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长期施用磷肥对冬小麦根际磷、锌有效性及其作物磷锌营养的影响

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Effects of long-term P fertilization on P and Zn availability in winter wheat rhizosphere and their nutrition

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摘要 以中国农业大学昌平试验站长期定位试验为基础,研究了长期施用磷肥对冬小麦根际磷锌有效性及其对作物磷锌营养的影响。结果表明,长期施用磷肥[P_2O_5 , 135 kg/($hm^2 \cdot a$)]导致土壤有效磷含量逐年提高;对根际和非根际土壤有效锌含量没有显著影响,但是根际土壤有效锌含量显著高于非根际土壤;长期施用磷肥冬小麦抽穗期植株锌含量显著低于不施磷处理;无论拔节期和抽穗期,植株含磷量和植株磷锌比(P/Zn)都随着施磷量的增加而显著增加。长期施用磷肥处理(P1和P2)在显著提高了冬小麦子粒含磷量的同时,显著降低了其含锌量;冬小麦子粒磷锌比(P/Zn)随着施磷量的增加也显著增加,子粒含磷量与含锌量呈极显著的负线性相关关系。

关键词: 磷肥管理 磷营养 锌营养 冬小麦 磷肥管理 磷营养 锌营养 冬小麦

Abstract: The effects of long-term P application on the available P and Zn in rhizosphere soil, P and Zn concentration in grain of winter wheat were studied on the 20 years long-term experiment station in Beijing. The main results were as follows: soil Olsen-P concentration significantly increased with long-term high P fertilization [P_2O_5 135 kg/($ha \cdot a$)]. DTPA-Zn concentration in rhizosphere was significant higher than that in bulk soil. P concentration in shoot of winter wheat both at shooting stage and heading stage was apparently improved with increasing P application rates. Whereas, Zn concentration in shoot of winter wheat treated with long-term P fertilization was significantly lower than that of no P supply at heading stage. The P/Zn ratio in winter wheat plant was significantly enhanced with increasing P application rate both at shooting stage and heading stage. Compared with no P treatment, P_2O_5 67.5 and 135 kg/($ha \cdot a$) application significantly increased P concentration and decreased Zn concentration in grain of winter wheat. As the results observed, P/Zn ratio in winter wheat grain was significantly increased. A significantly negative relationship between P and Zn concentration in winter wheat grain was observed.

Keywords:

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