

## FOREWORD

Illegal logging is a global problem that poses significant environmental, economic, and social consequences. It is defined as the harvesting, transportation, processing, buying, or selling of timber in violation of national and international laws. The trade in illegal timber is worth billions of dollars annually and is often associated with corruption, organized crime, and human rights abuses. In addition to contributing to deforestation and the loss of biodiversity, illegal logging also impacts the livelihoods of local communities who depend on forests for their survival. It can also contribute to climate change by releasing carbon into the atmosphere and reducing the capacity of forests to absorb carbon.

Efforts to combat illegal logging have increased in recent years, with international agreements, laws, and certification schemes aiming to improve forest governance and promote sustainable forest management. However, illegal logging persists, fueled by high demand for cheap timber products, weak law enforcement, and inadequate governance. Addressing illegal logging requires a multifaceted approach, including strengthening legal frameworks, enhancing enforcement mechanisms, promoting sustainable forest management practices, and reducing demand for illegal timber products through consumer awareness and responsible sourcing. In this issue of *Wood and Fiber Science*, we examine the latest developments in the identification and authentication of wood species to combat illegal logging.

The first article in this issue, by Raobelina et al (2023), presents a study on the use of a portable near-infrared (NIR) spectrometer for the identification of four *Dalbergia* species from Madagascar. The authors demonstrate that the portable NIR spectrometer is a reliable tool for the identification of wood species, and its portability makes it an ideal tool for fieldwork. The findings of this study have important implications for the monitoring and enforcement of regulations on the trade of *Dalbergia* species.

The second article, by Kim et al (2023), presents a novel method for distinguishing between native- and plantation-grown mahogany (*Swietenia macrophylla*) using chromatography and high-resolution quadrupole time-of-flight mass spectrometry. This study has important implications for the enforcement of regulations on the trade of mahogany, which is a valuable timber species that is often illegally harvested from natural forests.

The third article in this issue, by Richardson et al (2023), presents the “Global Wood Species Priority List,” a living database of tree species that are most at risk for illegal logging, unsustainable deforestation, and high rates of global trade. The authors argue that such a database is crucial for prioritizing conservation efforts and ensuring the sustainability of global forest ecosystems. This article highlights the need for international collaboration and cooperation in the fight against illegal logging.

The fourth article, by Wang et al (2023), presents a study on the identification and classification of bamboo based on cross-sectional images using deep learning. The authors demonstrate that deep learning can be used to accurately identify and classify bamboo species based on their anatomical features. This study has important implications for the monitoring and enforcement of regulations on the trade of bamboo, which is a valuable raw material for various industries.

The fifth and final article in this issue, by Duchesne et al (2023), presents a study on the forensic identification of five Meliaceae (mahogany) species using a combination of gas chromatography × gas chromatography-time-of-flight mass spectrometry-based metabolomic profiling and wood anatomy. The authors demonstrate that this combined approach can be used to accurately identify and authenticate mahogany species, which are often illegally harvested and traded. This study has important implications for the enforcement of

regulations on the trade of mahogany and for the conservation of natural forests.

Overall, the articles in this issue highlight the importance of developing and implementing effective strategies for identifying and authenticating wood species to combat illegal logging. The use of portable NIR spectrometers, high-resolution quadrupole time-of-flight mass spectrometry, deep learning of images, and metabolomic profiling are all promising tools for the identification of wood species. Additionally, the establishment of common databases, such as the “Global Wood Species Priority List,” can help to prioritize

conservation efforts and ensure the sustainability of global forest ecosystems. We hope that these articles will stimulate further research and discussion on this important topic and contribute to the development of effective solutions to combat illegal logging. As a community of scientists, the impact of our research in the use of wood products should not be siloed from the moral and ethical implication from the harvest and trade of these products.

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