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32. © Preliminary observations of using smoke-water to increase low-elevation beargrass (*Xerophyllum tenax*) germination. Shebitz, D. J., Ewing, K., and Gutierrez, J. Native Plants Journal 10(1):13-20. 2009.



Preliminary observations
of using smoke-water
to increase low-elevation

Beargrass

Xerophyllum tenax
germination

| Daniela J Shebitz, Kern Ewing,
and Jorge Gutierrez

ABSTRACT

Through a greenhouse experiment, we found that smoke-water can be an effective restoration tool in germinating beargrass (*Xerophyllum tenax* (Pursh) Nutt. [Liliaceae]) seeds. We studied the effects of smoke-water on germination rates of beargrass seeds collected from low-elevation dry forests of the southeastern Olympic Peninsula of Washington State and from a wetland of the western Peninsula. Seeds received a treatment of either smoke-water or tap water (the control), which was followed by a cold stratification treatment for 0, 8, 10, 12, 14, or 16 wk. The highest success of beargrass seed germination resulted from seeds collected from the wetland habitat being exposed to smoke-water prior to undergoing 14 wk of cold stratification. This study supports the use of smoke technology in restoration when the reintroduction of burning is not feasible.

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KEY WORDS

fire, seeds, Olympic Peninsula, restoration, Liliaceae

NOMENCLATURE

USDA NRCS (2008)

Beargrass (*Xerophyllum tenax* (Pursh) Nutt. [Liliaceae]) is an herbaceous perennial that grows 1 to 2 m (3.3 to 6.6 ft) in height (Maule 1959; Rose and others 1998). It ranges across 914 m (3000 ft) of elevation from near sea level on the Olympic Peninsula of Washington State to subalpine forests in the Cascades, Olympics, Sierras, and Rocky Mountains (Hitchcock and Cronquist 1973; Stewart 1994; Cooke 1997; Blatner and others 2004). From May to late summer, beargrass flower stalks grow to 150 cm (60 in) tall and are topped with a club- or cone-shaped inflorescence of white flowers, each approximately 1.3 cm (0.5 in) across (Figure 1) (Cooke 1997; Munger 2003). Flowering occurs in 5- to 7-y intervals (Stewart 1994; Munger 2003), and studies indicate that increased flowering often occurs following fire (Cooke 1997; Kruckeberg 2003). Beargrass' structural adaptations to fire are exemplified in its apical meristem, leaves (Rentz 2003), and rhizome (Maule 1959), yet the response of its seeds to fire has not yet been investigated.

Past research has shown that it is difficult to germinate beargrass seeds under controlled conditions using hot water, freezing, chlorine bleach, or acid (Smart and Minore 1977; Jelitto and Schacht 1985). The only method that has proved successful for high-elevation beargrass seeds involves long periods (16 wk) of cold stratification (Smart and Minore 1977).

Figure 1. Beargrass in bloom at the Quinault site. Photo by Daniela J Shebitz