Scientific Name: *Calamagrostis canadensis (Michx.) Beauv* **Common Names:** Bluejoint Reedgrass, Macoun's Reedgrass

Above: *Calamagrostis canadensis*, Rob Routledge, Sault College, Buggwood.org, some rights reserved CC BY

Life Form: Graminoid

Site Preferences: Moist to wet bogs, meadows, prairies, open forests. Low to high elevations, wet permafrost sites, performs best on deep wet soils with high organic content (Burton & Burton, 2003; Matheus & Omtzigt, 2013; Wynia, 2002)

Tolerances: High flood tolerance, can be drought tolerant once established, very winter hardy, can be shade tolerant, tolerant to nutrient-poor soils, permafrost, slightly acidic soils, slightly saline soils (Banerjee, Creasey, & Gertzen, 2001; Matheus & Omtzigt, 2013)

Distribution: Across Canada (Wynia, 2002)

Plant Identification:

This plant is a tall grass with erect, slender stems which are generally between 2 and 4 feet tall (Burton & Burton, 2003), but has been reported to grow up to 6 feet in Alaska (Banerjee et al., 2001). Stands of this species often appear hummocky due to creeping rhizomes and root stocks. Long narrow leaves are tinted blue and rough to the touch. The flowering head is open with a main axis and several branches that are further branched. Each branch ends in a flower which turns into a single seed. The flowering head often turns purplish in color (Wynia, 2002). Seeds are approximately 3 mm in length with callus hairs at the base (Banerjee et al., 2001).

Harvesting Considerations:

In Bulkley Valley, northwestern British Columbia, *C. canadensis* is ready for harvest between September 10th and October 17th (Burton & Burton, 2003). This may vary in the Yukon and should be determined by forecasting earlier in the season (Banerjee et al., 2001). This grass has very light seeds which spread through wind dispersal. Seeds produced are primarily the result of cross pollination, and populations tend to have considerable genetic variability (Macdonald & Lieffers, 1991). Collect as many individuals as possible (between 50 and 200) to capture as much of this genetic diversity as possible. This species can also reproduce through rhizomes, so there is potential that what appear to be individuals are actually clones. To reduce chances of collecting from an individual resulting from the spread of rhizomes, inspect population and set a minimum collection distance between plants. Determine sampling strategy based on size

Above: *Calamagrostis canadensis* leaf and stalk Rob Routledge, Sault College, Buggwood.org, some rights reserved CC BY

and makeup of population. This grass often grows in large, monospecific stands (Burton & Burton, 2003), so using a grid or transect to sample individuals will likely be successful. If there is variation in environmental features within the population, break the population into groups based on this and sample individuals randomly within each group, choosing a proportional number of individuals based on its size relative to the entire population (Way, 2003). There is also a potential for seed yields of this species to be quite low (Tesky, 1992).

Above: *Calamagrostis canadensis* seed. Steve Hurst - USDA-NRCS PLANTS Database - Not copyrighted image

Seed Collection:

Assess ripeness of seeds before collection. To harvest, cut stems with sharp clippers or hand sickle (Burton & Burton, 2003). Harvest into heavy-duty paper bags. Cloth bags are not recommended as seeds can catch on cloth (Way & Gold, 2014b). Do not fill bags more than 50% (Banerjee et al., 2001).

Post-Harvest Handling:

Remove large debris from bags. Staple tops of paper bags to prevent seed loss. Ensure seeds do not overheat in direct sunlight or in a parked car. Label all bags inside and out, and inspect collections from different collectors before combining (Way & Gold, 2014a). Seeds should be processed as soon as possible, but can be temporarily stored in a well-ventilated area. When storing temporarily, seeds can be kept in bags or spread on trays to begin drying (Banerjee et al., 2001). Seeds should be sealed in containers overnight to prevent reabsorption of moisture (Way & Gold, 2014a).

Seed Processing:

Spread out to dry in a well ventilated room between 5°C and 20°C with low relative humidity (15 % RH is recommended) (Hay & Probert, 2013). Grass seeds usually dry in anywhere from a few days to two weeks. *C. canadensis* seeds likely have orthodox seed behavior and should be dried down to 15% equilibrium relative humidity (eRH), or 3-7% of their initial fresh weight moisture content before storing. eRH is a measure of the relative humidity of seeds at equilibrium with air in a sealed chamber and can be measured with a hygrometer (Linington & Manger, 2014). Once dry, seed heads can be tapped against the edge of a tub, or placed into a bag and shaken to remove seeds (Smreciu, Gould, & Wood, 2013; Tallgrass Prairie Centre, 2009; Terry & Sutcliffe, 2014). Screen seeds through a 4.9 mm round holed screen and use fingers to rub seeds through and remove callus hairs, then screen through a 1.2 mm screen to remove dirt (Burton & Burton, 2003). Seeds should be placed in labelled, air-tight containers for storage. Ensure containers are clearly labelled.

Seed Storage:

Store seeds in freezer at -18 °C ± 3 °C for long-term storage (FAO, 2014). For active collections being stored for 10 years or less, seeds can be stored between 0°C and 10°C (Rao et al., 2006). However, *C. canadensis* seeds have remained viable for at least 4 years when stored at room temperature (Burton & Burton, 2003; Smreciu et al., 2013).

Germination Pre-treatment:

Pretreatments include 5 days of cold stratification (Baskin & Baskin, 2014), however other resources report that stratification was not beneficial (Burton & Burton, 2003; Wynia, 2002). When attempting to germinate seeds, it is important to note that seeds of the same species can have different germination requirements based on their location of growth. Dormancy can also vary based on storage conditions. For example, drying seeds can induce dormancy in some seeds, while others lose their dormancy during storage (Basey, Fant, & Kramer, 2015; Probert, Manger, & Adams,

2003). If seeds have been dried prior to germination, soaking seeds in a solution of 0.5% sodium hypochlorite (NaOCl) for 10 minutes, then rinsing with water for 1 minute prior to germination will reduce the chance of rehydration damage. If this treatment is not available, suspend dry seeds over water in a sealed container for 24 hours (Davies, Sacco, & Newton, 2015).

Seed Germination:

For germination testing, label germination containers with collection number, species, germination conditions, start date, and number of seeds. Place germination paper into petri dishes. Wet paper just enough so that paper is moist but there is no standing water. Place a representative sample of seeds into Petri dish and space in an even grid. Multiple dishes may be required depending on sample size. Place lids on Petri dishes and place in germination chamber (or area with stable temperature). Place lids on Petri dishes and place in germination chamber (or area with stable temperature) (Davies et al., 2015). Expose to daylight for 8 hours at 25 °C and in darkness for 16 hours at 10°C. Seeds should not be in direct sunlight but exposed to daylight. Monitor seeds daily and record proportion of seeds having germinated. Moisten filter paper as necessary. Seeds should germinate within 34 days (Royal Botanic Gardens Kew, 2014). Continue test until no more seeds germinate or all seeds have germinated. 42 days is the recommended time for germination testing unless slow germination is expected (Davies et al., 2015). Seeds that have not been germinated should be assessed. If seeds look healthy inside, it is possible that gemination conditions or length of germination is not suitable for a portion of the seeds. A tetrazolium test can be used to determine viability of remaining seeds to determine if germination is due to inappropriate conditions or seeds that are unviable (Hay & Probert, 2013). When planting in soil, seed between 0.6 cm and 1.2 cm. Grows best in warm, moist soils in spring.

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