
Using Moisture Probes to Measure Rootzone Water

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Soil Moisture Probes

-how to use them

*Is this green
wet or dry?
Does it need
water?*



Soil Moisture Probes

- what they measure

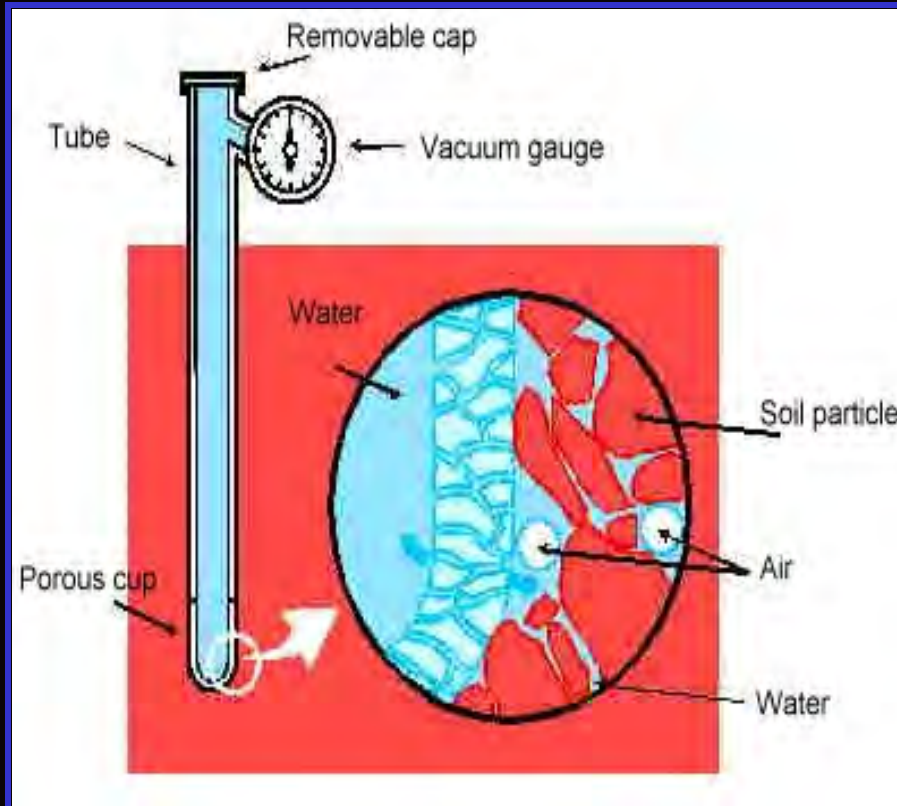
- Measures: volumetric soil moisture content
- Units: % (cm^3 water / cm^3 soil)



Soil Moisture Terms

- Water Content – the amount of water present in the soil, either on a mass (gravimetric) or volume (volumetric) basis
 - *Measured by probe*
- Water Potential – the amount of suction force required to move water from soil into turf roots
 - *Indicator of turf drought stress*

