ations.

- The availability of labor.
- Whether soil moisture is suitable.

Apply Cultivation at Correct Soil Moisture

Different cultivation methods are most effective at a particular soil moisture level at the time of application. If soil moisture is outside this range, effectiveness declines.

Methods that have loosening action on the soil are more effective if the soil is somewhat drier than field capacity. Field capacity would be the soil moisture at one day after a good irrigation or rainfall event on a fine textured soil. "Somewhat drier" would be two to four days after irrigation or rainfall.

If the soil becomes too dry, the implement will not be able to penetrate and will lose its effectiveness. In contrast, on excessively moist soils, little loosening action occurs.

For operations that penetrate the soil, but with minimal loosening action, a soil moisture near field capacity would be best. Any cultivation should be avoided at soil moisture above (wetter than) field capacity to avoid destruction of the soil structure.

Evaluate your Results

The benefit of cultivation are often difficult to evaluate. You should be able to observe improved filtration/percolation, better rooting, increased shoot growth or loosening of the soil; this, the grower should see fewer of the symptoms that represent clues to the presence of soil physical problems. Using the same procedures to identify the primary problems on a site is beneficial in identifying results. Careful observation of the soil profile is particularly beneficial. Sometimes an untreated area can be left for comparison.

While evaluation of cultivation results is difficult, it is well worth the effort to adjust your program over time. Certainly this is one area where the experience of superintendent and observation over time are essential to evaluate cultivation program effectiveness.

In conclusion, cultivation programs evolve by long-term experience on a particular site (i.e., trial and error); using what someone else has found effective; using the "latest" device with hopes it will be the right operation; or by a careful analysis of the problem, evaluation of different options and correct use of various procedures.

The main reason that better cultivation programs have not evolved are:

- Difficulty in determining the primary soil physical problem(s) present on a site.
- A lack of specific, comparative data on how each cultivation method influences soil physical conditions and turfgrass growth.

Historically, growers have had to rely on empirical observation to determine the relative effectiveness of different techniques. In recent years, research projects supported by the USGA Green Section at Michigan State University and the University of Georgia have greatly increased our knowledge about various methods. Much of this information will be published over the next year.

Because soil physical problems exist on almost all golf courses and cultivation is a main tool to alleviate these problems, the development of a sound cultivation program is important. The same logical and scientific approach used in formulating cultivation programs as with other cultural practices will result in improved and more efficient cultivation and better turf.

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Report from Down Under

by Pam Charbonneau, OMAFRA Turfgrass Advisor

In August of this year I had the opportunity to take part in the Mid-Conference meeting of the Board of Directors of the International Turfgrass Society (ITS) in Sydney, Australia. The major focus of the society, which was founded in 1969, is to host the "International Turfgrass Research Conference" (ITRC). This conference is held every four years, and a different country from around the world hosts the event. The mid-conference meeting was held in Sydney, Australia, because they are the hosts of the 8th ITRC to be held in July, 1997. My involvement with this organization stems from the fact that Canada has offered to host the 9th International Turfgrass Research Conference to be held in 2001 in Toronto and I have volunteered to be one of the key organizers. The Board of Directors of the Sports Turf Association awarding me a travel grant toward the cost of my travel which made it possible for me to attend this meeting. This travel grant was greatly appreciated.

I would like to give the Sports Turf Association membership some information about the International Turfgrass Society as well as some technical highlights from my trip to Australia. As I mentioned the Society sponsors a turf research conference every four years. Of note at the last ITRC held in Palm Beach, Florida, was the number of papers presented on sports turf. There was a half day symposia on "Quantification of Surface Characteristics of Sports Fields" where 7 papers were presented. The reason that I mention this is that when the ITRC is held in Canada this will be an excellent opportunity to hear world renown researchers talk about their work on sports fields. I know 2001 seems a long way down the road, but it will be upon us before we know it.

As a board member of ITS, I sit on the Board of Directors with Directors from the United States, New Zealand, Australia, Japan, Denmark, France and England. Our task at the Mid-Conference meeting was to help organize the conference for 1997. The ITRC is a week long conference with a one day field trip to turf sites of interest in the middle of the week.

We had the opportunity to visit several potential sites which could be included in the ITRC turf tour in Sydney. All of these sites were growing warm season turfgrasses. Our tour visited the Royal Botanic Gardens where there are several turf species demonstration plots, the Australian Golf Club where there are some replicated turf variety trials, Sydney Race Track which has a turfed track, the Olympic Warm-up Track and the Australian Turfgrass Research Institute which is a self-supporting institute. This institute offers consulting, soil testing, pest diagnosis as well as research testing of new turf products and pesticides. There is a lot of interest in turf at the moment in Australia because of the fact that they are hosting the Olympics in the year 2000.

