

FLUORESCENT LIGHT EFFICIENCY

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"Critical experiments show that maximum growth of most plants under cool white fluorescent lights will be equivalent to or better than that obtained under the blue-red phosphors." This quote from the Connecticut Greenhouse Newsletter 60:1-3, 7/74, is confirmed by a paper by Itzhak Biran and Anton M. Kofranek (J. ASHS 101(6): 625-628, 11/76).

In this paper, Cool White lamps were found to be the most efficient based on growth of Tradescantia fluminensis and by mathematical calculations. The abstract of their paper is as follows:

"The relative efficiency of several types of fluorescent lamps (General Electric) for dry matter production was examined both experimentally and by mathematical calculations. The highest yield of Tradescantia fluminensis plants per electrical energy input unit was obtained with Cool White lamps. In comparison to Cool White lamps the yield under other lamps was: Daylight = 88%; Cool White Deluxe = 73%; Plant Light = 72%; Pink + Blue = 36%. Similar results were found using calculations based on the action spectrum for photosynthesis of an "average leaf" proposed by McCree (8), the spectral energy distribution curves of the different lamps and the illuminance (lux) at the plant level. Measurement of the rela-

tive efficiency based on input wattage of Cool White (General Electric) and Agro-lite (Westinghouse, F-40/AGRO) fluorescent lamps for dry matter production of 9 foliage plant species showed an average 9% advantage of the Cool White lamp. We propose that fluorescent lamp evaluation for plant growth be standardized using McCree's or Balegh and Bidulph's equation for predicted photosynthetic efficiency."

If Cool White is considered as 100%, Agro-lite lamps had an efficiency of 90%, Daylight 88%, and Plant Light 72%. While the blue-red lamps have a special use for aesthetic purposes, Biran and Kofranek reinforce the premise that, for maximum growth, Cool White lamps are the most efficient fluorescent light source available.