The normal practice is to match the existing grass, but you might want to consider introducing a new, complementary variety to build resistance to insects and disease. Choose a variety that's fairly close in color and texture to the existing turf, and you may see a rather striking improvement. A starter fertilizer like 18-24-12 will also help.

When it comes to weed control, we would seldom use a pre-emergent, because we are usually slit-seeding or overseeding at this time of year. If your field has a serious weed problem, you may consider a pre-emergent product labeled for new seeding, but post-emergents are more efficient — and cost-efficient — because you can be target-specific.

If the turf has had substantial insect infestations in the past, this is a good time to plan a treatment for those. There are now products designed to be applied at this time of year to prevent outbreaks in

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PRODUCT SHOWCASE

Chandler Arizona Parks Department

Chandler, Arizona

Chandler Arizona has selected Primavera bermudagrass for all fifteen of the new soccer fields that have been seeded in the last eighteen months. In addition, they are using Primavera on all the city parks and grounds.

According to Kris Kirsher, maintenance coordinator, they have used common bermudagrass before but had problems with allergic reactions among the players. Then they tried Mid-iron bermudagrass but is was very susceptible to bermudagrass scale. The third variety they tested was Primavera. Kris was really impressed with its quick germination and establishment. It stayed greener longer in the fall and greened-up earlier in the spring than any of the other seeded types they tested. Primavera also was resistant to bermudagrass scale, so their problems were solved.

Kris and his crew of four were able to convert old cattle corrals, to excellent quality soccer fields. The San Tan Soccer Association plays on the fields nine months out of the year and with the use by other groups, there are soccer games almost every day of the week throughout the entire season. The quality of the playing surface is excellent throughout the year. The number of injuries and loss of players have been greatly reduced with the dense turf that they are able to produce with Primavera. It has been stated by numerous authorities that Chandler has the best soccer fields in the Phoenix area.

The work done by Kris and his crew is impressive, especially when one realizes that it was done on a minimum budget.

"Primavera is a high quality, lower cost alternative to the standard turf varieties sold only in sod or stolon forms." *Kris Kirsher, Maintenance Coordinator*

Off Season Work

continued from page 28

August and September. That kind of treatment will give your new plants a better chance to get started, and will dissipate into the soil well before you have athletes rolling around on it. Be sure to follow label instructions carefully to time your applications correctly.

If disease has been a problem on your field in the past, now is a good time to think through the cultural procedures you'll follow all the way through the end of the season. A little planning at this time of year will allow you to decrease the pressure that lets these diseases gain a foothold.

And while you're planning, it's a smart move to take some time at this point to draw up a written maintenance program to run through the end of the competitive season. At this point, while the details of your renovation program are fresh in your mind, it's a good time to get down on paper the steps you expect to take to strengthen the turfgrass continually throughout the summer and fall.

It's important to inspect all catch basins around the field. This kind of situation endangers players.

Reconstruction

If you're planning to reconstruct a field completely, this is the time to do it, so the facility will be fully settled and mature before the first game.

No matter how long you've worked with a field, and no matter how well you know it, it's still a good idea to survey the entire playing surface (and 20 feet beyond the field boundaries) before you begin work. If you don't, the work you do may cause more problems than it solves.

One example is a field that was originally designed to slope side-to-side. When wet spots appeared, the field manager thought it was too shallowly crowned, and built up the middle of the field. The result, of course, was a full half of the field that turned into a quagmire when it rained.

On a surveying worksheet my company uses in the field, we write down the existing elevation; then, back at the office, we'll plan out our proposed elevations. You can draw up your own worksheets to use both for surveying and for your pre-season inspection.

Once you've come to a good understanding of how the field is contoured, you can decide how it should be reconstructed and set your contours. In a dry climate, a ten-inch crown can be used, representing a one percent slope. In moderate to wet conditions, a 17-inch crown amounts to a 1.75 percent slope. For soccer, of course, the flattest possible surface is preferred.