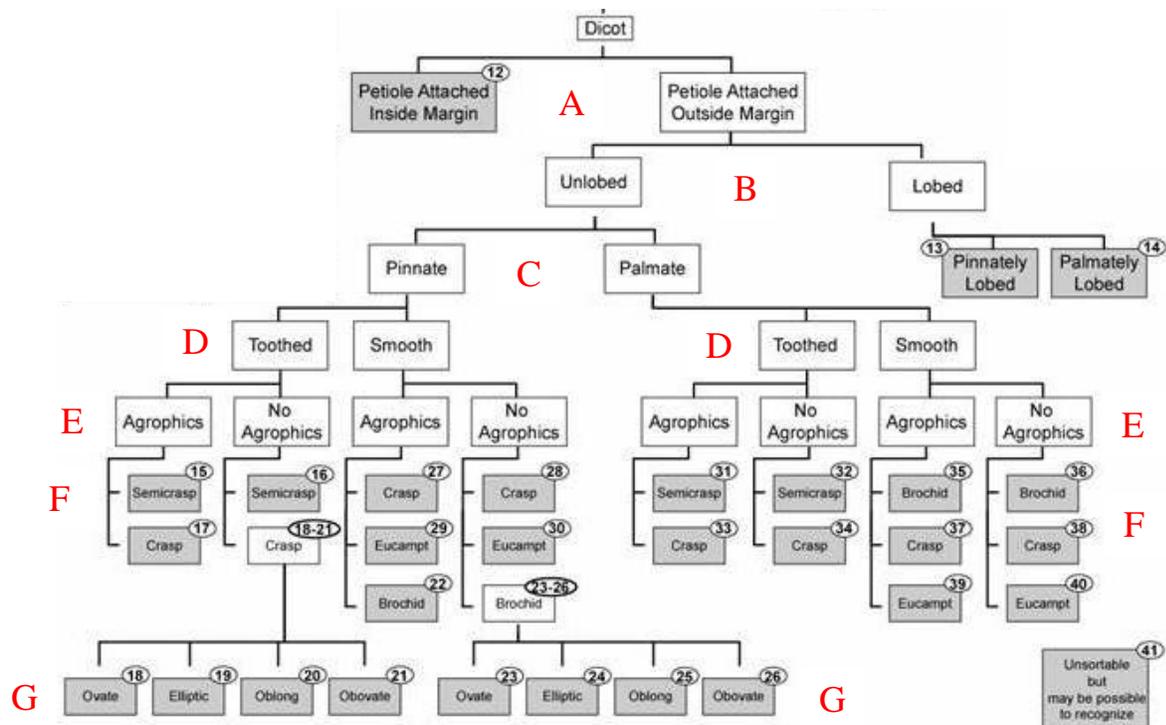


Denver Museum of Nature & Science

Guide to binning dicots

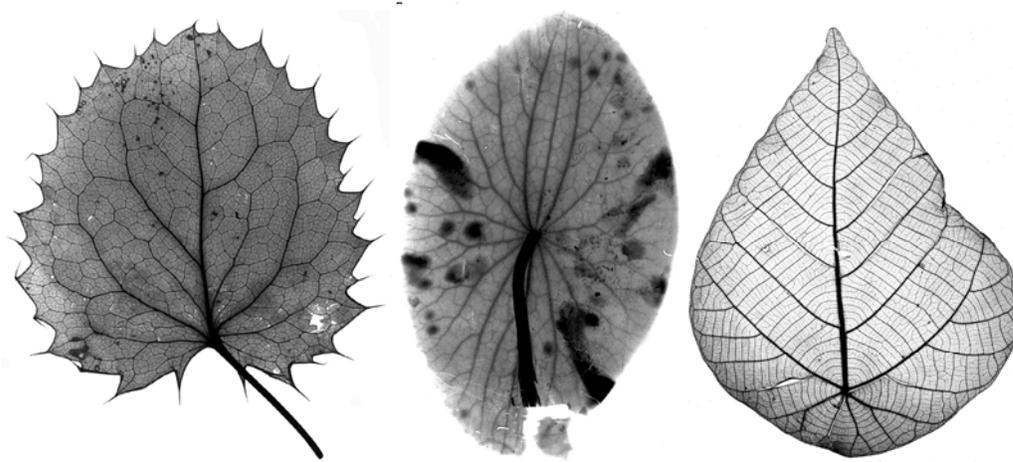
Once you have determined that the leaf is a **dicot** (veins are arranged in a net-like fashion), just follow the tree to arrive at the correct bin:



A. Petiole Attachment- the petiole is another name for the stem of the leaf.

-*Petiole attached outside margin* (marginal)- the stem, or petiole, of the leaf attaches at the base of the leaf.

