



The Water Drop

A Pollution Prevention/Water Quality Newsletter by the University of Georgia Biological and Agricultural Engineering Department

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WATER CONSERVATION IS A JOB FOR EVERYONE!

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“Your local County Extension Agent is a source of more information on this subject.”

With the increased rainfall this fall the thought of water conservation may not be on the minds of Georgians. However, with the replenished reservoirs, ponds, and streams, now may be the best time to start thinking about water conservation.

The Pollution Prevention Assistance Division (P2AD) of the Georgia DNR had an extensive phone survey conducted to determine the public’s perspective on water issues. Additionally, the survey asked what type of message they would respond to in a water conservation campaign. Water quality and quantity were the items that were the most important “top-of-mind” issues facing Georgia residents. Generally, respondents said that conservation is important more from a personal concern than an environmental concern. Citizens whom disagreed stated that they do not feel that residential users use much water or they do not know ways to conserve. The results of the survey can be viewed at <http://www.p2ad.org/watermessaging.html>. Other water conservation or water efficiency links can also be found on

Fun Fact
Without Conservation, the toilets in a single family home use 20.1 gallons per person per day or 27.7% of daily water use.

the P2AD website (<http://www.p2ad.org>).

Agriculture is also being ask to conserve water. Some of the methods are through the use of conservation tillage practices, irrigation system retrofits, conservation plans and other means. With the signing of HB 579, the farming community is now required to have metering devices installed on their permitted irrigation systems. The Georgia Soil and Water Conservation Commission is the lead agency on the purchasing, installation and mainteiance of these meters.

In preparation of the initial round of meter installations, a series of Agricultural Water Conservation Workshops have been set-up across South Georgia. The purpose of these workshops is to help explain the reasons for the meters and answer some questions related to the Water Metering Program. For more information, see the flyer later in this newsletter.

Water conservation is something that affects us all and we all need to participate.💧

The University of Georgia Cooperative Extension Service, College of Agriculture and Environmental Sciences and the Pollution Prevention Assistance Division (P2AD) of the Department of Natural Resources. The University of Georgia and Ft. Valley State University, the U.S. Department of Agriculture and counties of the state cooperating. The Cooperative Extension Service offers educational programs, assistance and other materials to all people without regard to race, color, national origin, age, sex or disability. An EQUAL OPPORTUNITY/affirmative action organization committed to a diverse workforce. Title photo by Tim McCabe, USDA Natural Resources Conservation Service.

Agents Attend Southern Region Water Quality Conference

by: Dr. Mark Risse

Biological and Agricultural Engineering and State Water Quality Coordinator

Learning from other's experiences is critical to advancing water resource efforts in Georgia and that was the primary goal of the biannual Southern Region Extension Water Quality Conference held in Ruidoso, New Mexico, October 19-22. This year, more than 240 people, including 22 from Georgia attended the conference and learned about successful research and extension projects from around the Southern region.

This workshop is hosted by the Land Grant University Water Quality Coordinators in each of the Southern Region States and is funded by the USDA 406 Water Quality program (see <http://srwqis.tamu.edu>). Each coordinator identifies several successful projects from their State that they feel should be shared with others and the resulting conference is a smorgasbord of ideas for successful water quality programs that county agents and others can implement back home. This year's location, in the deserts of New Mexico, really highlighted water quantity issues. As our van crossed the Rio Grande River which had an enormous river channel but only a trickle of flow, I was struck by the thought that clean and abundant water supplies are something that we can truly impact.

While the program and activities at this workshop are designed to encourage interaction between Extension professionals from different States, many Georgia attendees learned about programs going on in their own backyard. Georgia attendees presented the following:

Workshops:

Gary Hawkins: Volunteer Water Quality Monitoring and Equipment; **Mark Risse:** The Livestock and Poultry Environmental Stewardship Curriculum

Presentations:

Keith Fielder: Water Quality and Fecal Coliform monitoring on Big Cedar Creek; **Paul Vendrell:** Water quality of private wells in Georgia; **Mickey**

Cummings: Monitoring the Brasstown Creek for E-coli and Fecal Bacteria; **Charles Rice:** Improving Water Quality at the Cathechee Golf Course and Reforestation of shoals in the Lake Hartwell Area; **Peter Hartel:** Source Tracking of Fecal Coliform Bacteria; **Victoria Richbourg:** Water Curriculum for 4-H clubs in Georgia; **Rad Yager:** Why does Georgia need an Irrigation Research Center; **Wayne McLaurin:** Statewide network of Home Composting Demonstration Sites; **Forest Stegelin:** Economics and water use decisions in the green industry; **Tommy Bass:** Livestock Environmental Management Systems, **Bobby Smith:** Feeding programs lower P levels in animal waste; **Tina Pagan:** Forest*A*Syst interactive CD; **Julia Gaskin:** Georgia Agricultural Pollution Prevention Program; and **Rosemary Seymour:** Georgia's Green Industry Pollution Prevention Partnership

