

Forest Ecology

(stand dynamics of thinning)

Bruce C. Larson
University of British Columbia

What is a stand?

According to the silviculture textbook:

- *A stand* is a contiguous group of trees sufficiently uniform in species composition, arrangement of age classes, site quality, and condition to be a distinguishable unit.

Growing Space

- **Total growing space**
- **Available growing space**

Amount of Available Growing Space

- **Continuum**
- **Cohort**

Cohort

Cohort = all trees that initiate after a disturbance.

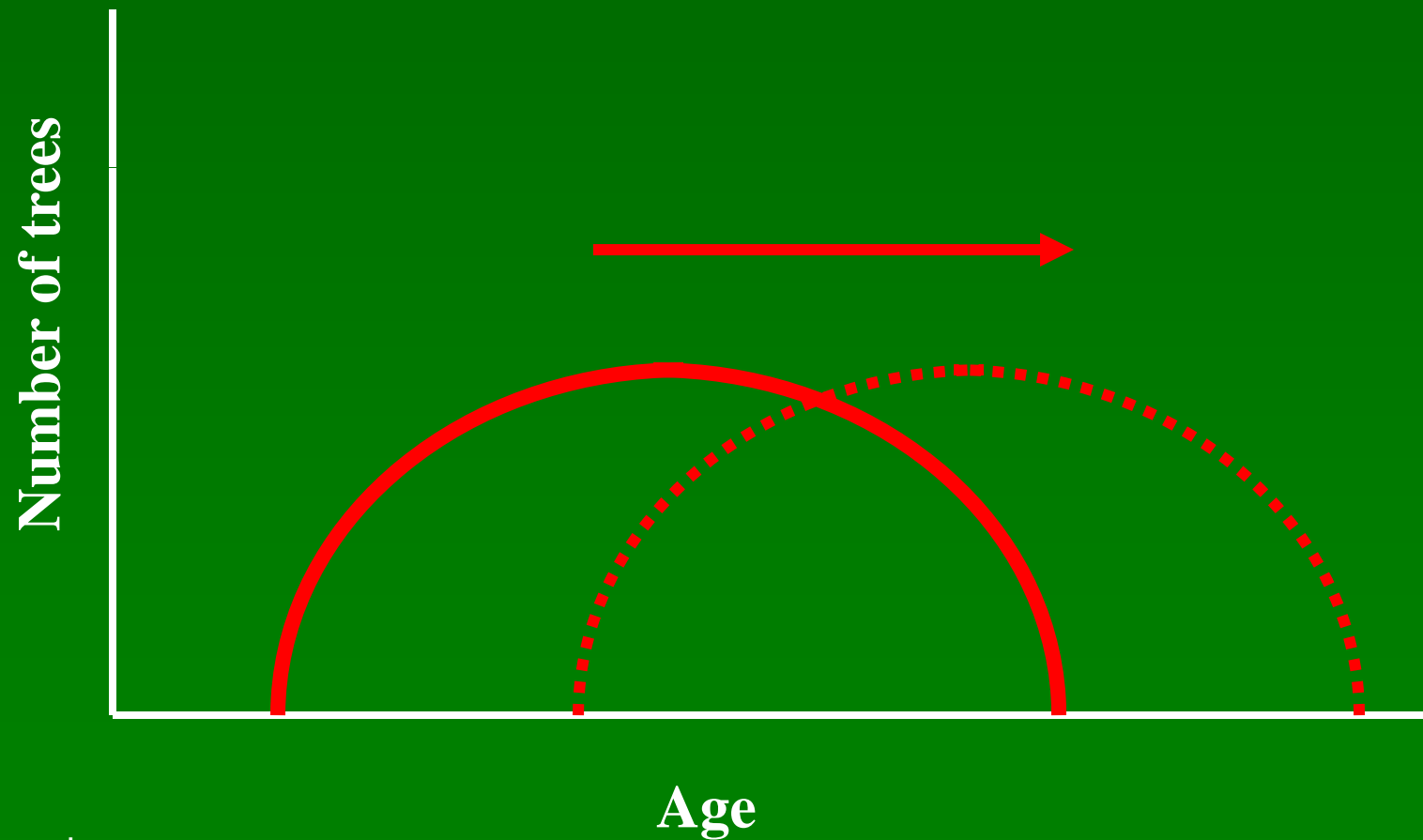
Oldest trees in a cohort are those that initiate first

Youngest trees are those that initiate just before all growing space is occupied.

Stages of Single Cohort Development

- **Stand Initiation**
- **Stem Exclusion**
- **Understory Reinitiation**
- **Complex**

