



Seed Collection and Extraction

OF FIREWEED, SHOWY ASTER AND CANADA GOLDENROD



INTRODUCTION

Reclamation of industrial sites in Alberta's forest settings requires the re-establishment of self-sustaining boreal forest ecosystems comprising native forest plant species. Considerable work has been done recently in northern Alberta to develop efficient methods for harvesting and extracting seeds of native species.

This technical note outlines protocols for seed collection and extraction of three circumboreal species:

- **Fireweed** (*Chamerion angustifolium*),
- **Showy aster** (*Aster conspicuus*,
Synonym: *Eurybia conspicua*), and
- **Canada goldenrod** (*Solidago Canadensis*).

These protocols have been developed and tested for efficiency at the Boreal Research Institute (BRI) in Peace River.



SPECIES



Fireweed



Showy aster



Canada goldenrod

SEED COLLECTION

Fireweed flowers from July to September and the seed is typically harvested between mid-August and September when the capsules near the midpoint of the inflorescence are splitting (Schultz et al., 2001; Skinner, 2006).

Goldenrod and showy aster seeds are typically harvested in September and October (Burton and Burton, 2003; Pavek, 2011).

The methodology of seed collection is common to each of the three species and is stated below:

1. Avoid collecting leaves while harvesting seeds as they are very difficult to separate from the seeds. Clip the inflorescence avoiding any leaves. This will keep the seed collection clean.
2. Cut the spike and place it upside down in a large perforated bag such as an onion bag to provide aeration. Spikes from different seedlots should not be mixed. Once full, place the onion bag in a large paper bag. Store collected inflorescence under the shade to avoid seed deterioration from direct sunlight.
3. Dry collected spikes on drying racks to allow for good air flow, or in shallow containers at ambient temperatures for 1-2 weeks. Cover with window screen to prevent contamination from other seedlots.
4. When the pappus has fully fluffed up, the seeds are ready for extraction.

SEED EXTRACTION

Seed extraction is specific to each species as described below.

Fireweed seeds have more pappus, but the pappus separates easily from the seeds using a vacuum. On the other hand, showy aster and goldenrod seeds have a smaller quantity but stickier pappus and require more steps to extract

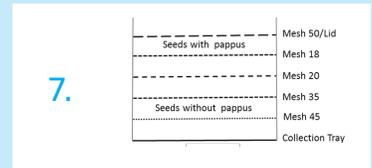
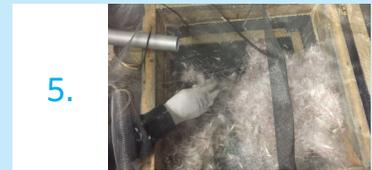
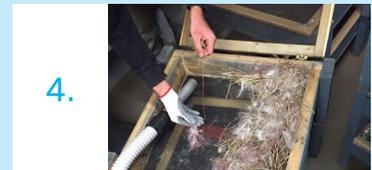
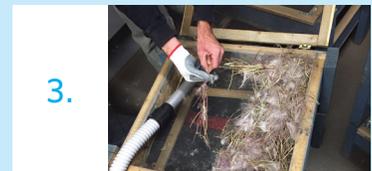
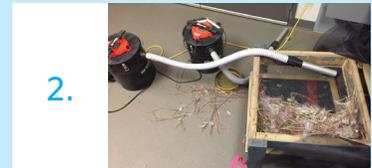
SEED EXTRACTION: FIREWEED

EQUIPMENT

- Clean sealed vacuum (e.g. ash vacuum)
- Clean shop vacuum
- Column-blower (e.g. Agriculex Inc)
- Sieves with mesh sizes 45, 35, 20, 18 and 50
- Collection tray for the bottom of the stack of sieves