Several other Georgia participants presented posters on other successful research and demonstration programs. In addition to this workshop, the USDA sponsors an annual National meeting that was held in Tampa, Florida this January (see <http://conference.ifas.ufl.edu/wq/>). I would encourage everyone involved in outreach and education activities associated with water quality issues to try and attend one of these meetings at some point. I polled the Georgia participants as we departed the airport past midnight after three days of meetings, tours, and extra-curricular networking. They all seemed tired and ready to be home, yet, they also seemed motivated and ready to implement many of the new ideas and approaches they had learned throughout the week. This is what it's all about!

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OPTIONS AVAILABLE FOR PRECISION IRRIGATION WATER APPLICATION

*by Calvin Perry, Biological & Agricultural Engineering
University of Georgia – Tifton*

Irrigation has been practiced since the Sumerians diverted the Euphrates River water to their crops in an area of what is now southern Iraq. Irrigated cropland transformed civilizations and shaped the future of Earth as we know it today. Today, some 40% of the world's food comes from the 17% of irrigated cropland. China, the US, and Pakistan account for over half of the world's irrigated land. Between 1970 and 1982, worldwide irrigation expansion moved along at 2% a year, since that time, expansion has slowed to 1.3% a year: expansion is now into harder to reach areas. Future projections show a slowing to 0.6% expansion per year.

In Georgia, in 1970 there were 144,000 acres of irrigated agriculture. In 1998, the number had increased to 1,463,000 acres - a 10 fold increase. The number of center pivot systems increased from 87 in 1970 to over 8000 in 1998 while the number of manually-moved portable pipe systems decreased from over 6000 to just 442 over the same period. Today, over 9500 center pivot systems irrigate some 1.1 million acres. Agricultural irrigation has moved from mostly manual to mostly automatic.

There is a need for precision water application for a number of reasons. Irrigation systems currently in use apply a rate across an area and are not capable of varying the application amount across a field.

Worldwide, 1 out of 5 irrigated hectares is damaged by salt problems. More and more rivers are running dry due to heavier and heavier municipal and industrial demands. Damage to aquatic ecosystems is putting pressure on water use. Changing demographics (rural to urban) are putting additional pressure on irrigation use - groups are questioning sources of and application of irrigation water. In Georgia, there is a need for precision water application based on several factors including cyclical drought periods (some for extended periods), depleting aquifers, salt water intrusion near the coast, and the "water wars" between GA/FL/AL. Another important reason for considering precision water application is the rapidly changing population

demographics - more people are moving into the urban areas of Georgia, thus shifting the political balance in favor of the affluent north at the expense of the rural south.

There are several means of accomplishing precision water application:

- Better controls of existing irrigation systems through end gun controls and appropriate irrigation scheduling,
- Both Surface and Subsurface Drip

- irrigation, and
- Precision Irrigation

A research study of 175 randomly selected pivots in South Georgia found that 38% of the pivots made incomplete circles, 97% had end-gun shut-off controls (the study did not determine how well the shut-offs worked), and 3% had "off target" spray problems (areas where water was applied other than

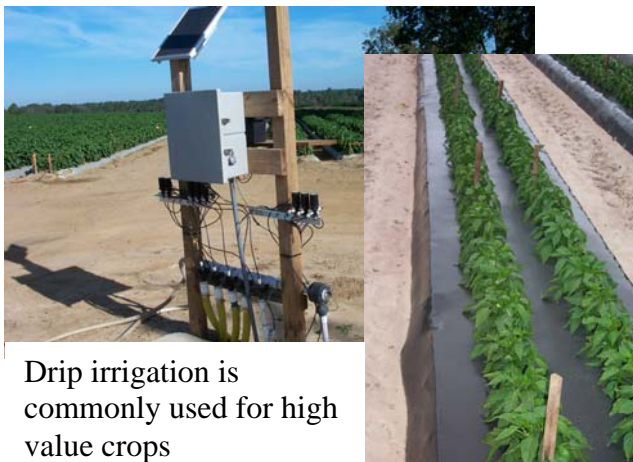


Variable Rate Irrigation (VRI) is one means to conserve water by applying to prescribed areas (Photo by Calvin Perry, 2004)

the cropped area). Many of these systems could benefit from better, fail-safe shut-off and reverse controls as well as improved end-gun controls. Such systems also could benefit from the ability to apply varying amounts of irrigation water to specific areas in a field.