Cohorts

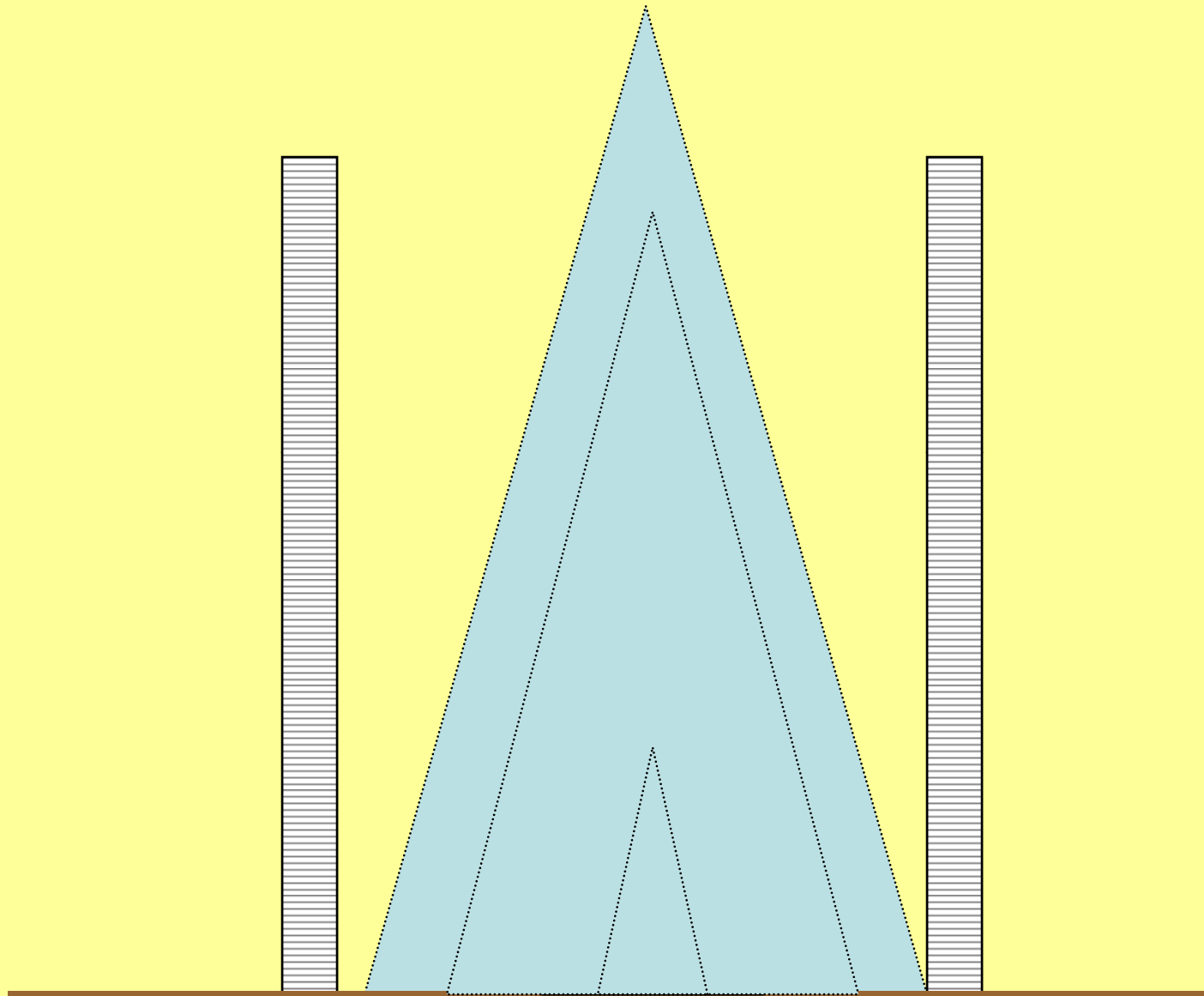


Stand Initiation

- **Growing space available**
- **Trees invade until all space taken up**
- **All trees invading during this stage are considered one cohort**



