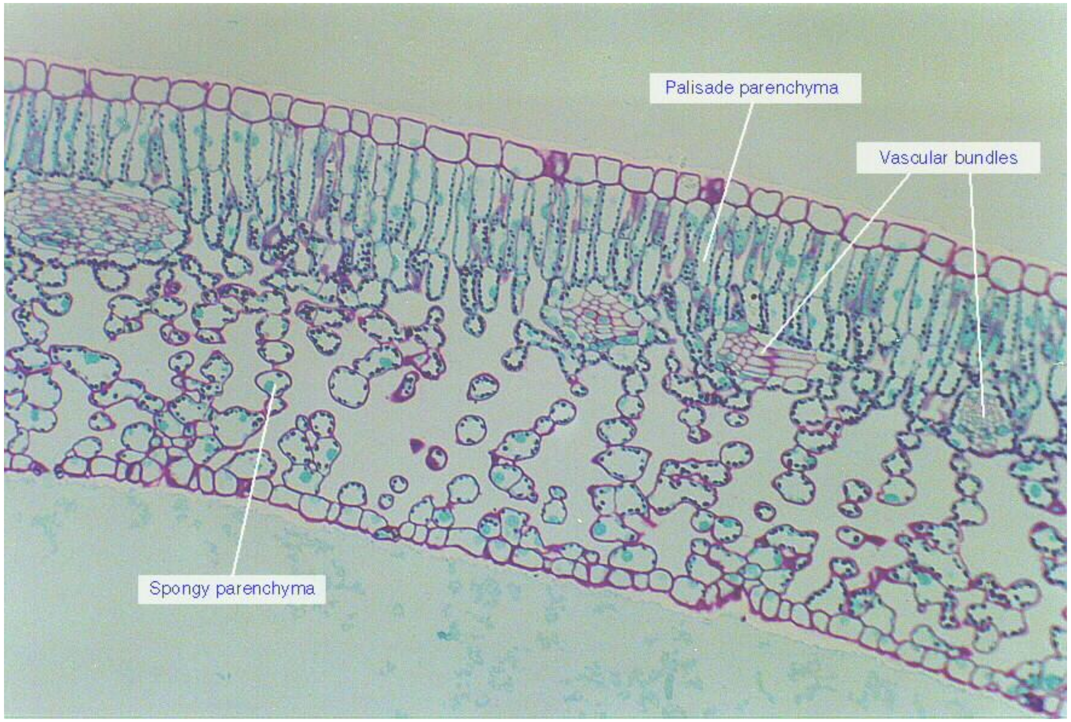
Flowering Plants

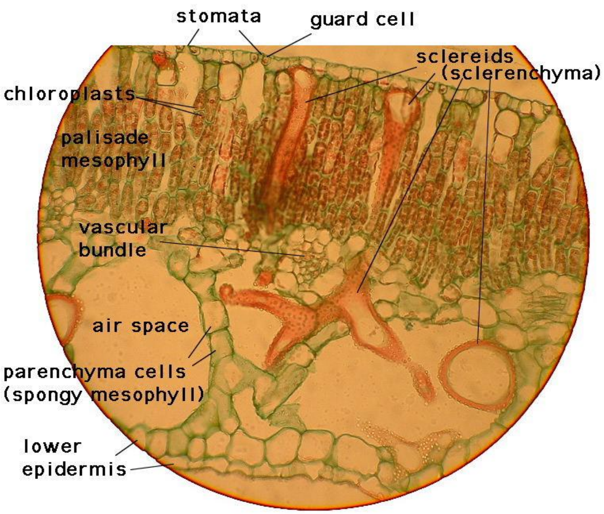
Angiosperms

Environmental adaptation in Angiosperms

- Plants that produce flowers are classified as Angiosperms.
- These plants are all vascular plants.
- Have various types of flowers
- Live in a variety of diverse environmental conditions.
- They can be further described as being Hydrophytes, Mesophytes, Xerophytes or Halophytes.

Hydrophyte





- Adapted to live in either partially or fully submerged in water.
- Thin cuticle
- Stomata mainly on upper surface particularly if water lilly…
- Large air spaces in spongy mesophyll allow storage of gases and make leaf lighter.

