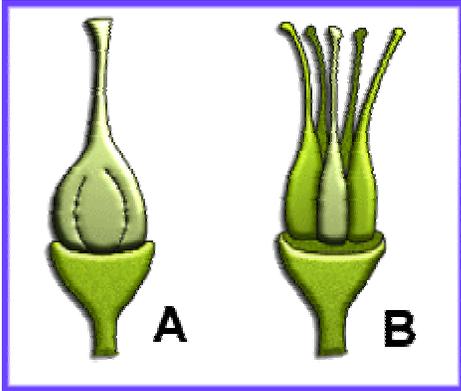


Lecture 9 Fruits, Hormones, Reproduction, Defense, Angiosperms

Types of Fruits

Simple: Your normal fruit, seed (ovule) enclosed in an ovary (fruit). Develops from a single pistil (which may contain one or more fused carpels). Pistil is a group of carpels that are fused together or just 1 carpel. Figure A is a single pistil that may have 1 carpel or many carpels fused together (but they look like one structure)



Legume is a special type of simple fruit that is dry at maturity and splits open along seams to release seed.

Aggregate: A single flower that contains many unfused (hence separate) carpels. (Which means many pistil since each pistil is an fused carpel). Figure B shows separate unfused carpel, hence many pistils. Each ovary from each carpel enlarges and forms a fruit. These fruits join together to form a single aggregate fruit. Examples: raspberry, blackberry.

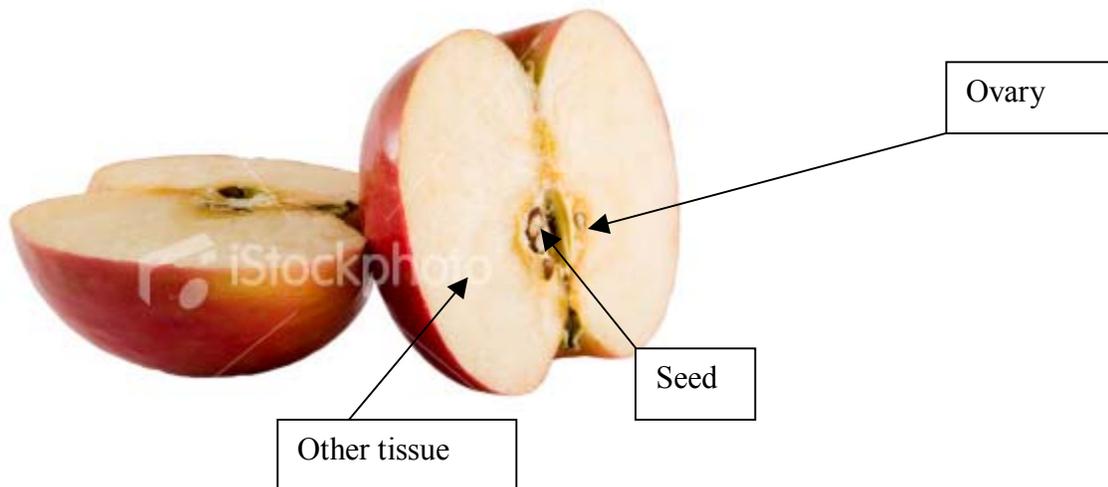
One flower



One pistil

Multiple: Multiple flowers on a single stalk. (inflorescence) Ovary from each flower mix ("fuses") with nearby ovaries to form a compound fruit. Example: pineapple

Accessory fruit: Tissues from plant (other than the ovary) forms the fruit. Example: apple.



Ovary

Seed

Other tissue

Fruits wrap summary:

Simple: 1 flower with 1 pistil

Legume: dry simple fruit that splits apart

Aggregate: Multiple pistil with 1 flower

Multiple: multiple pistil with multiple flower

Accessory: You got more stuff on you than from the ovary.

Tropisms:

Tropism is the plant's growth response towards external stimuli. It could be positive tropism (bends towards the source) or negative tropism (bends away from the source) (positive and negative only indicates direction, not good or bad)

Phototropism: Plants bend towards the light to get better photosynthesis. Cause by the coleoptile (protective layer on a new stem) at the tip

Gravitropism: Roots bends toward gravity (positive) while stems bends away from gravity (negative)

Dawin's experiment conclusion: Coleoptile senses light and there seems to be something that exists that send signals for the plant to bend. (existence of auxin)

How auxin explains gravitropism and phototropism: Auxin causes cell elongation. In phototropism, the auxin gather on the side away from light. This gathering causes that side to elongate more and this plant simply bends. (because 1 side is longer)

In gravitropism, gravity causes auxin to gather on the bottom. Auxin accumulated there causes the bottom side to elongate, which causes the stem to bend.

Hormones:

There are five types of hormones:

Auxin

Gibberlin

Cytokinens

Ethleyene

Abcissic acid

What does auxin do? Cell elongation as already said. Cell elongation in turn causes stem elongation. Auxin is also involved in apical dominance, this inhibits lateral growth of the branches. Auxin also make seedless fruits. (Apply auxin before fertilization occurs, then you got a seedless fruit)

Auxin promotes the lateral growth of roots for some reason..

- 1) stem elongation
- 2) fruit growth
- 3) inhibit lateral growth

4) Promotes lateral growth of roots

So, + for stem elongation. – for stem wide (due to apical dominance), - for Root (er, maybe because it encourages stem growth mostly) – for Leaf abscission (abscissic acid and auxin work opposite. Older leaves have less auxin and thus more likely to fall off) + for Fruit (seedless fruits)

Gibberlin is stem elongation. The way it elongates uses a different method from the auxin. (Applied to a dwarf, increased growth) Affect the development of fruits. When seed germinates, it releases gibberlin from its embryo to tell the seed to mobilize food sources (in endosperm) etc..

So + for stem elongation, - for stem wide (elongation counters wide it seems), - for leaf ancission, not sure why. + for fruit and seed. Gibberlin is almost the same as auxin except nothing in root but has + in seed germination.

Cytokinens promotes cell division. Called so because it induces cytokinesis. Unlike auxin, promotes the growth of axillary buds (side branches). Also involved in seed gemeration.

So, cytokinens have + for stem width (cell division), + for seed germination.

Ethylene, induces leaf abscission, fruit ripening (not the same as development of fruit), and make stems wide.

So + for stem width, + for abscission. (nothing for fruit since its fruit ripening)

Abscissic acid is mostly a stress hormone. Water stress – opening/closing of the stomata. Winter stress- causes the seed to remain dormant.

So, - for stem long... because it promotes stem wide. + for leaf abscission and – for seed germination.

Auxin + gibberlin (elongation) vs cytokinens + ethylene + abcissic (wide) – abcissic has actually prohibits elongation

Auxin + gibberlin (inhibit abscission) vs ethylene + abcissic acid (abscission)

Auxin + gibberlin for fruit

Gibberlin + cytokinens vs abcissic acid for seed

Gibberlin – for root, don't know why