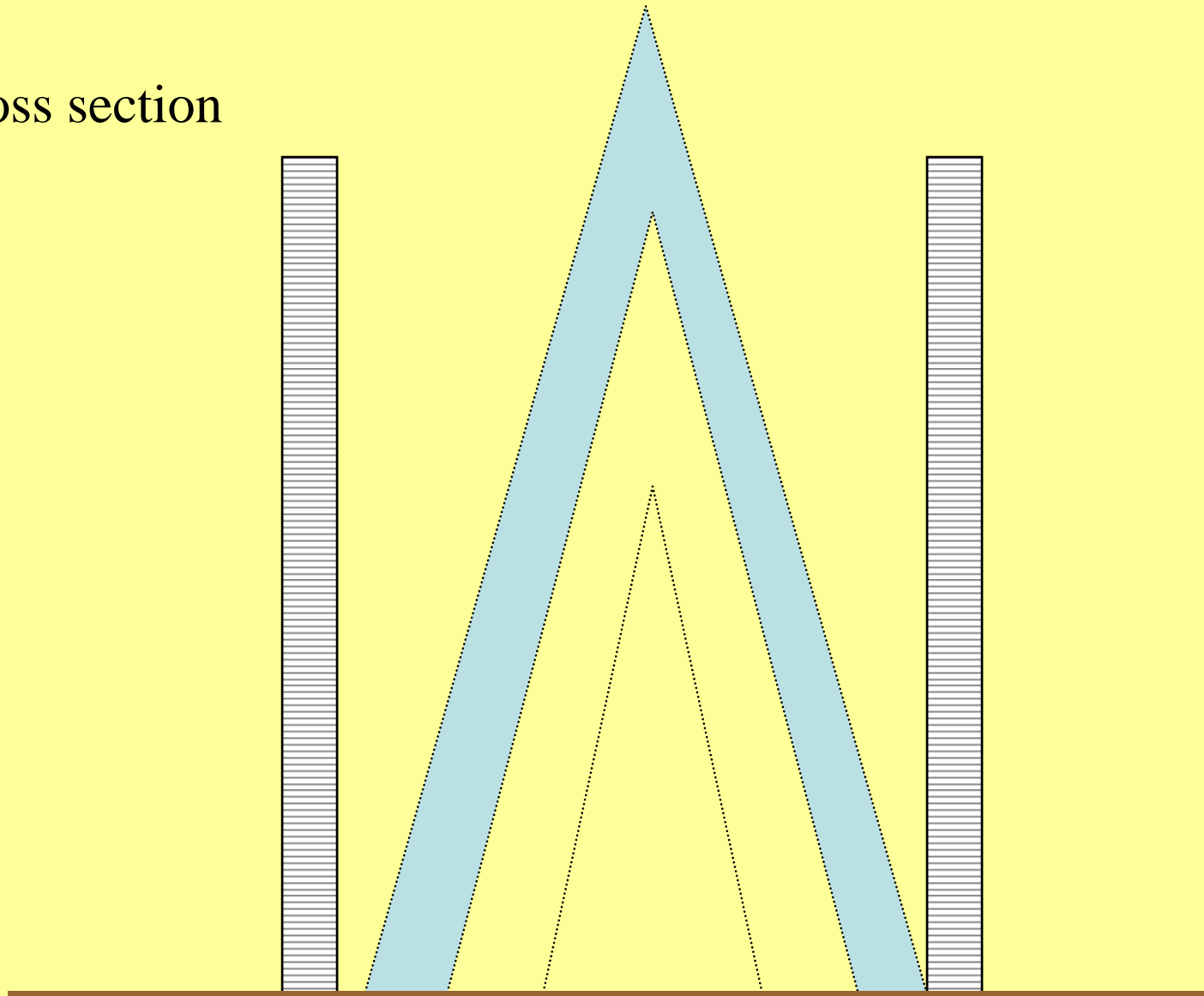


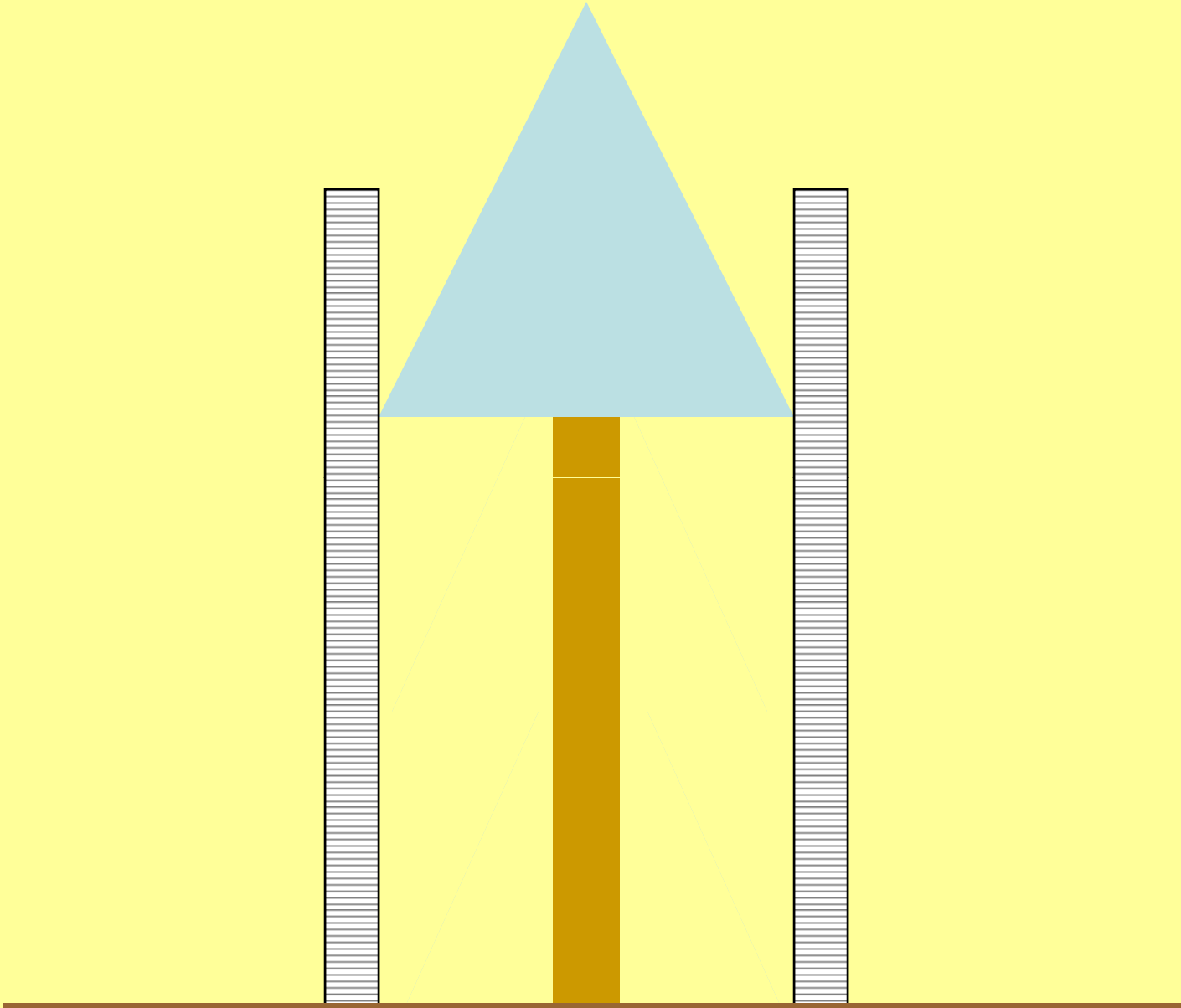


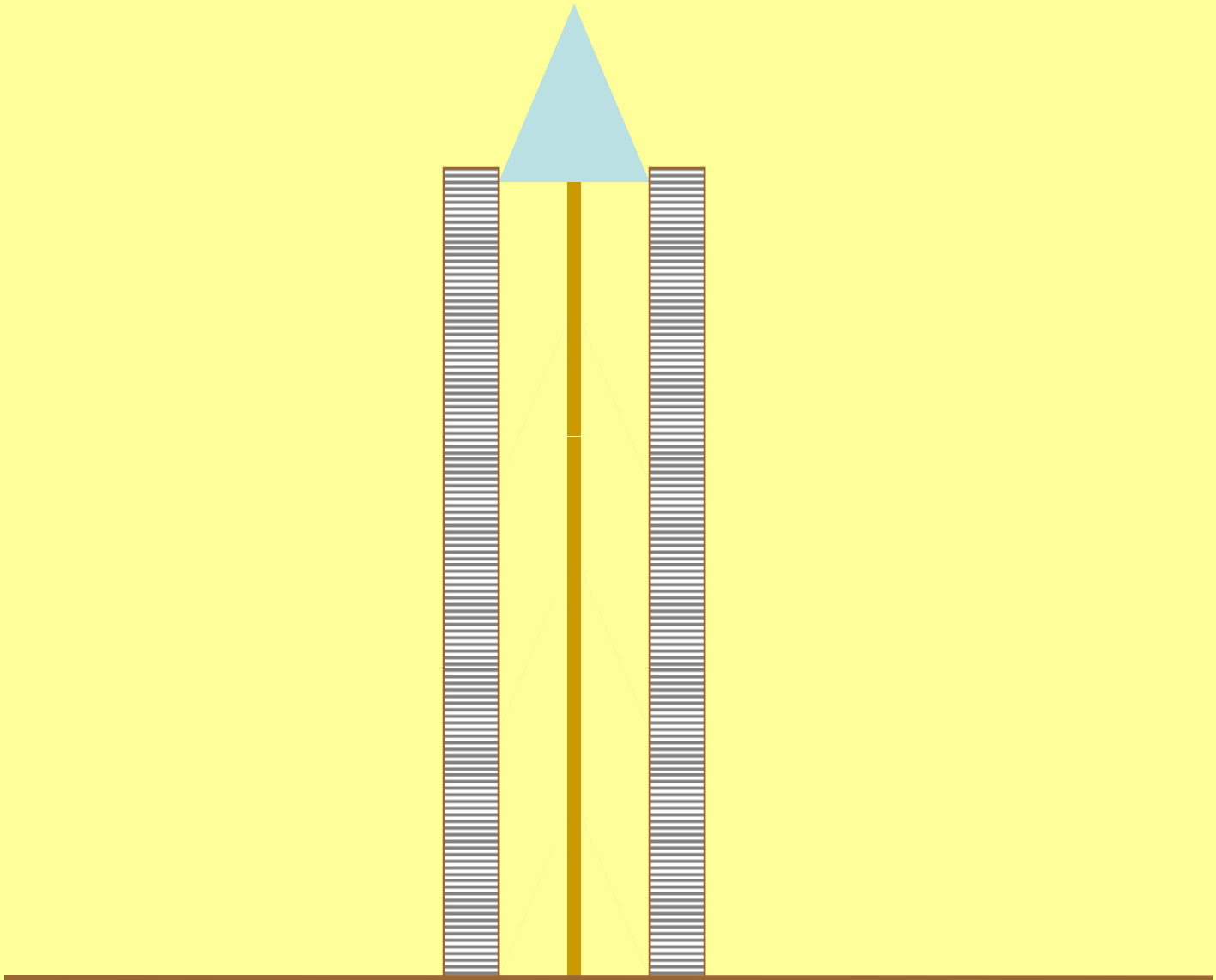
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