Title prototype development of a plant-response experimental light-source system with LEDs of six peak wavelengths

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Abstract

A prototype of a light-source system has been designed and developed to support advanced experiments for plant light-response studies. The light-source system consists of light-emitting diodes (LEDs) of six types: violet, blue, green, orange-yellow, red, and far-red (peak wavelengths: 405, 465, 530, 595, 660, and 735 nm). The light-source system can produce light with different compositions of the six wavelength ranges, and can provide photosynthetic photon flux densities (PPFDs) of 416 μmol m^{-2} s^{-1} for an area of 0.18 m^2 at a distance of 175 mm below the LEDs. This PPFD is sufficient for cultivation experiments with almost all plants that might be grown under artificial light. This paper provides a technical description of the light-source system and the results of quantification tests.