

Welcome to the 4-H Citrus Workshop!



Gameplan for today

- **Part 1 – Brief history and general info, tree care**
- **Part 2 – Pests !**
- (A maybe a part 3 – out in the gardens looking for pests)



(Brief) History of Citrus



- Citrus brought to the United States in the 1400's by Christopher Columbus
- And brought to Florida in the 1500's from Spain
- 1800's industry took off



(Brief) History of Citrus

- Acres of citrus has been close to 900,000 acres at times
- In 1980, about 140,000 acres in Lake County- Lake produced more citrus than any other County!
- And 44 million boxes produced
- A box contains about 350 pieces of fruit



Original box



9 box bin

(Brief) History of Citrus

CANKER

GREENING

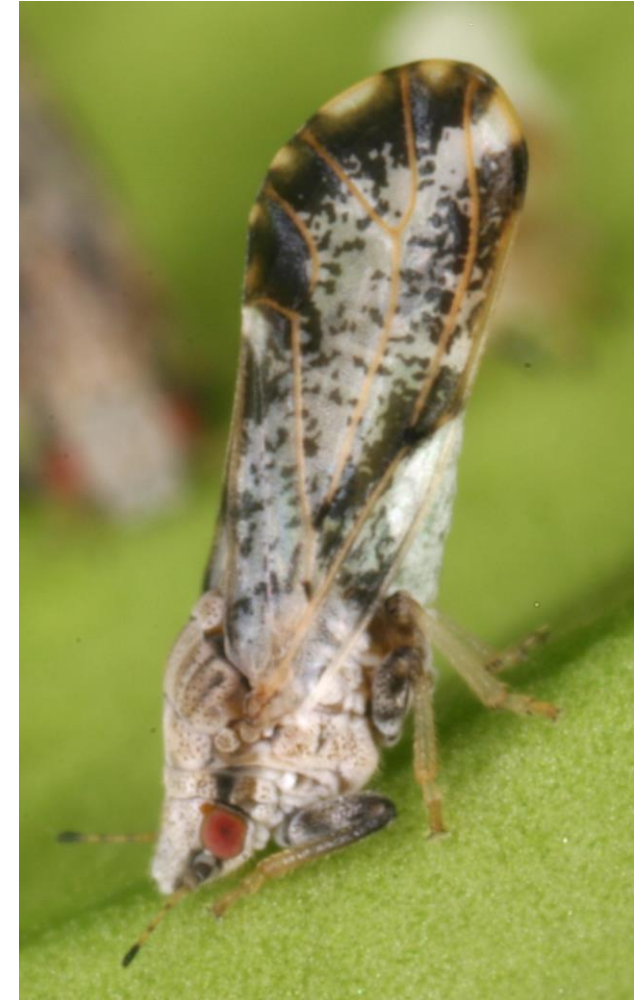
- 80's freezes pushed production south, now most of production
- Freezes, diseases and insect pests, and urbanization have hurt the industry



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(Ok, not SO brief) History

- **Greening or HLB is what has most hurt the industry**
- **Thought to have originated in Asia, was first detected in FL in 2005 and since then, production has reduced by about 75% !!**
- **Bacteria disease that is spread by small little insect called and Asian Citrus Psyllid**



Citrus Industry (General)

