MICRO-CREDENTIAL 3 • MODULE 1

Diameter Growth

A simple guide to how trees become wider, how we measure growth, and why diameter matters in forestry.

LEARN THE ENGINE • MEASURE THE TREE • MANAGE THE FOREST



Two Ways a Tree Grows

Trees grow in two directions: up and out.

- Primary growth makes the tree taller.
- Secondary growth (girth) makes the stem wider from the inside of the trunk.
- Diameter growth happens inside the trunk.

KEY IDEA: Trees grow taller at the tips and wider from the cambium.

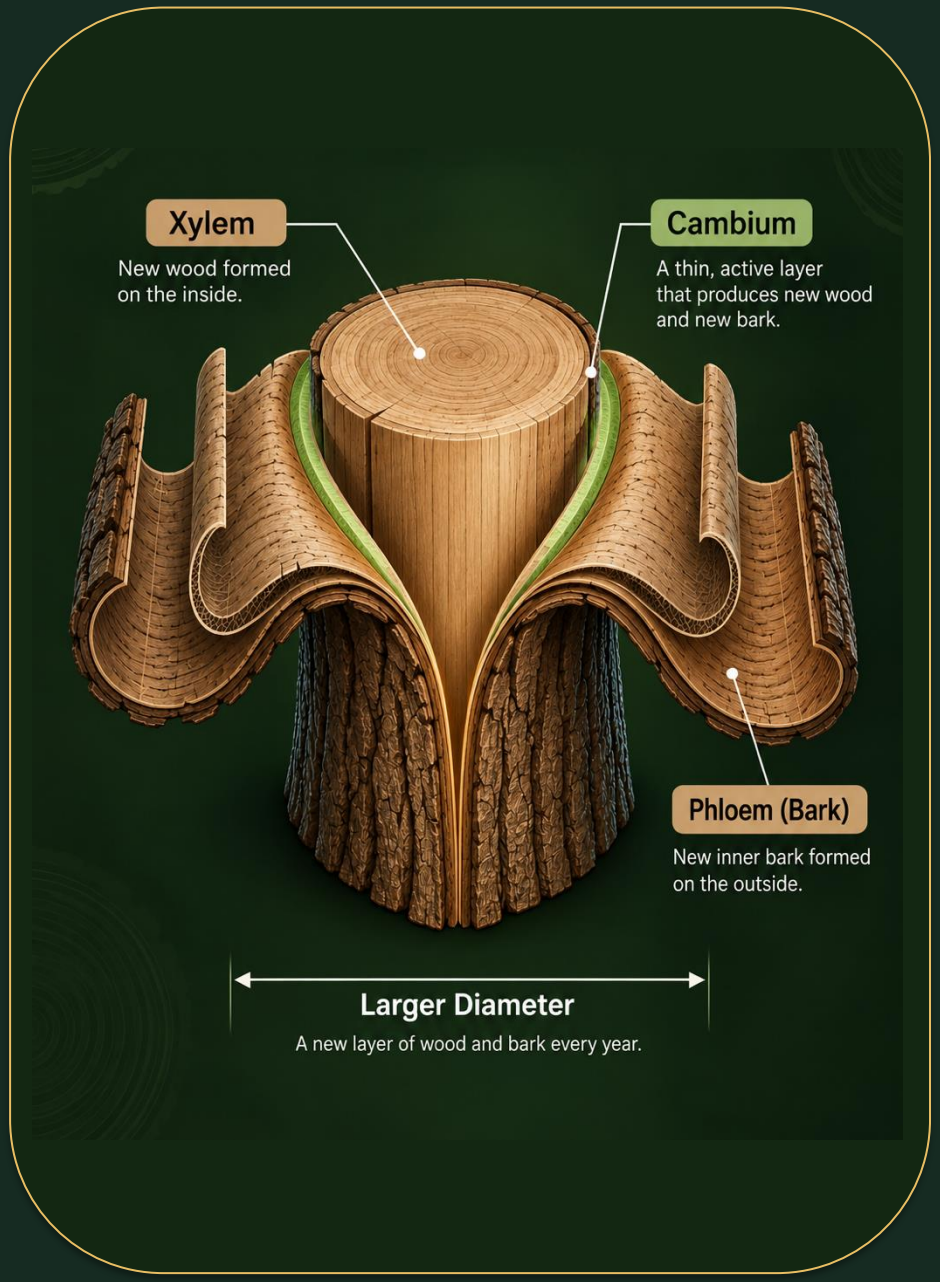


What Is Secondary Growth?

