

Plant Phenology

By Dr. Fritz Schnelle (Leipzig 1955)

Chapter 1: Tasks and Nature of Phenology (pp. 11-12)

(Translated into English by Mark D. Schwartz in February 2009)

The word “phenology” is derived from the Greek words *phainesthai* ‘to appear’ and *logos* ‘teaching, science’. By this we refer to striking plant growth processes that can be observed. The term “phenology” thus generally refers to the science of the growth phenomena and developmental processes of plants, if – as in this case – we are referring to plant phenology. The same thing applies to animal phenology, which has not yet, however, obtained the status and importance of plant phenology. As such, we often just use the abbreviated term phenology, to refer to plant phenology.

The name “phenology” for this branch of science was proposed by Charles Morren (a botanist in Liege) about the middle of the 19th century. Although the formation of this word is somewhat unfortunate, it has become established. Attempts to introduce a new (philologically correct) term have been made from time to time, but any such efforts are unlikely to succeed.

Phenology is ultimately responsible for observing periodically recurring phenomena of plant growth and recording the time of their occurrence. Observations made in different areas or over several successive years are compared with each other. Phenology deals not only with mere observation; it also is tasked with determining regularities in the periodic growth sequence and with investigating the dependence of these processes on environmental conditions. Especially for plant phenology, the influence of soil and climate on the periodic appearance of plant life needs to be determined. Applied phenology shows us the various scientific and practical uses of our observations and research findings. All striking growth phenomena that are clearly visible, and that we can absolutely say appear on a given day, are observed. These include, for example, the beginning of flowering, i.e., the moment when the first blossoms have opened in the tree we have chosen for daily observation. This day is taken as the beginning of flowering.

The steadily growing thickness and length of trunks, branches, stems or stalks, and the gradual growth of leaf surfaces and fruits, are less suitable for phenological observations in the usual sense, because you often need special equipment and tools to monitor these growth processes accurately from day to day. The phenological specialty area that monitors the progressive growth of plants by continuous measurement is called “phenometry”. Sometimes these measurements are also possible through observations by eye or by other simple means, such as determination of the daily length growth of cereal stalks during the time of shooting with a tape measure. To determine the thickness of fruit growth, we are dependent on special measuring instruments. Therefore, the implementation of these studies will in general remain limited to stations designated for this purpose.

For general phenological observations on the other hand, the appearance of first leaves in spring works very well, i.e., the moment in which the buds are just opening and the first leaf

unfolds. Other striking growth phenomena deserve our attention as well, for example, fruit ripening, leaf coloring and leaf fall, or in agricultural crops: sowing, emergence, appearance of the ears and panicles, crop growth, etc. These phenomena are also known as “phenological phases” or “growth phases” (i.e., development stages).

In this way, the growth of trees, shrubs, herbs, and grasses can be followed throughout the year. The horse chestnut, for example, is observed initially in spring from the thresholds of spring buds until the day when the first leaves flush. Then sometime later, we observe the appearance of first blossoms. In autumn, we have bursting of fruit and dropping of the mature brown chestnut. Then come yellow and brown leaf colors, i.e., the use of leaf coloration, and finally leaf fall can be observed. When observing agricultural crops, one can note – among other things – when spring sowing of oats is done, when first green leaves are visible on the dark brown soil, when in early summer shooting stems’ first panicles come from the upper leaf sheaths, and finally, when in summer oat fields are cut.

Phenology thus seeks to observe easily discernible growth phenomena (growth stages), which ultimately determine annual plant development, and can be used to recognize the individual growth rhythms inherent in plants.