

模拟深松条件下深施磷肥对旱地冬小麦根系生长和水肥效应的影响

Effects of Phosphorous Fertilizer Deep Application on Winter Wheat Root and Soil Water Under Soil Loosening Conditions

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中文摘要:

通过模拟深松机具下的深施肥技术,研究了深施磷肥对旱地冬小麦产量、根系生长、水肥效应的影响。研究表明,深松条件下深施磷肥平均效果比传统施肥增产38.5%,20 cm和40 cm各施一半的效果最好,但深施到20 cm和深施到40 cm之间差异不显著。深施磷肥促进了小麦根系在土层内的生长发育,提高了小麦根系总量,尤其是深层根系总量明显增加,这对旱地冬小麦吸收深层土壤中的水分和养分是十分有利的。深松条件下,深施磷肥的水分利用系数比传统施磷提高了8.4%。此外,深施磷肥有助于冬小麦在整个生育期内磷素的均衡供应。

英文摘要:

By imitating the soil loosening machine, the effects of phosphorus fertilizer deep application on winter wheat root and yield and soil water or available P balance were studied in arid land. The results suggested that phosphorus fertilizer deep application had a significant effect on increasing winter wheat yield by 38.5% than traditional tilling phosphorus fertilizer application, the best treatment was 1/2 P fertilizer at 20 cm and 1/2 P fertilizer at 40 cm, but no significant effect between different application depth(20 cm and 40 cm). It also increased the root weight of winter wheat, especially that of deep root, which had an important role for wheat to absorb water and phosphorus from subsoil. Furthermore, phosphorus fertilizer deep application could improve the efficiency of water application than that of traditional application, respectively increasing 8.4% for three deep application treatments. The direct effect of phosphorus fertilizer deep application was to improve wheat phosphorus nutrition, especially for deep root to absorb phosphorus from subsoil. As a result, the vertical efficiency of phosphorus fertilizer application was higher than that of traditional tilling application, but the risk of phosphorus deficit in subsoil was also higher.

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