

COMPARISON OF LAI DETERMINATION TECHNIQUES IN DIFFERENT DUNE VEGETATION TYPES

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Research was conducted in the nature reserve De Westhoek (De Panne, Belgium) during the 2004 growing season. The main objectives of this research are (i) to directly determine the leaf-area-index (LAI) in different vegetation types destructively, (ii) and indirectly by different non-destructive optical methods (including airborne remote sensing), (iii) to compare the applied methods to estimate LAI, and (iv) to produce a map of the horizontal LAI distribution in the research area. The destructive LAI determination was conducted in ten plots representative for the herbaceous vegetation, and in three types of shrub vegetation (*Salix repens*, *Hippophae rhamnoides* and *Ligustrum vulgare*). It was found that the LAI of herbaceous vegetation is low and ranges between 0.87 and 4.60, with a mean LAI value of 2.11 ± 0.34 . The LAI of shrub vegetation ranges between 2.25 and 3.58, measured for *Salix repens* and *Hippophae rhamnoides* respectively. A mean LAI value for the shrub vegetations is 3.03 ± 0.19 . Because of the limited canopy height of the herbaceous vegetation, ground-based optical determination of LAI was only conducted in the shrub vegetation, by means of the SunScan (Delta-T Devices Ltd, Cambridge, UK). The indirect LAI determination, with a mean value of 5.67 ± 0.50 , systematically overestimated direct LAI. Another optical method is the hemispherical photography (Nikon Coolpix 5000 camera). The software used to analyze the hemispherical photographs is CAN_EYE (INRA-Avignon, France). The first results also indicate a systematic overestimation. An important reason for this overestimation is that besides the leaf area also the woody area is measured, so the plant-area-index (PAI) instead of the LAI is measured. Airborne remote sensing data are not yet analysed but will be used to establish a relationship between direct LAI and some vegetation indices such as the Normalized Difference Vegetation Index (NDVI). Both multispectral (3 bands) and hyperspectral (32 bands) data will be used. Based on the above established relationship a map of the horizontal LAI distribution in the nature reserve De Westhoek will be produced.