

Student researcher T.J. Dawson examines hexagonal pans of sod, a primary ingredient in the indoor natural turf system designed for the Pontiac Silverdome to host rounds of World Cup 1994. Photo courtesy: Bruce Fox.



The Pontiac Silverdome. Organizers expect the more than 80,000-seat venue to be filled to capacity more than once during World Cup 1994. Photo courtesy: Douglas G. Ashley.

# Laying the Groundwork for World Cup Soccer

By Richard Lehnert

ince the state of Michigan is a leading turf producer, shipping sod there seems a bit like sending coals to Newcastle. But on Sunday, April 11, more than three acres of California-grown turf began to arrive in Pontiac, MI. Its home was Pacific Sod, near Los Angeles.

The sod was trucked 2,000 miles. To reduce weight, the producers grew the grass on compost laid over plastic. Little more than bare roots and a crown made the trip.

Once in Pontiac, it underwent further labor-intensive preparations. By April 22, it was laid into a large rectangular shape where it was to sit until mid-June. Then, the field was to be disassembled and moved inside the Pontiac Silverdome, the huge domed stadium where the Detroit Lions play football.

But this field isn't for American football. It's for the sport the world calls football but Americans call soccer. Only one game will be played on it this year, an exhibition match on June 19 between Germany and England. Then, after 15 days indoors, the turf will be taken outside and stored for 11 months, says Tom King, who is directing World Cup USA 1994 Inc. from the Silverdome.

### **Game Plans**

In June of 1994, four World Cup Soccer games will be played on natural turf inside the Pontiac Silverdome. Not only did the United States, a country of mediocre status in the world soccer community, win the right to host this prestigious 52-game world playoff series, it gained approval to play four of the games indoors.

Never before has World Cup Soccer been played indoors. FIFA, the International Federation of Football Association, world soccer's ruling body, was convinced to allow it — with the condition that games be played on natural turf, not artificial. And the two men who sold the idea that it could be done were Michigan State University turfgrass researchers John "Trey" Rogers and Paul Rieke.

Since then, they have been working for about a year to solve the problems that come with growing grass indoors. That's the overall goal: to learn how to grow and maintain turf in indoor facilities.

"A few years ago, I made up a list of personal and professional goals I would like to accomplish in my life," says Rogers. "Among them was, 'Grow grass indoors for athletic events.""

Right now, the goal is short-term they just want to grow grass indoors long enough to play the games on a perfect soccer field. They need great grass for just a few days.

"When you've got one billion people who are going to observe the results of your efforts, there's a tremendous amount of pressure," says Rogers. (The last World Cup final game, when West Germany played Argentina in Italy, was watched on television by an estimated 1.5 billion people.)

Since grass doesn't get growing in Michigan until mid-April, it was decided that Pacific Earth Resources, and its subsidiary Pacific Sod, would grow sod in California and ship it to Michigan, where the scientists and soccer buffs would take over.

A key figure in this scenario is Rogers. The 33-year-old Arkansas native is the project's lead researcher at Michigan State University.

## The Process

The sod was transplanted into about 2,000 mostly hexagonal metal boxes. The grass was laid onto 6 inches of topsoil made of eight parts sand, one part sandy loam and one part Michigan peat.

"You want a soil that is easily drained

but not easily compacted," says Rogers. "You want it to resist compaction and have open pore space, but it must have stability, too. If the soil is too loose, it would be difficult to grow grass on it and would be easy to tear up."

The sod itself was grown from a blend of six varieties of seed. Three varieties of Kentucky bluegrass made up 85 percent of the mixture. The remaining 15 percent of the mixture is comprised of three perennial ryegrasses. Two varieties of each were chosen for sports tolerance and one of each for shade tolerance.

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#### World Cup Soccer

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Every soccer ball is covered with a skin of 32 hexagons and pentagons, which close into a perfect sphere. On a flat surface, hexagons alone work perfectly, six fitting around one. But the hexagonal shape wasn't chosen for its elegant soccer ball image. It was selected for the practical reason that three seams come together at a point, instead of four, as on a square. The field is expected to be tight.

The hexagonal boxes are each 7 1/2 feet in diameter. Each weighs approximately 3,000 pounds filled. About 2,000 boxes are needed to fill the Silverdome floor. The hexagons, like tiles, fit tightly together. The field edges are trimmed off with fill-in triangles to make the rectangle.

