Presentation on theme:

"Photoperiodism in Plants"

Dr. Deepak Kumar Rawat

Teaching Associate, Crop Physiology

CSAUA&T KANPUR

Photoperiodism

- This is the response of a plant to the relative lengths of daylight and darkness.
- It is based on a system that monitors the day/night cycle.
- The photoreceptor involved in this is a blue-green pigment called phytochrome.
- Phytochrome has 2 forms, one active and one inactive.

Phytochrome.

- The inactive form is Pr, the active form is Pfr.
- When phytochrome absorbs light it readily converts from the inactive, (Pr)form to the active form (Pfr.)
- Thus there is more Pfr during daylight.In the dark Pfr spontaneously reverts back to Pr.

Phytochrome

- The plant measures the hours of darkness by the amount of phytochrome in each form.
- Phytochrome system

Flowering

- The onset of flowering varies depending on whether the plant is a “Short-day” or “long-day” plant.
- Flowering involves a response to the length of night.
- The length of night varies with latitude and with the seasons.
- When the period of darkness extends to a certain length, the plant “knows” that the right season has arrived.

Short-Day Plants

- These flower when the photoperiod is less than a certain critical day length. i.e. they flower with a short day and a long night.
- E.g. a short-day plant species with a critical day length of 10 hrs will flower only if the dark period exceeds 14 hrs.

-In temperate climates these flower in winter, early spring or autumn.

-E.g. Poinsettias and chrysanthemums.

- In the tropics most plants are short-day plants.

Long-Day Plants

- These flower when the photoperiod exceeds the critical day length. i.e. they require a long day and a short night.
- In temperate climates, these plants flower in summer. E.g. petunias.
- These measure the shortening nights and flower when these become brief enough.

Day-Neutral Plants.

- These are not sensitive to photoperiod
- E.g. dandelions, garden peas, tomatoes.
- In these plants flowering is controlled internally.
- Many plants living in deserts are day-neutral. These habitats tend to experience short, irregular periods of heavy rain, so plants must grow and flower as quickly as possible.

Vernalisation

- Many seeds such as rye and wheat, require a period of cold before they will germinate.
- This is called Vernalisation.
- Application of gibberellins in appropriate concentrations can overcome this special requirement.

Dormancy

- Many seeds enter a period of dormancy or metabolic inactivity after they have formed.
- As the seed enters dormancy, it dries out until its water content may be only about 5% of its total weight.
- The length of dormancy varies with different species, but serves to ensure the seed only germinates when conditions are ideal.

Abscission

- This is leaf fall.
- It may be seasonal or may follow accidental wind damage, animal browsing, or drought.