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调亏灌溉对滴灌成龄香梨果树生长及果实产量的影响

Impact of regulated deficit irrigation on growth and fruit yield of mature fragrant pear trees under trickle irrigation

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中文关键词: [灌溉](#),[土壤水分](#),[品质控制](#),[调亏](#),[水分利用效率](#),[营养生长](#),[果实生长](#)

英文关键词: [irrigation](#) [soil moisture](#) [quality control](#) [regulated deficit](#) [water use efficiency](#) [vegetative growth](#) [fruit growth](#)

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中文摘要:

调亏灌溉对果树节水、提高果实产量和品质具有一定效果。2009—2010年, 在新疆库尔勒巴州农业科学研究所进行试验, 研究滴灌调亏时间及土壤水分亏缺程度对树龄24 a的成龄库尔勒香梨果树生长及产量的影响。果实细胞分裂期、果实缓慢膨大期、果实细胞分裂期至缓慢膨大期, 分别进行中度土壤水分亏缺与重度土壤水分亏缺灌溉。中度土壤水分亏缺的灌水量为美国A级蒸发皿蒸发量(Ep)的60%, 重度土壤水分亏缺的灌水量为Ep的40%。其它时段灌水量与对照相同, 为Ep的80%; 对照处理整个生育期灌水量均为Ep的80%。灌溉周期为7 d。结果表明, 前2个生长阶段的调亏灌溉均抑制了香梨树的营养生长, 提高了香梨果实产量和灌溉水利用效率。各调亏处理的夏季修剪量比对照减小了8.4%~43.2%。2 a内, 细胞分裂期重度调亏处理, 产量分别比对照增加了15.5%和19.2%, 较对照节水9.7%和8.1%; 果实缓慢膨大期中度调亏处理, 产量分别比对照增加了14.0%和18.0%, 较对照节水13.2%和11.3%; 果实细胞分裂期及果实缓慢膨大期的重度调亏处理, 产量分别比对照减少了15.4%和13.2%, 较对照节水34.7%和28.4%。调亏灌溉对香梨果实品质无显著影响。结果对成龄库尔勒香梨灌溉管理具有指导意义。

英文摘要:

Regulated Deficit Irrigation (RDI) is known to have higher water use efficiency, and higher fruit yield with better quality. Field experiments were conducted during 2009 and 2010 in Korla city, Xinjiang autonomous region, to investigate the effects of RDI applied in different growth stages and with different levels of water deficit on vegetative, fruit growth and yield of mature fragrant pear trees of 24 years old. The experimental treatments involved moderate and severe water deficit, in either the cell division period or in the slow fruit growth period or in both periods. Trickle irrigation, with 2 driplines, one on each side of the trees was adopted. The moderate RDI used 60% and the severe used 40% replacement of US Class A pan evaporation, respectively. Irrigation amount during non-deficit stages was the same as in the control treatment. The control treatment was irrigated at 80% of pan evaporation during the whole growth season and all treatments were irrigated weekly. The results showed that the water deficit applied during both cell division and/or slow fruit enlargement stage inhibited the vegetative growth. Compared with the control, the summer pruning of the RDI treatments was reduced by 8.4%-43.2%. In both years, as compared with the control, the severe water deficit irrigation during cell division stage significantly increased yield by 15.5%-19.2%, and reduced the irrigation water by 9.7%-8.1%. The yield of moderated water deficit irrigation in slow fruit enlargement stage was increased by 14.0%-18.0%, and the irrigation water was reduced by 13.2%-11.3%. The yield of severe water deficit irrigation during both cell division and slow fruit enlargement stages was decreased by 15.4%-13.2%, and the irrigation water reduced by 34.7%-28.4%. Fruit quality had no significant differences among the treatments. The results are meaningful to guide the irrigation management of mature Korla fragrant pear trees.

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