Another way to make precision water applications is through the use of irrigation scheduling - making sure water is applied when needed at the rate needed. Some scheduling methods include water balance method, tensiometers, electrical resistance meters, computer models, evaporation pan systems, and full-blown weather stations.

Drip irrigation (or microirrigation) is commonly used with high-value vegetable crops and orchard crops. Recent research suggests that drip irrigation can be used successfully with row crops. Some of the advantages of drip irrigation include more efficient application, more uniform application (if designed correctly), decreased energy costs, easy automation, fewer moving parts, field operations can occur during irrigation, and potentially less disease. Disadvantages include high initial investment cost, plugging, high maintenance requirements, concerns about waste products (driplines), fewer “turn-key” systems available, fewer visual indicators, and that tillage/traffic options may be affected.



Drip irrigation is commonly used for high value crops

Precision irrigation, also called Variable Rate Irrigation (VRI) or “site-specific irrigation” is a relatively new approach to precision water application. This type of irrigation is well suited to southeastern agriculture for a number of reasons. Most fields in the southeast have areas with varying soil textures (light vs. heavy), topography, water holding capacities, infiltration rates, and drainage rates. VRI allows optimum amounts of water to be applied to each area of the field rather than applying a uniform rate to the entire field.

Currently, center pivot irrigation systems can vary the water applied by changing the travel speed through an area (affecting a pie-shaped area of the field), starting/stopping an end gun, re-watering areas, or changing nozzle packages. A new VRI system at the UGA-Tifton Campus uses programmable controllers to cycle sprinklers on/off and control pivot travel speed. This allows the operator to define control areas with different application rates. Pressure control valves on each drop pipe maintain proper pressure to each nozzle. A GPS unit on the end tower determines the position of the pivot.

Results from VRI system performance testing indicate good correlation between target and actual application rates and also show that sprinkler cycling on/off does not alter the Center Pivot (CP) uniformity. By applying irrigation water in this precise manner, water application to the field is optimized. In many cases, substantial water savings can be realized.

For more information on VRI visit the following web sites: <http://www.nespal.org/PrecAg> or <http://www.nespal.org/irreff>.

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ANREP IS OFF AND RUNNING!

by Charles Rice, Hart County Extension Service

Congratulations and Thank You Georgia ANREP members!!! You are truly #1. Georgia ANREP has more members than any other state and we are not slowing down. I want to thank all of the members who have joined and are charter members of Extension's newest professional organization. Also, I need to thank Bill Hubbard and Ben Jackson for bringing ANREP to Georgia and being so diligent to make sure it succeeded.

For those who are unsure of what ANREP is let me enlighten you. ANREP is short for Association of Natural Resource Extension Professionals. Whose mission is to advance the professional status of Natural Resource Extension personnel in the United States. For Extension Professionals that's everyone because we all work with our natural resources everyday. For myself ANREP gives me an opportunity to learn from others and to showcase some of my accomplishments. There are two wonderful opportunities for Georgia members to enjoy some fellowship and to learn from one another. The ANREP State meeting is being planned for sometimes in September 2004 at Skidaway Island. We are grateful for our Marine Science members for hosting this event. Also, everyone should remember and be prepared for the National ANREP meeting to be held May 16-19, 2004 in Oglebay, West Virginia. Put that date on your calendar. Information can be found at <http://www.conted.vt.edu/extprof/>.



ANREP is a member of JCEP (Joint Council of Extension Professionals) where we meet with CAES administration, state and federal administrators to voice your concerns about matters impacting extension. Georgia ANREP is a tremendous opportunity to learn, teach, and experience the abundant natural resources that our state has to offer. I applaud those who have joined and encourage those who have not to consider this adventure.

The following is the list of officers for the 2004-2005 year. Congratulations and we look forward to a good FIRST year.

- President -- **Charles Rice**
- Pres.- Elect -- **Gary Hawkins**
- Secretary __ **Sarah Latshaw**
- Treasurer -- **Steve Brady**
- District Rep. -- **Lenny Wells, Michael Wheeler, Jule-Lynne Macie**
- Marine Ext. Rep. -- **Anne Lindsay Frick , Karen Payne**
- State Staff Rep. - **Michael Mengak**
- Program Chair -- **Steven Patrick**
- Awards Chair -- **Phillip Edwards**

Please join myself in congratulating this wonderful group of leaders for our new association. We have a busy and productive year ahead of us. Again, thank you for your dedication to the pursuit of excellence in professional service.

If you are interested in becoming a member contact any of the officers listed above.

