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Applicator's Log continued from page 28 possibly a quicker spring green-up, an important factor for any turf used in early spring.

One concern we had was the effect of crumb rubber on turfgrass during the summer. As the density of the turf stand increases during the growing season, the effect of crumb rubber on surface temperatures moderates due to the shading effect of the turfgrass, an effect measured and confirmed during 1993 and 1994.

Integrated Tool

Although crumb rubber is an excellent tool, it is not a "cure-all." It cannot be an exclusive means for maintaining turf in any high-traffic area and must be used as a tool integrated into the management program.

We recommend: turf managers have

Crumb Rubber

a 100 percent turfgrass stand, or as close to this possible, before making any crumb rubber applications. Crumb rubber should be topdressed between 0.375 and 0.50 inch (not more than 0.25 inch at given any

| Particle Size | 27 Oct | 4 Dec | 27 Oct | 4 Dec |
|----------------------|---|------------|--------------|----------------|
| 1/4" 10/20 mesh | 5.9 5.9 | 4.6 4.4 | 5.7 5.8 | 0.216 0.236 |
| Significance | NS | NS | NS | NS |
| Topdressing Depth | | | | |
| 0.00" | 5.7 | 4.7 | 53.6 | 41.7 |
| | 6.0 | 4.7 | 61.7 | 50.8 |
| 0.15" | 0.0 | (A. P. A.) | | |
| 0.15" 0.30" | 5.9 | 4.6 | 71.7 | 63.3 |
| 0.30" | 170000000000000000000000000000000000000 | (2.75) | 71.7 73.3 | 63.3 65.8 |
| | 5.9 | 4.6 | 31,1000 | 7770 |

TABLE 2. EFFECTS OF CRUMB RUBBER ON COLOR & DENSITY*

Color

rates on color and density ratings on a Kentucky bluegrass\perennial ryegrass stand under trafficked conditions at the Hancock Turfgrass Research Center, East Lansing, MI. 1994.

application) in high-traffic areas.

Crumb rubber will not resurrect the turfgrass, but it will protect the crown tissue area of the plant which becomes vital in improving the longevity and quality of a high-traffic turfgrass stand.

While the research to date has been extremely promising, we have not covered every scenario in the turfgrass industry:

1. Crumb rubber topdressed at 0.50 to 0.75 inch levels (1.200 to 1.800 pounds/1,000 sq.ft.) will increase turfgrass wear tolerance and prevent soil compaction in turfgrass maintained above 0.63 inch. We have also done some testing at lower cutting heights with similar results - such as 3/8inch bentgrass topdressed with 3/8inch crumb rubber — but obviously

there will be some limits.

2. Except for early in 1993, we have seen little difference in response from different crumb rubber sizes in our studies. However, we have noted the smaller size was easier to deal with in terms of working it into the turf area. It comes as no surprise that this is a more expensive product, and we caution against using a too finely granulated product as this could cause a detrimental effect in the soil profile relationship.

3. There is a question of crumb rubber particles contaminating soil and water quality. We have had crumb rubber tilled in the ground at MSU since 1990 and monitor soil samples annually. The major components of rubber are iron, sulfur and zinc. While

Density

07 Oct | 4 Dec

iron zinc levels have increased in our tests. none have approached levels of concern, nor do these elements pose concerns to water quality. At no time have seen any toxicity to the turfgrass plant during our studies.

We are confident have we

found another use for a difficult-toreuse product that poses environmental hazards and takes up landfill space. When topdressed, crumb rubber can extend turfgrass wear tolerance and reduce soil compaction in high-traffic areas. The more this product is researched and tested, the more uses will likely be found.

Dr. J.N. Rogers III is with the Department of Crop and Soil Sciences at Michigan State University, and J.T. Vanini is head hockey coach for Cortland State University in New York. MSU has received a patent on this use of crumb rubber and has sold its rights to JaiTire Industries (800-795-TIRE), Denver, Royalties paid to MSU go toward turfgrass research. So far, crumb rubber has been installed at more than 1,000 locations across the country.

Applicator's Log

Materials and Methods

The Trial Plot

July 29, 1993: A trial plot consisting of perennial ryegrass (Lolium perenne var. Dandy, Target and Delray) and Kentucky bluegrass (Poa pratensis var. Argyle, Rugby and Midnight) was established on an 80-percent-sand/20-percent-peat mix at the Hancock Turfgrass Research Center (HTRC) at MSU to determine optimal crumb-rubber particle sizes and topdressing application rates.

July 29, September 11 and October 5, 1993: Crumb rubber was topdressed in two sizes (10/20 mesh and 1/4-inch size); five treatment amounts (0.0, 0.05, 0.10, 0.125 and 0.25 inch) added to the surface in equal applications; and reached final levels at 0.0, 0.15, 0.30, 0.38 and 0.75 inch. Since treatment areas were small (10 by 12 feet), the crumb rubber was topdressed with a rotary spreader. It was then dragged in for even distribution. Crumb rubber was not applied in

August 26 through November 14, 1993: Wear treatments were applied by the Brinkman Traffic Simulator (BTS) to simulate 48 football games. Two passes by the BTS are equivalent to the traffic experienced in one football game between the hash marks between the 40-yard lines.

