PECAN TREE PLANTING 101

TEN STEPS TO A GOOD START

Monte L. Nesbitt, Extension Horticulture

Step 1: Start right with healthy, legal and appropriate trees:

- Legal: (Texas) Movement of plant material into El Paso, Hudspeth, Culberson, Jeff Davis, and Presidio counties requires phytosanitary treatment and is subject to state inspection if originating anywhere other than CA, AZ or NM (except Eddy & Chavez Counties, NM)
- Appropriate: Is there data to support planting the cultivar in your area of Texas or (---------)?
  - Nut maturity time, Scab/aphid resistance, alternate bearing, etc.

Step 1: Start right with healthy, legal and appropriate trees

- Rootstock considerations:
  - Budbreak influence
  - Fall dormancy influence
  - Vigor—rate of growth
  - Salinity tolerance
  - Cotton root rot resistance?

North	West	Central	Southwest	Southeast	East
Giles	Riverside Burkett	Riverside Burkett	Apache VC1-68	Elliott Curtis VC1-68	Moore Curtis

Grauke, Texas Pecan Handbook, 2012

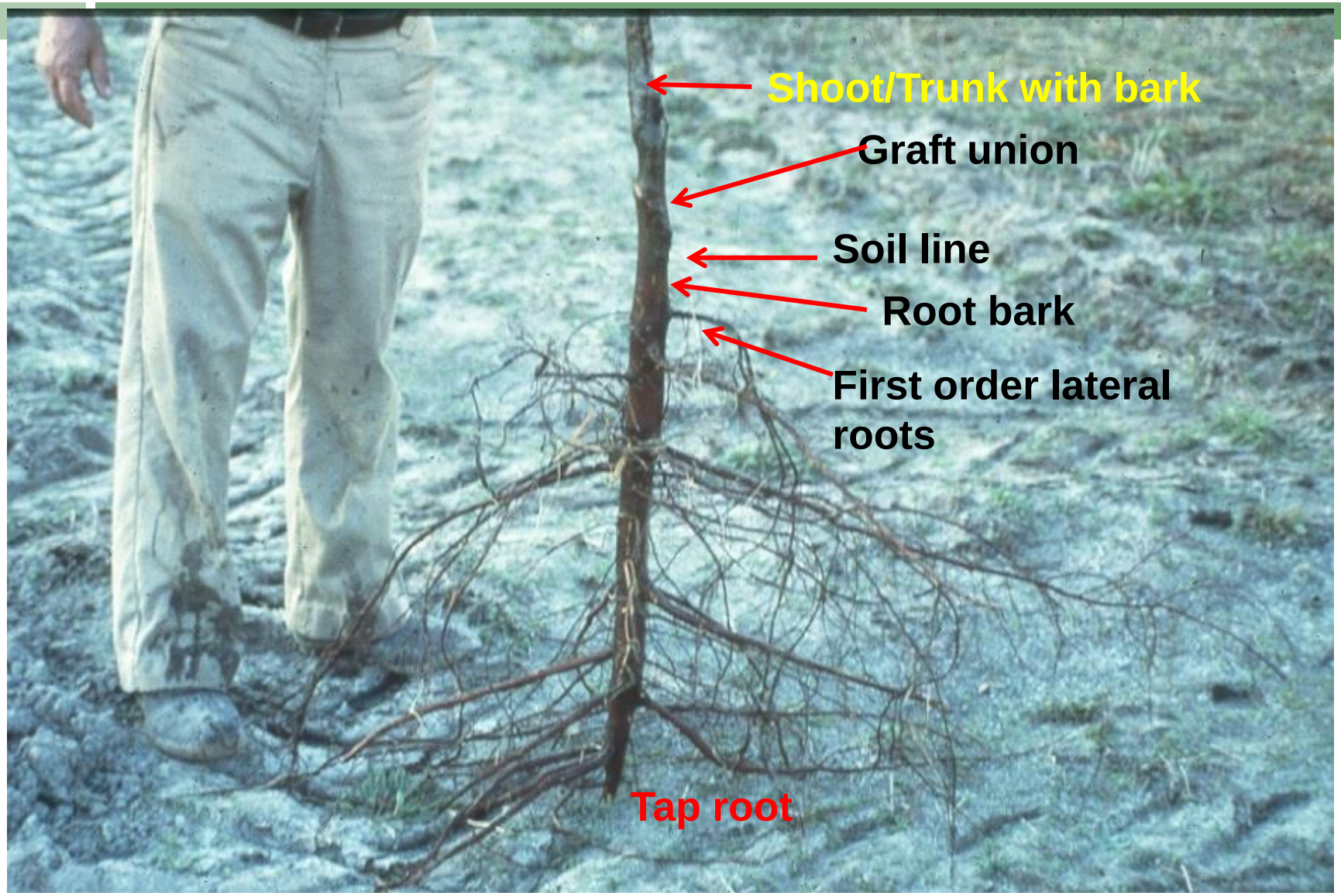
Step 2: Plant at appropriate time

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Fully Dormant	Bud Swell	Expanded leaves	Shoot growth
Bareroot	√	√	?	?	×	×	×	×	×	×	?	√	√	?	×	×
Container	√	√	√	√	√	?	×	×	√	√	√	√	√	√	√	√

Step 3: Plant trees of size you can be successful with.

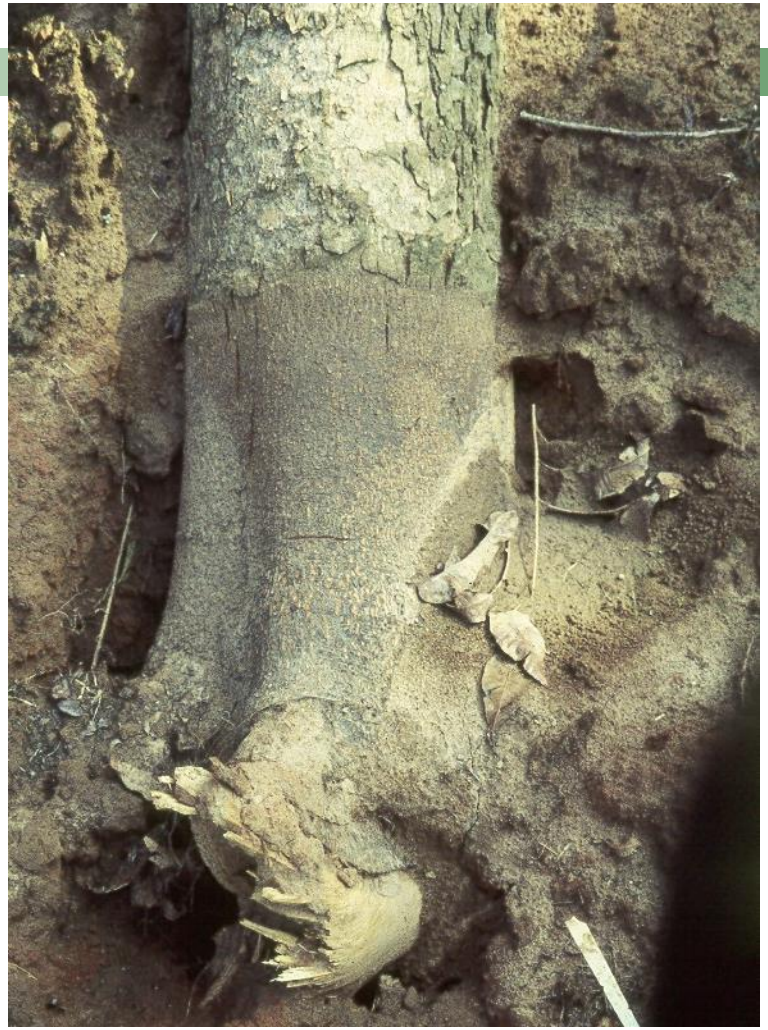
- Bare-root: Any plant of any ht. or caliper can survive if in good health, handled well, and planted correctly.
- BUT transplant success is more challenging with:
  - Ht <2’, caliper<3/8” or
  - Ht >10’, caliper>1 1/2”
- Containers: Pot size (root volume) should be proportionate to ht and caliper.

