Laboratory 18: Asteridae – Part 3

Today we will continue looking at the Core Asterids. We will be looking at another family in the Asterales (Campanulaceae – this order also includes the Asteraceae). Note that both the Campanulaceae and Asteraceae possess the unique trait of secondary pollen presentation by the stigma. This lab will mainly focus on families in the Lamiales (Oleaceae, Gesneriaceae, Acanthaceae, Verbenaceae, Lamiaceae, Scrophulariaceae, Plantaginaceae, and Orobanchaceae). The Core Asterids have **sympetalous corollas** (fused petals), **epipetalous stamens**, and **equal numbers of stamens and petals** (features which are also present in some members of the Ericales); but in some families, 1 or (rarely) more stamens may be sterile or lost.

Campanulaceae – Bellflower Family, 70 genera, 2,000 spp.

Mostly herbaceous, **typically with milky sap**. Leaves generally alternate and entire, rarely lobed; stipules absent. **Flowers radial to bilateral, bisexual, with hypanthium**. Sepals 5, connate. **Petals 5, fused, bell-shaped to tubular when radial, 2-or even 1-lipped with an adaxial slit when bilateral** (lobes not overlapping). Stamens typically 5, **attached to a disc at the apex of the ovary; anthers compressed or fused around style (for secondary pollen presentation)**. Carpels 2--5, fused. Ovary usually inferior. Style grows through anther ring to present pollen, **often with specialized hairs for this purpose**, stigma has as many lobes as carpels. Fruit a capsule or berry.

Campanula
Centropogon
Lobelia

Oleaceae – Olive Family, 29 genera, 600 spp.

Trees, shrubs, or vines. Leaves typically opposite, simple or pinnately compound; stipules lacking. Peltate scales sometimes present. Inflorescence determinate or flowers solitary. Flowers bisexual (rarely unisexual). **Sepals 4, fused**. **Petals 4 (sometimes more) fused**, often folded inward. **Stamens 2, epipetalous**. Carpels 2, fused. Ovary superior. Nectar disc often present. Fruit a drupe, capsule, samara, or otherwise.

Forestiera
Jasminum (leaves are alternate in some species)
Olea
Osmanthus

Acanthaceae – Acanthus Family, 256 genera, 2,770 spp.

Primarily shrubs and herbs. Leaves opposite and decussate (sometimesalternate); stipules absent. Flowers bisexual and bilateral**, subtended or sometimes enclosed by one or more large, colorful bracts**. Sepals 4-5. **Petals 4-5, fused into a tube and bilabiate**. Stamens 4 (with 2 long, 2 short) or just 2 in number, epipetalous, **anthers usually asymmetrical**; staminodes sometimes present. Ovary: superior, composed of 2 fused carpels. Style 1, but may be forked with two long stigmas. Fruit a capsule, often with hook-like outgrowths.

Acanthus
Justicia
Mackaya

Lamiaceae (Labiatae) – Mint Family, 260 genera, 6,970 spp.

Primarily herbs or shrubs, generally aromatic. **Stems four-angled in cross-section**; stipules absent. Leaves simple (occasionally pinnately compound), **opposite and decussate**, often with glandular hairs. Inflorescence with indeterminate main-axis and determinate lateral-branches. **Flowers bisexual and bilateral, usually strongly bilabiate**. Sepals 4--**5**, fused. Petals 4--**5**, fused. Stamens 4 (2 long, 2 short) or 2 (with 0 or 2 staminodes), epipetalous. Carpels 2, fused; locules 4. **Ovary superior; most with a gynobasic style**. Nectaries commonly present. **Fruit a shizocarp (of usually 4 nutlets**, or 1--3), berry, or drupe.

Lavandula
Mentha
Nepeta
Rosmarinus
Salvia
Teucrium
Thymus

Plantaginaceae – Snapdragon/Plantain Family, 113 genera, 1,800 spp.

