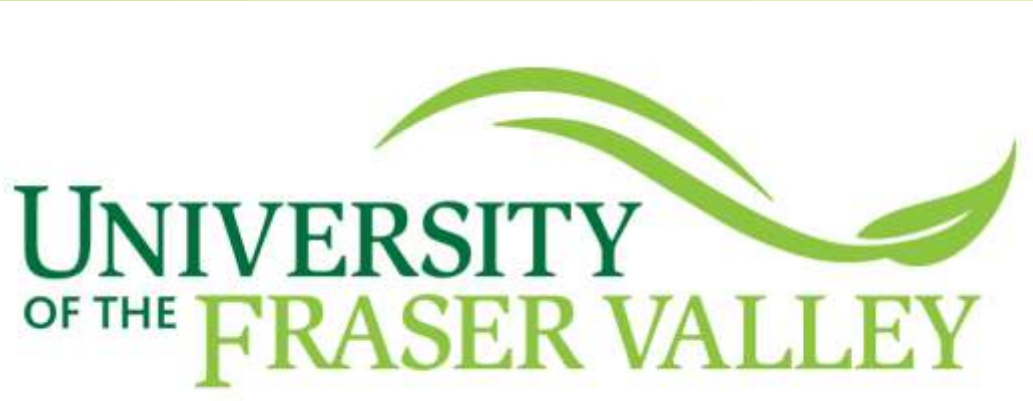


The Effect of Drying and Cutting on Parrot Feather Growth



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Introduction

The species being examined is the *Myriophyllum aquaticum* also known as the parrot feather. The species is a flowering dicot plant. The flower is major impactor of the high reproduction rates of the species. The rate of spread of this species can increase dramatically when disturbed in its optimal conditions. The high ability for the species to spread is an extreme risk factor for water body blockage essential to the city. It was mainly introduced as a horticulture species for homes and spread to many sites. At the moment there is no effective plan for the control of this species. The goal of this project is to determine controlling factors which would decrease the spread of the parrot feather species. This will be done by mimicking the environmental growth setting of the parrot feather in a lab setting.

The removal of this species would allow farmers better irrigation and less blockage in water bodies on city banks. The experiment was done to determine exactly which parts of the species was necessary for its survival, which ones could help in regrowth, and which parts had no effect at all.

Objectives

- Understand growth conditions of parrot feather under various conditions
- Use findings to develop a plan on how to control the parrot feather
- If a dried out parrot feather would regrow if put back into regular conditions
- Which part of the plant is necessary for regrowth
- Which parts of the plant if removed would have a negative or positive effect
- Determine if water supply is necessary for parrot feather survival

Methods

We entered the stream to collect samples. Rakes were used to pull out extremely large specimens, which were then bagged for transportation. Dirt was collected by digging ground near parrot feather location to mimic the environmental growth conditions in the lab setting. Water was also collected through the use of buckets and was transported to lab for plantation. Water was collected from stream and replaced weekly in lab to simulate slow stream flow conditions within the water body. The plants were then trimmed accordingly and planted within pales to ensure growth when used for experiment. This would allow removal of parrot feather which did not survive lab growth setting. The ones which survived were then used to create the experimental samples. Each species was cut accordingly to jar description. The dried species had been previously been planted in pale with water present and then shifted to another pale with no presence of water. These samples were used for the pre-dried jars.



Figure 1. Experimental Jars



Figure 2. Growth Buckets

Site Area

The site where samples were collected was on Tolmie Road between Number 3 and Number 4 road. For exact location the address of the house where parrot feather was largely abundant is 4791 Tolmie Road. Site had various stages of parrot feather growth and easier access water and soil collection setting.



Figure 3. Parrot Feather Growth



Figure 4. Site Extraction

Growth In Water & Soil

Plants of various sizes and parts were planted into jars mimicking environmental conditions. Jars were filled with soil collected from the site and topped with ditch water. Water was changed weekly to represent water flow occurring ditches.