Step 4: Know the terminology

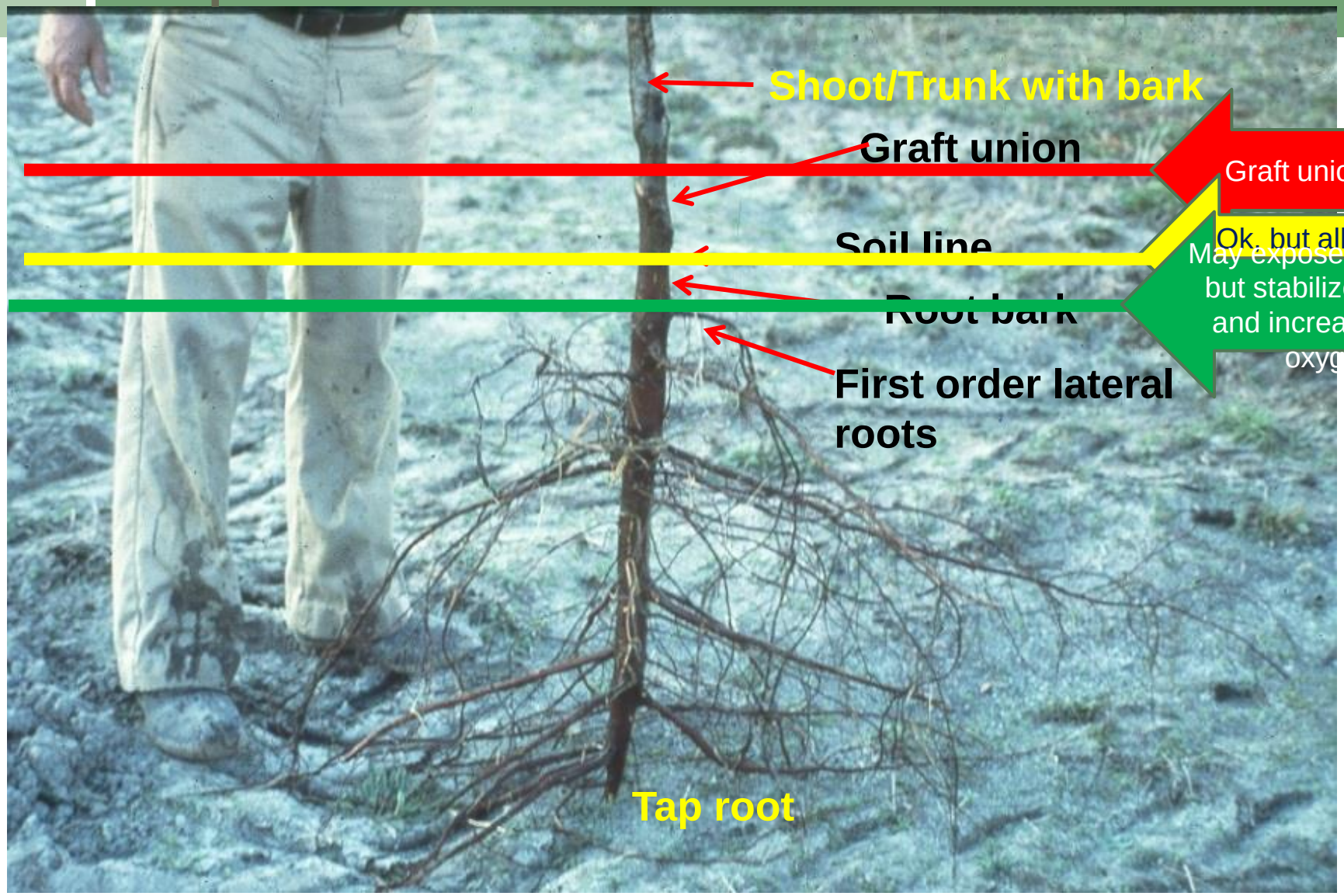


Importance

- Graft union—delineates the cultivar from the rootstock. Adult phase wood that won't root even if buried, creating a potential for wallowing.
  - If it roots, can create horticultural problems (not likely in pecans).
- Root bark—toughens over time, much like trunk bark, but may provide a site for freeze injury in early months/years.
- Soil line—identifies nursery planting depth, but doesn't always identify lateral root depth. Reflects nursery soil texture, seed depth and watering practices.
  - Why plant at the same depth in totally different soil?
- First order lateral roots—important to be at or near soil line to stabilize trunk and prevent wallowing.
  - High oxygen content important for overcoming transplant shock.



