


Irrigation and Drought

Rose Mary Seymour
Pollution Prevention Extension Specialist,
Ag Pollution Prevention Program
Bio and Ag Engineering
University of Georgia - Griffin Campus
And Georgia Pollution Prevention Assistance Division

- 
- Alternatives
 - Irrigation System Troubleshooting
 - Managing Water



Alternatives

- Wells
- Ponds and other surface water
- Rain water harvesting
- Gray water
- Reclaimed or Reuse water



Wells

- For irrigation a new well that pumps over 100,000 gpd (average for any month of the year) must have an agricultural permit
 - Equal to 70 gpm for 24 hours
- Shallow wells are likely to have reduced yield during climatic drought



Ponds and Other Surface Water Sources

- Same requirement for agricultural permit for 100,000 gpd
- Cannot pump a flowing stream to the point where there is no flow



Rainwater Harvesting

- Cistern must be large to provide much water during a drought
- When capturing roof water from large buildings, tie in air conditioning condensate and the cistern can refill even without rain
- Harvesting may also go into ponds
- Use wells to fill ponds and cisterns when needed



Gray Water

- Water from sinks, showers, washing machines used directly on the property
- Requires the sewer piping from toilets be isolated from gray water waste piping
- Requires treatment for surface application or can be applied subsurface
- Not something that is practical to create quickly



Reclaimed or Reuse Water

- Need separate piping (purple pipe)
- Work with local waste water treatment plant
- Expect to pay for the water and your distribution system

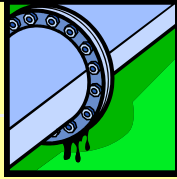


Troubleshooting to Increase Water Use Efficiency

- Leaks
- Application to hard surfaces and runoff
- Incorrect nozzles
- Mixed Applicators
- Pressure

Leaks

- Leaks are most likely to occur at joints and connections
- Poor pattern of sprinklers in a zone may indicate a leak at the valve or pipes upstream from the valve
- Poor pattern of a particular sprinkler with puddle



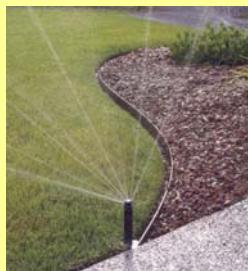
Off-site Applications

- Change whole rotor if it cannot be adjusted to a partial circle
- Be sure that half circle nozzles put out half the gpm of the full circle on a zone
- Mixing sprays and rotors is not a good answer to this problem

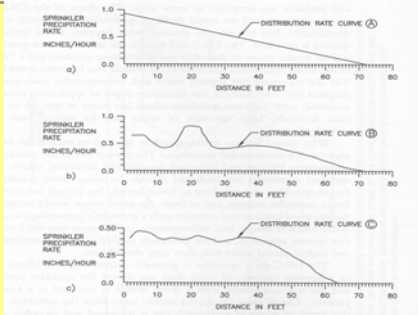


Incorrect Nozzling or Applicators

- Same size nozzle in full/part circle rotary sprinklers on the same zone/valve
- Spray heads and rotors mixed on the same zone/valve



Pipe Hydraulics and Pressure



Pressure Problems

- Low pressure symptoms – less overlap of spray patterns, rotors not moving
 - Possible Solutions
 - Fix leaks
 - Run system during off-peak use times
 - Booster pump or new pipes
- High pressure symptoms – misting at spray or sprinkler head
 - Possible Solutions
 - Pressure regulated applicators
 - In-line pressure regulators for a zone or particular heads

Irrigation Scheduling

- Major problems
 - Too much water
 - Watering too frequently





Irrigation Scheduling

- Best Management Practices
 - Water infrequently and deeply (the whole root zone)
 - Cycle sprinkler application to prevent runoff on low permeability soils and sloping areas
 - Water according to the soil type and the depth of the root zone for the plants being watered



Ways to Estimate Precipitation Rate

- Use data from manufacturer's catalog (this only works for square and triangular spacings on regular areas)
- Calculate PR for the actual spacings in a design (using previous equation)
- Measure actual PR depths applied in the landscape



Nozzle and Applicator Selection

- Estimating the precipitation rate of overlapping sprinklers uses this equation
PR = precipitation rate (in/hr)

$$PR = \frac{(96.3)(Q)}{(S)(L)}$$

Q = total flowrates from all overlapping nozzles (gpm)

S = spacing of sprinklers along lateral

L = distance between laterals



Scheduling Errors



- All zones irrigated the same length of time
 - Shaded or full sun
 - Slopes
 - Soil Type – infiltration and water holding capacity
 - Different type of applicators
 - Plant needs – rootzone depth, genetics
 - Odd/even watering schedule – don't try to water every available day – water once a week before it is required



Soil Type -- Moisture Available

Soil Type	Inches of Water to Fill 1 Foot (12 Inches) of Soil
Sand	0.5 in
Sandy Loam	1.5 in
Loam	2.0 in
Clay	2.0 in



Plant Root Zone

- Typical Root Zone Depths
 - Turf grass and Annual Beds
 - 6-8 inches
 - Perennials
 - 8-18 inches
 - Trees and Shrubs
 - 8-20 inches



New Technologies

- Smart water application technologies
- Remote control systems



Workshop in the Fall will teach more about these options
