温室采用多层内覆盖保温节能效果研究

Effect of heat preservation and energy-saving by applying multi-layer thermal screen in greenhouse

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中文摘要：

采用减小直接加热空间的温室节能措施，设计建造了试验温室，以乙烯-醋酸乙烯(EVA)膜作为水平内覆盖材料，以针织毡保温被作为温室侧墙内垂直保温覆盖材料，夜间在水源热泵加温条件下，研究了温室内增加1层水平保温覆盖、增加2层水平保温覆盖、四周侧墙内增加垂直保温覆盖对温室夜温变化的影响，以温室内外平均温差、相对节能率为指标，比较了温室不同保温措施的保温节能效果，结果表明：增加第1层水平保温覆盖可使温室内外温差提高1.9℃;增加2层水平保温覆盖可使温室内外温差再提高1.6℃；再在温室四周侧墙内增加针织毡保温被，还可使温室内外温差再提高1.7℃，与未采取附加覆盖的温室(对照)相比，3种保温措施的相对节能率分别为20.34%、31.78%、40.53%，温室3种内覆盖新增投资的静态投资收益率远高于现代农业的基准收益率。

英文摘要：

The greenhouse was designed and constructed by reducing heating space measure. The ethylene-vinyl acetate copolymer (EVA)film and knitted glass mat as the material for heat preservation were selected. In the night, the temperature was measured in the greenhouse heated by water source heat-pump under different heat preservation measures. The effects of energy-saving were compared respectively in the parameters, temperature difference between inside and outside of the greenhouse, relative energy-saving ratio at the different heat preservation measures. The result showed: adding the first horizontal thermal screen layer(EVA) inside the greenhouse, the temperature difference between inside and outside of the greenhouse was increased by 1.9℃, and the temperature difference was increased by 1.7℃, 1.6℃ respectively by adding the second(EVA) and the vertical thermal screen layer(knitted glass mat) inside the greenhouse wall. Comparing with the condition without any thermal screen inside the greenhouse, the relative energy-saving ratio of the three kinds of heat preservation measures were increased by 20.34%, 31.78% and 40.53%, respectively and the return efficiencies of the investment of the three kinds of heat preservation measures were greatly higher than that in the modern agriculture industry.

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