



ABSTRACT

“Auxin and Phyllotaxis”

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Phyllotaxis, the regular arrangement of leaves or flowers around a plant stem, is an example of developmental pattern formation and organogenesis. Phyllotaxis is characterized by the divergence angles between the organs, the most common angle being 137.5° , the golden angle. Models of phyllotaxis must explain its de novo establishment in the radially symmetric embryo, the stable maintenance of the different arrangements and the observed transitions between phyllotactic patterns. Most importantly, they must explain the specific divergence angles of 180° , 90° , 137.5° and in rarer cases other angles as well .

This quantitative aspect makes phyllotaxis an unusual developmental problem. It has traditionally attracted the interest of mathematicians and computer scientists, who have constructed a wide variety of simulation models. To the biologist it is surprising that only minimal assumptions about the underlying molecular mechanisms are sufficient to arrive at mathematical models that correctly and robustly recreate phyllotactic patterns. In this presentation I will give an overview of the experimental work on phyllotaxis and how these experiments form the basis for a new generation of simulation models. The interplay between modeling and experiment will be discussed.

Kuhlemeier, C., Phyllotaxis. Trends Plant Sci., 2007. 12: p. 143-150.