Herbs, or rarely shrubs. Leaves generally simple, alternate or opposite; stipules lacking. Flowers bisexual and bilateral (radial in *Plantago*, *Veronica*), sepals 4 or 5, fused. Petals 4--5, fused, corolla bilabiate when bilateal. Stamens typically 4 (with 2 long, 2 short -- sometimes 1 staminode), or rarely 2; epipetalous; **anther sagittate.** Carpels 2, fused. **Ovary superior; locules distinct.** Style 1; stigma 2-lobed. Nectar disc common. Fruit a capsule.

Antirrhinum
Isoplexis
Penstemon
Plantago

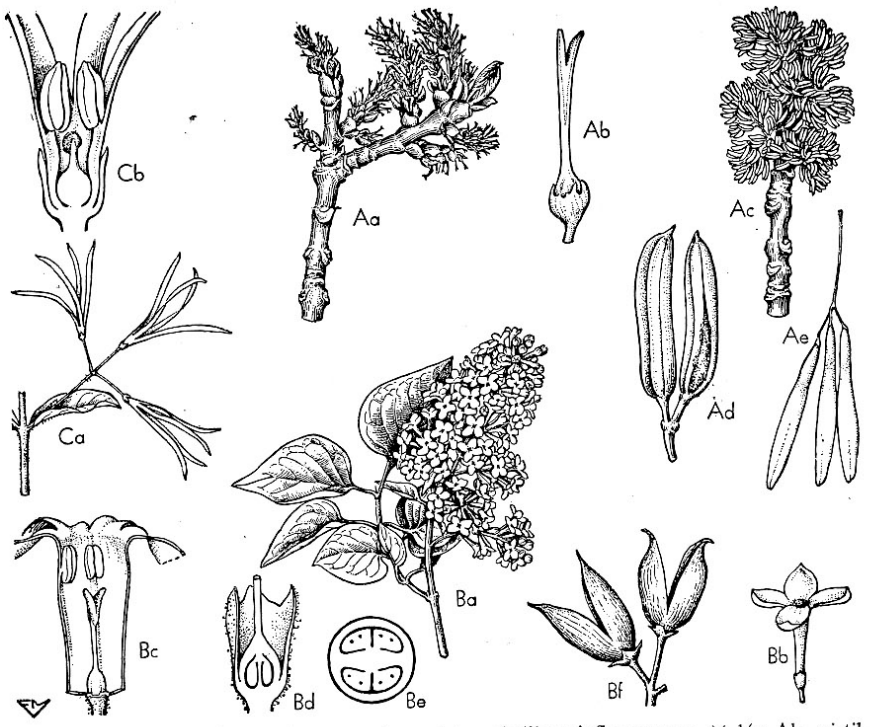
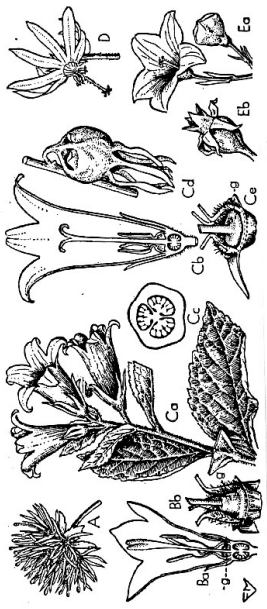


Fig. 261. OLEACEAE. A, *Fraxinus americana*: Aa, pistillate inflorescence, × ½; Ab, pistillate flower, × 4; Ac, staminate inflorescence, × ½; Ad, staminate flower, × 4; Ae, samaras, × ½. B, *Syringa vulgaris*: Ba, flowering branch, × ¼; Bb, flower, × 1; Bc, same, perianth expanded, × 2; Bd, ovary, vertical section, × 5; Be, same, cross-section, × 10; Bf, capsules, × 1. C, *Chionanthus virginica*: Ca, flowers, × ½; Cb, flower, perianth partially excised, × 5. (From L. H. Bailey, *Manual of cultivated plants,* The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)



