

Exploring soil composition in vernal pools and its relationship with seed density

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Introduction

Vernal pools are ponds in forested areas that fill with rain water and melted snow in the spring and evaporate by the end of the summer. Vernal pools provide a particular habitat that is crucial to the fauna and flora of the region. The biodiversity represented in healthy vernal pools is disproportionately related to their small size on the landscape. Many vernal pools around the Chicagoland area are deprived of their natural vegetation which provides the foundation of the ecosystem. Vernal pools have been restored, though the process is long and tedious. Researchers are seeking tactics that can make restoration less complicated. Though the lack of research on this natural phenomenon make restoration research a blind effort.



Fig. 1
(Left) Dry vernal pool with no vegetation and a canopy of Buckthorn beyond it. (Right) Healthy, fully restored wet vernal pool.

Methods

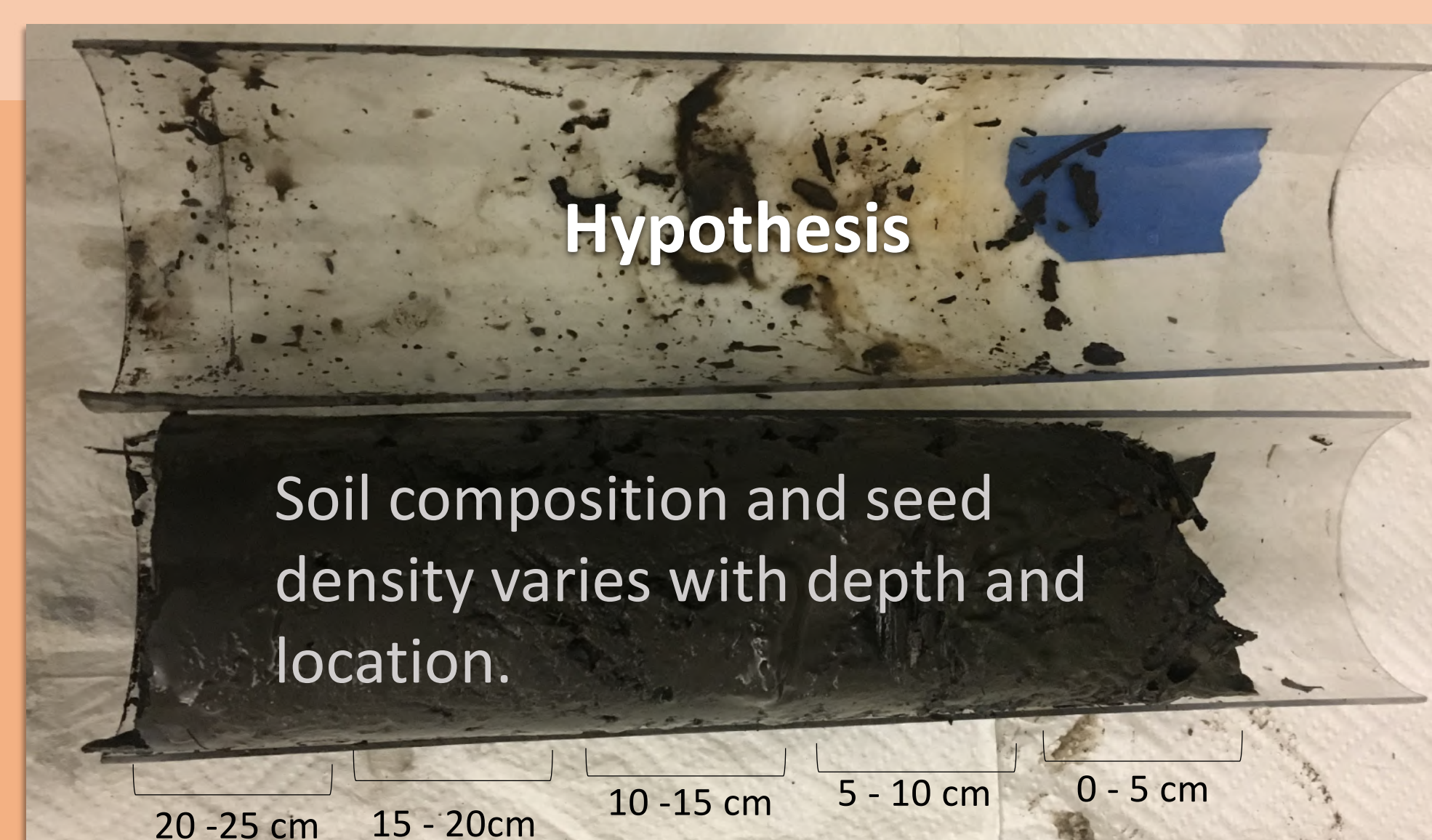
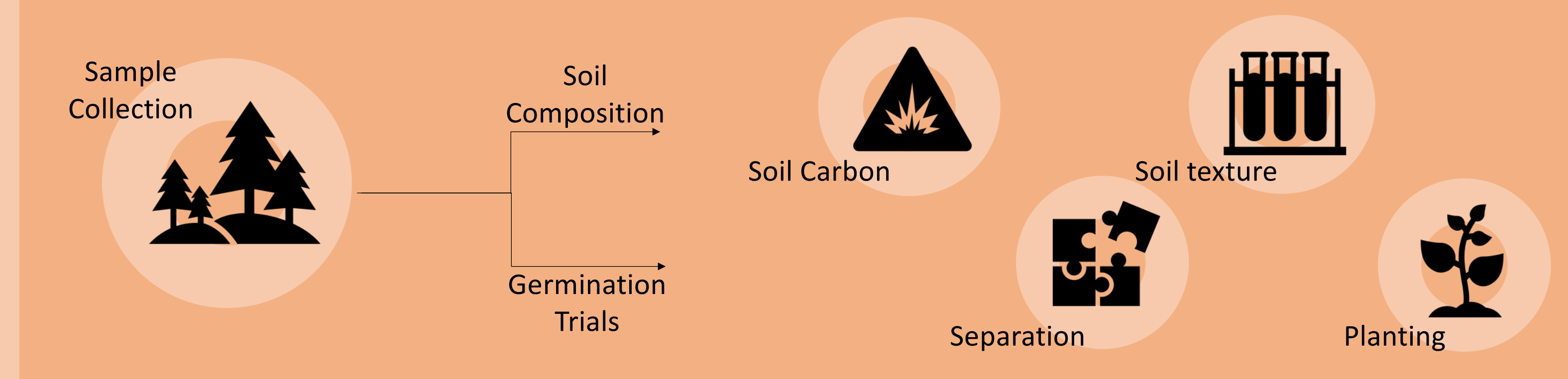


