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LED crop illumination inside space greenhouses

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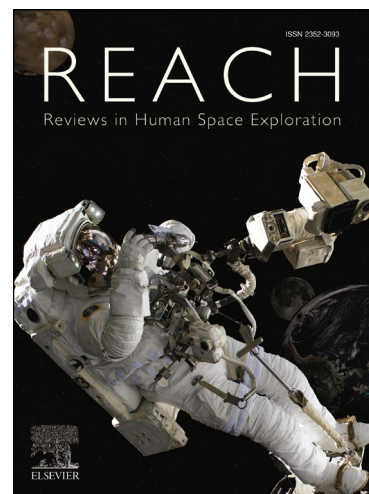
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LED crop illumination inside space greenhouses

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The LED lighting systems are regarded as perspective light sources for known and projectable space greenhouses (SG), as well as terrestrial greenhouses and plant factories on the Earth. At the same time, inconsistency of information about physiological effects produced by LED lighting and irregular character of plant responses to LED lighting have so far restricted the application of LED light systems. This review provides an analysis of the current concepts concerning the role of light for photoautotrophic plants and paths of interaction between different plant light perception systems. We summarize the accumulated knowledge about the main reactions of plant species to narrow-band lighting. We also provide an analysis of the basic parameters of plant lighting regimes – photosynthetic photon flux density, photoperiod, light spectrum and pulsed light vs continuous light – and their influence on crop light use efficiency. We discuss possible quantitative criteria for the evaluation of plant lighting regime quality inside the SG, and highlight the importance of statistical methods of experimental data analysis and the need to minimize the number of optimized parameters. Multi-factorial plant experiments and posterior regression analysis can be a convenient approach to optimize LED irradiation inside space greenhouses.

Key words: space greenhouse, LED lighting systems.

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