A tree adds new layers around its older wood.

- The trunk does not inflate like a balloon.
- Each year, a new layer of wood forms. They manufacture brand new physical wood “sleeve”.
- This added wood widens the stem.

KEY IDEA: Secondary growth adds a new layer around the stem.

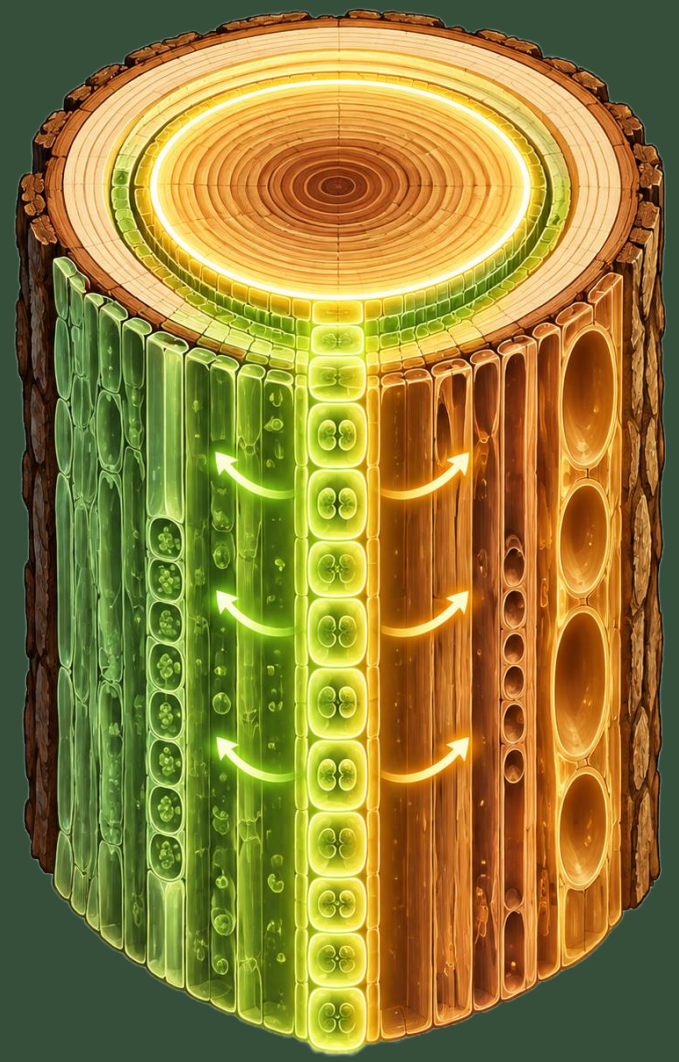


Meet the Vascular Cambium

The cambium is a thin layer of living cells.

- It sits between the wood and the bark.
- It forms a ring-like cylinder around the stem.
- When active, it produces new cells.

KEY IDEA: The cambium is the tree’s diameter-growth engine.



Inside the Cell Factory

The cambium makes wood inward and bark outward.

- Xylem (wood) forms toward the centre.
- Xylem moves water from the roots to the leaves.
- Phloem (inner bark) moves liquid food (sugars) around the tree.
- Old bark is pushed outward as the trunk expands.

KEY IDEA: New wood forms inward; new bark forms outward.



Read the Story in the Rings

One growing season leaves a visible pattern.

- Early wood: lighter colour, larger cells, thinner walls.
- Late wood: darker colour, smaller cells, thicker walls.
- One light band plus one dark band usually represents one year.

KEY IDEA: Tree rings record changes in seasonal growth.



What Is DBH?

