



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

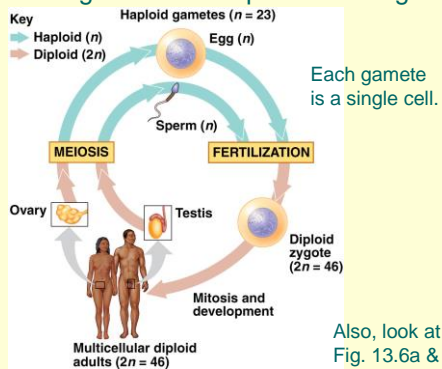
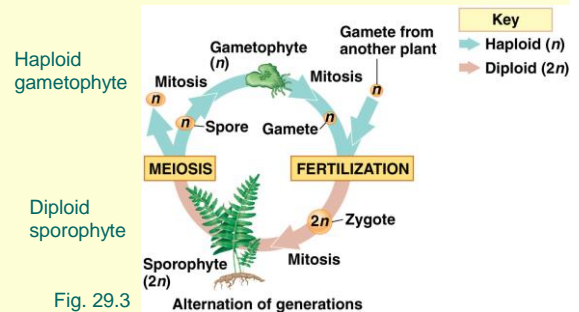


Fig. 13.5

Alternation of generations

- Multicellular haploid and diploid stages take turns producing each other



Where's the sporophyte?

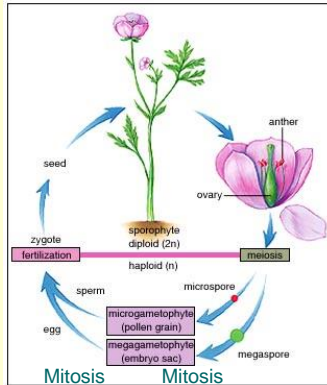


Gametophyte-sporophyte variations

	PLANT GROUP		
	Mosses and other nonvascular plants	Ferns and other seedless vascular plants	Seed plants (gymnosperms and angiosperms)
Gametophyte	Dominant ★	Reduced, independent (photosynthetic and free-living)	Reduced (usually microscopic), dependent on surrounding sporophyte tissue for nutrition
Sporophyte	Reduced, dependent on gametophyte for nutrition	Dominant ★	Dominant ★
Example			<div> Gymnosperm </div> <div> Angiosperm </div>

Fig. 30.2

Angiosperm life cycle



Also see
Fig. 38.6

Flowers: Reproductive shoots

- Four major parts (floral organs)

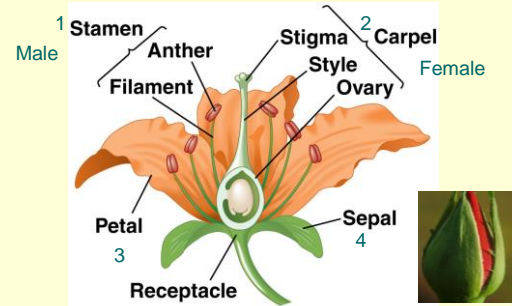


Fig. 38.2

(a) Structure of an idealized flower

Complete vs. incomplete flowers

- Four vs. fewer



Trillium—complete



Sweet grass—incomplete



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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

