

Plant Propagation Protocol for *Erigeron decumbens*

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/ERDE3.pdf>



North America distribution of *Erigeron decumbens* Nuttall



Distribution of *E. decumbens* Nutt. var. *decumbens*



Distribution of *E. decumbens* Nutt. var. *robustior* Cronquist

Source: USDA PLANTS Database (1)

TAXONOMY	
Plant Family	
Scientific Name	Asteraceae
Common Name	Aster
Species Scientific Name	
Scientific Name	<i>Erigeron decumbens</i> Nuttall
Varieties	<i>Erigeron decumbens</i> Nutt. var. <i>decumbens</i> <i>Erigeron decumbens</i> Nutt. var. <i>robustior</i> Cronquist
Sub-species	See common synonyms.
Cultivar	
Common Synonym(s)	<i>Erigeron decumbens</i> Nutt. var. <i>robustior</i> Cronquist is sometimes referred to as its own species, <i>Erigeron robustior</i> Cronquist (4). It is also referred to as <i>Erigeron decumbens</i> Nutt. ssp. <i>robustior</i> Cronquist (2).
Common Name(s)	Willamette fleabane, Willamette daisy, Willamette Valley daisy (1), White cushion fleabane (2)
Species Code (as per USDA Plants database)	<i>Erigeron decumbens</i> Nuttall is listed as ERDE3. <i>Erigeron decumbens</i> Nutt. var. <i>decumbens</i> is listed as ERDED. <i>Erigeron decumbens</i> Nutt. var. <i>robustior</i> Cronquist is listed as ERDER2 (1).
GENERAL INFORMATION	
Geographical range	See maps above for distribution in North America. <i>Erigeron decumbens</i> Nutt. var. <i>decumbens</i> is endemic to the Willamette Valley grasslands (1). <i>Erigeron decumbens</i> Nutt. var. <i>robustior</i> Cronquist is endemic to northern California grasslands and montaine coniferous forests (2). No specimens have been reported in Washington state.
Ecological distribution	<i>Erigeron decumbens</i> . var. <i>decumbens</i> is found in native

	grasslands in the Willamette Valley, preferring bottomland and lower slope prairies (3). <i>Erigeron decumbens</i> var. <i>robustior</i> grows in prairies, rocky slopes, sagebrush-scrub ecosystems, or proximal montaine coniferous forest in northern California (2, 5).
Climate and elevation range	<i>Erigeron decumbens</i> . var. <i>decumbens</i> inhabits the Willamette Valley prairies at 70 to 290 m elevation (4). <i>Erigeron decumbens</i> . var. <i>robustior</i> is found at elevation 200 meters in Humboldt county prairies, and at 700-1500 meters in montaine coniferous forests (2, 8). Both varieties grow in climate zones 8a and 8b, with an average annual extreme minimum temperature of -9.4 to -6.7 deg C according to the USDA Plant Hardiness Zone Map (7).
Local habitat and abundance	<i>Erigeron decumbens</i> var. <i>decumbens</i> grows alongside <i>Aster hallii</i> , <i>Festuca rubra</i> , <i>Danthonia californica</i> , <i>Deschampsia cespitosa</i> , and <i>Fragaria virginiana</i> . It is endangered, with only 32 occurrences and 5000 plants reported. It occurs only in the southern end of the Willamette Valley, but historically, its range extended north to Portland, Oregon. Its optimal habitat is well drained, deep soiled red fescue prairies, often dominated by <i>Deschampsia caespitosa</i> (tufted hairgrass) (3, 6). <i>Erigeron decumbens</i> . var. <i>robustior</i> is found primarily in Humboldt and western Trinity Counties, California (8), and has a wider range of habitats than the endangered <i>Erigeron decumbens</i> var. <i>decumbens</i> . It has been found growing on rocky slopes, prairies, sagebrush-scrub, seeps, yellow pine forests and Douglas-fir forests, and is not considered endangered, unlike <i>Erigeron decumbens</i> var. <i>decumbens</i> (2).
Plant strategy type / successional stage	<i>Erigeron decumbens</i> . var. <i>robustior</i> has a much broader range of soil types and ecosystems it can grow in, ranging from rocky slopes to seeps, and has an affinity for serpentine soils (5). Both varieties are not stress-tolerant, and are seral (4, 9). Fire tolerance data is inconclusive, and <i>Erigeron decumbens</i> var. <i>decumbens</i> is flood tolerant (4).
Plant characteristics	<i>Erigeron decumbens</i> is a tap-rooted perennial forb that is decumbent in form and moderately strigose, with green stems reaching 15-70 cm tall, forming a crown or branched caudex. It has a purplish base and numerous basal leaves up to 25 cm long and 1 cm wide, including

