

PHOTOPERIODISM

In the article describes the phenomenon of photoperiodism in plants and its influence on the flowering stage of decorative and agricultural crops. The classification of plants in groups is given, the basis of the classification is the reaction of plants on the length of the light day. Two groups of plants are considered - plants of a long and short day. The important points of the biology of plants of these groups are described, and the effect of the light day's length on one of the main phases in the ontogenesis of plants.

Key words: *photoperiodism, plants of a long day, plants of a short day, flowering.*

У статті описується явище фотоперіодизму у рослин та його вплив на фазу цвітіння декоративних та сільськогосподарських культур. Наведена класифікація рослин за групами, в основу класифікації покладено реакцію рослин на довжину світлового дня. Розглянуто дві групи рослин – рослини довгого та короткого дня. Описано важливі моменти біології рослин цих груп, вплив довжини світлового дня на одну із головних фаз в онтогенезі рослин.

Ключові слова: *фотоперіодизм, рослини довгого дня, рослини короткого дня, цвітіння.*

An environmental factor of great significance in controlling flowering is day length. In tropical regions there is very little change in day length throughout the year, and the days and nights are about equal. In temperate regions, day length changes from winter to summer, and the long days coincide with the warmer season. Many tropical species when brought into our zone produce flower buds only when the days are short, and continued long days prevent the formation of flower buds. Plants native to the temperate zone have a variety of flowering habits. Many plants produce flower buds in the early spring when the days are moderately short. Others flower during the summer when the days are long. Still others produce flower buds during the short days of late summer and early fall. Plants are grouped according to their response to day length into what are called short-day plants, long-day plants, and day-neutral or indeterminate plants. The short-day plants in general develop flower buds when the days are less than 13 or 14 hours long. The long-day plants produce flower buds when the days are longer than 13 or 14 hours. The day-neutral or indeterminate plants flower regardless of whether the days are short or long.

The critical photoperiod is not the same for all species in the same group. Chrysanthemums and poinsettias are both short-day plants. Chrysanthemums set flower buds when the days (including twilight) are shorter than 14.5 hours, whereas poinsettias produce flower buds only when the days are less than 12.5 hours. This fits our experience, for we know that chrysanthemums flower earlier in the fall than do poinsettias. Spinach and rose mallow are long-day plants. Spinach flowers when the days are longer than 14 hours, the rose mallow when they are longer than 13 hours. We learn then that short-day plants flower only when the days are less than a critical length and the long-day plants flower only when the days are longer than the critical length. When short-day plants are grown with days longer than the critical duration, they grow

vegetatively but do not flower. Long-day plants grown with days shorter than the critical make vegetative growth, but flowering is prevented.

Short-Day Plants. Plants of the north temperate region which flower early in the spring or in the autumn are short-day plants. At the equator the days are always short (12 hours) and hence plants from equatorial regions are generally short-day plants. When such plants are introduced to northerly latitudes, they flower in early spring, autumn, or winter.

Chrysanthemums, asters, salvia, cosmos, and poinsettia are typical short-day plants. They may be induced to flower out of season by altering the length of day. For example, if light is excluded from chrysanthemums from 5:00 in the afternoon until 8:00 A.M. each day beginning in early July, the plants flower earlier than usual. When the days are naturally short, flowering of short-day plants may be prevented by increasing the day length with artificial light or by interrupting the dark periods with light for times ranging from 1 minute in some species to 1 hour in others. There is increasing evidence for believing that the length of the dark period is more important than the length of the light period. Short-day plants require a long uninterrupted night for flowering. Sugar cane is a short-day plant. If the dark period is interrupted, sugar cane does not flower even though the days are short. The stem of sugar cane is the valuable product and flowering is not desired.

A knowledge of photoperiodic requirements of plants is not only of value in timing florists' crops, but it is also of value in agronomy. Soybeans are short-day plants. If planted early, they make considerable vegetative growth before the days become short enough in late summer to induce flowering. The large plants give a high yield. If the seeds are sown late, the plants are relatively small when the days are short enough for flowering and accordingly the yield per plant is low. If it is necessary to sow late, more seed must be planted per acre in order to obtain a profitable yield.

Long-Day Plants. Long-day plants flower when the days are more than 13 or 14 hours long. In the United States, plants which flower in late spring or early summer are long-day plants. In latitudes of 60° or more, most species are long-day plants. Short-day plants are not found at such latitudes because in spring and autumn when the days are short, temperatures are too low for flowering. Cereals, lettuce, radish, clover, and Rudbeckia are long-day plants that flower during summer. They may be induced to flower during our winters by artificially lengthening the days. The intensity of the supplementary light need not be high; about 5 foot-candles are sufficient, and some plants respond to supplemental light of only 0.1 foot-candle. Long-day plants will flower when the days are short if the dark period is interrupted near midnight with light. A long dark period favors flower formation of short-day plants but prevents flower formation of long-day plants. Interrupting a long dark period with light prevents flowering of short-day plants but promotes flowering of long-day plants.

Indeterminate or Day-Neutral Plants. Plants such as tomato, dandelion, cotton, sunflower, and snapdragons, which flower regardless of day length, are known as day-neutral plants.

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METHODS IN ENGLISH TEACHING

This article deals with different classification of teaching methods. The definition of "method" is given. The authors focus on binary and interactive methods, pointing out their role in professional teaching.

Key words: *method, methodology, foreign languages, interactive learning.*

Learning foreign languages determines the use of certain teaching methods.

According to A.Alexiuk, *the teaching method* is a complex, multidimensional pedagogical phenomenon that is not a subject to synonymous definition. Analyzing the essence and structure of teaching methods, the scientist identified their two main features: "These are such ways of interconnected activities between teacher and student, that would: 1) have given students the opportunity to learn social experience; 2) contributed to the identification of the most effective- according to specific conditions- means of management of educational and cognitive activities of students. Scientist gives the definition: "*Methods of learning* are organized ways of interconnected activity of teachers and students, aimed at solving educational problems of higher education [6, p. 442].

Overview of pedagogical and methodological literature showed that, although there are certain differences in the definition of teaching methods, the scientists (O.Bilyayev, Ye.Dmytrovskyy, V.Onyschuk, L.Fedorenko, S.Chavdarov) formulated methods of learning in general, as ways (types) of interaction between teacher (professor) and pupils (students), aimed at achieving the goals of studying.

The question of the classification of teaching methods remains controversial.

Teacher Yu.Babanskyy identifies three groups of teaching methods based on three organically related components - *motivational* (formation of interest to studying), *an effective organizational* (methods of organizing and ensuring the essential perception of educational information, methods of providing mental activity, inductive and deductive, reproductive and searchable nature, managed and self-directed educational and practical activities; such methods are commonly called verbal, visual and practical, reproductive and search as well as methods of managed and self-directed learning) and *control and evaluation* (methods of verbal, written and laboratory- practical control) [1].

The classification methods of language teaching by the sources of *knowledge, level of cognitive activity of pupils (students) ways of interaction of teachers and pupils (professor and students respectively) in classes* are still well- known.

According to the sources of sciences, as well as the nature of sensory perception (hearing, vision, touch), language teaching methods are defined by E. Dmitrovsky, O. Tekuchov, L. Fedorenko, S. Chavdarov: *verbal, visual and practical* teaching methods (traditional classification).