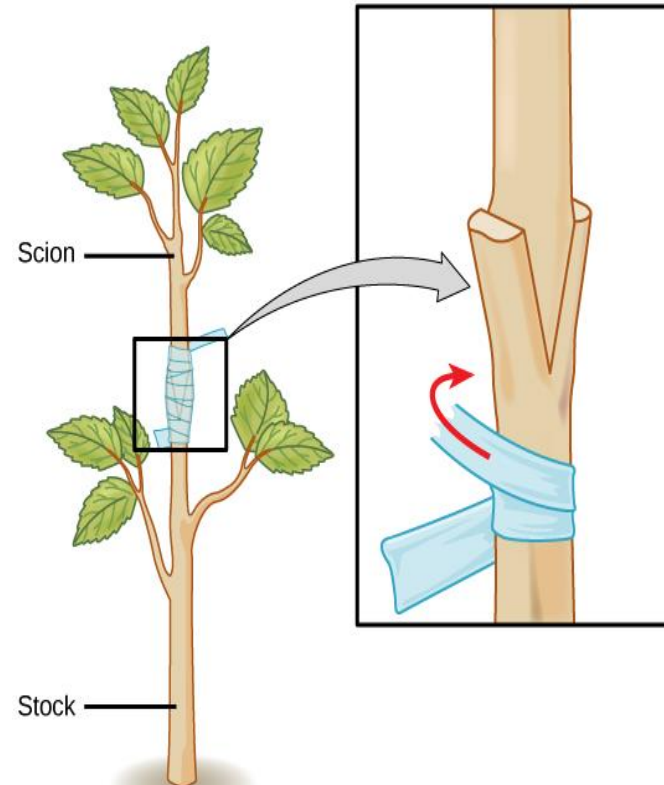
- **Citrus includes**
 - Oranges
 - Tangerines
 - Grapefruits
 - Lemons
 - Limes
- **Genetics similar and you can breed mixing genes from different types**



Citrus Industry (General)

Scions

- Top part
- AKA budwood
- Usually the variety name used to described tree
(Valencia, Hamlin, SugarBelle)
- Chosen for fruit and canopy characteristics



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The merging of the two is called grafting

Rootstocks

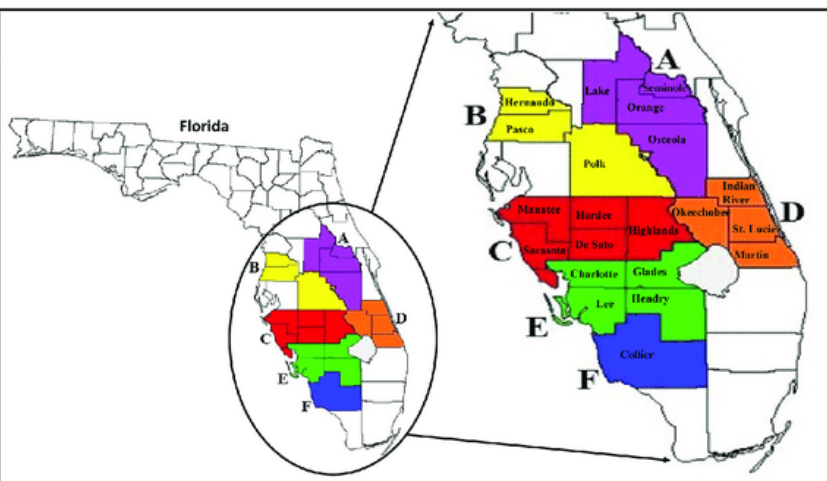
- Bottom part
- Often named with numbers and letter combo
 - (US 942, C-54, Swingle)
- Chosen for better characteristics in root and soil and pest/pathogen relationships

Citrus Industry (General)



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- 3 main areas of industry
 - Nurseries
 - Groves
 - Juice plants and packinghouses
 - Historically, about 90% of Florida citrus has been made into juice
- 4 general production regions
 - We are in the Central Ridge region
 - Deep sandy soils



Citrus Industry (General)

Some harvested by machines, most still harvest by hand

Goat is the machine that takes the smaller batches from the picking crew and takes dumps in into the semi trailer





Now-story

- Around 600,00 acres but much less production – down ~ 75%
- Citrus industry still a powerhouse for FL agriculture and contributes about 7 BILLION dollars to the states economy
- New techniques and adoption of technology to save and advance the industry



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Now-story (Newer Techniques)

IPCs – Individual Protective Covers

Uses



- Keeps psyllid out!
- Protects whole tree
- No chemical sprays * (for psyllids)
- Take off after 1-3 years – healthier tree better able to withstand greening
- Good environment for growing-microclimate
- Has some disadvantages – other pests, cost

Now-story (Newer Techniques)

CUPS - Citrus Under Protective Screen

Uses



- Like a giant IPC that lots of trees can grow under. Keeps psyllids out!
- Protects whole area production area
- Similar pros and cons as IPCs
- Hurricanes

Now-story (Newer Techniques)

Breeding towards resistance!