	<p>a long petiole, as well as gradually reduced cauline leaves. It has numerous flowering heads (1 to 20 per plant) with 20 to 50 purple-blue to pink ray flowers that are usually 1 cm long and 2 mm wide. It flowers from June through early July. <i>Erigeron decumbens</i> var. <i>decumbens</i> is colonial but <i>Erigeron decumbens</i> var. <i>robustior</i> is not. <i>Erigeron decumbens</i> var. <i>robustior</i> has a caudex that branches little if at all, and its inflorescence contains 3 or fewer heads with pale pink florets. Plants can spread vegetatively over distances less than 10 cm, but primarily reproduce by seed. They are primarily pollinated by halictine bees, <i>Toxomerus occidentalis</i> (syrphid fly), and <i>Phycoides campestris</i> (field crescent butterfly) and average seed dispersal is approximately 94 cm (10).</p>
<p>PROPAGATION DETAILS</p>	
<p>Clark et. al. germination tests on untreated and treated <i>E. decumbens</i> seeds (9, 11, 12)</p>	
Ecotype	Seeds were collected in 1993 and 1994 from <i>Erigeron decumbens</i> var. <i>decumbens</i> plants outside Eugene, Oregon.
Propagation Goal	Germinants
Propagation Method	Seed
Product Type	Container
Stock Type	
Time to Grow	Weeks for germinants in germination chamber, 6 months for germinants in simulated field conditions (9)
Target Specifications	Germinants
Propagule Collection Instructions	Seeds were collected in June and July 1993 and 1994 from a Willamette Valley prairie outside Eugene, Oregon, by removing seeds from seed head. Seeds from 1993 were cleaned and stored in unspecified conditions for one year (9, 11).
Propagule Processing/Propagule Characteristics	Seed production of <i>Erigeron decumbens</i> var. <i>decumbens</i> is high, producing 160 to 220 seeds per head, yet only 3 to 29 of these seeds per head appeared robust and viable. Seed density per pound not reported. Viability and germination of seeds collected in 1993 and 1994 were similar, suggesting that seed storage for a year does not affect seed longevity or viability over short time periods (11).
Pre-Planting Propagule Treatments	Seeds collected in 1993 were stored until use in 1994 but cleaning protocol was unspecified. Group 1 seeds from both 1993 and 1994 were scarified by removal of pericarp and seed coat on the cotyledon end of the seed, and treated with gibberellic acid. Group 2 seeds from both 1993 and 1994 were not

	<p>scarified, were subject to gibberellic acid treatment, and the seeds were also subject to cold stratification at 4 degrees Celsius for two days.</p> <p>Group 3 seeds from both 1993 and 1994 were not scarified and were subject only to gibberellic acid. A control group had no scarification, stratification, or any dormancy treatments.</p> <p>The number of seeds tested in each scarification or stratification method is unreported (9, 11).</p>
Growing Area Preparation / Annual Practices for Perennial Crops	Seeds were sown into pots of an unspecified size, filled with soil from a natural population (12).
Establishment Phase Details	<p>Seeds from each group were subsequently placed in a germination chamber (15°C dark/30°C light) for two weeks with a 16 hour photoperiod. Addition of gibberellic acid promoted germination, but only for scarified seeds without cold stratification collected in 1993. Group 2 seeds that were cold stratified at 4 degrees Celsius had 0% germination. The two day cold stratification for group 2 seems to inhibit the effect of gibberellic acid. Maximum seed germination (83.3%) occurred by 1993 seeds that were scarified and treated with gibberellic acid (group 1). Addition of gibberellic acid to uncut seeds (group 3) had little effect on germination percentages and germination rates of less than 5% (9, 11).</p> <p>Some seeds from each group were placed in simulated field conditions instead of a germination chamber. Seeds from each group were selected and sown in two trials, once in early winter and again in late winter, into pots filled with native soil and buried outdoors. A follow-up report in 1997 for the same study showed no germination from the early winter pots, regardless of seed scarification. However, the pots buried in late winter had seeds that germinated the following spring from April through May, with a 33.5% seedling establishment by June, for the scarified seeds (9, 12).</p> <p>These tests show that pre-treatment seed coat scarification is essential for germination of <i>Erigeron decumbens</i> seeds (11).</p>
Length of Establishment Phase	Most germination occurred within one week of seed placement in germination chambers. Seeds planted in simulated field conditions germinated in 6 months (11, 12).
Active Growth Phase	This phase is beyond the scope of the experiment.