Mesophyte

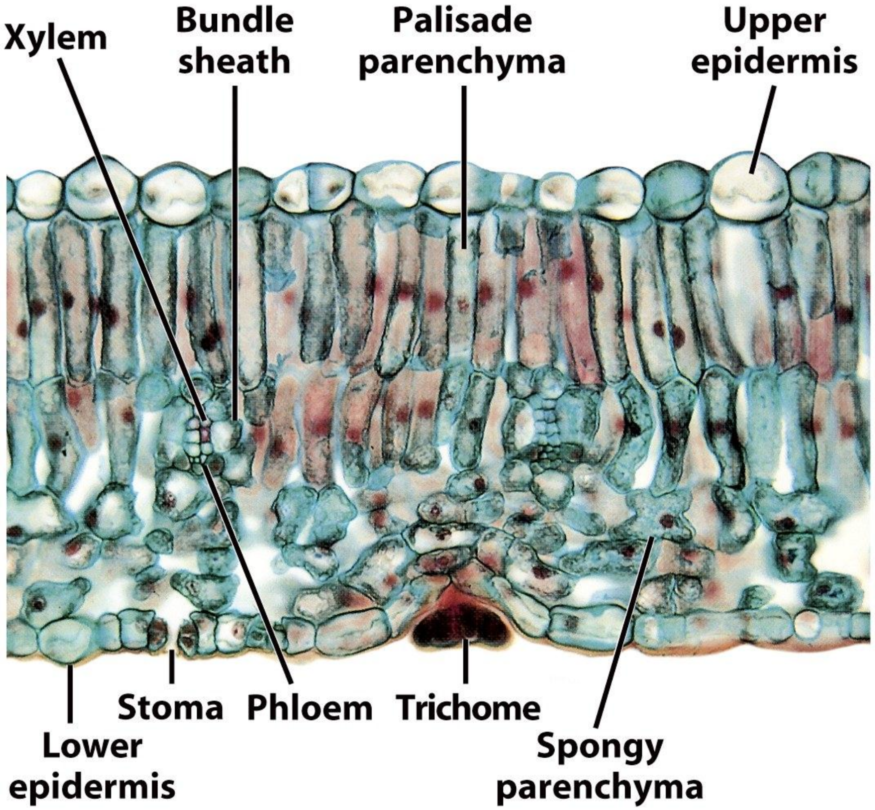


Figure 25-20b
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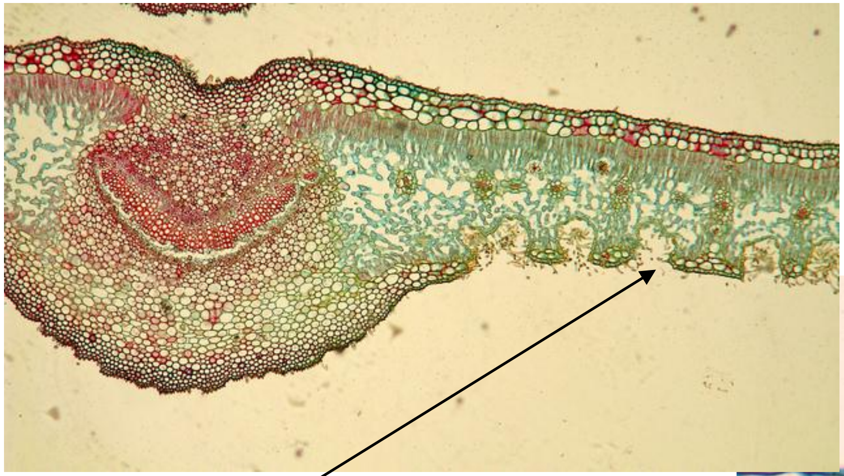
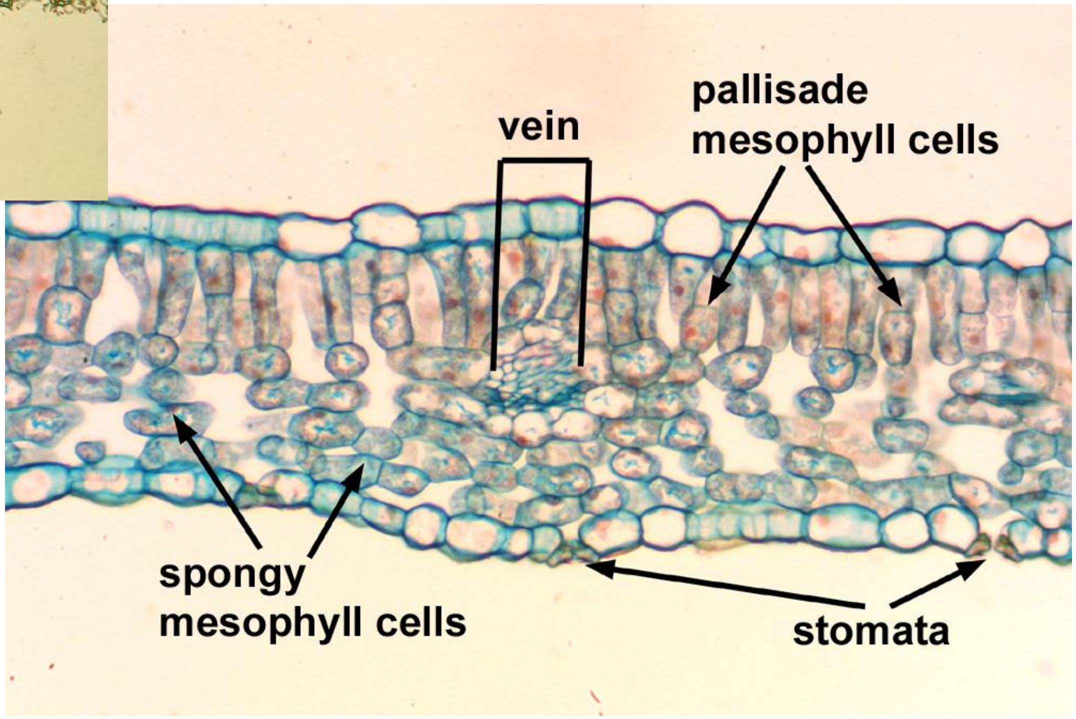
- Terrestrial plants adapted to neither wet or dry conditions
- Small cuticle
- Stomata on both sides of leaf but usually on underside, to allow bigger SA on for maximum photosynthesis.
- Mesophyll well differentiated with intracellular sopace.

