

Water Relations and responses to drought

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What is drought ?



9 liter pot



3 liters of water
At field capacity FC
33 % soil humidity (vol)



Soil water deficit
Relative extractable water REW
From FC (100%) to wilting point (0%)

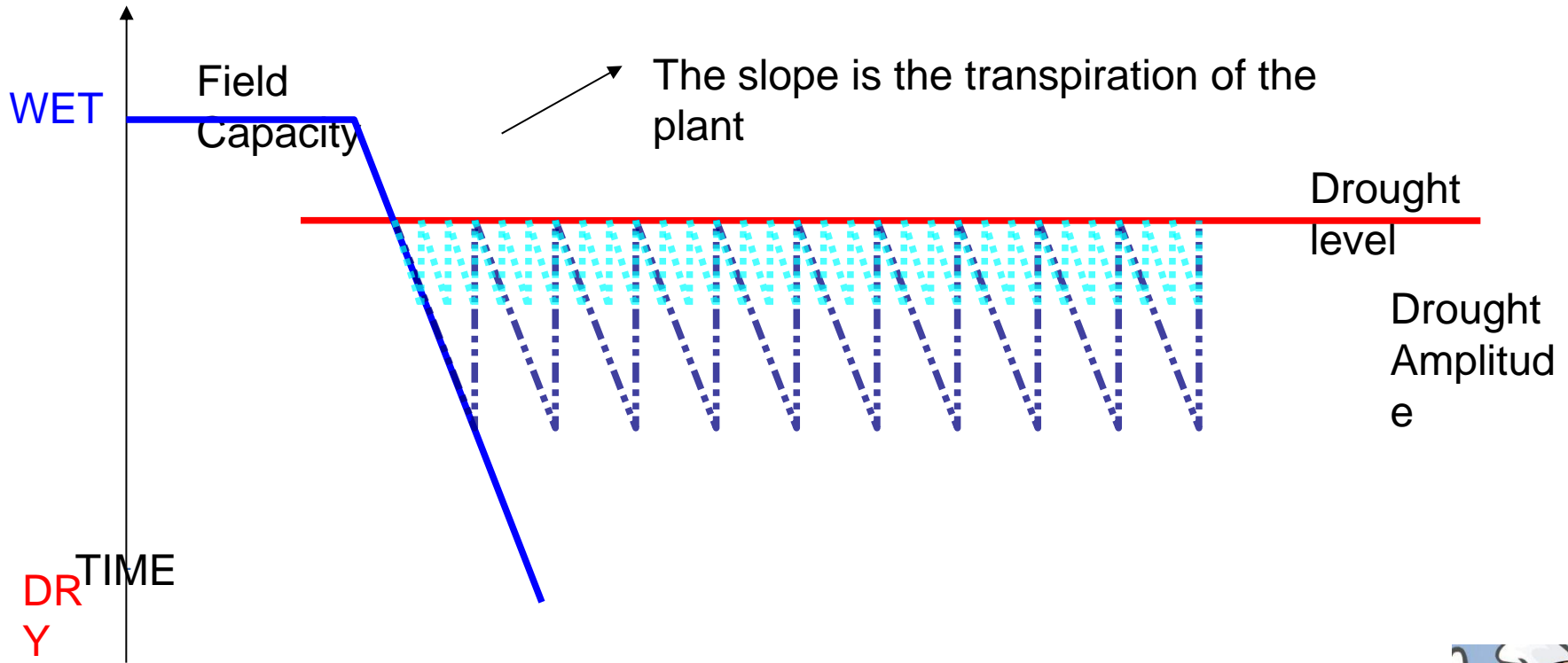
Drought stress
REW < 40 %

How to manage drought in an experimental system ?

By weighing !