Susceptible

- No real or additional defenses towards disease or pest issue



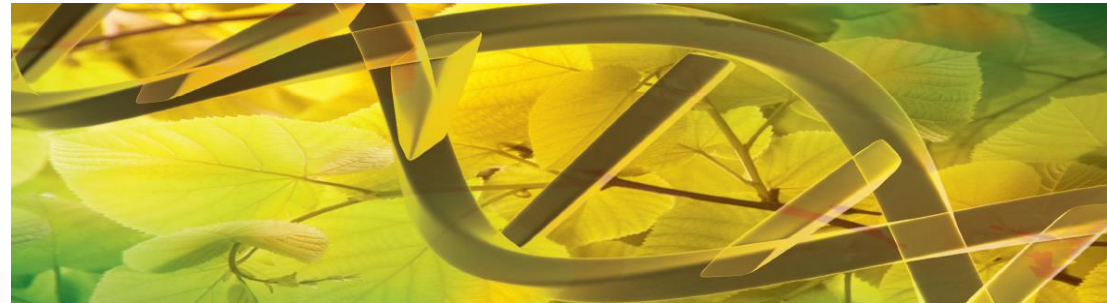
Tolerance

- A plant can tolerate a disease or pest issue to a reasonable level and success
- **BETTER**



Resistance

- A plant can be immune to a disease or pest issue completely or be minimally effected that it shows no symptoms or very little symptoms



Container Growing – Caring for your tree!

Growing in the ground (soil)

- Sandy soils good
- Hard to over water in our area (ridge soils)
- Big root system
 - Can find water and nutrients
- Less control, harder to change



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Growing in container (media)

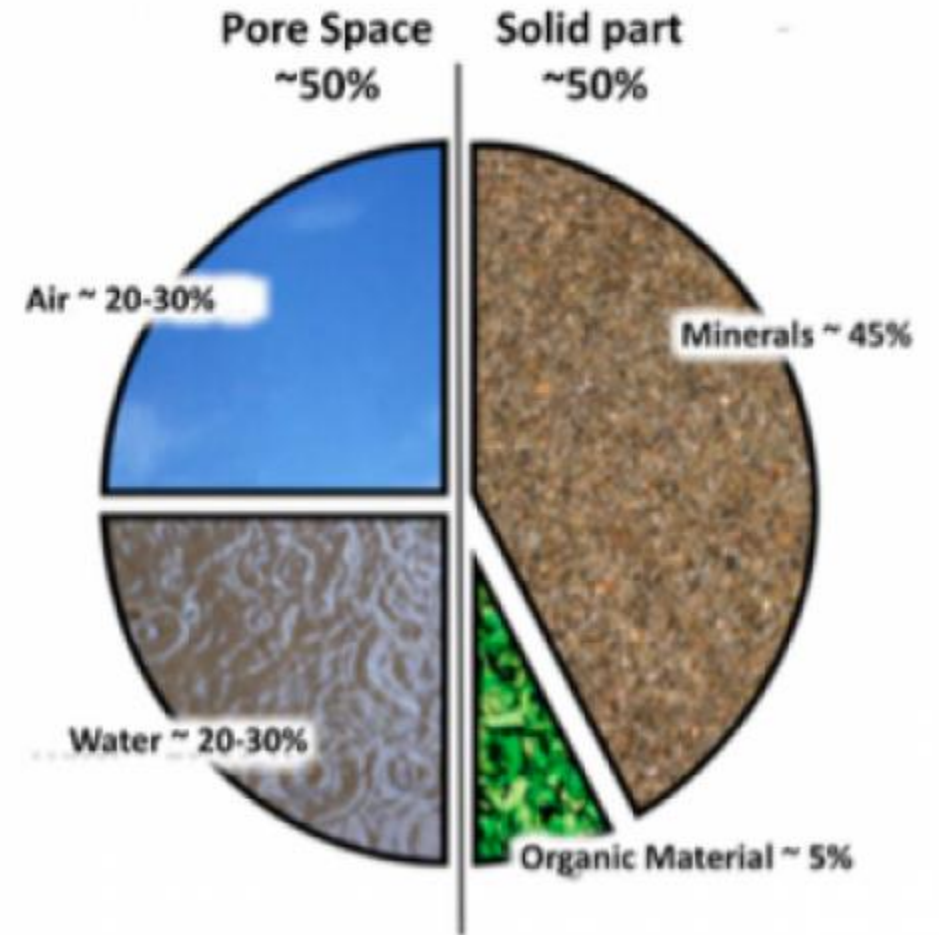
- Sand not good
- Easy to over water potting media
- Smaller root system
 - Limited water and nutrients within pot
- More control, easier to change



