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秸秆扩蓄肥对土壤水分和马铃薯产量品质及水分利用的影响

Effects of straw amendment fertilizers on water use efficiency, yield and quality of potato

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中文关键词: [秸秆](#), [土壤水分](#), [肥料](#), [扩蓄肥](#), [马铃薯](#), [水分利用效率](#)

英文关键词: [straw](#) [soil moisture](#) [fertilizers](#) [grainy amendment fertilizers](#) [potato](#) [water use efficiency](#)

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中文摘要:

为了增强土壤保水力, 改善土壤结构, 提高土壤水肥利用效率, 该文将玉米、小麦和大豆3种作物秸秆经理化处理并与聚丙烯酰胺 (PAM) 结合造粒形成的秸秆扩蓄肥应用于马铃薯大田栽培, 并与单施钾肥及不施肥处理为对比, 研究了3种秸秆扩蓄肥对马铃薯生长发育期间的土壤物理性状、生理特征、产量品质及水分利用效率的影响。结果表明, 3种秸秆扩蓄肥具有较强的保水性能, 能显著增加0~20 cm表层土壤含水率, 提高马铃薯苗期、块茎增长期、淀粉累积期的土壤耕层及20~70 cm水分; 有效降低土壤体积质量, 提高非毛管孔隙比例, 增加土壤孔隙度; 显著提高马铃薯盛花期叶片光合速率、气孔导度和蒸腾速率, 增加马铃薯株高、冠幅面积和叶面积。与不施肥处理比较, 秸秆扩蓄肥处理的淀粉含量提高12.3%~13.6%, 大中薯率提高37.9%~42.8%, 产量提高39.3%~50.4%, 水分利用效率提高35.6%~45.4%。该研究为秸秆扩蓄肥的推广提供了依据。

英文摘要:

In order to improve the retention capacity of soil, soil structure, and the utilization efficiency of water and fertilizer, three types of straw amendment fertilizers made from corn, wheat and soybean straw treated with physicochemical methods and combined with poly-acrylamide (PAM) respectively were applied to potato cultivation in the field. Meanwhile, their effects on the physical properties, physiological characteristics, yield, quality and water use efficiency were studied, taking no fertilizer and single potash fertilizer for comparison. The results indicated that three types of straw amendment fertilizers all had better water preserving ability, and not only increased significantly the water content of the 0-20 cm surface soil but improved the water content of plough layer and 20-70 cm soil during the seedlings, tuber growth and starch accumulation stage. They decreased effectively the soil bulk density, raised the non-capillary porosity rate and soil porosity, at the full-bloom stage of potato, and also increased dramatically the leaf photosynthetic rate, stomata conductance and transpiration rate. Meanwhile the plant height, crown breadth area and leaf area of the potato were raised. As compared with control groups, the starch content, the rate of big and middle tuber, the potato productivity, and the utilization efficiency of water in the soil increased 12.3%-13.6%, 37.9%-42.8%, 39.3%-50.4% and 35.6%-45.4% respectively on the treatments of three fertilizers. Therefore, straw amendment fertilizers had significant effect on the soil water utilization and potato growth. This study provides theoretical basis for the extension of straw amendment fertilizers.

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