




FERTILITY ASSESSMENT & NUTRIENT MANAGEMENT

DRAGON FRUIT / PITAHAYA SEMINAR
UC SOUTH COAST RESEARCH AND EXTENSION CENTER
AUGUST 2014




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Have we reached maximum potential?

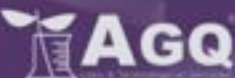



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Steps to Fertility Management

- Understanding the nature of the crop
- Determining field conditions of production site
- Achieving optimal conditions in soil & water
- Plant phenology and nutrient requirements
- 4 R's


(Right rate, Right time, Right place, Right material)


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Nature of the Crop

Plant Origin: South and Central America

- Tropical Climate
- High content of organic matter
- Generally acidic soils
- Humid conditions (68-100 in. rain/year)
- Well drained soils
- Moderate to high salt & drought tolerance



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Soil Requirements

- Sandy-Clay-Loam type
- pH: between 5.3 - 6.7
 - Acid management may be required for California operations
- High Organic Matter content (over 3%)
 - High CEC, High N mineralization, Moisture holding capacity, aeration & drainage

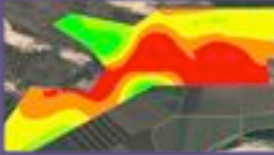



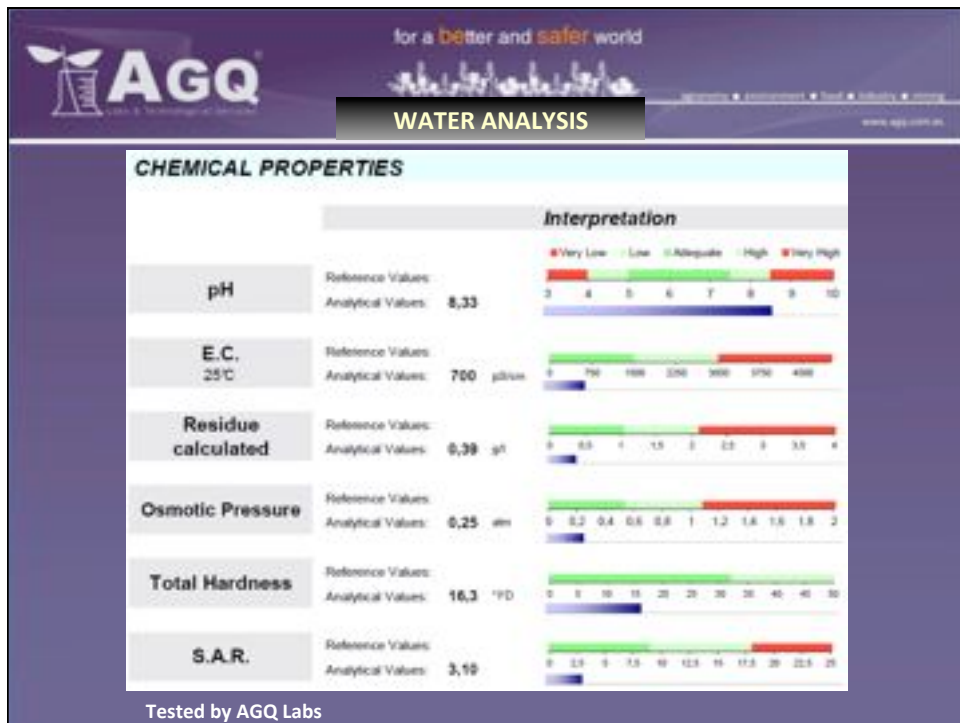
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Evaluating Field Conditions

- Site Homogeneity
 - Soil types, topography, weak areas, etc.
- Soil Testing and Laboratory Analysis
 - Drawn from different management zones to determine deficient/excessive components
- Testing Water Source for Irrigation Suitability
 - Determining if water is apt for use/ if treatment is necessary for pitahaya requirements
- Strategy to Obtain Baseline Optimal Conditions
 - Based on analytical results obtained from soil and water with steps to reach determined composition.



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NUTRIENT MANAGEMENT

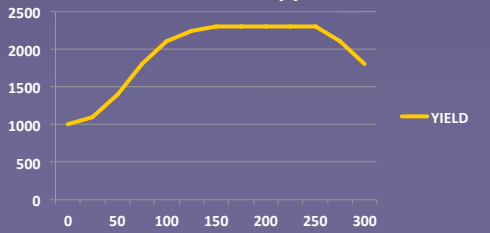
ESSENTIAL MINERAL: element is part of some essential plant constituent or metabolite, and in its absence the plant is unable to complete a normal life cycle and that the

Primary Macronutrients: N, P, K
 Secondary Macronutrients: Ca, Mg, S
 Micronutrients: B, Fe, Mn, Cu, Zn, Mo
 Others in study: Si, Na, Cl, Ni...

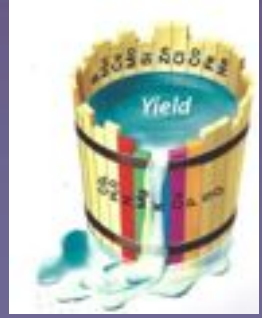
• LIEBIG'S LAW OF THE MINIMUM

YIELD


• NUTRIENT app CURVE vs YIELD



Nutrient Application	Yield
0	1000
50	1500
100	2100
150	2300
200	2300
250	2200
300	1800



