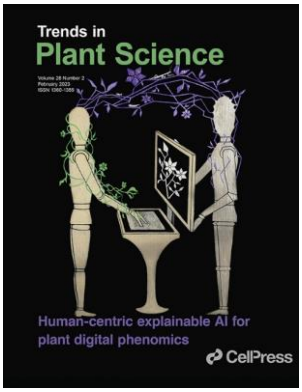
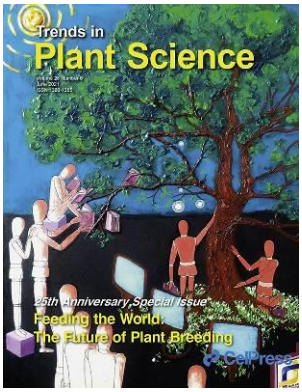
Prof. Harfouche research has been featured on 9 cover pages of prestigious journals.

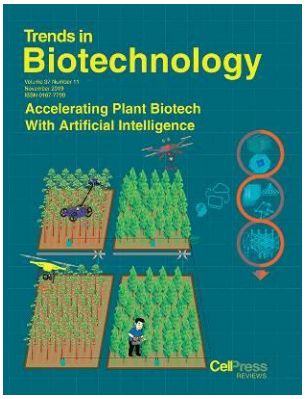


Cover: Artificial intelligence (AI) predictive models are predominantly black box models. But are black boxes easy to break into? In real-world applications, models must be accurate and correctly and verifiably explainable. Harfouche and colleagues propose a novel human-centric explainable AI (X-AI) system architecture and discuss its potential to improve AI applications in plant phenomics. Pictured is an artist's allegorical drawing of human–AI complementarity. A feedback loop that enables interaction between human (left) and AI (alter-ego; right) to collectively learn and achieve superior results is exemplified by plant branches; mantid flies represent code debuggers. Green and purple parts of the hybrid system in which human and X-AI algorithm (displayed on the screen) can work together emphasize the duality of the nature of the subjects, real and virtual, human and artificial. Image credit: Ugo Bongarzoni.).

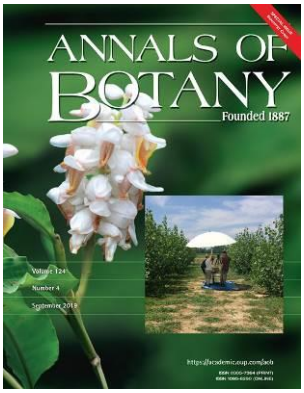
Cover: Artificial intelligence (AI) can impact and improve our ability to turn data into insights. As these advances have begun to percolate into plant phenomics, it is time to develop educational initiatives for the plant science community so the future workforce will be equipped to leverage AI algorithms and take the lead in this AI revolution that will ultimately bring countless benefits for our breeders and farmers. Nakhle and Harfouche (100323) created "Ready, Steady, Go AI," an interactive online tutorial to help students and researchers at all levels gain an understanding of how AI can be applied to extract biologically meaningful information from imaging data and to drive innovation within their own research. Image credit: Antoine Harfouche and Farid Nakhle.



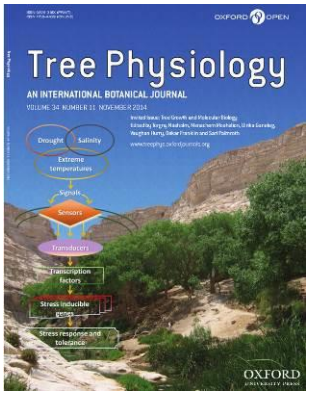
Cover: Agricultural biotechnology products and services cannot have an impact unless understood and accepted by the public. Pictured is an artist's allegorical drawing of science communication and bioethics that has been created to highlight the main message of the opinion article by Antoine Harfouche & Arie Altman and colleagues: the need for effective communication between scientists and non-scientists. The pictorial composition is dominated by a luxuriant tree that offers fruits and knowledge in various ways to people interacting with it, such as the lay public, researchers, and policymakers. Image credit: Ugo Bongarzoni (artist, Rome, Italy).



