Plant reproduction

You know about the birds and the bees, why not the birch and the beech?

Lecture outline

- Life cycles and alternation of generations
- Flowers
- Pollination and fertilization
- Fruits and seeds
- Asexual reproduction

Life cycles

- Generation-to-generation sequence of stages

Each gamete is a single cell.

Also, look at Fig. 13.5 & b

Alternation of generations

- Multicellular haploid and diploid stages take turns producing each other

Where’s the sporophyte?

Gametophyte-sporophyte variations
Angiosperm life cycle

Flowers: Reproductive shoots
- Four major parts (floral organs)

More about incomplete flowers
- If a flower is missing either stamens or carpels, the plant can be described as being either:
  - **Monoecious**: individual flowers with either stamens or with carpels occur on the *same* individual plant
  - **Dioecious**: individual flowers with either stamens or with carpels occur on *different* plants

Complete vs. incomplete flowers
- Four vs. fewer

Monoecious plants
- Ear of corn—fertilized carpellate flowers
  - Silk = styles
  - Female
- Corn tassels—staminate flowers
  - Male

Dioecious plants
- Sagittaria—staminate Male
- Sagittaria—carpellate Female

Fig. 38.2 (a) Structure of an idealized flower

Fig. 38.14a
Male gametophyte
- Microspores lead to male gametophyte
- Anther
- Each of 4 microspores
- Generative cell (will form 2 sperm)
- Nucleus of tube cell
- Forms pollen tube
- Male gametophyte (in pollen grain)
- Diploid
- MEIOSIS
- Haploid

Pollen
Ragweed

Female gametophyte
- Megaspores lead to female gametophyte
- Megaspore
- Megaspore (diploid)
- MEIOSIS
- Haploid

Pollination
- Bringing the male and female gametophytes together
- Co-evolution
- Pollination by moths and butterflies
- Pollination by bats
- Pollination by flies
- Moth on yucca flower
- Long-tongued bat feeding on desert flower at night
- Hoverfly on cassia flower
- Hummingbird drinking nectar of salvia flower

Do plants usually self-fertilize?
- Why?
- Self-incompatibility—biochemical block is most common
- Structural adaptations

Double fertilization
- Endosperm and zygote formed
- Role of endosperm?

Seed formation
- After fertilization, ovule develops into a ? and ovary develops into a ?

Seed formation
- Proembryo
- Cotyledons
- Shoot apex
- Root apex
- Suspensor
- Endosperm
- Terminal cell
- Basal cell
- Zygote
- Egg
- Pollen grain
- Micropyle
- 2 sperm
- Synergid
- 2 sperm
- Polarity nuclei
- Zygote
- (2n)
- Endosperm nucleus (3n) (2 polar nuclei plus sperm)
From flower to fruit

Seed structure

Seed germination

- What happens first?
- Pulling vs. pushing

Asexual reproduction

- Many plant species can clone themselves: **asexual or vegetative reproduction**
- Partly a result of plants’ ability for indeterminate growth
- Why can this be a good thing?

Humans and plant reproduction

- We’ve taken advantage of plants ability to reproduce asexually
- **Cuttings** (or fragments) from plants are used to produce MANY plants with certain desired characteristics
- At one end of a cutting is a mass of dividing, undifferentiated cells called a **callus**
- A callus forms adventitious roots and eventually differentiates into all parts of a plant

Garlic callus