**Leptosporangiate Ferns: Polypodiales *sensu lato***

The broad definition of the fern order Polypodiales includes ~1600 fern species divided into at least 13 families. In this exercise, you will learn nine species taken from eight families. Follow the instructions for each set of polypods as you learn characters that will help to identify these species. Consult the **Frond Dissection** handout for help. Use the **Fern Identification** sheet as a last resort. Follow directions as indicated. In all cases, label the species of your drawing and the following morphological characters where appropriate: petiole, rachis, pinna, sorus, indusium, false indusium, sporangia, annulus, frond, sterile frond, and fertile frond.

1. Dimorphic fronds

Look at *Asplenium platyneuron*, *Onoclea sensibilis* and *Woodwardia areolate*. Each of these species has dimorphic fronds. What is meant by “dimorphic fronds”?

* 1. Sterile fronds

Look at the sterile fronds of these three species. How do you know they are sterile? DRAW a sterile frond for each species. Describe the frond complexity of each species.

* 1. Fertile fronds

Now consider the fertile fronds of each species.

* + 1. Modified pinnae

Compare the fertile frond of *Onoclea* *sensibilis* to that of *Woodwardia areolate*. You will notice that the pinnae are modified compared to the sterile frond. Describe the modification for each and DRAW the fertile frond. Look at the sori under a dissecting scope. Can you see an indusium in either species?

* + 1. Pinnae relatively unchanged

Consider the fertile fronds of *Asplenium platyneuron*. How do they differ from the sterile fronds (other than having sori)? HINT: You will need to consider the entire habit of the fern for the answer. Look at the base of the pinnae in both the fertile and sterile fronds. What is this feature called? DRAW habit including sterile and fertile fronds. DRAW close-up of pinnae and rachis.

1. Monomorphic fronds
   1. Indusia absent
      1. Sori found marginally or submarginally

Look at *Adiantum pedatum* and *Pleopeltis polypodioides*. You will notice that *Adiantum* appears to have a linear indusium. This, however, is a false indusium. What is covering the sori in *Adiantum*? Does *Pleopeltis* have covered sori? Approximately how many sori are on each pinna in *Pleopeltis*? DRAW a pinna with sori for each species. DRAW a frond for each species. Describe the complexity.

* + 1. Sori subterminal on veins

Look at sori of *Phegopteris hexagonoptera*, can you see the veins where they originate? DRAW a frond and describe its complexity.

* 1. Indusia present
     1. Peltate indusia

Look at *Polystichum acrostichoides*. Do you see any features of the pinnae that you have seen before? HINT: It occurs only on one other species of these nine. Locate the sori. On what part of the frond can they be found? DRAW sori with indusia on a pinna. How are they positioned on the pinnae? The indusium is described as “peltate”. What does that mean? DRAW a frond and describe the complexity.

* + 1. Ciliate indusial

Look at *Athyrium filix-famina*. Locate the sori. Where are they located on the frond? DRAW sori with indusia on pinna. The indusium is described as “ciliate”. What does that mean? DRAW a frond and describe the complexity.

How does the frond complexity of *Athyrium filix-famina* differ from *Polystichum acrostichoides*? Is this a viable character to distinguish them?

1. No reproductive material present

Look at *Pteridium aquilinum*. There are no sori present on any of our specimens, so we cannot use these characters to distinguish this species. The frond complexity of this fern, however, is different some any of the others we have seen and can be used as a defining characteristic. DRAW a frond and describe the complexity.