Step 5: Choose right planting depth.

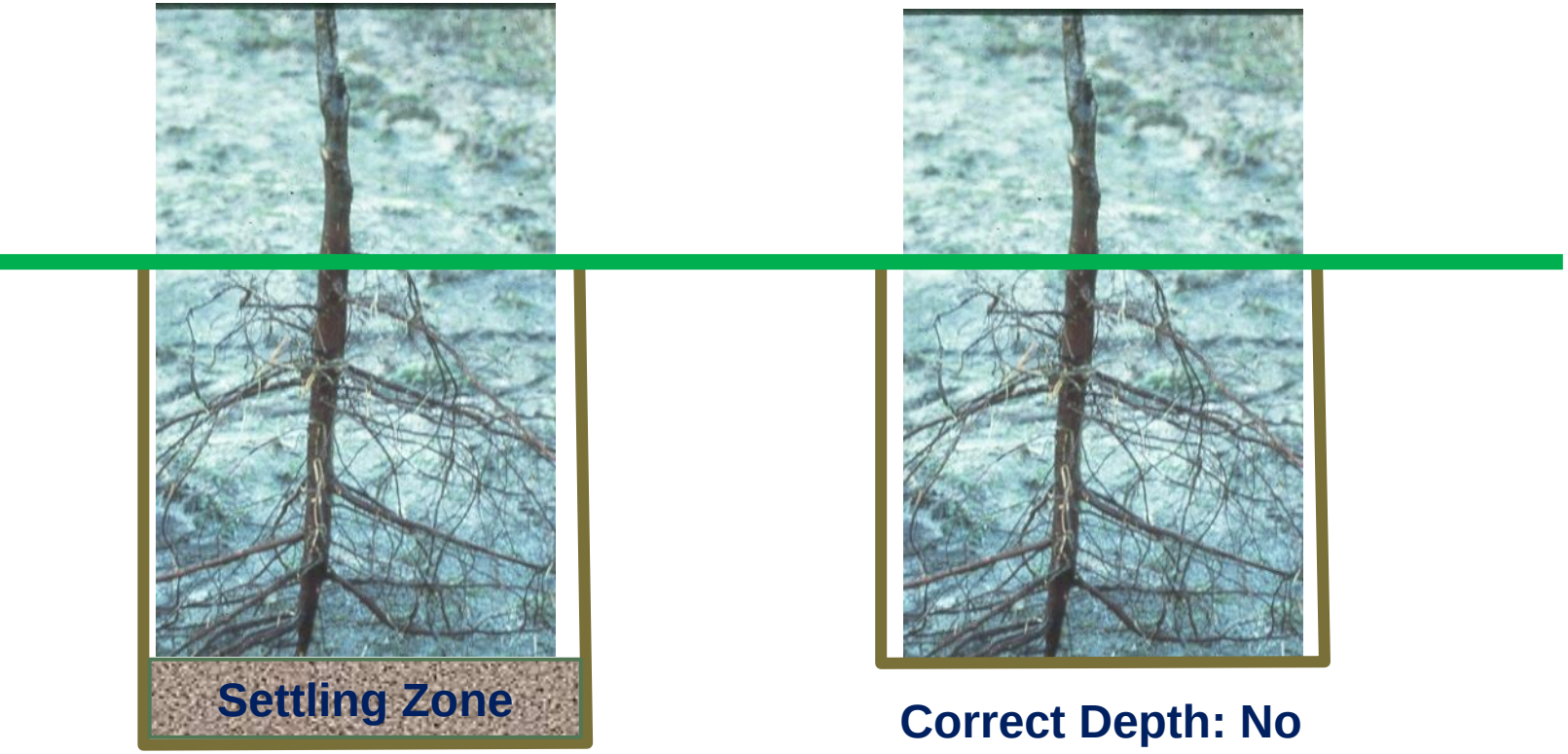


Graft union buried

Ok, but allows for May expose root bark, but stabilizes crown and increases root oxygen

Step 6: Beware of Settling

- Avoid digging holes deeper than the root system, which increases settling



Correct Depth: No Settling

Bare-root tree planting

Dig holes no deeper than needed to hold the roots. Firm up the base to prevent

Root prune if needed rather than circle roots around the hole.
Or dig wider hole

What is appropriate hole width?

