EFFECTS OF DEGRADABLE MULCHING FILM ON SOIL TEMPERATURE, SEED GERMINATION AND SEEDLING GROWTH OF DIRECT-SEEDED RICE (ORYZA SATIVA L.)

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摘要

The effect of degradable mulching film on dry direct- seeded rice remains largely unknown. Then the aim of this research is to investigate the effects of degradable mulching film on dry direct-seeded rice. A field investigation of four treatments (CK: non-mulching; MF1: a degradable film (Shanghai Hongrui Biotech, Shanghai, China); MF2: a degradable film (Xifeng Plastic Corp. Ltd., Baishan, China); MF3: common agricultural mulching film (Jialiming New Material Corp Ltd., Hinggan League, China)) was conducted to evaluate the effects of degradable mulching film on the rice seed germination, seedling growth, soil temperature, and grain yield of dry direct-seeded rice. The results showed that compared to CK, mulching film treatments increased soil temperature, especially at night time, improved seed germination rate, plant height, leaf area of seedlings, and grain yield. MF1 showed good degradation performances and had the highest soil temperature at the night time of 13.65 degrees C 14.08 degrees C, grain yield at 7.938t ha(-1), and seedling growth with shoot dry mass at 46.73 mg plant(-1) and root dry mass at 31.34 mg plant(-1). The germination rate significantly increased by 6.99%-755.60% at MF1 as compared to CK. Overall, mulching films resulted in high yield due to the increasing soil temperature, seedling germination, and improving seedling growth, amongst MF1 performance the best.

关键词

作者关键词: hill-drop drilling; grain yield; degradation progress; leaf area; root to shoot ratio
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10.

Effects of small ridge and furrow mulching degradable film on dry direct seeded rice.

作者: Li, Hui; Zeng, Shan; Luo, Xiwen; Fang, Longyu; Liang, Zhanhao; Yang, Wenwu

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摘要

Global climate change and socio-economic development have led to a shortage of water and labour resources, which has had a significant impact on rice cultivation. In this study, the application of micro-ridge-furrow planting technology and degradable film mulching in dry direct-seeded rice was investigated to address the factors restricting the development of the rice industry and reduce the impact of rice production on the environment. The effects of a micro-ridge-furrow planting pattern and degradable film mulching on soil temperature, seedling growth, and yield of dry direct-seeded rice in a semiarid region of China were studied through three field experiments: micro-ridge-furrow mulching with traditional plastic film (T1); micro-ridge-furrow mulching with degradable film (T2); and traditional flat-cropping mulching with traditional plastic film (CK). The experimental results demonstrated that the micro-ridge-furrow mulching film planting pattern promoted the germination of rice seeds and improved the soil temperature, plant height, leaf area, dry mass, and grain yield. T2 had the highest average soil temperature (14.68-17.83 ℃ during the day; 14.4-15.74 ℃ at night), leaf area (41.85 cm2 plant-1), root dry mass (45.32mg plant-1), shoot dry mass (58.46mg plant-1), root-shoot ratio (0.821), and yield (8.112 t ha-1). In summary, the micro-ridge-furrow mulching with degradable film (T2) is recommended as an efficient planting and mulching pattern for sustainably solving environmental problems and improving grain yield in semiarid regions of China.

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