

Sustainable Focus



By Lynn Grooms

In researching the topic of environmental sustainability, *Turf News* learned about a couple of new products that may help turfgrass producers reduce their environmental footprint. The first is a fertilizer recovered from wastewater treatment systems while the second is an irrigation system that uses between 50 percent and 85 percent less water than conventional irrigation systems.

Jim Zablocki, vice president, nutrient operations, Ostara Nutrient Recovery Technologies, Vancouver, BC, describes the company's *Crystal Green*® fertilizer as a replacement for conventional agricultural phosphorus (P) fertilizers. "Many university researchers agree that 80 percent of all P applied is tied up and unavailable to the plant. Our research on a large-scale sod farm in Maryland as well as in the U.K. has shown that high quality turf can be grown with one application of P per season, reducing the total amount of P required for application with conventional agricultural P sources by up to 80 percent," Zablocki says. Ostara's delivery system allows consistent amounts of P, magnesium (Mg) and nitrogen (N) to be made available to the plant.

Since *Crystal Green* is derived from wastewater, the source is renewable and sustainable. Due to its crystalline structure, it is a less soluble source of P, and the only slow-release P and Mg fertilizer available, Zablocki says. "It spoon feeds nutrients in doses according to the plant's needs rather than mass dosing with traditional forms of P, which results in nutrient runoff due to high solubility.

"At the farms in Maryland and the U.K., the root mass of the turfgrass increased in a much shorter time than we had seen before," Zablocki said. "Slow release Mg and

N are part of *Crystal Green's* makeup which promotes stronger root development and a greener, healthier canopy."

Matt Holloway, Quantico Creek Sod Farms, Hebron, MD, used *Crystal Green* to fertilize newly seeded grass last fall. "We were able to lift pieces of sod from one of our fields about 3.5 months after planting. Typically it takes nine to 12 months to do this. We were able to harvest the sod in just eight months, when it normally takes 13-14 months."

EPIC Irrigation System

Shifting from fertilizer, the *Environmental Passive Integrated Chamber (EPIC)* system has been designed to use between 50 percent and 85 percent less water than conventional surface or drip irrigation systems. It has been gaining interest as concerns over water consumption mount.

In fact, about 150 sites around the U.S. have installed the *EPIC* system, including sports fields, urban landscapes and green roof installations, says Jonas Sipaila, director of innovations, EPIC Green Solutions, which holds the worldwide rights to this system.

Last April, EPIC Green Solutions finalized an agreement whereby Firestone Specialty Products, a division of Firestone Building Products Company, will serve as the exclusive North American distributor of the *EPIC* product line. The *EPIC* system is used in combination with Firestone's ethylene propylene diene monomer (EPDM) synthetic rubber (which acts as a rubber liner).

The *EPIC* system works through gravity-driven capillary physics of washed sand



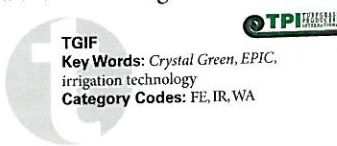
A reservoir under California's Cambria Elementary School campus holds up to two million gallons of water using the *EPIC* system (above). Inset photo: The use of *Crystal Green*, a fertilizer derived from wastewater, allowed a farm to harvest sod in eight months versus 13-14 months.

interfacing with a subsurface pipe. The system features the liner pan, a chamber and sand fill that covers and surrounds the pan and the chamber.

Water, such as runoff, is controlled by gravity and capillary physics (water wicking up through the sand) to travel through the system.

The liner pan catches and retains water while the chamber, through strategic placement of holes, controls how the water flows through and out of the chamber. Gravity controls water flow between the units and upward water flow creates the capillary rise.

The *EPIC* system has worked well on sports fields like the one at Cambria Elementary School in California. It was installed under 130,000 square feet of a 12-acre campus that includes a soccer field and other athletic fields. The campus was designed to collect stormwater and runoff. This is collected in *EPIC's* system and a secondary storage reservoir under the main field which can hold up to two million gallons of water. The *EPIC* system provides a source of free irrigation water and can be replenished with wastewater from the local sewage treatment plant. This eliminates the need for a fresh water irrigation source.