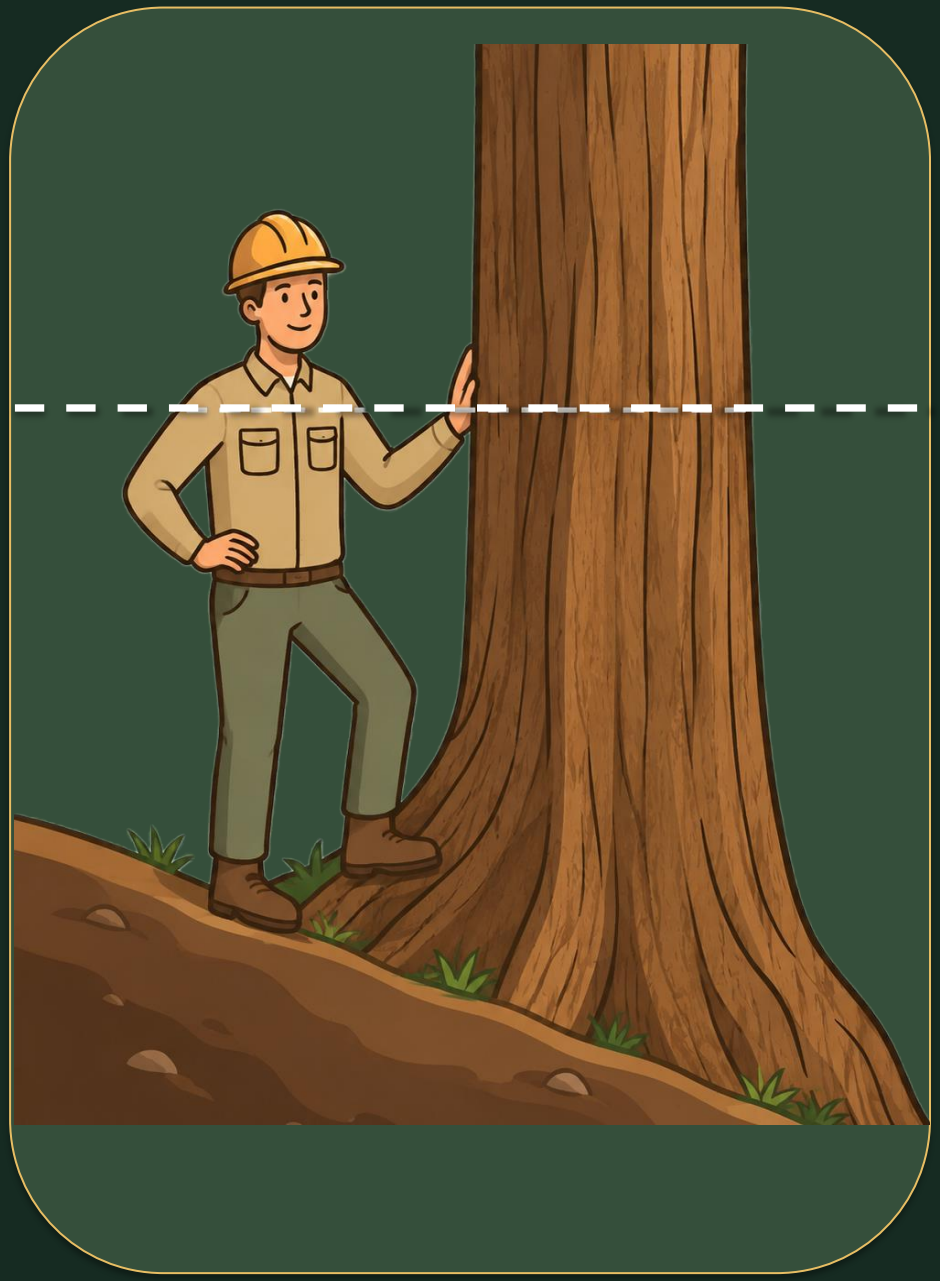
DBH means Diameter at Breast Height.

Measure at 1.3 m above the ground.

On a slope, stand on the uphill side.

Use the same height so measurements are comparable.

KEY IDEA: A standard DBH height makes data comparable.



Finding DBH: Three Simple Steps

Measure around the trunk, then convert the circumference to diameter.

1. Wrap a flexible tape around the trunk.
2. Divide circumference by 3.14 (π).
3. Or use a diameter tape (D-tape) to read DBH directly.

KEY IDEA: Circumference ÷ π = diameter.



Handling Tricky Trees

Small field decisions can change the measurement.