Before and After Length and Mass Growth in Water and Soil Condition Samples	BEFORE		AFTER	
	Mass (grams)	Length (cm)	Mass (grams)	Length (cm)
1 (3 nodes and whole plant)	5.55 grams	45 cm	4.75 grams	45 cm
2 (3 nodes with base root)	1.37 grams	11cm	0.27 grams	11.5 cm
3 (3 nodes)	0.58 grams	5.5 cm	0.49 grams	5.5 cm
4 (Flower)	1.31 grams	11 cm	3.59 grams	12 cm
5 (Middle shoot)	0.97 grams	11 cm	2.59 grams	11 cm
6 (1 node and middle shoot)	0.63 grams	12 cm	1.04 grams	12.5 cm

Growth in length was seen in samples 1, 2, 4, and 6 and no length growth was seen 3 and 5. Mass increase occurred in all.

Growth in Dried Plants

Samples collected from site were planted into buckets containing soil from ditches. No water was added and a 7 day timeline was used to dry out the samples. After a week these samples were then planted into jars containing the soil collected from site, and were topped with ditch water. Which was also changed weekly to mimic slow water flow in ditches. The goal of this procedure was to see if regrowth would occur in the species if a plant had been dried out.

Before and After Length and Mass Growth in Pre-dried samples	BEFORE		AFTER	
	Mass (grams)	Length (cm)	Mass (grams)	Length (cm)
1 (3 nodes and whole plant)	0.20 grams	21 cm	0.30 grams	21 cm
2 (3 nodes with base root)	0.03 grams	10cm	0.27 grams	14 cm
3 (3 nodes)	0.03 grams	10 cm	0.03 grams	10 cm
4 (Flower)	0.17 grams	11 cm	0.59 grams	18 cm
5 (Middle shoot)	0.07 grams	8.5 cm	0.10 grams	8.5 cm
6 (1 node and middle shoot)	0.63 grams	12 cm	0.90 grams	12.5 cm

Samples 2 and 4 experienced large growth in mass and length. The rest remained at constant mass and length

Growth in Dry Soil

The samples collected and grown in lab were planted into jars containing only soil. No water was present so the soil had become dried out. The species planted was previously grown in a bucket mimicking environmental conditions.

Before and After Length and Mass Change in Dry Soil Conditions	BEFORE		AFTER	
	Mass (grams)	Length (cm)	Mass (grams)	Length (cm)
1 (3 nodes and whole plant)	3.55 grams	46 cm	0.85 grams	38 cm
2 (3 nodes with base root)	1.44 grams	13 cm	0.15 grams	11.5 cm
3 (3 nodes)	0.14 grams	5.5 cm	0.11 grams	5.0 cm
4 (Flower)	1.88 grams	13 cm	0.45 grams	10 cm
5 (Middle shoot)	0.91 grams	10 cm	0.17 grams	9 cm
6 (1 node and middle shoot)	0.77 grams	9 cm	0.30 grams	7.5 cm

All samples showed decreases in mass and length. Where Sample 3 had the lowest decrease and sample 1 had largest decrease

Conclusions

Overall it is found that for the parrot feather to continually grow an active water supply is necessary. Without water intake the species decreases largely in both their mass and length of plant. Once dried out the species is only able to grow if the base root is still attached or if the flower portion is present for regrowth. Both are seen to have revived through the large increase of mass. If there is a presence of both soil and water supply that plant shows an expected mass increase in all parts. Meaning if optimal growth conditions are available any part of the plant present can have growth occur. There is a larger mass increase than length due to the intake of water.

Further Investigation

1. Does a longer drying duration result in less regrowth with presence of base root and/or flower?
2. Does a pesticide applied to the dried site stop before reintroduction of water supply decrease rate of regrowth?
3. How much oxygen supply is necessary to keep the species alive?
4. Is the species more susceptible to increase in heat or cold? Which would allow a determination for optimal time for treatment.