

Introduction to Botany: BIOL 154

Lab 4. Flower formula and flower diagram

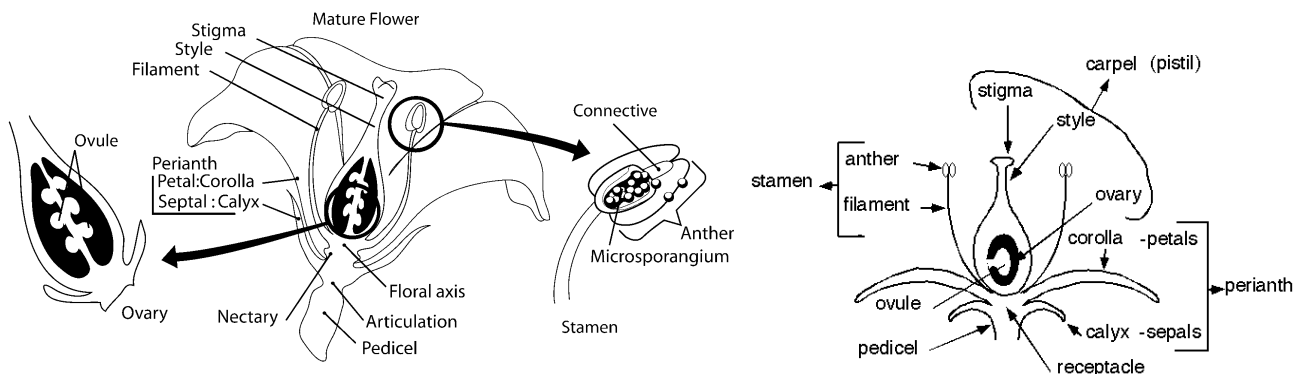
September 26th, 2011

1 Assignment

1. Read explanations below: flower terms, flower formulas, flower diagrams
2. For each of four diagrams from 2.3, supply the formula
3. Take one typical rosid flower (e.g., ivy-leaf geranium—*Pelargonium peltatum*, Geraniaceae)
4. Take either one monocot flower (e.g., hosta—*Hosta* sp., Asparagaceae) OR one asterid flower (e.g., scarlet sage—*Salvia splendens*, Labiatae or petunia—*Petunia hybrida*, Solanaceae)
5. For each of two picked flowers, draw flower diagram and supply it with flower formula

2 Background

2.1 Flower terms



FLOWER PARTS occur in whorls in the following order—sepals, petals, stamens, pistils

PEDICEL flower stem

RECEPTACLE base of flower where other parts attach

PERIANTH = CALYX + COROLLA

SEPALS small and green, collectively called the CALYX, **formula:** K

PETALS often large and showy, collectively called the COROLLA, **formula:** C

TEPALS used when sepals and petals are not distinguishable, **formula:** P

ANDROECIUM collective term for stamens: **formula:** A

STAMEN = FILAMENT + ANTHER

ANTHER structure containing pollen grains

FILAMENT structure connecting anther to receptacle

GYNOECIUM collective term for pistils/carpels, **formula:** G. Gynoecium can be composed of:

1. A single CARPEL = simple PISTIL
2. Two or more fused CARPELS = compound PISTIL
3. Two or more unfused CARPELS = two or more simple PISTILS

To determine the number of CARPELS in a compound PISTIL, count LOCULES, points of placentation, number of STYLES, STIGMA and OVARY lobes.

PISTIL Collective term for carpel(s). The terms CARPEL and PISTIL are equivalent when there is no fusion, if fusion occurs then you have 2 or more CARPELS united into one PISTIL.

CARPEL structure enclosing ovules, may correspond with locules or placentas

OVARY basal position of pistil where OVULES are located. The ovary develops into the fruit; OVULES develop into seeds after fertilization.

LOCULE chamber containing OVULES

PLACENTA place of attachment of OVULE(S) within ovary

STIGMA receptive surface for pollen

STYLE structure connecting ovary and stigma

FLOWER Floral unit with sterile, male and female zones

ACTINOMORPHIC FLOWER A flower having multiple planes of symmetry, **formula:** *

ZYGOMORPHIC FLOWER A flower having only one plane of symmetry, **formula:** ↑

PERFECT FLOWER A flower having both sexes

MALE / FEMALE FLOWER A flower having one sex, **formula:** ♂ / ♀

MONOECIOUS PLANTS A plant with unisexual flowers with both sexes on the same plant