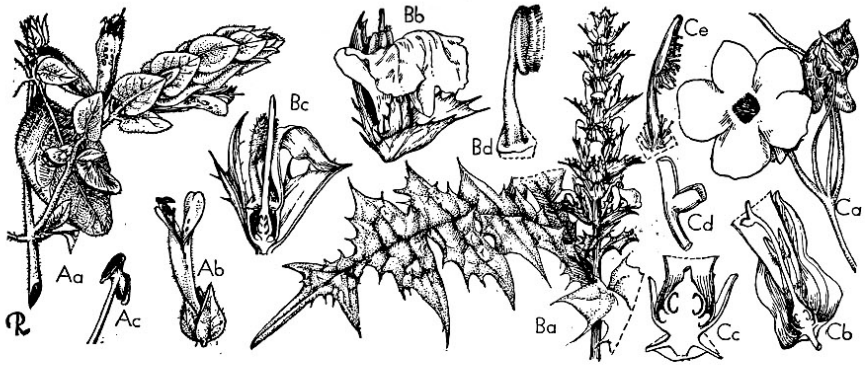


Fig. 284. ACANTHACEAE. A, *Beloperone guttata*: Aa, flowering branch, × ½; Ab, flower, × ½; Ac, anther, × 2. B, *Acanthus montanus*: Ba, inflorescence with leaf, × ⅛; Bb, flower with bract, × 1; Bc, same, vertical section, × 1; Bd, stamen, × 2. C, *Thunbergia alata*: Ca, flower, × ½; Cb, same, vertical section (corolla-limb excised), × 1; Cc, ovary, vertical section, × 3; Cd, stigma, × 4; Ce, stamen, × 3. (From L. H. Bailey, *Manual of cultivated plants,* The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)

figure from Lawrence (1951) **Taxonomy of Vascular Plants**

Fig. 273. LABIATAE. A, *Salvia splendens*: Aa, inflorescence, × ½; Ab, flower, vertical section, × 1; Ac, ovary, × 3; Ad, same, vertical section, × 3; Ae, nutlets, × 2. B, *Stachys grandiflora*: Ba, inflorescence, × ¼; Bb, flower, × ½; Bc, same, corolla expanded, × 1. C, *Molucella laevis*: whorl of flowers, × ½. D, *Teucrium lucidum*: Da, inflorescence, × 1; Db, flower, × 2. E, *Monarda didyma*: Ea, inflorescence, × ½; Eb, flower, × 1. F, *Mentha spicata*: Fa, inflorescence, × ½; Fb, flower, × 3. G, *Nepeta Faassenii*: Ga, inflorescence, × ½; Gb, flower, × 2. (From L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)

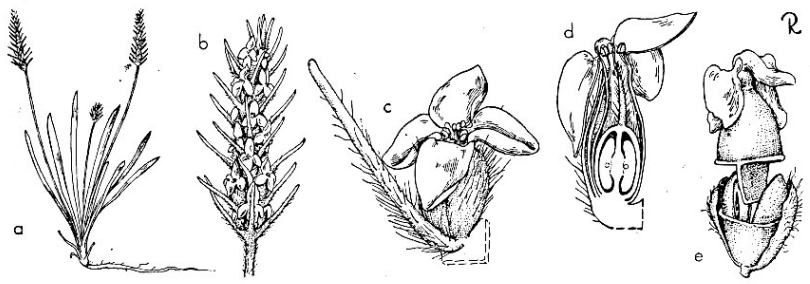


Fig. 287. PLANTAGINACEAE. *Plantago aristata*: a, plant in flower, × ⅙; b, inflorescence, × 1; c, flower, habit, with bract, × 6; d, same, vertical section, × 6; e, capsule, dehiscing, × 5.

figure from Lawrence (1951) **Taxonomy of Vascular Plants**