

## Review and Outlook

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# Integrated Orchard Management for High-Quality Bayberry Production

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**Abstract** This study focuses on the integrated management techniques for high-quality waxberry (*Myrica rubra*) orchards. Based on the biological characteristics, nutritional and medicinal value, and current status of the industry, the main problems in current production are analyzed. The study systematically summarizes key technical approaches to improving yield and fruit quality, including orchard site selection and establishment, cultivar selection and renewal, soil and fertilization management, water regulation, quality improvement, and green pest and disease control. By optimizing soil improvement and organic fertilizer application, implementing precise irrigation and drainage control, and reasonably regulating nutrient supply and orchard structure, fruit size, sugar content, and flavor quality can be significantly improved, while reducing environmental pressure. Combined with smart orchard technologies, ecological cultivation models, and the integration of agriculture and tourism, this research helps promote the transformation of the waxberry industry toward high quality, green development, and sustainability, and provides practical references for building a high-quality production system and upgrading the industry.

**Keywords** Waxberry (*Myrica rubra*); Orchard management; Quality improvement; Water and fertilizer regulation; Green control

## 1 Introduction

Chinese bayberry (*Myrica rubra* Sieb. et Zucc.), also known as red bayberry or waxberry, is one of the most representative subtropical fruit trees in East Asia. It is the only species with economic cultivation value in the family Myricaceae. It has been cultivated in southern China for at least 2 000~7 000 years, and the current planting area exceeds 330 000 hectares, with an annual production close to 1 million tons (Zhang et al., 2015). In addition to China, *Myrica* species are widely distributed in Asia, North America, South America, and parts of Europe, showing their global importance as both a specialty fruit and a medicinal resource. In major producing regions such as Zhejiang, Jiangsu, Fujian, and Guangdong, Chinese bayberry plays a key role in regional agricultural economies and farmers' livelihoods. This is mainly due to the development of specialized orchards, the promotion of superior cultivars (such as 'Dongkui' and 'Ding'ao'), and the continuous expansion of fresh fruit and processed product markets.

Chinese bayberry fruit is considered a "green and healthy food," rich in soluble sugars, organic acids, vitamins (especially vitamin C), minerals, and dietary fiber. Phytochemical studies have shown that it contains abundant bioactive compounds such as proanthocyanidins, anthocyanins, flavonols (e.g., myricetin and quercetin derivatives), and phenolic acids, which give it strong antioxidant capacity and diverse biological activities (Zhang et al., 2022). Extracts from its fruits, leaves, and bark have been reported to show antioxidant, anti-inflammatory, anti-allergic, anti-obesity, anti-diabetic, antibacterial, and anti-tumor effects, and may provide benefits for cardiovascular, cerebrovascular, and neuroprotective functions (Ren et al., 2019; Singh et al., 2025). These multifunctional properties support its wide industrial applications, ranging from fresh consumption and traditional processing (juice, wine, jam, preserved fruit, vinegar) to emerging uses such as extracting functional components, oils, and bioactive substances from seeds and processing residues (Mo et al., 2024).

The fruit ripening period of Chinese bayberry coincides with the rainy season in southern China. High humidity and insufficient sunlight often lead to yield reduction, sugar dilution, and shorter shelf life. The fruit has exposed skin and a soft texture, along with very high sugar and water content, making it highly prone to cracking, mechanical damage, rapid decay, and postharvest diseases. Under normal temperature conditions, its shelf life is