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Research Note

Intraspecific Chromosome Number Variation: a Neglected Threat to the Conservation of Rare Plants

PAUL M. SEVERNS* AND AARON LISTON

Department of Botany and Plant Pathology, Oregon State University, Corvallis, OR 97331-2902, U.S.A.

Abstract: *The effectiveness of rare plant conservation will increase when life history, demographic, and genetic data are considered simultaneously. Inbreeding depression is a widely recognized genetic concern in rare plant conservation, and the mixing of genetically diverse populations in restoration efforts is a common remedy. Nevertheless, if populations with unrecognized intraspecific chromosome variation are crossed, progeny fitness losses will range from partial to complete sterility, and reintroductions and population augmentation of rare plants may fail. To assess the current state of cytological knowledge of threatened and endangered plants in the continental United States, we searched available resources for chromosome counts. We also reviewed recovery plans to discern whether recovery criteria potentially place listed species at risk by requiring reintroductions or population augmentation in the absence of cytological information. Over half the plants lacked a chromosome count, and when a taxon did have a count it generally originated from a sampling intensity too limited to detect intraspecific chromosome variation. Despite limited past cytological sampling, we found 11 plants with documented intraspecific cytological variation, while 8 others were ambiguous for intraspecific chromosome variation. Nevertheless, only one recovery plan addressed the chromosome differences. Inadequate within-species cytological characterization, incomplete sampling among listed taxa, and the prevalence of interspecific and intraspecific chromosome variation in listed genera, suggests that other rare plants are likely to have intraspecific chromosome variation. Nearly 90% of all recovery plans called for reintroductions or population augmentation as part of recovery criteria despite the dearth of cytological knowledge. We recommend screening rare plants for intraspecific chromosome variation before reintroductions or population augmentation projects are undertaken to safeguard against inadvertent mixtures of incompatible cytotypes.*

Keywords: conservation genetics, Endangered Species Act, landscape genetics, population augmentation, recovery plan, reintroductions, restoration

Variación Intraespecífica en el Número de Cromosomas: una Amenaza Desatendida en la Conservación de Plantas Raras

Resumen: *La efectividad de la conservación de plantas raras incrementará cuando los datos demográficos y genéticos sean considerados simultáneamente. La depresión por endogamia es una preocupación genética ampliamente reconocida en la conservación de plantas raras, y la mezcla de poblaciones genéticamente diversas es un remedio común en los esfuerzos de restauración. Sin embargo, si se cruzan poblaciones con variación cromosómica intraespecífica no reconocida, las pérdidas de adaptabilidad de la progenie irán desde esterilidad parcial hasta completa, y las reintroducciones e incremento de la población de especies de plantas raras pueden fracasar. Para evaluar el estado actual del conocimiento citológico de especies amenazadas y en peligro en los Estados Unidos, buscamos recursos disponibles para conteo de cromosomas. También revisamos los planes de recuperación para discernir si los criterios de recuperación potencialmente colocan en riesgo a especies enlistadas al requerir reintroducciones o incremento de la población en ausencia de información citológica. Más de la mitad de plantas no tenían conteo de cromosomas, y cuando un taxón lo tenía, generalmente se originaba de una intensidad de muestreo muy limitada como para detectar la*

*email severnsp@science.oregonstate.edu
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