

东北地区黑土、草甸土长期施钾对玉米产量及耕层土钾素形态的影响

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Effect of long-term K application on corn yield and potassium forms in plough layer of black soil and meadow soil in northeast of China

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摘要 本试验研究了东北三省代表性的草甸土、黑土上连续13年施用钾肥对玉米产量和耕层土壤钾素形态的影响。结果表明,施钾可明显增加玉米产量,辽宁、吉林、黑龙江三个定位点NPK1处理分别较对照(NP)处理增产10.2%、13.6%、17.5%,但钾肥量增大(NPK2处理)产量没有表现出同步提高。施用钾肥可增加土壤水溶性钾、非特殊吸附钾、特殊吸附钾的含量和在全钾中的比例;施钾量增大,含量和比例随之提高,处理之间表现为NPK2>NPK1>NP。NPK2处理均与NP呈显著差异,两个土层表现基本一致,但在20—40 cm土层下处理之间差距缩小。施钾总体增加了非交换性钾、矿物钾和全钾含量的同时降低了矿物态钾在全钾中的比例,三省试点的土壤表现基本一致。随土层加深,各点相应处理的不同钾形态含量和比例变化不尽相同。全钾在黑、吉、辽三点随土层深度的变化分别表现为降低、持平、升高。

关键词: 长期定位 施钾 玉米产量 土壤钾素形态 长期定位 施钾 玉米产量 土壤钾素形态

Abstract: Based on 13 year's continuous K fertilizer application on meadow soil and black soil delegating 3 provinces of northeast of China, effect of K fertilizer's application on corn yield and potassium forms in the plough layer were studied. Results showed that K application could increase corn yield distinctly, the treatment of NPK1 made an increase of 10.2% and 12.6% and 17.5% compared with NP alone in Liaoning and Jilin and Heilongjiang, but yield didn't increase along with K fertilizer quantity's increasing. K application could increase content and proportion of water-soluble potassium and non-specifically adsorbed K and specifically adsorbed K, and those two indexes increased with K quantity's increasing and treatments behaved as NPK2>NPK1>NP. NPK2 significantly increased those two indexes compared to NP, but no difference in those two indexes between upper two layers was observed for NPK2 and the difference became less pronounced in layer 20-40 cm. K application increased content of non-exchangeable K, mineral K and total K collectively at the same time lowered proportion of mineral K. Content and proportion of different kind of K didn't vary unanimous in each regions. Total K showed fall, equal and increase separately in Heilongjiang, Jilin and Liaoning with soil depths.

Keywords:

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