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Conference Report

Plant Translocation for Threatened Species Conservation †

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Abstract: A training school on Plant Translocation—Theory and Techniques was held on 24–26 March 2021 organized virtually at the Botanic Garden of Rome, Italy. The aim of the course was to train budding scientists in the field of threatened plant restoration and conservation. The course was attended by 77 participants, viz., postdoctoral fellows, faculty and scientists, from 28 countries.

Keywords: plant translocation; threatened; conservation

1. Introduction

'Two-fifths of the World's plants are at risk of extinction'—State of the World's Plants and Fungi, Royal Botanic Gardens, Kew.

Humans have accelerated the rate of extinction by 100–1000 times the natural rate, and plants species are under accelerated threat globally. The best place to conserve plant diversity is in its natural habitat; however, the increasing demand for natural resources will continue to degrade natural habitats. It will lead to a large number of plant species facing extinction. Target eight of the Global Strategy for Plant Conservation aims to conserve 75% of threatened plant species in ex situ collections and prepare 20% of them for recovery and restoration programs. According to the IUCN Guidelines for Reintroductions and Other Conservation Translocations, translocation is the human-mediated movement of living organisms from one area to another for conservation purposes.

Plant translocation has been increasingly considered as an important conservation tool that will allow plant populations to recover in the absence of naturally occurring propagules. The rationale for translocation (population reinforcement, reintroduction and introduction) is the establishment or augmentation of new or existing populations to increase the survival prospects of a species by increasing population size and genetic diversity, or by representing species demographic groups or stages. In particular, translocation of endemic and endangered plant species to their natural habitat is one of the emerging tools of biodiversity management. Consequently, to prevent the extinction risk of threatened plant species and to enhance their conservation status, translocation has become increasingly important in plant management worldwide.

Despite the huge number of ongoing projects, translocation science is still in its infancy, and the biological underpinnings of translocating plant species have been poorly developed. Considering the knowledge gap, a three-day training school titled 'Plant Translocation—Theory and Techniques' was organized virtually at the Botanic Garden of Rome, Italy, from 24 to 26 March 2021. The course was conducted to train new scientists within the field of threatened species restoration and establish a dialogue between experienced conservation scientists and the next generation of practitioners. The training school was supported by the European Union through COST Action 18201 'An integrated approach to conservation

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of threatened plants for the 21st century', ConservePlants. The 77 selected participants for the course were PhD students, postdoctoral fellows and scientists/faculty from 28 countries: Albania, Australia, Cyprus, the Czech Republic, Estonia, France, Germany, Greece, Hungary, India, Israel, Italy, Lebanon, Luxembourg, Moldova, Montenegro, the Netherlands, Norway, the Philippines, Poland, Portugal, Serbia, South Africa, Spain, Switzerland, Turkey, the UK and the USA.

The school opened with salutations by Prof. Marco Alberto Bologna (University of Roma Tre) and Prof. Fabio Attorre (Director, Botanic Garden of Rome), both leading conservation scientists, the former an entomologist and biogeographer, the latter a plant ecologist and conservationist.

2. Presentations

2.1. Overview of Threatened Plant Translocation

Prof. Thomas Abeli (Roma Tre University, Italy)

Prof. Thomas Abeli delivered talks on 'Overview of threatened plant translocation and its different phases', in order to introduce the topic and to link the talks of the following speakers to specific aspects of plant translocation. He discussed three main phases, i.e., preparatory actions, release, and monitoring and success evaluation for translocation of threatened plants. Prof. Abeli emphasized using fresh material for developing propagation protocols and to use information in the Seed Information Database (https://data.kew.org/sid/, accessed on 15 November 2021). This database is a useful tool for identifying germination requirements and other seed biological information, for decision support for seed conservation programs. He highlighted species distribution modeling and experimental releases for site selection in translocation studies. Thomas suggested monitoring of translocated individuals for at least 5–10 years; however, major observation lasts for 1–2 years based on the published literature.

2.2. Plant Translocation Success

Dr. Sandrine Godefroid (Meise Botanic Garden, Belgium)

Dr. Sandrine Godefroid is a researcher developing ex situ conservation programs for endangered plant species to support their in situ conservation. She focused her talks "Are plant translocation successful?" on plant translocations globally and emphasized different criteria and variables to measure the success of translocation. Dr. Godefroid highlighted the selection of the wrong habitat as a major reason for the failure of translocation. Monitoring the performance of translocated populations is too often considered to be low priority and inadequately funded and implemented. She concluded her talk with the following message: The effectiveness of translocation can be improved by following strict rules and striving to build the necessary knowledge of target species, donor sites and recipient sites. Given the high cost of operations and the ever more rapid species extinction, it is also important to share our respective experience in methods and outcomes across the plant conservation practitioner community.

2.3. Scope of Plant Translocation

Dr. Andreas Ensslin (Conservatory and Botanic Garden of the City of Geneva, Switzerland)

Dr. Andreas Ensslin presented a talk on "exploring the full scope of translocations". He discussed different challenges in plant translocations and possibilities for improvements. Dr. Ensslin showed the benefits and faults of using seeding and planting in translocation. He added the importance of species distribution modeling in assisted migration; however, the survival of natural habitats is of utmost value. He also focused on ex situ collections mainly in seed banks and cryogenic preservation in botanical gardens. He stressed the gardens' potential by quoting 'Botanical gardens devote only 10% of their capacity to threatened plants'. He closed his talk with the importance of seed banks in the de-extinction of plant species.

2.4. Importance of Genetics in Plant Translocation

Dr. Guy Colling (Musée National d'histoire naturelle de Luxembourg)

Guy Colling gave a talk on the "importance of genetics in plant translocation". He highlighted genetic drift and inbreeding depression as the two main problems in fragmented populations which may lead to the extinction of species. He added 55% of plant species have fragmented populations. Dr. Colling also emphasized the importance of plant taxonomy in translocation and conservation. He said: 'the lives of several botanists would be necessary to shed light on the taxonomy for plant conservation'.

2.5. One Size May Not Fit All in Plant Translocation

Prof. Kingsley Dixon (Curtin University, Perth, Australia)

Prof. Kingsley Dixon, a special guest of the training course, gave a fascinating talk entitled "one size may not fit all in plant translocation" on the achievements of ecological restoration and translocation of threatened species in Australia. He focused on current and future challenges of upscaling ecological restoration as a way to have more habitats and chances for reintroducing threatened and extirpated plants. He also pointed out the importance of talking with people outside the field of conservation as a way to increase awareness on conservation issues and the need for habitat restoration.

3. Conclusions

The course could not exhaustively cover the huge topic of plant translocation. Rather, it was a seed that will hopefully germinate and develop within the next generation of conservation scientists and practitioners. Indeed, during the course, participants were very active in sharing their points of view and doubts with the teachers which, in turn, benefited from a two-way exchange of experience with the attendees. From the course, it emerged that only with improved knowledge will plant translocation become increasingly effective; the training school Plant Translocation—Theory and Techniques provided some important information that will drive the activity of several young conservationists.

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