NATURE

50 Years Ago

It seems to be generally agreed that the standard of self-expression in spoken and written English among sixth-form and undergraduate scientists and technologists is low. Various causes have been blamed … but in all the diagnoses and cures I have seen so far, all the emphasis has been on past failures by English experts and future remedies to be administered by other English experts. It is not my intention to dissociate English teachers from the problem altogether … but I want to suggest that scientists and technologists themselves must take most of the responsibility for the low standards of self-expression in their professions, and that a major change of outlook on their part is the only thing that can bring a substantial improvement in the situation.
From *Nature* 1 December 1962

100 Years Ago

Biologische und morphologische Untersuchungen über Wasser- und Sumpfgewächse. By Prof. H. Glück — Prof. Glück has produced a portentous volume on the riparian flora, forming the third instalment of his work on water and swamp plants. Frankly, we do not find justification for the 600 or more pages of his book, and we fancy most readers who have been in the habit of using their eyes when observing or collecting plants will find but little to reward them for the trouble of its perusal … No doubt a work of this kind possesses some value, but, as it appears to us, it excellently illustrates the truth of the saying that the secret of dullness lies in the attempt to write all one knows. Prof. Glück gives the impression (perhaps unjustly) that he has written all he knows about his subject, and certainly he has jotted down a good deal that is already very familiar to others.
From *Nature* 28 November 1912

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Figure 1 | Thirsty trees. Reports of drought-induced forest die-off[4], such as that in Switzerland in 1999 shown here, have increased in recent decades, suggesting that climate change is already having an impact on tree health in many locations. Choat and colleagues' study[3] of trees across the globe suggests that they are at high risk from even small increases in drought intensity.

are better at withstanding xylem embolism. The exciting finding, however, is that angiosperm trees in all forest biomes have converged on a risky strategy, operating at extremely narrow safety margins. This implies that these trees are already, under current conditions, on the verge of injurious levels of water availability, and that even a minor increase in drought intensity will induce levels of xylem embolism that will impair growth and lead to tree death.

The suggestion that all forests are on the brink of succumbing to drought, and may already be responding to climate change, is supported by observations of increased drought-induced forest die-offs and tree mortality in many ecosystems[4] (Fig. 1). For gymnosperms, Choat *et al.* found wider safety margins, suggesting that these trees may have a higher tolerance to increased drought. However, even these trees are threatened by hydraulic failure, as recent regional die-offs of pines show[4]. Taken together, these studies sound a warning bell that we can expect to see forest diebacks become more widespread, more frequent and more severe — and that no forests are immune. The ramifications of this scenario are diverse and, in many respects, dire: forest mortality will be accompanied by changes in species composition, changes in ecosystem function and losses of services and biodiversity[4].

Advancing our knowledge of organismal responses to factors such as drought and temperature is essential to improving predictions of the consequences of climate change[5,6]. Through their meta-analysis of the global distribution of xylem vulnerability, Choat *et al.* have dramatically increased our understanding of the comparative vulnerability of forests. Nevertheless, the mechanisms that actually lead to drought-induced tree mortality still remain elusive; in fact, it is known that some species can survive complete hydraulic failure for extended periods of time[7]. Although many studies have assessed the response of plants to experimentally manipulated precipitation and/or temperature[8], the results of these studies do not lend themselves to comparisons of drought responses across biomes, because of differences in treatments and in the resulting drought intensities. A coordinated network of standardized experiments is needed to further advance understanding of climate-change responses in ecosystems worldwide.

Our ability to forecast the consequences of drought for forests is also limited by the high regional uncertainty in current models for rainfall and drought prediction, for both long-term trends and extreme events[1,2]. A fundamental lesson from Choat and colleagues' study is that even small changes in drought intensity can be expected to lead to mortality in forests all over the world. This only highlights the urgent need for climate models that return more-confident predictions. ■

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