HLB-AFFECTED CITRUS RESPONSE TO FREQUENT IRRIGATION AND VARIED FERTILIZATION IN FLORIDA

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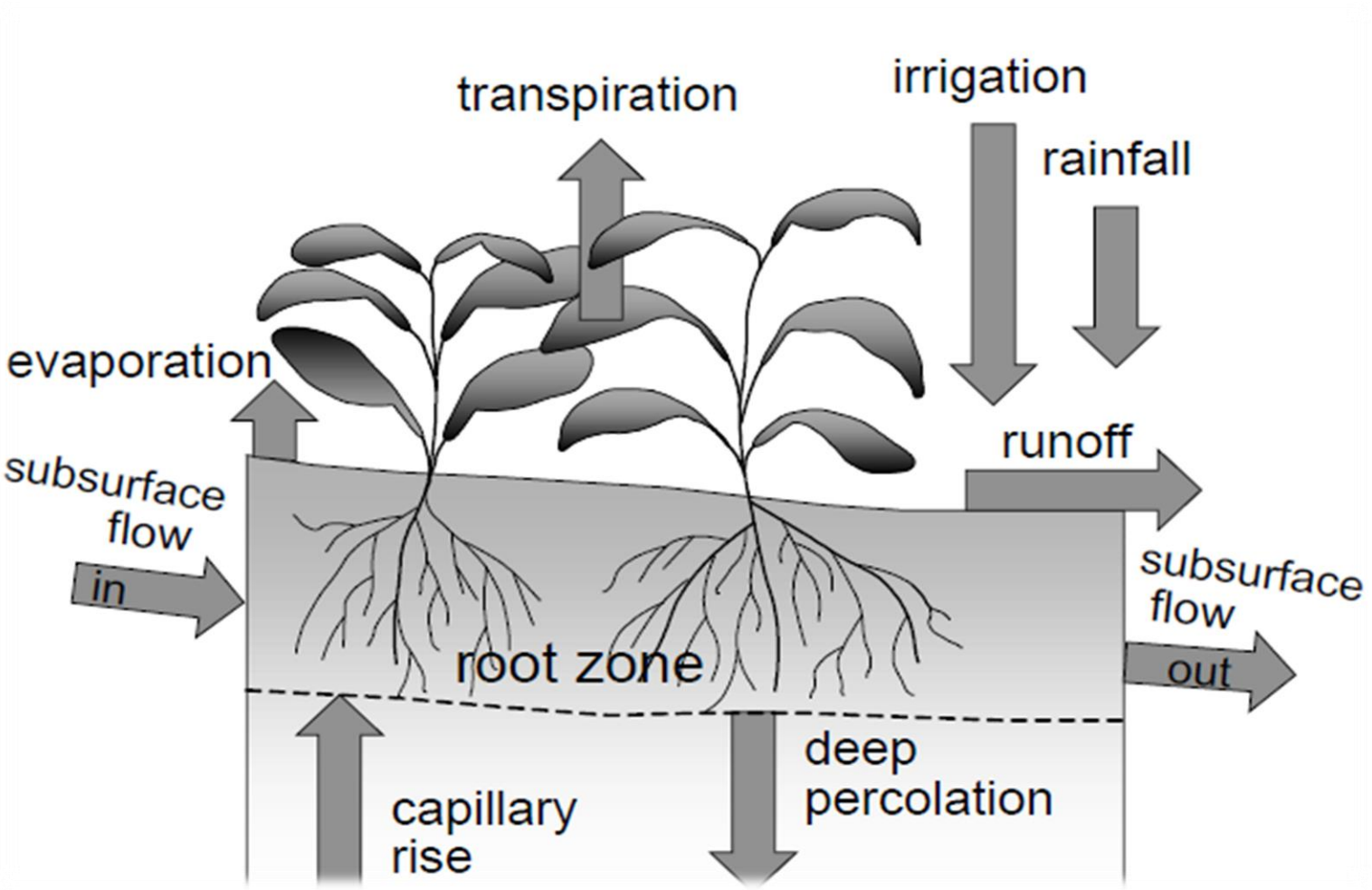
WATER MANAGEMENT STRATEGIES