-*Petiole attached inside margin* (peltate)- the petiole attaches inside the leaf, place the leaf in **Bin 12**.



MARGINAL

PELTATE

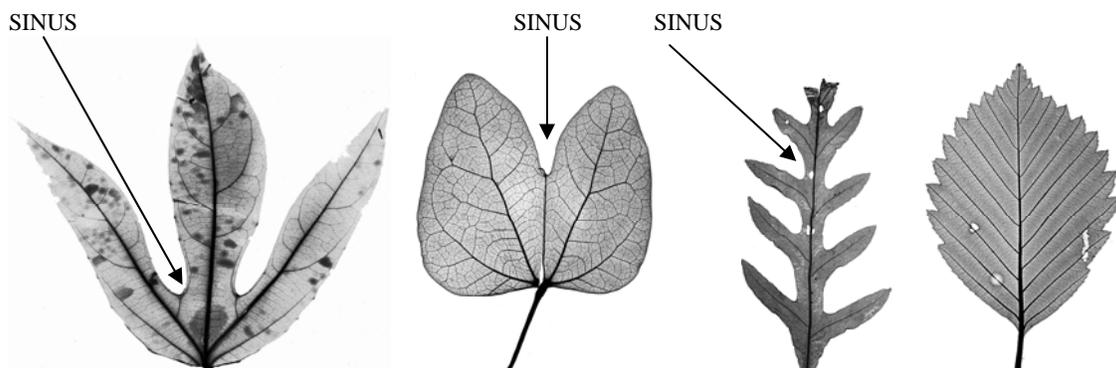
PELTATE

B. Lobed- a lobe is a marginal projection from the leaf where the sinus is incised into the leaf at least 25% of the distance to the primary vein. (Doesn't make sense? Just look at the pictures below).

-*Palmately lobed*- the major veins in the lobe are primary veins and arise from the base of the leaf. **Bin 14**

-*Pinnately lobed*- major veins of the lobes are formed by secondary veins that come off the primary. **Bin 13**

-*Unlobed*- go on to the next step.



