

Measuring Daily Light Integral (DLI)

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The daily light integral (DLI) concept measures the total amount of photosynthetic light plants receive during the day — not just the intensity of sunlight at a given moment. Conceptually, DLI is similar to how we measure rainfall. To measure DLI, we “collect” light throughout the day similar to a rain gauge.

Lavandula angustifolia ‘Hidcote Blue’

Daily Light Integral ($\text{mol}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$)
Low → → → → → → → → → → → High



Quality
Low → → → → → → → → → High

Photo courtesy of Beth Fauszy, Michigan State Univ.

How Does DLI Affect Growth?

Increasing DLI can:

- Increase plant mass (roots, shoots and flowers)
- Increase branching
- Reduce time to flower
- Increase flower size and number



This is a small, mobile sensor without data logging capabilities.

How Can You Measure DLI?

There are different ways to measure DLI in your greenhouse, but the two most common methods use:

- Mobile quantum (photosynthetic light) sensors (with or without data loggers)
- Quantum sensors that are connected to the greenhouse environmental control system

Here are a few tips for using DLI sensors:

- Place sensors at plant height and adjust the sensor height as the crop grows
- Use a level to make sure the sensor is level
- Keep the sensor clear of dust and debris by periodically washing with distilled water and a tissue
- If possible, return your sensors to the manufacturer every few years for re-calibration

DLI requirements differ between greenhouse crops as outlined in the table inside this brochure.



This is a mobile, self-contained data logger with a quantum sensor.

More DLI information is available in Commercial Greenhouse Production: *Measuring Daily Light Integral in a Greenhouse*, Purdue Extension publication HO-238-W (also in Spanish as HO-238-SW). Available from the Purdue Extension Education Store, www.the-education-store.com.



This is a quantum sensor that connects to a greenhouse environmental control system.

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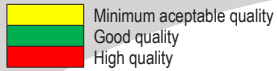
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DLI Requirements for Various Greenhouse Crops



1=Requires ample water to perform well at high-light levels.
 2=Requires cool or moderate temperatures to perform well at high-light levels.
 3=Stock plants perform well under higher light levels than finished plants.

Species	Average Daily Light Integral (Moles/Day)															
	Greenhouse															
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
Ferns (Pteris Adiantum)	Y	G	R	R	R											
Maranta	Y	G	R	R	R											
Phalaenopsis (orchid)	Y	G	R	R	R											
Saintpaulia	Y	G	R	R	R											
Spathiphyllum	Y	G	R	R	R											
Forced hyacinth	Y	G	R	R	R											
Forced narcissus	Y	G	R	R	R											
Forced tulip	Y	G	R	R	R											
Aglaonema		Y	G	R	R											
Bromeliads		Y	G	R	R											
Caladium		Y	G	R	R								1	1	1	
Dieffenbachia		Y	G	R	R											
Dracaena		Y	G	R	R											
Nephrolepis		Y	G	R	R											
Streptocarpus		Y	G	R	R											
Hosta		Y	G	R	R								1	1	1	
Hedera (English ivy)		Y	G	R	R											
Begonia (heimalis)		Y	G	R	R											
Sinningia		Y	G	R	R											
Schlumbergera		Y	G	R	R				2	2	2	2	2	2	2	
Cyclamen		Y	G	R	R											
Exacum		Y	G	R	R											
Heuchera		Y	G	R	R											
Coleus (shade)		Y	G	R	R											
Impatiens, New Guinea		Y	G	R	R											
Iris, Dutch (cut flowers)		Y	G	R	R											
Kalanchoe		Y	G	R	R											
Lobelia		Y	G	R	R								2	2	2	2
Primula		Y	G	R	R											
Impatiens		Y	G	R	R											
Pelargonium peltatum (Ivy geranium)		Y	G	R	R											
Begonia (fibrous)		Y	G	R	R											
Senecia (dusty miller)		Y	G	R	R											
Fuchsia		Y	G	R	R								2	2	2	2
Euphorbia (poinsettia)		Y	G	R	R								3	3	3	
Hydrangea		Y	G	R	R											
Lilium (asiatic and oriental)		Y	G	R	R											
Lilium longiflorum (easter lily)		Y	G	R	R											
Ageratum		Y	G	R	R											
Antirrhinum		Y	G	R	R											
Chrysanthemum (potted)		Y	G	R	R											
Dianthus		Y	G	R	R											
Gazania		Y	G	R	R											
Gerbera		Y	G	R	R											

Species	Average Daily Light Integral (Moles/Day)														
	Greenhouse														
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Hibiscus rosa-siniensis			Y	G	R	R	R	R	R	R	R	R	R	R	R
Lobularia			Y	G	R	R	R	R	R	R	R	R	R	R	R
Pelargonium hororum (zonal geranium)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Rose (miniature potted)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Salvia splendens			Y	G	R	R	R	R	R	R	R	R	R	R	R
Schefflera			Y	G	R	R	R	R	R	R	R	R	R	R	R
Angelonia			Y	G	R	R	R	R	R	R	R	R	R	R	R
Aster			Y	G	R	R	R	R	R	R	R	R	R	R	R
Salvia farinacea			Y	G	R	R	R	R	R	R	R	R	R	R	R
Iberis			Y	G	R	R	R	R	R	R	R	R	R	R	R
Catharanthus (vinca)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Celosia			Y	G	R	R	R	R	R	R	R	R	R	R	R
Chrysanthemum (garden)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Coleus (sun)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Coreopsis			Y	G	R	R	R	R	R	R	R	R	R	R	R
Cosmos			Y	G	R	R	R	R	R	R	R	R	R	R	R
Croton			Y	G	R	R	R	R	R	R	R	R	R	R	R
Dahlia			Y	G	R	R	R	R	R	R	R	R	R	R	R
Echinacea			Y	G	R	R	R	R	R	R	R	R	R	R	R
Ficus bejaminia			Y	G	R	R	R	R	R	R	R	R	R	R	R
Gaura			Y	G	R	R	R	R	R	R	R	R	R	R	R
Gomphrena			Y	G	R	R	R	R	R	R	R	R	R	R	R
Hemerocallis			Y	G	R	R	R	R	R	R	R	R	R	R	R
Lantana			Y	G	R	R	R	R	R	R	R	R	R	R	R
Lavendula (lavender)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Tagetes (marigold)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Petunia			Y	G	R	R	R	R	R	R	R	R	R	R	R
Phlox (creeping)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Rudbeckia			Y	G	R	R	R	R	R	R	R	R	R	R	R
Scaevola			Y	G	R	R	R	R	R	R	R	R	R	R	R
Sedum			Y	G	R	R	R	R	R	R	R	R	R	R	R
Thymus			Y	G	R	R	R	R	R	R	R	R	R	R	R
Verbena			Y	G	R	R	R	R	R	R	R	R	R	R	R
Viola (pansy)			Y	G	R	R	R	R	R	R	R	R	R	2	2
Zinnia			Y	G	R	R	R	R	R	R	R	R	R	R	R
Alstroemeria (cut flower)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Capsicum (pepper)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Chrysanthemum (cut flower)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Dianthus (carnation)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Gladolius (cut flower)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Lycopersicon (tomato)			Y	G	R	R	R	R	R	R	R	R	R	R	R
Rose (cut flower)			Y	G	R	R	R	R	R	R	R	R	R	R	R

Source: James E. Faust, *Ball Red Book*.