Rule 1: The Slope

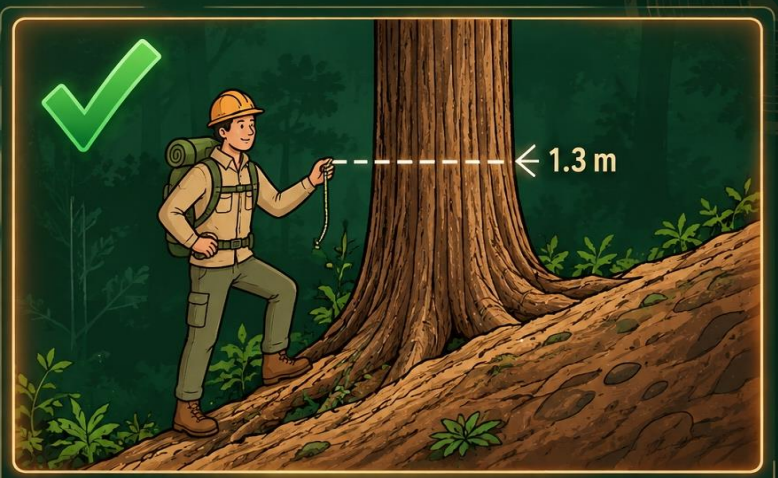
- Slope: measure from the uphill side.

Rule 2: The Fork

If a tree splits into two trunks below breast height, it counts as two separate trees

- Fork below 1.3 m: measure each stem separately.
- Fork above 1.3 m: treat it as one tree at DBH.

KEY IDEA: Measure the tree according to its shape and position.



Rule 1: The Slope



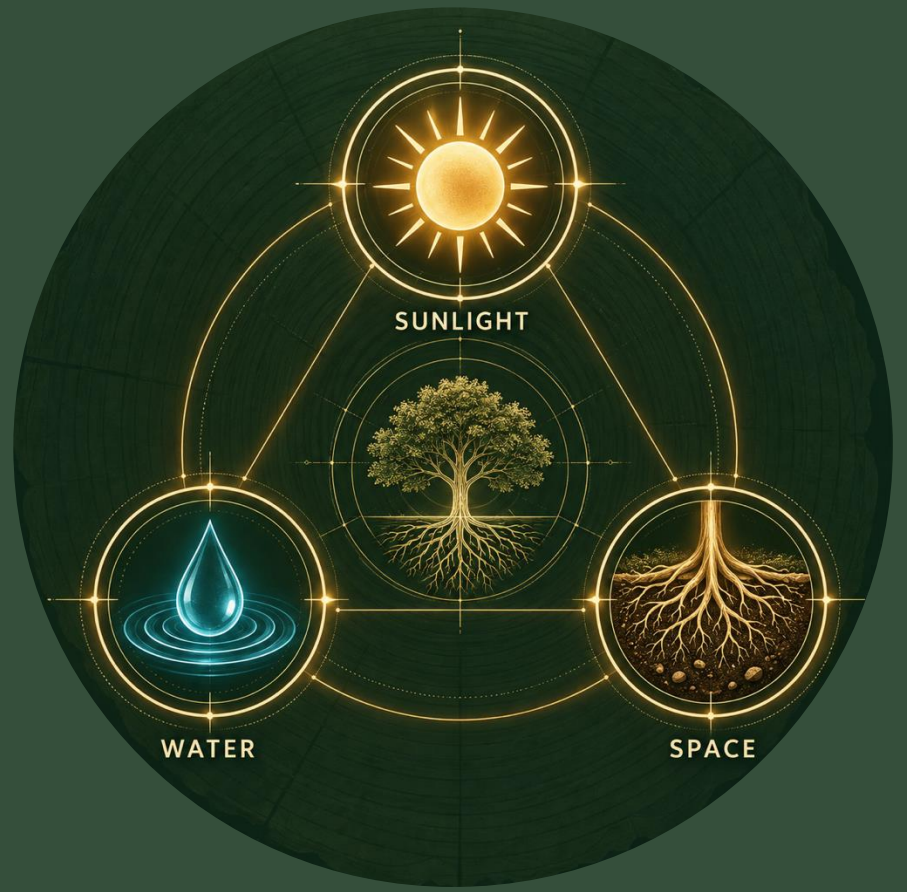
Rule 2: The Fork

What Does a Tree Need?