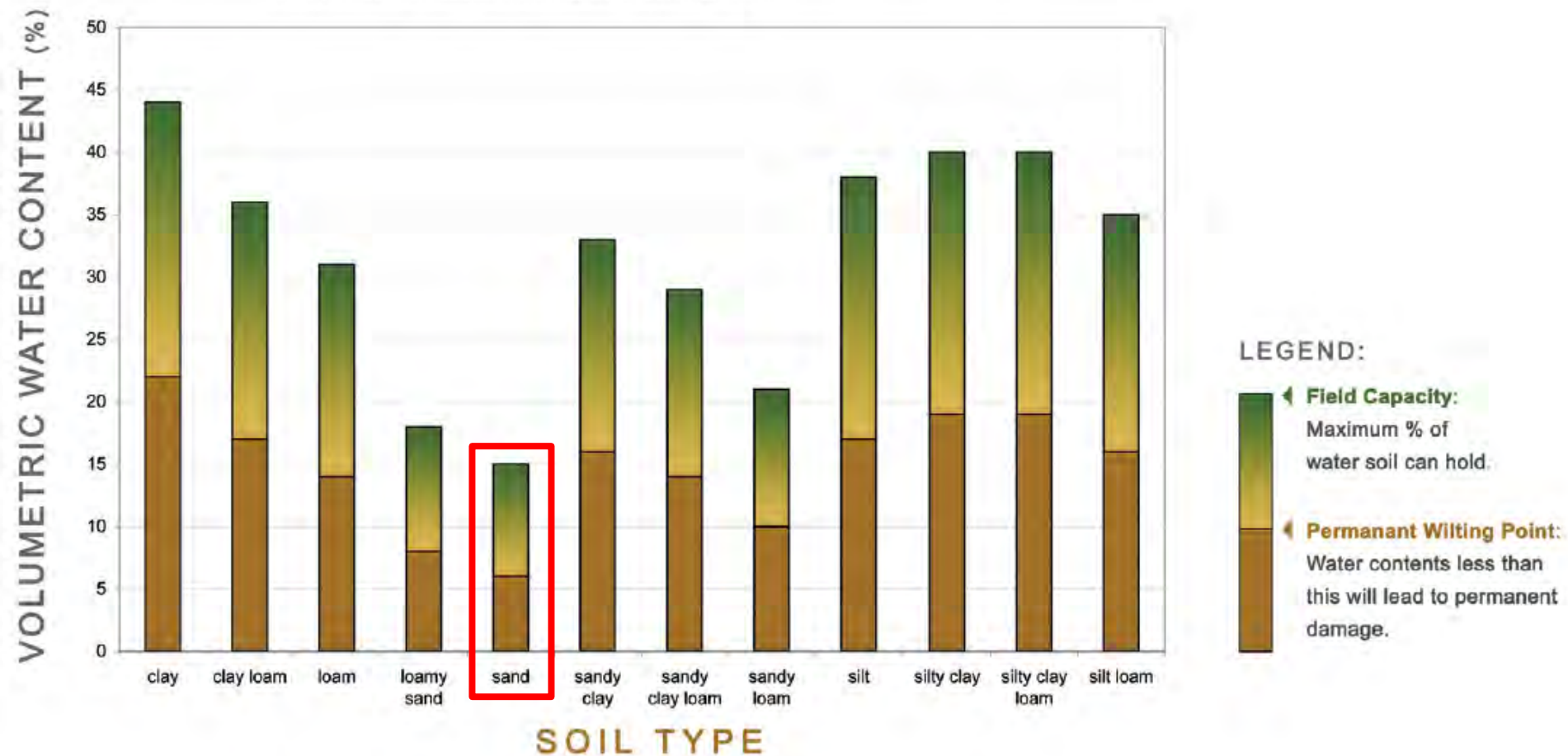
Water Potential Measurement: *Tensiometers*



Water Content vs. Water Potential

Water Holding Capacity By Soil Type

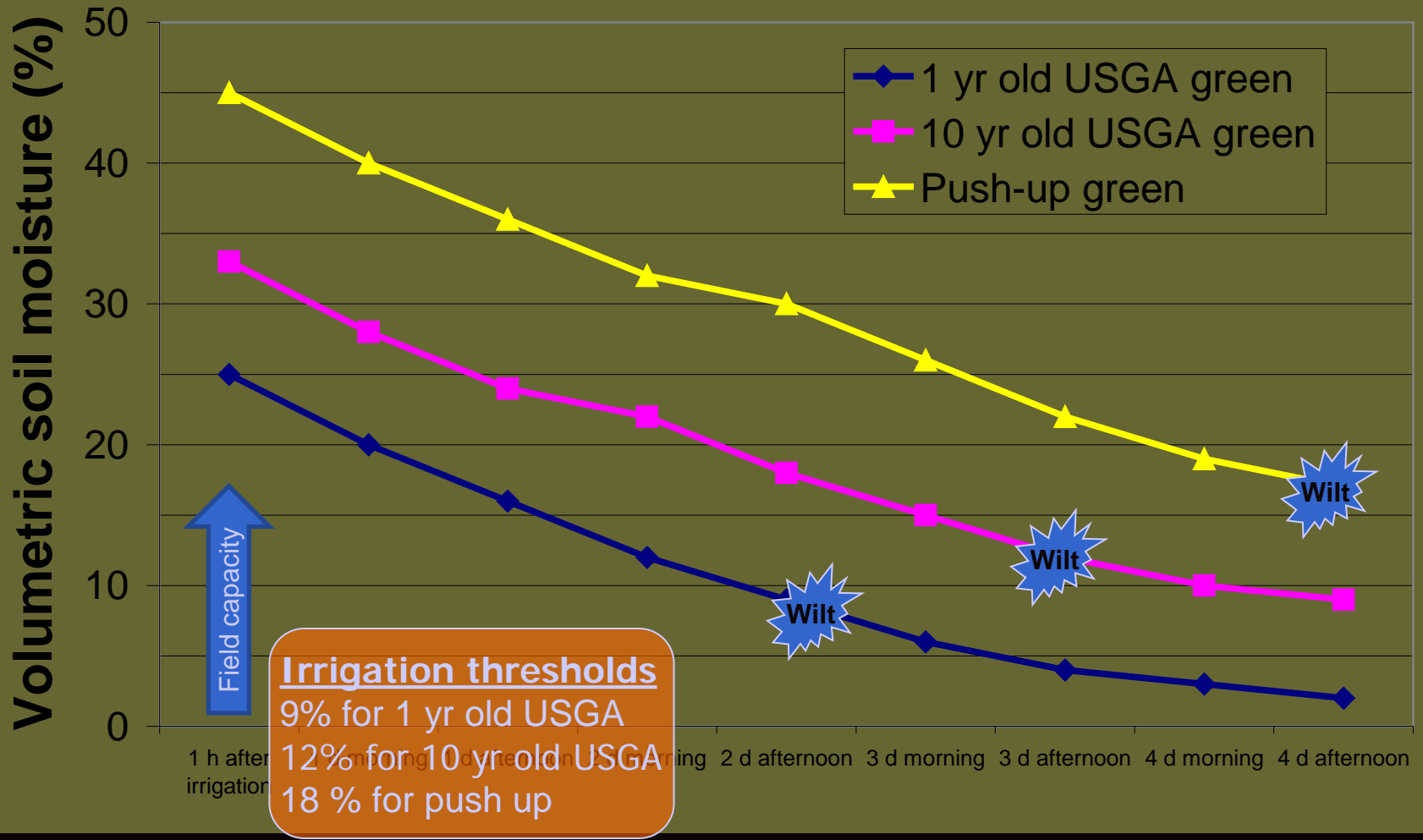
Source: New Mexico State University Climate Center
<http://weather.nmsu.edu/models/irrsch/soiltype.html>



