UNIVERSITY OF CALIFORNIA, RIVERSIDE TURFGRASS RESEARCH PROGRAM

Better Turf Thru Agronomics

UCRTRAC Newsletter, June 2001

Inaugural UCRTRAC Golf Tournament: Putting, Driving, and Scoring for Research

UCRTRAC's inaugural golf tournament to support turf research, held on May 3, 2001 at the PGA of Southern California Golf Club at Oak Valley in Calimesa, accomplished its objectives: to make the public more aware of UCRTRAC and to raise additional revenue for turf research at UCR. More than 140 golfers participated.

"The golf tournament is an example of the teamwork that it takes to make a public/private partnership thrive. We planned the event for more than a year, but it was **Bert Spivey**, the Tournament Chairman and Superintendent at Industry Hills Golf Courses, who provided the leadership, energy, and enthusiasm that ensured success," said **Chuck Wilson**, UCRTRAC delegate and Tournament Committee member, representing the Southern California Turfgrass Foundation (SCTF).

"From the outset, Bert was the driving force behind the tournament. His vision and leadership enabled the committee to create a first-class event," Wilson said.

Members of the Tournament Committee were UCRTRAC delegates **Carl Clifton**, President, Lawnscape Systems and representative of the Southern California Turfgrass Council (SCTC); **Paul Mayes**, Director of Golf Course Maintenance, PGA Club, Calimesa; **John Martinez**, Superintendent, Southern California Golf Association (SCGA) Members' Club, Murrieta; **Dennis Frey**, SCTF; **Robert Green**, UCR Turfgrass Research Agronomist; **Chuck Wilson**, President, Site Development Services and SCTF representative; and **Bert Spivey**.

"The whole planning process brought all of the UCRTRAC member organizations closer together. Now, we have laid the groundwork for next year's tournament. We're one step ahead," Spivey said. In May 2002, the second UCRTRAC Research Golf Tournament will be held at the SCGA Members' Club.

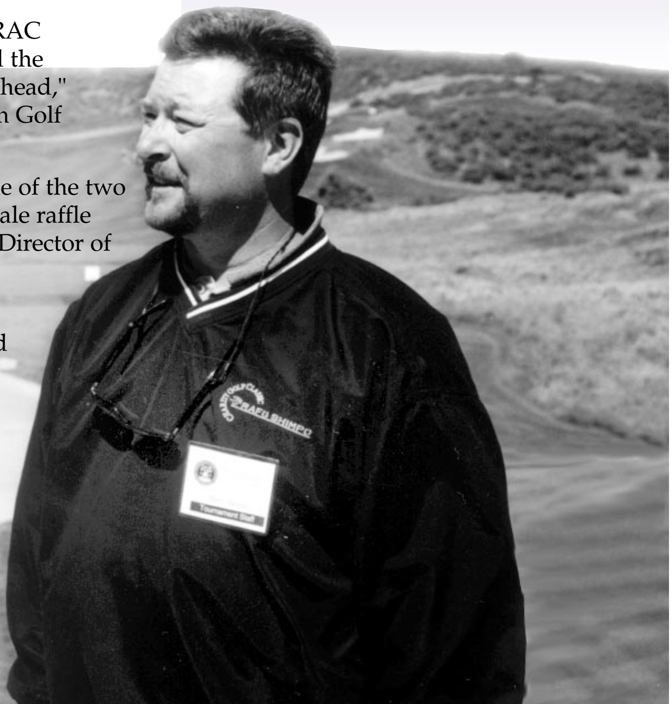
At this year's event, players in teams of 4 navigated one of the two 18-hole courses at the PGA Club and were treated to upscale raffle prizes, arranged by UCRTRAC delegates **Kevin Heaney**, Director of Course Rating, SCGA, and **Pat Gross**, USGA Agronomist.

UCRTRAC delegate **Paul Mayes**, PGA Club Superintendent **Doug Westbrook**, and their staff provided excellent playing conditions, Spivey said.

"**Robert Green** and **Pat Gross**, working with golf course architects Brian Curley and Lee Schmidt, recommended the grasses selected for the PGA Golf Club," said **Tom Gustafson**, Executive Director, Southern California Section, PGA, and UCRTRAC delegate.

