

Systematic Botany. Lecture 9

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September 16th, 2011

Outline

Questions and answers

Liliaceae alliance—lily family alliance

Orchidaceae—orchid family

Previous final question: the answer

Chocolate is making from plant of ... family?

- ▶ Malvaceae s.l., mallow family

Leguminosae classification

- ▶ Three subfamilies: Caesalpinioideae, Mimosoideae and the biggest is Papipionoideae (Faboideae)
- ▶ Caesalpinioideae:
 - ▶ *Gleditsia*—gleditsia
 - ▶ *Bauhinia*—orchid tree
 - ▶ *Cercis*—redbud
 - ▶ *Delonix*—royal poinciana
- ▶ Mimosoideae:
 - ▶ *Desmanthus*—prairie mimosa
 - ▶ *Prosopis*—mesquite
 - ▶ *Acacia*—acacia

Delonix regia in flower



Representatives of Papilionoideae (Faboideae)

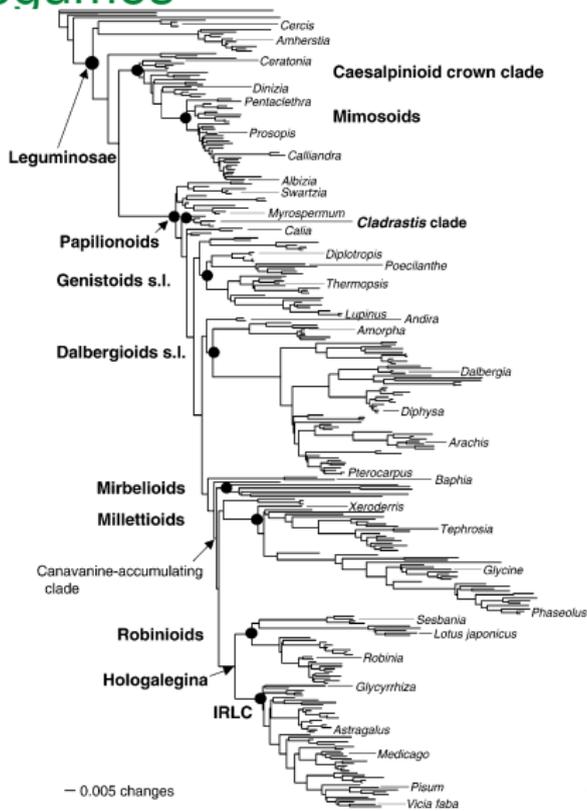
- ▶ Swartzioids (*Swartzia*: highly unusual, but only in tropics)
- ▶ Genistioids
 - ▶ *Lupinus*—lupinus
- ▶ Dalbergioids
 - ▶ *Amorpha*—false indigo
 - ▶ *Petalostemon*, or *Dalea*—prairie-clover
 - ▶ *Arachis*—peanut
 - ▶ *Desmodium*—tick-trefoil
- ▶ Millettoids
 - ▶ *Apios*—ground nut
 - ▶ *Phaseolus*—beans
 - ▶ *Glycine*—soybeans
 - ▶ *Psoralea*—breadroot

Representatives of Papilionoideae (Faboideae) (contd.)

- ▶ Robinioids
 - ▶ *Lotus*—trefoil
 - ▶ *Robinia*—locust

- ▶ IRLC (“inverted repeat-lacking”) group
 - ▶ *Caragana*—Siberian peashrub
 - ▶ *Astragalus*—milkvetch
 - ▶ *Oxytropis*—loco-weed
 - ▶ *Trifolium*—clover
 - ▶ *Vicia*, *Lathyrus*—vetch
 - ▶ *Medicago*—alfalfa
 - ▶ *Melilotus*—sweet clover
 - ▶ *Pisum*—pea

