Towards a global network of tree-ring based information on tree mortality

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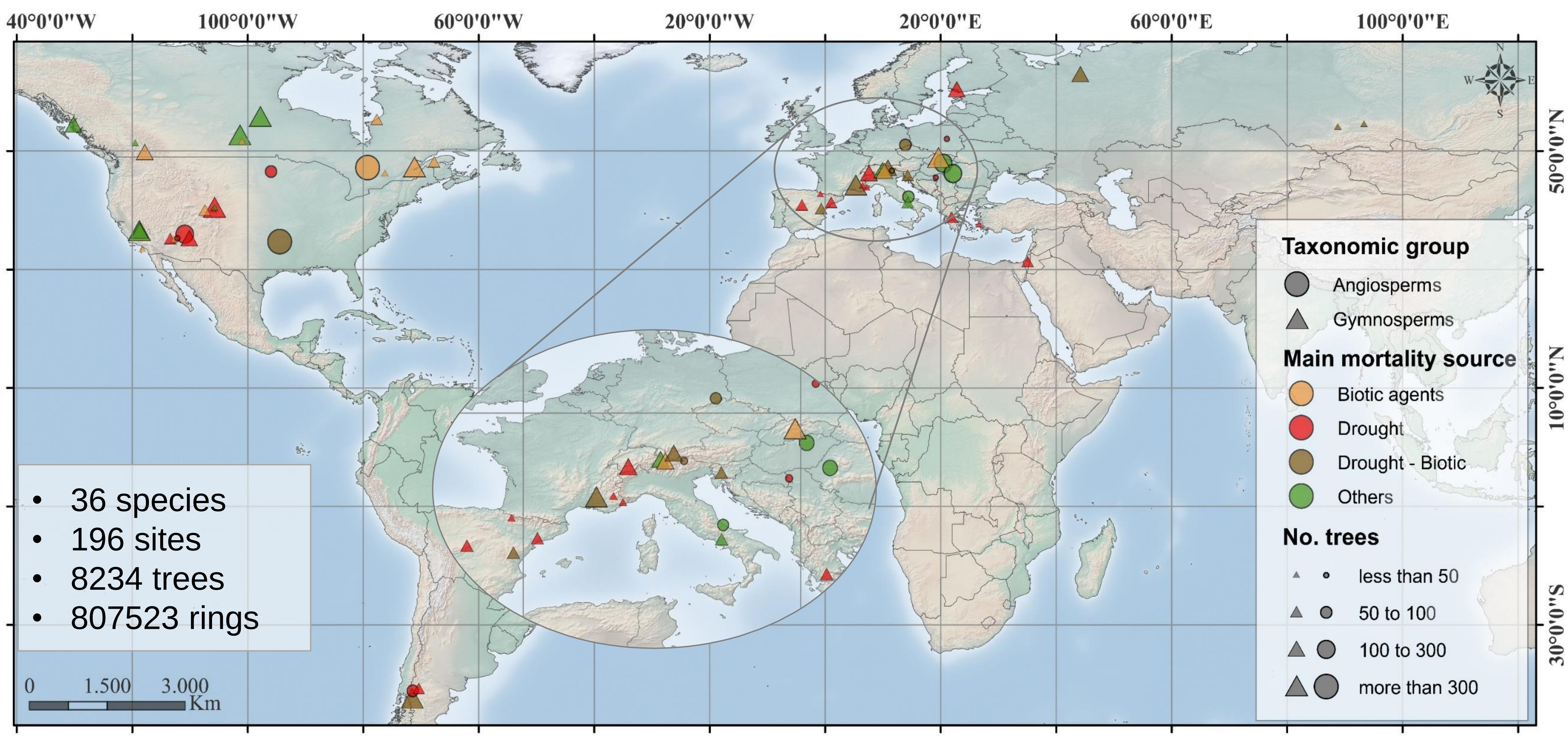
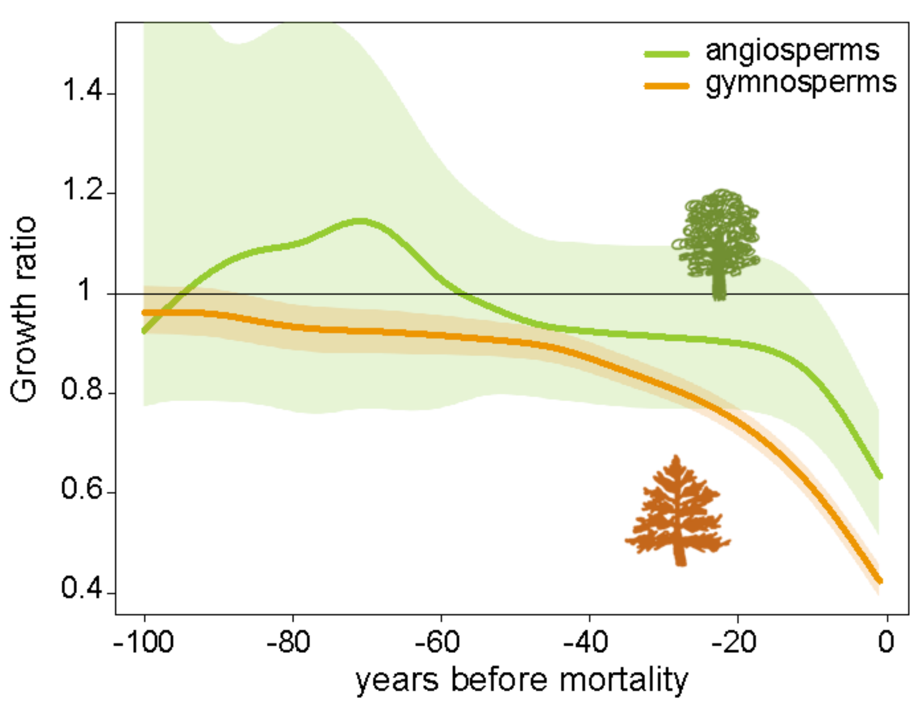
Why is-it needed?

