Growth in the tropics: Palms and non-Palms

Part I Stem Growth

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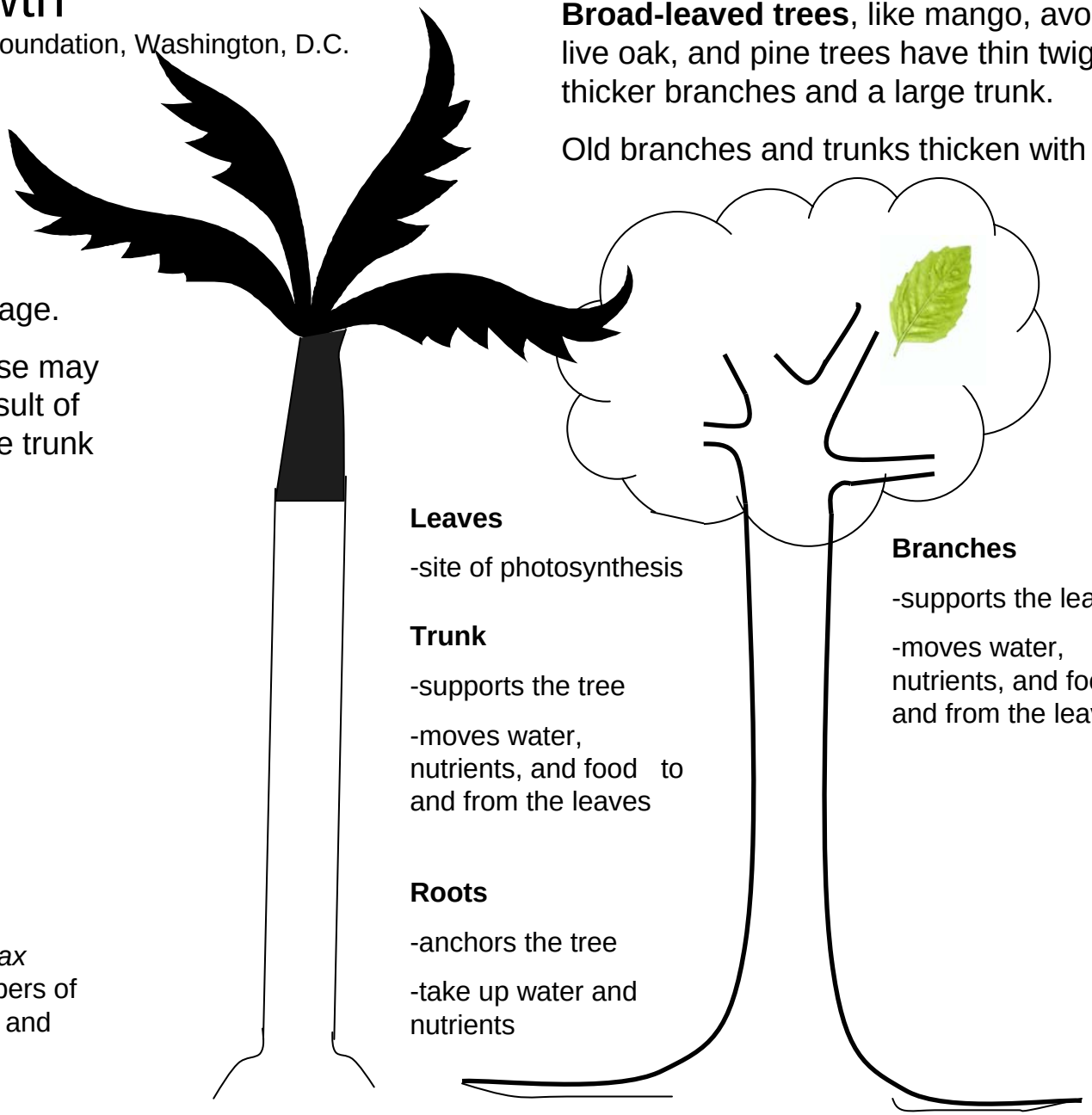
Broad-leaved trees, like mango, avocado or live oak, and pine trees have thin twigs and thicker branches and a large trunk.

Old branches and trunks thicken with age.

Palms rarely get thick with age.

In some palms, the very base may show a swelling that is a result of new roots pushing out of the trunk near the ground.

Swollen base of a *Coccothrinax procteriana* due to large numbers of roots growing out of the trunk and into the soil.