PALMATELY
LOBED

PALMATELY
LOBED

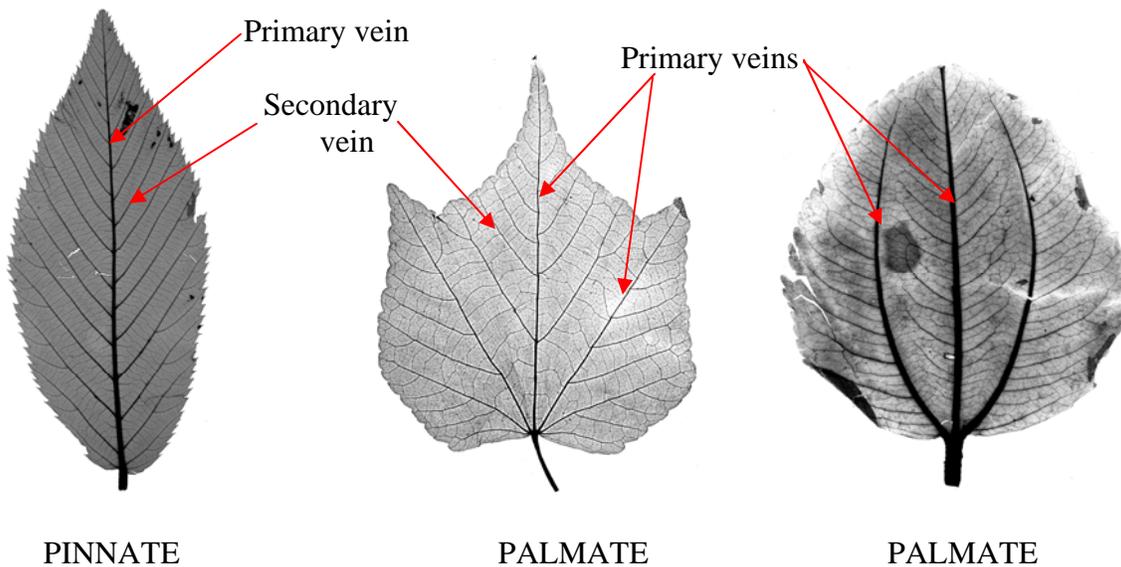
PINNATELY
LOBED

UNLOBED

C. Primary Venation: The primary vein is the thickest vein (or veins) which start at the base of the leaf.

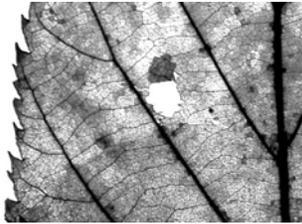
-*Pinnate*- leaf has only one primary vein. **Bins 15-30**

-*Palmate*- leaf has more than one primary vein. Primary veins radiate from the base of the leaf and are significantly larger than other veins on the leaf. The thickness, or gauge, of a vein must be at least 75% of the gauge of other primary veins to count as a primary. **Bins 31-40**

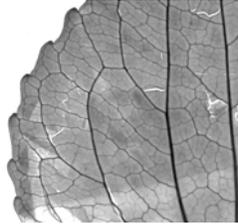


D. Margin

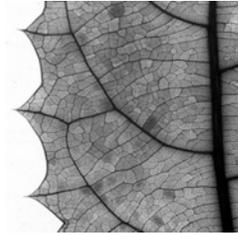
-*Toothed*- can be recognized by projections along the margin that are fed by veins.
-*Smooth/Entire*- margin is exactly that. There are no projections (teeth) along the margin.



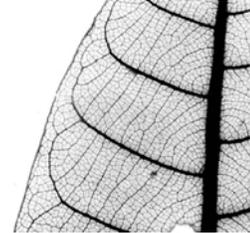
TOOTHED



TOOTHED



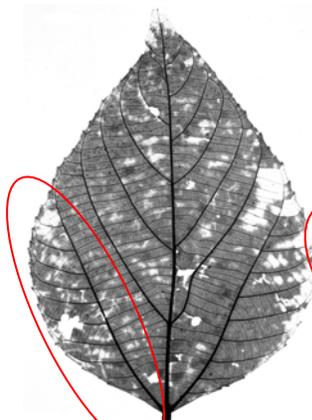
TOOTHED



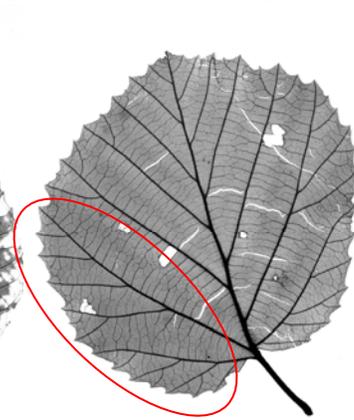
SMOOTH/ENTIRE

E. Agrophic Veins: (note: secondary veins are the next thinnest veins after primary veins. These two types of veins, plus the agrophics when present, create the structural framework for the leaf.)

-*Agrophics*- A comb-like complex of veins composed of a lateral primary or secondary veins with 2 or more excurrent minor 2° veins that originate on it and travel roughly parallel courses toward the margin. The latter may be straight or looped but they are not bilaterally paired.