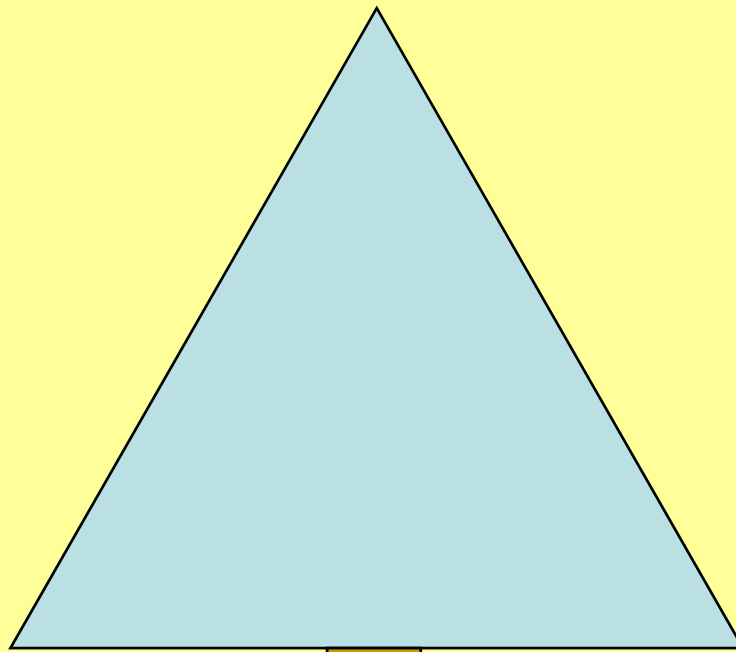
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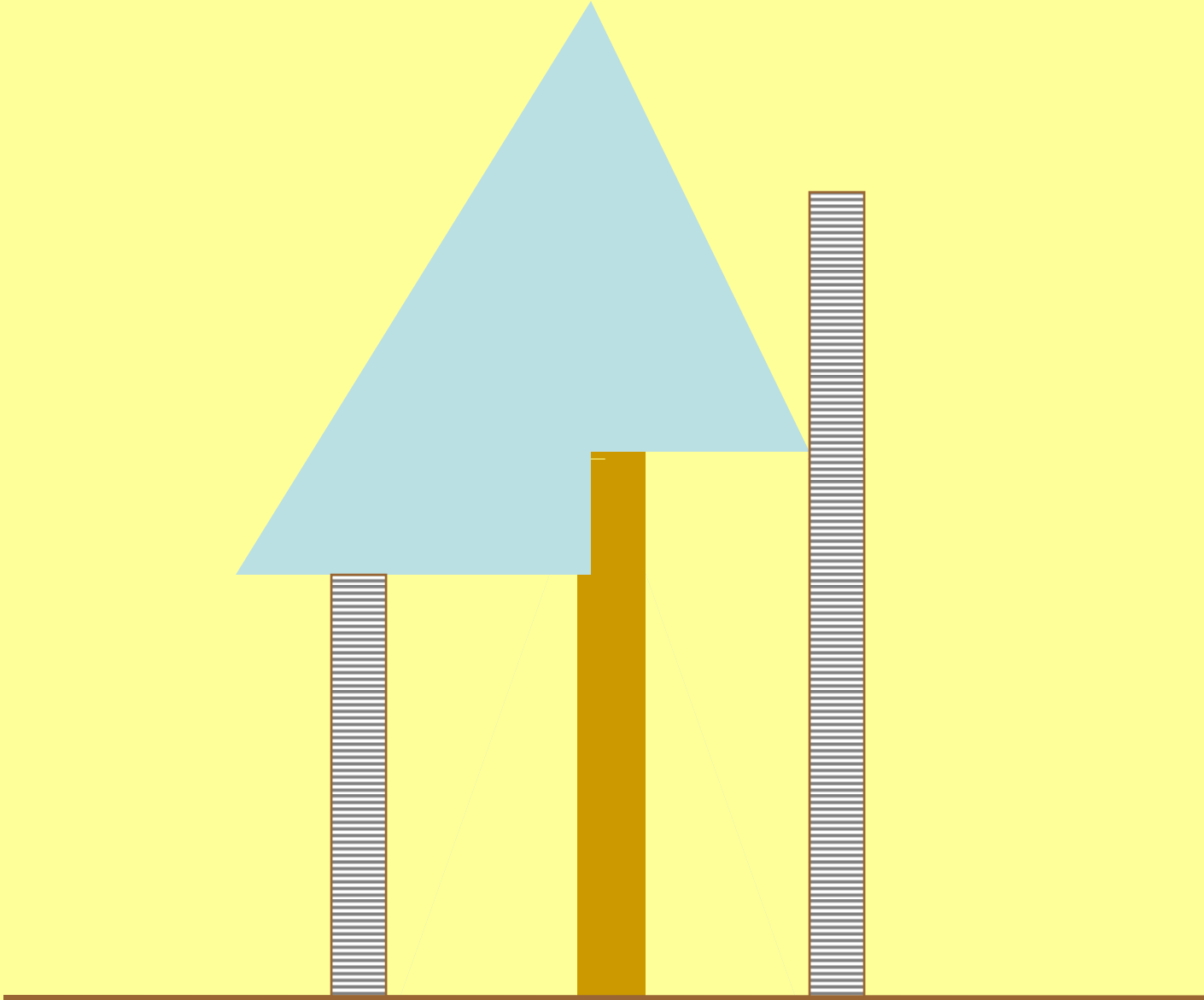
Cross section





