

## Pteridophytes

Pteridophytes (ferns, fern allies, & lycopods) comprise the basal grade of vascular plants. Unlike the seedplants, pteridophytes are free-sporing, seedless and pollenless. The lycopods comprise the most phylogenetically distant clade of vascular plants and are characterized by vascular plant plesiomorphies of microphyllous leaves and dichotomous branching. The ferns & fern allies comprise a morphologically diverse clade marked by the vascular plant apomorphy of macrophyllous leaves except where these were secondarily reduced in the horsetails and whisk-ferns.

### **I. Families to Know on Sight (no keying allowed for lab quizzes or final)**

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#### **A. Lycopodiaceae** (lycopods, lycophytes, club-mosses) – p. 63

Diagnostic Summary of Extant Species: Stoloniferous or rhizomatous herbs with numerous spirally arranged microphylls and dichotomously branched stems; sporangia in terminal strobili or in the axils of leaves.

#### **B. Equisetaceae** (horsetails & scouring-rushes) – p. 73

Diagnostic Summary of Extant Species: Rhizomatous herbs with hollow, ribbed, silicaceous green stems; Leaves minute & inconspicuous, connate, in whorls at nodes; branches (if any) whorled or opposite; sporangia in terminal strobili on aerial stems.

#### **C. Polypodiaceae sensu lato** (ferns) – p. 78

Diagnostic Summary: Rhizomatous, locally acaulescent herbs (tree ferns in some tropical locales) with rosettes of pinnate to bipinnate (simple) leaves (“fronds”) with dichotomous venation; flowers and strobili lacking, sporangia borne in sori on the undersides of leaves or on specialized and highly modified fertile leaves.

### **II. Genera to Know (you can write your own key to genera and use on lab final)**

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#### **A. Equisetaceae** – p. 73

1. *Equisetum* (herbs)

6. *Asplenium* (herbs)

7. *Dennstaedtia* (herbs)

#### **B. Lycopodiaceae** – p. 63

2. *Diphasiastrum* (herbs)

8. *Dryopteris* (herbs)

3. *Huperzia* (herbs)

9. *Onoclea* (herbs)

4. *Lycopodium* (herbs)

10. *Polystichum* (herbs)

11. *Polypodium* (herbs)

12. *Pteridium* (herbs)

#### **C. Polypodiaceae s.l.** – p. 78

5. *Adiantum* (herbs)

### **III. Some Economic Botany**

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- Coal is responsible for 60% of the electricity generated in the US, and most coal is the fossilized remains of Carboniferous horsetails, lycopods, and ferns.
- Lycopodiaceae includes several species (e.g., *Lycopodium* spp.) used historically as a source of flammable spores used in flash powder and theatrical pyrotechnics.
- Polypodiaceae *sensu lato* are a source of numerous ferns in ornamental horticulture. Some have limited use for their edible fiddleheads (e.g., the ostrich fern, *Matteuccia struthiopteris*), but since many or most are poisonous, one must be cautious when collecting and consuming such products.

**Fern Taxon Morphological Data Sheet**

<b>Genus</b>	<b>Family</b>
<b>Habit</b>	a. Terrestrial vs. Emergent or Submergent Aquatic b. Caulescent vs. acaulescent c. Herb, Shrub, Tree, Vine/Liana d. Succulent vs. Not succulent
<b>Armature</b>	Armed (Spines, Prickles, Thorns) vs. Unarmed. If armed, where:
<b>Lvs</b>	<p><b>Form:</b> Broad, Needle-like, Scale-like or Microphyllous</p> <p><b>Complexity:</b> Simple, Pinnate, Bipinnate, Palmate, Dissected</p> <p><b>Phyllotaxy:</b> Alternate (spiral, distichous), Opposite, Whorled, Rosette.</p> <p><b>Attachment:</b> Petiolate, Pseudo-petiolate, Sessile, Sheathing.</p> <p><b>Leaf Petiole or Rachis Scales:</b> Lacking or sparse, Petiole proximal, Petiole distal, Rachis</p> <p><b>Margin:</b> Entire, Toothed (serrate/dentate/crenate), Lobed (pinnate/palmate/other), Undulate</p> <p><b>Venation:</b> Parallel, Pinnate, Palmate, Dichotomous</p> <p><b>Overall Leaf Shape Above Petiole:</b> Elliptic, (ob-)Ovate, (ob-)Lanceolate, (ob-)Cordate, Sagittate, Pyramidal or Deltoid</p> <p><b>Lower Pinnae:</b> Longer than middle, Shorter than middle</p> <p><b>Shape (blade):</b> Orbicular, Elliptic, (ob-)Ovate, (ob-)Lanceolate, (ob-)Cordate, Sagittate, Other:</p> <p><b>Apex (blade):</b> Acute, Acuminate, Obtuse, Round, Mucronate, Emarginate, Other:</p> <p><b>Stipules:</b> Stipulate, Exstipulate</p> <p><b>Upper Surface (blade, petiole):</b> Glabrous, Pubescent (color:                      texture:                      )</p> <p><b>Lower Surface (blade, petiole):</b> Glabrous, Pubescent (color:                      texture:                      )</p>
<b>Sp</b>	<p><b>Position:</b> Under vegetative leaf, On modified leaf or other structure</p> <p><b>Shape:</b> Round, Reniform, Linear</p> <p><b>Covering:</b> Naked, Indusiate</p> <p><b>Other:</b></p>