Length of Active Growth Phase	Not Applicable
Hardening Phase	This phase is beyond the scope of the experiment.
Length of Hardening Phase	Not Applicable
Harvesting, Storage and Shipping	This phase is beyond the scope of the experiment.
Length of Storage	Not Applicable
Guidelines for Outplanting / Performance on Typical Sites	Not Applicable
Other Comments	
INFORMATION SOURCES	
References	See list below.
Other Sources Consulted	Thorpe, A. S., and T. N. Kaye. "Conservation and Reintroduction of the Endangered Willamette Daisy: Effects of Population Size on Seed Viability and the Influence of Local Adaptation." <i>Native Plants Journal</i> 12.3 (2011): 289-98. <i>Native Plants Journal</i> . Web. 24 May 2016. < http://npj.uwpress.org/content/12/3/289.short >.
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References:

"Calflora: Erigeron Robustior." *Calflora: Erigeron Robustior*. Calflora.org. Web. 24 May 2016.
<http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=10739>. (5)

Clark, Deborah L. *DEMOGRAPHIC ANALYSIS OF ERIGERON DECUMBENS VAR. DECUMBENS, AN ENDANGERED PLANT SPECIES OF THE WILLAMETTE VALLEY, OREGON 1999 Field Studies*. Oregon State University. U.S. Fish and Wildlife Service Western Oregon NWR Refuge Complex, Feb. 2000. Web. 24 May 2016.
<http://people.oregonstate.edu/~wilsomar/PDF/C_FWS_00.pdf>. (6)

Clark, D.L., K.K. Finley, and C.A. Ingersoll. 1995a. Regeneration biology of *Erigeron decumbens* var. *decumbens*, an endangered plant of the Willamette Valley. Unpublished report on file at Oregon Department of Agriculture. Summary available at
<http://people.oregonstate.edu/~wilsomar/PDF/CFI_Erde_95.pdf>. (11)

Clark, D.L., C.A. Ingersoll, and K.K. Finley. 1997. Regeneration of *Erigeron decumbens* var. *decumbens* (Asteraceae), the Willamette daisy. In, Kaye, T.N., A. Liston, R.M. Love, D. Luoma, R.J. Meinke, and M.V. Wilson [editors]. *Conservation and management of native plants and fungi*. Pp. 41-47. Native Plant Society of Oregon, Corvallis, Oregon. Abstract available at <http://people.oregonstate.edu/~wilsomar/PDF/CIK_NPSO_97.pdf>. (12)

Endangered and Threatened Wildlife and Plants; Endangered Status for "Erigeron Decumbens" Var. "decumbens" (Willamette Daisy) and Fender's Blue Butterfly ("Icaricia Icaroides Fenderi") and Threatened Status for "Lupinus Sulphureus" Ssp. "kincaidii" (Kincaid's Lupine), 3875 -3890 h-7 § 65 FR 3875 (2000). Web.

<<https://www.federalregister.gov/articles/2000/01/25/00-1561/endangered-and-threatened-wildlife-and-plants-endangered-status-for-erigeron-decumbens-var-decumbens>>. (8)

"Erigeron Decumbens var. Decumbens." *Oregon Threatened or Endangered Plant Field Guide*. Oregon State University. Web. 24 May 2016.
<http://orbic.pdx.edu/plants/view_plants2.php>. (3)

Gisler, S.D. 2004. Developing biogeographically based population introduction protocols for at-risk Willamette Valley plant species. Report to US Fish and Wildlife Service, Portland, Oregon. Native Plant Conservation Program, Oregon Department of Agriculture, Salem, Oregon.
<<https://www.fws.gov/oregonfwo/species/Data/WillametteDaisy/Documents/ODA2004ReportErigeronDecumbens.pdf>>. (9)

Nesom, G. L. "Erigeron Robustior (Cronquist)." *Flora of North America*. Flora of North America, 2004. Web. 24 May 2016.
<http://www.efloras.org/florataxon.aspx?flora_id=1>. (2)

"Plant Hardiness Zone Map." *USDA Plant Hardiness Zone Map*. USDA. Web. 24 May 2016.
<<http://planthardiness.ars.usda.gov/PHZMWeb/#>>. (7)

"Plants Profile for Erigeron Decumbens (Willamette Fleabane)." *Plants Database*. USDA. Web. 24 May 2016. <<http://plants.usda.gov/core/profile?symbol=ERDE3>>. (1)

Thorpe, A.S., and T.N. Kaye. 2006. Erigeron decumbens ssp. decumbens (Willamette daisy): Population monitoring and evaluation of mowing and burning at Oxbow West, West Eugene Wetlands. 2006 Progress Report. Institute for Applied Ecology and Bureau of Land Management, Eugene District, Eugene, Oregon. Print. (10)

"Willamette Daisy (Erigeron Decumbens)." *Oregon Department of Agriculture*. Oregon Department of Agriculture. Web. 24 May 2016.
<<https://www.oregon.gov/ODA/shared/Documents/Publications/PlantConservation/ErigeronDecumbensProfile.pdf>>. (4)