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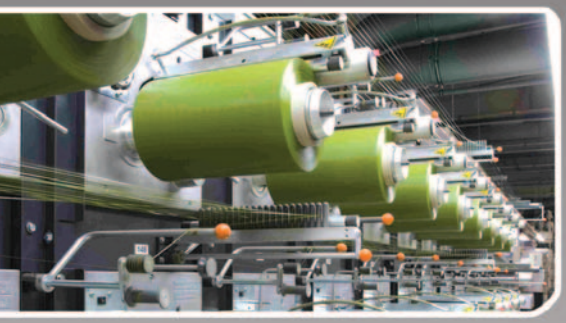

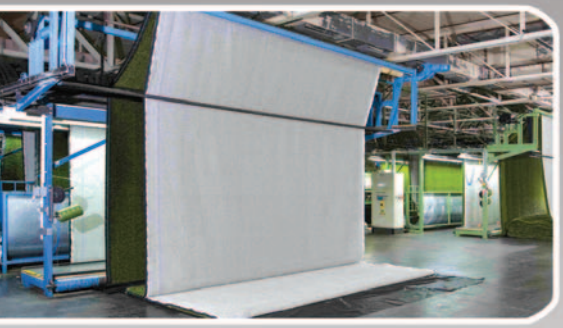

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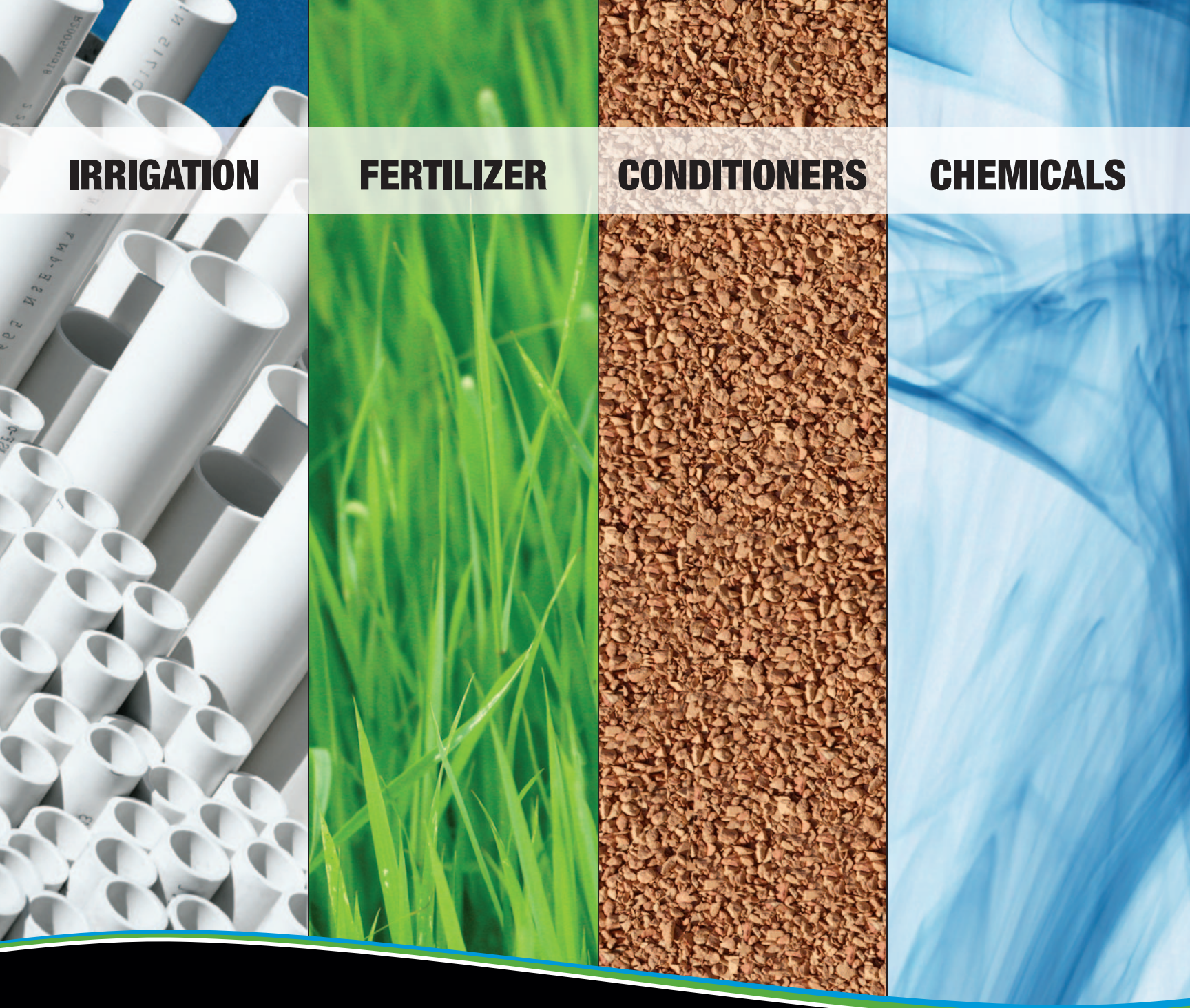

