

ROOT FORAGING: A GENERAL BOTANY PROJECT

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Do roots forage? If so, they will proliferate in pockets of rich soil more than in pockets of poor soil.

This is an interesting hypothesis because it gets students to realize that plants are alive.





We used:

- ❖ Soil sedimentation columns
- ❖ Layers of potting soil vs. perlite
- ❖ Bean seeds

The clear glass allowed us to actually see many of the roots.



One “confounding” factor is that water from the top can wash nutrients down into lower layers. What did we do to avoid this problem?

Another problem in research design:
sequence effect.

Does it matter whether the top layer,
in which the root first grows, is soil vs.
perlite?

❖ We started all seeds in a thin layer of
soil at the top.

❖ We alternated the order of soil vs.
perlite.





One of the response variables that we measured was length of the roots against the glass.



We also carefully removed the soil and perlite, and weighed the roots (fresh weight).



Turns out that beans were not such a good species to use. You can see two reasons in this photo.

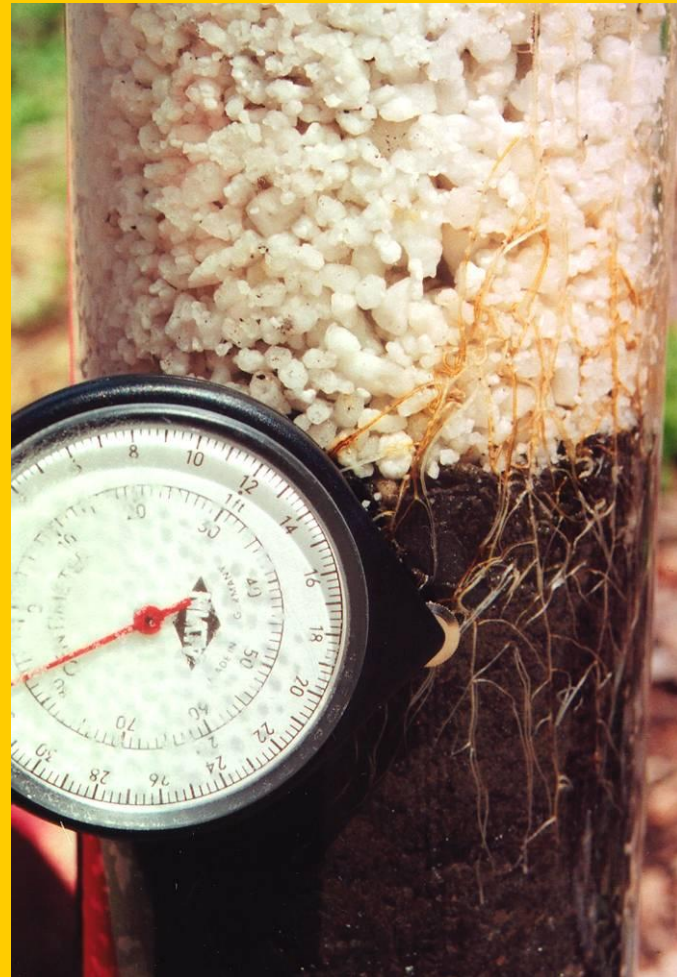
We used separate ANOVAs for root length and root weight, using sequence, and soil vs. perlite, as independent variables. Neither variable was significant.

I wrote out the results for the students, requiring them to interpret what the p value meant.

So I tried it the next year, using sunflowers instead of beans: smaller seeds, and no nodules.

This time the results were significant: roots proliferated more in soil than in perlite.

This time, the students were also asked to compare their results with those of the previous class.



Plants are alive, and see how far down the roots can go even from a plant with a small shoot!

THE END

