Monocots are a major clade of Angiosperms comprising nearly 70,000 species. Monocots evolved from a herbaceous ancestor that may have resembled a herbaceous member of Basal Angiosperm Grade. Most monocots are herbs with atactostelic stems, parallel-veined leaves, leaf bases that encircle and often ensheathe the stem, and trimerous flowers. Monocots include some of the world’s most ecologically and economically important plants (Tables 1).

We will survey the monocots this semester in three parts due to the large number of monocot taxa we wish to study.

Table 1. Economically important Monocots (alphabetically by family).

1) Araceae is the source of numerous ornamental, tropical house plants. In the tropics, some plants such as Monstera deliciosa produce edible fruits, although generally eating member of this family, especially the foliage, should be avoided.

2) Agavaceae is the source of agave (Agave), the source of sap that leads both to the production of tequila and agave “nectar”, and of numerous ornamental plants.

3) Arecales is the source of coconuts (Cocos nucifera), dates (Phoenix dactylifera), and numerous ornamental trees.

4) Alliaceae is the source of garlic, onion, and chives (all from Allium) and daffodils (Narcissus).

5) Bromeliaceae is the source of numerous bromeliads of horticultural importance.

6) Cyperaceae: The stem pith of Cyperus papyrus was the raw material in the production of Egyptian papyrus paper. In fact, our word “paper” comes from “papyrus.”

7) Iridaceae is the source of irises (Iris).

8) Liliaceae is the source of lilies (Lilium and related genera) and tulips (Tulipa).

9) Musaceae is the source of cultivated bananas and plantains from the genus Musa.

10) Orchidaceae is the source of orchids, which are important ornamentals and, due to due to poaching, are protected under CITES. Fermented capsules of the Vanilla Orchid (Vanilla planifolia) are the source of vanilla flavoring.

11) Poaceae is the source of civilization’s top food plants: wheat (Triticum spp.), rice (Oryza sativa), maize or corn (Zea mays), oats (Avena), barley (Hordeum vulgare), and sugar cane (Saccharum officinarum). Numerous other plants provide ground cover (i.e., Kentucky bluegrass, Bermuda grass, etc.) or ornamentals. Bamboos (e.g., of the genus Bambusa and others such as Phyllostachys) provide construction materials or ornamentals.

12) Smilacaceae is the source of edible and medicinal sarsaparilla (Smilax).

13) Xanthorrhoeaceae is the source of not only one of the more difficult to spell families, but Aloe Vera (from Aloe vera and other species such as Aloe feroxii) and numerous ornamentals protected under CITES.

14) Zingiberaceae (a relative of Musaceae) is the source of ginger (Zingiber officinale), cardamom (Elettaria cardamomum) and numerous tropical ornamentals.
I. Monocots Part 1

A. Families to Know on Sight

1. Alismataceae (water-plantain family) – p. 128
   Diagnostic Summary: Aquatic or marsh, acaulescent herbs with emergent, petiolate leaves with pinnate or palmate leaf venation; Flower trimerous and 3 or 6 to many free carpels.
   Generalized Flora Formula: Ca $^3$ Ca $^3$ A $^3$ or 6-many G $^3$ or 6-many

2. Araceae (aroid or arum family) – p. 119
   Diagnostic Summary: Terrestrial, aquatic, or epiphytic herbs, vines or lianas. Terrestrial plants cormose. Some aquatic plants exist as free-floating, thalloid duckweeds. Epiphytic and vining (tropical) plants with conspicuous adventitious roots. With the exception of duckweeds, leaves are simple (sometimes trifoliate), petiolate, and with pinnate or palmate venation. Flowers minute and solitary in duckweeds, otherwise numerous and aggregated into fleshy spike called a spadix that is subtended or variously enveloped by a conspicuous spathe.
   Generalized Flora Formula: P $^{2+2, 3+3, 0}$ A $^4$ or 6 G $^3$ minute, spathe & spadix, uni- or bisexual

3. Liliaceae (lily family) – p. 149
   Diagnostic Summary: Bulbous herbs with parallel-veined leaves; Flowers trimerous with 6 showy tepals, 6 stamens and 3 fused carpels.
   Generalized Flora Formula: P $^3+3$ A $^3+3$ G $^3$ showy tepals

