

INFLUENCE OF BIOLOGICAL PREPARATION ON SOIL PROPERTIES

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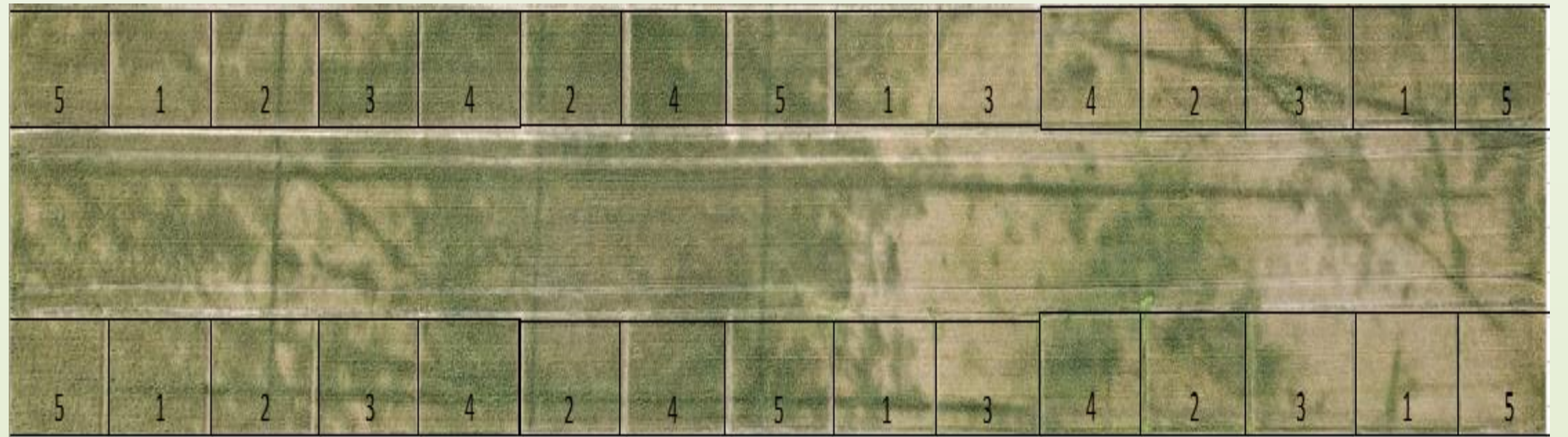
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•Rationale: Biological preparation with microorganisms are not only important in maintaining the soil structure, but they also perform organic matter degradation, increase the availability of nutrients to plants. Biological preparations promote the absorption of nutrients even in extreme conditions. However, there is a lack of research to explain how biological preparations affect soil agrochemical properties and how their distribution is affected by different rate of nitrogen fertilizer.

The investigations were carried out at the Experimental Station of Vytautas Magnus University Agriculture Academy, Lithuania, in 2018–2019. The soil in the experimental field was *Endohypogleyic-Eutric Planosol – Ple-gln-w*, according to FAO, moderate loam on light loam.

•The aim was to investigate the influence of biological preparations on soil pH, phosphorus (P), potassium (K), nitrogen (total, N) and humus content.

•Methods: A two-factor field experiment was conducted to determine the effect of biological preparations on soil properties. Field experiment treatments: spraying of biological preparations (Factor A): 1) not sprayed, 2) Bactogen + Aurin spray, 3) BactoMix5 spray (in spring), 4) Stimulin spray, 5) BactoMix5 spray (in autumn). Different rates of nitrogen fertilization (factor B): 1) N105; 2) N165.



