



INDEX FRESH  
**SEMINAR**  
— SERIES —



**Brokaw Nursery LLC**

Mailing: P.O. Box 4818, Ventura, CA 93007-0818 U.S.A  
Physical: 5501 Elizabeth Road, Ventura, CA 93004  
Tel. 805-647-2262 Fax 805-671-9738



# Girdling in Avocados

**CONSUELO FERNANDEZ | BROKAW NURSERY LLC**  
**SAMUEL GARIBAY | BROKAW NURSERY LLC**

# ASPECTS TO DISCUSS:



- What is girdling?
- Physiology
- Application in avocado
- Why do we do it?
- When do we do it?
- How do we do it?
- How do we choose which trees to girdle?
- How do we choose which branch to girdle?
- How do we know if we girdled correctly?
- Advantages and disadvantages
- Notes



**INDEX FRESH**



**Brokaw Nursery LLC**

# WHAT IS GIRDLING?



*“A variety of methods used to stop or reduce the flow of sap via the bark or phloem to the lower parts of the tree and to the roots.”*

 Girdling

 Cincturing



**INDEX FRESH**



**Brokaw Nursery LLC**



**INDEX FRESH™**



**Brokaw Nursery LLC**

# WHY ARE GIRDLES USED IN AGRICULTURE



- Effect on timing of flowering and fruiting
- Effect on fruit size
- Effect on yields
- Kill unwanted trees



# PHYSIOLOGY



# Overview of Transport in Plants

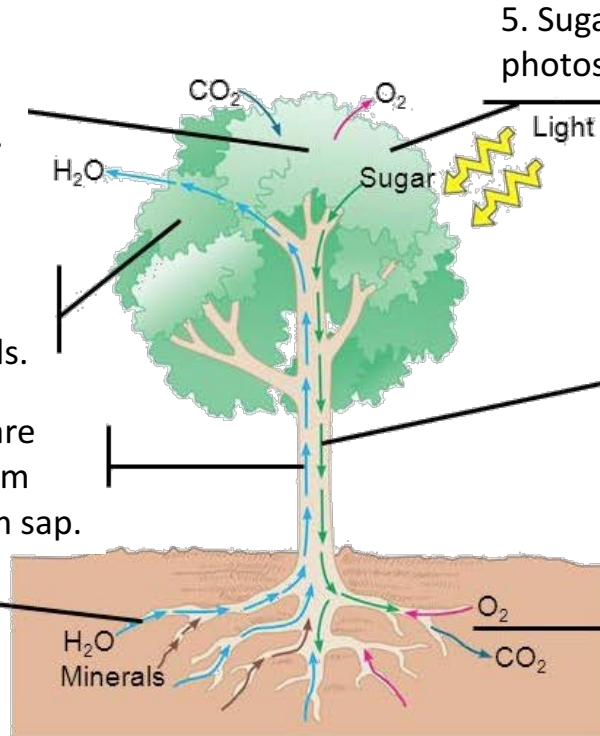


4. Through stomata, leaves take in  $\text{CO}_2$  and expel  $\text{O}_2$ . The  $\text{CO}_2$  provides carbon for photosynthesis. Some  $\text{O}_2$  produced by photosynthesis is used in cellular respiration.

3. Transpiration, the loss of water from leaves (mostly through stomata), creates a force within leaves that pulls xylem sap upwards.

