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# Increasing blue light from LED's reduces growth of lettuce

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## Introduction

Despite years of research, the effect of light quantity (intensity) and quality (color) on plants remains poorly understood. Light emitting diodes (LEDs) now facilitate this research because of their narrow band output. Increasing blue light (400-500 nm) has been shown to reduce growth in some crops.

Red lettuce was used because of interest in its color response to light quality and quantity.

## Methods

The system included 16 chambers whose spectral output is show in **Fig. 1**:

- Eight at a low light ( $200 \mu\text{mol m}^{-2} \text{s}^{-1}$ )
- Eight at high light ( $500 \mu\text{mol m}^{-2} \text{s}^{-1}$ ) (Table 1)

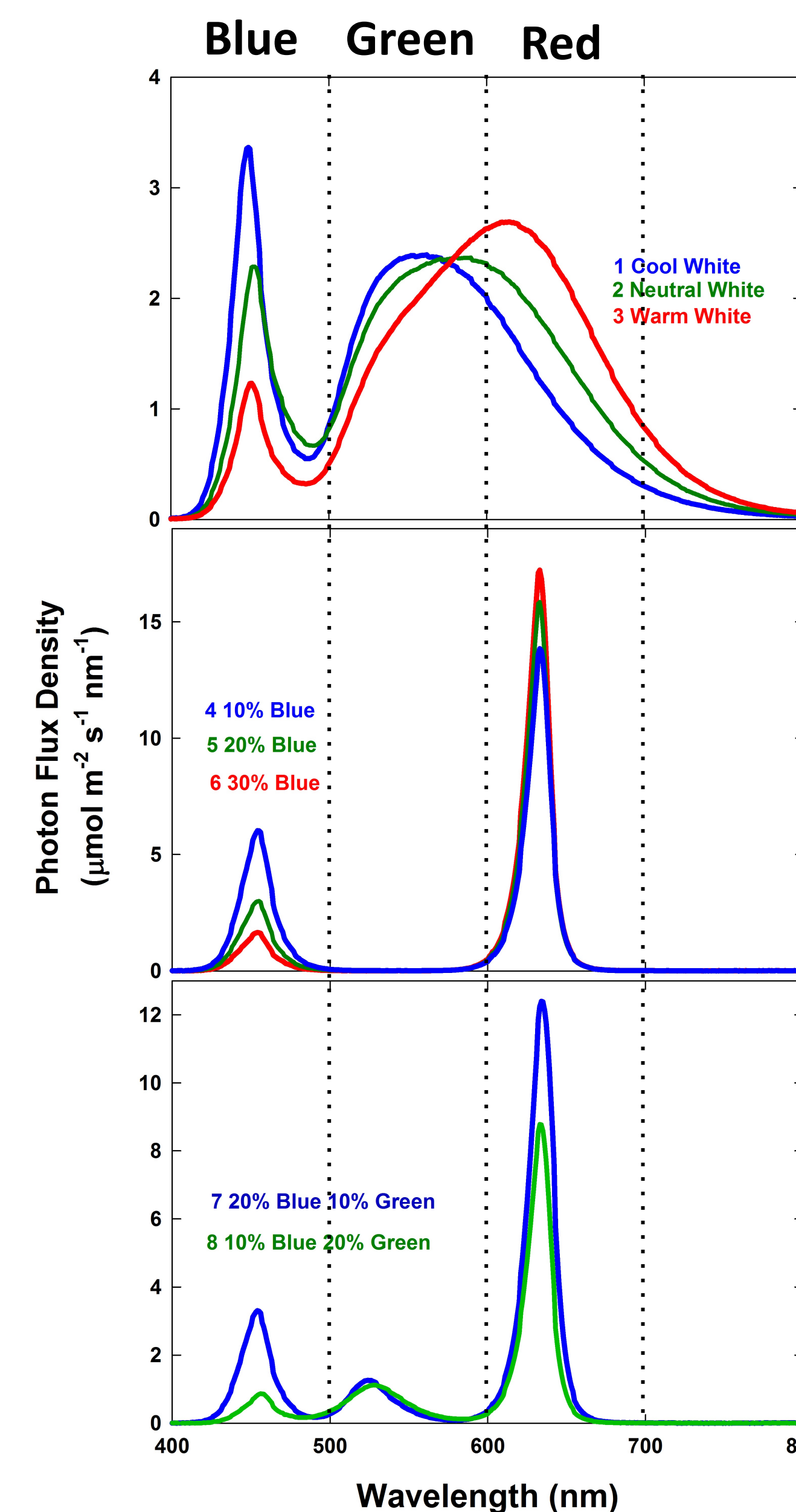
Other than light, all other environmental conditions, where the same for all chambers. Temperature was a 21 C day and 18 C night.

