From Forest Nursery Notes, Winter 2009

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SEED TRANSFER ZONES FOR A NATIVE GRASS

Festuca roemeri

GENECOLOGICAL EVIDENCE

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ABSTRACT

A common-garden study of *Festuca roemeri* (Pavlick) E. B. Alexeev (Poaceae) revealed substantial genetic variation within and among 47 populations from throughout its range in the Pacific Northwest, US, for growth, fitness, phenological, and morphological traits. Using climatic and physiographic variables, genetic patterns over the landscape were examined through principal component and regression analysis. Elevation and latitude of the seed source, and to a lesser extent temperature and precipitation, explained a significant proportion of the genetic variation, suggesting that observed variation was associated with adaptation to local environments. Most plants from the Willamette Valley exhibited poor growth and survival, perhaps due to inbreeding. *Festuca roemeri* variation clustered into seed transfer zones corresponding to Level III ecoregions, and one zone was further subdivided. High-elevation populations separated from lower-elevation populations but did not cluster into a single seed zone. Seed transfer zones reported here provide a guide for plant community restoration efforts using this species.

Wilson BL, Darris DC, Fiegener R, Johnson R, Horning ME, Kuykendall K. 2008. Seed transfer zones for a native grass (*Festuca roemeri*): genecological evidence. Native Plants Journal 9(3):287–302

KEY WORDS

common-garden study, habitat restoration, inbreeding depression, conservation genetics

NOMENCLATURE

Plants: Barkworth and others (2007)
Fungi: ITIS (2008)

Festuca roemeri (Pavlick) E. B. Alexeev (Poaceae) is a community dominant in grasslands and savannas west of the Cascade Range and Sierra Nevada from southern British Columbia through northern California at elevations of 30 to 1830 m (100 to 6000 ft). The species is valued for habitat restoration and erosion control projects, but its use has been limited by difficulties obtaining correctly identified seeds and by disagreements about genetically and ecologically appropriate seed transfer zones. Local seeds are preferred (McKay and others 2005), but how local those seeds should be may vary among species (Rogers and Montalvo 2004). The common-garden study reported here provides information to delimit *F. roemeri* seed transfer zones.

This grass was described relatively recently as *F. idahoensis* var. *roemeri* Pavlick (Pavlick 1983) and later treated as a species (Alexeev 1985). Populations from inland areas of the Klamath region differ from both northern and coastal populations in details of leaf anatomy and isozymes (Wilson 1999). The Klamath region populations have been recognized as a separate subtaxon, *F. roemeri* var. *klamathensis* B. L. Wilson (Wilson 2007).

The species now has 3 centers of distribution. *Festuca roemeri* var. *roemeri* grows in relatively extensive grasslands in the Puget Trough of western Washington. Most *F. roemeri* populations in the Willamette Valley and Douglas County are small and isolated (Wilson 1999). The *F. roemeri* var. *klamathensis* populations in northwest California and southwest Oregon vary in size but are often large and interconnected.