

Plant Competition from the Field and Laboratory Perspective

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This series of introductory labs provide our first-year students the opportunity to explore the relative strengths and limitations of field versus laboratory work. Experimental design, hypothesis testing, data collection, and interpretation are emphasized. The first part of this project takes place in the field. Students conduct a survey of trees in nearby woods. Each team of four students identifies and measures all trees (greater than 5 cm in diameter) in a different 400 m² site. Groups from all lab sections pool their results and then plot the average tree diameter versus the number of trees per 400 m².

Students observe that trees in less densely populated study sites tend to be larger than trees in denser study sites. They are asked what they can infer from these data and to consider whether they have proven that competition is occurring among the trees. We also discuss whether other factors might influence how trees respond to crowding.

Based upon their field results, groups of three to four students each design and implement an experiment to examine how plants respond to crowding in laboratory conditions. They also test whether certain factors might influence how plants respond to crowding. Nutrient or water availability, soil pH, and varying temperature, are a few of the parameters students have examined. Each group examines a different factor.

Four to five weeks after planting the seeds, students harvest the plants and weigh them. Students assess how their plants responded to crowding. They evaluate whether the other factor they studied had an effect on the plants response to crowding. They also compare their laboratory results to the field survey and each group presents an oral report of their findings.