

New Daily Light Integral Maps for the United States

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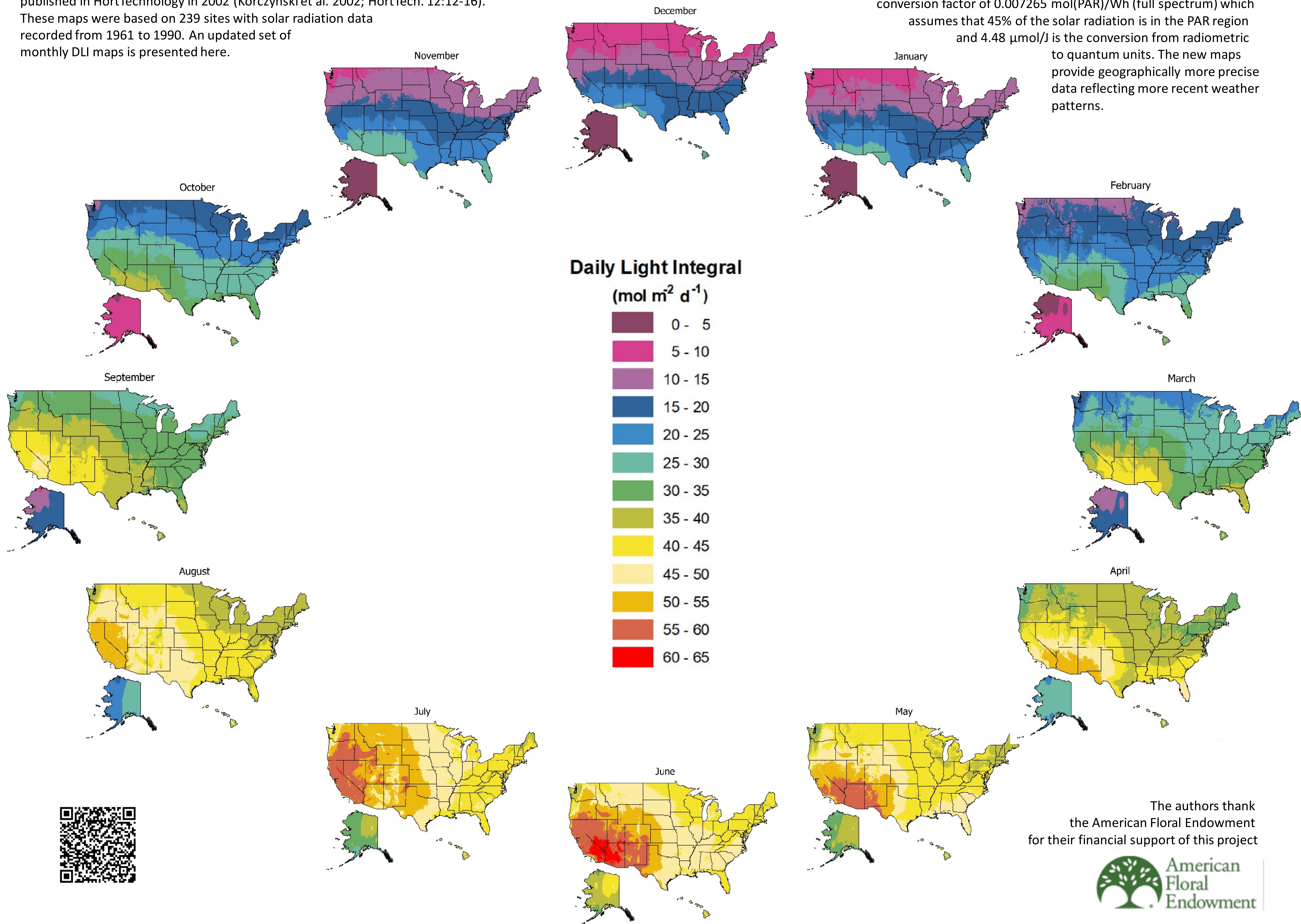
INTRODUCTION

Daily Light Integral (DLI) represents the total photosynthetically active radiation accumulated over one day. Since plants are essentially accumulators of solar radiation, this measurement is extremely useful for describing solar radiation as it affects plant growth. Over the past few decades, DLI has become a familiar measurement for plant scientists as well as commercial growers.

A set of 12 monthly DLI maps for the lower 48 states in the U.S. was originally published in HortTechnology in 2002 (Korczynski et al. 2002; HortTech. 12:12-16). These maps were based on 239 sites with solar radiation data recorded from 1961 to 1990. An updated set of monthly DLI maps is presented here.

METHODOLOGY

Solar radiation data were utilized from the National Solar Radiation Database provided by the National Renewable Energy Laboratory. The new DLI maps presented here are based on an updated database that includes data from 1991 to 2010. The new database provides higher resolution data modeled from satellite images of cloud cover. The data are presented in pixels with one pixel representing each 10 km² area of land across the U.S. The database provides global horizontal irradiance (unit) data that are converted to DLI (mol m⁻² d⁻¹) using the conversion factor of 0.007265 mol(PAR)/Wh (full spectrum) which assumes that 45% of the solar radiation is in the PAR region and 4.48 μmol/J is the conversion from radiometric to quantum units. The new maps provide geographically more precise data reflecting more recent weather patterns.



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