DIOECIOUS PLANTS A plant with unisexual flowers with one sex on each plant, in effect, male and female plants

SUPERIOR OVARY most of the flower is attached below the ovary, **formula:** G_{...}

INFERIOR OVARY most of the flower is attached on the top of ovary, **formula:** G_{...}

WHORL flower parts attached to one node

2.2 Flower formulas

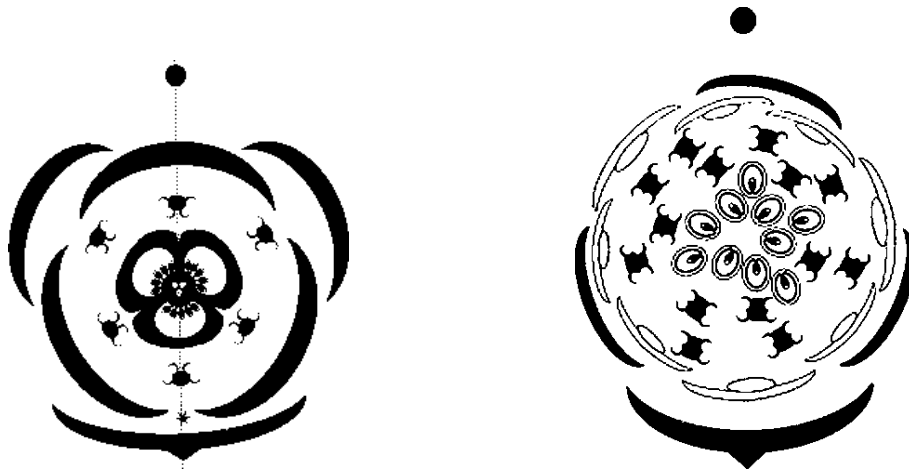
*K₄C₄A₂₊₄G₍₂₎: flower actinomorphic, with four sepals, four petals and six stamens in two whorls, ovary superior, with two fused carpels

↑K₍₅₎[C_(1,2,2)A_{2,2}]G_(2×2): flower zygomorphic, with five fused sepals, five unequal fused petals, two-paired stamens attached to petals, superior ovary with two subdivided carpels

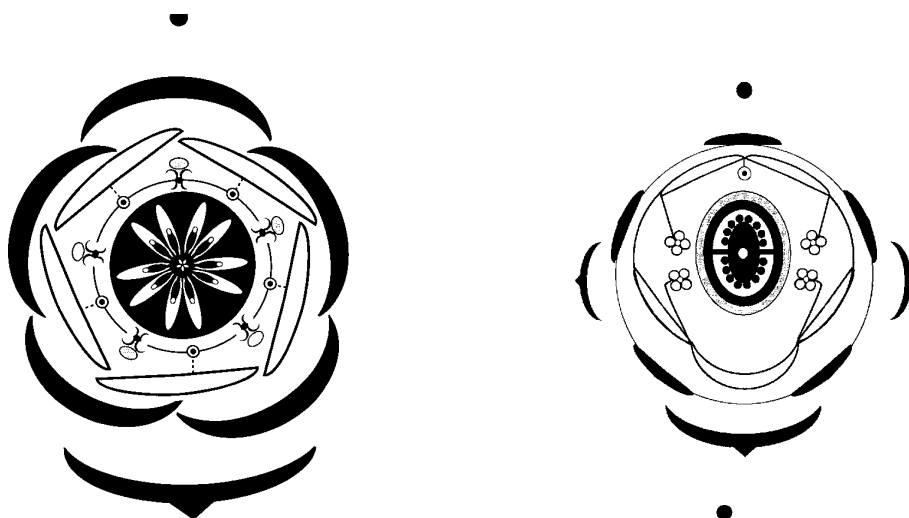
*K₍₅₎C₍₅₎[A₅G₍₃₎]: actinomorphic flower with five fused sepals and five fused petals, five stamens attached to pistil, ovary inferior, with three fused carpels

- Plus “+” is used to show different whorls; minus “–” shows variation; “√” = “or”
- Brackets “[]” and “()” show fusion
- Comma “,” shows inequality of flower parts in one whorl
- Multiplication sign “×” shows splitting
- Infinity sign “∞” shows indefinite number of more than 12 parts

2.3 Flower diagrams



Typical monocot flower (left) and primitive “dicot” flower (right)



Typical rosid flower (left) and asterid flower (right)



How to draw a diagram (graphical explanation).

Formula for the same flower: $\ast K_5 C_5 A_5 G_{(5)}$