The cambium needs resources to keep growing.

- Sunlight powers the tree’s food production.
- Water and climate affect ring width.
- Space reduces competition for roots and nutrients.
- A healthy crown supports stronger diameter growth.

KEY IDEA: Light, water, climate, and space influence growth.

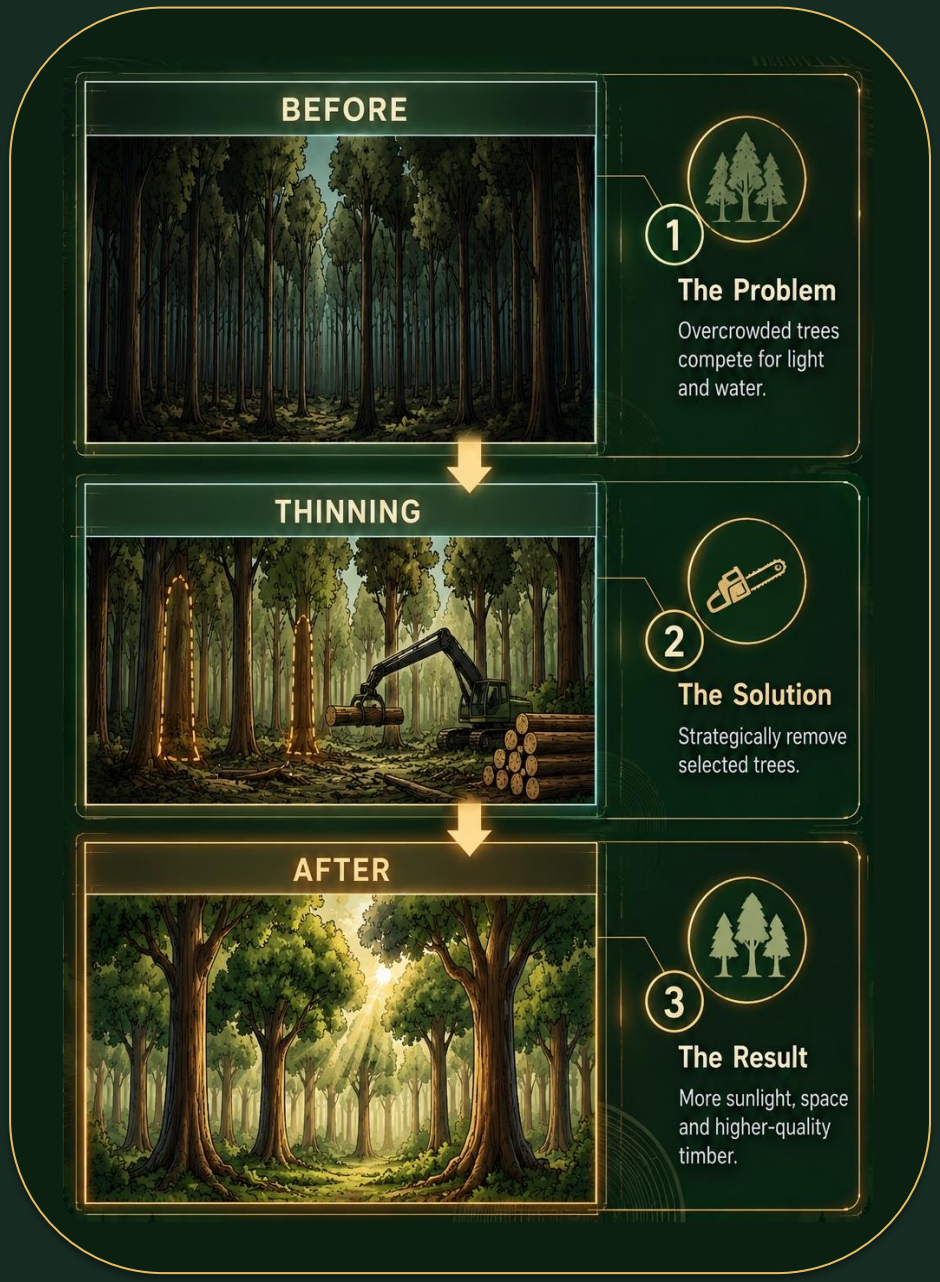


Thinning: Giving Trees Room

Thinning is one of the silviculture practices to reduce competition inside a crowded stand.

