

# LATICIFER ONTOGENY IN *TARAXACUM KOK-SAGHYZ* ROOTS

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Received: 17 June 2025

Accepted: 18 August 2025

Cornish, K. and Abdul Ghaffar, M.A. (2025). Laticifer ontogeny in *Taraxacum kok-saghyz* roots. *Rubber Science*, 38(2): 163-177.

*Taraxacum kok-saghyz* (rubber dandelion) is being developed as an alternative to *Hevea brasiliensis* (the Para rubber tree), the sole commercial source of natural rubber. Both *Hevea* bark and rubber dandelion roots contain pipe-like, multinucleate vessels known as laticifers, which produce latex rich in rubber particles. This study presents a histological analysis of laticifer ontogeny and development in rubber dandelion using multiple microscopy techniques. Rubber particles were detected in cells as early as eight days after seed germination, preceding laticifer differentiation. Laticifers were first observed 14 days after germination, originating from the pericycle and regions outside the primary phloem, and were present in all roots by day 16. Only articulated, anastomosing laticifers were formed in rubber dandelion roots. In mature roots, the highest numbers of laticifers occurred near the crown, gradually decreasing toward the root tip. In contrast, laticifer density was greatest in regions where the root diameter was smallest. Although no clear correlation was observed between laticifer number and rubber particle concentration, these findings provide valuable insights into laticifer development and may serve as a basis for early-stage prediction of rubber concentration and yield in rubber dandelion roots.

**Keywords:** Confocal laser scanning microscopy, *Hevea brasiliensis*, Rubber, Rubber particles, Transmission electron microscopy

## INTRODUCTION

Natural rubber (NR; *cis*-1,4-polyisoprene) is a critical agricultural material commercially produced in tropical regions from a single clonal tree species (*Hevea brasiliensis* Müll. Arg.). Although West Africa produces natural rubber and latex, the vast majority of the global rubber supplies are produced by smallholders in Southeast Asian countries where multiple factors may

limit overall rubber output. These factors include dwindling numbers of skilled laborers, especially for tapping trees, weather issues like monsoons, mismanagement of farms and serious disease outbreaks exacerbated by narrow genetic diversity of cultivated clones (Furtado *et al.*, 2008; Cornish, 2017). Geographical and biological diversification is essential to protect rubber supply chains (Cornish, 2017).