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Container Media

- Roots need to breathe
 - Air
- They also need water and nutrients
- Container growing is all about balancing these 3 needs
- Water till soaking wet and don't water again until top inch or two is dry (light brown in color)



Container Media

Water Holding capacity

- Sphagnum peat moss
- Coir (coconut)

Air Space

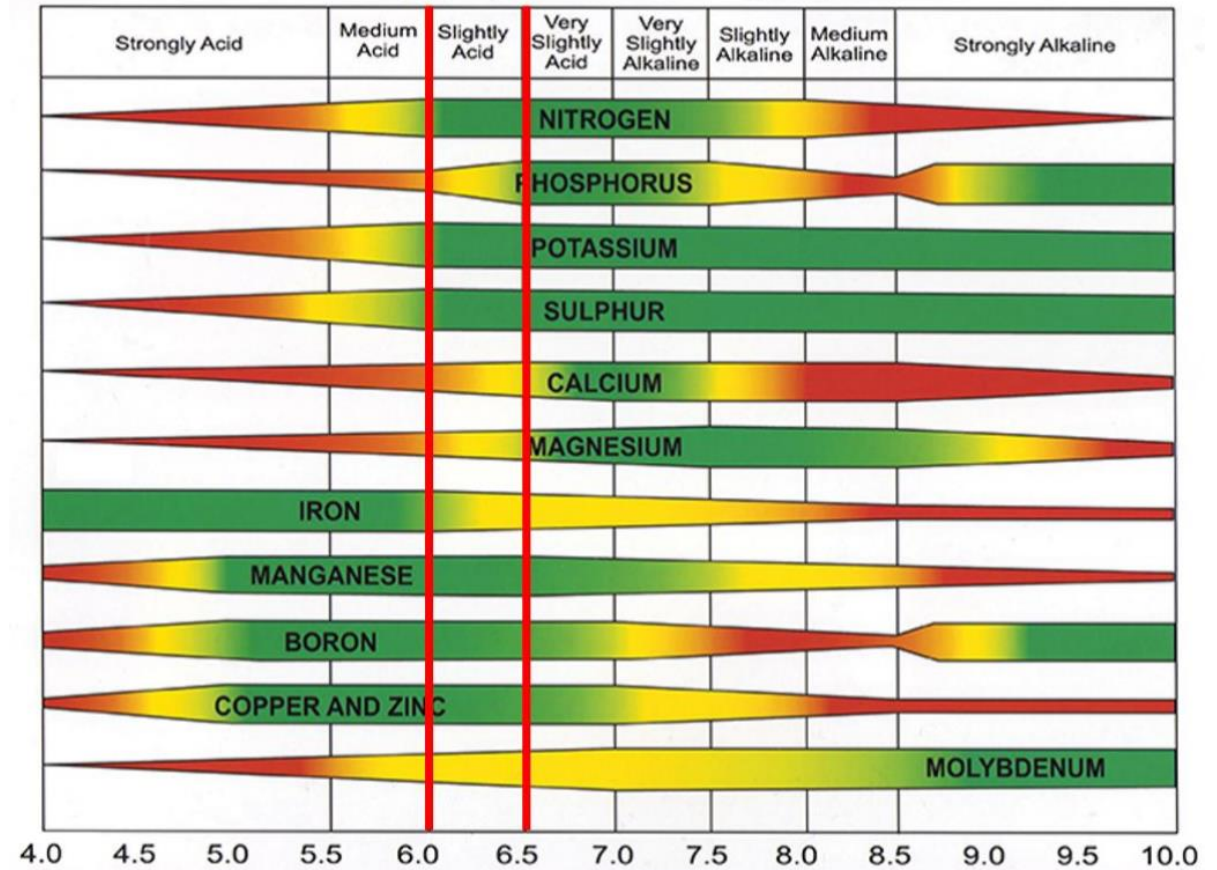
- Perlite
- Wood products (pine bark)
- Stones

