# Light source effects on hydroponically grown compact 'Winter Density' bibb lettuce©

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There is growing concern about food safety, environmental impact, and efficient energy usage in horticultural production systems. Producing lettuce under different kinds of artificial lighting can be a solution addressing these concerns. Light-emitting diodes (LED) offer the advantages of a narrow light spectrum, low power consumption, and little heat production. The objective of this study was to determine the effects of different light sources and crop phenology (growth stage) on the growth of compact 'Winter Density' Bibb lettuce in a noncirculating hydroponic system. *Lactuca sativa* 'Winter Density' bibb lettuce seedlings were started in Oasis® cubes. Seedlings were transferred to 5.1-cm net pots and put in 1.9-L containers containing a hydroponic nutrient solution. The solution was composed of Hydro-Gardens' Hobby Formula 10N-$8P_2O_5$-$22K_2O$ hydroponic fertilizer with added magnesium sulfate (9.8% Mg). The lettuce was grown in a lab under high output T-5 fluorescent lights. The light level was 119.5 µmol $m^{-2}$ $s^{-1}$ with an air temperature of 22.6°C. The photoperiod was 16 h. After 10 d, half the plants in the containers were moved under red+blue+white LEDs for 10 more d. At the end of the study, plant height, shoot-root ratio, percent dry weight partitioned to shoots, nutrient solution used and electrical conductivity of the remaining nutrient solution were greater under fluorescent lighting. Root dry weight, percent dry weight partitioned to roots, and shoot dry weight per nutrient solution used were greater under LED lighting. There were no significant differences in shoot dry weight, total plant dry weight, SPAD readings, or pH of the remaining nutrient solution. In conclusion, moving lettuce plants from initial fluorescent lighting to LED lighting showed that crop phenology (growth stage) enhanced certain attributes of hydroponically grown compact lettuce.

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