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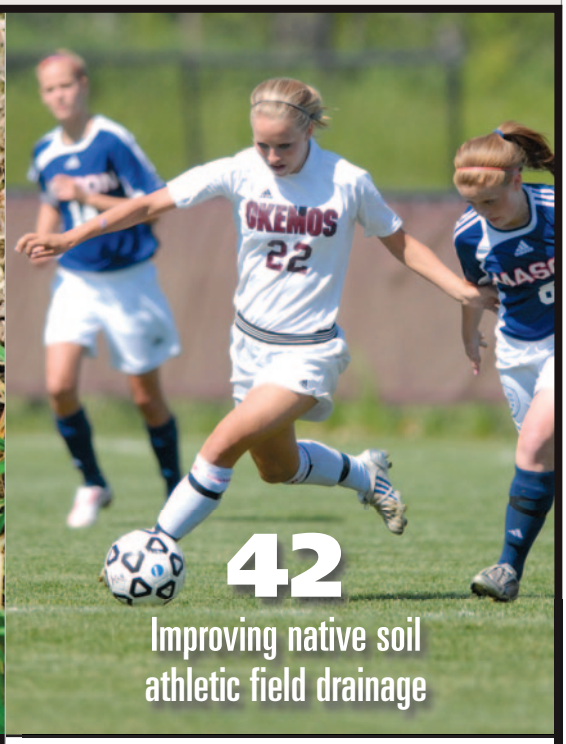

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To Seed or Not to Seed? That is our question
BY DR. GRADY MILLER

on the cover

Jason Bowers working on Lane Stadium's Worsham Field, home of the Virginia Tech Hokies, Blacksburg, VA.

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Trusting science is right route

IN THIS ISSUE we provide an update on the latest published studies regarding any possible environmental or health problems associated with infill synthetic turf systems. Since no one can foresee with certainty into the future, we have to live with what is known today, and the methodology of scientific research is the most accurate measure available.

Some folks choose to focus on what is unknown, especially when it comes to their children—that is, to heck with the science, might those pieces of rubber be harming my little Emily or Jacob? To which a rational response is, dozens of studies by experts with no axe to grind in the debate have resulted in the same conclusions—at this time, there are no known dangers to people from playing on infilled synthetic turf (other than normal sports-related injuries of course).

In this month's article we look at three topics: heat, toxicity and MRSA (Methicillin resistant Staphylococcus aureus, aka "staph"). High temperatures on these surfaces isn't in dispute, though anecdotally some observers say that poorly maintained, hard packed dirt on fields can be just as hot.