Cover: Recent advances in genomics and phenomics are delivering valuable insights into the complex biological mechanisms that underlie plant functions in response to environmental perturbations. However, linking genotype to phenotype and assimilating multi-omics data into biologically meaningful interpretations remain a challenge. In pages 1217–1235 of this issue, Harfouche and colleagues discuss how next-generation artificial intelligence can deal with these challenges and interface with multi-omics to accelerate breeding for climate-resilient crops. Cover image conceptualized by Harfouche and colleagues and designed by Antoine Harfouche and Sacha Khoury.

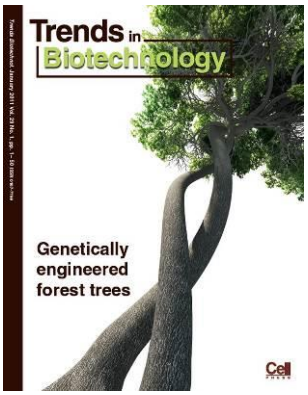


Cover: Bioenergy with Carbon Capture and Storage (BECCS) is an effective Negative Emission Technology (NET), but the crops required for this technology must be able to grow on marginal – poor quality – agricultural land and not compete with food crops. Taylor et al. describe the recent advances in identifying non-food tree and grass species suitable for bioenergy production on droughted, poor quality land. Defining the ideotype for drought tolerance in Populus, Miscanthus and Arundo that includes rapid stomatal responsiveness and vigour. Understanding the genetic basis of drought tolerance through GWAS studies is helping to resolve breeding targets for rapid bioenergy crops selection.



Cover: Abiotic stress detrimentally affects forest growth and productivity worldwide. Populus euphratica Oliv. is a salt-tolerant species and naturally distributed in semi-arid areas of the Middle East and Asia, growing at locations with wide ranges of temperature and soil conditions, including high salt content. The cover shows a grove of P. euphratica in Ein Avdat canyon in the Negev desert, Israel, at an elevation of 450 m. The average annual rainfall is 100 to 200 mm and soil water is largely derived from a nearby saline stream (electrical conductivity of top soil extract: 35.9 dS m^{-1}). The insert shows the molecular controls of abiotic stress, which can cause irreversible changes in cellular homeostasis, leading finally to cell death. Harfouche et al. (pages 1181–1198) review recent progress in the molecular basis of abiotic stress tolerance in forest trees, and its relevance to tree improvement. Photo: Arie Altman.

Cover: In light of impending water and arable land shortages, population growth, and climate change, it is more important than ever to examine how forest-tree domestication can be accelerated to sustainably meet future demands for wood, biomass, paper, fuel, and biomaterials. On pages 64–72 Antoine Harfouche and colleagues offer an important avenue to accelerate the domestication of forest trees by integrating modern genetic and genomic techniques with conventional breeding. Cover design Susanne C. Brink



Cover: There is a growing interest in domesticating forest trees through genetic engineering. However, regulatory hurdles are limiting field studies and commercial deployment of transgenic trees. In the accompanying article on pages 9–17 in this issue, Harfouche et al. review recent advances in tree genetic engineering, including novel strategies for introducing major traits (e.g. stress tolerance, root formation, wood characteristics), and further discuss emerging applications, such as biofuels and biocontainment. The cover shows two intertwined trees resembling a DNA double helix. Image: [2008] Andrey Solovyev/Bigstock.com.

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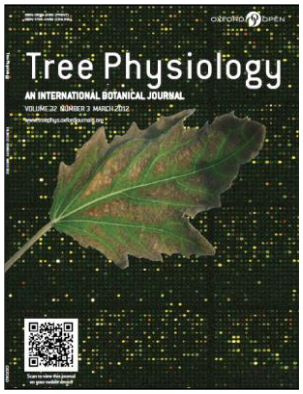

Cover: Tree Physiology is promoting molecular genomics research directly linked to physiological processes. Salinity is a major environmental stress affecting plants worldwide and Populus alba L. (white poplar) is a moderately salt-tolerant poplar. On pages 1335–1355 of the recent special section on Poplars and the Environment (Tree Physiology 31(12)), Beritognolo et al. report on comparative transcriptional and physiological analyses of two P. alba genotypes under salinity stress. The authors identify genes and biological processes that discriminated the response of the two genotypes and could likely increase salinity tolerance in poplar. The cover shows salt-induced necrotic lesions of a P. alba leaf in a microarray experiment. Photo: Isacco Beritognolo, Antoine Harfouche, and Muriel Gaudet.