Plants were harvested 21 days after emergence.

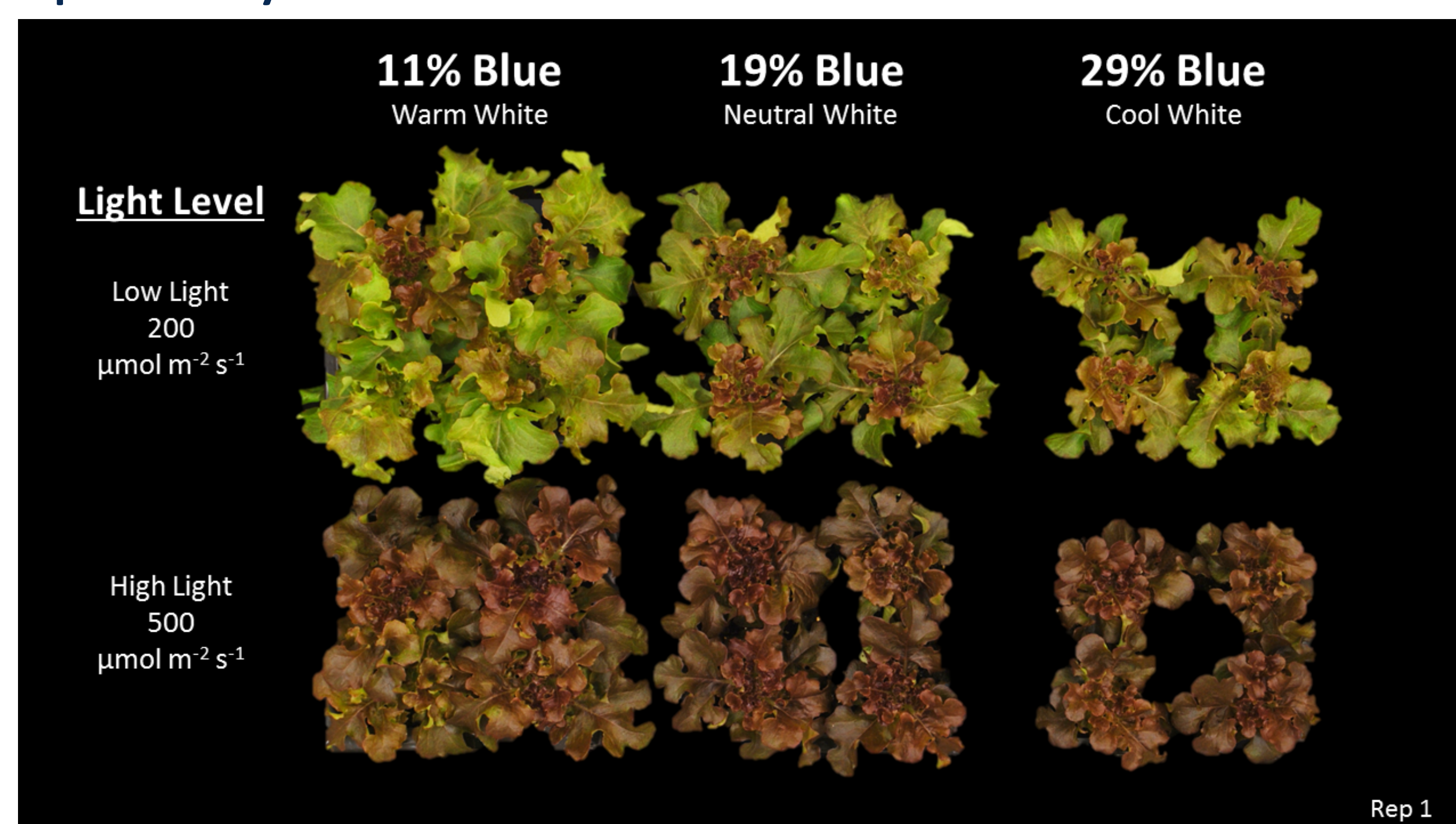
**Table 1:** Percent light in the 8 treatments

Chamber	% of total Light		
	Blue	Green	Red
1	27	48	25
2	19	46	35
3	11	41	38
4	10	0	90
5	20	0	80
6	30	0	70
7	20	10	70
8	10	20	70

