

Research Insight

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Construction of a Standardized Cutting Propagation and Seedling Production System for *Tetrastigma hemsleyanum*

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Abstract *Tetrastigma hemsleyanum* Diels et Gilg is an important medicinal plant resource in China with considerable medicinal value and development potential. However, the decline of wild resources, its relatively long growth cycle, and the insufficient supply of high-quality seedlings have constrained large-scale cultivation and industrial development. Cutting propagation offers several advantages, including the preservation of elite germplasm traits, a relatively short propagation cycle, simple operation, and suitability for large-scale seedling production, making it an important approach for producing high-quality *T. hemsleyanum* planting material. This article focuses on the construction of a standardized cutting propagation and seedling production system for *T. hemsleyanum*. It analyzes shoot regenerative characteristics, adventitious root formation, and the major factors affecting rooting, and systematically summarizes key techniques involving elite mother-plant selection, cutting type and specification, collection and rooting pretreatment, rooting substrate optimization, plant growth regulator application, cutting season, and planting density regulation. Seedling management measures involving temperature, humidity, water supply, light, shading, ventilation, nutrient supply, and pest and disease control are further discussed. On this basis, a standardized seedling production framework is proposed covering hardening and transplanting of rooted cuttings, seedling quality evaluation and grading, nursery release standards, and whole-process quality traceability. In view of current limitations, including insufficient screening of elite mother plants and high-rooting materials, inconsistent technical parameters and seedling quality standards, and relatively low levels of facility-based and digitalized production, future priorities should include strengthening elite germplasm selection, improving standardized operating procedures, and promoting facility-based, large-scale, and intelligent seedling production. This article provides a reference for improving cutting propagation efficiency, ensuring a stable supply of high-quality seedlings, and promoting the sustainable utilization of *T. hemsleyanum* medicinal resources.

Keywords *Tetrastigma hemsleyanum*; Cutting propagation; Adventitious root; Standardized seedling production; Seedling quality

1 Introduction

Tetrastigma hemsleyanum Diels et Gilg, commonly known as Sanyeqing, is a perennial climbing vine in the Vitaceae that has long been used in Chinese folk medicine and is widely recognized as a valuable traditional medicinal plant (Ji et al., 2021). Traditional and contemporary uses center on the tuberous roots and, in some contexts, the whole herb or aerial parts, which are used to clear heat, detoxify, reduce swelling and pain, promote blood circulation, and treat conditions such as high fever, pneumonia, hepatitis, pharyngeal disorders, convulsions, and inflammatory diseases (Zhu et al., 2020; Xia et al., 2023). Modern phytochemical studies show that the species contains a wide range of bioactive constituents, including flavonoids, phenolic acids, polysaccharides, triterpenoids, steroids, and organic acids, with flavonoids and polysaccharides regarded as the representative active components. These compounds underpin broad pharmacological activities, including anti-tumor, anti-inflammatory, antioxidant, antiviral, antibacterial, antipyretic, analgesic, hepatoprotective, and immunomodulatory effects (Wang et al., 2025). Mechanistic and spectrum-effect studies further indicate that *T. hemsleyanum* extracts can inhibit inflammatory signaling and tumor cell proliferation, while recent work on polysaccharides suggests additional antitumor activity through immune enhancement and gut microbiota regulation (Zhou et al., 2022). Because of this combination of long-standing medicinal use and expanding modern pharmacological evidence, *T. hemsleyanum* is increasingly regarded as a resource plant with high economic, social, and drug-development value (Hu et al., 2021; Pang et al., 2024).