Soil water balance of the root zone

WATER USE IN CITRUS TREES

Sapflow sensors (right and top)

Lysimetry (left)

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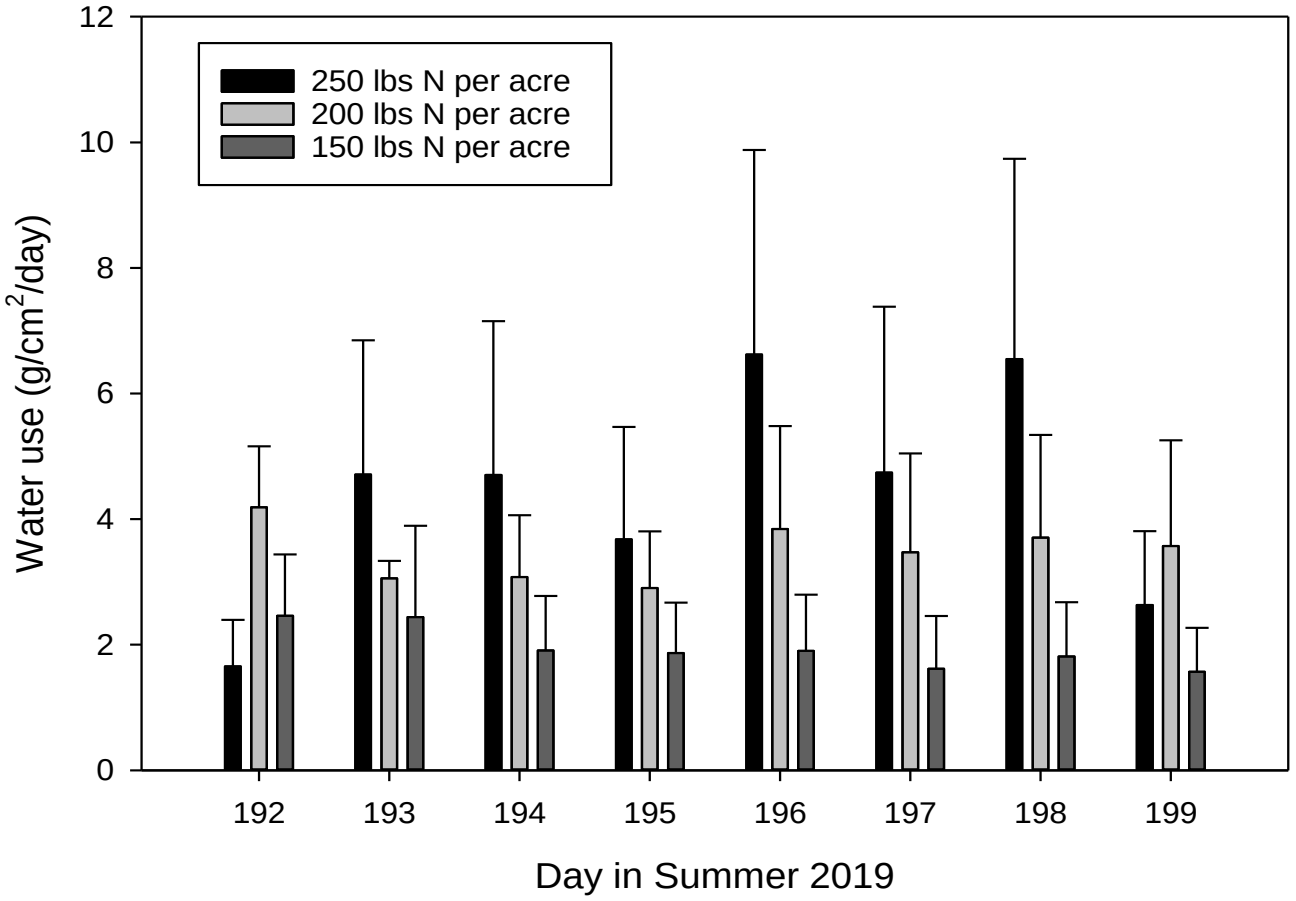
SOIL MOISTURE MEASUREMENTS