Dr. Andy McNitt, associate professor of soil science at Penn State, is a nationally recognized authority on synthetic turf research and oversees a test plot on campus of various manufacturers' systems. He studied whether irrigating synthetic turf will cool it down and found that the heat transfer from the surface to the sole of an athlete's foot is significant enough to contribute to greater physiological stress that may result in serious heat-related health problems.

Some methods Dr. McNitt tried to reduce surface temps were initially successful in lowering the number to that of natural grass, but those lower temps couldn't be maintained for more than 3 hours. "Right now there is no effective and economically feasible way to lower the surface temperature of infilled synthetic turf," says Dr. McNitt. "Many are working on lots of ideas but I don't think anyone has solved it yet."

Regarding toxicity, current research has shown turf fibers (on new generation of fields rather than original AstroTurf products) are lead-free, do not leach, and that crumb rubber infill is neither ingestible nor inhalable. Both the states of New Jersey and New York cycled through the concerns and questions and arrived at "Let them play" decisions.

Darren Gill, director of marketing for FieldTurf, puts it succinctly: "Simply put, since the industry's early installs 15 years ago, no illness has ever been shown to be related to play on artificial turf."

As for MRSA, a growing problem in athletic environments, Dr. McNitt's latest work, from December 2008, concludes, "It should be noted that [staph] survival rate on a common turfgrass species used for athletic fields in the northern United States was comparable to the survival rate on synthetic turf when no disinfectants were applied."

See page 20 for details and links to full reports.

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Consider becoming a leader of STMA

WHAT DOES STMA MEMBERSHIP MEAN TO ME? Education, networking, and opportunities to advance my abilities as a sports turf manager. STMA has been an association since 1981, and in the pages of this issue of *SportsTurf*, we continue our series of articles recognizing members' longevity with STMA. This month, you meet members who joined the association between 1995 and 1996 (page 58).

We are an association that is made up of members whose purpose is to help members succeed in this profession. Our early members provided the foundation upon which the association has grown. From the very beginning, our members believed in the value of sharing knowledge and experiences from which a great association was formed. They have also provided wisdom over the years as the association has tremendously grown as well as experienced challenging times. I would like to personally thank our long-time members for their continued support of this wonderful association.

As you look at this list, you will notice that many of these members are involved on STMA committees, hold chapter leadership roles, and several have served, or are currently serving on, your national Board of Directors. A well-functioning board is one that listens to its members, accepts new ideas, and blends ideas with the wisdom of the past. Being an active participant on a great board is important to the members you represent as well as strategically guiding the goals of the organization.

The boards that I have had a privilege to work with have taught me the ways and the strength of what a group of volunteers can do to grow an association. The experience has been so rewarding, and it has gone by so fast. Last year the membership approved new bylaws, which changed the board composition and length of service. We now have shorter term lengths for the executive board members along with the addition of two At-Large Director positions. The board service was shortened to encourage more members to participate in board service.

I would personally like to encourage all members to consider board service. Take the time to review the strategic plan of the association, find an area that sparks your interest and submit your name for a board position. The Nominating Committee also looks for members who have had strong and active participation with chapters and committees. These areas act as a "feeder system" for board service; however they are not mandatory requirements. Now is the time to consider submitting your name for board service. In the coming months the Nominating Committee will be reviewing names that have been submitted for board service, and developing the Slate of Candidates to present to you for a vote.

It is a rewarding way to participate in the strategic growth of STMA. If you have questions or need more information, please contact STMA headquarters or the Chairman of the Nominating Committee, Immediate Past President Mike Andresen, CSFM.

By Brad Jakubowski

Weather 101:

fundamental meteorology for turf managers

WE LIVE UNDER AN OCEAN OF AIR SOME 60 MILES THICK. How that ocean of air behaves day to day is what we call weather. Nearly every sports turf manager will agree that weather affects most aspects of their job and is a critical component of their daily lives. In this article, we will examine some of the basic principles of weather and applications of those principles to day to day management activities.

