Physiological Approaches to Improve Water Use Efficiency: Vegetable Crops

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FOCUS: Improve the productivity of applied irrigation

• Plant processes that regulate crop water use

• Manipulating these processes to conserve water at the farm and higher levels

• “doing more with less”
Approaches

- Drip Irrigation and Plasticulture
Approaches

- Plasticulture & drip irrigation
  - Deficit irrigation
  - Partial root zone drying
  - Drip tape placement
    - (depth and emitter spacing)
  - Grafting
  - Anti-transpirants
  - Population density
  - Scheduling
Deficit Irrigation: Melons

- Strategy to control vegetative growth thus increasing water savings.
- Average water savings of ~20 mm by reducing irrigation amounts by 25% (or irrigating at 75%ET).
- No significant effect on yield or quality.
- Leaf physiology: Transpiration reduced but water use efficiency increased.
Drip tape placement: Onions

- Root distribution in soil profile as a function of emitter spacing & drip tape depth
Grafting: Watermelons

- Improving drought tolerance by grafting on drought tolerant rootstocks.
- Grafting resulted in 1 - 2 additional harvests without additional water inputs.
- Grafted plants maintained a more favorable water status than non-grafted plants.
Others: Planting density

- Making the most out of applied water
- Finding optimum planting density to maximize water productivity: Yield/in
Disrupt vector reproductive cycle and disease spread by controlling moisture availability and flushing patterns.
Others:
Water Management for Energy crop production

- Sustainability
Thank you

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