



**UNIVERSITÄT HOHENHEIM**  
INSTITUT FÜR PFLANZENPRODUKTION UND AGRARÖKOLOGIE IN  
DEN TROPEN UND SUBTROPEN

Wasserstress-Management bei Kulturpflanzen in den Tropen und Subtropen (380c)

**Erfassung der Gasverluste während der  
Blattneubildungsphase des Kautschukbaums  
(*Hevea brasiliensis* Müll. Arg.)**

Master-Arbeit im Studiengang  
„Nachwachsende Rohstoffe und Bioenergie (M.Sc.)“

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## ABSTRACT

The ever-expanding rubber demand causes an expansion of rubber cultivation in regions with suboptimal growth conditions, such as northeastern Thailand and the Yunnan Province in China.

The experimental part of this study was realized in Menglun, Xishuangbanna, a region located in the southern part of the Yunnan Province. It is characterized by a subtropical climate, i.e. a dry season from November to April and a wet season from May to October. The expansion of rubber plantations is attended by deforestation of natural primary or secondary tropical rain forest. This rapid conversion of tropical forests not only influences economical functions and services of ecosystems but also causes a decreasing latex yield by suboptimal plant growth.

The main objective of this study was to gain knowledge of the interactions between plant parameters (morphological and physiological) and changes in climatic conditions during the refoliation of rubber trees.

Leaves of 14 and 23 year old rubber trees were investigated. They were assigned different leaf age classes within a whole whorl. The quantification of morphological leaf changes included the measuring of leaf length, leaf area, leaf dry matter, specific leaf area (SLA) and chlorophyll content via SPAD value. To determine the physiological changes, stomatal conductance ( $g_s$ ), transpiration rate (E) and net CO<sub>2</sub>-assimilation rate (A) were measured with a porometer LCpro+. Once a week additional leaves of all leaf age classes were harvested and used as reference to determine the leaf water potential (LWP). The collected data were correlated with soil water content, air temperature, humidity and vapor pressure deficit (VPD).

The analysis showed that leaves which flushed at first were bigger and greener than leaves at the same age, which flushed later. They also had higher dry matter contents and a lower specific leaf area. No correlation was found between leaf age and physiological parameters. Leaves of younger rubber trees had a higher stomatal conductance and transpiration rate than those of older trees. Net CO<sub>2</sub>-assimilation rate and leaf water potential showed no significant differences between the two ages of the rubber trees. It was found that an increase in VPD has a negative impact on the stomatal conductance. Within the framework of this study it was not possible to determine the effect of soil water content on the leaf water potential. It is assumed, that the trees were well watered during the whole experimental period.