One of the first things a sports turf manager does in the morning is check the current weather conditions. This information can be obtained from TV, radio, the internet, and newspapers. Most commonly reported are temperature, humidity, dewpoint, barometer, and wind.

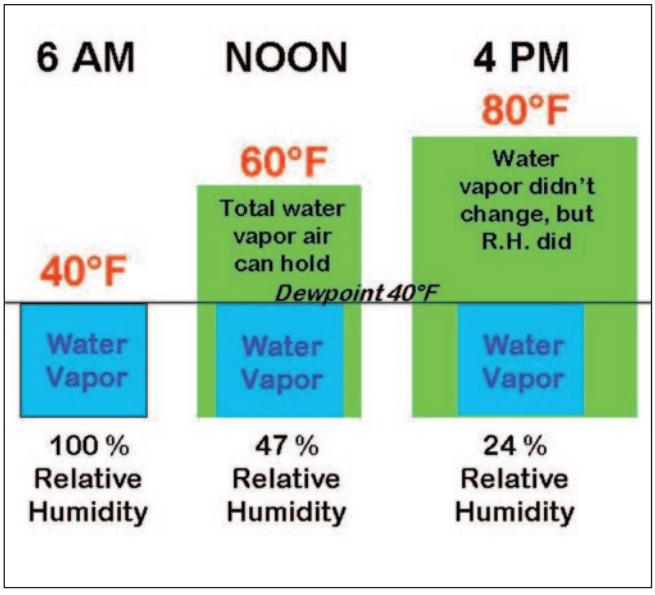
Temperature is one of the two major drivers of weather and is one of the most obvious of the weather components. It is a measure of how rapidly air molecules are moving in the atmosphere, which in turn tells us how warm or cold it feels. Normally, temperatures change gradually over a period of time. However, when major changes in temperature occur over a short period of time, it usually indicates the presence of a front. Fronts are narrow boundaries separating relatively cold and warm air and have predictable qualities.

Cold fronts are made up of relatively cool and dense air and move along the ground like a bulldozer, forcing air up along their leading edge. When air is forced up in this manner, we experience more abrupt weather with gusty winds and thunderstorms. This abrupt weather normally lasts for only a brief period, so, if you are preparing for a game or project on the field and a cold front is passing through, you may only have to plan for a delay of a couple of hours.

Warm fronts move much more slowly than cold fronts and are made up of relatively warm air that is less dense. This air cannot displace cooler air and gradually warms the space it travels through. Because of this gradual process you may experience several hours or even a day or two of light to moderate rain as a warm front passes.

Moisture is the second major driver of weather. In essence, moisture could be considered the fuel for earth's weather while temperature is the activator. In a weather report, moisture is represented by humidity and dewpoint. Humidity is expressed as a percentage, which indicates relative humidity.

Relative humidity is a measure of how much moisture is in the air compared to how much it can hold. Warmer air can hold more moisture while colder air holds less. Since relative humidity varies with air temperature, it changes as the day warms up, making it a less reliable indicator of humidity levels.



The table above illustrates the relationship between temperature and relative humidity. As air temperatures warm throughout the day, the amount of moisture it can hold also increases, resulting in lower relative humidity. All the while, the actual amount of water vapor (dewpoint) does not change

Weather icons courtesy of istockphoto.com

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The higher the dewpoint, the greater amount of water vapor in the air which means muggier conditions and lower evaporation rates.

Dewpoint (or the dewpoint temperature) is a measure of the actual moisture content of a parcel of air. Dewpoint is the temperature at which air becomes saturated and water vapor condenses into dew, fog or clouds. In general, the higher the dewpoint, the greater amount of water vapor in the air which means muggier conditions and lower evaporation rates. Table 1 lists some example dew-point temperatures.