How to calibrate a moisture probe for your site:

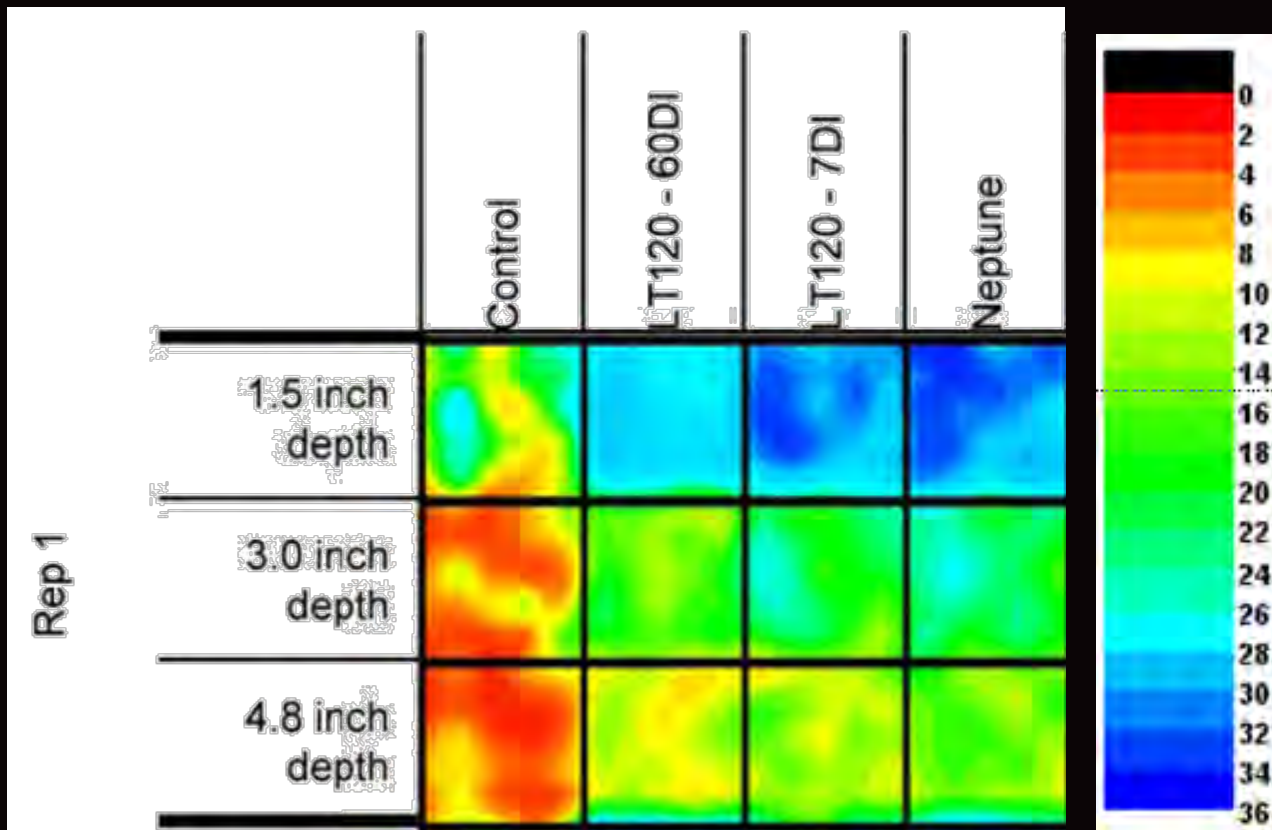
1. Irrigate the turf thoroughly- take reading 1 hour later
2. Take readings twice daily and note visual moisture stress symptoms
3. Continue until turf shows drought stress symptoms and determine irrigation threshold
4. Calibrate for each root zone type