2. Water and minerals are transported upward from roots to shoots as xylem sap.

1. Roots absorb water and dissolved minerals from the soil.

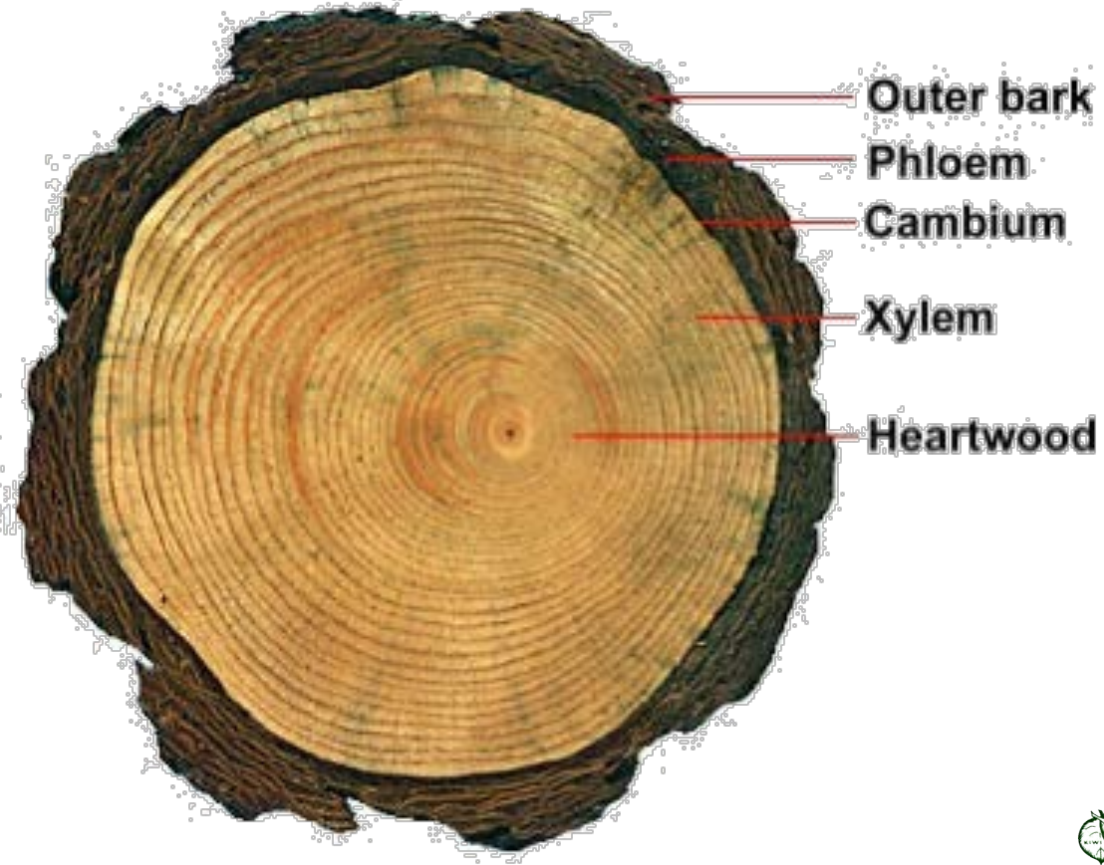


5. Sugars are produced by photosynthesis in the leaves.

6. Sugars are transported as phloem sap to roots and other parts of the plants.

7. Roots exchange gases with the air spaces of soil, taking in  $\text{O}_2$  and discharging  $\text{CO}_2$ . In cellular respiration,  $\text{O}_2$  supports the breakdown of sugars.

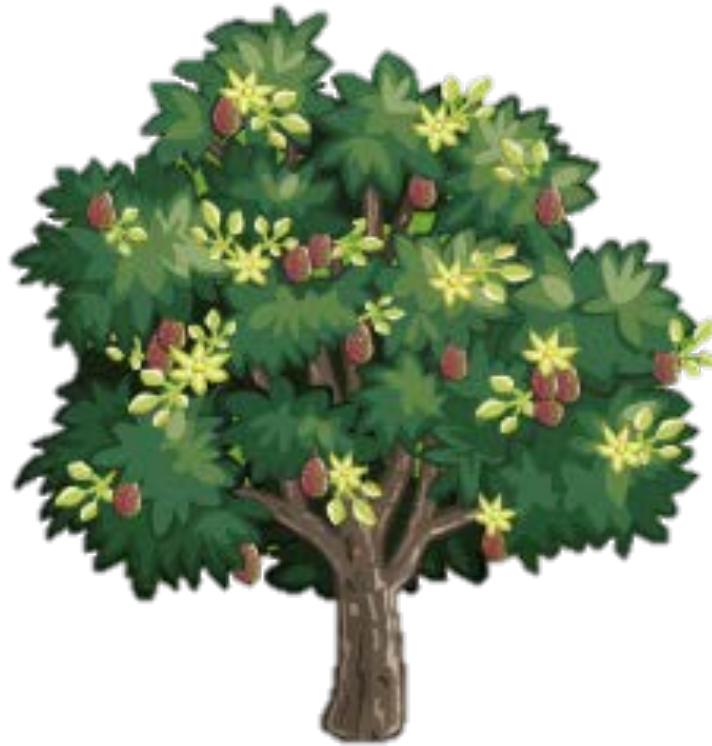
# TRUNK INTERNAL STRUCTURE





## XYLEM

Mass flow of **water** and **mineral salts** by transpiration through xylem cells



## PHLOEM

**Sugar** made in leaf cells by photosynthesis creating concentrated sugar solution



Interruption of phloem transport of **photoassimilates (carbohydrates)** between the girdled trunk or limb and other parts of the tree, essentially between canopy and roots.





# GIRDLING IN AVOCADO



**INDEX FRESH**

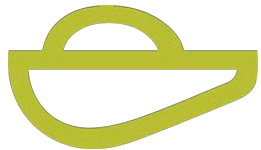


**Brokaw Nursery LLC**

# WHY DO WE DO IT?



- To ensure *good flowering and fruiting* in healthy trees. In this sense it temporarily swings the vegetative: reproductive balance away from vegetative to reproductive growth, depending on the severity of the girdle.



INDEX FRESH®



Brokaw Nursery LLC



**WITHOUT GIRDLE**



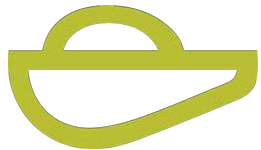
**WITH GIRDLE**



# WHEN DO WE DO IT?



- 👉 Brokaw Ventura County orchards: October
- 👉 Others may perform from September 15<sup>th</sup> to November 15<sup>th</sup> depending on orchard location.