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- Blocked suction lines in pumps
- Hydrants spaced too far apart, reducing uniformity of water application
- Old mainlines in need of replacing, with no air release valves
- Varying nozzle types and sizes on the one spray line and/or traveling irrigators
- Inadequate mainlines that need replacing and poorly matched pumping units for the duty required, and
- Few nutrient retention ponds to capture and reuse water

The irrigation assessment strengthens the case for investing in infrastructure. Using this information, irrigators with river water license entitlements were encouraged to submit proposals to receive grants

for some or all of the improvements identified in their irrigation assessment. In exchange for the grant, irrigators must transfer a portion of the water savings from their license entitlement and receive AUD \$3,300 (GST inclusive) per megaliter of water transferred. To the author's knowledge, this project approach is unique worldwide.

As of June 30, 2011, 19 turf producer project proposals have been approved to the value of AUD \$1,630,200 in exchange for 494 megaliters of river water transferred from license entitlements.

In addition to the grants program, more than 50 producers have attended WSF's information meetings, with training planned for producers in the latter part of 2011. This is one of the main R&D priorities identified in the Australian Turf Industry Strategic Plan.

Satellite and SMS Scheduling

The satellite and SMS Scheduling technology provides advice to irrigators in the Hawkesbury Nepean catchment by means of SMS through their cell phone or personal computer. The technology combines satellite imagery with on-ground weather station data. It collects real-time information on crop indexes and weather, then analyzes the information to determine the crop water requirement (*Ho Dang, pers. comm. 2011*).

The information is provided as an SMS on the client's cell phone and more details are provided on the Internet through the IrriSat SMS Web site.

Producers also can use this Web site to compare their performance with other

irrigators. The SMS is sent daily. The information is tailored to each individual farm and advises the pump run time required to deliver the necessary irrigation. The farmer then decides when to irrigate and how much to apply, with guidance from the SMS message (*Machar, 2010*).

Nutrient Smart Farms

The Nutrient Smart Farms (NSF) project aims to reduce nitrogen (N) and phosphorus (P) entering the Hawkesbury Nepean river with matching dollar for dollar contributions required of producers. Nutrients leave turf farms during rainfall or irrigation runoff. Therefore, it is important that irrigation application rates do not exceed the soil's infiltration rate. Where possible, it is best that nutrient-rich runoff water be captured in a retention pond and then reused.

Ponds increase irrigation efficiency if used properly. As an example, with rainfall of 800 mm and evaporation of 1500 mm per year, a four-megaliter capacity pond should capture all irrigation runoff and 65 percent of the total runoff from 20 hectares (50 acres) in an average year. The pond may capture 85 percent of the P and 75 percent of the N in runoff and occupy 2000 m² with a maximum depth of four meters (*Senn, 2010*).

Conclusion

The Australian turf industry has shown strong willingness to improve water management practices despite recent natural disasters and challenges presented by climate variability. If the industry is to prosper, then turfgrass must be marketed as an environmental champion and the industry seen as part of the solution. This can only be achieved by working together at a national, state and local level.

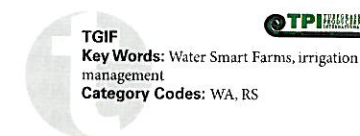
The WSF & NSF Projects have achieved significant water and nutrient savings benefiting the environment, but also accelerated the adoption of best irrigation management practices that otherwise might not have been undertaken without project funding.

Australian producers face a future with less water due to projections of more prolonged drought and warmer temperatures. With this in mind, producers who have adopted more efficient systems will be in a better position to manage these challenges into the future.

The industry must be prepared for the next drought, and develop appropriate tools and systems to market products

more effectively. The commitment of the national bodies, state associations and Australian and state governments have shown that positive outcomes can be achieved when all stakeholders work together. It is hoped that funding programs similar to the SmartFarms projects will be available to other turf producers in the future.

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