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Guidelines for Measuring and Reporting Environmental Parameters for Plant Experiments in Growth Chambers

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1 Purpose and Scope

1.1 The purpose of this Engineering Practice is to set forth guidelines for the measurement of environmental parameters that characterize the aerial and root environment in a plant growth chamber.

1.2 This Engineering Practice establishes criteria that will promote a common basis for environmental measurements for the research community and the commercial plant producer.

1.3 This Engineering Practice promotes uniformity and accuracy in reporting data and results in the course of conducting plant experiments.

2 Introduction

2.1 The aerial environment is characterized by the following parameters: air temperature, atmospheric composition including moisture and carbon dioxide concentration, air velocity, radiation, and the edge effects of wall/floor on these parameters.

2.2 The root environment is characterized by the following parameters: medium composition and quantity, nutrient concentrations, water content, temperature, pH, electrical conductivity, and oxygen concentration.

2.3 Measuring and reporting these various parameters will be covered in the sections that follow. The definitions of the parameters indicate the symbol and units in the format, (symbol, units). Measurements should be made which accurately represent the mean and range of the environmental parameters to which the plants are exposed during the experimental period, to indicate the temporal variations, both cyclic and transient, and the spatial variations over the separate plants in the chamber.

2.4 The definitions, measurement techniques, and reporting procedures provide criteria and promote uniformity in measuring and reporting environmental parameters, but these guidelines should not be used to select the environmental parameters applicable to a particular experiment. Other parameters may be applicable to a particular experiment or special environments such as elemental concentration in hydroponic solutions, pollutant concentration in air quality research, and spectral quality ratios in photobiology.

2.5 When measurements are made, the chamber should be operating with containers and plants located in the chamber. Provision should be made to take all measurements with minimum disturbance to the operating environment.

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