Much of the interesting information from my trip to Australia

was gleaned from conversations with ITS board members. We are all familiar with the project which involved moving turfgrass to the Pontiac Silverdome for World Cup 1994 which was headed up by Trey Rogers of Michigan State University. There were also projects undertaken for World Cup 1994 which involved putting in temporary sod over artificial turf in stadiums such as Meadowlands Stadium in New Jersey and Giants Stadium in New York. These techniques involves placing plywood on top of the artificial turf followed by up to three layers of polyethylene and geotextiles. The agronomists had to guarantee that at the end of the soccer games that the artificial turf would be as good as new. The geotextiles were topped with a layer of sand anywhere from 3-10 inches and then large rolls of bermudagrass sod were laid on top. Bermudagrass is not normally grown in the Northeast but it was felt that they would withstand the wear and the temperatures better that cool season turf species. This all took place from a month to 3 weeks before the soccer games. At the end of the games the organizers had as little as 24 hours in some cases to bring the fields back to artificial turf. Since the World Cup of soccer there have been several exhibition soccer games which have taken place in the U.S. featuring European teams. At these events artificial turf has been covered and thin layers of sand (as little as 3 inches have been brought in) and thick cut sod (1.5 inches) has been placed on top. Dr. Jim Watson of Toro International will be talking about some of these projects in his keynote speech at the upcoming 1996 Ontario Turfgrass Symposium.

Dr. Jim Watson also reported on work being done at Michigan State University on use of crumb rubber (recycled tires which have been ground up) as a topdressing for heavy wear areas in sports fields. A one time application on 1/4 inch provides good protection of turfgrass crowns from wear. This also has been useful for high traffic areas in passive parks and golf courses where cart traffic is heavy. This technique could easily be adopted by Ontario sports turf managers.

Researchers from New Zealand are conducting trials on a new type of turf which consists of natural grass grown into a synthetic matting on a sand base. The result is a surface with the playability of natural grass with the wear resistance and durability of synthetic turf. This type of turf is compatible with a Prescription Athletic Turf system or any other field construction, provided there is good drainage. Maintenance practices are very similar to a natural turf field, however the field could not be aerated but could be verticut to control thatch. Water use may be less because the mat provides a barrier which slows down evapotranspiration. Optimum mowing height for this type of system is 1 1/2 inches which is similar to a natural turf field. There are two fields in the United States which have this system - Rice Stadium at the University of Utah and University of California at Los Angeles practice field. This system also shows promise for golf tees and walk-off areas near greens. (see following article)

New Zealand has also developed protocols for measuring the quality of sports turf surfaces. The idea behind this is to have a minimum standard for sports field surfaces. If a field falls below the minimum the teams are not obligated to use the field. The motivation is to provide a high quality, safe playing surface for all athletes.

The ITS board member from Japan reported on the current economic recession in Japan. Although golf course construction is down by 20% there is an increase in interest in sports field construction. This has partly been triggered by the fact that Japan will be hosting the World Cup Soccer tournament in the year 2002.

As you can see there are many new products and techniques being investigated around the world to make your job as turf managers easier, or more challenging. By the time 2001 arrives there will be many more innovations. I hope many of you will mark your calendars for the 9th International Turfgrass Research Conference to be held in Toronto in July 2001. Again, I want to thank the Sports Turf Association for making this trip possible.

The Best of Two Worlds?

Terry McIver
Editor, Landscape Management

Natural and Synthetic Turf Joined for Divot-free Playing Surface.

Proponents from both the artificial and natural turf will be thrilled with the latest ally in athletic turf surfaces: SportGrass.

The invention of sport field expert Jerry Bergevin, president of Turf Systems International, SportGrass consists of natural grass growing into a synthetic matting. Grass grows down through the synthetic backing and in between fibrulated synthetic strands, which protect the crown and roots of the plant.

The results is a surface with playability of natural grass and the wear resistance and durability characteristics of synthetic turf. The natural turf cushions the impact of sports activity, and the artificial turf and matting below act as an anchor to reduce - if not eliminate - divots.

SportsGrass is available as sod, or it can be established on site, as it was this past summer at the University of Utah's Rice Stadium, the first major SportsGrass installation in the U.S.

Brian Nelson, director of buildings and grounds at the university, says the field has held up "extremely well" after practices and two full games. A pregerminated ryegrass mix was used to fill in minimal wear areas - which the company says should be expected - but Nelson reports there were "no divots whatsoever."

SportsGrass needs five to six weeks to establish, after which the grass has grown above the height of the plastic blades, and the roots have formed a mass of interconnecting fibres in the soil.

SYNTHETIC SECRET - The key to field stability seems to lie in the type of synthetic material used. SportsGrass uses Desso DLW synthetic turf, manufactured by Desso DLW Sports Systems, Int., headquartered in Germany.

"SportsGrass is basically the same material as a sand-filled synthetic turf. "All we've done is modify the material." says Bergevin. The artificial turf is made out of polyethylene, which is softer than