

slowly-available fertilizers may provide a slow initial green-up, especially under cool, dry spring conditions.

Slow response can be offset with high rates (1.5 to 2 lbs. actual N per 1000 sq. ft.) of the slowly-available sources, as is often done with straight ureaform and natural organics.

This is one of those rare instances in which more than 1 lb. of N per 1000 sq. ft. can be safely applied. Unless you wish to adhere to a strictly natural organic program, it is wiser and easier to apply a blend of quickly- and slowly-available N sources in the early season.

The resin-coated product called "Once" allows you to fertilize once in the spring and yet provide even greening throughout the growing season. This fertilizer has performed impressively in three years of testing at Colorado State University.

Use N for disease control—Over- or under-fertilization, especially in the spring, can result in turfgrass disease problems (Table 2). Red thread can be a problem during moist, cool springs on fine fescue and perennial ryes if they are under-fertilized and not growing at a satis-

factory rate. On the other hand, diseases like stripe smut can become severe if susceptible Kentucky bluegrass cultivars get too much fertilizer during the spring.

Research at Cornell University and other universities shows that nitrogen sources may also play an important role in suppressing certain diseases. That work suggests that natural organic fertilizers and composts, when used as turf fertilizers, can sometimes reduce the incidence or severity of diseases like brown patch, necrotic ring spot, red thread, dollar spot and pythium root rot. Success may vary depending on fertilizer and location.

Clippings return nutrients—Grass clippings provide legitimate and important nutrient sources when returned to lawns. In addition, the severity of rust and red thread may be dramatically reduced on ryegrass and bluegrass lawns where clippings are returned.

Use fertilizer responsibly—Any fertilizer application has the *potential* to contaminate water resources through surface runoff or leaching. Continuing research, however, indicates that careful fertilizer use presents negligible risk to most

ground and surface water sources.

Using water-soluble fertilizers on sandy soils with high precipitation or irrigation rates greatly increases the potential for groundwater contamination.

Runoff from turf sites probably presents little hazard to water quality. However, sloppy application of fertilizer onto hard surfaces like driveways and streets will obviously present a problem when that fertilizer (which often is a pesticide carrier) is carried into storm drains with precipitation. The responsible applicator will guard against this altogether, or clean up any mistakes by sweeping up the mis-applied material.

Benefits of other nutrients—Remember to test for and maintain adequate potassium levels for your soil type. Research shows that potassium can be an important enhancer of wear, heat and drought stress on both cool- and warm-season species. Try reducing the amount of N you use by making iron a more important part of your standard fertility program.

—Dr. Koski is an extension turfgrass specialist at Colorado State University's Department of Horticulture.

LM REPORTS: IRRIGATION COMPONENTS

Today's technology means savings on water and money

■ Why the interest in centralized irrigation? The reason is water—or, more precisely, the cost of water—which spouts ever higher as its availability evaporates with more frequent droughts.

Today's irrigation technology gives turf managers near-psychoic ability to forecast plant water requirements and compensate for dry spells. By combining weather stations with moisture sensors and irrigation controllers, the odds against over- or under-watering are minimized.

And you no longer need to have massive acreage to take advantage of the technology.

Stephen Smith, of Aqua Engineering in



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Ft. Collins, Colo., predicts even more site-specific irrigation controls and monitoring systems in the next two to three years. "Your imagination is the only hindrance," says Smith.

The money you can save is considerable. By coordinating evapotranspiration (ET) rates with centralized irrigation controls, Smith says the city of Pueblo, Colo., saved \$125,000 in water costs in one year, far exceeding its investment in central controls, data collection, a weather station and implementation. Smith calls it "a cost-effective way to approach large-scale landscape irrigation."

Dorothy Borland, water conservation analyst for Denver, Colo., parks and recreation, reports millions of gallons of water being saved by the city, thanks to a rain shut-off feature found in the best controllers.

—Terry McIver



The following is a listing of some of the companies marketing irrigation controllers and sprinklers obtained from literature on hand at LANDSCAPE MANAGEMENT offices at press time. Exclusion of any product or company is unintended. For a complete listing of irrigation product manufacturers, consult LM's 1991 September Buyers' Guide.

CONTROLLERS

COMPANY	PRODUCT	FEATURES
Buckner Fresno, Calif. (209) 275-0500	C.O.P.S. Universal	Operate and monitor field controllers from a central computer using a radio interface. Can be used with new or existing field controller system. Any number of systems can operate up to 999 field units; each field unit runs up to 42 stations. Can retro-fit existing systems.
Champion Los Angeles, Calif. (213) 221-2108	Pro Series	Three start times per program; selectable seven day/skip day function; timer settings from one minute to 5 hours, 59 minutes; manual program start or manual station operation; independent dual programs; auto/off rain switch; solid state design; fuse protected circuitry; master valve/remote pump start circuit.
Griswold Controls Irvine, Calif. (714) 559-6000	GD Series	Automatic manual shutdown; rainy weather shutdown; drip irrigation control; master valve output; universal radio interface allows you to turn valves on and off from any location with standard transmitter; dual seven-day programs; 12 start and repeat hours; timing from 30-seconds to 30-minutes
Hardie Irrigation Carson City, Nev. (800) 634-8873	Total Control	Modular design; day clock/calendar for true odd/even day programming; three independent programs that can run concurrently; programmable rain-off to seven days; water budgeting feature. Self-diagnostic electronic circuit breaker with valve 'short' detector.
Hydro-Electronics Deer Park, N.Y. (516) 667-7852	Hydro-Saver Pro-Line	8-, 12- and 16-station dual program microprocessor controllers; 365-day built-in calendars for odd/even water restrictions and other complex watering schedules; dual programming; drip irrigation feature; up to three start times per day; flexible-zone timing; water budgeting feature.
Motorola Schaumburg, Ill. (708) 397-1000	MIR 5000	Independent programming of each station or sprinkler group; field satellites can perform up to eight independent irrigation functions simultaneously; central control operates several different types of sprinkler heads independently; field interface unit hooks up to most IBM PC-compatible computers.
Rain Bird Glendora, Calif. (818) 963-9311	Maxi System IV	"Cycle and Soak" feature saves water by automatically preventing the unwanted evaporation, flooding/pooling and run-off that occur when water is applied faster than it can be absorbed by the soil. ET-sensitive scheduling; communicates directly with optional on-site weather station
Toro Irrigation Riverside, Calif. (714) 688-9221	O.S.M.A.C. System	Designed in cooperation with Motorola; can run as a low-cost upgrade to existing system or as a complete control system for new golf installations. Expandable from eight to 48 stations; central or remote control; multi-valve syringe; alarm paging capability from key sensors monitoring flow, power, pumps.
Weather-Matic Garland, Texas	Lawn Mate	Nine volt standard alkaline battery automatically starts in event of power failures. Programs and clock time are uninterrupted for a week with the back-up system. Easy installation, thanks to removable lower panel, which allows access to field wiring terminal block. Two models are designed for seven and 12 stations.

