

2种晚实核桃光合特性及产量变化

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摘要:【目的】探讨2种晚实核桃(*Juglans regia* L.)光合特性及与产量之间的关系,为其丰产栽培提供理论依据。【方法】用便携式Li-6400光合仪和PAM-2100叶绿素荧光分析仪,以晚实核桃品种‘清香’‘晋龙1号’为试材,在自然条件下测定光合荧光参数及其产量变化。【结果】‘晋龙1号’和‘清香’净光合速率(P_n)日变化均为双峰曲线,在13:00出现显著的光合“午休”现象;光饱和点(LSP)分别为1 612.5、1 716.7 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$,光补偿点(LCP)分别为37.32、49.27 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$,表观量子效率(AQY)分别为0.031 8、0.037 6,最大净光合速率(P_{max})分别为11.40、18.68 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ 。‘清香’具有较佳的光合能力。在13:00前后最大光能转化效率(F/F_m)、实际光化学效率(Yield)、光化学淬灭(qP)、qN及Yield在全天几乎均高于‘晋龙1号’,表现出较好的光能转化效率和胁迫耐受性。2者在单株产量和平均公顷产量上也表现出极显著差异,‘清香’是‘晋龙1号’的1.77倍。【结论】2种晚实核桃中午 P_n 的下降由非气孔限制引起,光合能力与单株产量呈极显著正相关;其需要强光而对弱光响应不敏感的特性适宜稀植,从而提高核桃的产量。

关键词:晚实核桃;光合特性;荧光特性;产量

中图分类号:S664.1

文献标志码:A

文章编号:1009-9980(2017)07-0851-10

Studies on photosynthetic characters and their relationship with yield in two late season walnut cultivars

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Abstract: 【Objective】The purpose of the study was to explore the relationship between photosynthetic characters and productivity in two late season walnut cultivars in order to provide theoretical reference for high yielding cultivation. The changes in the photosynthesis, chlorophyll fluorescence and yield per plant in the two cultivars were studied in this experiment. 【Methods】The two late season walnut cultivars, ‘Qingxiang’ and ‘Jinlong1’, were used as the materials. The trees grown at a space of 5 m×6 m were ten years old and cultivated according to the conventional management. The soil was sandy loam, and water and fertilizer management was poor in orchard. Determination of changes in photosynthetic and fluorescence parameters, fruit yield and kernel yield per plant was under normal circumstances. Photosynthetic and environmental parameters were determined using a portable photosynthetic analyzer (Li-6400, USA) and a chlorophyll fluorescence analyzer (PAM-2100, Germany). The experiment was conducted in July 2016 in a walnut orchard in south mountain of Chengxian, Longnan. The measurements were carried out on July 1 and 2, July 11 and 12 and July 21 and 22. Three grafted walnut seedlings were selected for each cultivar, and the fifth or sixth functional leaves of the middle compound leaves from three new branches in the same growth direction of the outer canopy of each tree were measured. The diurnal variation of photosyn-

收稿日期: 2016-12-12 接受日期: 2017-03-21

基金项目: 国家星火计划项目“秦巴山区核桃产业发展关键技术集成与示范”(2015GA860002)

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