The 500-acre PGA Golf Club at Oak Valley opened in July 2000. About 280 acres are dedicated to native vegetation and wildlife refuge, Mayes said.

Please see ***GOLF TOURNAMENT****, page 2*



Bert Spivey, Tournament Chairman, at the PGA of Southern California Golf Club at Oak Valley in Calimesa on May 3, 2001.

PGA Club Tournament Director **Bryan Addis** and his staff at Oak Valley set up on-site registration, hors d'oeuvres, and lunch and provided every amenity to participants in the UCRTRAC Tournament.

The golf tournament was managed by **Steve Porus** and **Phil Lange**, who both oversaw sponsorships and publicity. (Please see the list of tournament sponsors in the right-hand column.)

Neal Beeson, President, Sports Turf & Facilities Management and Treasurer of the SCTF, and **Mike Sommer**, Turf Solutions, volunteered during the tournament.

Golf tournament proceeds will support UCRTRAC research and educational extension activities that address specific, industry needs.

Ongoing UCRTRAC research located in the putting green nursery at the PGA Club is evaluating the effect of endoROOTS (endomycorrhizae) and ROOTS 2 on creeping bentgrass establishment and maintenance on a newly constructed sand rootzone, said **Robert Green**. The three-year study began in Fall 2000.

Established in 1996, UCRTRAC provides a formal industry-wide linkage between UCR and the turfgrass industries in Southern California. Member organizations contribute to UCRTRAC research and education initiatives. Since 1996, every dollar donated to UCRTRAC has helped to generate 3.1 dollars in turf research grants.

UCRTRAC member organizations and their delegates include the Southern California Golf Association *(Kevin Heaney, John Martinez)*, the Southern California Section, Professional Golfers Association *(Paul Mayes, Tom Gustafson, Frank Talarico)*, the California Golf Course Superintendents Association (GCSA, *Pat Gradoville*), the Hi-Lo Desert GCSA *(Mike Kocour)*, San Diego GCSA *(John Martinez)*, GCSA of Southern California *(Bert Spivey, Pat Gradoville)*, California Sod Producers Association *(Jurgen Gramckow)*, Southern California Turfgrass Council *(Carl Clifton, Mark Hodnick)*, Southern California Turfgrass Foundation *(Chuck Wilson, Neal Beeson)*, University of California *(Robert Green, Vic Gibeault, Steve Cockerham)*, and the United States Golf Association *(Pat Gross, Mike Huck)*.

Tournament Committee members Bert Spivey, Chuck Wilson, and Carl Clifton (l-r) at the PGA Club on May 3, 2001.

Thanks to Tournament Sponsors

PLATINUM: Eagle One Golf Products, West Coast Turf

GOLD: EZ Partyrentals, Ewing Irrigation, J.R. Simplot

SILVER: Southland Sod Farms, Synagro

BRONZE: AM-Sod, Cylex, Inc., High Tech Irrigation/Rain Bird, Oglebay Norton Industrial Sands, Superior Sod, Turf Merchants

BREAKFAST: Lawnscape Systems

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Energy Conservation Strategies for Turfgrass Maintenance in California

As energy costs increase and supplies of electricity and petroleum products dwindle in California, turfgrass managers are forced to implement practical conservation strategies to maintain quality turf. Three energy intensive components of turf culture -- mowing, irrigating, and fertilizing -- are demanding managerial action under current economic conditions.

Mowing, irrigating, and fertilizing account for about 75% of all energy intensive maintenance practices, wrote Philip Busey and John Parker, two Florida turf scientists, in their review chapter, **Energy Conservation and Turf Maintenance**, published in 1992 by the American Society of Agronomy.

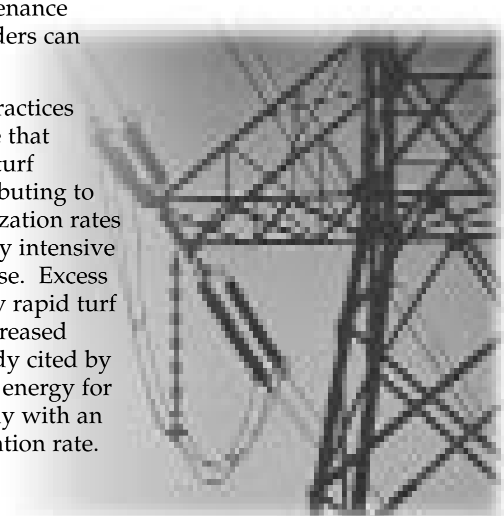
Conservation strategies that are effective energy savers in commercial turf installations, such as a sod farm or golf course, may not be feasible or prudent in another turfgrass installation, such as a residential lawn. Turf managers must deal with qualitative issues in assessing energy consumption: Is the turf green enough for its aesthetic and functional uses? Does it play well enough? Is the turf sufficiently protecting the highway embankment from erosion?

