It's good to have a shady side: Sun and shade leaves play different roles in tree canopies

March 31 2011

'Outer' tree canopy leaves influence the sunlight reaching inner canopy leaves by changing their shape, says a new study.

The shape and physiology of leaves within the tree canopy is not constant, and can vary depending on their position within the tree crown. This phenomenon is expected to have important consequences for how trees cope with stress and use resources.

A new study describes how the leaves in the outer canopy of olive trees can influence the light environment within the canopy by changing their shape, as more elongated leaves resulted in higher levels of solar radiation inside the crown.

Author Rafael Rubio de Casas and colleagues observed that inner canopy leaves appear to be particularly adapted to the use of diffuse solar radiation, which is more constant than direct radiation. They propose that outer canopy leaves change not only to maximize their own performance, but also to create a beneficial environment for the inner canopy leaves. They also suggest that leaves in various positions of the canopy can use different types of solar radiation for photosynthesis and operate at different time windows. Exposed leaves are expected to use direct solar radiation and be more active when the sun is close to the horizon, while shaded leaves specialize in the capture of diffuse radiation and are more active when the sun is higher.

De Casas and colleagues feel that their work shows a novel and

heretofore unexplored integrated function of leaves that could have substantial ecological importance.

More information: Rubio de Casas, R. (2011). "Sun and shade leaves of Olea Europaea respond differently to plant size, light availability and genetic variation." *Functional Ecology*. onlinelibrary.wiley.com/doi/10 … 011.01851.x/abstract

Provided by National Evolutionary Synthesis Center