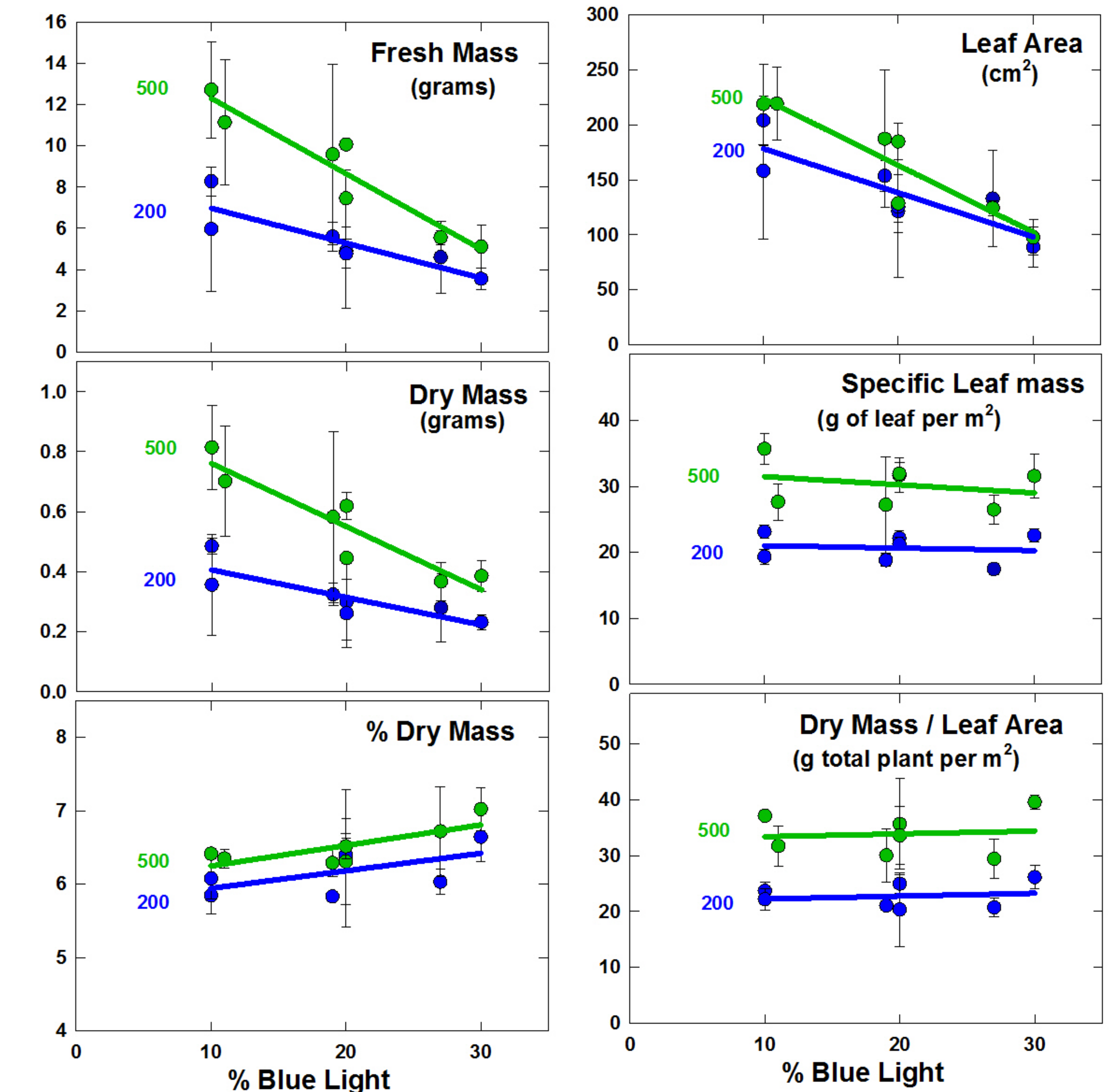
**Figure 1:** Spectral output of each treatment



**Figure 2:** Light quality altered growth and quantity altered color.



**Figure 3:** Effect of blue light on six growth parameters



## Results

Lettuce size was significantly reduced by light quality. Plants grown with high percentages of blue light were smaller than plants grown with less blue light (Figure 2 and 3).

Lettuce color was significantly affected by light quantity, but was not affected by light quality (Figure 1).

Lettuce at high light levels displayed more red leaf color than lettuce grown at low light levels.

## Conclusion

These data help to elucidate the effect of light quality and quantity on red lettuce.

The impacts of which are important for photobiology and also for commercial lettuce production.

