

⑤ There are some other plants which require short photo period followed by long photo period.

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Name of Subject - Botany

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Topic - photoperiodism (contd). (Plant physiology)

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### Photoperiodic induction

A plant can be photoperiodically induced by exposure to a few correct photoperiodic cycles. There are a few plants which require only one correct cycle of photoperiod for being photoperiodically induced. Notable example in this connexion is Cockspur plant.

### Perception of photoperiodic stimulus

It has been experimentally proved in case of chrysanthemum and Petaluma that photoperiodic stimulus is perceived by leaves. (Cajalchjan, 1934) Hamner and Khudairi (1951) have observed that neither the fully mature nor the <sup>in</sup>completely mature leaves are capable of perceiving photoperiodic stimulus. It is the semi-mature leaves which perceived photoperiodic stimulus properly.

### Photoperiodism and Quality of light

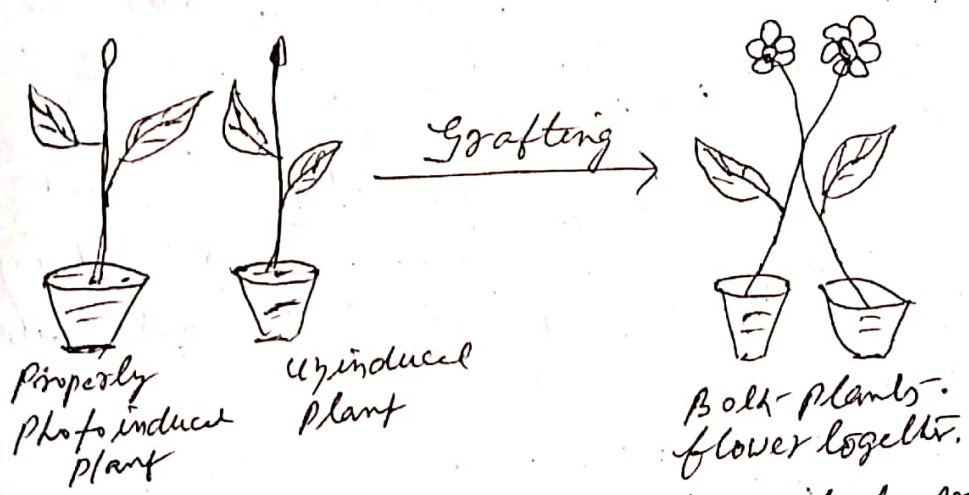
Green light has been found to be completely incapable of inducing photoperiodic stimulus. Even blue light induces very poorly to the plant to perceive photoperiodic stimulus. It is the red light between the wavelength 580 to 680 nm which causes proper photoperiodic stimulus in plants.

Photoperiodism and flowering hormone

Cajlachyan proposed the synthesis of flowering hormone during photoperiodism. The evidence in this connexion come from the following facts -

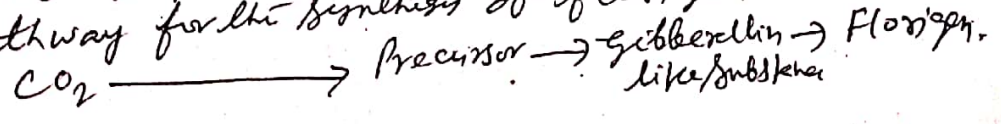
- (i) The site of perception of photoperiodic stimulus and the site of effect (where the effect of stimulus is expressed) are distantly apart. Stimulus is perceived by leaves and the flowers arise from stem. Thus certainly something hormone like substance may be transmitted from leaves to the stem when flowers arise.
- (ii) When two plants one properly photoinduced and another untreated with proper photo period are grafted together. Both of these plants flower simultaneously.

This grafting experiment also suggests the synthesis of a hormone. This hormone was later termed as "florigen".



Later on  $CO_2$  was found to be precursor in the formation of this supposed flowering hormone "florigen". The chemical nature of this florigen was found to be almost like gibberellins.

Thus Cajlachyan (1958), Botay (1958) and Meylor (1961) proposed the following tentative scheme or pathway for the synthesis of florigen.





## Photoperiodism and Phytochrome

Actually the starting discovery of phytochrome by Butler (1959) paved the proper way for the understanding of the mechanism of — photoperiodism.

Phytochrome (a coloured pigment) is chemically chromophores associated with the protein. The phytochrome has been found in <sup>almost</sup> all green plants except in few algae.

Haupt found that the phytochrome remains associated with the plasma membrane of the cell.

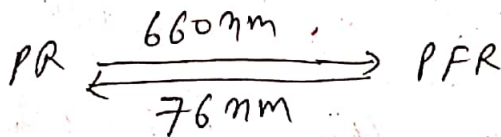
This phytochrome has two forms —

PR	and	PFR
Phytochrome		Phytochrome
red		far red.

PR absorbs red light at 660 nm and PFR absorbs red light at 760 nm. This PR promotes flowering whereas PFR suppresses flowering.

This PR is blue<sup>green</sup> in pigment and PFR is light green in colour. These two forms of phytochrome actually a phyco bilin that is allophyco bilin.

In short day plants after light period the phytochrome remain in PFR forms and during dark period this PFR is gradually converted into PR.



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