
Reproductive phenology: a key aspect of ecological strategies in Mediterranean populations of plant species

Jules Segrestin^{*1}, Marie-Laure Navas², and Eric Garnier¹

¹Centre d'écologie fonctionnelle et évolutive (CEFE) – CNRS : UMR5175, Université Montpellier II - Sciences et techniques, Université Montpellier I, Université Paul Valéry - Montpellier III, École Pratique des Hautes Études [EPHE] – Campus CNRS - 1919 route de Mende - 34293 Montpellier cedex 5, France

²Montpellier SupAgro – Montpellier SupAgro – 2 place Pierre Viala - 34060 Montpellier cedex 02, France

Abstract

Phenology, which can be defined as the study of periodic biological events in organisms, is as an important component of plant ecological strategies. Indeed, the seasonal distribution of resources and hazards generates selection pressures on the timing of the different phases of the vegetative and reproductive cycles. Phenology has been largely ignored in trait-based research. The aim of this study is to assess whether reproductive phenology can be considered as an axis of functional variation in plants using three traits: (1) flowering time, (2) ripening time and (3) length of reproductive period. We used data from Mediterranean populations of 154 species to explore: (1) the relationships between the distributions of reproductive trait values in relation with the Mediterranean climatic conditions, characterized by a summer drought, frosts in winter, and heavy rainfall events in autumn; (2) the correlations among traits including those proposed by Westoby (1998) in the context of the Leaf-Height-Seed plant ecology strategy scheme.

All three phenological traits spanned a wide range of values, and were tightly associated with climatic conditions. Correlations among traits were identified, suggesting developmental coordination between the different phases of reproductive phenology. Flowering time was correlated with plant height, but neither with leaf traits nor with seed mass.

This study confirms the value of using phenological traits as a functional dimension in comparative approaches. It brings new insights into the links between phenology and other dimensions of plant functioning, putting back phenology into the broader context of plant ecological strategies.

Keywords: Reproductive phenology, plant functional traits, ecological strategies, comparative approaches

^{*}Speaker