Accommodate roots without circling.
Prune roots or dig wider hole

where soil is

Step 7: Don't get fancy with your backfill

- Possibilities:
  - [illegible] soil
    - [illegible]mpo[illegible]
    - [illegible]
    - Pea[illegible]s
    - [illegible]awdu[illegible]
  - [illegible]psoil"
  - Native soil

Depending on time of year, eliminate soilless media when transplanting

- Realities:
  - Native soil
    - Especially on dense clays

Avoid Differential Drying

What if native soil is heavy clay?

Only use the native soil, but elevate the trees above grade on berms or mounds.

Step 8: Don’t get fancy by fertilizing when planting

- Possibilities:
  - Fertilizer
  - Lime to raise pH
  - Root stimulator
  - Rooting hormones
    - (IBA, BA, NAA)
  - Mycorrhizal inoculant
  - Other—humates, etc.
- Realities:
  - The planting hole is a small volume of soil.
    - Nutrient & pH correction is better made pre-plant at the field level.
  - Many root stimulator products have unproven components (vitamin B-1)
  - There is science to support hormones and mycorrhizal inoculants, but there are many interactions which make the potential outcomes situational.

Step 9: Plant with sound horticultural technique

- Position
- Fill
- Tamp
- Flush
- Cover
- Firm

Position

- Identify depth line
- Orient bends (graft) into prevailing wind (south in Texas)
- Plumb with topography.
  - Unless the tree is crooked.
  - Plant the roots crooked to have a straight top.

Fill & Tamp

- Use a wooden broom handle or fiberglass rod to tamp/press soil through and around roots to base of hole.

Flush

- With hole ½ to 2/3 filled with native soil, flush with water, to further settle soil particles and displace air pockets.

Cover

- Cover the roots and fully fill the hole, using tamping rod to pack soil firmly from base to top of hole.

Firm

- Use weight to firm the soil, leveling off with top lip of hole.
- Recheck tree position, insuring that the tree has not settled.
- If settled, unpack, remove and start over.

Step 10: Prune the top

- The argument for:
  - Assumes root reduction or shock
    - Bare-Root-Yes
    - Containers-Maybe
  - Pruning reduces transpiration demand, allowing time to grow new roots.
  - Training is facilitated by early pruning.

Experienced Orchardists

- The argument against:
  - All leaves make energy; necessary for new roots.
  - Reduction of branches/leaves reduces transplant shock and early re-growth.
  - It visually feels bad!

Landscapers/Arborists

Even though painful to you, cut tree back 1/3 to ½, which facilitates root growth and establishment.

CARE: WATER & FERTILIZER

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Water trumps fertilizer in pecan orchard establishment

First year tree--struggling

Second year tree--thriving

Facts about roots and water

- Most feeder roots responsible for water uptake establish in the top 1-2 ft of soil.
- Roots CANNOT grow in areas where there is no plant available water.
  - They will NOT seek or grow to water.
  - They grow where there is water.
- With good watering, roots will spread outward significantly from the trunk during the first two years.
- #1 Goal after planting is do not let the roots dry out!
- BUT……

Overwatering is a major stunter/killer of young pecan trees.