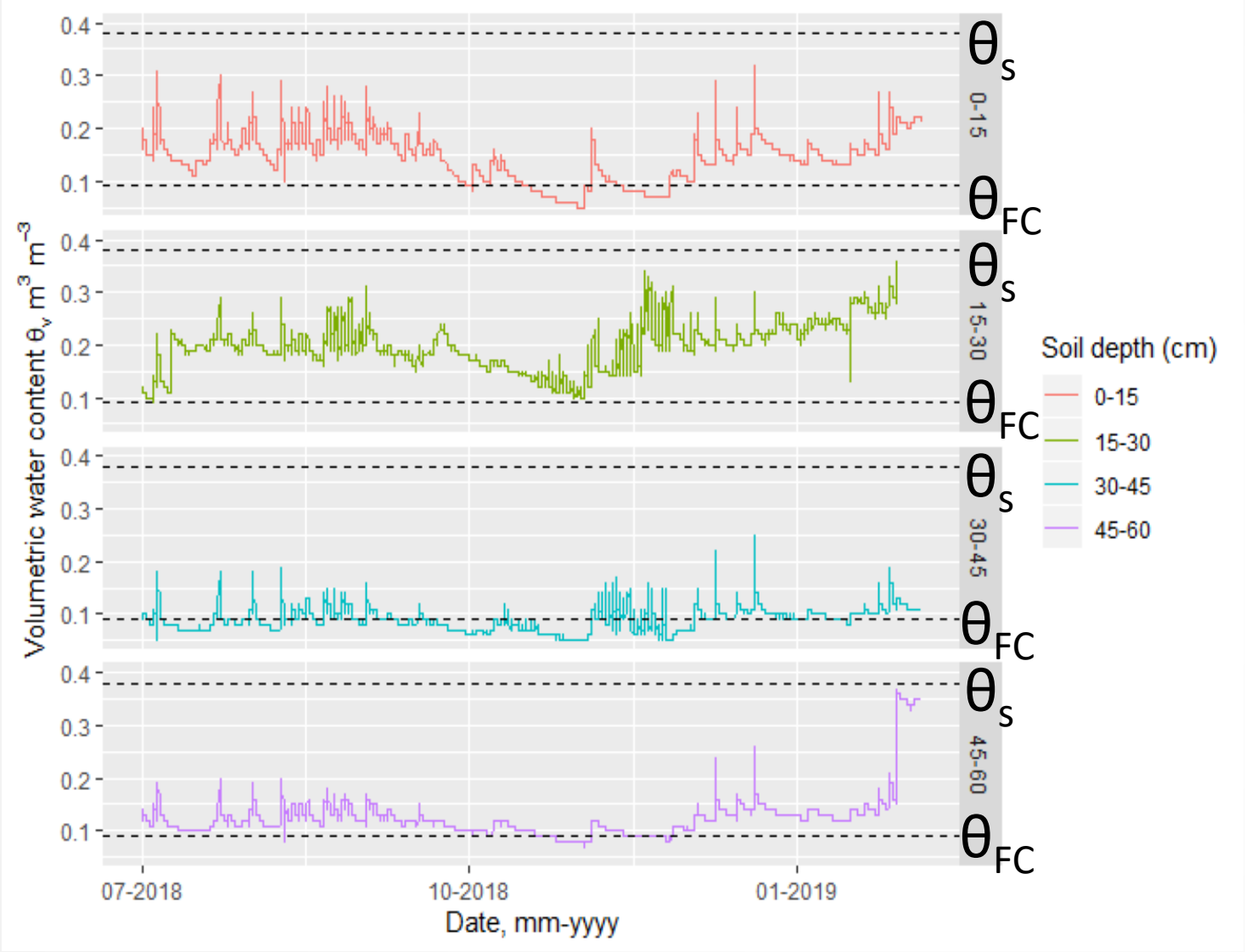
Water monitoring at grove scale and soil moisture measurement at 15, 30 and 60 cm soil depth

