Tree vitality and forest health: any better indicators?

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Tree Vitality and Forest Health: Can Tree-Ring Stable Isotopes Be Used as Indicators?

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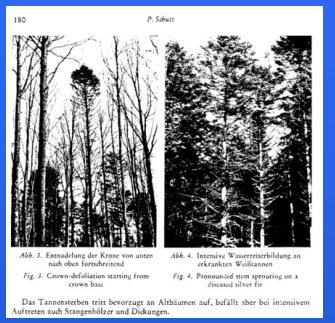

180 P. Schütt

Abb. 3. Entnadelung der Krone von unten nach oben fortschreitend
Fig. 3. Crown-defoliation starting from crown base

Abb. 4. Intensive Wasserreiserbildung an erkrankten Weißtannen
Fig. 4. Pronounced stem sprouting on a diseased silver fir

Das Tannensterben tritt bevorzugt an Altbäumen auf, befällt aber bei intensivem Auftreten auch Stangenhölzer und Dickungen.

New Phytologist — Review

Tansley review

Mechanisms of plant survival and mortality during drought: why do some plants survive while others succumb to drought?

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Contents

Fig. 1 Dead ponderosa pine (*Pinus ponderosa*) trees in Bandelier National Monument, New Mexico, USA. (Photograph courtesy of Craig Allen.)

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A retrospective, dual-isotope approach reveals individual predispositions to winter-drought induced tree dieback in the southernmost distribution limit of Scots pine

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New Phytologist — Forum

Letters

Drought induced tree mortality – a tree-ring isotope based conceptual model to assess mechanisms and predispositions

Drought-induced tree mortality is likely to increase in future as climate models forecast increased frequency of drought events together with higher air temperatures (Dai, 2013; Allen *et al.*, 2015). Besides the presence of inciting (e.g. heat and drought events) and contributing (e.g. opportunistic biotic agents such as *et al.*, 2014). Even though hydraulic failure might occur independently of carbon starvation, many cases have been observed where carbon balance and hydraulics were both impaired (Adams *et al.*, 2017). The carbon starvation–hydraulic failure concept as applied here is rather a continuum with relatively stronger influence of the one or the other process on mortality.

A tree's predisposition to carbon starvation or to hydraulic failure (Fig. 1a) may be indicated by specific syndromes of traits (Anderegg *et al.*, 2016) reflecting different strategies to face drought (Pivovaroff *et al.*, 2016), modified by differences in local resource availability. The main approach we have chosen for our conceptual model is a conspecific synchronic comparison of growth and tree ring isotopic signals between later dying and surviving trees over longer time periods from the same stand aiming to understand

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