



## **Northern forest tree populations are physiologically maladapted to drought**

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Northern forests at the leading edge of species distributions may not show increased primary productivity under climate warming, instead being limited by climatic extremes such as drought. Looking beyond tree growth to underlying physiological mechanisms is fundamental for accurate predictions of forest responses to climate warming and drought stress. Working within the experimental structure of a 30-year genetic field trial for a widespread conifer, we analyze relative contributions of xylem plasticity (n=1170) and inferred stomatal response (n=2340) to drought tolerance in populations from across a 4000 km species range. We show a range of isohydric to anisohydric behaviors due to genetic adaptation: Trailing edge populations exhibit anisohydric properties while tree populations in central areas of the species distribution are plastic to environmental change due to isohydric behaviors. Northern forest tree populations showed lower drought tolerance and growth due to a suite of physiological maladaptations. Due to drought, therefore, northern areas most probably do not profit from climate warming and would rather benefit from cautious implementation of assisted migration.