

PRESS release

LESSONS FROM THE WILD: SLOW BUT INCREASING LONG-TERM GROWTH ALLOWS FOR MAXIMUM LONGEVITY IN EUROPEAN BEECH

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BEECH TREES OLDER THAN 600 YEARS DISCOVERED IN THE POLLINO MASSIF: THIS HIGH-MOUNTAIN OLD-GROWTH MEDITERRANEAN FOREST HARBORS THE OLDEST DECIDUOUS HARDWOODS

Discovering, studying, and preserving old trees is a top priority for conservation biology and sustainable development.

We used tree-ring data from a high-mountain old-growth Mediterranean beech forest to reconstruct long-term growth patterns in trees of maximum longevity for temperate hardwoods. The study site, located in the Pollino National Park - southern Italy -, is very close the southernmost component of the UNESCO network of ancient and primeval beech forests of Europe.

<<In these stands, characterized by a complex uneven-aged structure, individual growth history is highly variable; one tree can take from one to seven centuries to reach a large size (>60 cm of diameter at breast height). Here large canopy gaps are soon filled by dense regeneration, and slow growth rates in early life due to high competition are also linked to long life spans in undisturbed environments>> says Gianluca Piovesan, the leading author of the research.

Slow but overall increasing long-term growth was found to be a prerequisite for extreme tree longevity. In the stands we studied, the relationship between average stem radial increment and age followed a negative power law: that maximum longevity was attained for mean radial increments of ~0.5 mm/year. Growth suppression in early stages of life, together with limiting climatic conditions, also contributed to reaching maximum stem ages (>600 years old) in these Mediterranean mountain environments.

The oldest, slow-growing beech trees are characterized by broken crown tops and stunted heights because of harsh site conditions. "Shorter trees, such the one we named Michele (stem age > 622

years), in memory of the distinguished 19th century Italian botanist Tenore, are generally less vulnerable to climatic extremes (such as windthrow, especially when the crown is loaded with snow), conferring them a higher chance of a long life” says Piovesan.

Large old beech trees and snags provide habitat for saproxylic insects of high conservation concern, including the flagship species *Osmoderma eremita*, a European beetle restricted to rooting zones of hollow trees, and currently endangered. Preserving and restoring the wild forest landscape of the Pollino National Park is a priority to combat the continuing loss of biodiversity as recently reported by [IPBES 2019 Global Assessment](#).

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Photo credit: Gianluca Piovesan

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