

BPSC 031 "Spring Wildflowers"

Lab 6. Rosaceae (the Rose Family) and Fagaceae (the Oak Family)

I. Rosaceae (Rose Family)

Plants of highly variable habits and leaf designs, from herbaceous ephemerals to long-lived woody shrubs and trees. Flowers with five separate sepals, five separate petals, and numerous stamens attached to a shallow cuplike or bowl-shaped hypanthium, derived from an enlargement of the floral receptacle. Although modern molecular taxonomy has shown the subfamilies to be many and its classification quite complex, traditionally, the family has been classified according to its fruit type into four subfamilies: **Rosoideae**, **Prunoideae**, **Maloideae**, and **Spiroideae**. Although we know now that this traditional classification is an oversimplification, it is easy to follow and we will use it in the lab.

Key to the subfamilies of the Rosaceae

- A. Herbaceous, often prickly plants or low shrubs with composite leaves; many apocarpous pistils that mature separately into achenes or drupelets and form aggregated fruits **Rosoideae**
- A'. Woody shrubs or trees mostly with entire leaves; fruit a drupe, a pome, or dry follicles **B**
- B. Fruits fleshy **C**
- C. Ovary superior, fruit a drupe, derived from a single monocarpellate pistil **Prunoideae**
- C'. Ovary inferior, surrounded by the overgrowth of the hypanthium; fruit a pome **Maloideae**
- B'. Fruits dry; the gynoecium consists of one to many apocarpous pistils that mature into dry follicles bearing one or many achenes, often wind-dispersed with a plumose style **Spiraeoideae**

II. Fagaceae (Oak Family)

The Fagaceae are woody shrubs or trees with simple, toothed, or pinnately lobed leaves, petal-less catkins of male flowers, and cups or spiny burs containing an acorn or nuts. The plants are monoecious, with separate male and female flowers. The unisexual flowers are inconspicuous, small and greenish. Male flowers in catkins; female flowers single or in small clusters. Each female flower sits in a scaly cup with a single pistil bearing a 3-lobed stigma. The fruits are acorns that sit in a cup of warty or scale-like bracts.

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

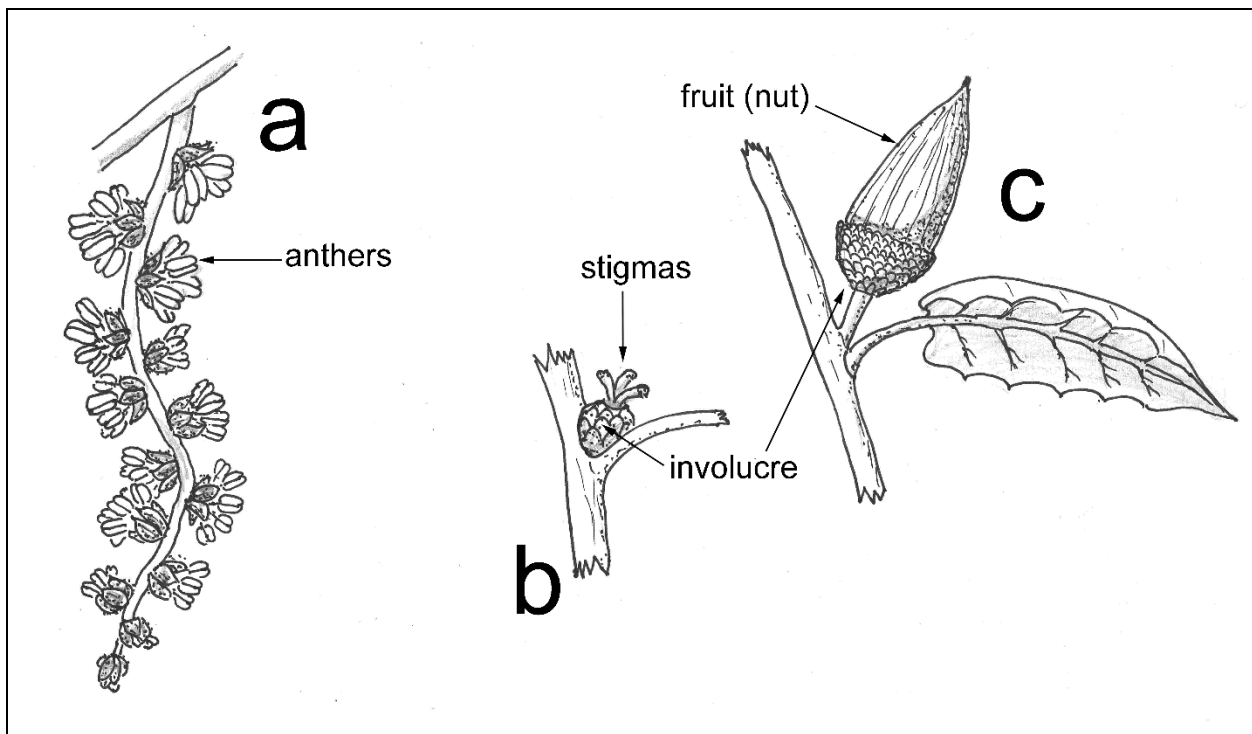
1. Rosaceae (Rose Family)

- a. With care, dissect the flower and observe flower parts. Can you see the hypanthium? Count the number of pistils.
- b. Look at older flowers to see if you might find a ripening fruit. Is the fruit a hip, a pome, a drupe, or a dry follicle?
- c. Look in detail at the leaves and the stem. Can you see any epidermal pricks (spines growing from the epidermis)? Is the leaf entire or composite?

