

Plant morphology: outdated or advanced discipline in modern plant sciences?

CRISTINA SALMERI

Dept. of Biological, Chemical and Pharmaceutical Sciences and Technologies, Section Botany and Plant Ecology, University of Palermo, Via Archirafi 38, 90123 Palermo, Italy. E-mail: cristinamaria.salmeri@unipa.it

Despite an increasing societal awareness and sensitivity about biological diversity and nature conservation as pivotal matters for human survival and well-being, plant systematics has gone through a steady decline in interest, and researches on these topics are often neglected. This particularly applies to plant morphology in its broad sense (i.e. including anatomy, histology, micro-morphology), which has increasingly become marginalized and considered less important than other scientific methods in plant biology. Notwithstanding, even in the current times of genomics (plus other “omics” topics) and functional ecology, when trait-based approaches are essential for studying and understanding plant functions and species relationships, comparative morphology as integrative discipline still assumes a pivotal role, remaining fundamentally relevant to nearly all fields of plant biology.

Lots of studies have demonstrated how vegetative and reproductive characters, and their anatomical and/or micro-morphological structures, can be informative for phylogenetic studies and helpful to solve taxonomic problems at various levels. Most phenotypic traits show adaptive variation and different range of plasticity which have proved to be of great ecological and physiological significance and useful, for instance, in reconstructing plant adaptation to past climatic conditions or establishing defence mechanisms and structural changes in response to stress and climate changes, which all are basic information for nature conservation. Meanwhile, understanding patterns and origins of such morphological modifications is crucial to address main evo-devo questions. The role in other applied sciences, as agriculture, bioengineering, and forensic botany, is no less important.

Contrary to common belief, plant morphology is not a conservative finished science, but, like other sciences, it is open to constant innovations involving concepts (e.g. the shifting from structure-based to function-based evolutionary perspective) and methods. Actually, plant morphology has changed over time and improved its analytical approaches embracing new technologies and tools, without neglecting traditional methods. Examples of such applications will be provided and discussed.