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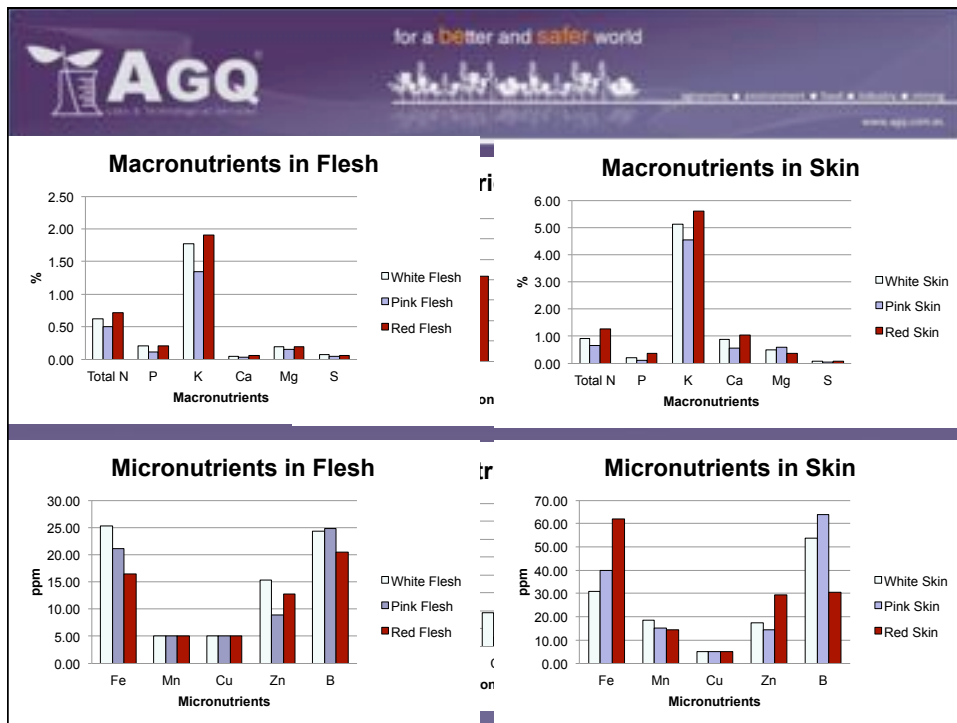
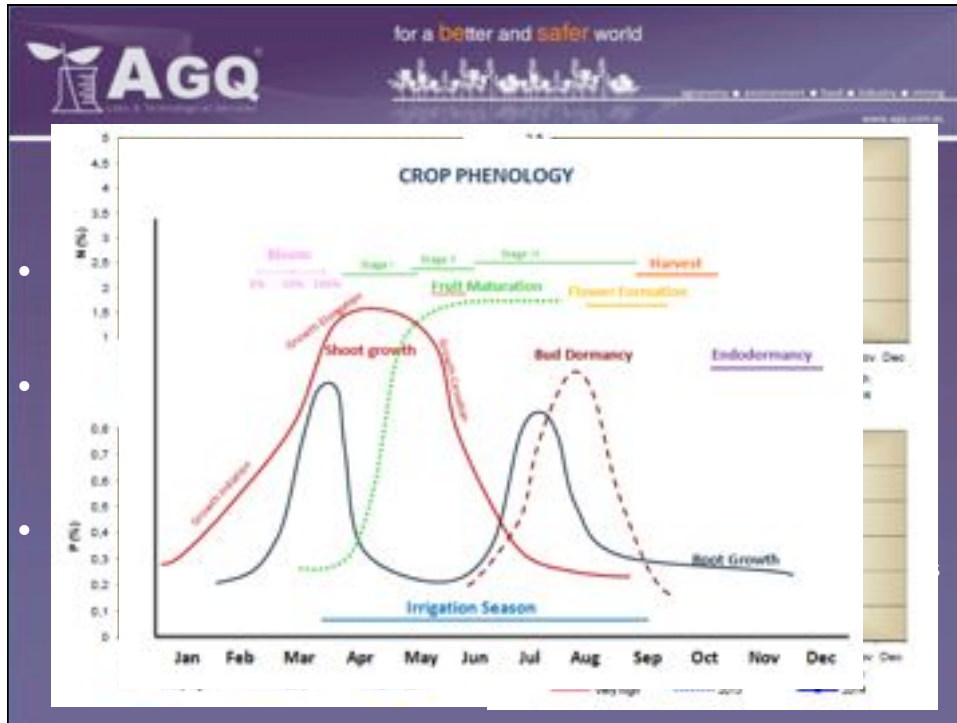
FERTILIZER REQUIREMENTS

University of Florida Extention:

- First year: 6-6-6, 8-3-9, 8-4-12 @ 0.25 lb/vine w/ 2-3% Mg every 2 months. 4 lbs of manure or compost. 4-6 minor element sprays from March-September. EDDHA Fe to soil @0.25-0.5 oz/vine
- Second & Third Years: Increase dry fert. 0.3-0.4 lb/plant using above formulas. Increase manure or compost to 6 lbs/plant. Increase EDDHA Fe to 0.75-1.00 oz/ vine
- Fourth Year +: 0.5-0.75 lb/plant dry fert. 3-4 times/year. Continue minor element and EDDHA Fe applications as before. Manure or compost @ 5 lbs/application twice/year.

Independent study (Nicaragua): 4 T/ha Organic matter + 187 N + 66 P + 198 K (Kg/ha)

National Pintung University (Taiwan): 9 lb/plant steer manure every 4 months + 3.5 oz/plant (13-13-13)



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4 R's

- **Right Rate**
 - Input ratios N:K; vegetative (>1.2) vs. Fruit Generation (<1)
 - Concentrations capable of being drawn efficiently by shallow root zone
- **Right Time**
 - Understanding when plant demand is high or low to avoid under application or leaching losses.
- **Right Place**
 - Keeping nutrients in the effective root zone (consider soil texture and the need for spoon feeding), foliar applications
- **Right Material**
 - Compatible nutrients, only necessary applications, fertilizer quality.

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