Measuring Cantaloupe Growth from Emergence to Harvest

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Cantaloupe (melon) Production - Arizona

- **Spring melons**
  - **~ 10,000 acres**
- **Yield ~ 230 cwt./acre**
- **Fall melons**
  - **~ 4,000 to 5,000 acres**
  - **Yield ~ 214 cwt./acre**

Crop System Efficiency

- **Provide inputs that you need**
  - **must consider positive crop response**
- **Timing is critical**
- **Must follow crop condition**
  - **requires crop monitoring**

Critical Limiting Factors in Desert Agriculture

- **Water (Irrigation management)**
- **Nitrogen**
- **Pest Control / Management**

Crop Management – Strategies

- **Scheduled Approach**
  - **Based on calendar dates or days after planting (DAP)**
- **Feedback Approach**
  - **Based on crop condition**
  - **Stage of growth**

Feedback Management Requirements

- **useable / accessible measurement**
- **established baselines / guidelines**
  - **reference base**
- **common variety types (species)**
- **regionally specific baselines**
- **validation of recommendations**

Silvertooth, Jeffrey C. 06/04/03. The 9th Annual Melon Field Day, Maricopa Agricultural Center, Maricopa, AZ.

Dynamic Nature of the Melon Plant

- Due to it's indeterminate nature, melon plants are very sensitive/responsive to environmental conditions
- Plant will retain or abort fruit in response to current conditions
- Melon plants are sensitive or responsive to management
- Managing veg./repro. balance critical

Melon Plant Growth / Mgt.

- Allocation of nutrients and resources to vegetative/reproductive components
  - in response to environmental conditions
- Represents a major challenge in melon production
  - Irrigation
  - Fertilization
  - Pest management/control
  - Vigor/disease management

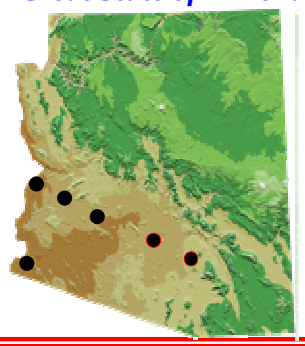
Vegetative / Reproductive Balance

- What is normal?
- How do you measure it?
- What do you do about it?

Crop Monitoring - Objectives

- Predict important stages of growth
- Yield Projections

Great State of Arizona



Development of Baselines for Reference – Arizona conditions

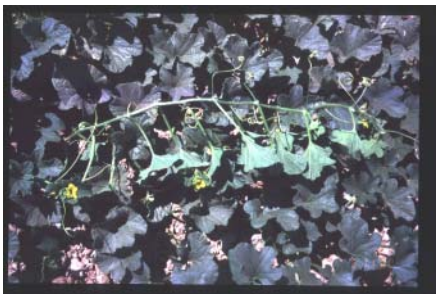
Development of a representative database (regionally specific)

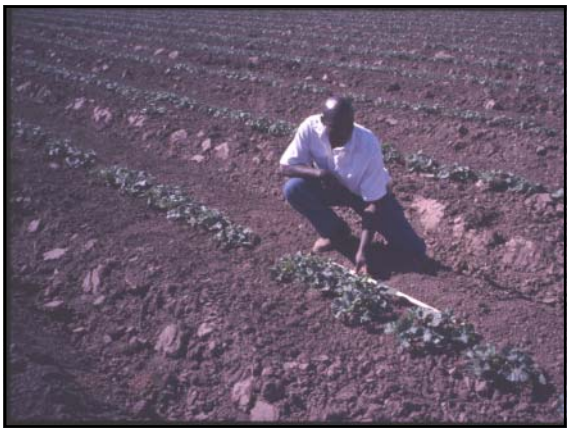
- Regular sampling of plant growth and development data