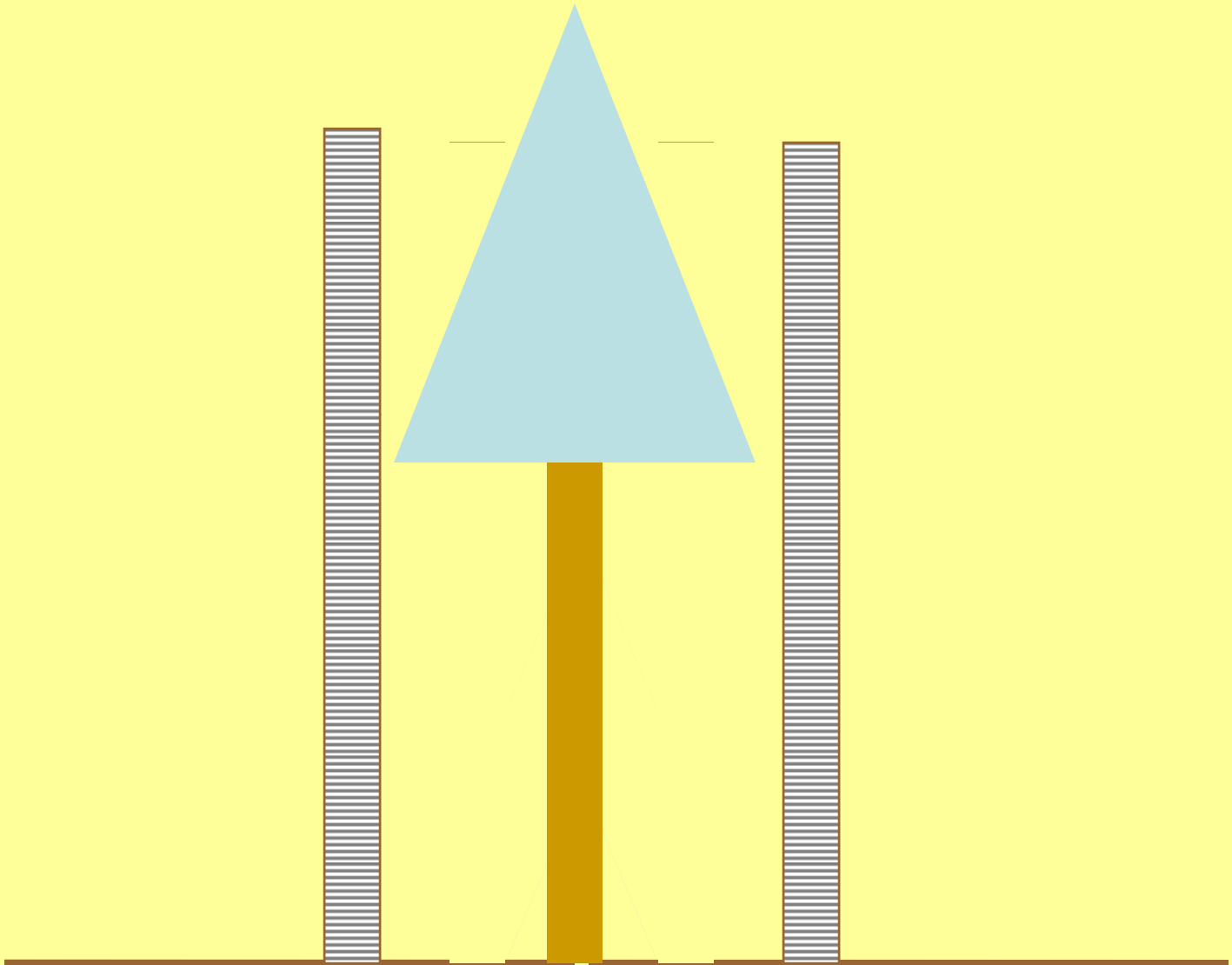






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Priorities for Photosynthate

