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The Golden Ratio In Natural Adaptations: An Exploration Of Phi And Its Role In Natural Adaptations Of Phyllotaxis

This project was designed to determine if pollinators prefer the golden ratio in the plants they pollinate. In addition, I researched other possible explanations of phi's prevalence in the natural world and the properties of phi. Two plants, one containing phi and the other manipulated to exclude it by changing petal, leaf and stem length, and leaf and petal distribution will be placed on soil within a mesh cube. Two pollinators will be released at a time and observed for 30 minutes each. This will be repeated three times per pollinator species. I have also compiled information from scholarly worked concerning phi from a broad range of sources in an attempt to better understand the ratio. I have developed the theory, ways to test it, and established the foundational knowledge necessary for further study. First, phi is a mathematical constant with extraordinarily interesting properties. Secondly, phi is found in architecture, art, and extensively in nature. Organisms adapt naturally towards what has positive aspects for them, therefore, phi being found extensively in nature, phi must have properties that are positive to plants. In order to be "positive" to a plant, it must either directly help the plant reproduce, or help it survive so that it can reproduce. Whether my hypothesis is proven correct or incorrect, it will help create a foundation for further study. Why do the pollinators prefer/not prefer the golden ratio? If they don't have a preference, what is the reason phi is found so often in the natural world? If they do, why would they? All these questions and more are grounds for further study that require the background I have established this year.