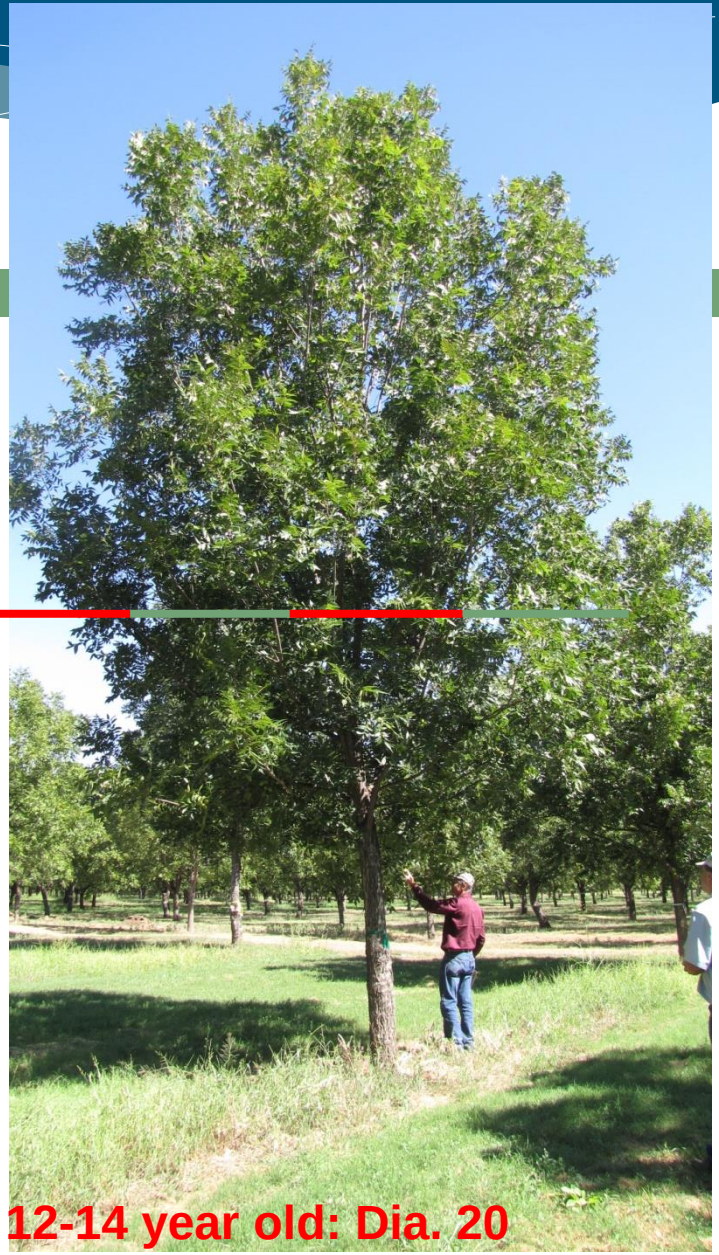
Photo: McEachern

PBLS: observed in soils that are too dry, too wet, or compacted.

1-2 year old: Dia. 1.5 ft.

4-5 year old: Dia. 6-8 ft

7-8 year old: Dia. 10-12 ft



12-14 year old: Dia. 20 ft

How Much Water??—Depends on soil type, canopy size and conditions influencing evaporation.

TEXAS A&M AGRILIFE EXTENSION

Pan Evaporation as estimato of pecan tree water needs.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
College Station	.08	.10	.15	.19	.22	.27	.28	.28	.22	.17	.12	.09
Fort Stockton	.13	.17	.29	.36	.41	.48	.44	.40	.30	.23	.17	.13
Austin	.08	.11	.17	.20	.23	.28	.30	.31	.23	.17	.12	.08
Temple	.08	.11	.16	.20	.22	.28	.31	.31	.24	.18	.12	.09

Q (Gal/tree/day)=D2 x E x 0.80 x 0.49

6 ft Trees, Fort Stockton, June=6.8 Gallons per Day

6.8 G/Day x 7 days=1,666 GPA/week (35 Trees/A)

One acre-inch water=27,154 gallons

Based on research with medium-sized trees with little crop.

Soil moisture can be measured to more accurately determine when plant available water is nearing depletion

Options for water delivery

- Drip—punch-in emitters or drip loops
- Drip—pre-set emitters
- Subsurface Drip—closely spaced
- Microsprinklers
- Solid Set

Initital system for establishment vs. permanent system for mature orchard

Mulch slows soil moisture evaporation, reduces weed emergence, lowers root temperature: a win-win-win for plants and the grower!