Xerophyte

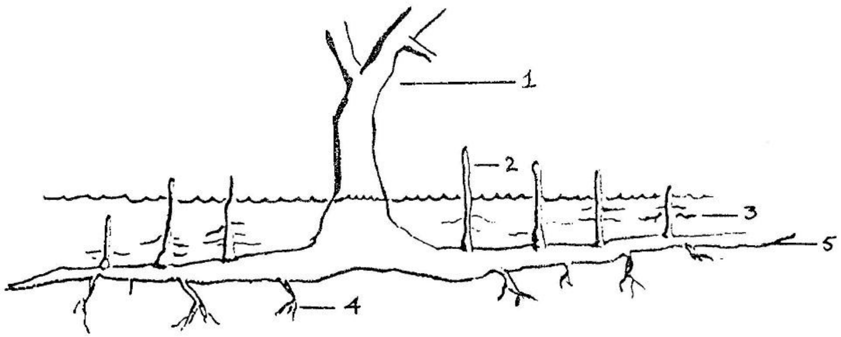


Pits with sunken stomata



- Adapted for dry conditions
- Thick cuticle which stops uncontrolled evaporation through leafsunken stomata maintains humid air around stomata to reduce water loss
- Leaf can be curled also to reduce water loss

Halophyte



Simplified diagram of the mature mangrove root system.

1. Main trunk
2. Pneumatophors
3. Nutritive roots
4. Support roots
5. Cable roots

Fig. 5

- Effected by high salt concentrations
- Thick cuticle
- Sunken stomata
- Pnematophores for oxygen exchange

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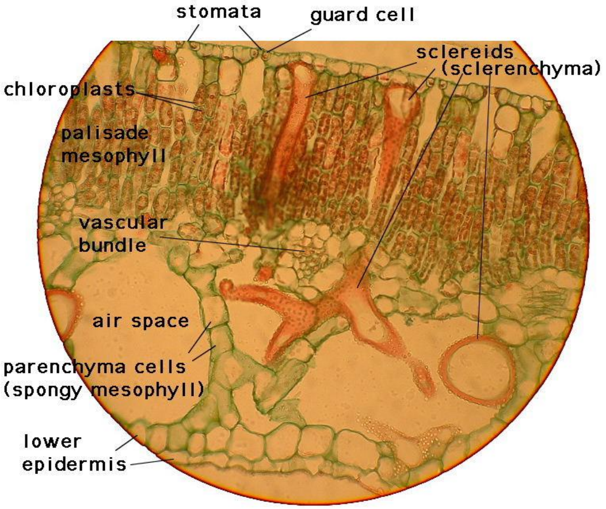
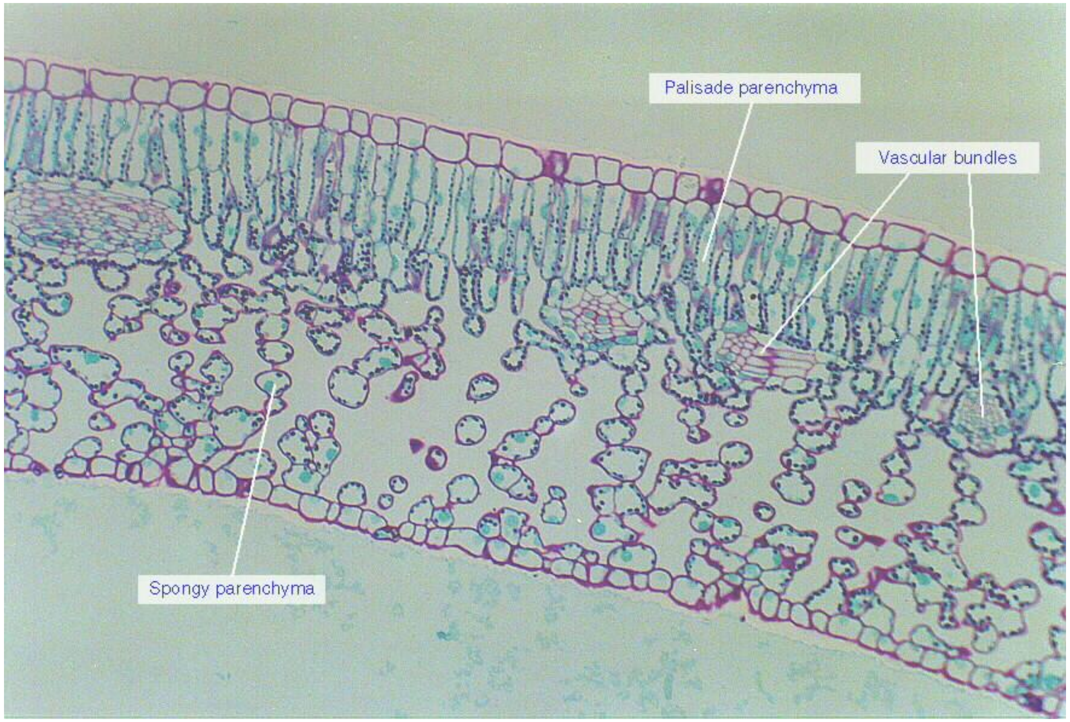
Hydrophyte


