

The Effects of Increased CO₂, Soil Acidification, and Drought on Aperture, Density, and Potential Conductance Index of Stomata Demonstrated by Buckwheat Plants (*Fagopyrum esculentum*) and Pea-plants (*Pisum sativum*)

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The preservation of plants deteriorating over climate change is critical for organisms that depend on them for sustenance. Within the plants, the stomata — pores specialized by parenchymatic cells — regulate 95% of gas and water network between the plant and its environment by modifying its size and density. However, the climatic fluctuations are challenging plants with environmental conditions of increased CO₂, drought, and soil acidification. Strikingly, less research on how stomata respond to said environmental factors warrants a study that explores the effect on stomatal density, size, and conductance in buckwheat and pea-plants. The experimental setup includes seven groups per plant: a control, two positive controls with increasing CO₂, and four groups with increased CO₂ combined with soil acidification and drought. It was hypothesized that density, size, and potential conductance would all decrease and that climate change will ultimately lead to a progressive decline in the efficiency of plants to maintain homeostasis. Data was collected for a four-week period and it was revealed that both plants exposed to 700ppm and 950ppm CO₂ levels resulted in a substantial reduction in size and density as well as a patent degradation in plant vigor. A detailed formula was utilized to determine the potential conductance using variables like net assimilation rate. However, our presumption that climate change would lead to a progressive decline in all plants cannot be supported as our research only investigated C3-crop plants, not taking into perspective the other varieties of plants such as C4 and CAM.