Fig. 2,3
(Left) Example of how samples were chosen. Each pool had four transects with two samples taken along each. (Top) A sample divided into five 5cm parts.



Results

Fig. 4
(Bottom) Percent clay found in depths 5-25cm from inner and outer samples.

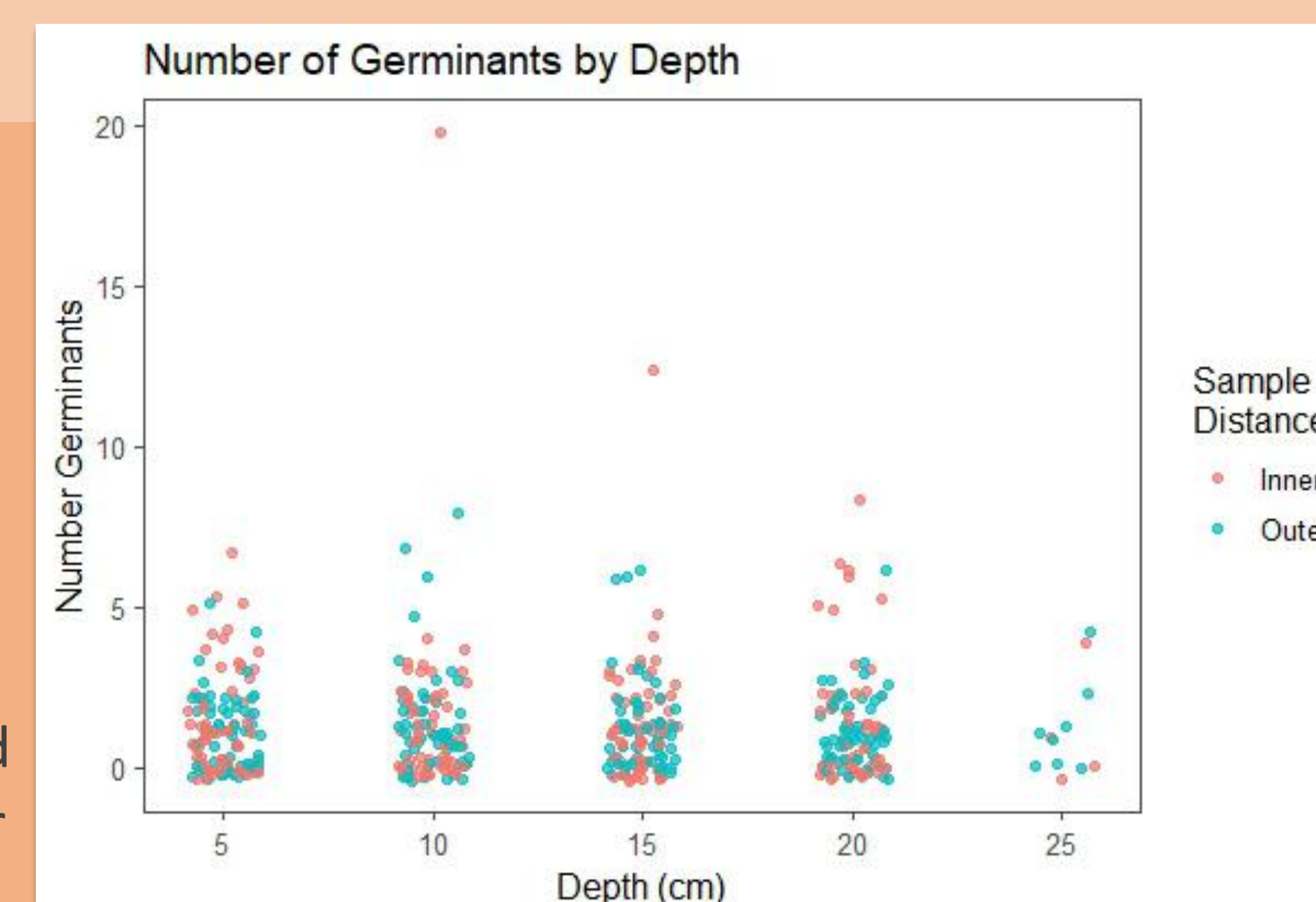
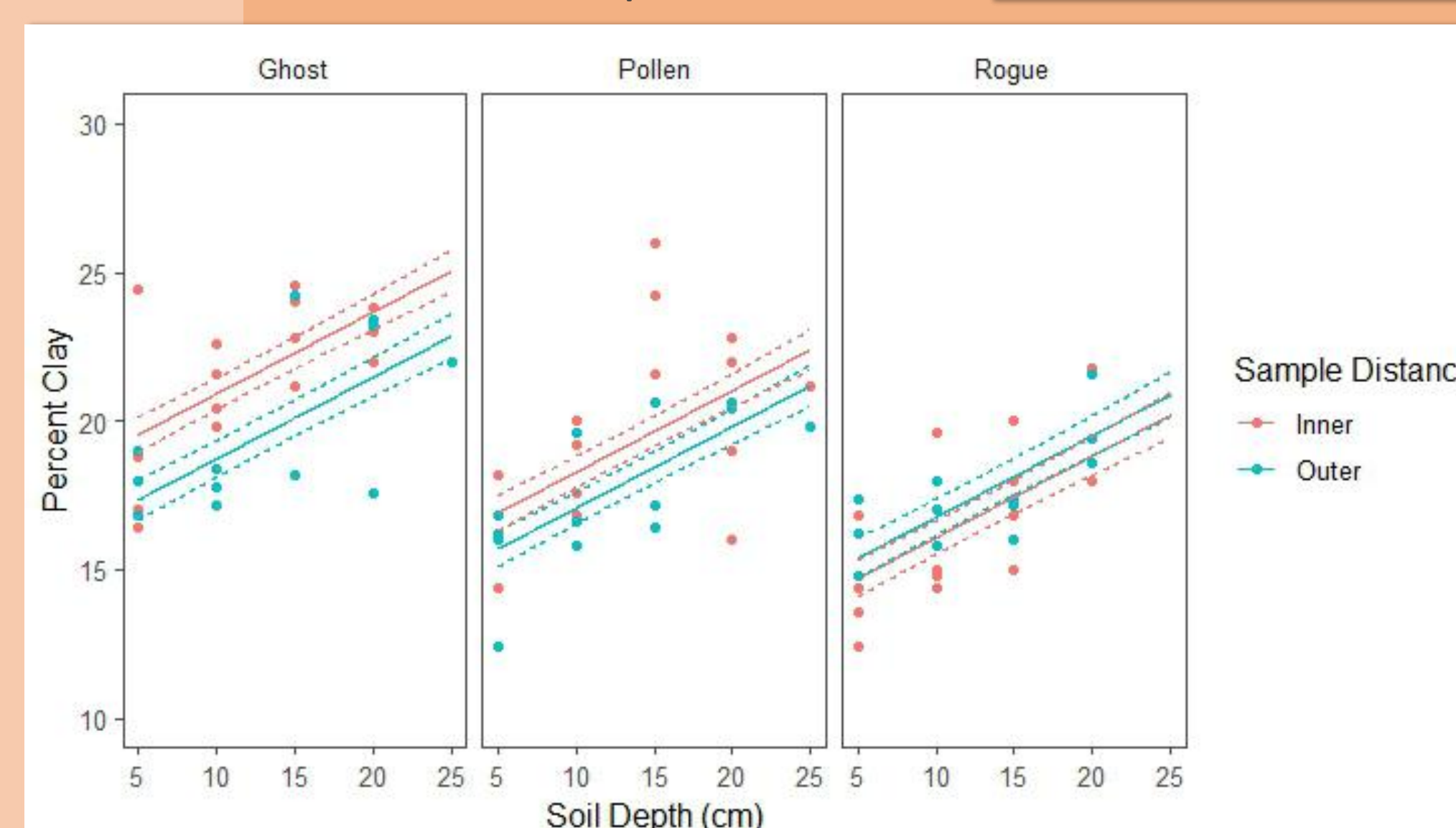


