



Tropentag, September 17-19, 2014, Prague, Czech Republic

“Bridging the gap between increasing knowledge and decreasing resources”

Stem and Root Anatomy of Monocot Woody Plant *Dracaena cinnabari* Balf.f

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Abstract

The endemic plant *Dracaena cinnabari* (Dragon Blood Tree) on the Socotra Island, Yemen, is a spectacular relict of the Tethys tropical forest. It is a secondary thickening monocot with a special tree habitus and an umbrella-shaped crown. In spite of the high importance and vulnerability of the species, its anatomy has been poorly investigated. Therefore, research focused on the anatomy of secondary thickening parts has been carried out. The samples were collected from fresh wind-throw on the highland plateau Firmihin. Seventy permanent slides showing the cellular and vascular structure of stem and root in transverse, tangential and radial cuts were created in the dendrochronological laboratory of the Department of Wood Science at Mendel University in Brno, Czech Republic. The results prove uniqueness of the anatomical structure. Atypical secondary thickening is caused by lateral meristems and extra-fascicular cambium, which are generated in a zone that separates epidermis and parenchyma of the central cylinder. Stem and root mainly consist of lignifying parenchyma tissue. Concentric vascular bundles without sclerenchyma sheaths and line arrangement of parenchyma cells (visible on transversal cut) characterise stem parts created by cambial activity. Later growth pattern termed “diffuse secondary growth” can be described as a rapid multiplying of parenchyma cells and concentration of vascular bundles in the peripheral part of a stem. This results in forming a cavity in the central part of a stem. The anatomy of secondary thickening roots is very unusual, due to the absence of radial vascular bundles that typically occur in roots. Root anatomy show concentric vascular bundles and line arrangement of parenchyma cells surprisingly similar to stem structure. Knowledge of species anatomy leads to understanding the unexplored eco-physiological processes in the plant body. Such research of endangered *Dracaena cinnabari* deserves further study.

Keywords: Dragon Blood Tree, monocot, secondary thickening parts