

Photoperiodism :

Photoperiodism is defined as the response of plants to the timing of light and darkness. Although the most imp. photoperiodic response in the plants is flowering, other responses such as pigmentation, branching, dominance can also be seen. The phenomenon of photoperiodism with respect to flowering is known since 19th century. It was demonstrated that when an additional source of light such as incandescent filament lamp was used in the green houses, some vegetables flowered earlier than normal.

To plant physiologist Garner and Allard (1920) 1st demonstrated a detailed investigation of factors that might cause certain plants to flower. They were studying growth and flowering behaviour in *Lycopersicon* (glycine max) and Maryland mammoth variety of tobacco (*Nicotiana glauca*).

Both these plants flowered only in the particular season irrespective of their sowing and growing season. They are short day plants & flowered during sept - Oct. when the daily exposure to light was reduced below a certain critical duration. From this experiment, Garner & Allard concluded that relative length of the day was the most imp. factor in growth and development of plants.

Based on photoperiodic response of flowering, plants have been grouped into the following 4 categories -

a) Short day plants : This plants flower readily only when the photoperiod is shorter than a critical period. Under longer photoperiods, this species or varieties do not flower & remain in the vegetative phase. The critical day length or the photoperiod depends upon the species. For eg. violet plants flower when the day length is shorter than 11 hours while chrysanthemum in day length shorter than 15 hours. These are short day plants because they do not flower when the day length is more than the critical 11 or 15 hours.

eg. (Monocot) - winter aloe, Bryophyllum, Japanese morning glory, chrysanthemum, ecamose, lamp.

b) Long day plants : This plants flower readily only under a range of photoperiod longer than the critical photoperiod. Flowering is induced under very long photoperiods on continuous illumination but a few long day plants may also flower slowly and less profusely under shorter photoperiods as well. Again, the critical day length varies according to the species. For eg. Barley or wheat plants flower only when the day length is more than 12 hours. While spinach plant flowers only when the day length exceeds over 13 hours. Some species like Agrostis palustris have a very long photoperiod of more than 16 hours.

Eg: Raphanus sativus, Pisum sativum, Jubium aestivum,
Azalea cereale, Avena sativa (oats), Hordeum vulgare,
Brassica sp etc

Photo Neutral Plants :-

3) Day neutral plants or Indeterminate: These plants flower readily over a wide range of daylength from relatively short day length to continuous illumination. In these plants, flowering is controlled by other factors like age, no. of nodes and previous history of cold treatment.

Eg: Cucumis sativus (Cucumber), Lycopersicon esculentum (tomato)
Solanum tuberosum, Gossypium hirsutum, Zea mays

4) Intermediate plants: These plants flower only under day length within a certain range and fail to flower under either longer or shorter photoperiod. In this category, some varieties of sugarcane, Eupatorium hyssopifolium and climbing hemp-waad (Mikania scandens) are included.