

Improving water use efficiency

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Presentation Outline

- Distribution Uniformity
- Irrigation Scheduling
- Irrigation Systems Maintenance



Distribution Uniformity (DU)

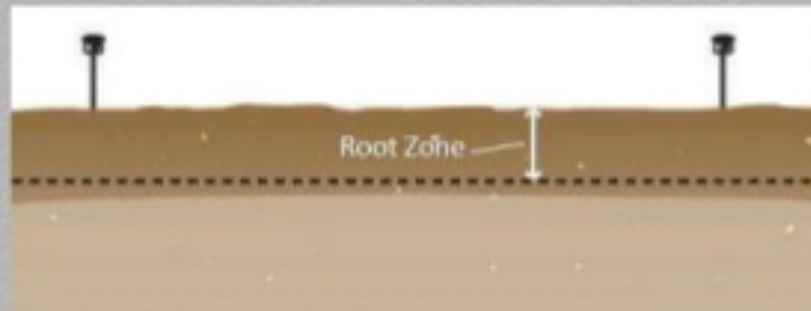
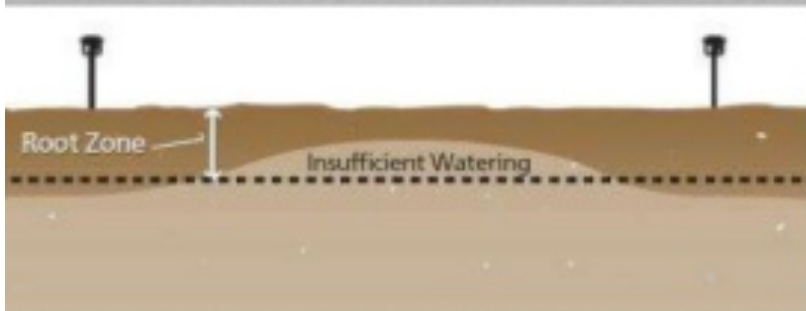
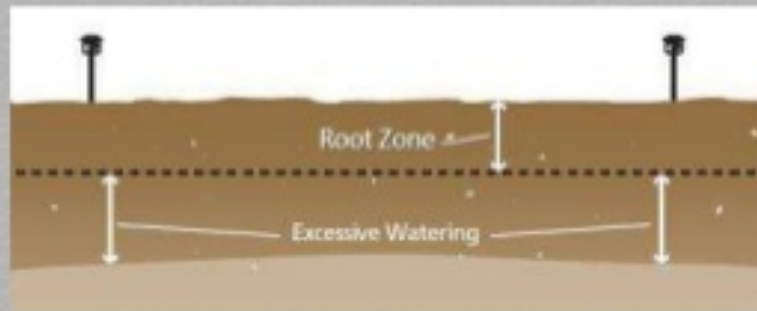
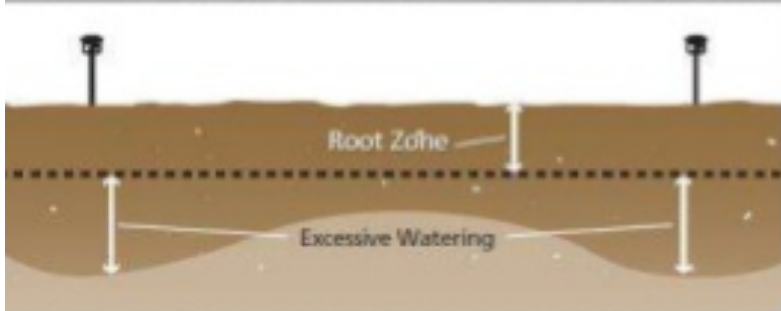
- Ideally, all irrigated areas should receive the same amount of water.
- If DU is high ($>90\%$), most plants will receive the same amount of water.
- If DU is low ($<70\%$), some plants will receive more water than others.

Importance of Distribution Uniformity

- Not enough water results in high soil moisture tension, stressed plants and yield reductions.
- Too much water can also reduce yields through nutrient leaching, increased disease incidence or problems with proper growth stimulation.