IMPROVED WATER USE EFFICIENCY WITH GOOD NITROGEN MANAGEMENT



Daily irrigation could help in managing HLB affected trees and reduce tree water stress with optimal fertilization.

IRRIGATION MANAGEMENT FOR CITRUS



Soil moisture remained above field capacity at 0-6-inch, 6-24-inch depth most of the time and close to field capacity at 12-18-inch depth

HIGHLIGHTS FROM STUDIES
MACRONUTRIENTS AND MICRONUTRIENTS

Study on Micronutrients

- Tree density 450 trees/acre
- N rates -> 150, 200 and 250 lbs N ac^{-1} applied in 4 splits.
- Annual IFAS recommended rate (x1) applied in 3 splits:
  - Mn = 9.0 lbs ac^{-1}; Zn = 5.0 lbs ac^{-1}; B = 1.0 lb ac^{-1}
- Micronutrient treatments ->

  Foliar x1, Foliar x2, Soil x1 and Control
- Soil sampling and moisture monitoring depth: 0-60 cm at 15 cm(6-inch) increments.
- Irrigation was applied to meet daily evapotranspiration (ET) demand.

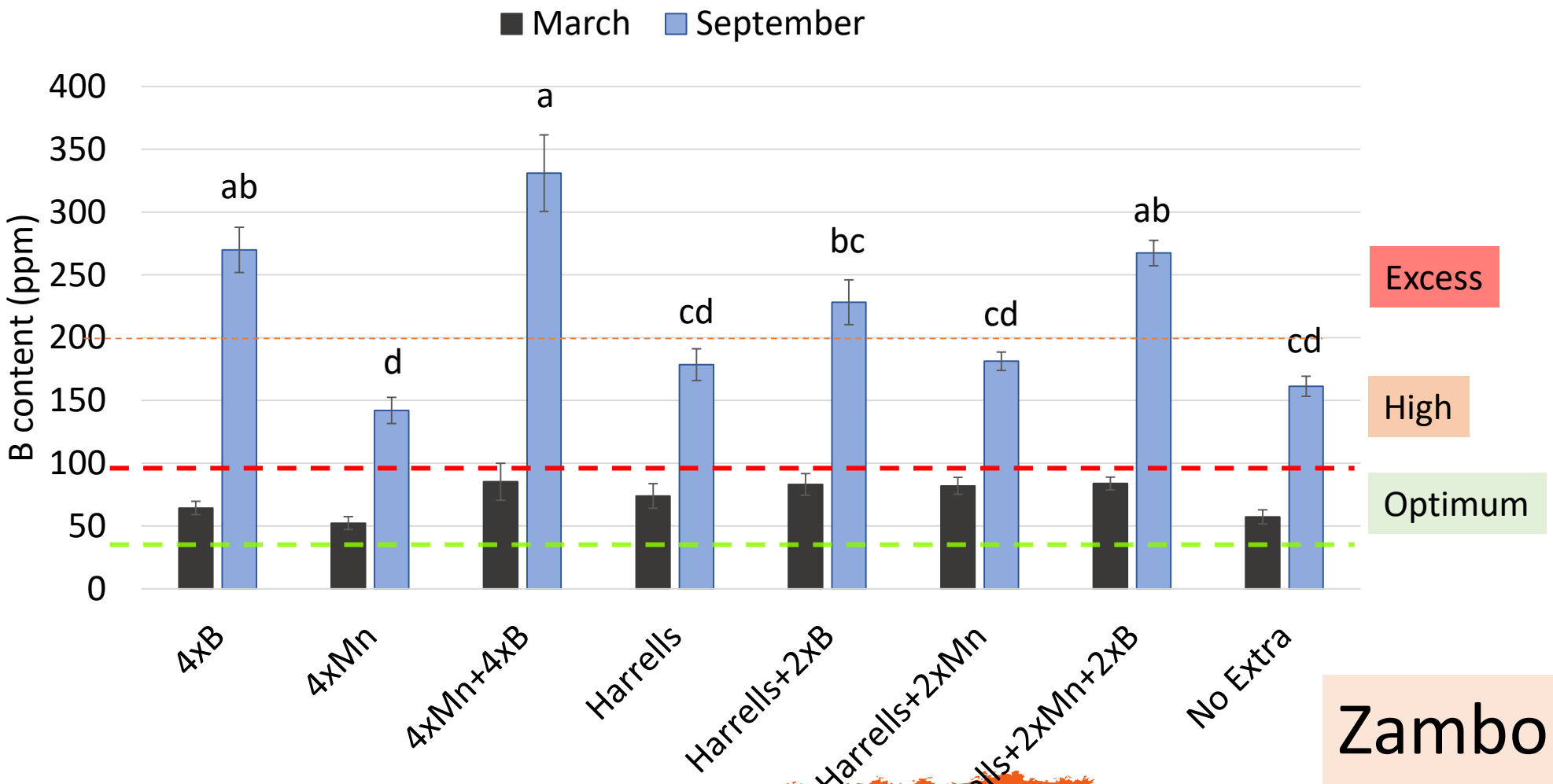
Soil Boron (B), Zinc (Zn) and Manganese (Mn)

