中国农学通报 2011, 27(第9期4月) 299-304 DOI: ISSN: 1000-6850 CN: 11-1984/S

农学—应用研究

垄沟覆膜集雨边行玉米与中行玉米竞争对产量的影响

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摘要:

为了给旱地玉米水分利用和产量提高提供理论依据和科学指导，此研究从植物种内竞争的角度出发，来探讨垄沟覆膜集雨玉米如何高效利用水分和提高产量。试验设有2种类型的垄沟覆膜集雨，它们的沟宽均为60 cm，而垄宽分别为30 cm和60 cm。设有高、低2种种植密度，高密度每沟种植三行，低密度每沟种植两行。裸地为对照，同样设有高低2个种植密度。结果表明，垄沟覆膜集雨具有聚雨保墒的作用。整个生育期间的玉米单株和单位面积生物量，以及收获时的生物产量、籽粒产量和水分利用效率，垄沟覆膜集雨都显著高于裸地。相同垄宽的垄沟覆膜集雨，当密度较高时能明显提高玉米的生物量、籽粒产量及水分利用效率。受密度效应的影响，8月15后60 cm和30 cm垄宽的高密度垄沟覆膜集雨，它们中行玉米的单株生物量都显著低于它们边行玉米的单株生物量；收获时30 cm垄宽的垄沟覆膜集雨中行玉米的收获指数较低，导致该处理较低的收获指数和较低的产量。在所有的处理里，60 cm垄宽的高密度垄沟覆膜集雨处理的单位面积产量最高。总之，高密度、宽垄垄沟覆膜集雨的种植模式是提高玉米产量和水分利用的一个重要方面。

关键词:

The influence of Competition between Edge Line Corn and Middle Line Corn on Yield in Plastic Film Mulching on Ridge for Rainwater- harvesting

Abstract:

Abstract: In order to provide a theoretical basis and scientific guidance for the water use and yield increase of corn, according to intraspecific competition, the study explored how to increase water use and corn yield in the ridges mulched with plastic film for rainwater-harvesting. There were two types of plastic film mulching on ridge for rainwater-harvesting, which had the same furrow of 60 cm, and their ridge widths were 30 cm and 60 cm, respectively. The two planting density of high and low were used for this plastic film mulching on ridge for rainwater-harvestings. There were three lines corn planted in the furrow in the high planting density and two lines corn in the low planting density. As the control, the bare land also had two planting densities of high and low. The results showed that the rainwater-harvesting had the role of rainwater harvesting and holding soil water. The biomass of single plant and per unit area in the whole growth period, biomass of per unit area at harvest, grain yield and water use efficiency at harvest were significant higher in the ridges mulched with plastic film for rainwater-harvesting than in the bare land. In the ridges mulched with plastic film for rainwater-harvesting of the same ridge width, the high planting density was benefit for the increasing of biomass, grain yield and water use efficiency. After Aug. 15th, due to density effect, the biomass of single plant in the high planting density corn of 60 cm and 30 cm ridge was significant lower than in the middle line than in the edge line, and there was lower harvest index value in the middle line than in the edge line in the 30 cm ridge mulched with plastic film for rainwater-harvesting at harvest, which was the main reason for the lower harvest index and grain yield in the high planting density of 30 cm ridge mulched with plastic film for rainwater-harvesting. There was the highest grain yield in the high planting density of the 60 cm ridge mulched with plastic film for rainwater-harvesting in all treatment. In general, the high planting density and wide ridge for the ridges mulched with plastic film for rainwater-harvesting were the important aspect for the increase of grain yield and water use in the corn of dry land.

Keywords: edge line growth advantage

收稿日期 2010-10-22 **修回日期** 2010-12-03 **网络版发布日期** 2011-04-25

DOI:

基金项目:

河南科技大学科学研究基金资助;河南科技大学博士科研启动基金资助

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