Diverse forests tend to be healthier, more resilient: Study

Feb. 28 (UPI) -- Previous studies showed more diverse tree stands to be healthier and more productive than monoculture forests, but scientists didn't know why. New research suggests tree diversity lends a forest adaptability, allowing it to maximize the sun's energy.

Because different trees take on different forms, and can alter their shapes in different ways, a diverse array of trees is more likely to efficiently fill space in the canopy. A fuller canopy allows a forest to covert more solar energy into biomass and absorb more carbon dioxide.

"It's a common hypothesis that complementarity matters," Laura Williams, a graduate student in ecology at the University of Minnesota, said in a news release. "This is a case study that provides evidence to support complementarity in the use of space."

Williams and her colleagues and advising professors analyzed the health of

37 plots of trees, ranging in composition from total monoculture to a combination of 12 tree species. All of the tree stands were planted four years prior to analysis. The scientists used measuring tape and height poles to measure the dimensions of each plot's canopy. They also measured trunk circumferences to estimate total biomass.

In diverse plots, scientists found trees were better able to fill in gaps in the canopy and take advantage of unused light.

Almost all plantation forests feature just a single species. Monoculture is the norm. The latest research -- published in the journal Nature Ecology & Evolution -- suggests more diverse plantation forests produce more wood and absorb more carbon.

"This study shows how we can think of forests as communities made up of trees that fit together, partition labor and react to their neighbors in ways that affect how the entire ecosystem functions," Williams said. "In helping to answer the long-unresolved question of why more diverse mixtures grow more, we've improved our understanding of how to sustain and improve the functioning of forests in ways that contribute to the well-being of humans and our planet."