Forestry Research Advances

EDITORIAL

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Inaugural Editorial: *Forestry Research Advances*

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Forests occupy one-third of Earth's terrestrial surface and serve as habitats for approximately 80% of global terrestrial biodiversity, harboring countless animal, plant, and microbial species. Forest watersheds are estimated to supply 75% of the world's accessible freshwater resources, which are essential for the livelihoods, agriculture, and industries supporting half the global population. Beyond these critical ecological services, forests fundamentally sustain global supply chains by providing timber, pulp, food, medicine, and various other forest products. However, accelerating anthropogenic pressures, including agricultural expansion, urbanization-driven deforestation, the impacts of climate change, and devastating invasions of pests and pathogens, are collectively threatening forests' sustainability and biodiversity conservation. In this precarious context, forestry research emerges as a pivotal discipline for safeguarding the health of the planet's biosphere.

Despite its critical importance, forestry research has historically lagged far behind food crop studies in terms of both research funding opportunities and resource allocation. This disparity stems from multiple systemic challenges. The inherent biological complexity of perennial tree species requiring multi-decadal growth observations. Genetic manipulation of tree species with large genomes remains technically challenging and less advanced than that for annual crops; and there are practical difficulties in maintaining genetically uniform experimental materials. The prolonged limited research capacity in forestry has historically restricted the development of dedicated forestry journals with sufficient academic impact. Many seminal discoveries in tree biology have resorted to publishing in general plant science journals predominantly focused on model plants and agricultural crops, leading to fragmented knowledge dissemination within the forestry community.

The distinctive biological characteristics of forest trees necessitate a reassessment of the conventional research evaluation paradigms. Although the methodological standards established for food crop research are scientifically valid, strictly applying them to forestry may place undue limitations on the field. This argument does not suggest lowering scientific standards, but rather emphasizes the need for balanced evaluation frameworks that (1) acknowledge current technological limitations in tree biotechnology, (2) consider realistic funding cycle constraints, and (3) appropriately recognize incremental advancements while maintaining scientific integrity. Such approaches could better support researchers' motivation and facilitate meaningful advancements in this ecologically vital discipline.

While foundational research on model plants and food crops has achieved remarkable progress, its applicability to tree-specific biological challenges remains limited. Key questions regarding their extended life cycle adaptations, ecological functions, wood formation mechanisms, perennial growth patterns, and regulation of seasonal dormancy can only be resolved through direct investigation of the tree species themselves. Technological innovations now empower forestry research to bridge historical gaps through agricultural studies. For example, advances in genomic sequencing has enabled rapid progress in deciphering complex tree genomes, with some projects now surpassing model species' genomic resolution within condensed timelines. This convergence has accelerated with the widespread adoption of high-throughput technologies and artificial intelligence-driven analytics, rendering previously inaccessible forestry research increasingly approachable. These developments now enable in-depth investigations into tree-specific biological traits, creating unprecedented demand for specialized knowledge dissemination platforms to support the rapidly advancing field of forestry research. Thus, we proudly launch *Forestry Research Advances* (*FRA*) as a dedicated platform for disseminating transformative discoveries in tree biology and forest ecosystems.

FRA focuses on mechanistic investigations into fundamental biological questions concerning forest ecosystems and tree species, encompassing multidisciplinary perspectives spanning genetics, molecular biology, ecology, and related disciplines. The journal particularly prioritizes basic research elucidating the regulatory mechanisms underlying tree-specific characteristics, including but not limited to perennial growth patterns, developmental traits, adaptive evolution, and ecological functionality.

In addition to fundamental studies, *FRA* also welcomes translational research that bridges fundamental biological insights with practical applications in areas such as forest management, conservation, and tree improvement. Translational research plays a crucial role in bridging the gap between laboratory discoveries and field implementation, helping to ensure that theoretical advances contribute meaningfully to solving real-world forestry challenges. Examples include the development of CRISPR-edited low-lignin poplar trees to optimize pulpwood production, molecular marker-assisted breeding strategies that transfer pathogen resistance into commercial cultivars, and the application of spectral imaging—derived from photosynthetic research—for monitoring forest health. Likewise, ecological studies on nutrient cycling have informed evidence-based forest management practices aimed at promoting ecosystems' resilience. By highlighting the practical relevance of scientific breakthroughs, *FRA* seeks to foster a dynamic interface between discovery and application. We encourage submissions that demonstrate how translational research can drive innovation and support the long-term health and sustainability of forests and tree species.

For an enhanced disciplinary focus, our primary scope centers on biological processes rather than the applied aspects of forest product processing and utilization, and prioritizes studies on trees themselves rather than other forest-dwelling species (e.g., herbaceous plants, animals, or microbes) in isolation. However, interdisciplinary studies investigating how these organisms directly influence tree biology through biotic interactions remain within our scope.

FRA aims to provide a reputable knowledge dissemination platform for the rapidly evolving field of forestry research. We will actively use various popular social media platforms to foster a dynamic research community for forestry research. We publish high-quality original research articles, reviews, perspectives, and commentaries via the Gold Open Access model, which ensures immediate, free access to published content. Publication costs are typically covered by authors or their institutions, supporting open scientific exchange and fostering robust discourse in the field.

We warmly invite the global forestry research community to collaborate in cultivating this vital scholarly resource. Through high-quality submissions, rigorous peer review contributions, and active community engagement, together we can establish *FRA* as the premier venue for accelerating innovation in forest science. With collective support, this initiative will catalyze sustainable progress in understanding and preserving Earth's indispensable forest ecosystems.

Forestry Research Advances—nurturing insights for future forestry.

Conflict of interest

The authors declare that they have no conflict of interest.

Dates

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