Other Container Media Components

- Compost
- Vermiculite
- Kenaf

Essential Nutrients

- Plants make their own food from the sun but there are nutrients they need from the world around them to help them to this – like we need vitamins and minerals
- There are 17 nutrients essential to plants and 14 of them come from the soil
- What are the other 3?
 - Carbon
 - Oxygen
 - Hydrogen

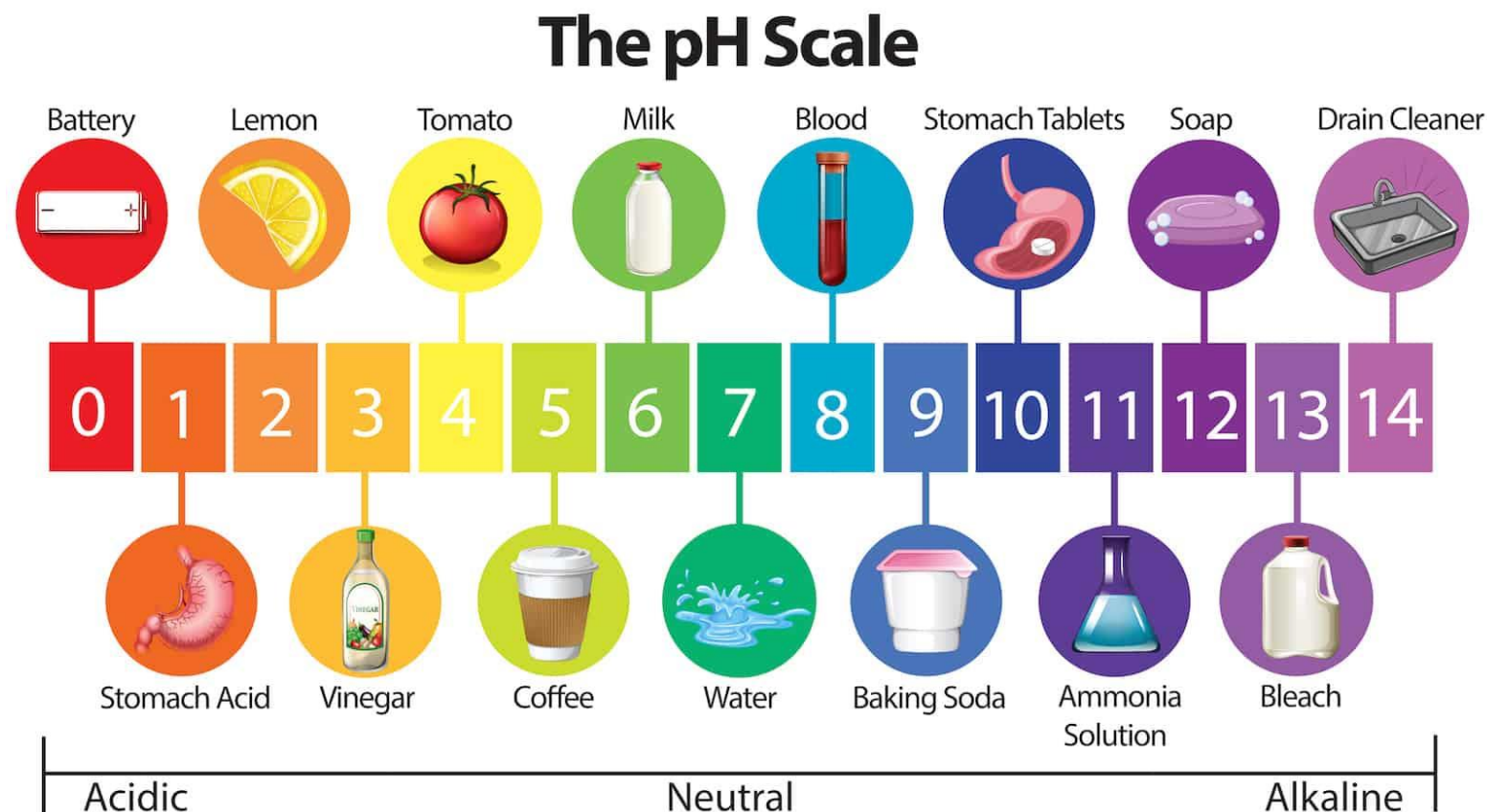


pH and why it matters !

- What is pH ????????

