

**BPSC 031 “Spring Wildflowers”  
Lab 4. Five-parted families**

**Key to the five-parted families (five petals, fused into a corolla tube)**

- A. Flowers radiate, never two-lipped..... B
- A'. Flowers strongly zygomorphic, two-lipped..... D
  - B. Plants often foul-smelling leaves; saucer-, trumpet-shaped, or tubular flowers with pleated petals; fruit a berry or a many-seeded capsule..... **Solanaceae**
  - B'. Herbaceous plants with inflorescences arranged in helicoid cymes..... C
    - C. Plants with sticky (glandular) epidermal hairs, a forked style and a multi-seeded ovary that yields a capsule as fruit..... **Hydrophyllaceae**
    - C'. Bristly-haired plants with a single style and a 4-lobed ovary yielding 4 nutlets..... **Boraginaceae**
  - D. Fragrant, aromatic plants with opposite leaves and square stems, two-lipped flowers with 4-lobed ovaries yielding 4 nutlets..... **Lamiaceae**
  - D'. Mostly herbaceous, aromatic plants with zygomorphic, two-lipped flowers and 2-chambered capsules containing many small seeds..... **Scrophulariaceae**

Take randomly one of the plants in the lab and, using the above key, try to identify the family to which that species belongs. Then, according to the family you have identified, develop the following activities.

**1. Solanaceae (Nightshade Family)**

- a. Crush part of a leaf and smell it. Does it smell fetid or foul?
- b. Look in detail at the distinctive characters of the flower: Take a flower bud and look at the yet unopened petals. Are they pleated on each other? Look at the ovary and the ovules. How many carpels form the ovary? Are there many ovules in each chamber of the ovary?

**2. Hydrophyllaceae (Waterleaf Family)**

- a. Look in detail at the helicoid cyme and then touch the leaves: Do the leaves have sticky hairs and feel glandular?
- b. Observe the pistil in the flower: Is the style forked? Identify the ovary and dissect it: Does it have two chambers with many ovules each?

**3. Boraginaceae (Borage Family)**

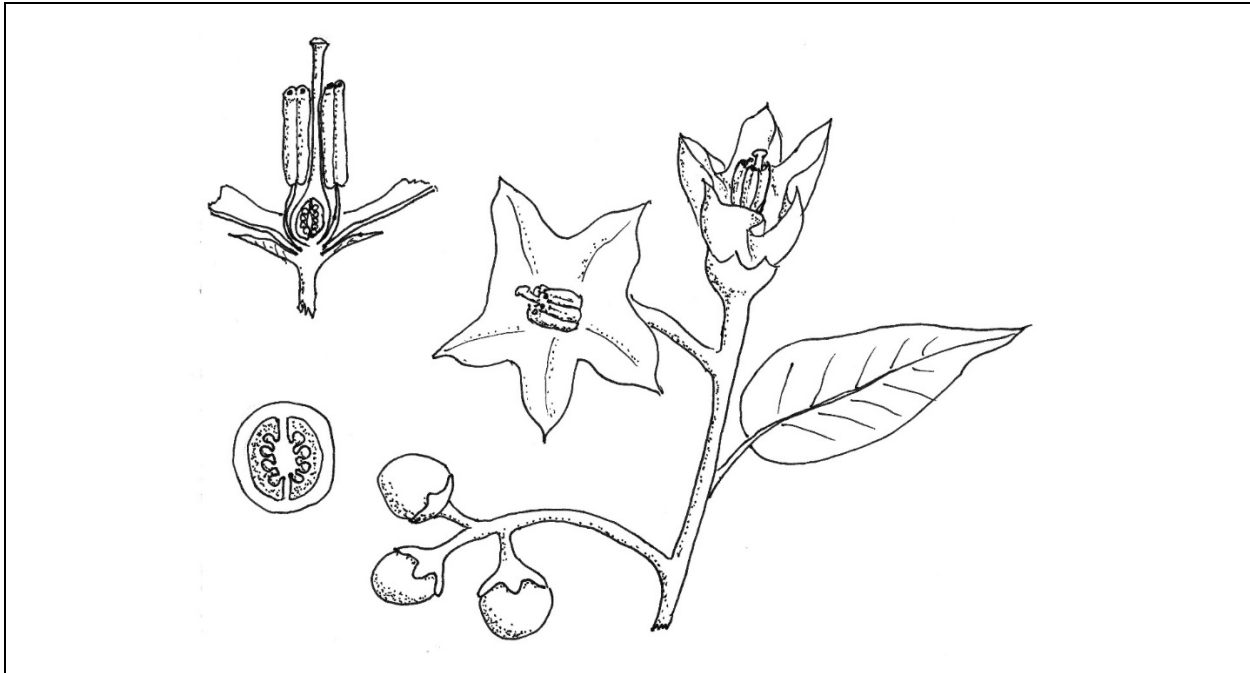
- a. Look in detail at the helicoid cyme and then touch the leaves: Do the leaves have prickly hairs and feel bristly?
- b. Observe the pistil in the flower: Is the style entire, un-forked? Identify the ovary and dissect it: Does it have four ovules at the base that yield four nutlets after fertilization?

