

Genetics & plant restoration

Vegetation restoration and re-introduction of species require careful consideration of genetics

(Havens, K. 1998. The genetics of plant restoration: an overview and a surprise. *Restoration and Management Notes* 16:68-72). Generalizations based on work with a limited number of species are extremely difficult to make. Yet, generating complete information for every species to be restored is unrealistic. Moreover, time and financial constraints and the sheer magnitude of restoration of plant diversity invariably force practitioners to act on educated guesses. Information from an albeit limited number of studies presented in a symposium about plant population genetics at the Chicago Botanic Garden in October 1997 and several recently published guidelines and case studies on restoration of rare plants provide starting points for restorations and reintroductions.

Reductions in population size or plant density or fragmentation of populations can lead to reductions in genetic variation and accompanying loss of fitness in most plant groups. Loss of genetic variation may be greater in species that once occurred in large, highly outcrossing populations. To prevent such genetic hazards in reintroduced plants, large, genetically diverse populations should be created. Equal number of seeds or plants from each maternal line in newly created populations can decrease inbreeding and increase genetic variation. Propagules must be collected with this goal in mind. Seeds must be collected from a randomly stratified sample of plants, so that they include seeds from individuals of different types (e.g., sizes) and from different types in different locations. Seeds from each maternal plant should be kept separate to not only equalize founder representation in reintroductions, but also, if desirable,

to purge the genetic load in some lines. Propagules should be from the same ecoregion and, if known, from the same evolutionary line. Propagules with a high site fidelity may be less important in highly outcrossing species. Hybridization between populations may have been common in the evolution of many species and may have rendered hardier individuals. Whether one wishes to introduce, reintroduce, or augment populations is important in the mixing of propagules. For example, introductions should be made in the historic range, and propagules from a site, if available, are preferable for reintroductions. However, species conservation should prevail over population integrity if the choice is between preservation and integrity of a species.