

# Elastic stresses influence formation of leaf veins

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Elastic stresses may play a crucial role in determining a leaf's venation pattern, according to a joint Argentinian-French study published April 11th in the open-access journal *PLoS Computational Biology*. The researchers have developed a model that reproduces statistical properties of venation patterns, based on the assumption that cells can suffer abrupt elastic distortions during growth. These distortions appear due to the elastic stresses generated by the unequal growth rate of different leaf tissues.

Leaf veins are the channels that conduct substances within the leaf and lend support to the leaf tissue. The accepted view of vein formation claims that the transport of the hormone auxin triggers cell differentiation to form veins. Although auxin plays a fundamental role in vein formation, there are important features of the leaf vascular system which remain unexplained. In particular, flux of auxin would produce a tree-like branched vein pattern, reminiscent of a river network, while real venation patterns are highly interconnected, more akin to a crack pattern in mud or paint.

These facts led Fabiana Laguna, Steffen Bohn, and Eduardo Jagla to further analyze a previously-proposed hypothesis that elastic stresses play an important role in leaf venation. To test whether this hypothesis could sustain a quantitative comparison with actual venation patterns, they developed and implemented a numerical model, and found simulated patterns with statistical properties similar to natural ones.

The full explanation for the development of veins could involve both elastic stresses and the influence of auxin, the authors say. They believe that their study could trigger further experimental work to test the relevance of elastic stresses in vein formation.

Citation: Laguna MF, Bohn S, Jagla EA (2008) The Role of Elastic Stresses on Leaf Venation Morphogenesis. PLoS Comput Biol 4(4): e1000055. doi:10.1371/journal.pcbi.1000055 ([www.ploscompbiol.org/doi/pcbi.1000055](http://www.ploscompbiol.org/doi/pcbi.1000055))

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