Phylogeny of legumes



Cruciferae classification

- ▶ In some recent classifications, this family is fused with neighbor Capparaceae (containing large and outstanding genus *Cleome* and other genera)
- ▶ In this case, it will have three subfamilies: Capparoideae, Cleomoideae and Brassicoideae and *less stable characters*—for example, Capparoideae are often trees, have multiple stamens and gynophore.
- ▶ Main groups of Brassicoideae:
 - ▶ Cardamineae–Lepidieae–Descurainieae group
 - ▶ Arabideae–Thlaspidieae–Brassicaceae group
 - ▶ Hesperideae group

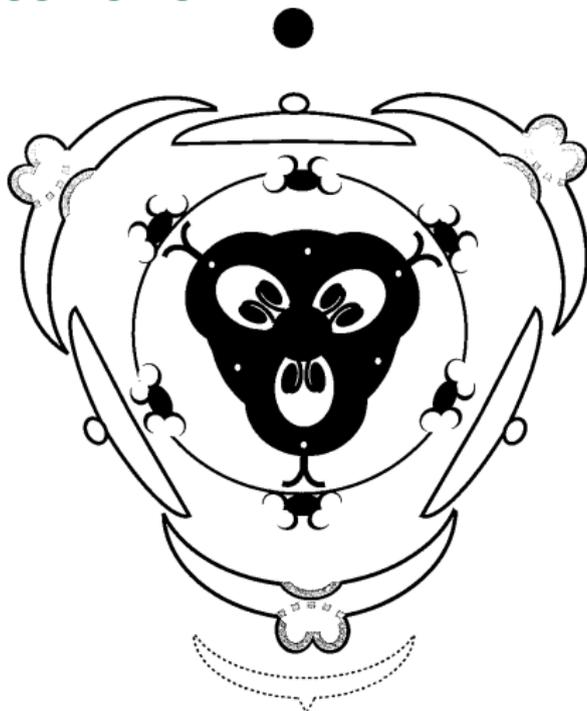
Representatives of Brassicoideae

- ▶ Cardamineae–Lepidieae–Descurainieae group
 - ▶ *Cardaria*, *Lepidium*—peppergrass
 - ▶ *Descurainia*—flixweed
 - ▶ *Rorippa*—yellow cress
 - ▶ *A Armoracia*—horseradish
 - ▶ *Wasabia*—wasabi
 - ▶ *Cochlearia*—cress
 - ▶ *Erysimum*—erysimum
 - ▶ *Capsella*—shepherd's purse
- ▶ Arabideae–Thlaspideae–Brassiceae group
 - ▶ *Sysimbrium*—hedge mustard
 - ▶ *Brassica*—cabbage, mustard
 - ▶ *Arabis*—rockcress
 - ▶ *Draba*—whitlowwort
- ▶ Hesperideae group
 - ▶ *Hesperis*—sweet rocket

Liliaceae alliance—lily family alliance

- ▶ Now former Liliaceae is broken into dozens of families, that was done **before** “molecular era”
- ▶ Most important are: Liliaceae s.str., Smilacaceae, Melanthiaceae, Amaryllidaceae and Asparagaceae
- ▶ \approx 3,000 species
- ▶ Distributed thorough the world
- ▶ Life forms: perennial bulbous or rhizomatous herbs, sometimes tree-like plants (*Dracaena*, *Aloë*)
- ▶ Leaves simple, alternate (rarely verticillate), with acrodromous venation
- ▶ Flowers solitary or in racemes, 3-merous, with simple perianth of 6 free (sometimes fused) tepals, 6 stamens in 2 whorls
- ▶ Pistil with 3 carpels, ovary superior (sometimes also inferior)

Liliaceae alliance flower



$$*P_{3+3}A_{3+3}\underline{G}_{(3)}$$

Representatives of Liliaceae alliance

Importance: many ornamental plants, some are vegetables and pharmaceuticals

- ▶ Liliaceae s.str.
 - ▶ *Fritillaria*—bell lily
 - ▶ *Lilium*—lily
 - ▶ *Tulipa*—tulip
- ▶ Smilacaceae
 - ▶ *Smilax*—greenbriar, carrion flower
- ▶ Melanthiaceae
 - ▶ *Zigadenus*—death camas
 - ▶ *Trillium*—trillium, wake robin

Representatives of Liliaceae alliance (contd.)

