Study Guide for Plant Taxonomy Quiz on Wednesday November 4, 2015

Keep an eye to the BIG PICTURE—I may ask a question or two about how everything fits together!

**Magnoliid Clade**

What characters resolve magnoliids into a separate clade (for example: molecular synapomorphies and secondary chemistry), monophyletic group including the Magnoliales, Laurales, Canellales & Piperales, perianth parts spiral or whorls of 3, sources of spices, stamens frequently poorly differentiated, be able to describe the foliage & calyx & corolla & androecium & gynoecium & fruit of **the Magnoliaceae, Myristicaceae, Lauraceae, Piperaceae, Aristolochiaceae, and Saururaceae**

**General Monocots**

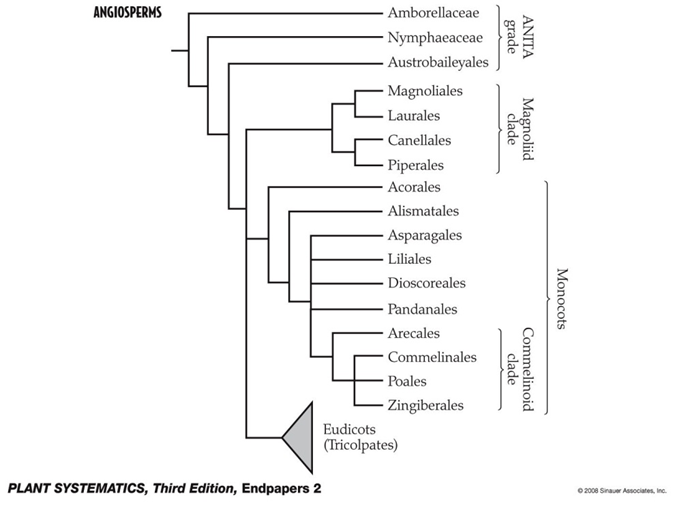
Embryo with a single cotyledon– remains the best morphological synapomorphy of monocots

Other monocot characteristics (but not necessarily synapomorphies since there are many exceptions) : parallel veined leaves, fibrous roots, herbaceous habit, scattered vascular bundles, leaves formed at the basal end of the leaf primordium (= intercalary meristem), monosulcate pollen, DNA sequence evidence, flower parts in 3’s.

What is a cotyledon (leaf or leaves developed at first embryonic node) and how do they differ from endosperm? Ploidy level of endosperm vs. cotyledons.

No vascular cambium (i.e., no wood) in monocots although they can grow thicker by virtue of anomalous (secondary thickening) meristem

Know the foliage/calyx/corolla/androecium/gynoecium/fruit for **Lilliaceae, Melanthiaceae, Agavaceae, Iridaceae, Orchidaceae, Poaceae.**



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| Family | Foliage | Calyx | Corolla | Androecium | Gynoecium | Fruit |
| Magnoliid Clade |  |  |  |  |  |  |
| Magnoliaceae | Trees/shrubs blade with pellucid dots containing ethereal oils (aromatic terpenoids) | Tepals distinct | Tepals distinct | Many undifferentiated stamens | Numerous distinct, superior | aggregate of follicles, seed red, dangles |
| Myristicaceae | bark exudes reddish sap; blades with pellucid dots containing ethereal oils; contains myristicin (=hallucinogen | Three connate tepals | Three connate tepals | filaments connate into a solid column; stamens 2 to numerous | one ovule, ovary superior | leathery follicle, large seed, colorful aril |
| Lauraceae | contain ethereal oils (made from 5 carbon fragment called terpenoid) | Usually 6 tepals | Usually 6 tepals | filaments with nectar producing appendages; stamens 3-12 | one carpel, ovary superior | Drupe or one seeded berry |
| Piperaceae | contains ethereal oils | No perianth! Spikes of thick, minute flowers | No perianth! Spikes of thick, minute flowers | filaments distinct; stamens 1-10 | 1 ovule per gynoecium, superior | drupe |
| Aristolochiaceae | ethereal oils with pellucid dots and aristolochic acids, bitter yellow nitrogenous compounds | connate, showy, dull red, mottled | missing | filaments adnate to style; stamens 6-12 | 4-6 carpels, inferior ovary | Septicidal capsule |
| Saururaceae | with ethereal oils | Absent-- Flowers with a single petaloid bract | Absent-- Flowers with a single petaloid bract | 3-8 distinct stamens | 3-4 carpels united at the base; superior | capsule |