Although the residential sector has a different set of action thresholds from the commercial sector, collectively, the residential sector statewide is a significant energy consumer when maintaining turf. Homeowners and caretakers at multiple housing complexes need to monitor cultural practices and to be energy-wise.

Mowing. Mowing is fundamental to healthy, weed-free, dense turf but a significant energy consumer. Parker and Busey cited a study that said dull mower blades increased energy consumption by 22%. Maintaining proper engine tuning and control settings can improve fuel efficiency. Reel type mowers use less energy than rotary mowers because their shearing action is 3 times more efficient than inertia cutting and because reel mowers do not propel leaf blades as much as rotary mowers. Mowing dry grass uses considerably less energy than mowing wet grass. If feasible, the frequency of mowing should be reduced by reducing turf growth rates, which can be accomplished by reducing fertilization and irrigation rates or by using growth regulators.

Mowing edges and borders is more energy intensive per unit area than mowing large areas. To reduce energy consumption, edges should be less sharply angled, if possible. Modifications in edge design can yield significant reductions in maintenance energy costs. Mulching in borders can reduce energy consumption.

Fertilizing. Fertilization practices need to be monitored to ensure that they are sufficient to maintain turf health and vigor but not contributing to luxuriant growth. When fertilization rates increase, almost all other energy intensive maintenance inputs also increase. Excess fertilizer leads to an excessively rapid turf growth rate, which leads to increased mowing frequency. In one study cited by Busey and Parker, the mowing energy for bermudagrass increased linearly with an increasing nitrogen (N) fertilization rate.



Please see **ENERGY CONSERVATION**, *page 4*

Practical Advice to the Golf Industry

Pat Gross, UCRTRAC delegate and USGA Agronomist, recently published an article advising colleagues about action to take in response to the energy crisis.

Back Up and Protect Data. "Rolling blackouts and energy surges may affect your computerized irrigation programs and other information stored in your computer," Gross warned. He recommended backing up computer programs, installing surge protectors for the irrigation pump station and wells, and considering phase monitors and restart timers for the pump station.

Get Power Audit. Gross recommended power audits to make sure you are getting the best possible rate structure. Commercial customers have an assigned utility account representative who, upon request, can do an on-site analysis. "There are dozens of different rate structures, and in some cases, special programs," Gross wrote, but the utility is not required to inform customers about cost saving opportunities. You need to ask.

Upgrade. "If you have been thinking about replacing your pump station with energy efficient motors or upgrading your wells and pump capacity, do it now. These upgrades will likely allow you to irrigate the course in a shorter period of time while taking advantage of super off-peak energy rates. Given the anticipated rate increase, the payback on these improvements will be much faster. Also, rebates may be available for much of this work," Gross wrote.

"The best advice for now is to be informed, be prepared, and do what you can to conserve while improving efficiency," Gross concluded.

ENERGY CONSERVATION, *continued from page 3*

Slow-release fertilizers facilitate energy conservation because energy consumption associated with equipment and labor is reduced, as is leaching. Grasscycling and mulching mowers become more attractive for certain turf installations when energy is expensive and scarce, because returned clippings provide many required nutrients. If N applications are reduced, it is essential to include adequate concentrations of poorly mobile micronutrients, such as Fe, because Fe enhances turf color.

Estimates of the primary energy costs for N vary from 5 to 10 times the primary energy cost of phosphorus (P) and potassium (K). "Therefore, a lower marginal increase in turf value per unit of P or K would easily justify the addition of P and K rather than extra N....More research is needed on the possible substitutability of less energy intensive nutrients," Busey and Parker wrote.

