

Jate Sathornkich 2009: Application of Photograph Method for Estimating Tree Structure Parameters of Rubber Tree (*Hevea brasiliensis* Muell. Arg.). Doctor of Philosophy (Tropical Agriculture), Major Field: Tropical Agriculture, Interdisciplinary Graduate Program. Thesis Advisor: Associate Professor Sornprach Thanisawanyangkura, D.Agr. 74 pages.

Plant canopy structure can be measured or estimated in several ways. Photographic method is an indirect method that can estimate plant height, diameter volume, total leaf area and vertical distribution of leaf area of individual tree from numerical photographs. In this study, the photographic method was used in field condition. Two types of equipments using for measuring camera parameters with taking photographs were developed. The process of taking photograph and photographic processing in the field condition have been introduced. The photographic method was applied to estimate canopy structures of young rubber trees. Nine trees of 2 to 3 years old clone of RRIM600 and RRIT251 were photographed. Plant height, diameter, volume and leaf inclination distribution of each tree were estimated with the photographic method and compared with data calculated from digitizing technique. Total leaf area was compared with data measured with a leaf area meter. The results showed that tree height, crown height, crown diameter and crown volume were overestimated by this method. Total estimated leaf area was slightly higher than measured data due to the picture zone area used by the photographic method. Estimation of photosynthetic rate of rubber canopy using RATP model has been tested. Leaf area density estimated from photographic method gave 50% overestimation compared to the digitized data when used as an input for the RATP model. Our results indicated that the photographic method can be used to estimate canopy structure of young individual rubber trees. However, for estimating photosynthesis rate using RATP model, using leaf area density estimated from photographic method as an input need to be improved.

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