

# OCR (B) Biology A-level

## 4.4.1 - Plant reproduction

### Flashcards

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# What is a phytochrome?



# What is a phytochrome?

A plant photoreceptor that converts between 2 forms:

- Biologically inactive **P<sub>r</sub>** absorbs red light & is abundant in darkness.
- Biologically active **P<sub>fr</sub>** absorbs far-red light & is abundant in sunlight.

Ratio of P<sub>r</sub>:P<sub>fr</sub> enables plants to detect how long days are.



# How do phytochromes control flowering?



# How do phytochromes control flowering?

- Pr absorbs red light and converts to Pfr
- Activates the hormone florigen which stimulates flowering
- Phytochromes signify that light intensity is high enough for photosynthesis



# What is vernalisation?



## What is vernalisation?

An extended period of exposure to cold temperatures that promote the transcription of genes involved in flowering.



Give some examples of wind-pollinated plants and describe their adaptations.





# Give some examples of wind-pollinated plants and describe their adaptations.

Cereals e.g. wheat, maize, rice.

- external anthers optimise pollen dispersal
- excess pollen compensates for wind wastage
- feathery stigma catches pollen from the air
- small, dull petals (no need to attract insects)
- grow densely over large areas
- light pollen, sometime with 'wings'
- inflorescences (flowers grow as groups)



Give some examples of a  
insect-pollinated plants and describe  
their adaptations.



# Give some examples of insect-pollinated plants and describe their adaptations.

Legumes e.g. clover, chickpeas, lentils.

- internal anthers and small stigma directly touch insects
- large, bright petals and nectar from glands attract insects
- may produce chemicals to mimic scent of female insects or to intoxicate insects
- grow individually
- large pollen, sometimes with projections that attach to insect



How do the male nuclei reach the embryo sac?



## How do the male nuclei reach the embryo sac?

1. Pollen grain from one plant lands on the stigma of another.
2. Pollen tubes grow down the style from the grain down to the ovule.
3. Pollen tube delivers two male gametes.



# What happens during double fertilisation?



# What happens during double fertilisation?

In the embryo sac of ovule:

- One sperm cell fertilises an ovum to form an embryo.
- One sperm cell fuses with two polar nuclei to form a triploid endosperm.



# What is the function of the endosperm?





# Why is the function of the endosperm?

Acts as a nutrient source for the embryo.



# How is germination stimulated?



## How is germination stimulated?

1. Seed absorbs water, activating the embryo to secrete the cell-signalling plant growth factor gibberellin.
2. Gibberellins induce the synthesis of amylase.
3. Amylase diffuses to the endosperm layer and causes the hydrolysis of starch to glucose.



State the factors affecting seed germination.



State the factors affecting seed germination.

- Water availability (trigger secretions of gibberellin)
- Temperature
- Availability of  $O_2$  for respiration
- Use of fertiliser provides extra nutrients for growth



List some environmental problems that agriculture contributes to.



List some environmental problems that agriculture contributes to.

- **Global warming:** deforestation; methane from paddy & cattle farming; machines powered by fossil fuels
- **Air pollution:** emissions from farm machinery
- **Eutrophication:** fertilisers enter water sources
- **Less biodiversity:** habitat destruction; monocultures



Define food security.





Define food security.

A measure of how much food is available for people to access. Includes considerations of affordability.



Define food sustainability.



Define food sustainability.

Food production and consumption that conserves resources and contributes to economic growth in local communities.



Suggest ways of improving the world's food security.



# Suggest ways of improving the world's food security.

- Reduce deforestation
- Increase yields e.g. by targeting fertilisers & irrigation/ using organic farming methods to improve soil
- Decrease meat consumption
- Produce meat without using grain that could be fed to humans
- Decrease biofuel production so more land is available
- Decrease household waste & improve food storage



# What is a cereal?



# What is a cereal?

Any grass cultivated for the components of its grains, which are edible.



Why are cereals referred to as 'staple foods'?





## Why are cereals referred to as 'staple foods'?

Maize, rice & wheat are basic nutrient sources consumed daily by populations worldwide.

Represent  $\frac{2}{3}$  of all global food consumption.

Maize is grown in the largest quantities for human consumption, animal feed & products like corn starch.

