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**21. © Conservation and reintroduction of the endangered Willamette daisy: effects of population size on seed viability and the influence of local adaptation.** Thorpe, A. S. and Kaye, T. N. *Native Plants Journal* 12(3):289-298. 2011.

# Conservation and reintroduction of the endangered Willamette daisy

EFFECTS OF POPULATION SIZE ON SEED VIABILITY  
AND THE INFLUENCE OF LOCAL ADAPTATION

Andrea S Thorpe and Thomas N Kaye

## ABSTRACT

Our research suggests that habitat fragmentation and reduced population size in Willamette daisy has led to loss of fitness in some populations and to population differentiation. In outcrossing species, habitat fragmentation and reduced population size can lead to increased genetic drift, local adaptation, and (or) inbreeding. We explored some of these issues for the endangered forb Willamette daisy (*Erigeron decumbens* Nutt. [Asteraceae]). This species is currently restricted to approximately 40 sites in the Willamette Valley, Oregon; more than half of the known populations have fewer than 100 individuals. We found a positive relationship between seed viability (as measured by the percentage of filled seeds) and population size. In populations with 20 or fewer individuals, seed viability dropped to less than 2.5%. In modified reciprocal transplant and common-garden experiments, we found that although there were some differences in survival, growth, and reproduction in transplants from 2 source populations, the effect of source varied depending on response variable, year of planting, year of monitoring, and habitat. Conservation of Willamette daisy will benefit from increasing the size and genetic diversity of existing populations and from reintroducing genetically diverse populations within the historic range of the species. Knowledge of genetic diversity of populations can be critical for making appropriate management decisions for rare species, including determining if population augmentation is necessary and, if so, from which source populations.

Thorpe AS, Kaye TN. 2011. Conservation and reintroduction of the endangered Willamette daisy: effects of population size on seed viability and the influence of local adaptation. *Native Plants Journal* 12(3):289–298.

## KEY WORDS

reintroduction, Willamette Valley, prairie, endangered species, allee effect, *Erigeron decumbens*, Asteraceae

## NOMENCLATURE

Plants: USDA NRCS (2011)

Insects: ITIS (2011)