stomata
guard cell
sclereids
(sclerenchyma)
chloroplasts
palisade
mesophyll
vascular
bundle
air space
parenchyma cells
(spongy mesophyll)
lower
epidermis


Palisade parenchyma
Vascular bundles
Spongy parenchyma

Mesophyte

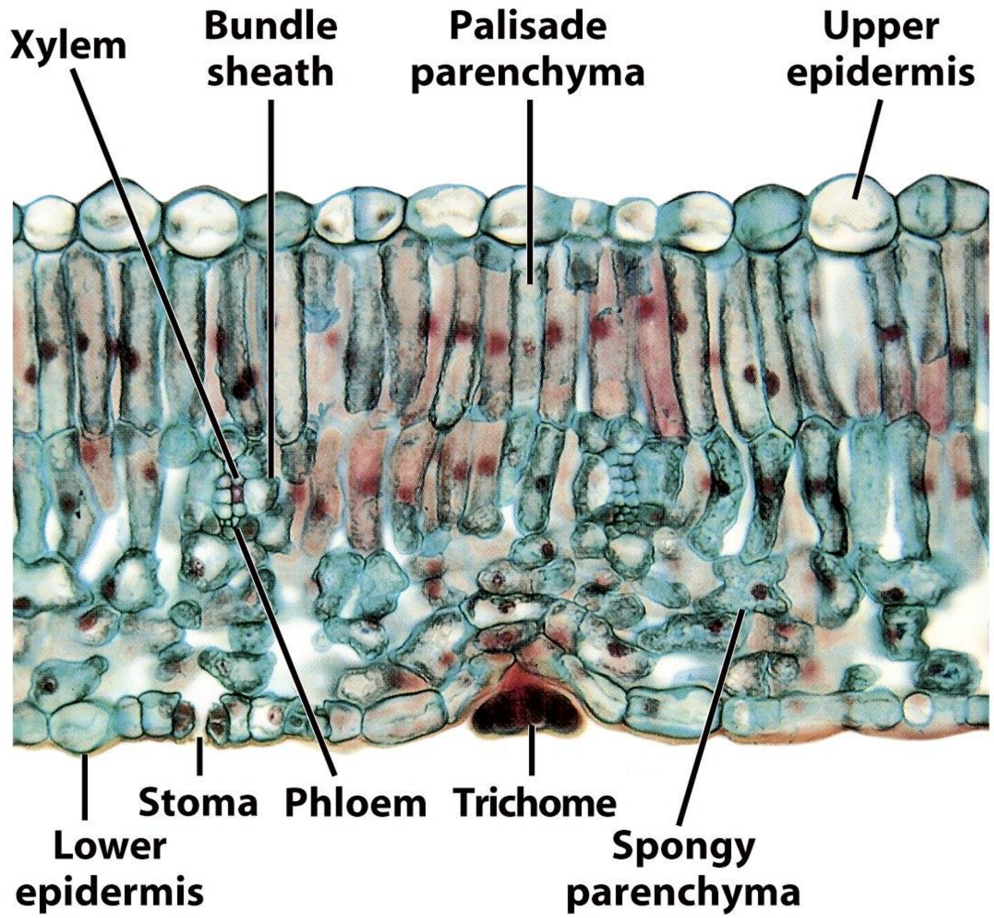