TABLE 1 Dew-Point Thresholds

Dew-point Temperature	
≤ 10°F	Significant snowfall is inhibited
≥ 55°F	Minimum for severe thunderstorms
≥ 65°F	Considered humid my most people
≥ 70°F	Typical of the rainy tropics
≥ 75°F	Considered oppressive my most

Lutgens and Tarbuck, 2007

For example, dewpoint tells Dan Bergstrom at Minute Maid Park in Houston, TX, how fast the water will evaporate from his infield skinned areas. Given the warm temperatures in Texas, a dewpoint over 70 tells him he won't have to spend much time throughout the day watering the infield skin. A dewpoint under 40 tells him that he will spend most of his day watering the skin. The low dewpoint and high temperatures contribute to high evaporation rates.

It is also beneficial to include dewpoint in your recordkeeping when managing diseases. You may discover that certain diseases develop at certain dewpoint temperatures. This may help you better anticipate the onset of diseases and make better use of your fungicide expenses.

One more note regarding dewpoint; as relative humidity approaches 100%, the air has about as much moisture as it can hold and will start to form frost when temperatures are at or below freezing and form dew when the air is above freezing. Understanding how temperature and dewpoint interact may help you schedule early morning maintenance more efficiently and save downtime waiting for the frost to break or dew to dry.

The barometer reading indicates surface atmospheric pressure and is generally measured in inches of mercury (in. Hg). This is a measure of the total weight our ocean of air has as it presses against a surface. Colder air is denser and exhibits greater pressure, while warmer air is lighter and exhibits less pressure. In areas of high pressure, air tends to sink and promote clear skies while air rises in areas of low pressure and favors cloud formation.

Suppose that the barometric pressure is 30.06 inches of mercury and that the pressure is rising. This means we can expect to experience higher pressure with fair weather and little chance of rain. Barometers will rise as cold fronts approach and fall with the approach of warm fronts. Fair weather is most commonly associated with a rising barometer and high pressure while more rainy weather is associated with a falling barometer and low pressure.

Wind is generally defined as air in motion. Air tends to blow away from areas of high pressure and toward areas of low pressure. The greater the difference between high and low pressure areas, the stronger winds blows. This is called pressure gradient force.

Because the earth rotates, it causes winds to flow in a circular motion. This circular motion is what causes cyclones, tornadoes and hurricanes to behave the way they do. Winds flow out of high and into low pressure areas in a regular pattern, so weather forecasters can develop rules of thumb of what type of weather to expect when winds shift and pressure changes.

Remember: A wind is named for the direction from which it originates. So, a northeast wind blows from the northeast.

Applying basic weather knowledge

The following are perspectives from various sports turf managers and how they incorporate weather data into their day to day activities:

"What if you have a cold front coming through the night before a home stand and you're trying to decide whether to pull the tarp. If you get ¾ inch of rain overnight, but then have 35-degree dewpoints forecast the next day with low humidity, full sun, and a good breeze, then why spend the labor to tarp when the field will dry out anyway? You just saved overtime budget money AND irrigation water money for the infield dirt the next day.

"Of course if you made the same decision to NOT tarp with a 68-degree dewpoint forecast, you likely just rained out the game and cost your administration the gate for the night. So it works both ways. A savvy field manager who is a good communicator with the front office can really save some money by watching the weather closely."-Dan Bergstrom, Minute Maid Park, Houston Astros

"There is a direct correlation in baseball between weather and your daily maintenance activities. We all know on the turfgrass side how variable weather conditions impact turf health, disease pressure and irrigation scheduling. Knowing you have 2 days of rain coming up, you may think ahead and spray a preventative fungicide on the turf that will be under and near the tarp.

"Also to be monitored and projected is the amount of sunlight expected and how much wind is blowing on a given day. Evapotranspiration figures are a nice guide, but I like to use my skin. Am I sweating a lot or is my skin dry? Do I need to apply