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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 shown in Fig. 1:
- Eight at a low light (200 μmol m$^{-2}$ s$^{-1}$)
- Eight at high light (500 μmol m$^{-2}$ 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 where harvested 21 days after emergence.

<table>
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<th>Chamber</th>
<th>% of total Light</th>
<th>Blue</th>
<th>Green</th>
<th>Red</th>
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<td>8</td>
<td>10</td>
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<td>70</td>
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</tbody>
</table>

Table 1: Percent light in the 8 treatments

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 where 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).

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.