Figure 25-20b
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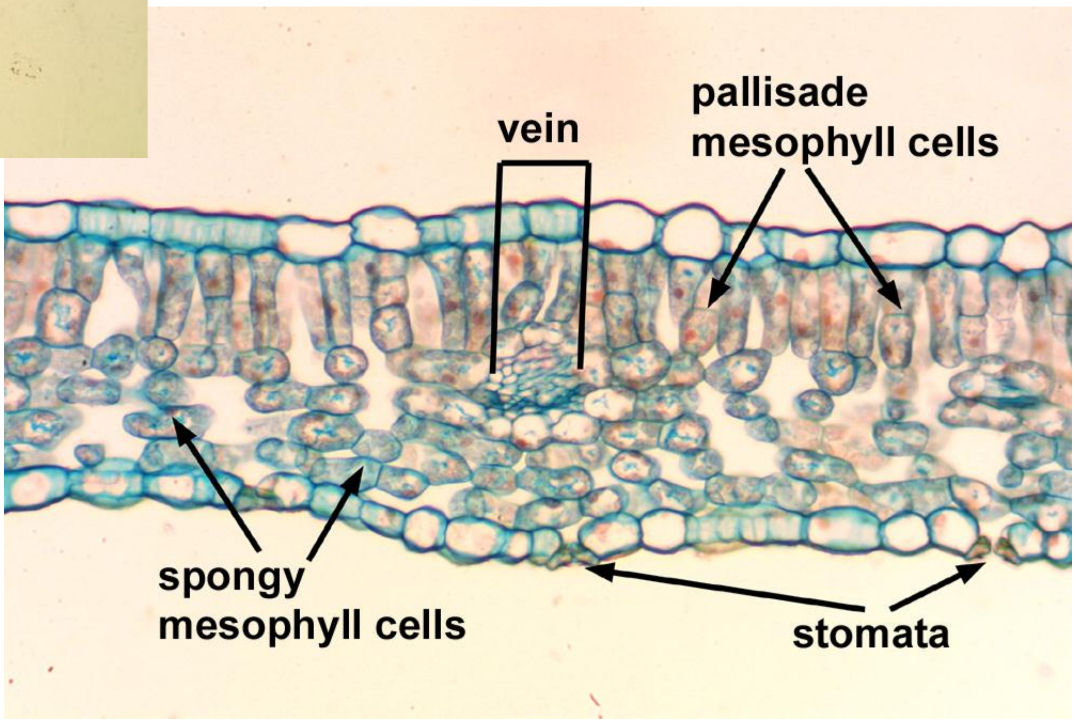
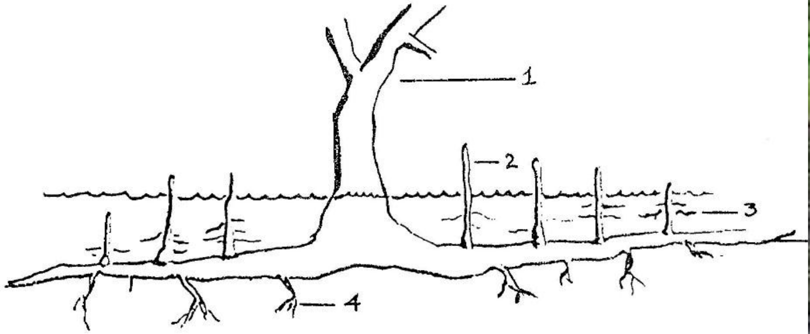
Xerophyte

Pits with sunken stomata



Halophyte



Simplified diagram of the mature mangrove root system.