1. Respiration
2. Foliage – Fine Roots
3. {Reproduction}
4. Primary Growth
5. Secondary Growth –
Secondary Compounds

Tree Attributes

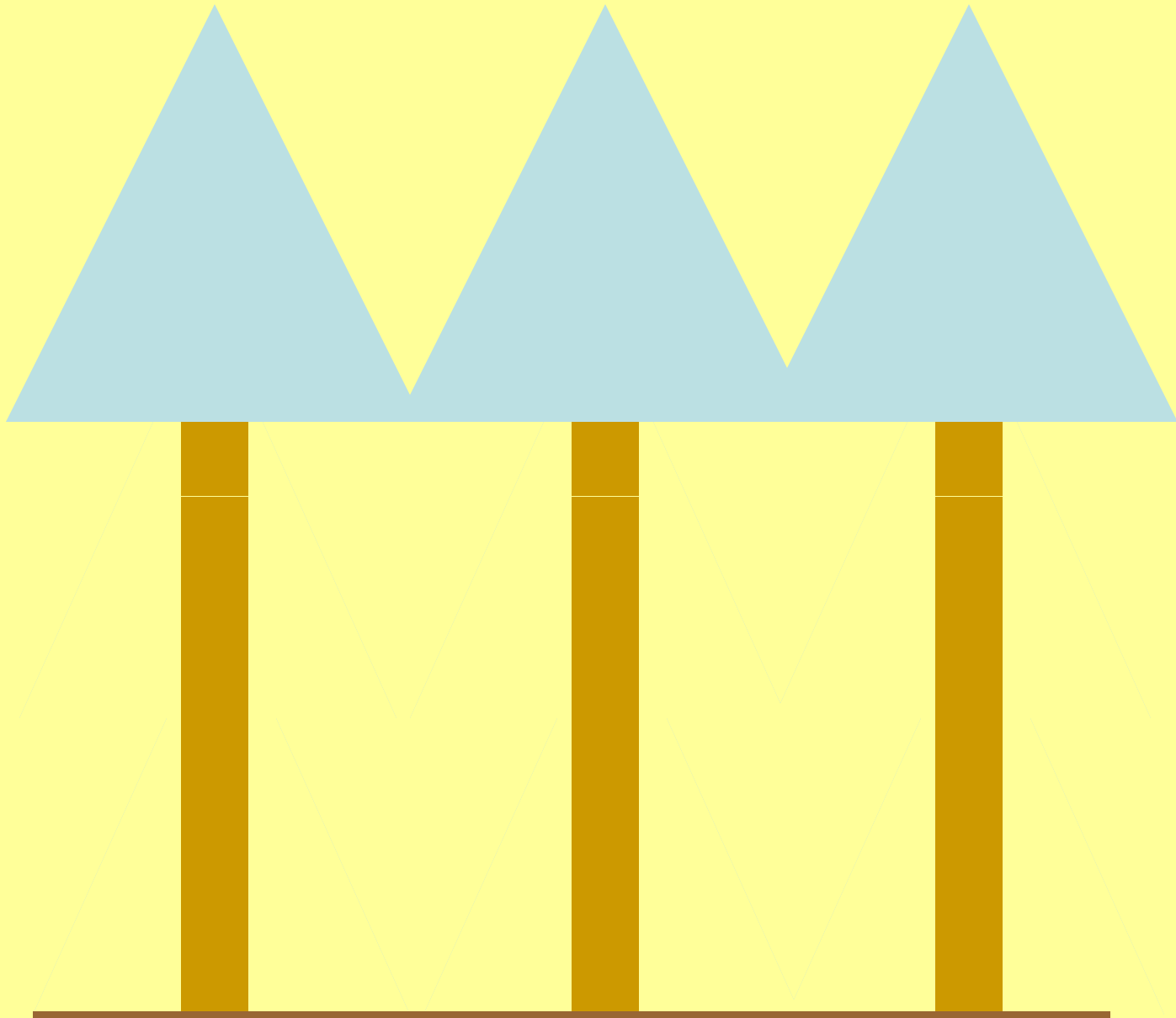
- Amount of foliage
- Amount of photosynthetic area
- Sun leaves– Shade leaves
- Epinastic control

Lag in Response

- **Not enough excess photosynthate to add foliage**

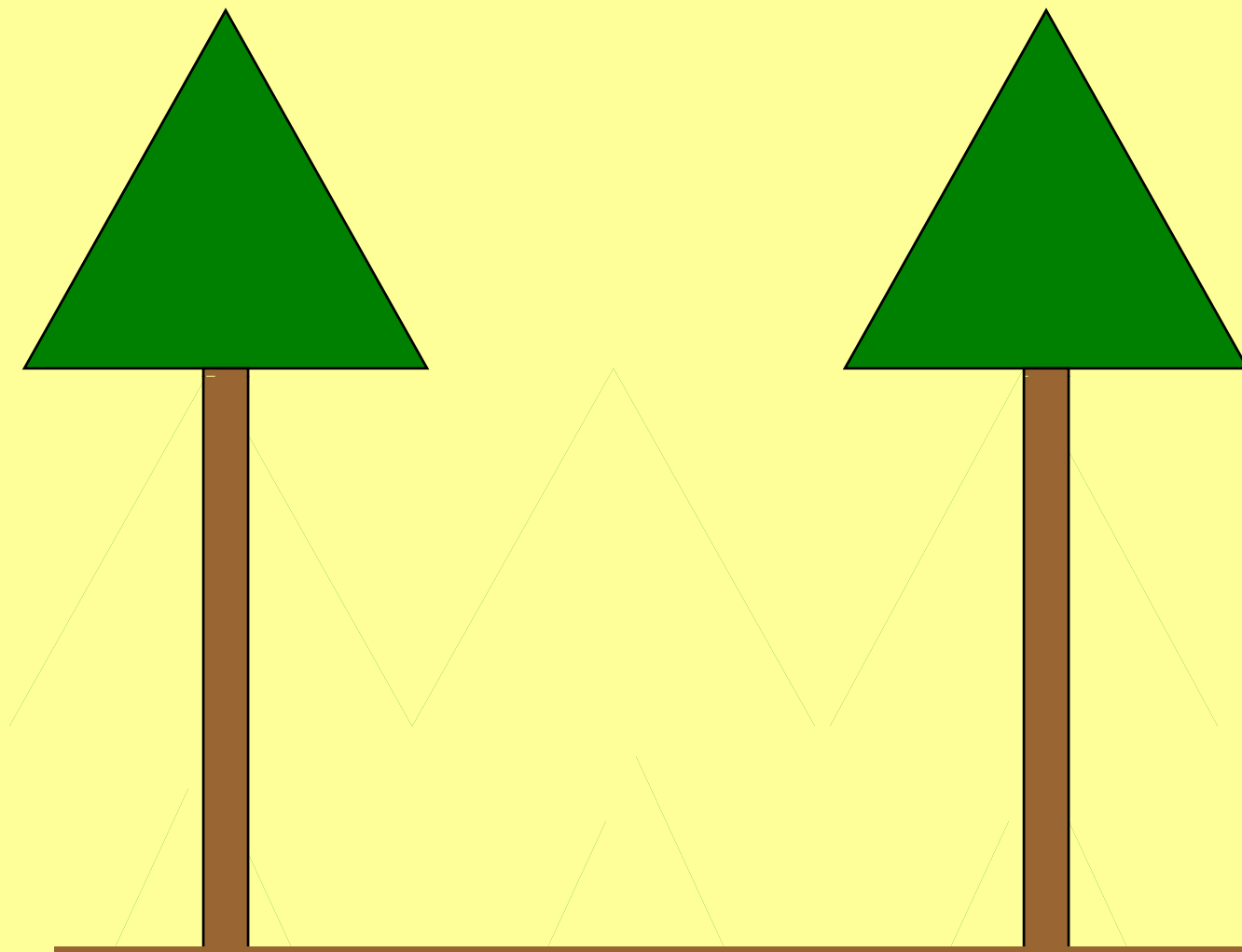
Ring Widths

- **Crosssectional area**
- **Matter of geometry**
- **Distance from crown**
- **Mechanical stimulation**



