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麦稻轮作下耕作模式对土壤理化性质和作物产量的影响

Effects of tillage patterns on crop yields and soil physicochemical properties in wheat-rice rotation system

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英文关键词:soils moisture land use wheat-rice rotation system no-tillage conventional tillage yield soil physical and chemical properties

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中文摘要:

为了探明不同耕作模式对土壤理化性质和作物产量的影响，采用田间定位试验方法，于2007－2010连续4 a在麦稻轮作制下开展了本试验研究。结果表明，免耕提高了耕层土壤体积质量，降低了土壤含水率。但是免耕土壤表层（0～10 cm）的体积质量仍在作物适宜生长的范围内，并未对作物的生长产生不利影响。免耕促进了土壤有机质和全氮在表层土壤的富集。0～10 cm土层有机质和全氮含量比翻耕处理显著增加，而>10～20 cm土层上述养分含量明显低于翻耕处理。小麦季免耕土壤的碱解氮、速效磷和速效钾含量的变化趋势与有机质和全氮含量相似，而水稻季免耕处理整个耕层土壤碱解氮、速效磷和速效钾含量均低于翻耕处理。免耕显著的提高了小麦产量，但降低了水稻产量，起主要作用的产量构成因素是小麦和水稻的有效穗数。整个轮作周期的作物产量以小麦免耕水稻翻耕模式的产量较高，比小麦翻耕水稻免耕模式产量增加了5.70%。

英文摘要:

In order to study effects of tillage systems on crop yields and soil physical and chemical properties in wheat-rice rotation system, a long term (2007－2010) experiment was conducted. The results showed that compared with conventional tillage, the soil bulk density increased and soil water content decreased with no-tillage. But even without tillage, bulk density of the 0-10 cm soil layer was still suitable for the growth of crops. No-tillage enriched soil organic matter and total nitrogen in the surface soil layer. Both the soil organic matter and total N content of no-tillage were significantly higher in 0-10 cm layer and lower in 10-20 cm layer than that of conventional tillage. During the wheat season, the soil alkali N、available P and available K contents had the same trends with those of organic matter and total N. Whereas during the rice season, with no-tillage, the soil alkali N、available P and available K contents in 0-20 cm layer were lower than those of conventional tillage. The results also indicated that the treatment of no-tillage increased wheat yield, but significantly reduced rice production, and the key component of the yield was the effective panicle amount of wheat or rice. During the whole wheat-rice rotation system, the yields of wheat treated with no-tillage and the yield of rice treated with conventional tillage were 5.7% higher than wheat with conventional tillage and rice with no-tillage.

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