

Selecting research of candidate crops in controlled ecological life support system(CELSS)

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In order to select appropriate biological components for controlled ecological life support system(CELSS) supporting future long-duration space mission and planetary exploration/habitat, five crops of lettuce(“neilvnanyou”, “dasusheng”, “naichoutai”, “dongfangkaixuan” and “sijiyoumaicai”), two crops of spinach(“daye” and “quan-neng”), one rape(“jingyou No.1”) and one common sowthistle were grown in Controlled Ecological Life Support Technique Complex Experimental System. Nutrient solution, light period and intensity, atmospheric temperature, relative humidity, O₂ and CO₂ concentration in the system were all regulated automatically. Canopy photosynthetic rate, transpiration rate were measured at different growing stages at different CO₂ levels (500,1000,1500 and 2000 $\mu\text{mol}\cdot\text{mol}^{-1}$) and different light intensities(100, 300, 500 and 700 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$). Three crops of lettuce “neilvnaityou”, “dasusheng” and “youmaicai”, one common sowthistle were selected based on their high productivity, nutrient composition and content, photosynthetic rate and transpiration rate, which is necessarily benefit for further research of CELSS.