1. Main trunk
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4. Support roots
5. Cable roots

Fig. 5

Adaptations for fire

EPICORMIC GROWTH

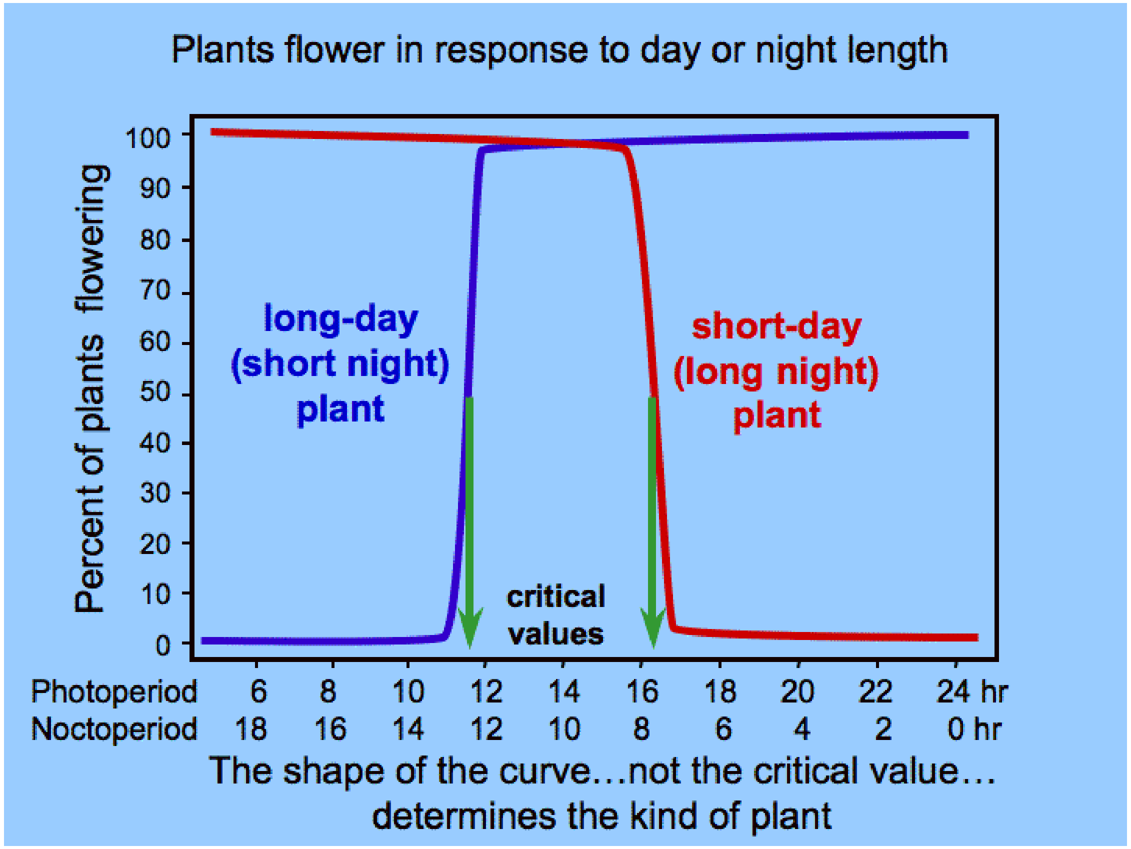
LIGNOTUBERS

GERMINATION OF FIRE RESISTANT SEEDS

FIRE TOLERANT GRASSES

Photoperiodism is the physiological reaction of organisms to the length of day (light period) or night (dark period).

Photoperiodic effects relate directly to the timing of both the light and dark periods.



Photoperiodism

In 1920, W. W. Garner and H. A. Allard published their discoveries on photoperiodism and felt it was the length of daylight that was critical, but it was later discovered that ***the length of the night*** was the controlling factor.

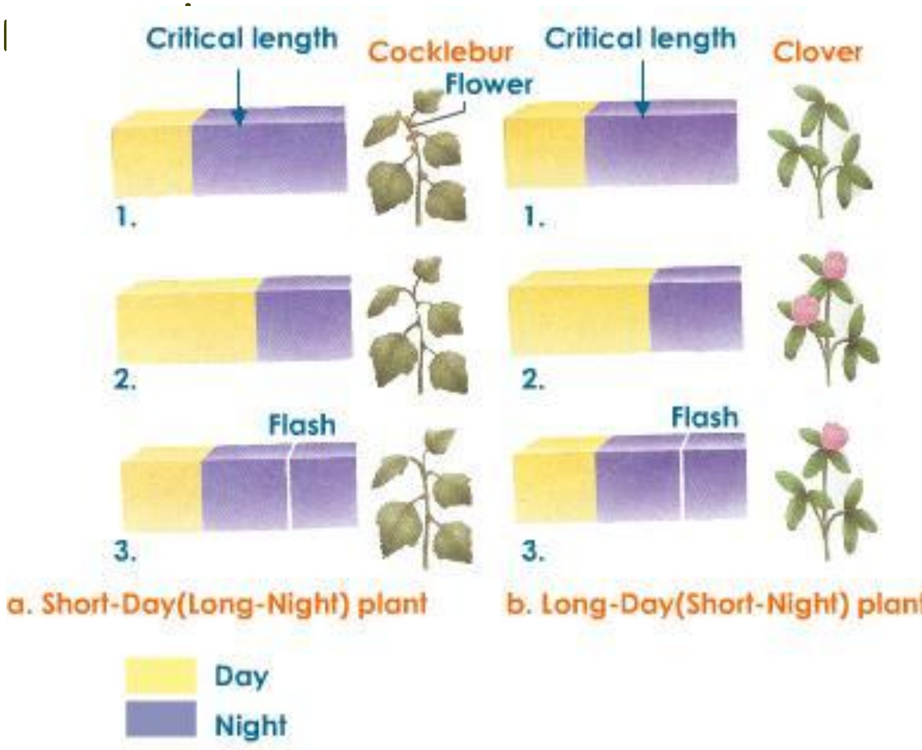
Photoperiodic flowering plants are classified as *long-day plants* or *short-day plants*, even though night is the critical factor, because of the initial misunderstanding about daylight being the controlling factor.

Each plant has a different length critical photoperiod, or critical night length.

Long Day Plants

Long-day plants flower when the day length exceeds their critical photoperiod. These plants typically flower in the late spring or early summer as days are getting longer.

