



DendroEnto

Wood anatomical and isotopes markers for studying the effect of insect defoliation on carbon allocation to growth / Apports des marqueurs isotopiques et de l'anatomie du bois pour l'étude des effets des défoliations d'insectes sur l'allocation du bois à la croissance.

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Summary —

Context — Past and recent forest declines frequently involved the concurrence of biotic and abiotic events. Defoliation of pedunculate and sessile oaks by the oak processionary moth are common but intermittent in Europe. However, information about population dynamics of the pest and intensity of defoliation on individual tree are difficult to obtain. Dendrochronological methods, including isotopes and anatomical traits, are increasingly used to study the effect of climate variations on trees. Even if pest insects are well known to modify carbon assimilation and allocation pattern, and to impact water relations, only few studies reported the effect of insect outbreaks on tree-ring isotopes or wood anatomy.

Objectives — The first objective of this project is to retrieve in the wood carbon isotope or anatomical signals that could constitute proxies for insect defoliation, essential for the study of past crises. The second objective is to take advantage of the defoliation to progress in the understanding of the pattern of carbon allocation in oak trees, specifically to the radial growth and storage processes.

Approaches — To reach these objectives, infra-ring analysis in wood isotope composition and quantitative anatomy will be performed on ten pedunculate oaks over the 2008-2014 sequence, which includes a complete defoliation crisis precisely monitored in a forest of the Grand-Est region.

Expected results and impacts — This project will provide important insights into carbon allocation in forests exposed to such disturbance regimes and establish a basis for proxy characteristics for this type of exogenous factor. This will help studying plant-insect interactions that appear particularly relevant in the context of increasing drought, known to enhance the vulnerability of trees to pests.