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New thinking and conceptual advances in plant conservation

Sergei Volis & Jordi López-Pujol

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GUEST EDITORIAL

New thinking and conceptual advances in plant conservation

According to recent estimations, about one-third of all plant species on the planet are threatened by extinction (Pimm & Joppa 2015) and if the continued rise in human population is not slowed down, these extinction rates could be even more dramatic. Unfortunately, and despite more than three decades of efforts, Conservation Biology is still far from providing infallible methods and practices for species management and recovery. This special issue of *Israel Journal of Plant Sciences* highlights the importance of new thinking in conservation biology and the development of new approaches to making plant conservation more efficient. The issue presents 10 articles on a variety of subjects of plant conservation that critically evaluate existing approaches and propose or utilize conceptually new ones.

An important contribution comes from the first article of the issue: a review by Heywood (2015) analyzing the challenges of conserving biodiversity at the species and population levels in their natural habitats (*in situ*) and the current and future role of protected areas in effective species conservation. This paper also analyzes the causes of failure to coordinate area-based and species-based actions. One of the major conclusions of this paper is that *in situ* is often ineffective due to the absence of a coherent strategy and too little emphasis on management plans which require monitoring and intervention.

A review by Volis (2015) introduces a novel approach that conceptually unifies *ex situ* and *in situ* approaches as parts of an integrated species-targeted conservation methodology. This concept is based on the idea that ecologically significant species' genetic variation is of primary importance for plant conservation, and this idea is used for providing guidelines about the inventory of existing populations, sampling and propagating sampled material, and the use of this material in species recovery actions.

A paper by Vitt et al. (2016) critically analyzes the ecological restoration literature and the plant reintroduction literature to discover insights into the promises and pitfalls of translocating species as an adaptation strategy in the face of our changing climate.

Next, two papers (Volis 2016a, 2016b) try to integrate restoration ecology with plant conservation biology and provide detailed methodological guidelines to achieve this goal. The major conclusion of these two papers is that threatened species should be included in ecological restoration plans having conservation goals. Introduction of multiple threatened species into a partially degraded site, central to the proposed concept, can serve two important goals: habitat/landscape restoration and increased chances of global survival for the threatened species. The proposed approach can be especially applicable in the regions having many threatened species within particular environments, with both threatened species and the whole ecosystem requiring immediate actions.

Muñoz-Rodríguez et al. (2016) present an innovative approach, using both distribution data and environmental niche models, for quick and easy evaluation of the IUCN categories for large regional species lists, followed by a gap analysis assessing the percentage of threatened plants effectively conserved *in situ*.

The paper by Draper et al. (2016), analyzing the effect of climate change on distribution ranges of 41 threatened Spanish medicinal plants, shows the utility of ecological niche modeling for conservation planning, with the areas of the highest overlap of the species predicted ranges having the highest priority for protection, and the populations most vulnerable to the predicted climate changes being the first priority for *ex situ* actions such as collecting seeds and creating living collections.

Laguna et al. (2016), by analyzing role of plant microreserves in conservation of endemic, rare and endangered plants of the Valencian Community, in Spain, demonstrate that a plant micro-reserve network can efficiently complement a network of existing protected areas and that the micro-reserves should preferentially be established outside the existing protected areas.

Ferrando-Pardo et al. (2016), in their study of the conservation value of the Valencian threatened species seed bank, show the importance of using proper quantitative and qualitative indicators for measuring collections' conservation utility, and propose several new indices for measuring the conservation value of seed collections.

Volis et al. (2016) present a case study where they show that in studying the extent and structure of genetic variation of an endangered species it is important to distinguish adaptive and non-adaptive genetic variation. Based on their results, they provide conservation recommendations using *quasi in situ* (Volis & Blecher 2010) guidelines.

The aim of this special issue is twofold. On the one hand, the range of subjects covered and innovative approaches proposed should be of interest to a wide international audience of conservation biologists and restoration ecologists. On the other hand, we believe that with the increasing number of Israeli plant conservation

scientists and practitioners, as well as the growing efforts of Israeli academic and research institutions to support plant conservation research, this issue will contribute to stimulating an interest in conceptual thinking among young Israeli conservation biologists. In addition, by organizing this special issue, one of the guest editors, who used to be an Israeli scientist, would like to express his deep gratitude for the attention and support that his research received from the Israel Academy of Sciences and especially from his former research institution (Ben-Gurion University).

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Sergei Volis
Key Laboratory for Plant Diversity and Biogeography of East Asia, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming, China
Email: volis@mail.kib.ac.cn

Jordi López-Pujol
Botanic Institute of Barcelona (IBB-CSIC-ICUB), Barcelona, Spain