Examples carnation, rye gı



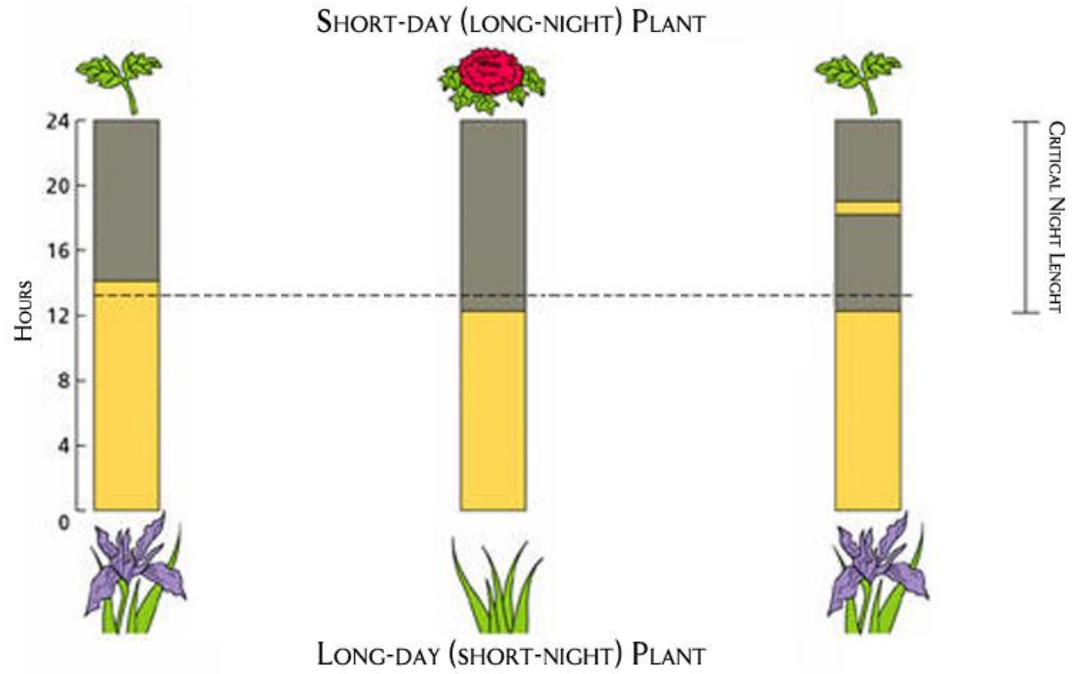
Short Day Plants

Short-day plants flower when the day lengths are less than their critical photoperiod.

They cannot flower under long days or if a pulse of artificial light is shone on the plant for several minutes during the middle of the night. They require a consolidated period of darkness before floral development can begin.

Natural night time light, such as moonlight or lightning, is not of sufficient brightness or duration to interrupt flowering.

Examples Cotton, Rice, Hemp, Sugar cane



Day- neutral Plants

Day-neutral plants, such as cucumbers, roses and tomatoes, do not initiate flowering based on photoperiodism at all. They flower regardless of the night length.

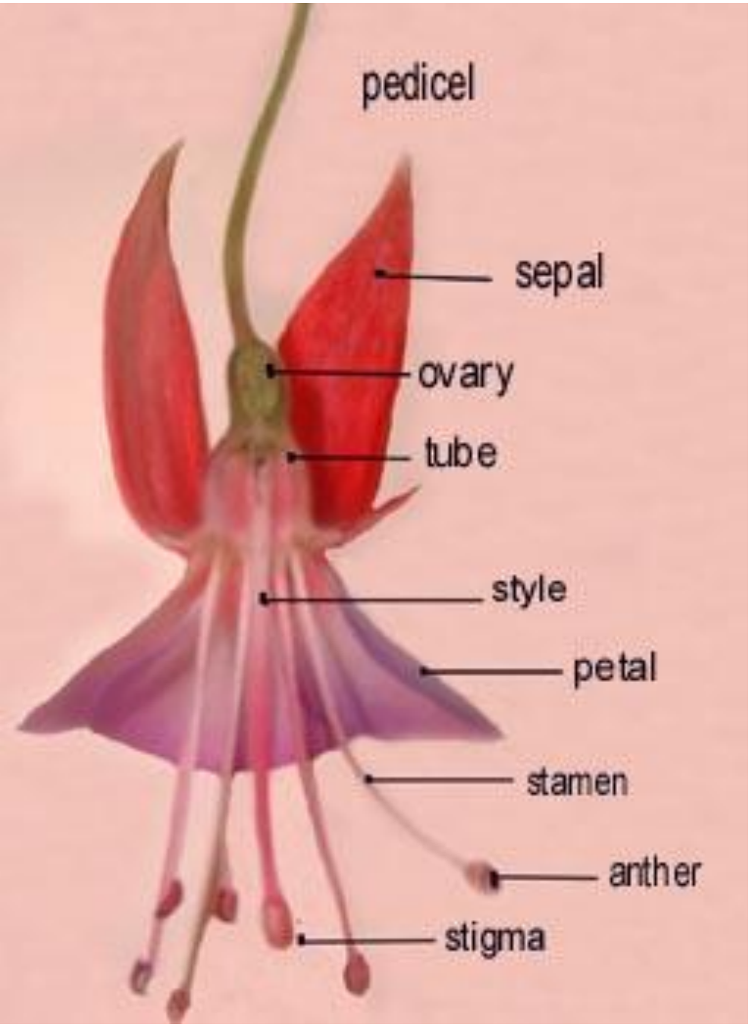
They may initiate flowering after attaining a certain overall developmental stage or age, or in response to alternative environmental stimuli, such as a period of low temperature, rather than in response to photoperiod.

The Parts of a Flower

- Most flowers have four parts:
- sepals,
- petals,
- stamens,
- carpels.

