

AN INVESTIGATION ON THE UTILITY OF THE SUNSCAN CEPTOMETER IN ESTIMATING THE LEAF AREA INDEX OF A SUGARCANE CANOPY

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Abstract

The usefulness of the SunScan ceptometer in estimating the leaf area index (LAI) of a sugarcane crop canopy was investigated. This was determined by making LAI measurements with the instrument at selected points in the field, followed by destructive sampling at the same points. The two sets of data were then compared. Measurements of LAI were also taken at one point of the field at various times of day in order to determine the effect of time of sampling on the results. The SunScan ceptometer gave LAI estimates which were $95\% \pm 2\%$ of the value that was obtained by destructive sampling. It thus appears to be useful in measuring LAI in a sugarcane crop. Measurements of LAI at different times of day showed that the best results are obtained around solar noon.

Key words: leaf area index, sugarcane, SunScan ceptometer

Introduction

Background

Leaf area index (LAI) is an important biophysical parameter of crops (Steduto and Hsiao, 1998). It is defined as the area of leaves per unit area of ground taking one side of each leaf into account (Monteith and Unsworth, 1990). A number of methods for measuring leaf area index have been developed, and can be classified as destructive and non-destructive methods (Kopeck *et al*, 1987; Warren-Wilson and Reeve, 1959). Destructive methods involve physical disturbance of the canopy, while non-destructive methods do not. Thus, non-destructive methods can be used to monitor the growth of plants, as measurements of LAI can be made a number of times throughout the season. They enable comparisons to be made between different canopies of similar architecture (for example, trial plots of different cultivars of the same species or irrigation trial plots).

In this research the focus was on one non-destructive method, the use of the SunScan ceptometer.

Objectives

The objective of this research was to establish the suitability and accuracy of the SunScan ceptometer in measuring the leaf area index of a sugarcane canopy.