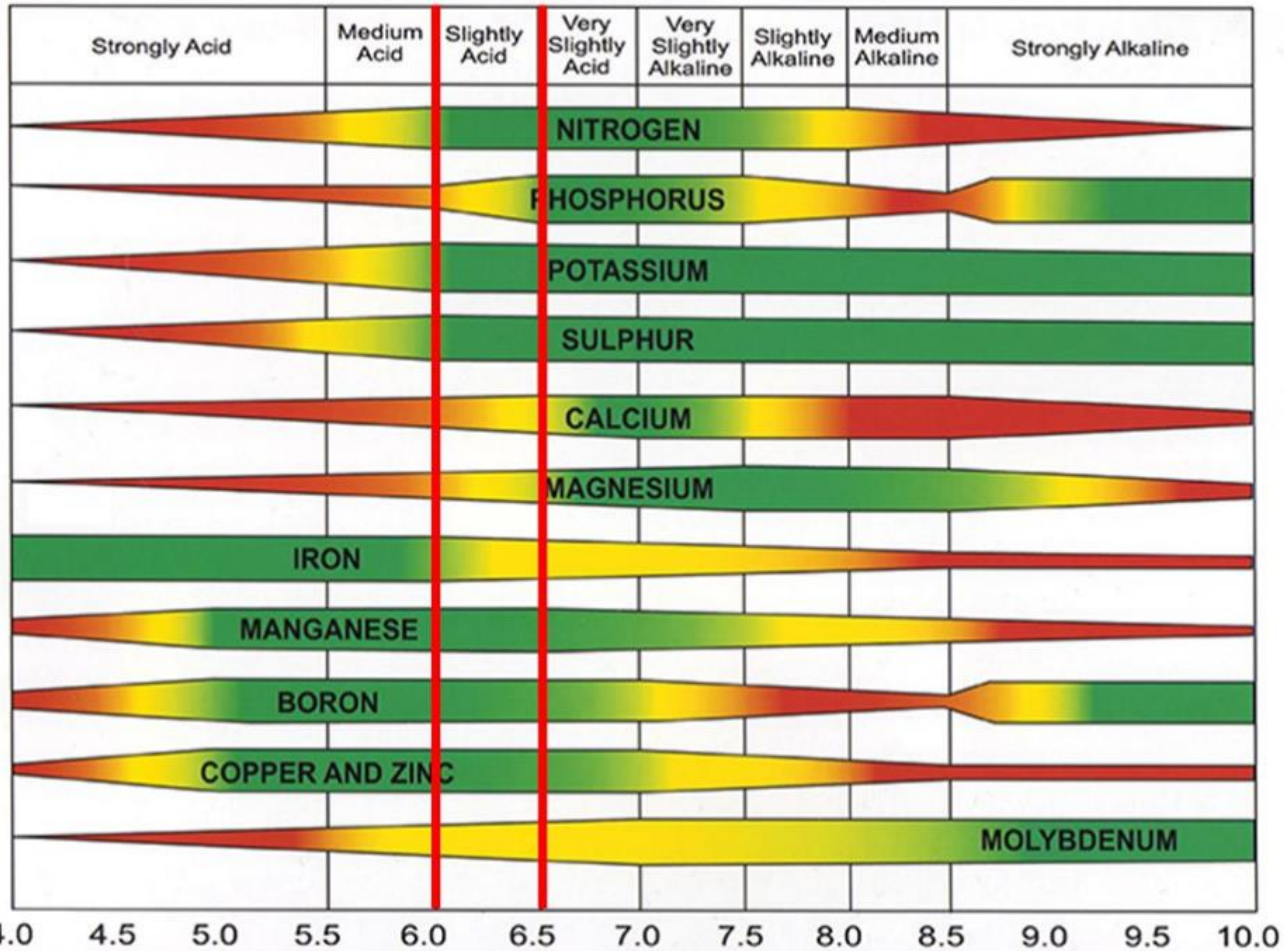
Used to say potential
Hydrogen

- Is a measure of how much hydrogen is in something – which means how acidic or how alkaline something is
- More hydrogen ions, more acidic



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Nutrients



Visual tissue assessment

In Nutrient Management Module 9
<http://landresources.montana.edu/nm>

MOBILE NUTRIENTS

Older/lower leaves affected

YES

Effects mostly generalized; plants dark or light green

YES

Plants dark green, often becoming purple or red

YES

PHOSPHORUS (P)

NO

Plants light green with leaves light green or yellow; no necrotic spotting

YES

NITROGEN (N)

NO

Plants light green; necrotic spotting on leaves; pale leaves sometimes scorched, cupped or rolled

YES

MOLYBDENUM (Mo)

NO

NO

Effects mostly localized; chlorosis with or w/out spotting

YES

Intervinal chlorosis; leaves sometimes red or with dead spots

YES

MAGNESIUM (Mg)

NO

No intervenal chlorosis; chlorotic areas with a burning or spotting along leaf margins

YES

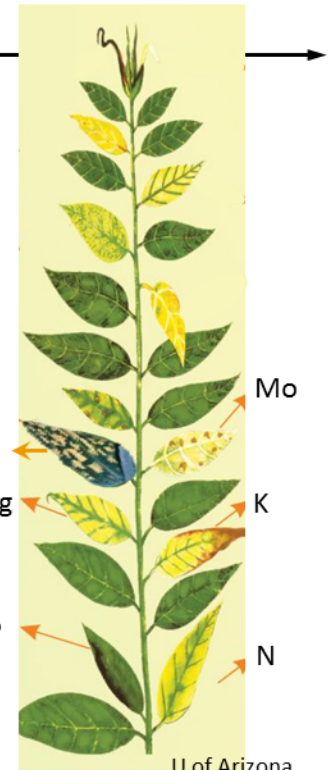
POTASSIUM (K)

NO

No intervenal chlorosis; distinct chlorotic and necrotic lesions (spotting) with abrupt boundary between dead and alive tissue

YES

CHLORIDE (Cl)



U of Arizona

Nutrients

- Exist naturally in soil and environment but often not enough
- So we can add fertilizer (like taking a multi- vitamin)
- What are those 3 numbers on fertilizer bag ?
 - N, P, K
- Good to have those AND other nutrients (micronutrients)
- Micronutrients and good nutrition in general are helpful in fighting HLB



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Types of Fertilizer

- Granular – releases nutrients fast. Doesn't last a long time **(OK)**
- Slow release – releases nutrients slower. Lasts a little longer. **(BETTER)**
- Controlled release, CRF – controlled amount available to plant over longer period of time **(BEST)**



“solid forms”

- Liquid fertilizer – nutrients dissolved easily in water, applied to soil OR to plants leaves. Goes through soil fast. Does **not** last long.

Irrigation

- In groves, micro jet emitters are now commonly used instead of overhead irrigations
 - Allows us to save water
- In nurseries, drip irrigation is often used (drip emitters)
 - Allows us to save water each pot slowly and avoid wetting plant leaves – which can lead to disease



← Microjet
Emitter

Drip irrigation or
drip emitter →



Technology in (Citrus) Agriculture



Automation

This is a potting machine that nurseries can use to pot plants for them. Machines can also harvest fruit, deliver precise amounts of chemicals



Soil Moisture Sensors (SMS)

Measure soil water – save water



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Drones/Sensors

Imaging, spraying