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TURFGRASS WATER.COM: A NEW WEBSITE FOR ALL TURFGRASS WATER ISSUES

by Dr. Clint Waltz and Dr. Bob Carrow
The University of Georgia – Griffin

The University of Georgia Turfgrass Team scientists are in the forefront of turfgrass water conservation and water quality research and outreach. To disseminate information related to turfgrass water issues, this team has generated a new website, TurfgrassWater.com. This site was developed and launched in December 2002 as a comprehensive “one-stop” information facility to address water management, water quantity, and water quality issues encountered by the citizens of Georgia and professional turfgrass managers. Also, this site demonstrates to governmental agencies not only the size and economic impact of the turfgrass industry in Georgia, but how turfgrass professionals have access to “sound science” for the development of site-specific programs focused on water conservation and preservation of water quality.

Our goal is to have and maintain the most in-depth website on these issues currently available to the turfgrass industry in an easy to navigate format. At present, the posted information is just the beginning, think of TurfgrassWater.com as a continual “work in progress”. Web-based media allows for constant updating to stay current with changing trends and improved information. As we learn more from ongoing research, this page will be one of the first places to find study results and information on improved water management techniques.

What kind of information can be found at TurfgrassWater.com? The traditional approach to information transfer has been to produce a publication on a topic and assume it was sufficient for all audiences. At TurfgrassWater.com we provide multiple information packages for different audiences. For the homeowner, the professional that desires a quick overview, and County Extension Agents, several extension publications with practical information and “how to” approach have been posted. But for the individual that wants more in-depth information, this site also has scientific manuscripts and abstracts that possess the

fundamental research that went into developing water conservation practices for turfgrass.

Recognizing that “state-of-the-science” best management practices for turfgrass water conservation must rapidly integrate the latest information and new technology, TurfgrassWater.com contains a list of on-going research projects (e.g. soil moisture sensing, *in situ* plant tissue sensing, breeding efforts, etc.). Also, a list of information needs that must be addressed is included, along with a list of Turf Team members that are working to address these issues.

Included on the page is an “Upcoming Events” section. As programs, workshops, and special events relating to turfgrass water management arise, these events will be posted and linked to corresponding web-pages. To illustrate the importance of the turfgrass industry (click on [Water Use and Conservation](#), then click on [Industry](#)) to Georgia’s economy, we have included information on size and range of the turfgrass industry. Likewise, the environmental benefits of turfgrass are listed at this site-location. Currently we have only a few links to other sources of turfgrass water related information, but as the site evolves, more links will be added.

Also, TurfgrassWater.com has information on the Turfgrass Water Research and Information Park (TWRIP). The Park is located on the UGA Griffin Campus and is a state-of-the-science research and education facility. The mission of the TWRIP is to foster water conservation and environmentally sound use of water resources on turfgrass sites. Multiple UGA Turf Team scientists are involved in various research projects investigating:

- methods for improved irrigation guidance,
- reduction of nutrient and pesticide runoff and leaching,
- breeding of drought tolerant turfgrasses,
- turfgrass cultivar evaluations,
- tolerance of grasses to low water use,
- development of cultural management

techniques,

- the use of grasses for erosion and sediment abatement control,
- alternative water sources (treated wastewater) for turfgrass irrigation, and
- the influence of irrigation water quality on soils, plants, and the environment.

The TWRIP will also serve as a site for training symposia, field days, and workshop practicum to educate a wide array of clientele.

As this site develops, what kind of new information will be posted to TurfgrassWater.com? PowerPoint slide sets from presentations and workshops conducted by the scientists will be posted to assist the turfgrass professionals and County Extension Agents in their presentations for boards or municipalities. These sets will be developed by the scientist, such that the end-user does not have to “re-invent the wheel” by creating their own slides and to have accurate information in a presentation ready format. Additionally, a “Best Management Practices for Water Conservation in Urban Landscapes” publication will be added to the website.

Water conservation should be viewed on a whole system (soil, plant, water, management) basis, and TurfgrassWater.com with its informational packages was developed from that perspective. Without a science based approach to water use, Georgia cannot successfully address state-wide water issues or remain competitive in the global economy. The industry should be, and is demanding access to the best science-based information and technology. Therefore, TurfgrassWater.com will be instrumental in improving water management practices in Georgia.

We would like to thank Georgia Turfgrass Foundation Trust for the financial assistance to support this webpage. Also, we would like to acknowledge Jonathan Bohn and Marisa Griffin for their efforts in constructing the layout of TurfgrassWater.com and providing their technical expertise.