Development of Baselines for Reference – Arizona conditions

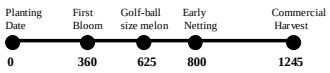
- **Plant measurements on 14 d intervals**
  - **Node numbers**
  - **Vine length**
  - **Female blooms**
  - **Melon number**
    - **(≥ golf ball sized melons / 3-4 cm dia.)**
    - **Primary and all fruiting vines**
      - **Usually up to 5 fruiting vines**

Vine Measurements



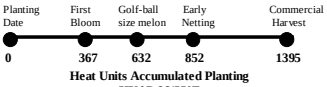


General melon plant development as a function of heat units



Heat Units Accumulated After Planting (HUAP 86/55°F)

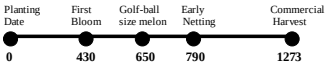
2003 melon plant development as a function of heat units



Heat Units Accumulated Planting HUAP 86/55°F

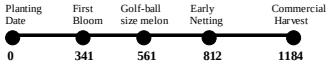
Waymon-Yuma Valley (Variety = Ocotillo), sub date = 1/26/03

2003 melon plant development as a function of heat units



Heat Units Accumulated After Planting HUAP 86/55°F

Aaron-Yuma Valley (Variety = S0l Real), sub date = 2/24/03



Heat Units Accumulated After Planting HUAP 86/55°F

Perriconni-Yuma Valley (Variety = Gold Rush), sub date = 3/5/03

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2003 melon plant development as a function of heat units

Planting Date	First Bloom	Golf-ball size melon	Early Netting	Commercial Harvest
0	352	629	811	1209

Heat Units Accumulated Planting
HUAP 86/55°F

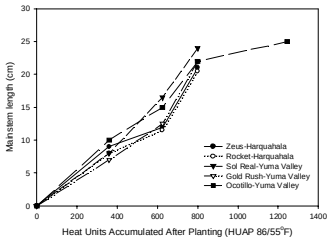
3W-Harquahala (Variety = Zeus), sub date = 2/19/03

Planting Date	First Bloom	Golf-ball size melon	Early Netting	Commercial Harvest
0	305	649	764	1162

Heat Units Accumulated Planting
HUAP 86/55°F

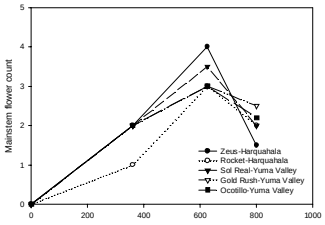
15W-Harquahala (Variety = Rocket), sub date = 3/5/03

2003 melon mainstem node development as a function of heat units



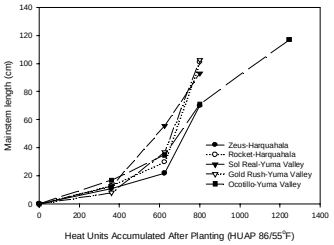
2003 melon mainstem node development as affected by HUAP.

2003melon mainstem flower development as a function of heat units



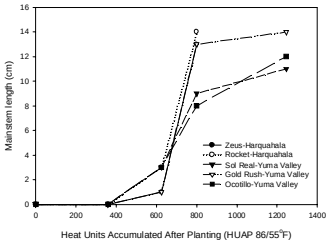
2003 mainstem flower development as affected by HUAP.

2003 melon mainstem development (length - cm) as a function of heat



2003 melon mainstem length as affected by HUAP.

2003 melons per 2m as a function of heat units



2003 melon count per 2m as affected by HUAP.

Melon Agronomy Program

- **Development of crop monitoring system**
  - **based on melon phenology models**
  - **heat unit (HU, 86/55 ºF thresholds) basis**
- **Development of feedback management systems**
  - **mgt. based on crop condition**
  - **nutrients, water, insect pests, PGRs, etc.**

Crop Monitoring - Crop Management

- Stage of growth (HU model)
- Crop vigor estimate
  - Vegetative growth index
- Fruit load development (melon prod.)
  - Ex. high fruit load = high N demand
- Yield projection

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