The hexagonal pans are made of two parts. The bottom pan is designed to be moved easily by fork lift. Around the pan top is a removable metal lip slightly larger than the pan. This allows the grass to overgrow slightly. When the lips are removed and the pans shoved together, the seams become invisible.

The grass will be moved into the Silverdome four days before the exhibi-

tion game on June 19. In those four days, it will knit together and be mowed before soccer field lines are painted on the field.

It will be left inside for a week after the game so the scientists can experiment and observe. What did 22 players running on the turf for two 45-minute halves do to the sod? Then the grass will be taken outdoors and stored for 11 months before the next soccer games, June 18, 22, 24 and 28, 1994.

Growing grass inside the Silverdome is a challenge. The inside of the domed stadium doesn't seem dark to the human eye, but grass sees it differently. Light that penetrates the Teflon-coated fiberglass dome is long-wavelength red light, and only about 10 percent of the outside light penetrates. Red light causes grass to grow long, spindly leaves and shallow roots. Shorter-wavelength light toward the blue end of the spectrum produces short, study growth and deep, strong roots that will stand up to athletics.

As part of this project, a 6,500-squarefoot research dome nicknamed "Silverdome West" was constructed at MSU's Hancock Research Center in East Lansing, about 75 miles west of the Silverdome. The dome is a replica of the Silverdome, made of the same material, suspended the same way by fans that produce internal air pressure. Sod was inside the structure last November.

Part of the research was aimed at finding how much and what kind of supplemental, artificial light would be needed to maintain grass indoors for about two weeks. Studies were also done on water, fertility and growth regulators. It was expected that evaporation would be low, Rogers notes, but some water will have to be added over the top. Some nitrogen and potash will be needed to maintain soil fertility and help the turf recuperate after games.

#### **Beyond Soccer**

If this seems a bit much for five soccer games, Rogers and his colleagues are looking at a much bigger picture. "I think the Europeans might be the first to embrace the concept of growing grass indoors," says Rogers.

If the researcher and his colleagues can make grass grow indoors in the short-day seasons, it will be a major accomplishment. Rogers thinks he can make grass "survive but not thrive" for



35 days indoors with current knowledge and technique, but extending that to year-round will be a substantial challenge. The potential applications of developing science and technology for growing grass indoors are far reaching — indoor golf in the winter months is just one possibility.

"One of our objectives is to develop a list of recommendations for lawn care under shady conditions," says Rogers. "A number of golf courses already use plant growth regulators on problem areas, such as greens and shady spaces, but it's being done a 'best guess' basis. We think our research should provide some answers about how much to use under various conditions."

As World Cup 1994 nears, the pressure rises. Rogers, who once "lived" at Silverdome West, now "lives" at the real Silverdome. When the games begin, the world tunes in, and everything has to be perfect.

"Soccer is kind of changing my life," says Rogers.

If the Silverdome field performs to expectations, much more than that, in the world of indoor field-played athletics, may change as well.  $\Box$ 

# World Cup Overview: Big Numbers

World Cup Soccer 1994 is expected to bring billions of dollars into the United States — an estimated \$120 million into the Pontiac area alone. That makes the \$500,000 MSU research project for growing natural grass indoors seem like small potatoes. The project was funded by the MSU College of Agriculture and Natural Resources, the World Cup Soccer Committee, the state of Michigan and the Silverdome.

Michael Abington, the executive director of the Silverdome, thinks the 80,638seat stadium may be filled for one or more games. On February 22, 1992, the U.S. team played the Commonwealth of Independent States team (the former Soviet Union) on artificial turf at the Silverdome. About 38,000 people watched the U.S. win, 2-1. Soccer fever hasn't reached the pitch in the United States that football fever has — or that soccer has abroad. However, preliminary World Cup ticket sales have exceeded expectations.

For the 1994 World Cup, 140 nations have entered teams, but only 24 will enter the World Cup round. Those 24 are being decided now, in some 500 qualification matches all over the world. The United States team will play because the U.S. is the host country. Germany will play because it is the defending champion. The other 22 teams must earn their right to play.

There are 52 games in the World Cup. The first round eliminates eight teams and results in 16 teams entering a singleelimination tournament. Semifinal winners play for the World Cup and second place. Semifinal losers play for third and fourth places.

Eight other U.S. cities will host games: Boston, Chicago, Washington, Orlando, San Francisco, Dallas, Los Angeles and New York/New Jersey.





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