



▲ The ECS underground pan prevents water loss to subsoil, while pipes control sand infiltration and direct water flow in a specific pattern through the chamber.

New Methods in Irrigation

ECS provides an effective subsurface watering system.

By Jim Connolly

Although Nevada, the driest state in the nation, may not be known for green pastures, a green lawn can still be achieved with proper irrigation. New technology by Evaporative Control Systems makes it possible to irrigate a yard without moving parts, computers or timers, while using 58 percent less water than traditional sprinklers, all without the development of dry spots.

Subsurface faces challenges

Irrigation by overhead sprinklers has long been a part of the American landscape. Sprinkler irrigation is the accepted practice for irrigating lawns since Joseph Smith patented the first swiveling lawn sprinkler in 1894. However, two major problems are directed toward sprinkler irrigation; a

decreasing water supply and environmental pollution due to fertilizers, salts and agricultural chemicals.

Many agricultural research projects have demonstrated improved water use efficiency and crop productivity through subsurface irrigation. Over 30 years ago, a book called "Turfgrass Science" predicted that subsurface irrigation would have a "gradual but limited expansion." It has been very limited indeed.

The reasons for the limited success of subsurface irrigation can be summarized into five main points. First, is the previous lack of attention toward water conservation. Secondly, the high cost of installation deterred many homeowners and builders from installing valuable water conserving equipment into homes.



Thirdly, failures in delivery systems, for example pipes and orifices clogged by roots and fine particles made maintenance cumbersome. The fourth and fifth reasons are the irregular capillary transport of water in certain soils and the fact that underground systems can be difficult to monitor.

Is it possible to design an irrigation system that is 100 percent efficient? If you are planning on irrigating with sprinklers, think again. If you think a little deeper, then you're on the right track.

One inventor is hoping to turn irrigation "upside down." Jonas Sipaila received his patent for a "Subsurface Fluid Distribution Apparatus and Method" in 1999 and believes he has overcome the problems that are preventing the acceptance of subsurface irrigation as a viable method for irrigating turf.

Sipaila is founder and president of Evaporative Control Systems in Reno, Nev. A graduate of Rochester Institute of Technology and an expert in soil water physics, Sipaila invented what he believes to be a practical, highly efficient and affordable method of subsurface irrigation.

How it works

The ECS uses a sand rootzone. The system relies upon capillary flow to wet the rootzone and gravitational forces for drainage. Water is contained in the system with the use of multiple plastic liner pans that are compartmentalized to allow for installation on undulating ground and easy monitoring of the underground pipe. If there is a problem with underground water flow, the exact location of the problem is evident before turf or seed is planted.

The plastic underground liner pans also prevent subsoil water loss, while the patented pipe controls the distribution of non-pressurized water, in a defined pattern through gravity. The pipe is specially designed to resist clogging or sand intrusion, a serious problem with underground drip systems.

The ECS relies on the capillary rise of water through sand to create the perfect mix of moisture and air in the 10-inch to 13-inch rootzone. It also maintains an underground reservoir for

continual water supply. All roof runoff, or incidental surface drainage is channeled through the system for secondary use, simplifying drainage issues.

The ECS provides a perfect growth environment for grass, trees, flowers and other plants in the same shared system. As a result, ten-inch root growth in a three-month period is not unusual for ECS irrigation.

Reclaimed water

Effluent reuse, or reclaimed water, may be the most significant policy change in irrigation practices. Prior to ECS, reclaimed water had severe public health issues from surface exposure and a technical limitation due to orifice blockage of conventional emitters. ECS technology controls underground water flow without pressure or blockage, making the use of reclaimed water a viable option. Ironically, what we have traditionally identified as wastewater contains all of the essential nutrients beneficial to plant growth.



