

Do you accurately measure and report the growing conditions of your controlled environment experiments?

Conditions in controlled environment plant growth rooms and chambers should be reported in detail. This is important to:

- Allow replication of experiments
- Compare results among facilities
- Avoid artefacts due to uncontrolled variables

Here is an example[†] of a report suitable for publication:

“The experiment was conducted in a 3 m by 4 m growth room equipped with cool white fluorescent lamps (Model 840, Philips) mounted above a clear glass barrier, and an upward airflow distribution system using sufficient outdoor make-up air to provide ambient CO₂ levels inside the room. Room air temperature was 25/20°C (SD ±2/1°C) during the light/dark period. Photosynthetically active radiation (PAR) at the top of the canopy was 400 μmol m⁻² s⁻¹ (SD ±10 μmol m⁻² s⁻¹) while maintaining a 12-hour photoperiod. Relative humidity in the room was 70% (SD ±10%). The plants were grown in 1 L pots filled with a free-draining peat-vermiculite (2:1 volume ratio) mixture, and hand-watered daily until saturated with freshly prepared nutrient solution (full strength Hoagland, pH 6).”

[†] Adapted from the brochure *Minimum guidelines for measuring and reporting environmental parameters for experiments on plants in growth rooms and chambers*



What to measure for accurate reporting	When to measure	What to report
Temperature (°C) Resistance, thermocouple or thermistor sensor (aspirated if in air)	At least once daily during light & dark periods	Mean & standard deviation (SD)
Photoperiod & PAR (h and μmol m⁻² s⁻¹) Quantum sensor for photosynthetically active radiation (PAR)	PAR: at start & end, and every 2 weeks of experiment	
Atmospheric moisture (kPa or %) Capacitance or dewpoint sensor, psychrometer or IRGA	At least once daily during light & dark periods	
* Carbon dioxide (μmol mol⁻¹) IRGA (infrared gas analyser)	At least hourly	
* Air velocity (m s⁻¹) Vane or hot-wire anemometer	At least once during experiment	
Liquid culture: pH pH probe	Before and after pH correction	
Liquid culture: conductivity (S m⁻¹) Electrical conductivity meter	Before and after EC correction	
Liquid culture: nutrients (mmol L⁻¹)	Initial and daily, or when replenished	Ionic concentration
Watering (L)	Daily, or when added	Frequency, amount and type of solution
Solid media: nutrients (mol kg⁻¹)	When added or replenished	Form and amount added

* Report if records are available, and always when it is a variable under investigation

For more advice on measurement and reporting, consult the brochure:
International Committee for Controlled Environment Guidelines (2004) *Minimum guidelines for measuring and reporting environmental parameters for experiments on plants in growth rooms and chambers.*