Irrigation System Distribution Uniformity (DU)



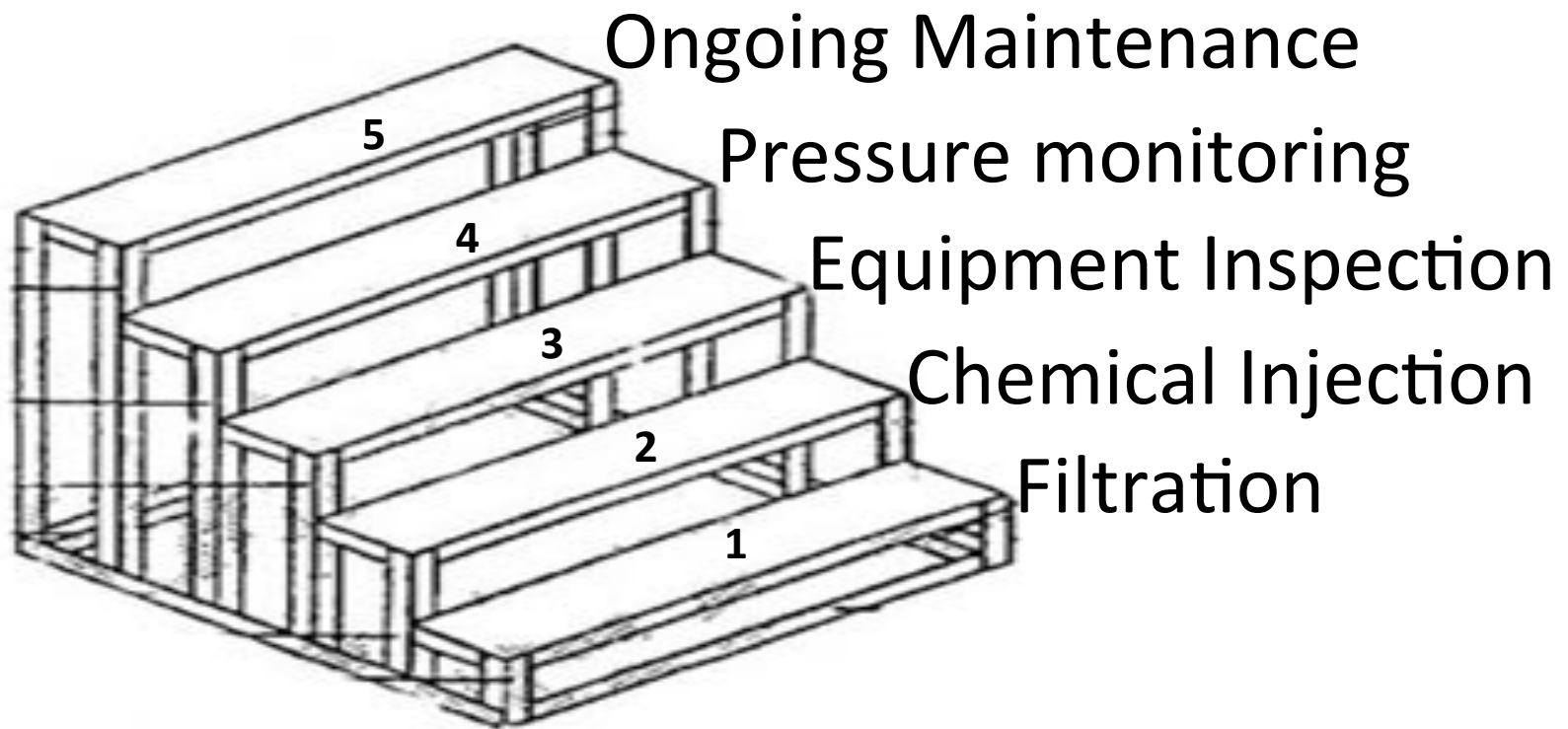
How do you measure DU?

By:

- Emitter discharge rate
- Pressures throughout the system



Five steps to improving DU



1. Why filter?

- To improve water quality
- To prevent emitter clogging



Types of filters

- Media filter (Sand and gravel)
- Screen filter
- Disk Filter
- Sand separator



Screen filters used in conjunction with sand media filters. Photo L. Schwankl

2. Chemical Injection

- Water Treatment
(Water quality)

