

PHOTOPERIODISM

- Flowering in certain plants depends not only on a combination of light and dark exposures but also their relative durations. This response of plants to periods of day/night is termed as photoperiodism.
- This phenomenon was discovered by Garner and Allard in Maryland mammoth (a mutant variety of tobacco) and blloxy soyabean.

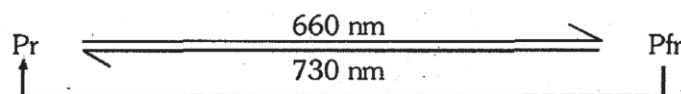
MECHANISM :

- Appropriate light/dark duration perceived by leaves with the help of a proteinaceous pigment (chromoprotein) called phytochrome.
- After suitable exposure a hypothetical hormonal substance (florigen) migrates from leaves to shoot apices for inducing flowering.
- Ultimately shoot apices modify into flowering apices.

Phytochrome : It is a chromoprotein pigment located on cell membrane. Phytochrome exists in two interconvertible forms :

(a) P_r (phytochrome red)

(b) P_{fr} (phytochrome far red)



Garner and Allard based upon response of plants to periods of day/night, classified plants into following groups

- Long Day Plants (LDP):** These plants perform flowering by receiving long photoperiod (above the critical period) e.g. Spinach, Radish, Lettuce, Wheat, Oat, Henbane.
- Short Day Plants (SDP):** Flowering occurs below the critical period of day length. Short day plants require a continuous critical dark period for flowering therefore they are also called long night plants. If the SDP plant is exposed to even a flash of light before achieving a critical dark period, flowering is prevented. e.g. Xanthium (Colcklebur), Chrysanthemum, Cosmos, Aster, Rice, Sugarcane, Strawberry, Potato, Tobacco, Soyabean varieties.
- Day Neutral or indeterminate Plants (DNP) :** Flowering is not affected by photoperiod or day length. e.g. Maize, Cotton, Tomato, Black Pepper, Cucumber, Sunflower.

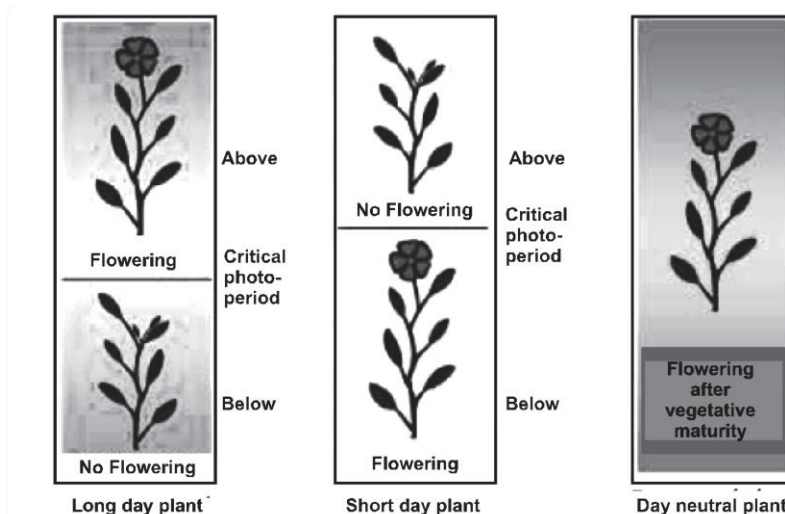


Fig : Photoperiodism : Long day, short day and day neutral plants