AGROPHICS



AGROPHICS



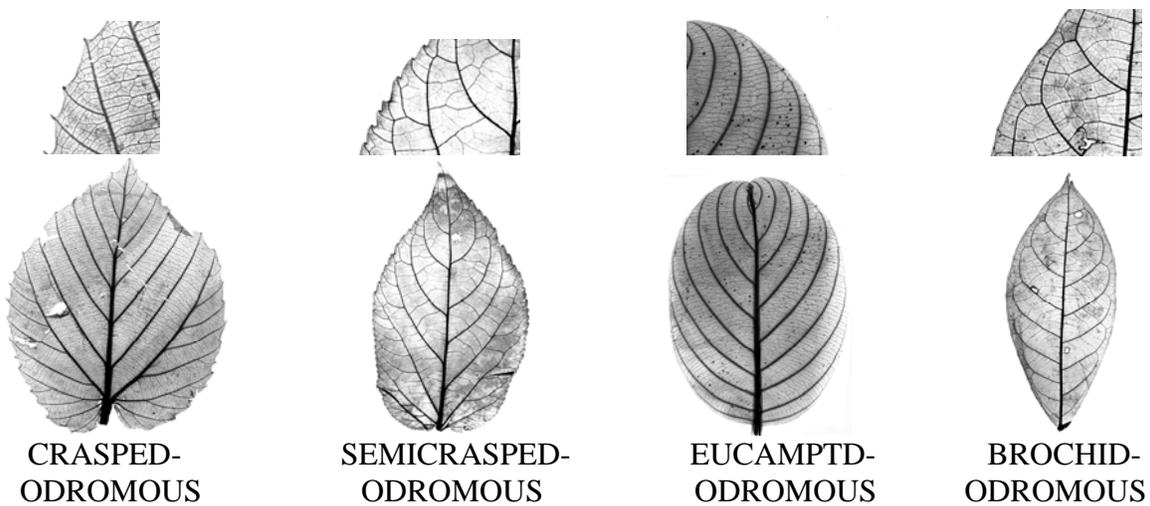
NO AGROPHICS



NO AGROPHICS

F. Secondary Venation- Secondary veins are attached directly to the primary vein(s). For binning, focus on the course of the secondaries near the margin in the center section of the leaf.

- Craspedodromous*- usually on toothed leaves, the secondary vein terminates at the margin, usually in a tooth.
- Semicraspedodromous*- usually on toothed leaves, the secondary branches near the margin. One of the branches terminates at the margin, and the other joins the superjacent secondary.
- Eucamptodromous*- usually on entire (smooth margin!) leaves, the secondary does not split or reach the margin. As it approaches the margin, it loses gauge (thickness) and fades away.
- Brochidodromous*- usually on entire (smooth margin!) leaves, the secondaries connect near the margin to form loops or arches.



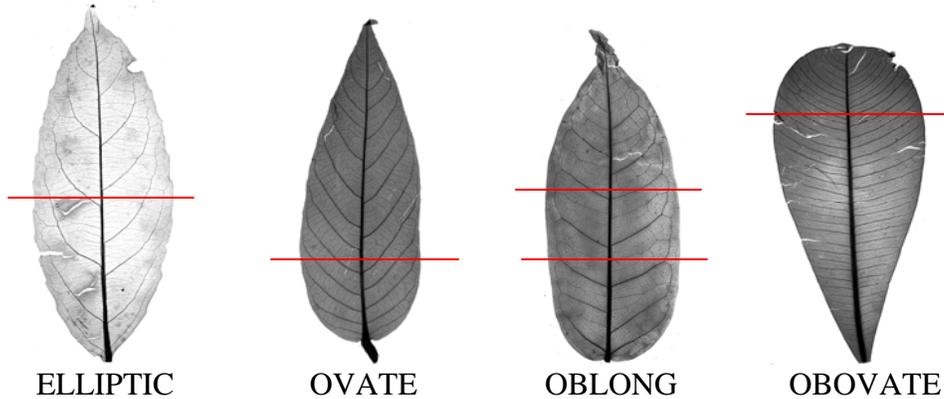
G. Shape (note: the length of a leaf is measured from the basal-most extension of the leaf tissue to the apical-most extension of the leaf tissue.)

-*Elliptic*- the widest part of the leaf is the middle 1/5.

-*Ovate*- the widest part of the leaf is the proximal 2/5. The proximal part is the base of the leaf.

-*Oblong*- opposite margins are roughly parallel for at least the middle 1/3 of the leaf.

-*Obovate*- the widest part of the leaf is the distal 2/5. The distal section is the apex, or tip of the leaf.



Please remember that diagnosing all of these characteristics can be subjective. Even the experts frequently disagree!