**INDEX FRESH**



**Brokaw Nursery LLC**

# From science to art



# HOW DO WE DO IT?



**INDEX FRESH**



**Brokaw Nursery LLC**



**INDEX FRESH**



**Brokaw Nursery LLC**





**INDEX FRESH**



**Brokaw Nursery LLC**

# TOOLS: BRANCH WIDTH



**1:** 1.5" to 2" branch diameter (4" x 14 TPI)

**2:** 2" to 3" branch diameter (6" x 10 TPI)

**3:** 3" to 12" branch diameter or more (9" x 8 TPI)



**Brokaw Nursery LLC**



# HOW DO WE CHOOSE WHICH TREES TO GIRDLE?

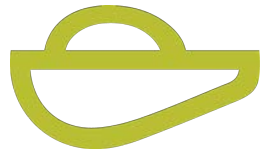


**INDEX FRESH**



**Brokaw Nursery LLC**

 Tree age: Second year *if* tree condition allows it.



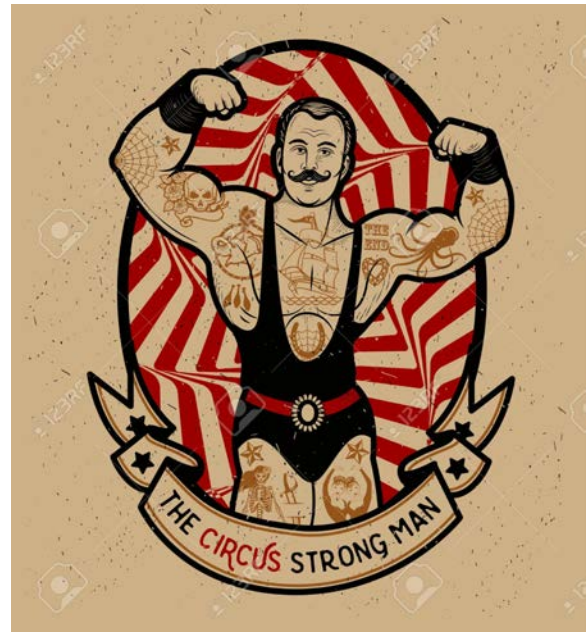
INDEX FRESH<sup>®</sup>



Brokaw Nursery LLC



# Tree vitality



**INDEX FRESH**



**Brokaw Nursery LLC**



# Existing crop load



**INDEX FRESH**



**Brokaw Nursery LLC**



# HOW DO WE CHOOSE WHICH BRANCH TO GIRDLE?

 What percentage of the canopy?



Between 50% and 70% of the canopy

Example with branches:

- A,B and C
- A and B
- Only B



INDEX FRESH



Brokaw Nursery LLC



# Where on the branch?

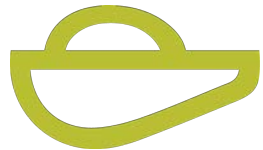


**INDEX FRESH**



**Brokaw Nursery LLC**

# Angle of the branch?

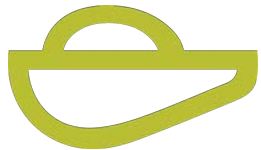


**INDEX FRESH**



**Brokaw Nursery LLC**

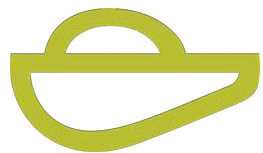
# How do we know if we girdled correctly?



INDEX FRESH



Brokaw Nursery LLC



**INDEX FRESH**



**Brokaw Nursery LLC**

# HOW DO WE KNOW IF WE GIRDLED CORRECTLY?



**JUST RIGHT!!**



**INDEX FRESH**



**Brokaw Nursery LLC**

# HOW DO WE KNOW IF WE GIRDLED CORRECTLY?



**TOO SHALLOW!!**

# HOW DO WE KNOW IF WE GIRDLED CORRECTLY?



**TOO DEEP!!**



# END RESULT



Not girdled branch

Girdled branch





# END RESULT



INDEX FRESH<sup>®</sup>



Brokaw Nursery LLC

# ADVANTAGES AND DISADVANTAGES



## Advantages:

- Less alternate bearing
- Higher yields
- Ability to load certain branches with fruit in the year prior to their removal

## Disadvantages:

- Training and skills
- Labor intensive
- Reduces fruit size while increasing yields
- Risk of limb breakage
- Potential risk of sunburn due to poor regrowth
- Damage to roots
- If overdone, higher alternation



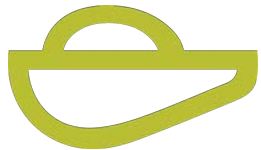
INDEX FRESH



Brokaw Nursery LLC

# GIRDLING NOTES:

- 👉 It is as much art as science
- 👉 Extreme care should be taken so that only the prescribed strip of bark is removed
- 👉 Proper timing optimizes girdling response
- 👉 Girdling places trees under considerable stress
- 👉 Do not girdle stressed trees
- 👉 Girdle no more than 70% of the tree
- 👉 Treat each tree as an individual (I 🙄 k before cutting)
- 👉 Only one aspect of overall orchard management
- 👉 Do it correctly or the effort is wa\$ted
- 👉 Disinfection of tools
- 👉 Rootstock and cultivars



**INDEX FRESH**



**Brokaw Nursery LLC**

# Questions?