May 16, 1994, trafficked lanes were slit-seeded with Lolium perenne var. Dandy at 1.1 pounds/1,000 sq.ft.

September 6 through November 15, 1994: Wear treatments were applied by the BTS to simulate 48 football games.

Measurements

In 1994, impact absorption was collected by the Clegg Impact Soil Tester (2.25 kg hammer). Impact absorption values were recorded with the Bruel and Kjaer 2515 Vibration Analyzer, replacing the read-out box. This analyzer allowed for further evaluation of surface hardness characteristics. The values recorded were an average of four measurements.

Shear resistance was measured with the Eijjkelkamp Shearvane. The value recorded was an average of three measurements. Surface temperature was read by the Barnant 115 Thermocoupler Thermometer.

Soil moisture recordings were provided by the gravimetric method. Three soil samples (7.6 cm) per treatment were used for this method. Density and color ratings were observed on October 27 and December 4.



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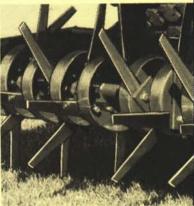
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FRONT LINES



El Nino and Other Unpredictable Phenomena

By Dave Ashman

I recently attended a seminar where experts in the field of marine and atmospheric sciences evaluated the coastal impact of an El Nino winter for southern California. It was a very interesting discussion, and the information was well presented to an overflow crowd. Most of those attending were from municipalities, academia, coastal business centers and the sports turf community.

The media was well represented at the event. Cameras and roving reporters proved to be an overwhelming distraction for many in attendance. The lure of the cameras seduced many in the crowd to speak their minds on the El Nino issue.

15 Seconds of Fame

I believe it was Andy Warhol who gave us the often quoted "15 minutes of fame" line. Judging from the response of the crowd to the media, I would say it is now more like 15 seconds of fame - the length of time for a good sound bite on the evening news. People who are used to dealing with the media are usually extremely cautious with what they say. People who are not used to dealing with the media are usually petrified or babble like idiots. The crowd offered examples of each group.

Most of the speakers were extremely cautious with the media. One speaker was asked, "Will there be an Nino winter for southern California?"

The learned orator thought for a second, then said, "The data is suggesting there will be a strong El Nino impact on the southland. I am not saying it - the data is saying it." Who collected the data? If he was unsure of

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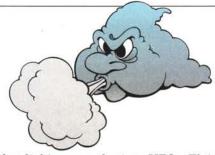


FRONT LINES

Front Lines Continued from pg 34

the data, why did he present it? This man sounded like a person testifying before a Senate subcommittee: "Senator, I can neither confirm nor deny the existence of any El Nino activities in the Pacific Theater."

The next speaker went to the other extreme, "Twelve of the 14 indicators of an El Nino winter are present today, and the government doesn't want you to know." The conspiracy theory is always an easily defensible position,



but linking your thesis to UFOs, Elvis sightings and grassy knolls may not be considered reliable.

There were many people who couldn't wait to offer their most profound thoughts on the matter. Most shared war stories of floods and devastation from previous El Nino winters. Listening to the stories, I couldn't help but think that these people are in leadership roles in their various communities. Is it a good idea to add to the media hype and share stories guaranteed to increase the anxiety of the people in the community? Maybe not.

The best group to watch were the people who had nothing relevant to say but offered what they perceived to be relevant. These are actual quotes:

"It doesn't matter how much Jell-O you put in the pool, you still can't walk on water."

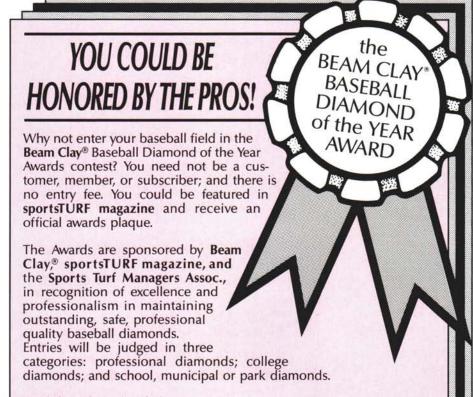
"Always look in the oven before you turn it on."

"When you hear the toilet flush and the words 'uh, oh,' it's already too late."

What were these people thinking?

Despite distractions, this was an informative seminar on the El Nino winter. Will there be a strong El Nino influence this winter? The bottom line is that it is extremely difficult to predict the weather more than five days in advance. There is strong measurable and verifiable scientific evidence that conditions which lead to an El Nino winter are present today. It wouldn't hurt to prepare for the possibilities in a fiscally sound way. Do what you can afford and what will offer the best insurance for your operation. The quote of the day said it best, "You can play ball when the field is under water!"

If you have a story or anecdote you would like to share, call (562) 425-2449 or write it down (include your name and phone number) and mail it to Ashman & Associates, 3164 North Greenbrier Road, Long Beach, CA 90808.



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