

Research Insight

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Research on the Understory Ecological Cultivation Model of *Tetrastigma hemsleyanum*

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Abstract This study focuses on the understory ecological cultivation model of *Tetrastigma hemsleyanum* and systematically analyzes its resource value, biological characteristics, understory habitat adaptability, compound cultivation models, key cultivation techniques, and comprehensive benefits. *T. hemsleyanum* is a traditional medicinal plant with high medicinal value and development potential. Its tuberous roots are rich in active compounds such as flavonoids, polysaccharides, and phenolic acids, showing important research value in anti-inflammatory, antioxidant, anti-tumor, and immunomodulatory activities. With increasing market demand and declining wild resources, artificial ecological cultivation has become an important approach for resource conservation and industrial development of *T. hemsleyanum*. *T. hemsleyanum* prefers shaded and humid conditions and is sensitive to strong light. It is suitable for growth in semi-shaded, humid, humus-rich, and well-drained understory environments. Bamboo forests, fruit forests, and broad-leaved forests can all provide suitable ecological cultivation conditions to some extent, but appropriate models should be selected according to stand structure, canopy density, soil conditions, and management objectives. Understory cultivation of *T. hemsleyanum* should focus on high-quality seedling propagation, vine guidance and trellising, water and fertilizer management, green pest and disease control, and timely harvesting, so as to promote tuberous root formation and stable accumulation of medicinal components. Understory ecological cultivation of *T. hemsleyanum* can improve forestland resource utilization efficiency, reduce dependence on wild resources, and promote medicinal plant resource conservation, ecological benefit enhancement, and the development of characteristic Chinese medicinal herb industries. In the future, provenance standardization, cultivation technical protocols, quality control, and industrial promotion systems should be further improved to advance the standardized, large-scale, and sustainable development of understory ecological cultivation of *T. hemsleyanum*.

Keywords *Tetrastigma hemsleyanum*; Understory ecological cultivation; Compound cultivation model; Tuberous root quality; Forest-medicine compound management

1 Introduction

Tetrastigma hemsleyanum Diels et Gilg is a perennial climbing vine of the genus *Tetrastigma* in the family Vitaceae and is one of the important traditional medicinal plant resources in China. Commonly known as “Sanyeqing”, it is regarded as a “plant antibiotic” because of its broad medicinal activities (Ji et al., 2020; Hu et al., 2021). Its main medicinal part is the tuberous root, while the whole plant is also used medicinally in some regions. In folk and clinical applications, it is commonly used as an adjuvant treatment for diseases such as high fever in children, pneumonia, hepatitis, gastritis, rheumatism, sore throat, lymphatic tuberculosis, and viral meningitis. Modern pharmacological and phytochemical studies have shown that the tuberous roots and aerial parts of *T. hemsleyanum* contain various active compounds, including flavonoids, polysaccharides, phenolic acids, terpenoids, steroids, and organic acids, and exhibit anti-inflammatory, antioxidant, anti-tumor, antiviral, immunomodulatory, anti-hepatic injury, and antibacterial effects (Ji et al., 2020; Zhu et al., 2020; Hu et al., 2021). Among these compounds, polysaccharides and flavonoids are considered representative active constituents of *T. hemsleyanum* and have shown potential application prospects in the development of food, medicine, and cosmetics (Shi et al., 2022; Wang et al., 2025).