

Author: [ADVANCED](#)

Volume Page

Keyword: [TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

ONLINE ISSN : 1349-1008

PRINT ISSN : 1343-943X

Plant Production Science

Vol. 12 (2009) , No. 2 139-149

[\[PDF \(7510K\)\]](#) [\[References\]](#)

A System for the Measurement of Vertical Gradients of CO₂, H₂O and Air Temperature within and above the Canopy of Plant

[Ahmed Al-Saidi](#)¹⁾, [Yasunori Fukuzawa](#)¹⁾, [Noboru Furukawa](#)²⁾, [Masami Ueno](#)²⁾, [Shigeyuki Baba](#)³⁾ and [Yoshinobu Kawamitsu](#)²⁾

- 1) The United Graduate School of Agricultural Sciences, Kagoshima University
- 2) Faculty of Agriculture, University of the Ryukyus
- 3) Tropical Biosphere Research Center, University of the Ryukyus

(Received: April 3, 2008)

Abstract: This technical report describes a gradient system for characterizing the vertical gradients of CO₂, H₂O, and air temperature within and above the canopy of plants. The system is low in cost and easy to use. The instruments were fitted and placed in one box with a total weight of about 10 kg. The box can be carried and moved from one site to another. The features of this apparatus are high frequency sampling cycle as short as 1 min per cycle for all six measurement levels and fast response gas analyzer for measurement as short as 10s per level. Two exhaust pumps, one sampling pump, six 3-way solenoid valves, and flow meter were used to insure simultaneous flow rate of air in all tubes from all measurement levels. This system transfers data from the data-logger directly to the add-in Spreadsheet of Microsoft Excel by using an Ethernet cable to automatically convert digital data to scientific units in less time. This system also allows the use of multiple micro-environmental sensors that can be sampled at the same time. It is useful not only for agricultural ecosystems but is also adequately sensitive and rapidly responds to the gas analyzer with a modifiable flow rate meter for use in forest ecosystems. This system also has potential for use in the measurement of CO₂, H₂O, associated environmental elements, and CO₂ storage flux within the canopy of plant, and other processes including a CO₂ sink and source.

Keywords: [CO₂ profile](#), [Gradient system](#), [H₂O concentration](#), [Light intensity](#)

[\[PDF \(7510K\)\]](#) [\[References\]](#)



Download Meta of Article [\[Help\]](#)

[RIS](#)

[BibTeX](#)

To cite this article:

Ahmed Al-Saidi, Yasunori Fukuzawa, Noboru Furukawa, Masami Ueno, Shigeyuki Baba and Yoshinobu Kawamitsu: "A System for the Measurement of Vertical Gradients of CO₂, H₂O and Air Temperature within and above the Canopy of Plant". *Plant Production Science*, Vol. **12**, pp.139-149 (2009) .

doi:10.1626/pps.12.139

JOI JST.JSTAGE/pps/12.139

Copyright (c) 2009 by The Crop Science Society of Japan



[Japan Science and Technology Information Aggregator, Electronic](#)

