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13. © Effect of habitat and plant position relative to the soil surface on survival of basin wildrye seedlings (*Leymus cinereus*). Link, S. O. and Bradney, D. J. M. Native Plants Journal 10(1):69-73. 2009.

Basin Wildrye Seedlings

(*Leymus cinereus*)

| Steven O Link and David JM Bradney

ABSTRACT

The initial survival of basin wildrye (*Leymus cinereus* (Scribn. & Merr.) A. Löve [Poaceae]) plugs used in restoration of riparian habitats in the Crooked River National Grassland in northeastern Oregon was strongly associated with habitat type and planting depth. Five plots in each of 4 study areas were assessed. Survival was strongly dependent on habitat, ranging from 18.8% at the lowest elevation to 70.5% at the highest elevation. Northern pocket gophers (*Thomomys talpoides* (Richardson) [Geomyidae]) were considered a major cause of mortality, while mortality by cattle (*Bos taurus* Bojanus [Bovidae]) grazing was significant at only one habitat. The lowest elevation habitat had a sandy loam soil with few rocks and strong evidence of gopher activity, whereas the highest elevation habitat had a rocky sandy loam soil with weak evidence of gophers. The highest elevation habitat had burned, which likely reduced competition. Survival of plants that were buried (69%) or with the top of the plug surface flush with the soil surface (53%) was significantly greater than for plants with some of the plug root mass above the soil surface (about 14%). Improved survival of *L. cinereus* plugs will likely be realized with control of gophers and cattle; additionally survival can be improved by ensuring plug surfaces are flush with the soil surface or buried by a few centimeters of soil.

Link SO, Bradney DJM. 2009. Effect of habitat and plant position relative to the soil surface on survival of basin wildrye (*Leymus cinereus*) seedlings. *Native Plants Journal* 10(1):69–73.

KEY WORDS

Planting depth, bunchgrass, gophers, restoration

NOMENCLATURE

USDA NRCS (2006)

Animals: ITIS (2008)

Restoring large bunchgrasses can improve the quality of wildlife habitat in the western US. Many herbivores use basin wildrye (*Leymus cinereus* (Scribn. & Merr.) A. Löve [Poaceae]) for forage (Anderson 2002). Jackrabbits (*Lepus californicus* Gray [Leporidae]) use *L. cinereus* for summer forage (Fagerstone and others 1980), and elk (*Cervus elaphus* Linnaeus [Cervidae]) and mule deer (*Odocoileus hemionus* (Rafinesque) [Cervidae]) use it for winter forage (Majerus 1992; Austin and others 1994). The Crooked River National Grassland in northeastern Oregon has been working to improve wildlife habitat by planting *L. cinereus* plugs in riparian and riparian buffer zones. The success of habitat improvement depends on survival of installed bunchgrass plugs.

Plugs were chosen because seeded plants develop slowly (Frischknecht and Plummer 1955), and germination and viability of native stands can be low (Evans and Young 1983; Anderson 2002). In contrast, bunchgrass plugs have demonstrated more than 98% survival 7 mo after planting in Oregon (Huddleston and Young 2004). In Idaho, Shumar and Anderson (1987) noted that while small wild *L. cinereus* plants salvaged and transplanted in the field can have survival up to 90%, they experience transplant shock and do not experience vigorous growth until the second growing season. Survival of *L. cinereus* nursery-grown plugs outplanted in the field has not been investigated (Anderson 2002).

Hence, one of our purposes was to test the effect of habitat on survival of *L. cinereus* plugs. The effect of habitat on monocot plug (Sheridan and others 1998) survival has been reported as significant, as it is for shoalweed (*Halodule wrightii* Asch. [Cymodoceaceae]) in Chesapeake Bay as well, with the suggestion that bioturbation was a potential cause of mortality (Sheridan and others 1998). Therefore, we installed *L. cinereus*