**Other Distinctive Features**

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<b>Armature</b>	Armed (Spines, Prickles, Thorns) vs. Unarmed. If armed, where:
<b>Lvs</b>	<p><b>Form:</b> Broad, Needle-like, Scale-like or Microphyllous</p> <p><b>Complexity:</b> Simple, Pinnate, Bipinnate, Palmate, Dissected</p> <p><b>Phyllotaxy:</b> Alternate (spiral, distichous), Opposite, Whorled, Rosette.</p> <p><b>Attachment:</b> Petiolate, Pseudo-petiolate, Sessile, Sheathing.</p> <p><b>Leaf Petiole or Rachis Scales:</b> Lacking or sparse, Petiole proximal, Petiole distal, Rachis</p> <p><b>Margin:</b> Entire, Toothed (serrate/dentate/crenate), Lobed (pinnate/palmate/other), Undulate</p> <p><b>Venation:</b> Parallel, Pinnate, Palmate, Dichotomous</p> <p><b>Overall Leaf Shape Above Petiole:</b> Elliptic, (ob-)Ovate, (ob-)Lanceolate, (ob-)Cordate, Sagittate, Pyramidal or Deltoid</p> <p><b>Lower Pinnae:</b> Longer than middle, Shorter than middle</p> <p><b>Shape (blade):</b> Orbicular, Elliptic, (ob-)Ovate, (ob-)Lanceolate, (ob-)Cordate, Sagittate, Other:</p> <p><b>Apex (blade):</b> Acute, Acuminate, Obtuse, Round, Mucronate, Emarginate, Other:</p> <p><b>Stipules:</b> Stipulate, Exstipulate</p> <p><b>Upper Surface (blade, petiole):</b> Glabrous, Pubescent (color:                      texture:                      )</p> <p><b>Lower Surface (blade, petiole):</b> Glabrous, Pubescent (color:                      texture:                      )</p>
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**Other Distinctive Features**

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<b>Armature</b>	Armed (Spines, Prickles, Thorns) vs. Unarmed. If armed, where:		
<b>Lvs</b>	<p><b>Form:</b> Broad, Needle-like, Scale-like or Microphyllous</p> <p><b>Complexity:</b> Simple, Pinnate, Bipinnate, Palmate, Dissected</p> <p><b>Phyllotaxy:</b> Alternate (spiral, distichous), Opposite, Whorled, Rosette.</p> <p><b>Attachment:</b> Petiolate, Pseudo-petiolate, Sessile, Sheathing.</p> <p><b>Leaf Petiole or Rachis Scales:</b> Lacking or sparse, Petiole proximal, Petiole distal, Rachis</p> <p><b>Margin:</b> Entire, Toothed (serrate/dentate/crenate), Lobed (pinnate/palmate/other), Undulate</p> <p><b>Venation:</b> Parallel, Pinnate, Palmate, Dichotomous</p> <p><b>Overall Leaf Shape Above Petiole:</b> Elliptic, (ob-)Ovate, (ob-)Lanceolate, (ob-)Cordate, Sagittate, Pyramidal or Deltoid</p> <p><b>Lower Pinnae:</b> Longer than middle, Shorter than middle</p> <p><b>Shape (blade):</b> Orbicular, Elliptic, (ob-)Ovate, (ob-)Lanceolate, (ob-)Cordate, Sagittate, Other:</p> <p><b>Apex (blade):</b> Acute, Acuminate, Obtuse, Round, Mucronate, Emarginate, Other:</p> <p><b>Stipules:</b> Stipulate, Exstipulate</p> <p><b>Upper Surface (blade, petiole):</b> Glabrous, Pubescent (color:                      texture:                      )</p> <p><b>Lower Surface (blade, petiole):</b> Glabrous, Pubescent (color:                      texture:                      )</p>		
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<b>Armature</b>	Armed (Spines, Prickles, Thorns) vs. Unarmed. If armed, where:
<b>Lvs</b>	<p><b>Form:</b> Broad, Needle-like, Scale-like or Microphyllous</p> <p><b>Complexity:</b> Simple, Pinnate, Bipinnate, Palmate, Dissected</p> <p><b>Phyllotaxy:</b> Alternate (spiral, distichous), Opposite, Whorled, Rosette.</p> <p><b>Attachment:</b> Petiolate, Pseudo-petiolate, Sessile, Sheathing.</p> <p><b>Leaf Petiole or Rachis Scales:</b> Lacking or sparse, Petiole proximal, Petiole distal, Rachis</p> <p><b>Margin:</b> Entire, Toothed (serrate/dentate/crenate), Lobed (pinnate/palmate/other), Undulate</p> <p><b>Venation:</b> Parallel, Pinnate, Palmate, Dichotomous</p> <p><b>Overall Leaf Shape Above Petiole:</b> Elliptic, (ob-)Ovate, (ob-)Lanceolate, (ob-)Cordate, Sagittate, Pyramidal or Deltoid</p> <p><b>Lower Pinnae:</b> Longer than middle, Shorter than middle</p> <p><b>Shape (blade):</b> Orbicular, Elliptic, (ob-)Ovate, (ob-)Lanceolate, (ob-)Cordate, Sagittate, Other:</p> <p><b>Apex (blade):</b> Acute, Acuminate, Obtuse, Round, Mucronate, Emarginate, Other:</p> <p><b>Stipules:</b> Stipulate, Exstipulate</p> <p><b>Upper Surface (blade, petiole):</b> Glabrous, Pubescent (color:                      texture:                      )</p> <p><b>Lower Surface (blade, petiole):</b> Glabrous, Pubescent (color:                      texture:                      )</p>
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