Phenophase

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The term phenophase is referring to the observable stage of a plant or animal's life cycle, which usually lasts only a few days to weeks. For a plant, this phenophase starts when the plant starts producing new leaves or flowers (1). Collecting phenological data is very important because it tracks important data on when plants are active and dormant, which aids ecologists in tracking climate change by keeping data on occurrences like first and last frost and first bud. (2) This data then lets biologists know if certain ecological events are early, late, or on time, and in doing so aids in the tracking of climate warming or cooling by proxy of environmental signs. Tracking phenophases also aids in identifying seasonal variations, and helps identify diseases or sicknesses in their area.

Method

Every week, I collected a notepad, a pen, a ruler, and a camera (iphone), and walked to the plants that I had picked to observe. Once I have found the plant described in my observations the previous week, I measure that bud in multiple ways. I see if the axillary bud that I am most concerned about has grown, along with any leaves, needes, or overall maturation of the plant. I measure this data with a ruler and record it into my notepad, where I continue to log these results every week. I repeat this process every week until I have found enough data to make a confident conclusion.

Discussion/Conclusion

Although I originally predicted that the birch would grow the fastest, followed by the ponderosa and the blackberry, I was wrong in parts of my hypothesis. This is evident through the data table (Table 1) and Figures (Figure 4) given. From these we can see that the birch tree grew the most in length, followed by the blackberry bush and then the ponderosa pine. There is a possibility that lack of growth in the pine was caused by limited exposure to sunlight, compared to the other two subjects which had full sun exposure. Overall, part of my hypothesis (the birch having the highest growth rate) was correct. The part of my hypothesis of (the ponderosa outgrowing the blackberry was wrong and my hypothesis was not supported by the data recorded.

For Future Research

Measuring the growth of the plants would be much more useful if we knew the weather and climate that they were growing in, so if in the future I were to undergo a similar study, I would add the recording of daily weather and temperatures in my data sets. This would help myself and any future viewer to be able to put recorded data into better context and retrieve better understanding.

References Cited

1. Descriptive Phenophase Definition, (undated). National Phenology Network. Retrieved 4/21/21. https://usanpn.org/taxonomy/term/16#:~:text=An%20observable%20stage%20or%20phase,a%20few%20days%20or%20weeks.

2. Applications of Phenophases, (March 7, 2019). Botanical Soceity of America. Retrieved 4/22/21. https://bsapubs.onlinelibrary.wiley.com/doi/10.1002/aps3.1224

Hypothesis

I predict that the out of all three plants in this study, the birch will grow the most in length followed by the ponderosa pine and the blackberry bush. This is because in my previous experience this is the order that they commonly bud out and grow.

Table 1: Phenophase Data

Week	Plant	Bud length (cm)	Observations
1	Ponderosa Pine	0.5	first bud, green needles
	Birch	2.5	first bud, sick looking tree
	Blackberry Bush	0	dormant
2	Ponderosa Pine	0.8	green needles, new bud
	Birch	2.7	red bud, sick looking tree
	Blackberry Bush	0	dormant
3	Ponderosa Pine	0.9	growing bud
	Birch	4	growing bud
	Blackberry Bush	1	new bud, leaves starting
4	Ponderosa Pine	1	growing bud, growing needles
	Birch	7	new repo. parts, lots of growth
	Blackberry Bush	2	growing well
5	Ponderosa Pine	1.6	growing bud and needles
	Birch	7	4 cm leaves
	Blackberry Bush	2.5	2 cm leaves
6	Ponderosa Pine	1.8	growing bud
	Birch	6	5.5 cm leaves
	Blackberry Bush	3	2.5 cm leaves
7	Ponderosa Pine	2.5	growing bud
	Birch	9	7 cm leaves
	Blackberry Bush	4	2.5 cm leaves

Table 1: data collected from a period of seven weeks through the growing period, documented in a table to analyze growth.

Fig. 1: Ponderosa Pine

Fig. 2: Birch

Fig. 3: Blackberry

Figures 1-3: pictures of all three subjects of observation on the last week data was collected

Results: Figure 4 shows that the starting lengths of buds started with birch at the highest, then followed by pine and blackberry. All three lines are somewhat steady, with birch ending at the top and blackberry passing up pine at the end of seven weeks.

Figure 4: Phenophase Growth Data

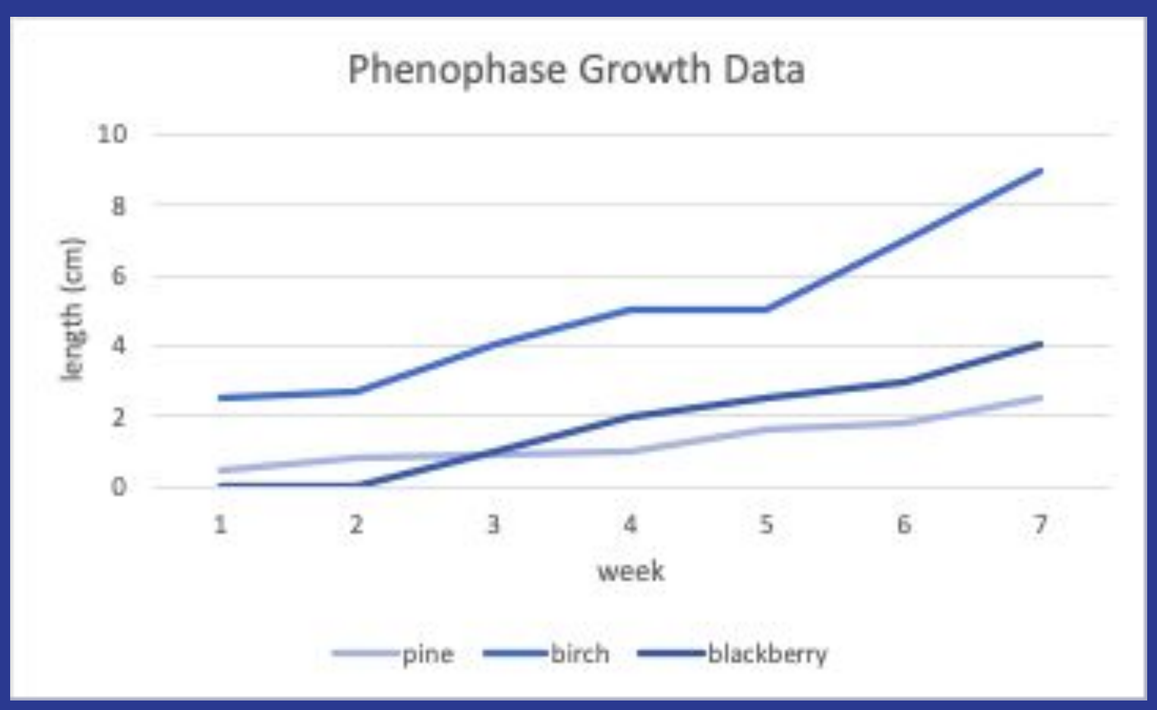

Figure 4: a line graph of the growth of the plants observed with the length in cm compared to the progression of time in weeks.