- Weigh at field capacity
- Estimate soil density
- Estimate amount of water at FC
- Define drought level DL
- Estimate amount of water at DL
- Estimate total weight (soil/pot/plant) at DL
- Weigh regularly, if mass is below, irrigate

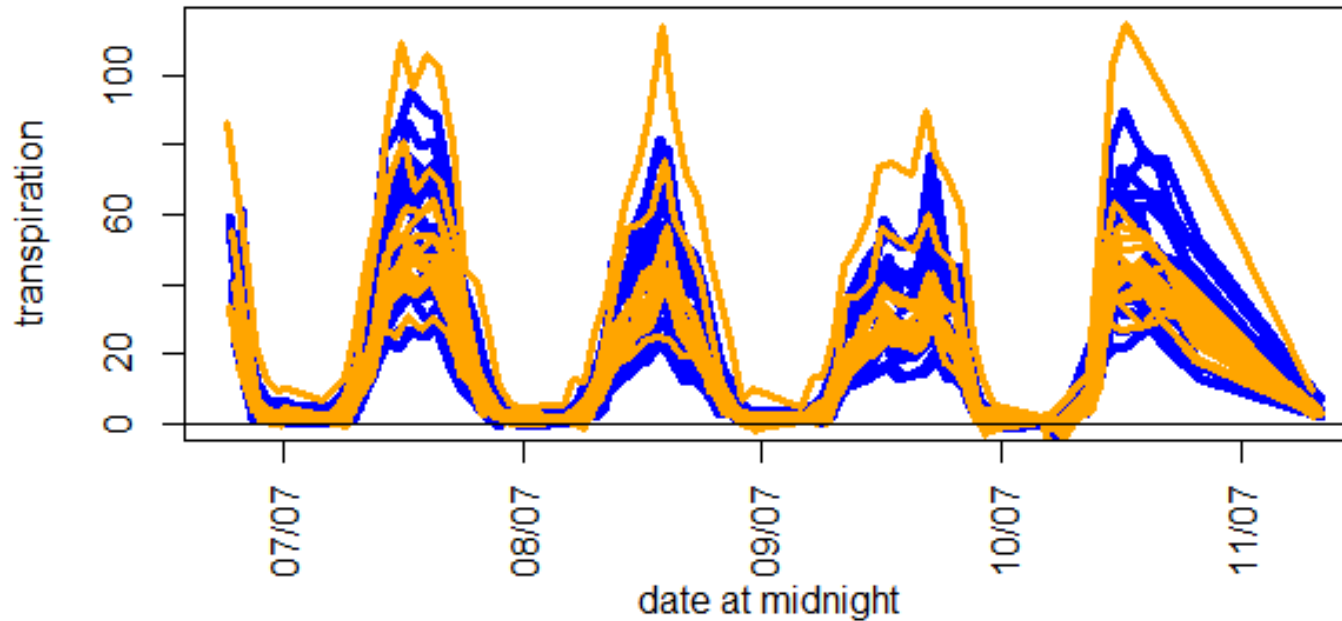


Regular weighing is necessary for a precise control of the drought
 Nearly hourly weighings /watering is possible with the robotic system

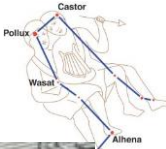
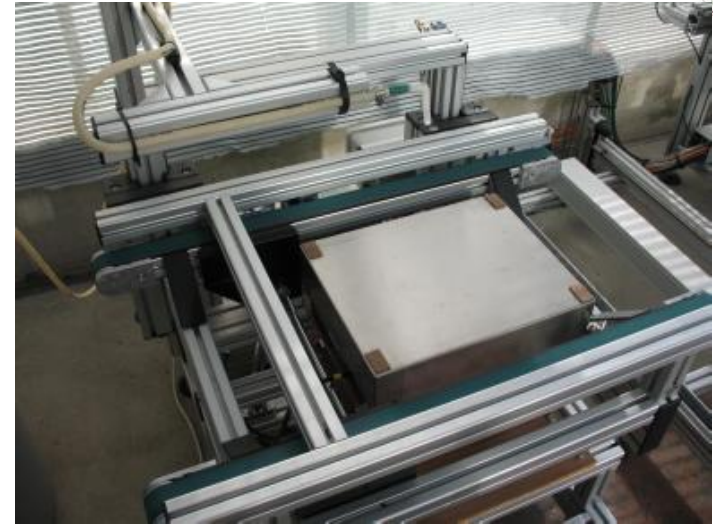


