

Can Activated Charcoal and Plating Density Improve Germination Rates of *Geum peckii* (Eastern Mountain Avens)?

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Background

Geum peckii is a perennial herb listed as endangered with native populations only found in Nova Scotia and New Hampshire. The species has become endangered due to its inability to compete for habitat, poor dispersion methods and small population size. Seed bank tests of *G. peckii* have shown germination rates of around 40%. Trials are underway to examine treatments that may improve germination for conservation purposes, including the use of activated charcoal. Another issue of interest is microbial contamination that can occur during germination tests.



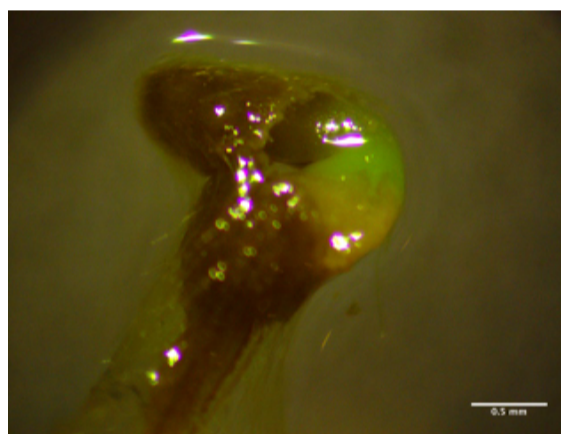
Geum peckii in full bloom

Objectives

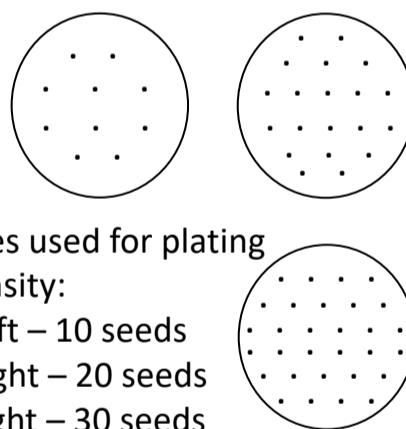
The objectives of this study were to test the effect of activated charcoal and variations in seed density on germination and microbial contamination. This may lead to a more successful method of germination for *G. peckii*, and potentially reduce contamination rates.

Experimental Methods

Plates were filled with one of two types of media; agar (A), or agar with an addition of 250 mg/L of activated charcoal (AC). Plates were then grouped into one of three densities; 10 seeds/plates, 20 seeds/plate or 30 seeds/plate. Prior to plating, the seeds were sterilized and placed on 10 ml/L PPM (Plant Preservative Mixture) plates for 48 hours. The experimental plates were left under timed 8 hour light exposure and were tracked for 28 days.

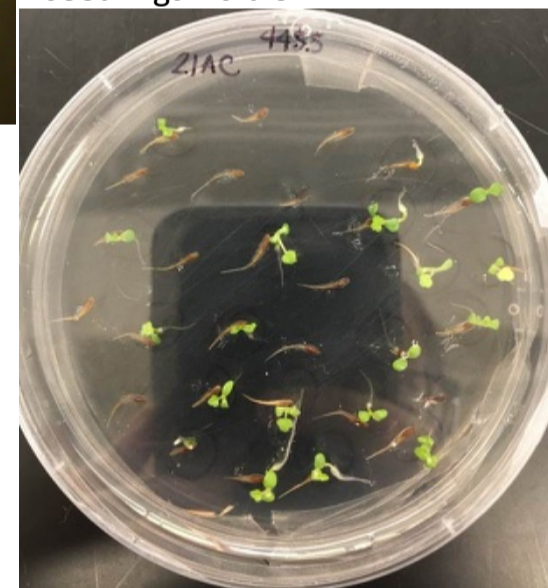


Left: First sign of cotyledon emergence following the initial stages of germination.



Templates used for plating each density:
Upper left – 10 seeds
Upper right – 20 seeds
Lower right – 30 seeds

Below: 30 seed AC plate seen after 28 days with many true seedlings visible.



Results

Out of the 720 seeds plated, 316 germinated (44%). The AC plates had a 10% higher rate of germination and 12% lower secondary contamination than the A plates. Similarly, when combined, low density plates had a secondary contamination rate of only 33%, much lower than the 71% for combined high density plates. The most successful treatment was 10 seed density with AC.

	Germination	Contamination	Secondary Contamination
10A	38%	8%	36%
20A	37%	18%	63%
30A	42%	16%	81%
10AC	52%	7%	31%
20AC	51%	16%	53%
30AC	45%	13%	62%

Special thanks to the K.C. Irving Environmental Science Centre and Acadia University for the use of their facilities, equipment and assistance.



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