

农学—应用研究

不同覆盖材料土壤水温效应与作物增产效应分析

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摘要:

在位于山西省阳曲县河村的“国家‘十一五’支撑计划农业综合节水研究示范基地”，采用大田试验对不同材料（普膜、降解地膜、秸秆、液膜）覆盖下的土壤水分和温度动态变化以及玉米生长和产量效应、WUE进行了研究，并分析了不同覆盖材料的经济效益。结果表明：供试降解膜和普膜覆盖均具有显著的增温效果和一定的保水作用，秸秆覆盖同时具有显著的降温作用和保水作用，而供试液膜只具有一定的增温效应，无保水作用，不同覆盖材料的增温或降温效应主要表现在玉米生育前期。供试降解膜和普膜覆盖均显著促进了玉米生长发育，玉米产量和WUE以降解膜覆盖最高，普膜覆盖次之，但经济效益以普膜覆盖最好，降解膜覆盖次之。供试液膜对玉米生长也具有一定促进作用，玉米产量、WUE和经济效益也均略好于CK，但差异均不显著。而秸秆覆盖影响了玉米生长发育，产量、WUE和经济效益均显著低于CK。由以上结果可见，在试验区域低温干旱并存的条件下，有效的覆盖材料应同时具备增温作用和保水作用，而且增温作用较保水作用更为重要。因此，秸秆不适合作为低温干旱并存区域的覆盖材料，供试液膜因其效果欠佳也不适宜推广应用，而普膜覆盖的推广应用可获得最大的经济效益，但考虑到普膜的环境污染成本，供试降解膜具有良好的推广应用价值。

关键词: 经济效益

Effects of Different Mulching Materials on Soil Moisture and Temperature and Crop Yield

Abstract:

A field experiment was conducted to study the influences of different mulching materials (ordinary plastic film (OFM), degradable film (DFM), straw (SM), and liquid film (LFM)) on the dynamics of soil moisture and temperature, the effects of corn growth and yield, and WUE, and the economic benefits of different mulching materials were analyzed at the same time, at the demonstration base of agricultural integrated water-saving research of state eleventh five-year supporting plan. The results indicated that the experimental DFM and OFM both had significant temperature-increasing effect and certain water-conserving effect, SM had significant temperature-decreasing effect and water-conserving effect together, experimental LFM only had certain temperature-increasing effect, but no water-conserving effect. The temperature-increasing or decreasing effects of different mulching materials mainly appeared in the earlier stage of corn growth and development. Experimental DFM and OFM both promoted corn growth and development, the corn yield and WUE of DFM were both highest, but the economic benefit of OFM was highest. Experimental LFM also had certain promoting effect to corn growth and its corn yield, WUE, and economic benefit were all slightly better than that of CK. SM showed adverse effect on corn growth and development, its corn yield, WUE, and economic benefit were all significantly lower than that of CK. The following conclusion could be obtained according to above results: the good mulching material must have temperature-increasing effect and water-conserving effect together, and the temperature-increasing effect was more important than water-conserving effect in the experimental area with low temperature and drought together. Therefore, straw was not suitable as mulching material, experimental liquid film was also not suitable to popularize and apply, the popularization and application of ordinary plastic film could obtain highest economic benefit, and the experimental degradable film could substitute ordinary plastic film as mulching material from the view of economical effect and environmental effect in the low temperature and drought area.

Keywords: economic benefit

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