Bruce M. Boman
Geometric Capitulum Patterns Based on Fibonacci p-Proportions,
Fibonacci Quart. **58** (2020), no. 5, 91–102.

Abstract

Modeling based on the golden angle has provided valuable insight into how densely packed phyllotaxis structures and organizational patterns arise. The classic example is the phyllotactic model based on the golden angle for organization of florets on a sunflower. Previous studies of geometric pattern generation show that structure organization and covering is highly sensitive to the angle of intersection of pairs of phyllotactic spirals (parastichies). In biology, these patterns arise in a meristem of the primordium and the golden angle of parastichy pairs produces an optimal packing density. Consequently, packing efficiencies and organization of coverings of a geometric capitulum can be modeled and its properties analyzed according to angle of rotation which produces a spiral pattern. To begin to understand how other phyllotaxis patterns might arise, different geometric patterns were generated based on the generalized golden p-sections, which are linked to the Fibonacci p-numbers. Generation of various geometric structures shows that different efficiencies of covering and regular organizational patterns occur across different golden p-proportions. Conclusion: studying geometric capitulum patterns based on golden p-ratios begins to show how geometric tissue patterns might occur in biology.