



Description of type states of spring phases in some pip fruit-trees (apple-tree and pear-tree) based on the BBCH code

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Phenology is an observational and descriptive science that has traditionally been used in the field of agroclimatology. In recent times it has acquired some relevance as indicator of climate change, especially as indicator of the effects of the changes and also to valuate the impacts on crops and natural ecosystems. There is a number of old data which have been taken by the meteorological services (in general by voluntary collaborators) and by some other institutions related with agriculture or the nature observation. There have been attempts to standardize observation methods, but the subject is still under debate, as much from the international point of view as from the interdisciplinary one.

Based on observations, it is really difficult to estimate the date of occurrence of a definite phenological phase for a species in a specific territory, and even more if information about climates changes is expected to be gathered. There are local variations due to physiography, edaphology or genetic diversity and, in the case of cultivars, due to farm practises. Wild species are more appropriate for climate studies, nevertheless it is important to observe cultivated plants because phenology is used in agriculture to determine dates at which to carry out some tasks.

In a plant (e.g. a fruit tree), and even more in a whole population in a specific place, a phase (e.g. sprouting or flowering) occurs gradually along 15 or 20 days. To gain more accuracy, some morphological and physiological states have been defined for shorter periods of time (3, 5 or 7 days). Some authors have identified such states for different species (Baggiolini 1952, Fleckinger 1965, Coutanceau 1965, Solignat 1968,

Maillard R. 1975, Felipe A. 1977, Simón J.L. 1977 etc.), but at present the BBCH code is progressively being adopted in different countries for an accurate phenological observation. The BBCH code is the result of a work carried out by a team of experts from different German research centres.

In the INM (Instituto Nacional de Meteorología, Spain) there is a phenological network which started in 1942. Observations are taken by voluntary collaborators. A Meteorological Calendar with maps of isophenes is regularly published since 1958. Considering the date when a phase change is observed in a specific species and place as a piece of information (datum), the INM's phenological data base has approximately 400,000 entries, from which approximately 117,000 are in computer support. The rest are stored on paper.

At present, there is a project in the INM aiming at defining a new phenological observation method, as well as to elaborate an observation guide which will be on Internet to be used by the INM phenological observers. As a task of this project, the phase's type states of the different fruit-trees are being observed, described and photographed in the Practice's Field of the School of Agronomical Engineering of the *Universidad Politécnica de Madrid*. Fieldwork is also being carried out in the province of Madrid countryside with the aim of evaluating the difficulties of observation, trying to re-define a method, and deciding the most appropriate species to be observed, as well as to gather photographic material for the Observation Guide which will be in the INM's Website.

As an example of the new project we present here a poster which is basically descriptive. The aim is to show by means of photographic pictures the type states of spring phases in some pip fruit-trees (apple-tree and pear-tree) based on the BBCH code