B. Genera to Know (you can write your own key to genera)

1. Alismataceae – p. 128
   1) Alisma (aquatic herbs)
   2) Sagittaria (aquatic herbs)

2. Araceae – p. 119
   3) Anthurium (vining epiphytic herbs)
   4) Arisaema (herbs)
   5) Lemna (aquatic herbs)
   6) Spirodela (aquatic herbs)

3. Alliaceae – p. 173
   7) Allium (herbs)

4. Commelinaceae– p. 394
   8) Commelina (herbs)

5. Hemerocallidaceae – p. 172
   9) Hemerocallis (herbs)

6. Iridaceae– p. 169
   10) Iris (herbs)

7. Liliaceae – p. 149
   11) Lilium (herbs)
   12) Tulipa (herbs)

8. Smilacaceae – p. 148
   13) Smilax (woody or herbaceous vines)

II. Monocots Part 2

A. Families to Know on Sight

1. Cyperaceae (sedge family) – p. 193
   Diagnostic Summary: Graminoid herbs with solid, triangular stems; Leaves spirally arranged, linear, with closed basal sheaths; Flowers tiny in spikes or panicles of spikelets; Fruits indehiscent triangular or lenticular achenes.
   Generalized Flora Formula: P $^{0–6}$ bristles A $^3$ G $^3$ (perigynium in Carex)

2. Poaceae (grass family) – p. 302
Diagnostic Summary: Graminoid herbs (bamboos) with hollow, round or terete stems; Leaves distichous, linear, with open basal sheaths; Flowers tiny, with highly modified perianth, in spikes or panicles of spikelets, each spikelet subtended by 2 glumes; Fruits indehiscent and nut-like caryopses (singular caryopsis).


B. Genera to Know (you can write your own key to genera)

1. Typhaceae – p. 183
   1) *Typha* (aquatic herbs)

2. Cyperaceae – p. 193
   2) *Cyperus* (herbs)
   3) *Carex* (aquatic or terrestrial herbs)

3. Juncaceae – p. 183
   4) *Juncus* (aquatic or terrestrial herbs)

4. Poaceae or Gramineae – p. 302
   5) *Digitaria* (herbs)

6) *Miscanthus* (herbs)

7) *Panicum* (herbs)

8) *Phragmites* (herbs)

9) *Phyllostachys* (woody “shrubs” or “trees”; “bamboos”)

10) *Poa* (herbs)

11) *Setaria* (herbs)

12) *Zea* (herbs)

III. Monocots Part 3

A. Families to Know on Sight

1. Orchidaceae (orchid family) – p. 153
   Diagnostic Summary: More or less succulent herbs often with short stem and rosette of leaves, mostly epiphytic in the tropics; flowers irregular (monosymmetric) with lower petal modified into *labellum*, and single stamen plus pistil fused into *column*. Fruit a capsule.

   Generalized Flora Formula:
   
   Ca 3,petaloid but distinct from Co Co 2+1 (labellum) A 1, pollinia G [3], column

   Strongly monosymmetric

2. Arecales or Palmae (palm family) – not in book
   Diagnostic Summary: Trees or shrubs with unbranched aerial stems terminated by a rosette of large, sheathing, pinnately compound or palmately lobed, plicate leaves; flowers tiny, regular (polysymmetric), aggregated into large, showy panicles. Fruit a berry or drupe.


B. Genera to Know (you can write your own key to genera)

A. Orchidaceae – p. 153
   1) *Cypripedium* (herbs)
   2) *Goodyera* (herbs)

B. Agavaceae – p. 177 (included in
Asparagaceae by APG III)
   3) *Agave* (succulent herbs or shrubs)
   4) *Yucca* (herbs, shrubs or trees)

C. Bromeliaceae – not in book
   5) *Aechmaea* (herbs)
   6) *Ananas* (herbs)

D. Strelitziaceae – not in book
   7) *Strelitzia* (herbs to small trees)

E. Musaceae – not in book
   8) *Musa* (herbs to small trees)

F. Arecales or Palmae – not in book
   9) *Cocos* (trees)
   10) *Phoenix* (trees or shrubs)
   11) *Serenia* (shrubs to small trees)

G. Xanthorrhoeaceae – not in book
   12) *Aloe* (succulent herbs, shrubs or small trees)