



**RegenPGC Graduate
Education Community**

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Unlocking Sexual Reproduction in *Poa Bulbosa*

Abstract Agricultural intensification has led to both environmental and economic degradation through the loss of topsoil and nitrate leaching into waterways. Interplanting cool season grasses as perennial groundcover (PGC) with maize can restore many of the lost ecosystem services due to agricultural intensification.

Poa bulbosa, with its summer dormancy trait, could be an ideal PGC that can eliminate competition with cash crops. Summer dormancy in *P. bulbosa* is mostly regulated by internal biochemical signals and is genetically controlled. It reproduces vegetatively as bulbils in the seed head and bulbs at the base of the plant, and sexually through seed. This species is native to Eurasia and when introduced to this country, the reproductive pathway is altered, and it mostly reproduces vegetatively. Understanding the environmental cues for true flower and seed formation is crucial for controlled hybridization in breeding *P. bulbosa*.

This study explores the impact of photothermal conditions on inflorescence development across six unimproved USDA *P. bulbosa* accessions. Six-week vernalization treatment and 24°C/16h flower initiation treatment is ideal for inflorescence development, true sexual flower and true seed formation. This study also aims to investigate the pollination behavior of *Poa bulbosa*, and its impact on seed production. We hypothesize that cross-pollination is likely to yield a higher seed count than self-pollination. Our methodology involves a series of steps, starting from bulbil germination, vernalization, and flower induction, to seed formation. We employ a unique approach of bagging inflorescences to monitor self-pollination and compare it with unbagged, cross-pollinated panicles. Our research also delves into the dormancy behavior of *Poa bulbosa* seeds and bulbils, hypothesizing a dormancy period of approximately three months post-maturity.

We conducted a systematic examination of seeds, bulbils and bulbils for their dormancy behavior, using two treatments – AOSA and 18degree/8hr. to assess the potential enhancement of germination and dormancy breakage.

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