Light

The quantum sensor approximates PAR light, the radiation between 400 and 700 nanometers. These are the most influential wavelengths for optimum plant growth. PAR light is necessary for the plant to function properly. Light requirements differ between crops, but the rule of thumb is to allow the maximum amount of light possible. Growers commonly apply shade to decrease temperature and improve foliage. In some crops, such as tomatoes, the yield has been shown to be directly proportional to the amount of light. Limiting light may cause the stomates to close which prevents the leaves from cooling off. The data logger monitors the light available and records it as moles/day (Peet, 2002).

Moles/day is the unit for the Daily Light Integral (DLI); the amount of light present during a day. The DLI varies with the seasons, increasing in the spring and decreasing in the fall. The greenhouse film and structure allow 35-70% of the light to reach the plants. Environmental factors like dust and dew can also block light. Light transfer is hard to asses using the human eye because it adjusts immediately to the current light level. The only way to verify light quantity is to use a light meter (Faust, 2002).

Installation of light sensors

- Position the sensor in an appropriate area to monitor plant conditions.
- Make sure the quantum sensor is not being shadowed or blocked.
- Use the bubble level to ensure the sensor is horizontal.
- Inspect the sensors frequently to make certain they are clear of obstructions.

Contact your cooperative extension agricultural agent for further suggestions on field placement.

Plant-Specific Light Requirements

Light quantity is measured in a daily light integral (DLI) which refers to the total amount of light a plant receives in one day. A plant requires a minimum DLI just like it requires a certain amount of rainfall. The following values were obtained from a set of experiments performed at Clemson University.

SPRING EXPERIMENT

The spring experiment measured plant development at 0% shade (18 mol/day), 25% shade (12 mol/day), 50% shade (6 mol/day), and 75% shade (3 mol/day).

Plant	Commercially Acceptable Quality	Highest Quality
Begonia	6 mol/day	12 to 18 mol/day
Pansy	N/A	18 mol/day
Marigold	6 mol/day	N/A
Angelonia	12 mol/day	18 mol/day
Petunia	N/A	N/A
Impatiens	3 mol/day	6 to 12 mol/day

Plant-Specific Light Requirements

SUMMER EXPERIMENT

The summer experiment measured outdoor plant development at 0% shade (38 mol/day), 50% shade (15 mol/day), 70% shade (6 mol/day), and 90% shade (3 mol/day).

Plant	Commercially Acceptable Quality	Highest Quality
Agertum	15 mol/day	> 15 mol/day
Vincia	7 mol/day	N/A
Zinnia	N/A	38 mol/day

FALL EXPERIMENT

The fall experiment measured outdoor plant development at 0% shade (30 mol/day), 50% shade (13 mol/day), 70% shade (8 mol/day), and 90% shade (3 mol/day).

Plant	Commercially Acceptable Quality	Highest Quality
Geranium	13 mol/day	30 mol/day
Melampodium	8 mol/day	30 mol/day

General Light Requirements

Light Quantity (Daily Light Integral-DLI)	**Results**
< 5 mol/day	Produces poor quality plants
5-10 mol/day	Produces commercially acceptable plants Produces high quality plants for shade-adapted species
10-20 mol/day	Produces high quality plants

Dif

The model 2475 includes temperature, relative humidity and light sensors. This unit displays DIF, which is the average day temperature minus the average night temperature. This value is used to determine stem elongation. When day temperature is warmer than night temperature (positive DIF value) plants will become taller. When day temperature is cooler than night temperature (negative DIF value) less stem elongation will occur.