Studies on young pecan trees demonstrated 36-60% increase in trunk caliper over weed control area, depending on area mulched.

Minimum of 4 ft x 4 ft, 8 inches

Application of fertilizer (salts) to newly planted trees can compromise establishment.

Trees should demonstrate new leaf & shoot growth before applying any fertilizer.

Know what is in your soil and water

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess.	Fertilizer Recommended
pH	7.9	(5,8)	-	Mod. Alkaline							
Conductivity	350	(-)	umho/cm	None				CL*			
Nitrate-N	11	(-)	ppm								75 lbs N/acre
Phosphorus	13	(50)	ppm								90 lbs P2O5/acre
Potassium	310	(150)	ppm								0 lbs K20/acre
Calcium	6,247	(180)	ppm								0 lbs Ca/acre
Magnesium	240	(50)	ppm								0 lbs Mg/acre
Sulfur	16	(13)	ppm								0 lbs S/acre
Sodium	82	(-)	ppm								
Iron	8.23	(4.25)	ppm								
Zinc	0.68	(0.81)	ppm								2 lbs Zn/acre
Manganese	9.22	(1.00)	ppm								0 lbs Mn/acre
Copper	0.70	(0.16)	ppm								0 lbs Cu/acre
Boron											
Limestone Requirement											0.00 tons 100ECCE/acre
Organic Matter	3.84		%								

Another Texas Example

Analysis	Critical Level	Orchard	Description	Recommendation
pH	6.2	7.8	Mod. Alkaline	None
Nitrate-N		3 ppm	Extremely Low	140 lbs/Ac
Phosphorus	50	8	Very Low	65 lbs/Ac P2O5
Potassium	100	563	Very High	None
Calcium	180	13,580	Very High	None
Magnesium	50	619	Very High	None
Sulfur	13	16	High	None

Deal with pH and macronutrient deficiencies (except N) before

Nitrogen Nitrogen-Essential for growth & tree development

- Not stable in soil
  - Leached by irrigation & rainfall
- Trees are depleted early in spring, so uptake is great at this time.
- Needs vary with tree age, soil type, orchard floor management practices, and crop load.
- Recommended rate is 80-200 lbs N/Acre for bearing trees

1-2 year old: Limb Spread 1.5 ft.

4-5 year old: Limb Spread 6-8 ft.

7-8 year old: Limb Spread 10-

Nitrogen

20-40 lbs/Acre/Year

Fourth –seventh year trees: target rate of 0.60 to 1.25 lbs actual N per tree per year

Second and third year trees can receive from 0.25 to 0.40 lbs actual N per tree per year

Nitrogen delivery rates for first year trees are typically ½ pound of ammonium sulfate (0.1 lb actual N) total. Or 1.0 pound 10-10-10 or 13-13-13. First application not before May of planting year and not later than August 15.

Zinc (Zn): Mild to moderate deficiency symptoms

Target Leaf Levels (Texas): 80-500 ppm

Severe Zn deficiency symptoms

Small leaves, lateral bud breaking, dwarfy-appearing trees.

Foliar Applied Zinc

- Prevents rosette.
- Increases leaf expansion of GROWING leaves.
- Ground application to high pH soils ineffective.

What to Spray

1-2 lbs zinc sulfate wettable powder/100 gal water

2 TSP/gallon

Or

1 qt zinc nitrate/100 gal water

Efficacy increased by addition of 32% Urea ammonium nitrate

@ 1 qt/100 gal water

On young trees, sprays made anytime to new flush growth are helpful.

***Bi-weekly, April to August**

Texas A&M Orchard, Brazos River Bottom,

Nickel (Ni) Deficiency & Correction

- Trees grown in containers with soilless media may exhibit Mouse-Ear disorder after transplanting to the field.
- Correct with foliar nickel fertilizer product
  - Nickel lignosulfate
  - Example: Nickel Plus (Nipan LLC)