Fig. 5
(Top) Number of germinants based on depth after one month. Inner and outer samples shown.

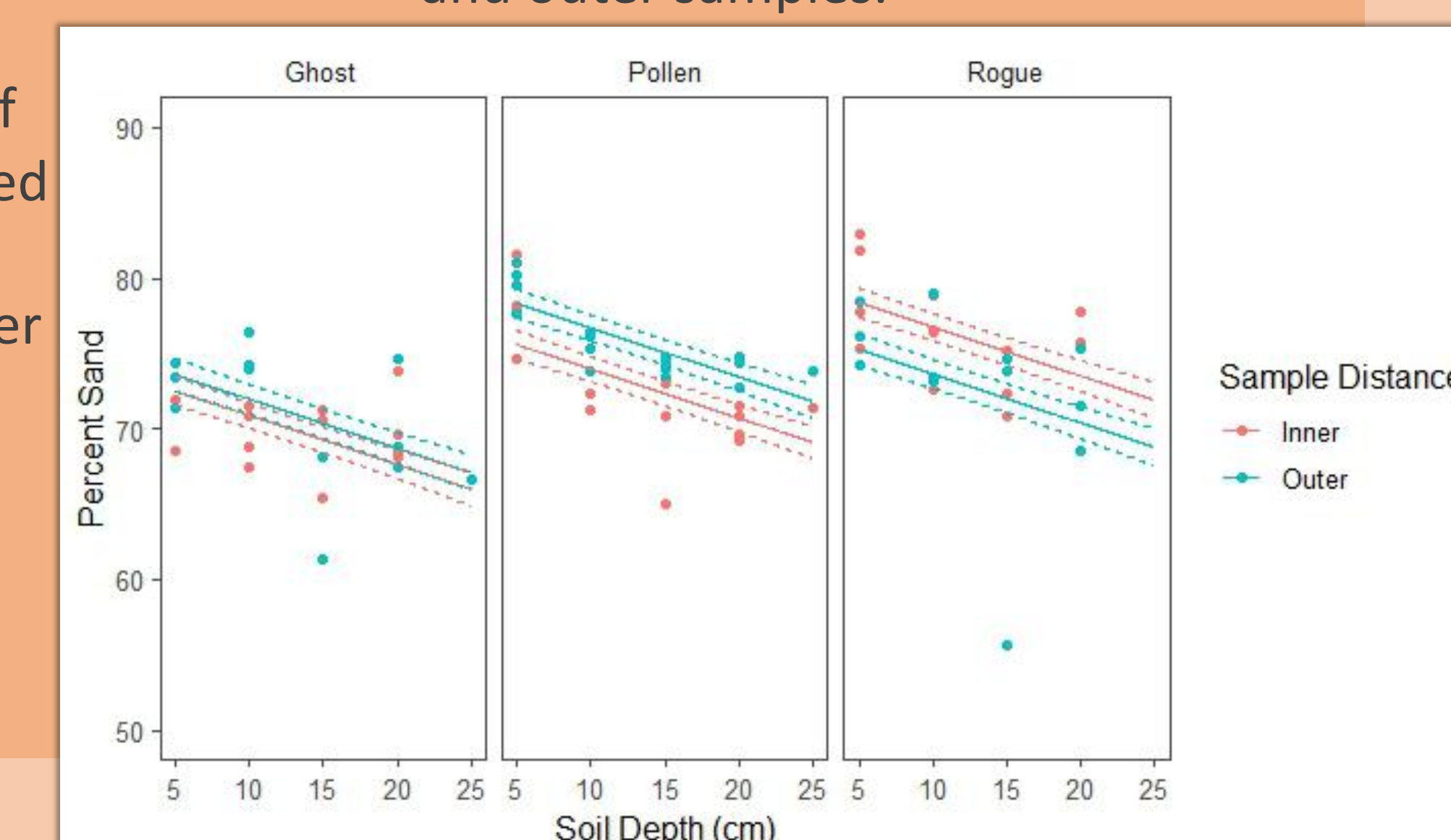


Fig. 6
(Bottom) Percent sand found in depths 5-25cm from inner and outer samples.

Fig. 7
Example of one sample represented in the chart.

Discussion and Conclusion

By evaluating the graphs representing soil texture in the three vernal pools, it is clear that all three ponds share similar results. Within each pond there seems to be a steady decline of sand and similar increase of clay with increasing depth. Most ponds reach 25 percent clay at 25 cm which may suggest that the deeper placement of these small clay particles is crucial to the formation of vernal pools. Because the presence of larger particles (sand) allows water to percolate faster, the small particles (clay) hold the water for the summer. As for the silt percentage and germination trials, both show a constant pattern. Depth nor location seem to dictate these factors, which puts forward the question: what dictates seed density within vernal pools?

It is evident that gaps exist within our knowledge of vernal pools. It is vital to research and try to make sense of what vernal pools have to offer to support restoration efforts and have a guideline of how to do so. Instead of going through the expensive and time consuming process of buying seeds and finding volunteers to disperse them to re-establish native vegetation, we might be able to find ways to utilize the seed banks with rich diversity that exist right below our feet!

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