Open Hydroponics/Advanced Production Systems in Florida

Peter D. Spyke

Dr. William Castle

Japie Kruger


Florida
Greening in Lemons

Background

- South Africa and China have HLB (Citrus Greening), and flourishing citrus industries
- We traveled to South Africa and China to learn about Greening management
- Space trees close, produce as much fruit as possible before Greening tree losses eliminate profit
- Rapid growth and early bearing accomplished by reducing stress. High tech in SA, hand tending tree by tree in China. Same outcome.


04/05/2006


04/05/2006


10/24/2008

In Florida, need High Tech
Two Components – OHS and APS

- "OHS" = Open Hydroponics
- "APS" = Advanced Production Systems

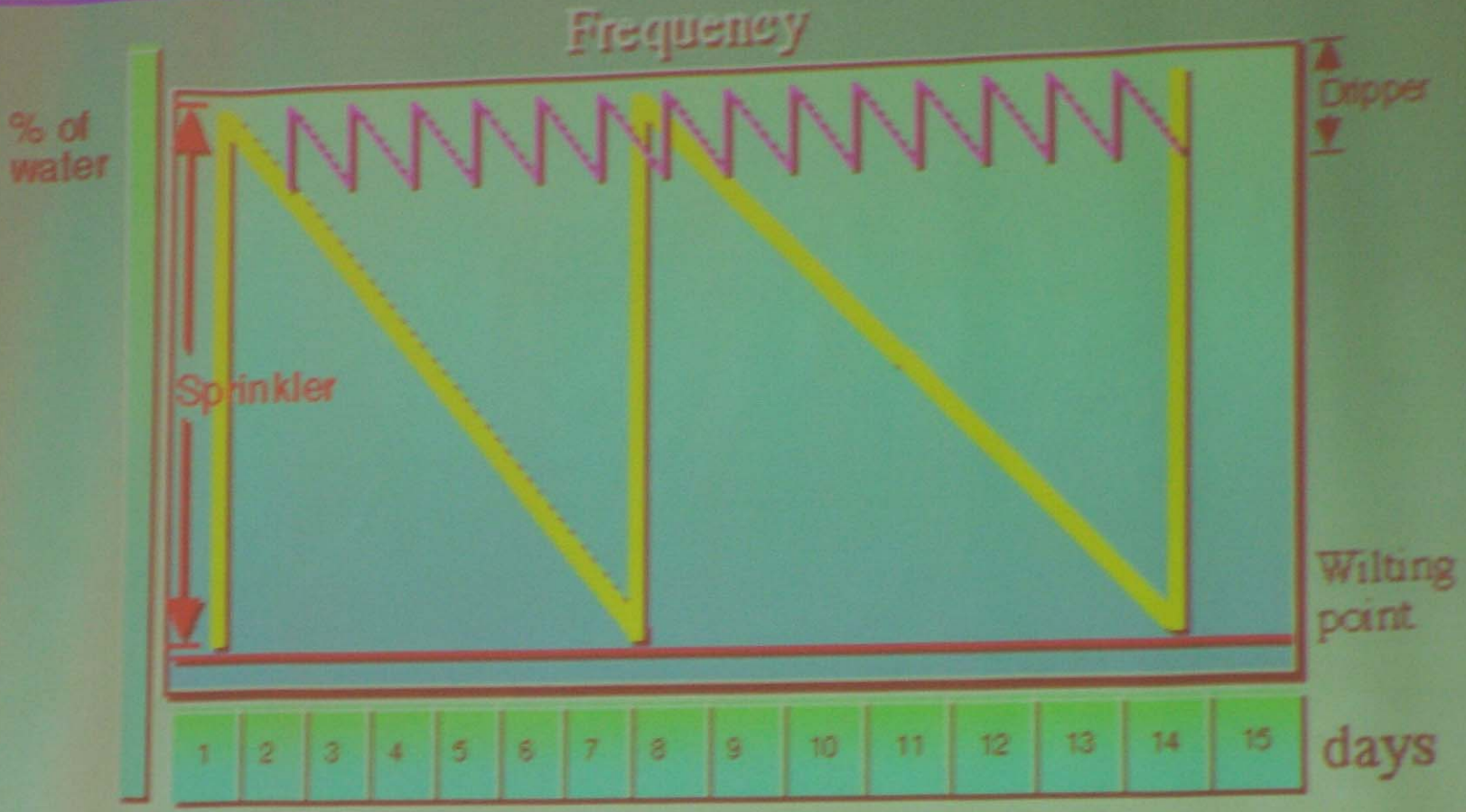
Open Hydroponics

- OHS = Water and Fertilizer Management.
- Apply water through low-flow drip irrigation.
- Pulse applications in small amounts throughout daylight hours.
- Irrigation water contains fertilizer with a complete mixture of nutrients (similar to true hydroponics).

OHS Operation Parameters

- Water and fertilizer schedule is based on the tree canopy size – 100% is when trees have reached their "containment size".
- Schedule pulse times based on emitter discharge rate, soil, % canopy coverage.
- Pause between pulse applications necessary to allow air to enter soil.

Irrigation Frequency Daily - Weekly



NETAFIM
Irrigation Equipment & Drip System

09/05/2006

Open Hydroponics

- Roots form dense "ball" under each emitter and efficiently absorb water and nutrients.
- Stress-free environment promotes rapid tree growth and high fruit production.
- Manage conditions in the "Root Ball" to promote growth, flowering, fruiting, and influence fruit quality.

Arapaho Citrus Management

- 2006 - Florida's first OHS/APS grove on 10-mile Creek in Ft. Pierce
- Grapefruit and Honeybells on multiple rootstocks and spacings
- Two soil types
- Multiple OHS Zones plus Microsprinkler comparison zone
- Trees planted in Nov 2006 – April 2007.


Emitter
03/06/2008

Full Automation is Required

3 Years

- After 3 years, we've proven the concept, and confirmed that significant water and fertilizer use reductions over microsprinkler are possible while maintaining rapid tree growth.
- Daily application of 1 day's worth of fertilizer, which the tree uses in a day, means no nutrient contamination of runoff = water quality BMP
- IFAS, USDA, Growers have systems - continues to show promise
- Calibration for Florida still necessary

Thank You Very Much!

Peter Spyke

Arapaho Citrus Management, Inc.

Dr. William Castle

IFAS

Japie Kruger

OHS Consulting, Australia

www.ArapahoCitrus.com