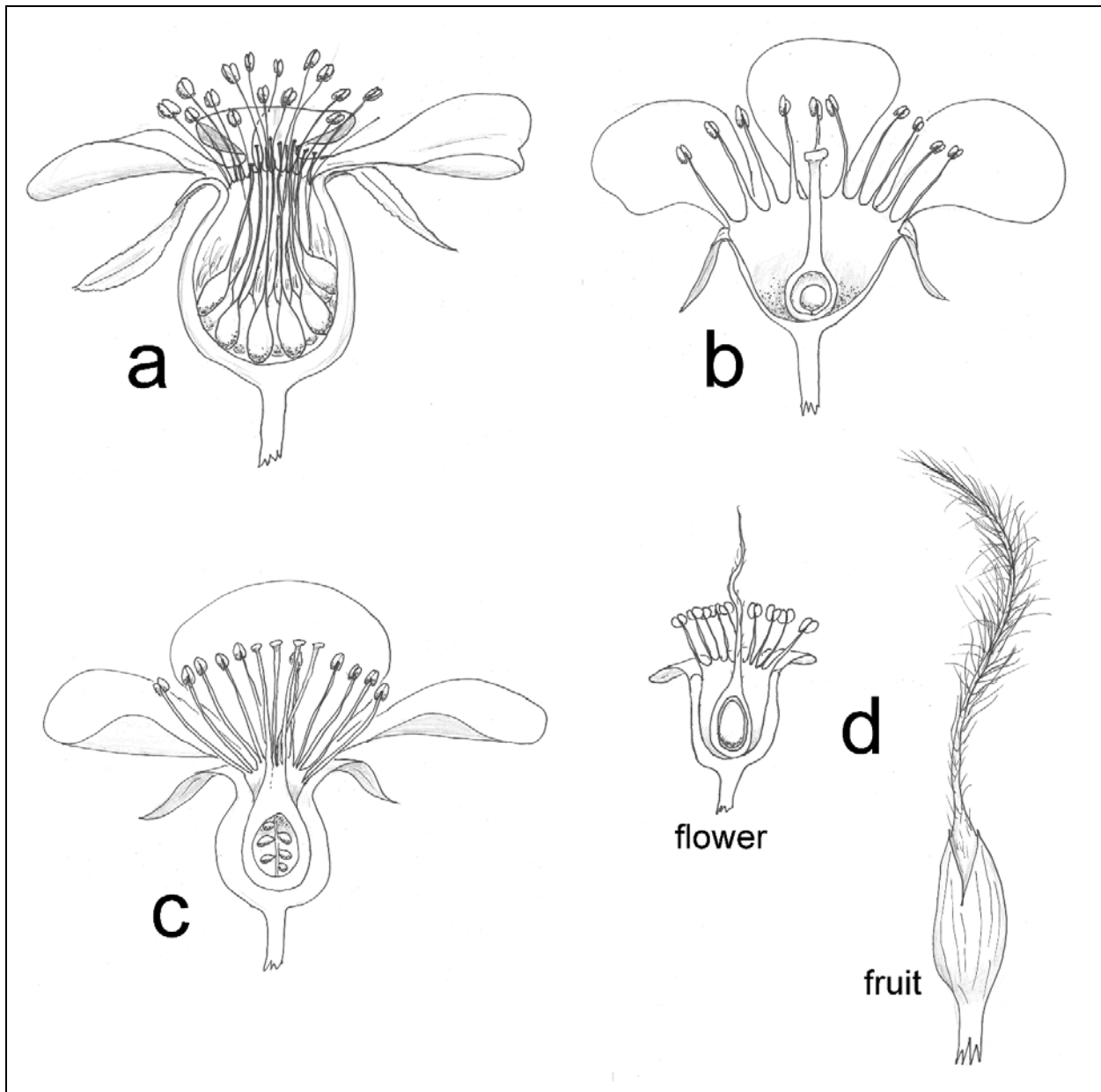
d. Using the key above, try to identify the subfamily to which your plant belongs. Make a sketch of the most distinctive traits you have observed.

2. Fagaceae (Oak Family)

- Look in detail at the flowers. Can you distinguish male and female flowers? Using the hand-held loupe, observe the stamens in the male catkins, and the three-parted style in the female flowers.
- Look at older flowers to see if you might find a ripening fruit, or, alternatively, dissect the ovary in a female flower you have. Can you see the single ovule that will develop into a nut? Look at the scaly involucre at the base of the flower. Describe it.
- Observe the leaves. Are they entire or composite? If entire, look at the margin of the leaf. Is it lobed, sinuate, toothed, or entire?
- Make a sketch of the most distinctive traits you have observed in this plant.



The Fagaceae at a glance: Woody perennials (shrubs or trees) with simple or pinnately-lobed leaves, (a) male flowers in petal-less catkins, (b) female flowers in cup-like or spiny involucre that develop into (c) acorns or nuts (*Quercus agrifolia*).



The Rosaceae at a glance: Despite their highly variable morphologies, plants in the family are recognizable by their five separate petals and numerous stamens, attached to a bowl-shaped hypanthium derived from the enlargement of the floral receptacle. (a) Plants in the subfamily **Rosoideae** have many pistils maturing separately while attached to a fleshy enlarged receptacle to form aggregated fruits (*Rosa californica*). (b) The **Prunoideae** have a one-ovuled pistil that develops into a one-seeded drupe (*Prunus ilicifolia*). (c) The **Maloideae** have a single pistil formed by the fusion of 5 or less carpels fused to a surrounding hypanthium to yield a pome (*Heteromeles arbutifolia*). (d) The **Spiraeoideae** have separate dry carpels that ripen into follicles bearing one or many seeds (*Cercocarpus betuloides*).