

Optimizacija gnojidbe bilanciranjem fosfora i kalija u uzgoju ratarskih usjeva

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Sažetak

Bilanciranje ukupnog unosa i iznosa značajan je činitelj optimalne raspoloživosti fosfora i kalija u tlima. Pokusi gnojidbe pšenice, kukuruza i šećerne repe s fosforom (0, 60, 120, 180 i 240 kg/ha) i kalijem (0, 80, 160, 240, 320 i 400 kg/ha) provedeni su na 4 lokaliteta u Baranji. Cilj je istraživanja kalibracija gnojidbe fosforom i kalijem na temelju iznosa nadzemnom masom, odnosa zrnom, unosa gnojivom, raspoloživosti AL metodom i bilance. Početne kiselosti tala su u rasponu 4,4-7,7 (pH_{KCl}) i 5,9-8,4 (pH_{H2O}), sadržaj humusa 1,45-4,01%, AL-raspoloživi fosfor 10,2-31,5 i kalij 9,5-29,8 mg/100 g. Dvogodišnja istraživanja obuhvatila su 4 vegetacije kukuruza, 2 pšenice i 1 šećerne repe.

Gnojidba fosforom utjecala je na prinos zrna kukuruza samo u 1 vegetaciji na tlu siromašnom fosforom, a gnojidba kalijem na prirod kukruzovine na praškasto-ilovastom tlu siromašnom kalijem. Prosječna odnosa zrnom pšenice bila su 50-66 kg/ha P₂O₅ i 29-40 kg/ha K₂O, zrnom kukuruza 44-122 i 21-72, dok su ukupna iznosa nadzemnom masom pšenice bila 66-100 i 96-140, kukuruzom 74-139 i 83-196 te šećernom repom 105-125 kg/ha P₂O₅ i 235-310 kg/ha K₂O. U tlo je žetvenim ostacima zaorano 4-6 i 14-22 kg/ha nakon pšenice, 17-86 i 46-156 nakon kukuruza te 45-59 kg/ha P₂O₅ i 99-152 kg/ha K₂O nakon šećerne repe.

Prema bilanci gnojidbe i iznosa kontrolni tretman je nakon 2 godine trebao rezultirati smanjenjem raspoloživog fosfora 108-141 i kalija 115-182 kg/ha. Međutim, AL metodom je u tlima utvrđeno stvarno smanjenje raspoloživog fosfora 3-34 i kalija 19-151 kg/ha. Maksimalna gnojidba (240 kg/ha P₂O₅ i 400 kg/ha K₂O) trebala je prema bilanci nakon 2 godine povećati raspoloživost fosfora za 329-344 kg/ha i kalija 560-651 kg/ha, ali je AL metodom utvrđeno povećanje raspoloživosti fosfora 239-411 i kalija 74-232 kg/ha. Zaključno, bilanciranje fosfora AL metodom točnije je nakon intenzivnije gnojidbe u odnosu na kontrolu, a kalija nakon kontrole u odnosu na veće gnojivne doze.

Ključne riječi: gnojidba, fosfor, kalij, pšenica, kukuruz

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Optimizing fertilization by balancing phosphorus and potassium in crop production

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Abstract

Balancing the total input and uptake of nutrients is an important factor for optimum availability of phosphorus and potassium in the soil. Field experiments with phosphorus (0, 60, 120, 180 and 240 kg/ha) and potassium (0, 80, 160, 240, 320 and 400 kg/ha) fertilization of wheat, corn and sugar beet were carried out at four locations in Baranja region. The aim of our research was calibration of phosphorus and potassium fertilization on the basis of the uptake by above ground biomass, removal by grain, input by fertilization, availability in soil determined by AL method and P and K balance. The initial acidity of soils ranged from 4.4 - 7.7 (pH_{KCl}) and 5,9 - 8,4 (pH_{H2O}), organic matter content ranged from 1.45 - 4.01%, AL-available phosphorus from 10.2 - 31.5 and potassium from 9.5 - 29.8 mg/100g. A two-year experiment included four fields of corn, two of wheat and one of sugar beet.

Phosphorus fertilization affected the corn grain yield only in one year on soil poor with phosphorus while potassium fertilization affected corn stalks on silty loam soils poor in potassium. The average uptake of P and K by wheat grain was 50-66 kg/ha P₂O₅ and 29-40 kg/ha K₂O, by corn grain 44-122 and 21-72, while total removal by above ground wheat mass was 66-100 and 96-140, by corn mass 74-39 and 83-196 and by sugar beet 105-125 kg/ha P₂O₅ and 235-310 kg/ha K₂O. By ploughing crop residues in the soil it was returned 4-6 kg/ha of P₂O₅ and 14-22 kg/ha of K₂O after wheat, 17-86 kg/ha P₂O₅ and 46-156 kg/ha K₂O after corn and 45-59 kg/ha P₂O₅ and 99-152 kg/ha K₂O after sugar beet.

According to the balance of fertilization and uptake, the control treatment should have after two years resulted in a reduction of available phosphorus and potassium 108-141 and 115-182 kg/ha. However, the AL method has determined the reduction of available phosphorus 3-34 kg/ha and potassium 19-151 kg/ha. The highest fertilization treatment (240 kg/ha P₂O₅ and 400 kg/ha K₂O) according to balance after 2 years should increase the availability of phosphorus 329-344 kg/ha and potassium 560-651 kg/ha, but the AL method determined the increase of the phosphorus availability 239-411 and potassium 74-232 kg/ha. In conclusion, balancing phosphorus according to AL method is more precise after intensive fertilization compared to the control, while balancing potassium is more precise after the control in comparison to the higher doses of fertilizer.

Key words: fertilization, phosphorus, potassium, wheat, maize

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