The energy value of N in fertilizers is generally 10 to 20 watt-hours/gram (W h/g), they said. Compared to pesticides, the energy intensity of fertilizers is relatively inexpensive. (See below.)

Irrigating. Irrigation water, particularly if supplied by municipal treatment processes, is energy intensive. In a California study cited by Busey and Parker, irrigation accounted for 69% of the energy intensity of a cool-season residential turf.

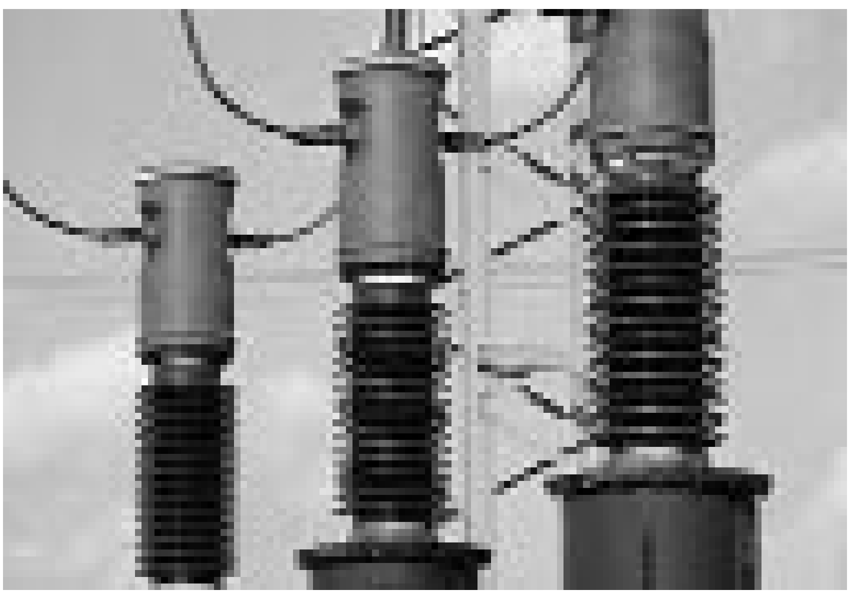
Increasing the distribution uniformity (efficiency) of the irrigation system and reducing the volume of irrigation water used can reduce energy consumption. If sprinkler heads need fixing, now is the time to do it.

Excessive irrigation can contribute to shallow rooting and can influence turf to become "luxury" energy users. Busey and Parker cited one study in which bermudagrass evapotranspiration (ET) rates were 71% higher at high rates of irrigation compared with low rates. Less frequent but deeper irrigation can encourage deeper root growth and can increase "drought-conditioning," reducing net irrigation requirements.

Irrigation that exceeds ET needs wastes energy due to percolation, runoff, and fertilizer leaching.

In the residential sector, an energy conservation practice to consider is to wait to irrigate until the turfgrass shows early signs of wilting.

Applying Pesticides. The manufacture of pesticides requires the highest energy per weight among all agricultural inputs. About 30 to 80 W h/g is sequestered in producing the active ingredients of most pesticides, Busey and Parker wrote, although consumption has been reported as high as 120 W h/g. The high biological activity of pesticides tends to offset their energy intensity.



Evaluation of Overseed Pretreatments

Herbicide and plant growth regulator treatments to improve the speed, density, and uniformity of ryegrass seed establishment when overseeded into bermudagrass fairways and roughs in the desert offer no significant benefit, says a UC environmental horticulture advisor whose research was published recently in ***California Turfgrass Culture*** (2000), Vol. 50(1-4).

A summary was published previously in ***Better Turf Thru Agronomics***, June 1997, but without the tables and figures reported now in ***Turf Culture***.

Mike Henry, UC Environmental Horticulture Advisor for Riverside and Orange Counties, found no significant differences in turf quality, color, and percent cover among the check plots and the plots treated with Scythe (an herbicide) or Primo (a plant growth regulator) during the germination and early establishment of perennial rye in the overseed process.

Plots were rated for color and quality on a scale of 1 to 9, with 1 representing dead turf (100% brown) and 9 representing a 100% perfect stand of uniform green grass. The untreated check and the experimental treatments (Scythe, Primo applied one time and Primo applied two times (before overseeding and 3 weeks after ryegrass germination) did not differ significantly and did not receive quality scores above 5.25. Color ratings for the check and experimental plots did not exceed 6.4 and were not significantly different.

