Name(s)	Project Number
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Project Title

FIBonacci? Exploring Spiral Geometry within the Natural World

Abstract

Objectives/Goals

The objective of this project was to determine the prevalence of both logarithmic spirals and more specifically Fibonacci spirals within mollusk families. It was concluded that logarithmic spirals occur often in nature and indeed serve as a common growth strategy. However, Fibonacci spirals are not often found within the spirals of mollusk families. The results of this project demonstrate how the prominence of the Fibonacci spiral in shells can be exaggerated and this topic is under-researched. However, logarithmic spirals do appear in mollusk families reflecting an efficient biological growth pattern.

Methods/Materials

Materials: turbinidae, angarridae, and naticae shells,camera, ruler, pencil, calculator
Methods:
1 Collect and photograph turbinidae, naticae, and angariidae species.
2 Measure the ratio between two consecutive radii of the spiral Repeat 10 times.
3 Calculate mean and sample standard deviation.
4 Calculate a 95% margin of error to determine whether the ratios are #the same# and the spiral is logarithmic.
 5 Use the equation for logarithmic spirals $r=ae^{b}*theta$ to see how logarithmic growth changes the variables a and b.
6 Solve for a and b, plug theta and r values.

Results

No shells contained the Fibonacci spiral. However, 1/3 of the sample did display logarithmic growth.

Conclusions/Discussion

Finding no Fibonacci spirals raises questions about whether mathematicians over-promote the Fibonacci spiral in shells. Shells do use logarithmic spirals as a biological growth pattern. Shells of the same family share aspects of spiral progression. The geometry of logarithmic spirals is applicable to other organisms and formations within the natural world.

Summary Statement

This project explores the frequency of the appearance of logarithmic or specifically Fibonacci spirals appear within mollusk families.

Help Received