INSTRUCTIONS

1. Place the dried inflorescence on the bottom screen of the seed drying rack. Partially cover the drying rack with a window screen while working in order to prevent dispersion of seed fluff and pappus in the air.
2. Push all the inflorescence cuttings to one side of the drying rack. Turn on the sealed vacuum and place the hose in between top and bottom screens to collect loose pappus.
3. Hold each inflorescence at the base and scrub your fingers up the stem, dislodging the seed pods. Discard the stems. Some seed pods will already be open and seeds will fall out of them.
4. Once all the stems are removed, seed pods and seeds with intact pappus will remain. Gently fluff the material with your hands. This will further loosen the seed pappus and help them get sucked into the vacuum.
5. Grab a handful of material in one hand and squeeze it hard enough to crack open the closed seed pods. Avoid crushing every pod into tiny pieces as it will make the fragments harder to remove. Keep the hand closed and use the other hand to pull the pappus with seed out of the fist a little at a time to let it get sucked into the sealed vacuum.
6. As a result of vacuum cleaning, the pappus collects around the air filter of the vacuum cleaner and seeds with the debris fall into the vacuum bin. Turn off the sealed vacuum periodically and suck the pappus off of the air filter using the clean shop vacuum.
7. Stack sieves with mesh sizes 45, 35, 20, 18 and 50 from bottom to top and place a collection tray at the bottom. Take a handful of seeds with chaff and leftover pappus from the vacuum bin and place between screens 50-mesh & 18-mesh and shake. 50-mesh sieve can be replaced by a lid, if available. Most of the seeds will accumulate in sieve with 45-mesh sieve.
8. Column-blow the material at low airflow to remove any debris from the seed.



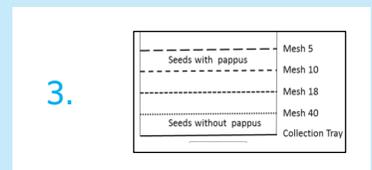
SEED EXTRACTION: SHOWY ASTER

EQUIPMENT

- Clean sealed vacuum (e.g. ash vacuum)
- Column-blower (e.g. Agriculex Inc. column-blower)
- Sieves with mesh sizes 40, 18, 10, and 5
- Collection tray for the bottom of the stack of sieves

INSTRUCTIONS

1. Remove seeds from the flower heads by tapping the plant with the fingers and pulling the seeds out. Alternatively, use a vacuum cleaner at gentle airflow. Collect seeds with intact pappus in a metal bowl.
2. Rub the seeds gently between the fingers to separate the loose pappus from the seed. Remove flower heads, leaves, and other debris manually, as much as possible.
3. Stack sieves with mesh sizes 40, 18, 10 and 5 from bottom to top. Sieve seed and chaff. Most of the seeds will accumulate in sieve with 40-mesh sieve.
4. Column-blow seeds again by slowly increasing the air flow to around 1" - 1 1/5". Light chaff and empty seeds will be removed.



SEED EXTRACTION: CANADA GOLDENROD

EQUIPMENT

- Clean sealed vacuum (e.g. ash vacuum)
- Column-blower (e.g. Agriculex Inc. column-blower)
- Sieves with mesh sizes 5 and 30
- Collection tray for the bottom of the stack of sieves

INSTRUCTIONS

1. Dry the inflorescence on the bottom screen of the seed drying rack and cover the rack with a window screen in order to prevent dispersion of seed fluff and pappus in the air.
2. Gently rub the collected inflorescence between the fingers to remove the seeds. The seeds will have pappus intact at this stage. Alternatively, use a sealed vacuum cleaner at gentle airflow.
3. Sieve the seed through a 5-mesh sieve to remove any large fragments of leaves and to fluff it further.
4. Place the seed into a container and rub between the hands until the seed pappus begins to matt and forms into a loose ball.
5. Winnow the matted seed and fluffed pappus manually through a 30-mesh sieve a handful at a time. This will separate the seed from the pappus.
6. Column-blow the material at low air flow rates to remove the remaining pappus and debris from the seeds.





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