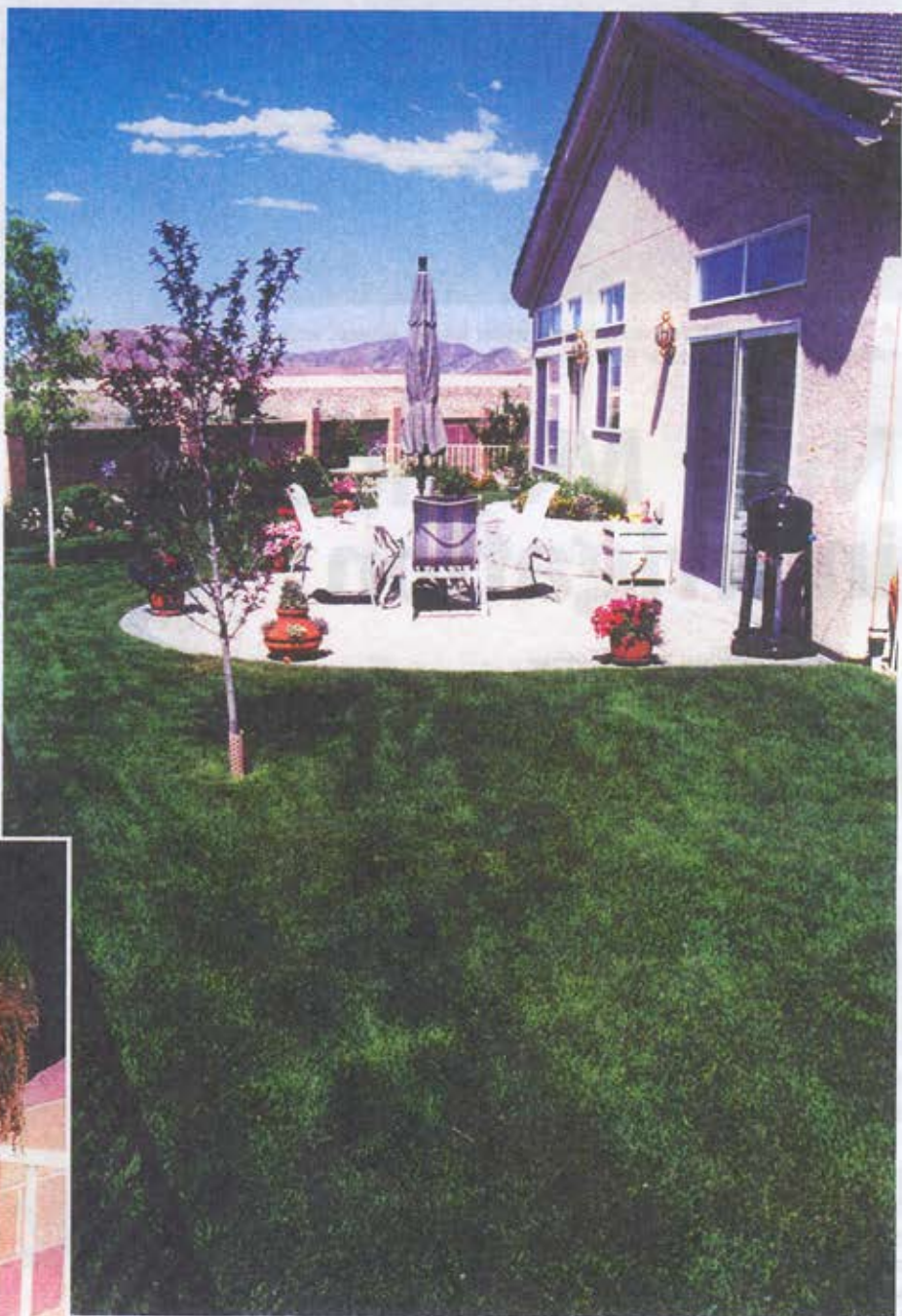
Jim Connolly is the president of James Connolly Consulting Ltd., an agronomic service company in Spokane, Wash. He may be reached via e-mail at jim@jccturf.com.

▼ Root growth of sod approaches 10 inches in a three-month period using the ECS irrigation system.



Some of the benefits of ECS subsurface irrigation and drainage include:

- ❖ Reduced water use of 50 percent or more;
- ❖ Increased drainage capacity;
- ❖ Optimum soil moisture and porosity;
- ❖ Lower maintenance costs compared to sprinkler irrigation;
- ❖ No mineral staining on fencing, glass or siding;
- ❖ Lower operational costs;
- ❖ Effluent use without public exposure issues;
- ❖ Reduction of environmental pollution; and
- ❖ The capture and recycling of water.



▲ This lawn has been using subsurface irrigation for three years to water both the grass and the accompanying plants and trees.