Quadrant II – Transcript and Related Materials

Programme: Bachelor of Science (Second Year)

Subject: Botany

Paper Code: BOC 104

Paper Title: Plant Physiology

Unit: 9- Plant response to light and temperature

Module Name: Photoperiodism: SDP, LDP & Day Neutral plants

Module No: 57

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Notes

Photoperiodism is the phenomenon of physiological changes that occur in plants in response to relative length of day and night. The response of the plants to the photoperiod, expressed in the form of flowering is also called as photoperiodism. The phenomenon of photoperiodism was first discovered by Garner and Allard (1920).

Photoreceptors like phytochromes and cryptochromes perceive the light stimulus and thereby producing signals to induce flowering in plants with respect to the critical length of photoperiod. **Critical photoperiod** refers to the minimum duration of light required to induce flowering.

Depending upon the duration of photoperiod, the plants are classified into three categories.

1. Short day plants (SDP)
2. Long day plants (LDP)
3. Day neutral plants (DNP)

1. **Short day Plants**

These plants require a relatively short day light period and a continuous dark period for subsequent flowering. These plants are also known as **long-night plants** E.g. Rice, Coffee, Soybean, Tobacco and Chrysanthemum

In short day plants, the dark period is critical and must be continuous. If this dark period is interrupted with a brief exposure of red light (660-665nm wavelength), the short day plant will not flower. Maximum inhibition of flowering with red light occurs at about the middle of critical dark period. The inhibitory effect of red light can be overcome by a subsequent exposure with far-red light.Interruption of the light period with red light does not have inhibitory effect on flowering in short day plants. Continuous dark period initiates early flowering.

2. Long Day Plants

These plants require longer day light period (14-16 hours) in a 24 hours cycle for subsequent flowering. These plants are also called as **short night plants**. E.g. Wheat, Radish, Cabbage, Sugar Beet and Spinach.

In long day plants, light period is critical. A brief exposure of red light in the dark period or the prolongation of light period stimulates flowering in long day plants.

3. **Day Neutral Plants**

These plants flower in all photoperiod ranging from 5 hours to 24 hours continuous exposure. E.g. Tomato, Cotton, Sunflower, Cucumber, Peas and certain varieties of Tobacco. During recent years, intermediate categories of plants such as *long short day plants* and *short long day plants* have also been recognized.

i. Long short day plants: These are short day plants but must be exposed to long days during early periods of growth for subsequent flowering. E.g. *Bryophyllum*.

ii.Short–long day plants: These are long day plants but must be exposed to short day during early periods of growth for subsequent flowering. E.g. certain varieties of wheat and rye.

	SHORT DAY PLANT	**LONG DAY PLANT**
1.	Plants flower when photoperiod is less than the critical day length	Plants flower when photoperiod is more than the critical day length
2.	Interruption during light period with darkness does not inhibit flowering	Interruption during light period with darkness inhibit flowering
3.	Flowering is inhibited if the long dark period is interrupted by a flash of light	Flowering occurs if the long dark period is interrupted by a flash of light
4.	Long continuous and uninterrupted dark period is critical for flowering	Dark period is not critical for flowering
5.	Flowering does not occur under alternating cycles of short day and short light period.	Flowering occurs under alternating cycles of short day followed by still shorter dark periods