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COASTAL PLAIN AGRICULTURE: SOIL COMPACTION SHOULD NOT CAUSE ONE TO QUESTION REDUCE-TILLAGE ADOPTION

by Clint Truman, USDA-ARS Southeast Watershed Research Lab, Tifton, GA

Crop production in the Coastal Plain region of Georgia is generally water-limiting. Reduced tillage systems (mainly strip-till) have been adopted to help with water conservation, this allowing crops to use water more efficiently and potentially reduces supplemental irrigation amounts needed throughout the growing season. A limitation of reduced tillage is soil compaction. Compaction decreases porosity and reduces the amount of water entering the soil surface and being held in the root zone, thus eliminating one of the benefits of reduced tillage – more infiltration and subsequently more water in the soil profile. In the Southeast, compaction has

caused producers to question their adoption of reduced tillage.

Integrating paratilling, a non-inversion deep tillage technique, into reduced tillage systems can eliminate soil compaction often experienced by producers who adopt reduced tillage as a management practice.

After 4 years of reduced tillage and before paratilling:

- ♦ In the top 1.5ft of soil, bulk density (BD) values for strip-till (ST) were 15-25% greater than BD values for conventional-till (CT)

- ♦ For ST, BD values for between-row (middle) were 20% greater than those from within-row.

After 4 years of reduced tillage and after paratilling:

- ♦ In the top 1.5ft of soil, BD values for ST with partilling (+PT) were significantly less (by ~ 15%) than BD values for ST without paratilling (-PT).

Reduced tillage systems coupled with residue management improves soil quality, increases

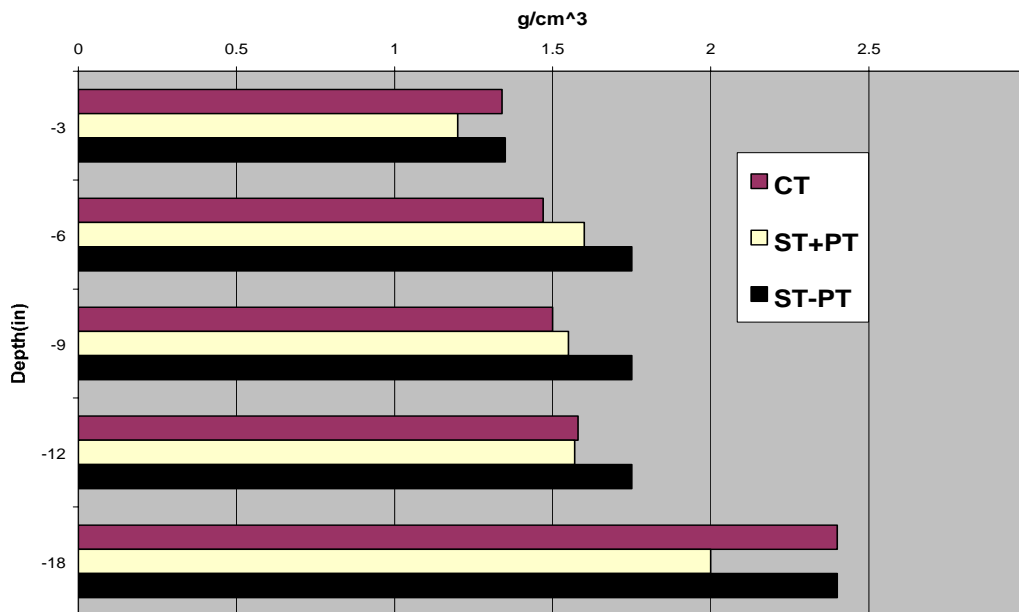
infiltration and soil water within the soil, and decreases runoff and erosion. With reduced tillage, *paratilling in the fall of every other year* eliminates soil compaction often experienced by producers who adopt reduced tillage as a management practice.

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Bulk Density, Gibbs Farm 2002, Tifton GA



Feel free to copy and distribute “The Water Drop” as you see fit. But if you do copy and distribute, please e-mail me with the number of copies distributed and to what type of group. This will help me evolve the newsletter into a water resources source that can be used by our clientele. You can e-mail me at ghawkins@tifton.uga.edu. Thanks.

“The Water Drop” can be found on the web at: <http://www.cpes.peachnet.edu/ghweb/WQNewsletter> or <http://www.agp2.org>

WANTED : Information

- Name and address or e-mail of persons that may be interested in the newsletter but did not receive one....
- Any water quality questions, article ideas, comments, FUN Facts, etc....
- Any photos showing someone, something, or an event showing the importance of water quality...

Send all information to Gary L. Hawkins at ghawkins@tifton.uga.edu or P.O. Box 748, CPES – Bio and Ag Engr, Tifton, GA 31793-0748.