

Plant Anatomy Lab 13 – Seeds and Fruits

In this (final) lab, you will be observing the structure of seeds of gymnosperms and angiosperms and the fruits of angiosperms. Much of the work will be done with a dissecting microscope, but a few prepared slides will also be used.

A set of photocopied images from the plant anatomy atlas will be available as a handout. You can use the handout to help you identify the various structures we will be looking at in seeds and fruits. Also, a fruit key is available as a separate handout.

Remember that we will be considering only a small fraction of the structural diversity present among seeds of gymnosperms and the seeds and fruits of angiosperms.

Seeds

Gymnosperms

Obtain a prepared slide of an immature pine ovule and of a mature pine ovule. You will be able to tell them apart from the following observations.

- Looking at the immature ovule, you will see a megagametophyte with one or more archegonia at the end near the micropyle. The egg inside may or may not have been fertilized.
- Also find the nucellus and integument tissues.

Next look at a slide of a mature ovule. Instead of the megagametophyte, you will find a developing embryo. As part of this embryo, find the

- cotyledons,
- the radicle (embryonic root), and the
- shoot apical meristem.

Depending on its age, you may also notice procambial strands running between the embryonic root and the shoot apex.

Points to consider: We might say that gymnosperms and angiosperms have seeds but only angiosperms have fruits - Why is that? Why don't we consider the seed cone of a pine tree a fruit?

Angiosperms

Dicot

Obtain a bean pod. Carefully open the pod and extract the seeds. Section the seeds and observe under the microscope (try a dissecting scope). Also look at the prepared slides of bean seeds (*Phaseolus*).

- Identify the cotyledons, the radicle, the seed coat (What is the seed coat derived from?), and the epicotyl or shoot apical meristem.
- Look at the prepared slides under the compound microscope; you should see procambial strands feeding the epicotyl. Are the cotyledons vascularized?

Monocot

Obtain a few corn kernels (caryopsis) and a prepared slide of a corn ovule. Section the kernels along the long axis and observe under the dissecting microscope.

- Find the scutellum, radicle, coleorhiza, coleoptile (encloses apex), and the shoot apical meristem.
- Also note how the seed coat and pericarp are fused together; you cannot separate the ovule tissues (endosperm and integument) from the ovary wall (pericarp).

Fruits

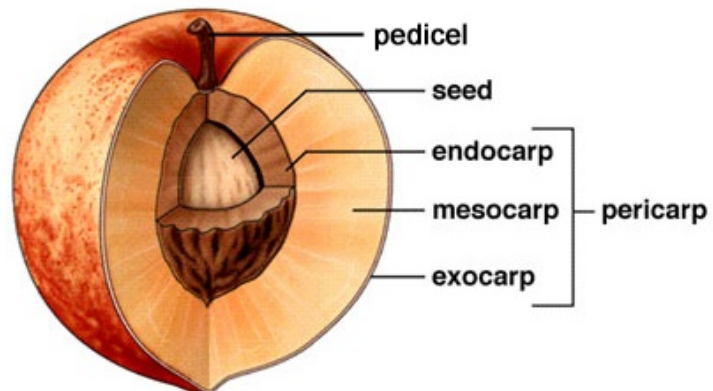
Think about corn. Can you separate seeds from the fruit around them? When we plant for corn, are they seeds or fruits?

Fleshy fruits

Obtain a fruit of each of the following: apple, grape, cherry (or peach [pictured at right]), lemon, and bean.

Section each fruit and identify the following tissues (referring to the figures in the atlas handout [grape is not shown]):

- Pericarp - derived from the ovary wall; try to find exocarp, mesocarp, and endocarp layers
- Seed and seed coat



These tissues are extremely variable in massiveness and in hardness, so look at each fruit individually. You can also check the key (from the Fahn text) and identify each fruit as to its type (drupe, pome...)

Dry fruits

Obtain a fruit of sycamore, ash, desert willow, and oak. Section each fruit and observe with a dissecting microscope. Compare what you see with the fruit key and determine the fruit type.

Examine the fruit of the live oak tree (*Quercus virginiana*). Make a longitudinal cut through the center of the fruit. Find the cotyledons and the radicle of the embryo. Where is the endosperm?

Look at the “fruit” of the sycamore (*Platanus occidentalis*). Why have I put quotation marks around the word “fruit”? What type of fruit are the actual fruits?

Examine a desert willow (*Chilopsis linearis*) pod. Open the pod and observe the seeds. The pod has two chambers and this is from a multiple carpel flower. So what kind of fruit is it? Refer to the handout and note the position of the cotyledons inside the seed coat.

Lastly, examine the fruits of the ash tree (*Fraxinus* sp.). This is a samara (like maple) - a winged seed. If you open the dried fruit, you will find the seed inside.