**4. Lamiaceae (Mint Family)**

- a. Crush part of a leaf and smell it. Does it have a pleasant (fragrant or aromatic) smell?
- b. Feel the stem between your fingers. Is it square?
- c. Observe the strongly bilateral, two-lipped flower. Look at the stigma and the anthers, and try to imagine the trajectory of a bee entering the floral tube. Identify the ovary and dissect it: Does it have four ovules at the base that yield four nutlets after fertilization?

## 5. Scrophulariaceae (Snapdragon Family)

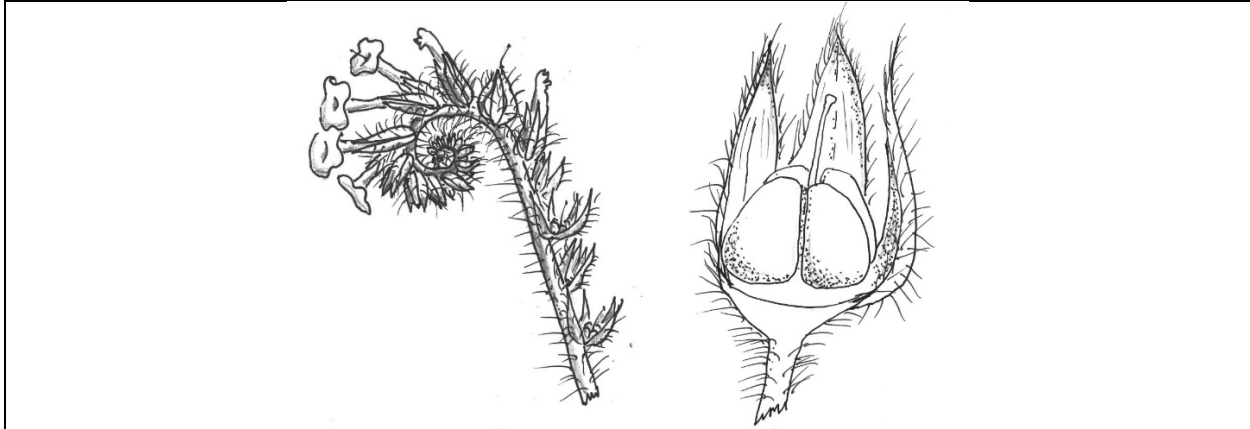
- Scrophs can be highly variable in their floral morphology. Look at the plant you have and try to interpret the flower shape: Is it strongly or weakly zygomorphic? Make a diagram of the flower.
- Look at the leaves. Are they opposite or alternate; do they smell fragrantly?
- Identify the ovary and dissect it, or better still, look for a developing fruit. Is the ovary two-chambered with many ovules? Is the fruit a capsule with multiple seeds?