Purpose of a leaf sample

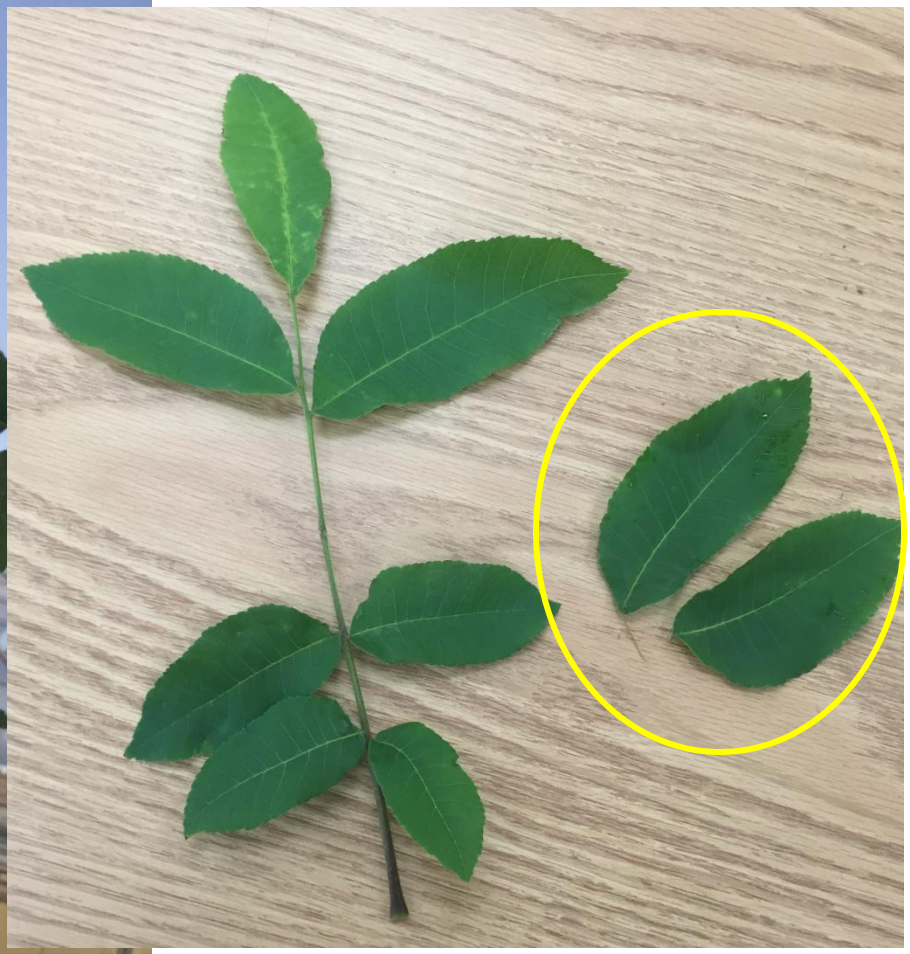
- Assess how current year fertilizer (or lack thereof) ***directly*** influences trees in the orchard to either meet or exceed comparable benchmarks.
- Provides little help if not used as a comparison to known standards sampled at the same time (July).

Pecan Leaf Analysis Sufficiency Levels

Element	Dry Wt. Concentration Texas
N-Nitrogen	2.5 to 4.0%
P-Phosphorus	0.15 to 0.30
K-Potassium	0.75 to 1.25
Calcium	0.70 to 3.00
Mg-Magnesium	0.30 to 0.60
Fe-Iron	50 to 300 ppm
Mn-Manganese	40 to 300
Zn-Zinc	80 to 500
B-Boron	20 to 45
Cu-Copper	10 to 30

Find leaf at midpoint of branch in July

How to Sample



Collect 50 leaflet pairs

Tips on Leaf Sampling

- **Be consistent in sampling month, sample trees, keeping varieties separate, sampling from nut-bearing or non nut-bearing terminals, sun exposed, canopy position, mid-point of growth…**

Leaf Washing Procedures

- 1. Send leaves directly to laboratory and request acid wash. **OR**
- 2. Wash leaflets in a 1% hydrochloric acid solution (Although it depends on the concentration of the muriatic acid, usually 2 TBSP /gallon of water will approximate a 1% hydrochloric acid solution.),
- Rinse in five separate distilled water baths and air dry before shipping."

http://soiltesting.tamu.edu/

Contact

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