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Stem Exclusion

- **No available growing space**
- **Repartitioning of growing space**
- **No regeneration**
- **The major stage of plantation forestry**



Understory Reinitiation

- **Overstory “loses its grip”**
- **Crown shyness**
- **Self-thinning**
- **Growing space becomes slowly available (without disturbance)**



Reasons to Thin

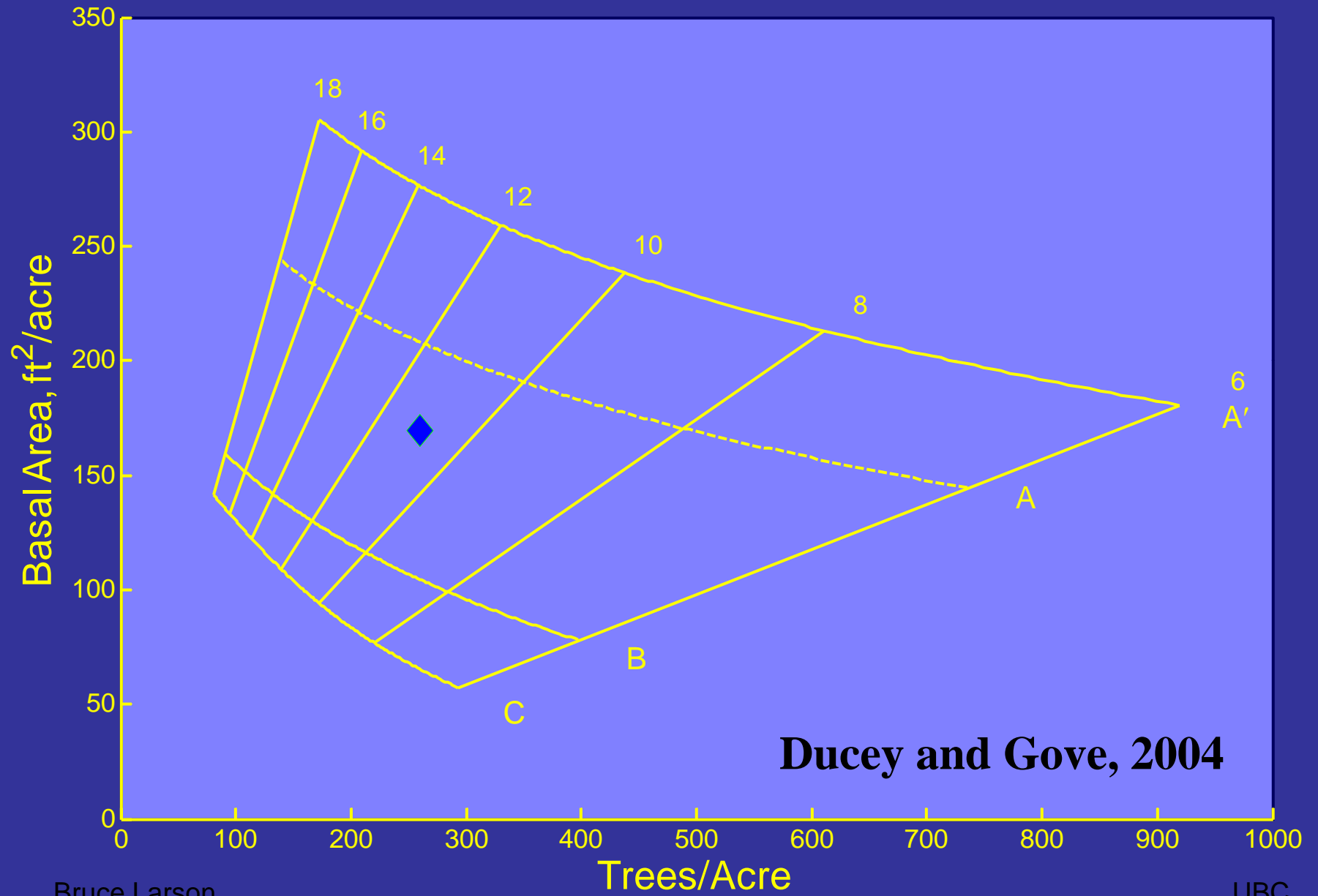
- **Maintain vigor of the stand (or cohort)**
- **Shift growth onto smaller number of trees**
- **Salvage potential mortality**
- **Non-timber aspects**
- **Create growing space at lower levels**
- **Early financial returns**