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Steps to save resources

Catalano: Establish irrigation system goals and make a thorough site evaluation.

resources credits 80 percent of its water savings to a properly operating irrigation system.

Catalano says a centralized irrigation system will typically pay for itself in six to 24 months.

"A number of quality computer-based central control irrigation management systems are available," says Catalano, "but the system will only be as good as the set-up. Proper set-up includes a thorough understanding of the site manager's goals and concerns, the abilities of the system being used, and a good field evaluation."

Catalano lists 10 steps to follow when planning and installing an irrigation controller:

1. Determine system goals. Collect

the information needed to determine how much water needs to be dispersed per valve.

the information needed to determine how much water needs to be dispersed per valve.

2. Evaluate the site. Variables include precipitation rates, adjustment factors, drainage patterns, uniformity of application, soil structure and sun exposure.

3. Conduct a hydraulic analysis. After you've determined how much you can run through each valve, determine how many valves can operate at one time. Respond to high- or low-flow conditions caused by mechanical system failures, such as broken risers or stuck valves. "The work is in determining placement of the master valve, what flows are expected, and what the shut-off threshold will be," says Catalano. Sequence events in such a way that you optimize the energy used by the pump station and reduce water waste or damage from pressure surges.

4. Input data to fit the system/quality control. Take the information learned in the first three steps, and look for variables. "These are the triggers we pull to make the system respond the way we want it to," says Catalano. "As these sys-

tems all tend to rely heavily on the data entered, the quality control of the data entered is very important."

5. Sequencing of events (or scheduling). Once you've determined the hydraulic sequence, you then program valves for start and stop times.

6. Simulate operations. Literally a "dry run." Using data, project how the new system is likely to perform.

7. Fine tune, making corrections as needed.

8. Operation. A step-by-step review of the results.

9. Training. a.) to eliminate computer-phobia, which is easily done, thanks to user-friendly technology or after-hours courses; b.) to learn the system, the menus, the software; to know what the system can do. This type of training is usually provided by the manufacturer or distributor. The more you learn, the better you can design the system to respond to certain weather conditions.

10. Monitor and adjust. This is a constant. "Probably the biggest mistake you can make in using central control is thinking the irrigation is now 'taken care of' and you don't have to touch it again," warns Catalano. Adjustments have to be made as needed.

SPRINKLERS

COMPANY	PRODUCT	FEATURES
American Granby Liverpool, N.Y. fax: (800) 729-3299	Harvard Turf-Flo	Ratchet design allows positive 360-degree positioning of riser/nozzle direction after installation without turning the entire pop-up body. Serviceable wiper seal; replaceable basket filler; stainless steel spring for positive retraction.
Hit Products Lindsay, Calif. (209) 562-5975	Various products	Proline pop-up sprinklers with nozzle adapters; Pro-Plug provides flushing of pop-up before nozzle installation; Santoprene wiper seal provides consistent self-flushing performance and minimum flow by.
Hunter Industries San Marcos, Calif. (619) 744-5240	PGP/I-40 sprinkler	PGP: a gear-driven sprinkler for turf and landscape applications. Available as a shrub model, 4-inch pop-up or 12-inch pop-up; 12 interchangeable nozzles; two-year exchange warranty The I-40 is a moderate-to high-capacity sprinkler for parks or other large turf areas. Five interchangeable nozzles; vandal-resistant; five-year exchange warranty.
Rain Bird Glendora, Calif. (818) 963-9311	R-50 series rotors	Now with adjustable bypass, making it simple to adjust water flow into the rotor. Permits fine tuning and allows the rotor to be adjusted for high performance in low pressure applications; full and part circle capability in each unit.
Safe-T-Lawn Miami, Fla. (305) 261-1589	Various products	Spray pop-ups, nozzles, and rotors. Ball Drive Rotor model is a low precipitation rate sprinkler; eliminates backsplash, allowing positioning close to buildings, driveways or streets. Rotates by the controlled drive of a stainless steel ball.
Toro Irrigation Riverside, Calif. (714) 688-9221	Super 700 Series	Shrub, commercial, lawn and hi-pop models, with eight interchangeable nozzles from 1.0 to 9.0 gpm; standard or custom imprinted debris covers.