不同种植模式麦田水资源利用率及边际效益分析 Effects of Different Planting Patterns on Water Use Efficiency and Marginal Profits of Winter Wheat

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关键词： 冬小麦 种植模式 水资源利用率 边际效益

摘 要： 选用山东省当前推广面积较大的“20+40”大小行、“20+40”沟播、“20+40”垄作以及常规等行距模式，研究不同种植模式对冬小麦农田水资源利用效率和边际效益的影响。结果表明，等行距、大小行、沟播和垄作种植模式的最大产量分别为7778.6、7624.8、8684.6和8893.7 kg/hm2，表明沟播和垄作都具有提高冬小麦产量的潜力，但在获得最大产量时，垄作的蒸散量比沟播提高了76.6 mm。沟播和垄作的最大水分利用效率均低于等行距和大小行，但沟播的最大水分利用效率在产量和蒸散量分别为7858.8 kg/hm2和407.5 mm时获得，均显著高于其余3种种植模式。综合考虑各种种植模式的水资源利用效率和边际效益，以灌拔节和抽穗水条件下沟播的净收益最高，其产量为8186.3 kg/hm2，灌溉量为120 mm，蒸散量为423.5 mm，水分利用效率为19.3 kg/(hm2?mm)。表明在亏缺灌溉条件下，沟播是最适合在山东省推广的冬小麦节水种植模式。 In Shandong Province, water shortage is the most important problem for winter wheat production. Four planting patterns, i.e., uniform row, “20+40” wide-narrow row, “20+40” furrow planting, and “20+40” bed planting patterns which were widely used in Shandong Province were selected for the experiment to study the effect of planting patterns on water use efficiency (WUE) and marginal profits of winter wheat. The results indicated that the max yield of uniform row, wide-narrow row, furrow planting and bed planting were 7778.6, 7624.8, 8684.6 and 8893.7 kg/hm 2 respectively. But, if get the max yield, evapotranspiration of bed planting pattern was higher than that of furrow planting pattern by 76.6 mm. The max WUE of furrow planting was lower than those of uniform row and wide-narrow row planting, so did bed planting. But if get the max WUE yield and evapotranspiration of furrow planting pattern was 7858.8 kg/hm2 and 407.5 mm respectively, they were all significantly higher than those of uniform row, wide-narrow row and bed planting patterns. Take the water resource use efficiency and marginal profits as a whole, furrow planting pattern irrigated at jointing and heating growth stages could get the highest netincome, under these conditions, yield was 8186.3 kg/hm2, irrigation amount was 120 mm, evapotranspiration was 423.5 mm, and WUE was 19.3 kg/(hm2?mm). The experiment showed that under water deficit, furrow planting was the most appropriate planting patterns in Shandong Province.

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