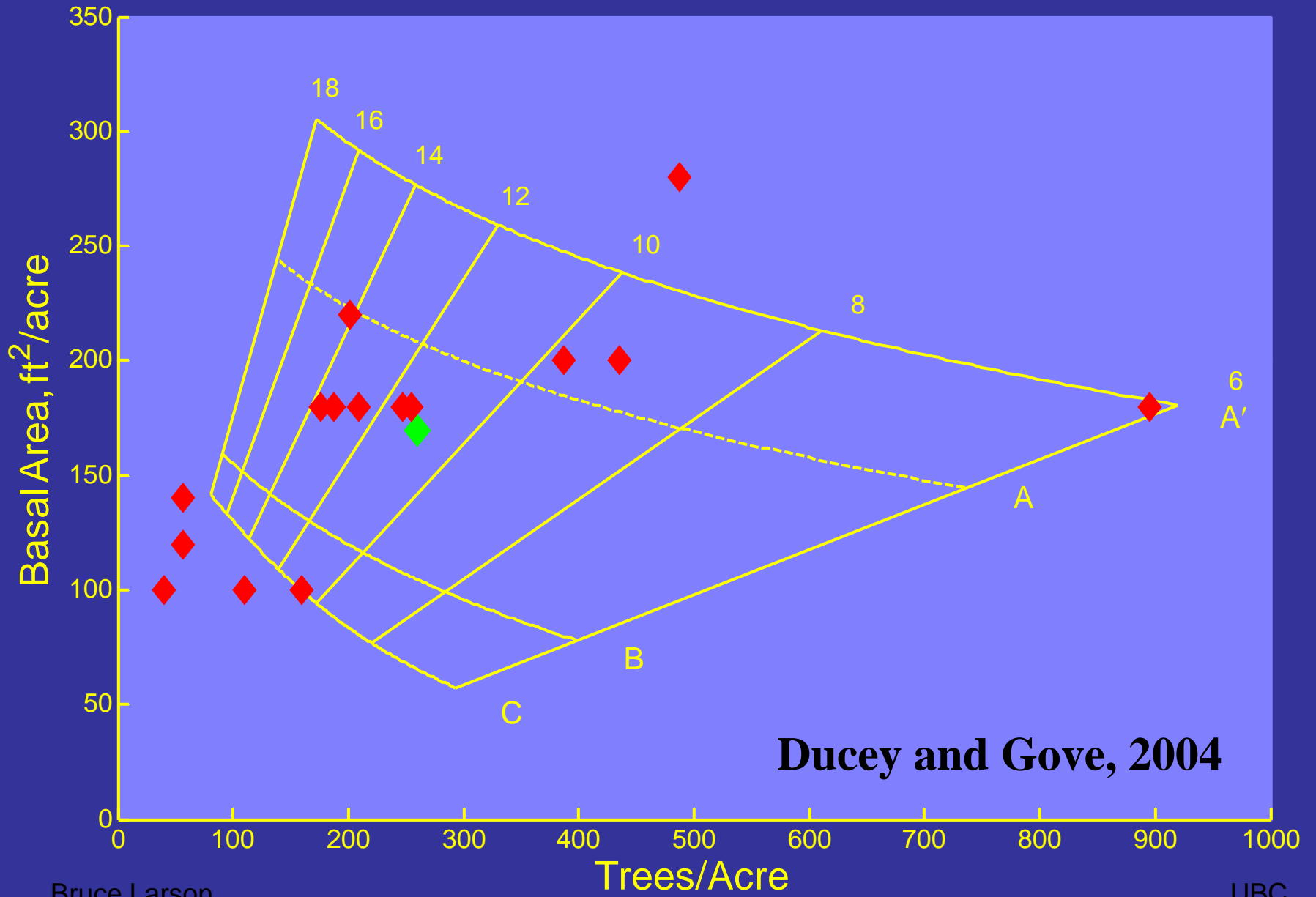
How do we measure stand density?

- Assumes a uniform crop
- Debates on averaged vs. additive
- Trees do not grow in averaged conditions
 - Most responses are non-linear



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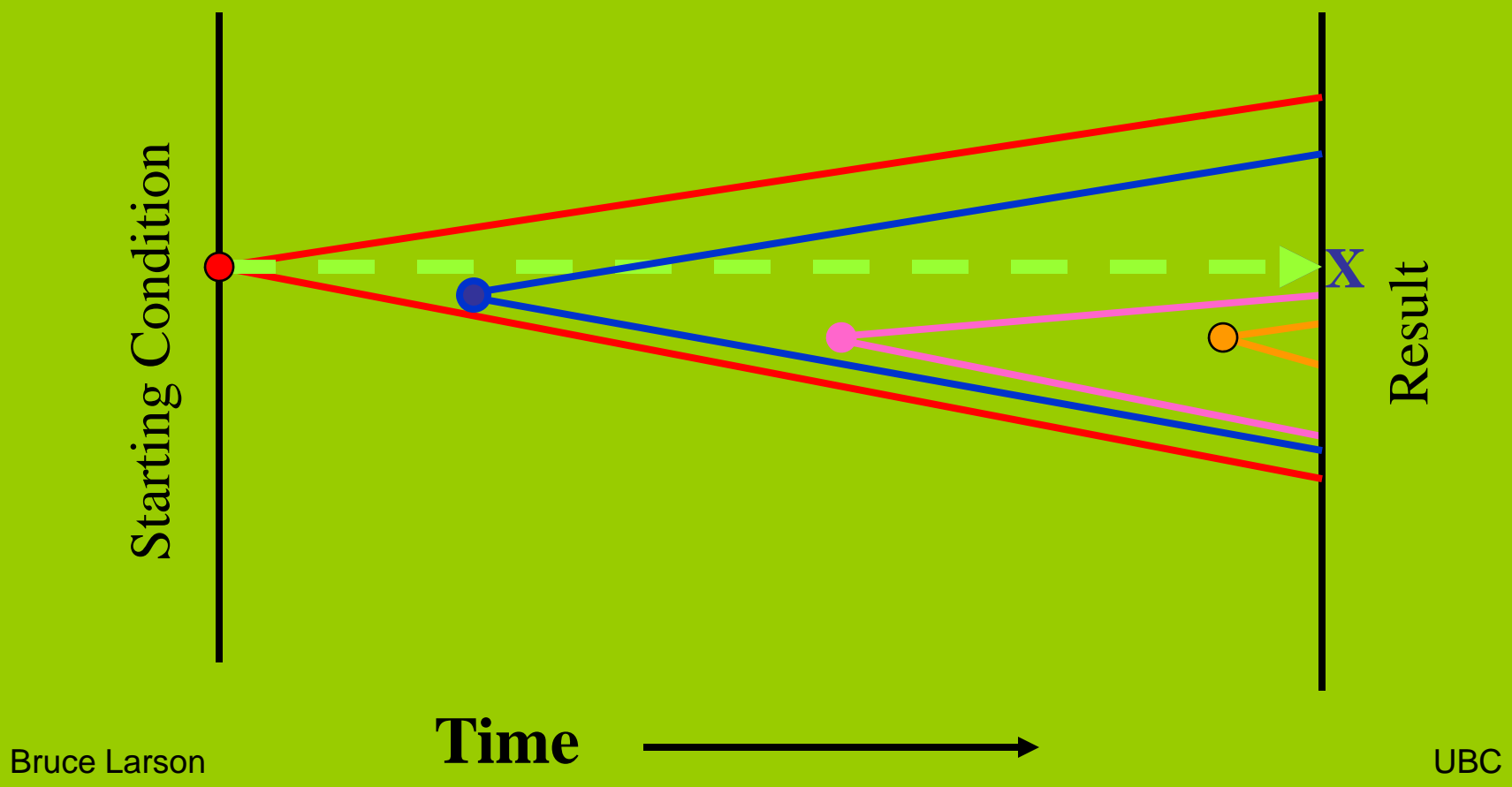
Silviculture

Our issue is not the measurement
of stand density,

but the management of stand
density

Think Like a Tree

Sound Plan



Unsound Plan