Monoecious plants

Ear of corn—fertilized
carpellate flowers

Corn tassels—
staminate flowers

Silk =
styles

Female



Male

Dioecious plants

Sagittaria—staminate
Male

Sagittaria—carpellate
Female

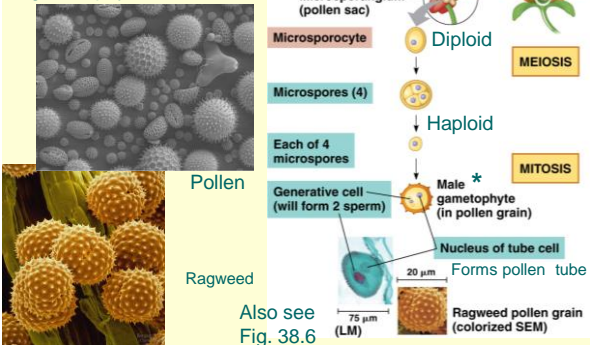


Fig. 38.14a



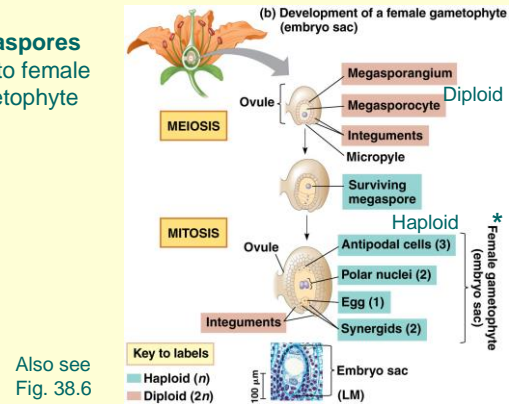
Male gametophyte

- **Microspores** lead to male gametophyte



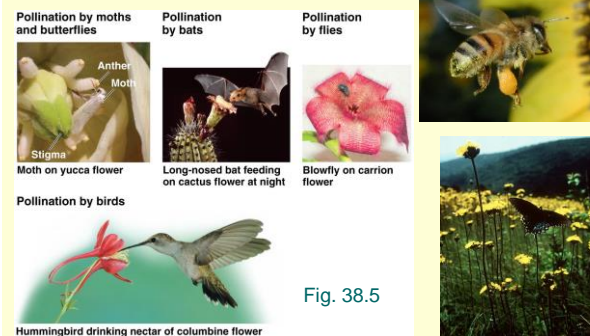
Female gametophyte

- **Megaspores** lead to female gametophyte



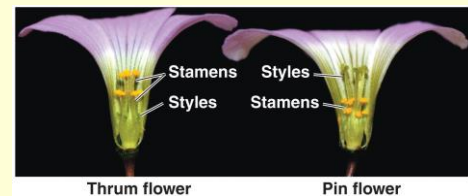
Pollination

- Bringing the male and female gametophytes together
- Co-evolution



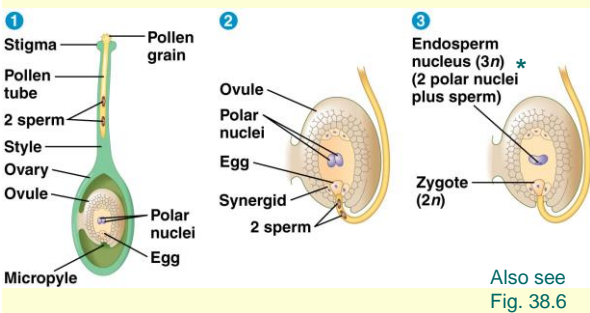
Do plants usually self-fertilize?

- Why?
- **Self-incompatibility**—biochemical block is most common
- Structural adaptations



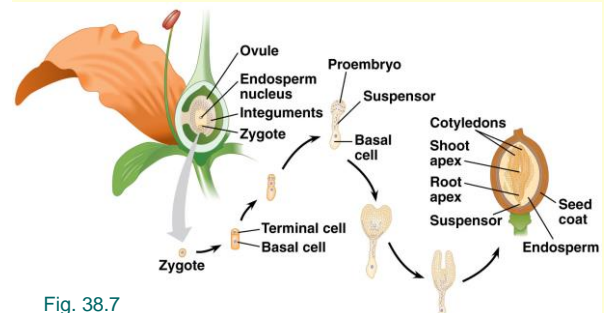
Double fertilization

- Endosperm and zygote formed
- Role of endosperm?



Seed formation

- After fertilization, **ovule** develops into a ? and **ovary** develops into a ?



From flower to fruit

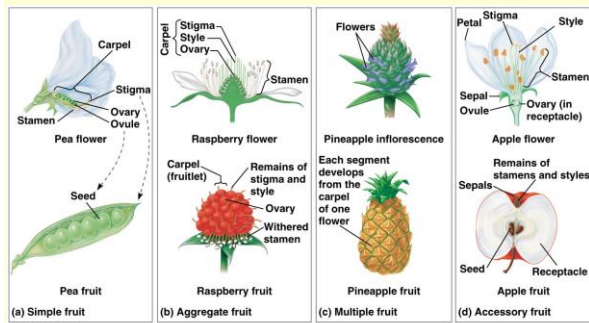
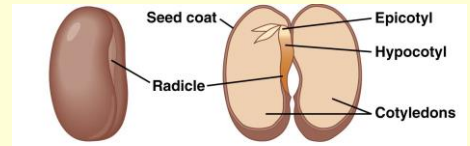
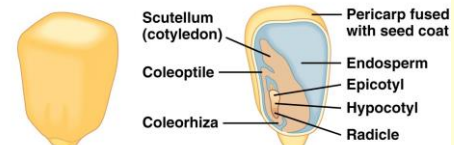


Fig. 38.11

Seed structure



(a) Common garden bean, a eudicot with thick cotyledons



(b) Maize, a monocot

Fig. 38.8

Seed germination

- What happens first?
- Pulling vs. pushing

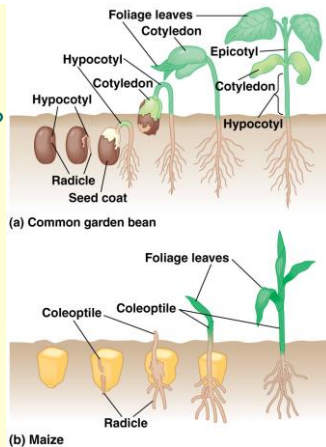


Fig. 38.9

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?

Fig. 38.13



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

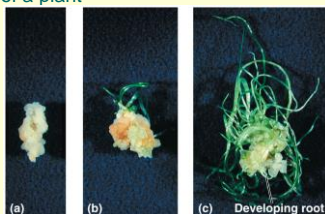


Fig. 38.15