

## Supplemental Lighting Run Time Worksheet

Use this worksheet to calculate how long to run supplemental lighting in your greenhouse.

Steps:

1. What percentage of the sun does your greenhouse let through? On a sunny day, use a PAR meter <sup>(1)</sup> to measure the “sunlight outside”. Then, run inside and measure the “sunlight inside” just above your crop. Make sure your meter reads in  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ .

*“percent of sun getting in the greenhouse” = “sunlight inside” ÷ “sunlight outside”*

$$\underline{\hspace{4cm}} = \underline{\hspace{1cm}} \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1} \div \underline{\hspace{1cm}} \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$$

(the answer will be a decimal less than 1.0)

2. How much light does the sun give where you live at the time in question?

This is determined from the DLI maps or from a data recorder... call this *“DLI from sunlight outside”*. Remember, DLI means “Daily Light Integral” and is reported in  $\text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$ .

DLI maps can be found here: <https://www.canr.msu.edu/uploads/resources/pdfs/dli-maps.jpg>

$$\underline{\hspace{4cm}} \text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1} = \text{“DLI from sunlight outside”}$$

3. How much light does your crop get from the sun?

*“DLI from sunlight inside” = “DLI from sunlight outside” x “percent of sun getting in the greenhouse”*

$$\underline{\hspace{4cm}} \text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1} = \underline{\hspace{1cm}} \text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1} \times \underline{\hspace{4cm}}$$

4. How much total light does your crop need?

This is determined from crop production guides, research, Extension, etc.... call this *"Total DLI needed"*. It is reported in  $\text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$ .

\_\_\_\_\_  $\text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$  = *"Total DLI needed"*

5. How much additional light do your lamps need to add to the sunlight?

*"Additional light needed"* = *"Total DLI needed"* - *"DLI from sunlight inside"*

\_\_\_\_\_  $\text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$  = \_\_\_\_\_  $\text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$  - \_\_\_\_\_  $\text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$

6. How much instantaneous light do your lamps provide?

This is determined by using a light meter. Make sure it reads in  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ . Measure in the dark, the same distance below your lamps as the crop will be....call this *"Lamp Intensity"*

\_\_\_\_\_  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$  = *"Lamp Intensity"*

7. How many hours do you need to run the lamps to provide the additional light?

*"Hours to run lamps"* = *"Additional light needed"*  $\div$  (*"Lamp Intensity"*  $\times$  0.0036)

\_\_\_\_\_ hours = \_\_\_\_\_  $\text{mol}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$   $\div$  ( \_\_\_\_\_  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$   $\times$  0.0036)

**Be sure to do inside the parentheses first!**

Note:

- <sup>(1)</sup> a "PAR meter" measures "Photosynthetically Active Radiation" in  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ . Also called "PPFD" ("Photosynthetic Photon Flux Density") or "Quantum Flux"

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