Turf in the study plots did not undergo typical "dry-down" for the month prior to renovation, Henry said.

Herbicide Selectivity and Tolerance in California Turfgrasses

Every 18 to 24 months, the University of California Integrated Pest Management Program (UC IPM) publishes an updated edition of its **UC IPM Guidelines for Turfgrass**, providing data about the sensitivity of 11 cool- and warm-season turf species to more than 25 pre- and postemergence herbicides. Also featured are the susceptibilities of more than 40 annual and perennial weeds to many of the same herbicides.

The **UC IPM Guidelines for Turfgrass** is available at UC Cooperative Extension county offices, or it can be accessed online free of charge at the UC IPM website, **http://www.ipm.ucdavis.edu**.

"**Selectivity** is the process that allows herbicides to be toxic to weedy species and not kill desirable species such as turf. It is a wonderful concept that can result in improved turf quality. Turf managers need to understand the factors that influence selectivity because it is not an absolute process," said **Dave Cudney**, UC Riverside Cooperative Extension Weed Specialist and contributor to the **UC IPM Guidelines for Turfgrass**.

Selectivity is achieved via many modes of action -- because turf does not transport or absorb the herbicide but weeds do, because turf metabolizes and detoxifies the herbicide but weeds do not, or because key metabolic processes are blocked in weeds but not in turf, he said.

Selectivity can vary with a herbicide's application rate, formulation, and placement as well as the turf's growth stage, stress, and type. Correct herbicide use and excellent turf culture are essential for maximizing selectivity, Cudney said.

Rate of Application

For both pre- and postemergence herbicides, if the application rate is too low, weeds may survive, but if it is too high, selectivity will decrease, resulting in stunted turf or the loss of both weeds and turf, Cudney said.

Stressed Turf

Avoid pre- and postemergence herbicide applications to stressed turf. Poor growing conditions, disease, insects, nematodes, and moisture or nutrient deficiencies can interact with herbicides to reduce selectivity and injure turf.

Preemergence Herbicides

Preemergence herbicides kill weeds early in their growth cycles, usually before emergence. Selectivity in turf is often gained because the turf species is well established and not in a vulnerable stage in its growth cycle; however, selectivity of preemergence herbicides can be altered, depending on the application rate and turf stress, as noted above, and the formulation, placement, soil texture, and stage of growth, Cudney said.

Formulation

Some formulations of certain preemergence herbicides are not appropriate in turf. For example, the wettable powder formulation of oxadiazon (Ronstar) can injure turf, but the granular formulation does not.

Soil Placement

If the herbicide is applied too deeply, shallow germinating weeds will be missed, and the herbicide will be concentrated in the rooting area of the turf, which can weaken the turf stand.

Soil Texture

Preemergence herbicides are more active in sandy, light-textured soils that are low in organic matter. Sandy, light-textured soils can have the same effect as high application rates. To avoid turf injury, reduced application rates are generally recommended on these soils. Consult the herbicide label before application, Cudney said.

Stage of Growth

To avoid turf injury from most of the preemergence herbicides, turf should be well established before application. One exception is siduron (Tupersan), which can be applied to newly established cool-season turf. With few exceptions, control of weeds by preemergence herbicides will be poor if the weeds have already emerged. Among the exceptions are dithiopyr (Dimension), which is efficacious on small, emerged crabgrass, and pronamide (Kerb), which is efficacious on emerged annual bluegrass in bermudagrass turf.

Postemergence Herbicides

Postemergence herbicides kill weeds after they emerge. They are most effective on small, annual weed seedlings and on perennial weeds when they first emerge from seeds, long before they have a perennial growth habit. Selectivity may be based on differences in absorption, transport, and metabolism. Application rate and turf stress alter selectivity, as noted above, as does formulation, spray coverage, and growth stage.

Formulation

Postemergence herbicides may be formulated without or with adjuvants to increase their activity. Because adjuvants can increase the effective application rate, they can lead to a decrease in selectivity at high application rates. The chemical formulation can alter activity. The ester formulation of triclopyr (Turflon) is more active in turf than the amine formulation.