Moisture probe calibration

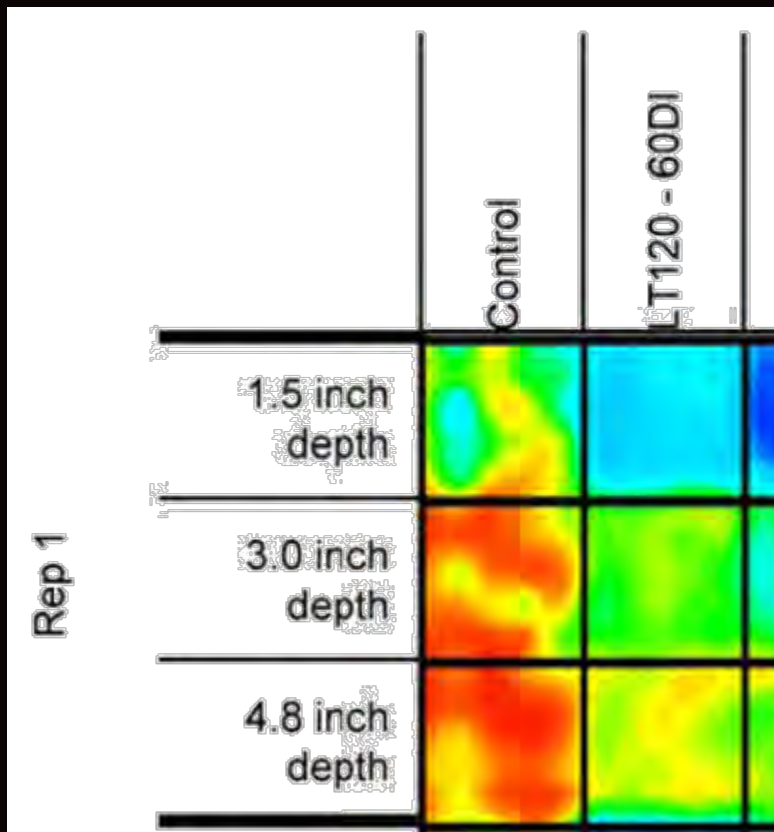


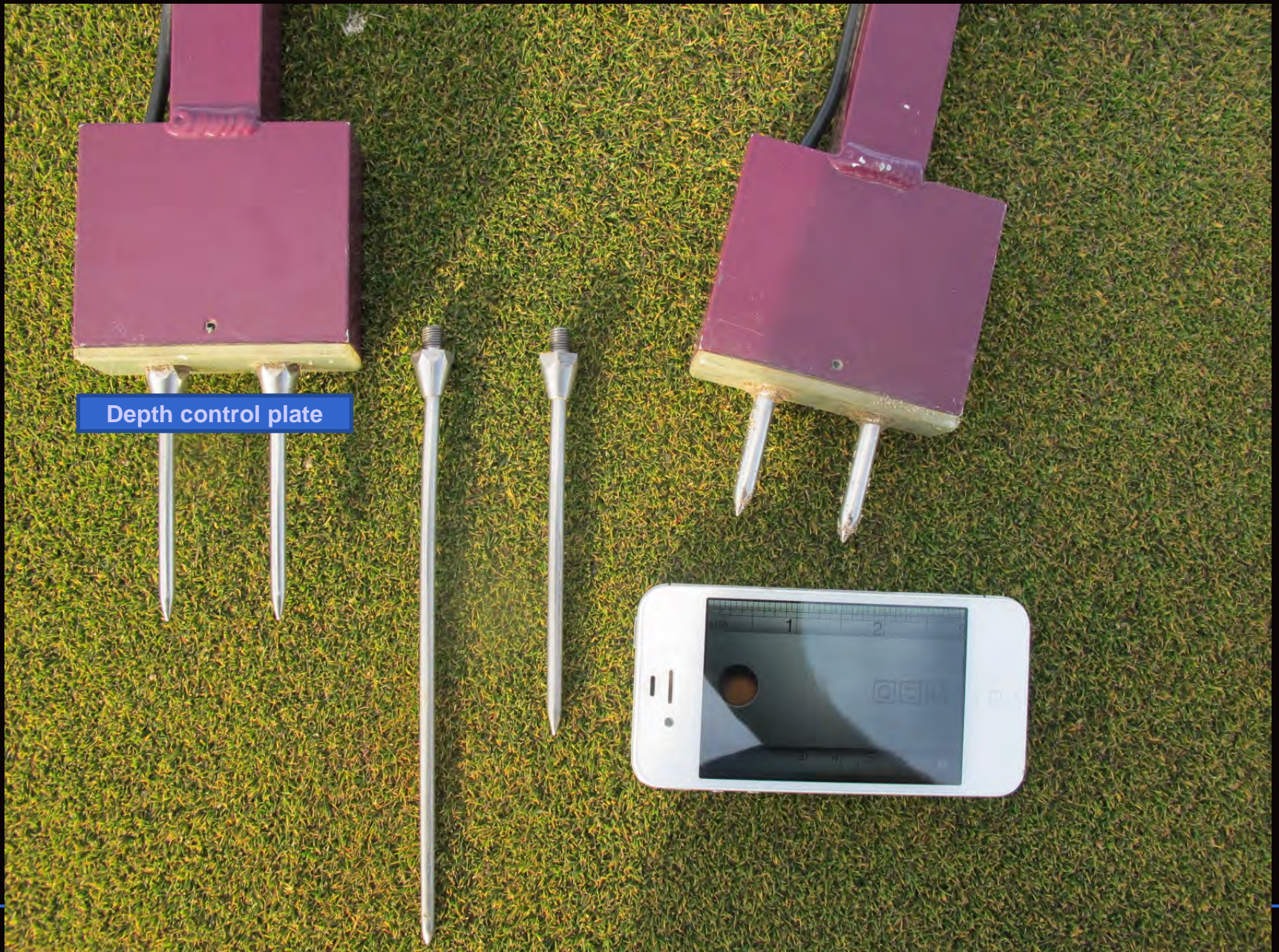


Rod length will determine your threshold for irrigation



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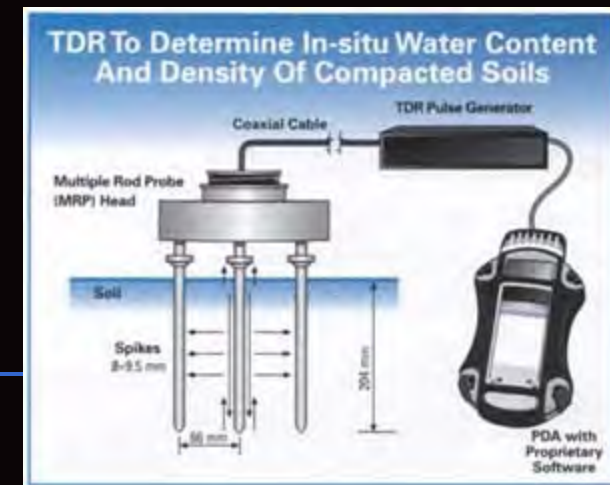
Depth control plate

Longer probes have wider base, which leaves larger holes in turf

Soil Moisture TDR Probes

-how they work

- Dielectric constant principle
 - Capacity of soil to transmit high frequency electromagnetic waves (600 MHz – 1.2 GHz)
 - Related to volumetric water content
 - Dry soil < 5, Water = 80
- Also, many probes separately measure EC and temperature



Soil Moisture FDR Probes

-how they work

- Similar technology as TDR
 - Use lower frequency radio waves (~ 150 MHz) to measure capacitance of soil
 - More precise in fine-textured and high salinity soils



Porous Blocks Moisture Meters

- *EC measurement*

- Less expensive
- Reading affected by salinity (fertilizer applications)
- Relatively poor measurement sensitivity
- Not enough precision for putting green turf



Soil Moisture Probes

- available devices

- Spectrum Fieldscout
- Campbell Sci. Hydrosense
- Dynamax Thetaprobe
- Decagon ECH₂O probes
- IMKO Trime
- Stevens Hydra Probe
- Cost (\$500 - > \$2000)

Moisture probes -

MAKING THE MOST OF LESS EXPENSIVE MODELS



Thank you. Questions?