- Remove selected trees, not every tree.
- The remaining trees receive more light, water, and space.
- Their crowns can expand and diameter growth can improve.

KEY IDEA: Thinning can reduce competition and release growth.

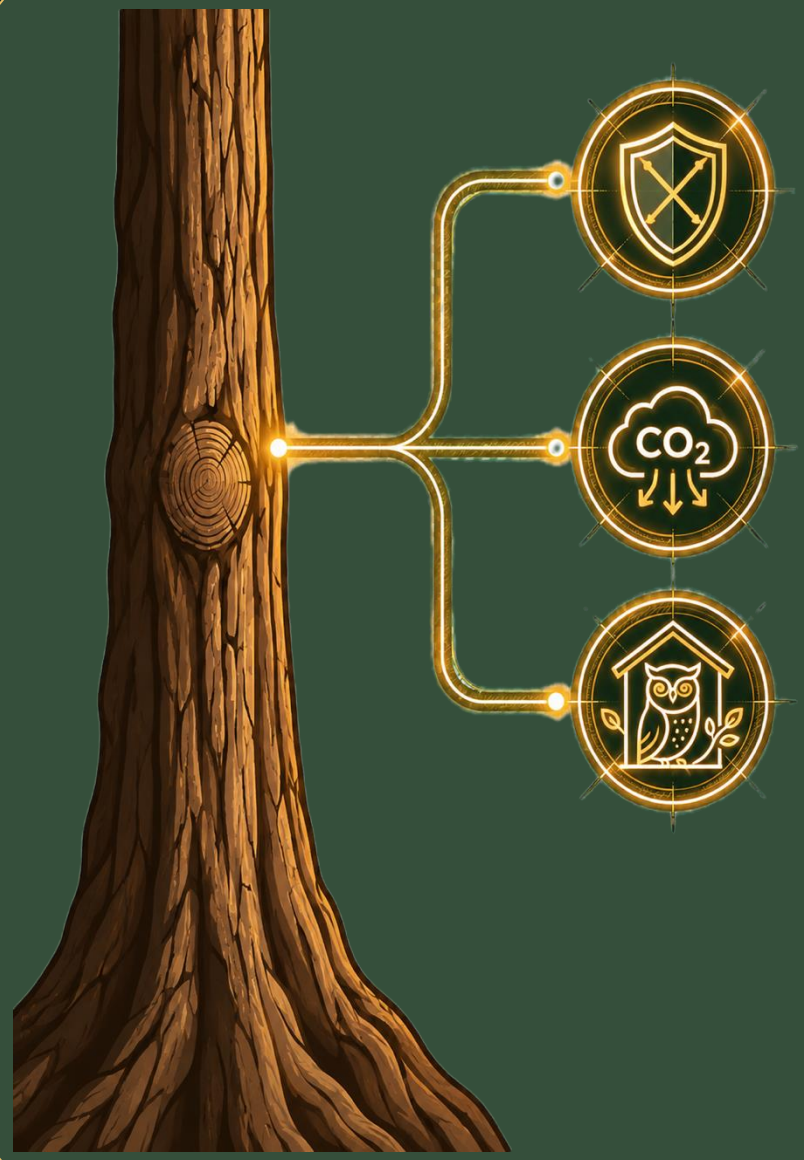


Diameter and Forest Health

A wider stem can support important ecosystem functions.

- Stronger stems can improve resistance to storms.
- Larger trees generally store more biomass and carbon.
- Old, large trees can provide shelter and cavities for wildlife.

KEY IDEA: Diameter links tree structure with ecosystem benefits.



Diameter and Timber Value

Diameter helps foresters estimate wood quantity and value.

- DBH and height support volume estimates.
- Basal area describes the cross-section of tree stems.
- Larger stems can produce more usable timber.

KEY IDEA: DBH helps estimate timber quantity and value.



The Big Picture

Understand the process, measure it well, and manage it wisely.

- Biology: the cambium adds new wood and bark.
- Measurement: DBH gives a standard way to track stem size.
- Forestry: managing competition can support healthy growth.
- Reflection: Why must DBH be measured at a standard height?

CHECK YOUR UNDERSTANDING: Explain how the cambium, DBH, and thinning are connected.