Please see **HERBICIDE SELECTIVITY**, *page 6*

HERBICIDE SELECTIVITY, *continued from page 5*

Stage of Growth

To avoid turf injury from most postemergence herbicides, turf should be well established before application. Annual or perennial weeds germinating from seed should be small and rapidly growing (not under stress). Established perennial weeds are difficult to control with "contact" herbicides, such as bromoxynil (Buctril), Cudney said. Translocated herbicides, such as triclopyr (Turflon) and dicamba (Banvel 4-S) are most effective on established perennial weeds when actively growing and transporting photosynthate to growing points and storage structures.

Spray Coverage

For "contact" herbicides, thorough spray coverage is necessary. Translocated herbicides, such as 2,4-D and clopyralid (Stinger, Lontrel), also require good coverage, but thorough coverage of each leaf is not necessary. When turf growth and weed growth are dense, some weeds may escape spray contact, necessitating retreatment; on the other hand, dense weed growth may screen turf foliage from herbicide treatment, serving as an enhancement to selectivity.

*(**Editor's note.** The status of herbicide resistance in California turf was featured in the January 2001 issue of **Better Turf Thru Agronomics**. To date, weeds commonly found in turf have not shown resistance to herbicides in California, but the turf industries must take proactive measures to prevent resistance before it happens here. Worldwide, herbicide resistance in plants is increasing at exponential rates. UC Riverside weed scientist **Jodie Holt** recommended that turf managers control the selection pressure being put on weeds in California to reduce the chance for resistance to evolve. She recommended mixing control techniques and learning enough about herbicide chemistry to rotate herbicides with different target sites and modes of action, which would reduce pressure for resistance.)*

Next Issue: New UC Turfgrass Research Site in the Coachella Valley To Be Featured

Under the direction of **Steve Cockerham**, Superintendent, UCR Agricultural Operations, the UC Riverside Turfgrass Research Program has established a new research site in the Coachella Valley. This new research site will be featured in the Fall 2001 issue of ***Better Turf Thru Agronomics***. Research at the site will include studies on general lawn care, athletic field use, and turf for golf in the desert communities.

Already underway are studies on 10 new grasses for fairways and general use turf in the desert and two studies on golf course putting greens. Planned are an irrigation study and research on bermudagrass.

Turfgrass and Landscape Management Field Day Sept. 18, 2001

A half-day of on-site research updates in the field for turf and landscape professionals is planned on Sept. 18, 2001, sponsored by UC Cooperative Extension, UCR's Botany and Plant Sciences Department, and UCR Agricultural Operations.

Eight Stops

The field day consists of 8 stops at the UCR Agricultural Experiment Station, with registration beginning at 7:30 a.m. and the program beginning at 8:30 a.m. Scientists will explain their research on-site and will answer participants' questions.

- **Diagnosing Landscape Problems**
- **Greenwaste Compost Use in Turf**
- **Nitrogen Fertilizer Management in Landscapes**
- **Dry-down Responses of Turfgrasses**
- **Glassy-Winged Sharpshooter Update**
- **Putting Green Traffic Tolerance**
- **Landscape Irrigation Management**
- **Researching Turfgrass Responses to Environmental Conditions**

The $25 fee covers registration costs, a continental breakfast, and proceedings. To register, call Susana Aparicio in the Cooperative Extension Office at (909) 787-4430, fax at (909) 787-5717, or use e-mail: susana@citrus.ucr.edu. Application has been made for PCA, ISA, and CCNPro continuing education credits. Enrollment closes on Sept. 13.

Better Turf Thru Agronomics is prepared for the delegates and membership of the University of California, Riverside Turfgrass Research Advisory Committee (UCRTRAC). Member organizations are the Southern California Golf Association; California Golf Course Superintendents Association (GCSA); GCSA of Southern California; San Diego GCSA; Hi-Lo Desert GCSA; California Sod Producers Association; Southern California Section, Professional Golfers Association; Southern California Turfgrass Council; Southern California Turfgrass Foundation; United States Golf Association; and UCR. The intent is to present summaries of turfgrass research results and topical information of interest to the Southern California turfgrass industries. The newsletter is written by Deborah Silva and edited by Dr. Vic Gibeault, Extension Environmental Horticulturist, and Dr. Robert Green,UCR Turfgrass Research Agronomist, and designed by Jack Van Hise, UCR Printing and Reprographics.