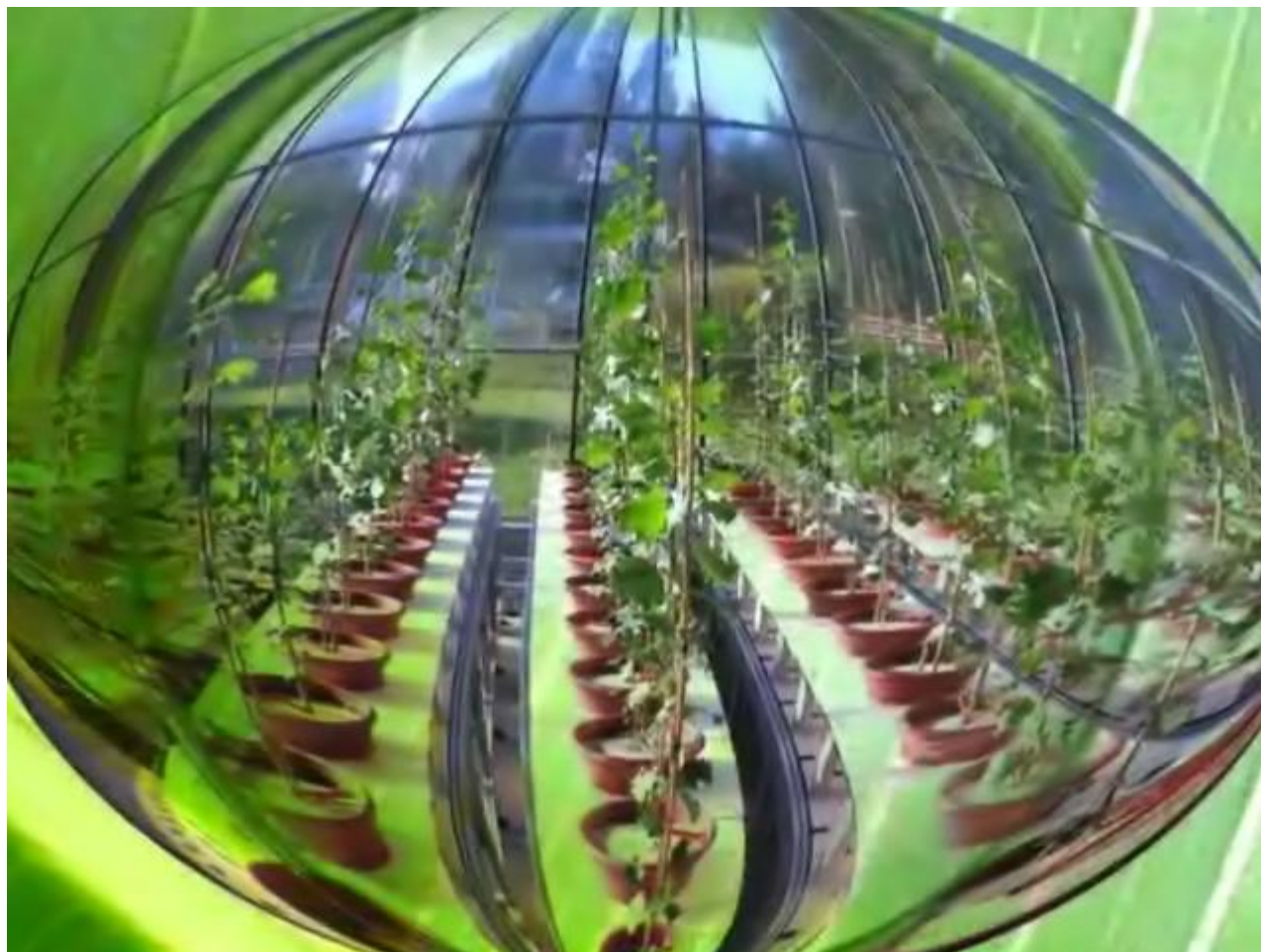
Day and Night Transpiration Kinetics

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The Pollux and Castor automated irrigation systems





How to control drought ?

TDR (Time Domain Reflectometry) Probes
 → measure Volumetric Soil Humidity

Manual measurements to control achieved soil water deficit level

