基于蒸发量的膜下滴灌棉花灌溉预警装置设计与试验 Design and Experiment of Scheduling Irrigation Device Based on Pan Evaporation for Drip-irrigated Cotton under Plastic Mulch

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关键词： 棉花 灌溉预警 蒸发 膜下滴灌

摘 要： 设计了一种基于蒸发量的简易灌溉预警装置，并建立了基于水量平衡原理的灌溉预警模型。通过田间试验，确定了适宜供水条件下新疆膜下滴灌棉花各生育阶段的蒸发皿—作物系数，并建立了适宜的灌溉预警指标，提出了降雨条件下的指标修正方法。田间应用表明，在北疆棉花膜下滴灌条件下，苗期、蕾期、花铃期和吐絮期分别以累计蒸发量达到140、75、50和120 mm来控制灌水时间，以0.15、0.4、0.7和0.25倍的累计蒸发量作为灌水量进行灌溉管理，可达到节水、高产的目的。 A simple visual device for scheduling irrigation based on pan evaporation for drip-irrigated cotton under plastic mulch was designed, and an irrigation scheduling model based on field water budget was established. The most suitable plant-pan coefficient for drip-irrigated cotton under plastic mulch and the indicators to schedule irrigation were determined in field conditions, while a revision method for the indicators was proposed under rainfall conditions. The field test proved that it was an effective way to program drip-irrigated cotton irrigation, once marked, there was no need for human intervention beyond checking the position of the water level in relation to the irrigation control marks. The suitable irrigation intervals based on pan evaporation at 140, 75, 50 and 120 mm and irrigation water amount of 0.15, 0.4, 0.7 and 0.25 times of accumulated pan evaporation for seedling stage, bud stage, flowering and bolling stage, and boll opening stage, respectively, could be recommended for drip-irrigation cotton under plastic mulch in the north of Xinjiang area, China.

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