

عنوان مقاله:

The relationships between carbon isotope discrimination and photosynthesis and rice yield under shading

محل انتشار:

مجله تولید گیاهان، دوره 10، شماره 4 (سال: 1395)

تعداد صفحات اصل مقاله: 14

نویسندگان:

L. Wang - Key Laboratory of Crop Ecophysiology and Farming System in Southwest China, Ministry of Agriculture, Sichuan Agricultural University, Chengdu 611130, China

F. Deng - Key Laboratory of Crop Ecophysiology and Farming System in Southwest China, Ministry of Agriculture, Sichuan Agricultural University, Chengdu 611130, China

T.Q. Lu - Mianyang Institute of Agricultural Sciences, Mianyang 621023, China

M. Zhao - Key Laboratory of Crop Ecophysiology and Farming System in Southwest China, Ministry of Agriculture, Sichuan Agricultural University, Chengdu 611130, China

خلاصه مقاله:

The measurement of carbon isotope discrimination (Δ) provides an integrated insight into the response of plants to environmental change. To investigate the potential use of Δ for identifying shade tolerance in rice, five rice varieties were selected and artificially shaded (53% light reduction) during the grain-filling period in 2010 and 2011, in Sichuan, China. Shading treatment had a significant influence on the Δ of rice organs, resulting in clear increases in the Δ of stems plus sheaths (Δ Sm), rice grains (Δ Gm) and rice flour (Δ Fm) at maturity, but a reduction in the Δ of leaves (Δ Lg) at the grain-filling stage. The relationships between Δ and leaf photosynthetic and chlorophyll fluorescence characteristics and grain yield showed a close dependence on plant organs and light regimes. Under shading treatment, photosynthetic rate was negatively associated with Δ Gm and the Δ of stems plus sheaths at the grain-filling stage (Δ Sg), whereas Δ Sm was significantly (PPSII (PSII), photochemical quenching (qP) and non-photochemical quenching (NPQ). Moreover, grain filling and grain weight under shading treatment were positively correlated with Δ Sg, but negatively related to Δ Sm in 2011. In contrast, a significant association between grain weight and Δ Lg was observed in 2010. It was found that lower values of Δ Lg, Δ Sm and Δ Gm in rice indicated better light-harvesting and light-use capability and also higher grain filling and grain weight of rice.

کلمات کلیدی:

Carbon isotope discrimination, Light regime, Photosynthesis, Rice

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/939120>