▶ Amaryllidaceae

- ▶ *Allium*—onion, garlic
- ▶ *Galanthus*—snowdrops

▶ Asparagaceae

- ▶ *Maianthemum*—false lily-of-the-valley
- ▶ *Asparagus*—asparagus
- ▶ *Smilacina*—smilacina
- ▶ *Uvularia*—bellwort
- ▶ *Yucca*—yucca
- ▶ *Aloë*—aloe

Morphology of orchids

- ▶ Epiphytes or vines, with aerial roots; roots with velamen. Terrestrial forms also have thick roots.
- ▶ Often have bulbs originated from stems or even leaves
- ▶ Thick leaves, usually with no visible veins
- ▶ Flowers in pending racemes
- ▶ Flowers bilaterally symmetric, with big lip which goes downwards in epiphytic species (terrestrial species have resupination)
- ▶ One stamen fuses with pistil
- ▶ Pollen in pollinia
- ▶ Seeds are dust-like, millions per flower

Dactylorhiza flower

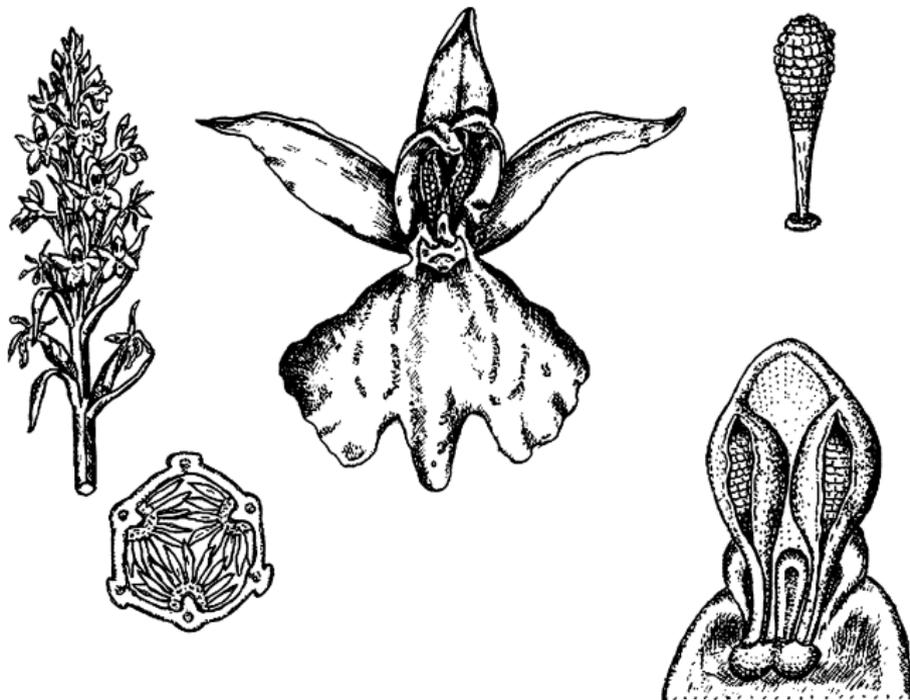


Diagram of Orchidaceae flower



$$\uparrow P_{3+2,1} [A_1 \overline{G_{(3)}}]$$

Representatives of orchids

- ▶ One economically important, *Vanilla* produces famous spices
- ▶ Lots of very popular ornamentals
- ▶ In temperate regions of America, *Habenaria* is the most species-rich group; in Eurasia—*Dactylorhiza*

Final question (2 points)

For Further Reading



O. A. Stevens.

Handbook of North Dakota plants. 3rd edition.

NDSU, 1963.