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| Family | Foliage | Calyx | Corolla | Androecium | Gynoecium | Fruit |
| Monocots (non-Commelinoid Clade) |  |  |  |  |  |  |
| Liliaceae | bulbs or rhizomes, parallel venation | Six distinct tepals | Six distinct tepals | Stamens 6, filaments distinct | 3 connate carpels, ovary superior | Loculicidal capsule |
| Melanthiaceae | poisonous alkaloids often present (hence the “Death Camas Family”!) | 6 mostly distinct tepals | 6 mostly distinct tepals | usually 6 distinct stamens | 3-10 connate carpels, usually 3 distinct styles; superior to slightly inferior | capsule |
| Agavaceae | leaves smooth with marginal fibers in Yucca; leaves toothed in Agave | 6 distinct tepals | 6 distinct tepals | 6 distinct stamens | 3 connate carpels; ovary superior in Yucca, inferior in Agave | loculicidal capsule, seeds with black phytomelan crust |
| Iridaceae | Equitant (& conduplicate) | 6 tepals, inner somewhat differentiated from outer | 6 tepals, inner somewhat differentiated from outer | Three distinct filaments, specialized pollination anatomy | Three connate carpels, inferior ovary | Loculicidal capsule |
| Orchidaceae | Roots strongly mycorrhizal, parallel venation and sheathing at the base | 6 Tepals, inner 3 and outer 3 somewhat differentiated, one of the inner ones forming the labellum | 6 Tepals, inner 3 and outer 3 somewhat differentiated, one of the inner ones forming the labellum | stamens fused to stigma forming a column; pollen forming masses called pollinia | ovary inferior, 3 carpels, stigma highly modified | capsule/minute seeds; seeds lacking endosperm |

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| Family | Foliage | Calyx | Corolla | Androecium | Gynoecium | Fruit |
| Monocots (Commelinoid Clade) |  |  |  |  |  |  |
| Commelinaceae | Grass like, sheathing at the base; flowers enclosed in spathe sometimes | Three, distinct | Three distinct, usually clawed | 3 or 6 stamens, sometimes with conspicuous hairs (Tradescantia) | Ovary superior, 3 connate carpels | Loculicidal capsule; seeds with conspicuous conical cap, bullet shaped |
| Poaceae | Divided into blade and sheath; ligule at junction; sometimes with auricle; stem=culm | Special flower anatomy c/o flower, floret, lemma, palea, glumes, lodicule, etc. | Special flower anatomy c/o flower, floret, lemma, palea, glumes, lodicule, etc. | 3 distinct stamens | 3 superior carpels that appear as two but only produce one grain | Grain= caryopsis |

**Plant Taxonomy Plant ID list 2015**:

Euphorbia (term to know: cyathium) in the EUPHORBIACEAE

Tribulus (terms to know: schizocarp, actinomorphic vs. zygomorphic=bilateral symmetry) in the ZYGOPHYLLACEAE

Chamaesyce (terms to know: serrate, pubescent) in the EUPHORBIACEAE

Ipomopsis (term to know: exserted) in the POLEMONIACEAE

Sphaeralcea (term to know: monadelphous) in the MALVACEAE

Hesperidanthus (terms to know: tetradynamous, silique, clawed petal) in the BRASSICACEAE

Phaseolus (term to know: keel= 2 fused petals, papilionaceous) in the FABACEAE

Guilleminea in the AMARANTHACEAE

Helianthus (terms to know: phyllary, Involucre) in the ASTERACEAE

Juncus (term to know: rhizome vs. stolon) in the JUNCACEAE

Castilleja (terms to know: hemiparasite vs. holoparasite) in the OROBANCHACEAE

Boerhavia (term to know: involucre) in the NYCTAGINACEAE

Croton (term to know: dioecious) in the EUPHORBIACEAE

Solanum (term to know: sympetalous) in the SOLANACEAE

Mentha (term to know: anthocyanins) in the LAMIACEAE

Berula (term to know: umbel) in the APIACEAE

Anemopsis (term to know: Magnoliid) in the SAURURACEAE

Verbena in the VERBENACEAE

Kochia (term to know: betalains) in the CHENOPODIACEAE

Argemone (term to know: caducous) in the PAPAVERACEAE

Polanisia in the CLEOMACEAE

Eriogonum in the POLYGONACEAE

Lepidium in the BRASSICACEAE

Phoradendron in the SANTALACEAE

Froelichia in the AMARANTHACEAE

Ephedra (term to know: Gnetophyte) in the EPHEDRACEAE

Vitis in the VITACEAE (term to know: tendril)

Crotalaria in the FABACEAE

Kraschenninikovia in the CHENOPODIACEAE

Ptelea in the RUTACEAE (terms to know: pellucid dots, ethereal oils)

Drymaria in the CARYOPHYLLACEAE

Ambrosia in the ASTERACEAE