- Tree mortality affects ecosystem functions, structure, and composition
- Tree mortality is increasingly being reported worldwide, mainly due to climate change
- We need realistic mortality indicators and algorithms for forest models and for managers

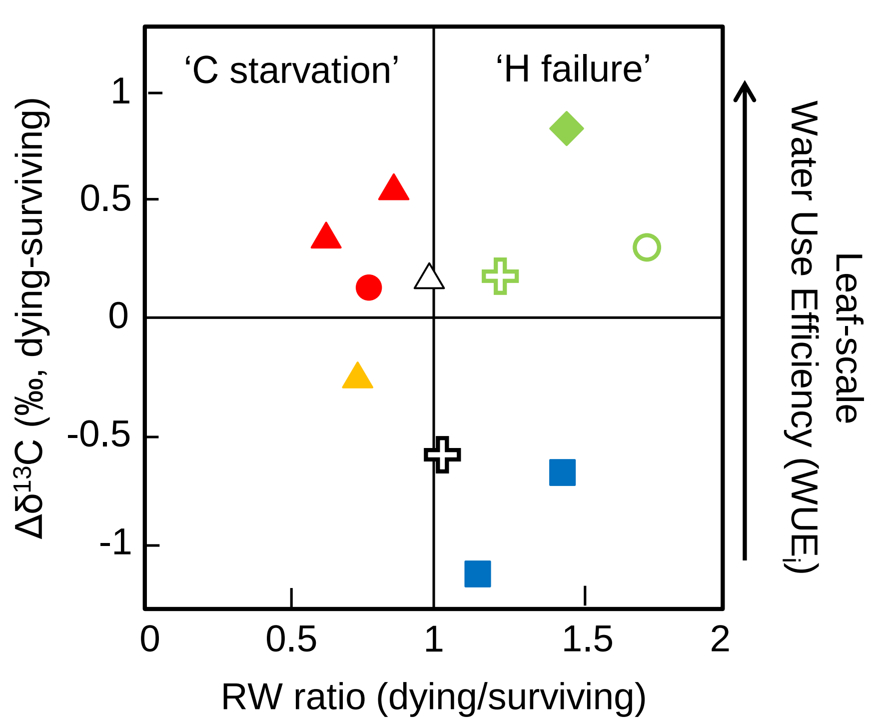


Main results

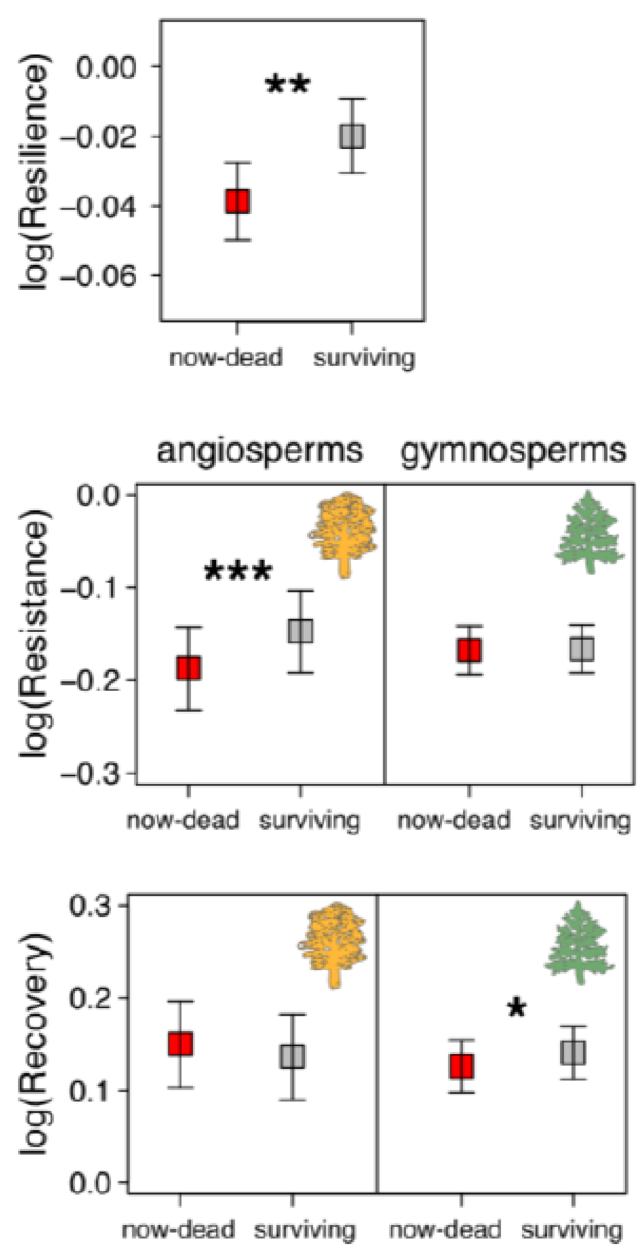
Growth patterns before mortality



Mean growth and δ13C



Growth resilience to
previous drought events



- Growth reductions before mortality are nearly universal, but their magnitude and duration depend on the tree species (longer for gymnosperms) and on the driver of mortality
- Increase in inter-annual growth variability and decrease in growth synchrony ~20 years before mortality, mainly for gymnosperms. No change in temporal autocorrelation
- Combining ring-width, $\delta^{13}C$ and $\delta^{18}O$ data provide insights on the physiological causes of mortality: e.g., C starvation vs. H failure
- Tree resilience to drought is a good indicator of future drought-induced mortality risk

Gessler et al. (2018) New Phytol.
Cailleret et al. (2019) Front. Pl. Sci.
De Soto et al. (in rev) Nature Comm.
Cailleret et al. (2017) Glob. Change Biol.