 - Bacteria

 - Fe + Mn

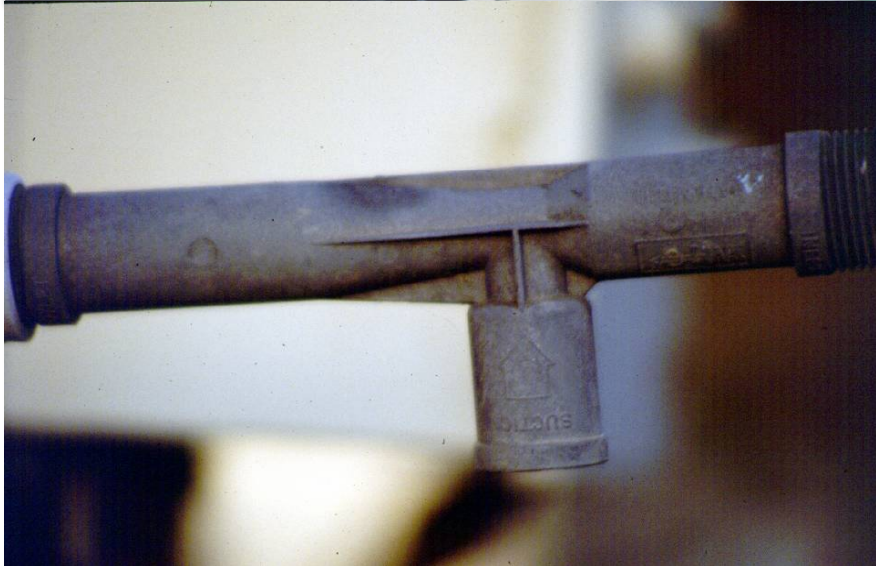
 - CaCo₃ – Lime

 - Many others

- Fertigation

 - Replace Crop Nutrients





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3. Equipment Inspection

- Leaks
- Mixed Equipment
- Broken Equipment
- Tree interference
- ?



Many different brands/types



4. Pressure Monitoring

- Flow and pressure are related
- Check Equipment specifications



Pressure and flow



Saddle-mount propeller meter installed at the head of a drip system. Photo: L. Schwankl.

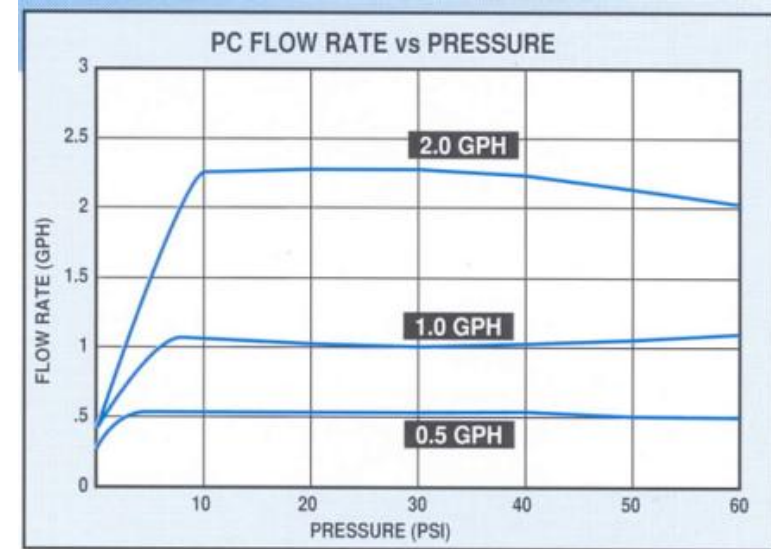


Pressure gauges with pitot tubes attached. Photo: L Schwankl

Discharge vs. pressure



Discharge vs. pressure for drip emitters with no pressure compensation.



Discharge vs. pressure for pressure-compensating (PC) drip emitters

Measuring pressures

- Main line
- Laterals
- Risers
- Emitters



5. Ongoing Maintenance

- Schedule filter cleaning and flushing
- Equipment checks – walk the lines
- Pressure checks
- Hose end flushing

Common scheduling methods

- Guess process
- Environmental measurements (Evapotranspiration)
- Soil/plants moisture content

Guess method

- Who knows???

CIMIS method

- Weather station
 - Determines plant water use
- Irrigation
 - Plant use and losses replaced



Soil Moisture method

- Tensiometer

Irrigate when soil depletion reaches set point in tensiometer



Factors affecting irrigation frequency

- Soil water retention capacity
- Infiltration rate
- Soil composition
- Evapotranspiration rates



Best Management Practices

- Check your system's distribution uniformity
- Review irrigation scheduling and maintenance
- Check your system components frequently



Questions