Retardation factor (R) of B, Mn and Zn at field capacity (FC) and saturation (S)

Soil depth (inch)	$R(\theta_s)$			$R(\theta_{FC})$		
	B	Mn	Zn	B	Mn	Zn
0-6	1.38	9.34	25.54	3.23	50.03	145.19

Zinc and manganese are strongly held in the rooting zone and might be available or unavailable depending on soil moisture conditions and pH. Boron might leach easily, and regular foliar fertilization is desirable depending on leaf analysis.

LEAF NUTRIENT CONTENT (B)



Zambon et al. 2019

Highlights of study conducted in Southwest Florida

- Immokalee, SWFREC (3rd year)
- N rate of Flatwood oranges (150, 200 and 250 lbs N per acre)
- Compare combinations of micronutrients (Mn, Zn, B) applied foliar only, and combination of foliar and ground applied (at two different rates).
- Determine the amount of Ca and Mg required in ground applications.

Leaf nutrient analysis in Southwest Florida

Leaf N, K, Mn, and Zn was raised to the range of optimum concentration with lower N rate.

Leaf Mn and Zn concentration were elevated from deficient in the untreated control to the high range of treated citrus trees.

Leaf B was above the optimum range regardless of the seasons and treatments.

Root analysis conducted in Southwest Florida

Trees treated with balanced macronutrients (Ca, Mg) had:

- greater total root length, total root area, total root volume.
- balanced above and below ground tree biomass such that increment in leaf area index (LAI) was in conformity to root biomass increase.

SUMMARY

- **FL sandy soils have low water and nutrient holding capacity that need good management practices.**
- **Frequent irrigation promotes better nutrient and water uptake in HLB-affected trees.**
- **Good nutrient management is critical for promoting tree performance under HLB conditions.**
- **It is important to keep up with periodic leaf tissue (minimum of 4x a year) and soil nutrient analysis (1x a year) to be able to know citrus tree needs.**
- **Check out for 2018/2019 Citrus Production Guide. Nutrition for Citrus Trees 3rd Edition will be out soon!**

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QUESTIONS/COMMENTS?

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