The parts of a flower

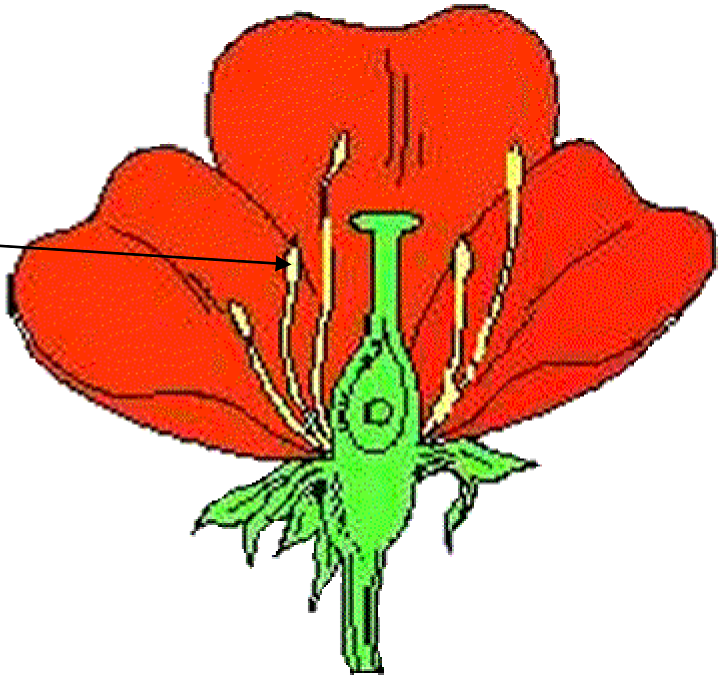
- Sepals protect the bud until it opens.
- Petals attract insects.
- Stamens make pollen.
- Carpels grow into fruits which contain the seeds.



pedicel
sepal
ovary
tube
style
petal
stamen
anther
stigma

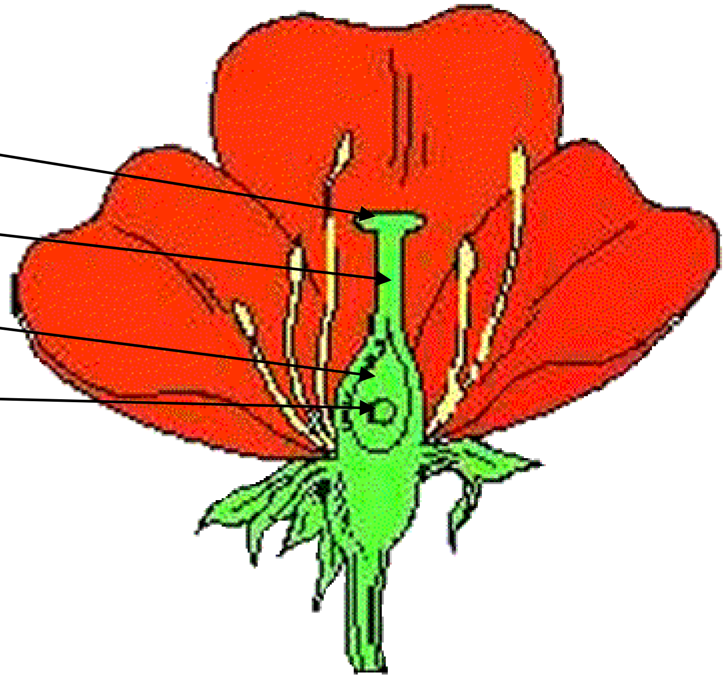
Stamen (male)

- Anther: pollen grains grow in the anther.
- When the grains are fully grown, the anther splits open.



Pistil (female)

- Stigma
- Style
- Carpel (ovary)
- Ovules (eggs)

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Activity

- Dissect your flower and take a photo or draw it and label all the parts.
- Sepals, petals, stamen, carpal, ovules, stigma, style and anther.

Adaptation in flowers.

Pollination

- Flowering plants use the wind, insects, bats, birds and mammals to transfer pollen from the male (stamen) part of the flower to the female (stigma) part of the flower.

Pollination

- A flower is pollinated when a pollen grain lands on its stigma.
- Each carpel grows into a fruit which contains the seeds.

Fertilisation

- Pollen grains germinate on the stigma, growing down the style to reach an ovule.
- Fertilised ovules develop into seeds.
- The carpel enlarges to form the flesh of the fruit and to protect the ovary.

Wind pollination

- Some flowers, such as grasses, do not have brightly coloured petals and nectar to attract insects.
- They do have stamens and carpels.
- These flowers are pollinated by the wind.

Seed dispersal

Seeds are dispersed in many different ways:

- Wind
- Explosion
- Water
- Animals
- Birds
- Scatter

How birds and animals help seed dispersal

- Some seeds are hidden in the ground as a winter store.
- Some fruits have hooks on them and cling to fur or clothes.

How birds and animals help seed dispersal

- Birds and animals eat the fruits and excrete the seeds away from the parent plant.

- Some plants and animals have evolved together (co-evolved) and are dependant on each other for parts of their development.