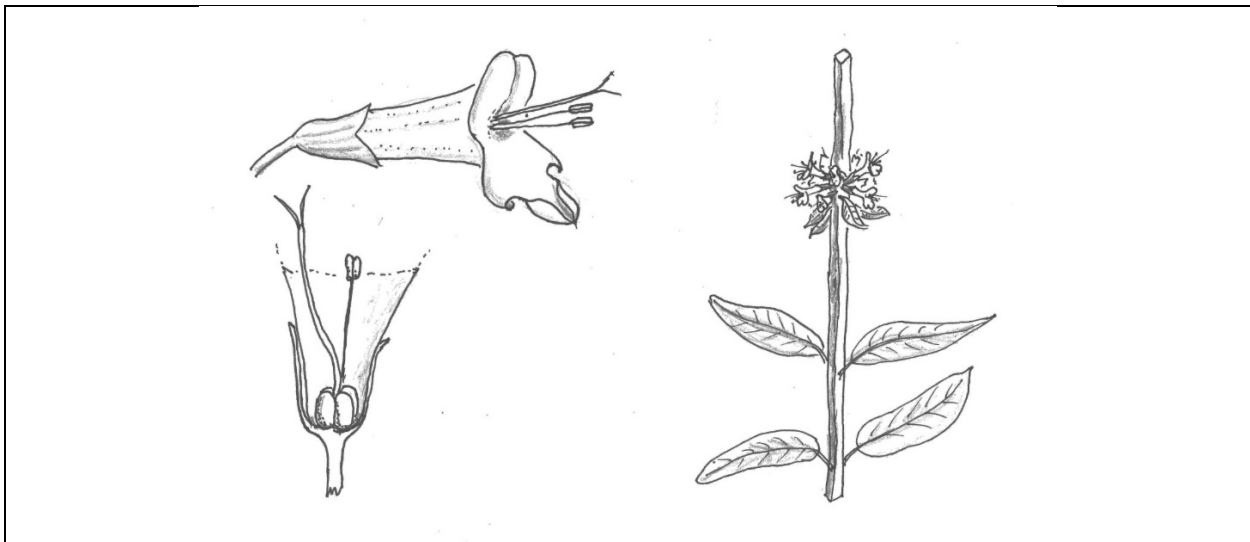
The Solanaceae at a glance: Foul-smelling plants with alternate leaves, pleated (or plicate) petals in the opening flower bud, connivent anthers with poricidal dehiscence, ovary superior with two carpels and many ovules, axile placentation. Fruit a two-carpelled berry or capsule (Illustration: *Solanum parishii*, "purple nightshade").



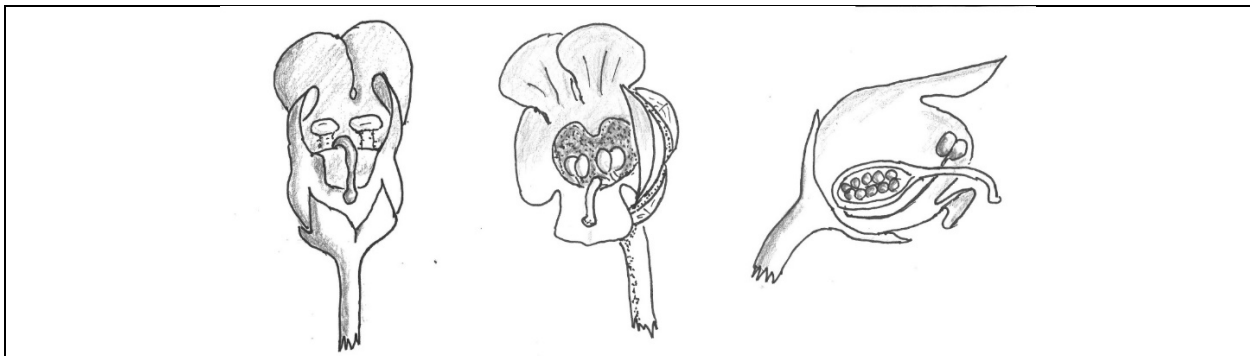
The Hydrophyllaceae at a glance: Glandular, or watery hairs, scorpioid cymes, ovary superior with a two-carpelled, multi-ovule pistil with a bifid stigma; fruit a capsule (Illustration: *Nemophila menziesii*, "baby blue eyes").



**The Boraginaceae at a glance:** Bristly, often prickly hairs, scorpioid cymes, ovary superior with two-carpels bearing two ovules each that mature into four distinct segments; fruit formed by four nutlets that detach separately from the dry flower receptacle (Illustration: *Amsinckia menziesii*, "fiddleneck").



**The Lamiaceae at a glance:** Square stems, strongly fragrant opposite leaves in a decussate phyllotaxis, flowers often arranged in spike-like clusters on stem nodes (but sometimes solitary in some species). Zygomorphic, two-lipped flowers, with a 2-capelled, 4-lobed pistil; fruits formed by four one-seeded nutlets (Illustration: *Salvia mellifera*, "black sage").



**The Scrophulariaceae at a glance:** Zygomorphic, two-lipped flowers, mostly clustered in spikes, racemes, or panicles. Usually four (sometimes 2 or 5) stamens joined to the tube, and a single pistil with a superior, 2-carpelled and 2-chambered ovary maturing into a multi-seeded capsule (Illustration: *Scrophularia californica*, "California bee-plant").