

A YEAR IN THE LIFE OF A TREE

Generalized Annual Events And Energy Storage

Basic Assumptions for this discussion:

- North Temperate Zone – Colorado
- Fruit production varies by species
- Using a spring flowering deciduous tree
- Conifers and Deciduous are not the same
 - Conifers store less sugars because they bear foliage all year
 - Some trees have photosynthetic bark
- Flowering time is species dependent
- Fruit production varies by species

Early November to Mid February

Status Quo

- Entire tree utilizes stored sugars for respiration
- Some species buds begin to swell after mid January
- Buds and shoots mostly dormant
- Minor root growth when soil temps above 40 degrees

Mid February to Mid April

Stored Sugar Movement increases

- Sugar flow increases from trunk to buds
- Foliar buds beginning to swell
- Flower buds swell or break in some species
- Root activity increases

Mid April to Mid May

Increased stored sugar movement and depletion

- Foliage and flower buds break dormancy
- Shoot elongation begins
- Leaf expansion begins
- Pollination and fruit production begins
- Root growth increases
- Sugars move from trunks and roots to sinks

Mid May to Mid/Late June

Maximum depletion of stored sugars

- Shoot elongation continues
- Buds set for next growth cycle
- Foliar expansion completed
- Fruit expansion in progress
- Springwood production begins in growth rings
- Root growth continues

Mid/Late June to Mid/Late July

Sugar production used to cover tree needs

- Springwood completed in growth rings
- Shoot elongation ends
- Sugars used to combat I/D problems
- Second flushes may occur if severely damaged Fruits require maximum sugar storage
- Summer wood production begins in growth rings
- Roots continue to grow

Mid/Late July to Early/Mid September

Maximum sugar storage in stems and roots

- Summerwood completed in growth rings
- Leaves prepare for dropping
- Fruits mature and drop or are removed
- Chlorophyll production slows down
- Root growth slows

Mid September to Late October

Sugar storage nears completion and begins depletion

- Chlorophyll production ceases
- Leaves ready to drop
- Buds dormant
- Tree prepared for dormancy
- Root growth continues

Growth Regulators – Hormones

Produced by Trees in Response to External Stimuli

- Auxins – Produced by Apical meristems
 - Controls buds & young leaves growth & tropisms
- Cytokinins – Produced by roots
 - Controls cell growth, flowering, fruiting & maturity
- Gibberellins – Produced by apical meristems
 - Controls bud, stem, root, young leaf & fruit growth
- Abscisic acid – Found in leaves, stems & fruits
 - Inhibits growth & breaking dormancy, closes stomata
- Ethylene – Found in fruits, nodes & old leaves
 - Opposes/reduces auxin effects, promotes fruit ripening

Stimuli Affecting Tree Growth

- Light – Type and exposure
- Day length or Photoperiod
 - Short-day plants
 - Long-day plants
- Temperature – degree days
- Soil moisture
- Soil nutrients
- Food availability
- Gases – O₂, CO₂, Ni, etc.
- Gravity