Leaves

-site of photosynthesis

Trunk

-supports the tree

-moves water, nutrients, and food to and from the leaves

Roots

-anchors the tree

-take up water and nutrients

Branches

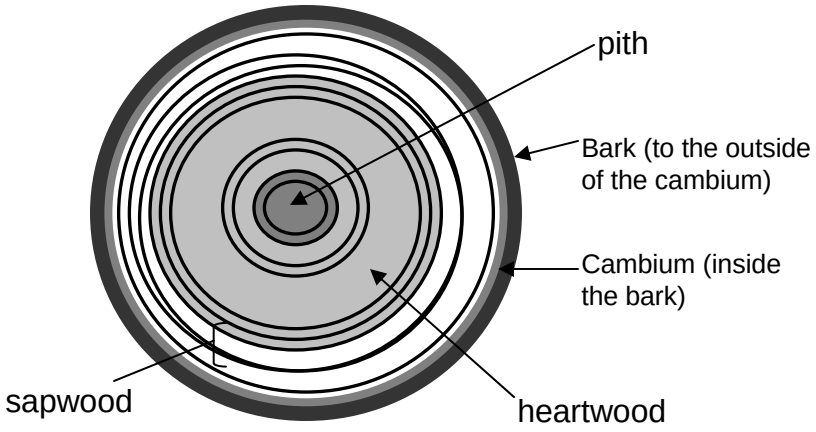
-supports the leaves

-moves water, nutrients, and food to and from the leaves

In **broad-leaved trees** the center is woody and in the very center is a pith.

When rings are present, the age of the branch or trunk can be determined by counting the yearly growth rings.

However, some tropical broad-leaved trees grow all year and don't have growth rings (ficus, mango, avocado).



Live oak - A cross-section (slice) of the tree trunk.

On the outside is the bark, then the cambium (pencil point) then a light layer of wood.

Most of the center is dark wood and the very center (white arrow) is the pith.

A flowering tree (*Chorisia*) branch cut in cross-section.

The pencil points to the cambium. To the outside of the pencil is the bark and to the inside is the wood.

The pith is to the lower side, not in the center.

Trees grow wider by producing new wood. The new wood grows from a thin soft layer of dividing cells, called the **cambium (X)**, that covers the outside of the wood and is protected by the bark to the outside of the trunk. The **wood (xylem)** gives the tree strength and transports water from roots to leaves.

The **inner bark** (**phloem**) transport sugars and amino acids produced by the leaves down to the roots. The cambium produces new inner bark to the outside.

When a tree is cut, you can recognize the wood (xylem) center and the bark (phloem and cork).

A slice of the wild tamarind tree.

The pencil tip is on the cambium. Bark is to the outside of the pencil and wood is to the inside of the pencil.

The difference between light “sapwood” and inner dark “heartwood” is clear.

Dade County pine – cross-section of a trunk.

Pencil points to the cambium which is split in this dried log.

Dark bark is to outside and wood (both sapwood and heartwood) is to the inside.

The inner bark is protected by the outer bark and cork. Both inner and outer bark can be peeled from the trunk because the cambium is a soft and delicate layer that can be easily split.

Birch bark for Indian canoes and cork for wine bottles can be removed because of the fragile cambium layer. The corks used in bottles are made from the bark of the European cork oak.

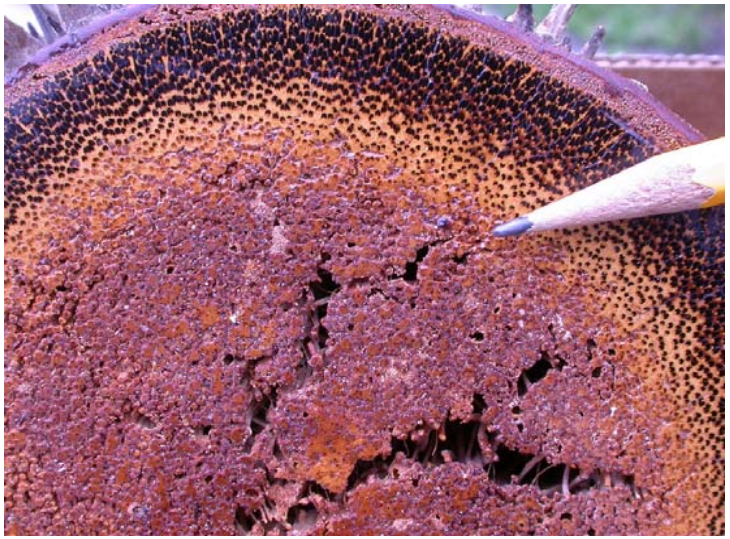
Bark of gumbo limbo (*Bursera*).

The bark is smooth, reddish in color and the thin layers of cork peel off in thin sheets.

Bark of live oak

The thick bark is deeply fissured and makes a good surface for the resurrection fern to grow on.

The trunk of most **palms** is usually cylindrical. This is because palms lack a cambium. In place of a core of wood and a covering of bark, palms have a fibrous stem.



Stem cross-section of the *Aiphanes* palm.

The central region split when the section was dried.

Note the separate vascular bundles that are darker and more numerous near the surface of the stem.

Cross-section of the base of a *Coccothrinax procteriana* showing the roots.

A few bottle palms and even the royal palm have swollen regions of the trunk due to localized cell enlargement but not due to new vascular tissues (xylem and phloem).

The base of this bottle palm (*Hyophorbe*) normally swells as it ages.

These old Cuban belly palms (*Gastrococos*) thicken high up the trunk. This may be way the palm stores water and food for the dry season in its native habitat.