Results

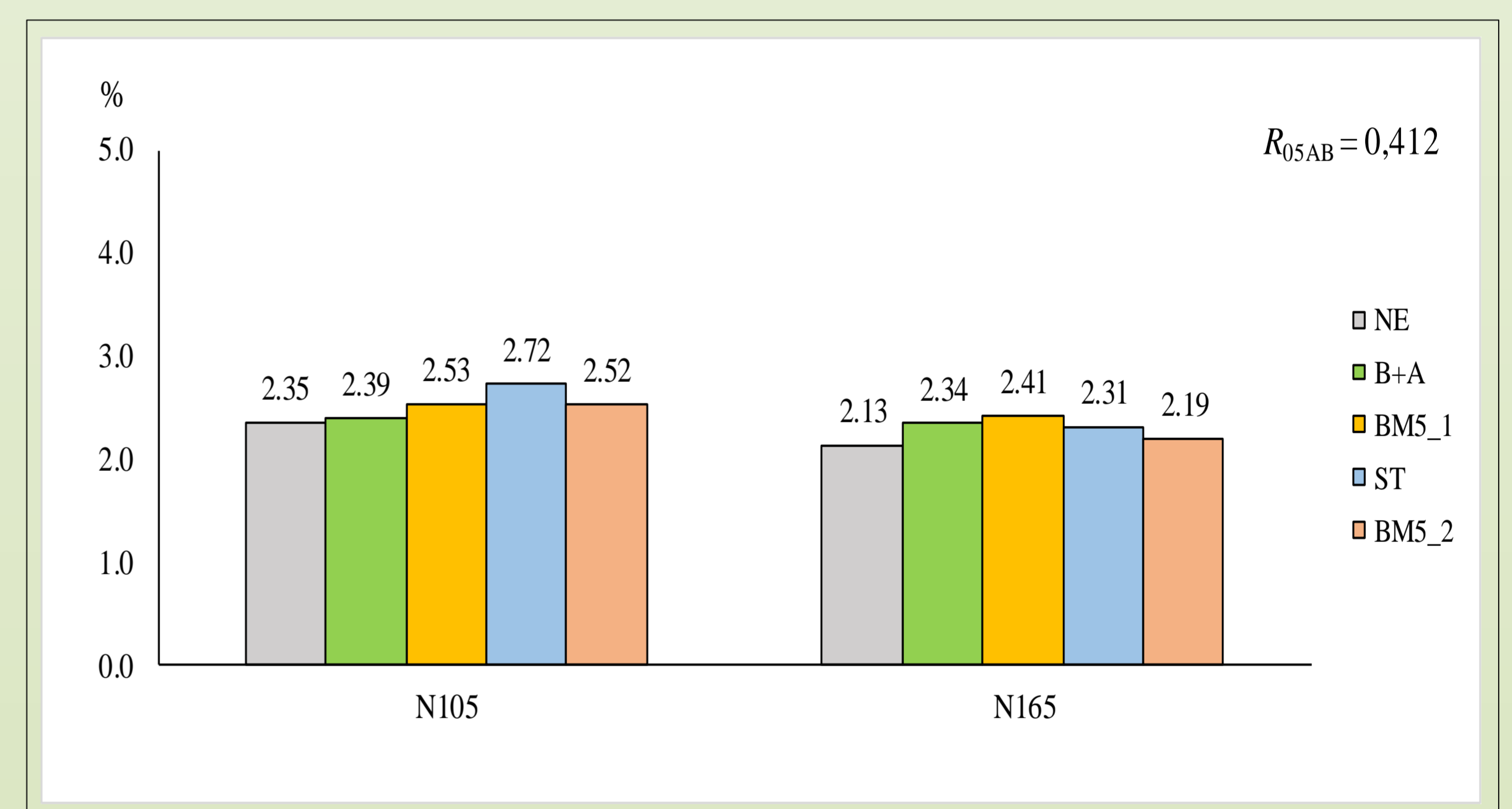
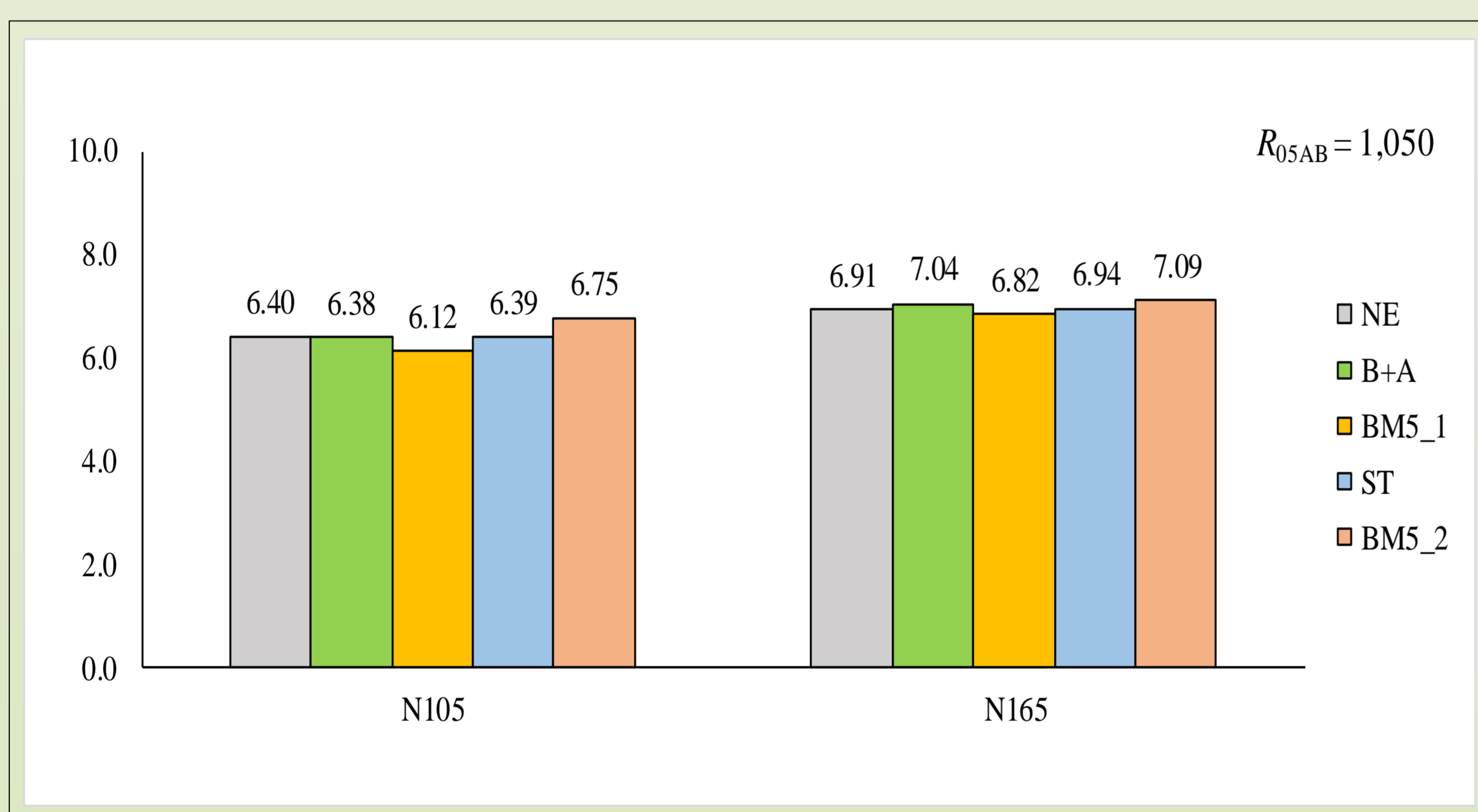


Figure 1. Effect of biological preparations and nitrogen rate on soil pH
 Note: 1. NE - control (without biological preparations); 2. B+A - Bactogen+Aurin; 3. BM5_1 - BactoMix5 in spring; 4. ST - Stimulin; 5. BM5_2 - BactoMix5 in autumn

Figure 2. Effect of biological preparations and nitrogen rate on soil humus content
 Note: 1. NE - control (without biological preparations); 2. B+A - Bactogen+Aurin; 3. BM5_1 - BactoMix5 in spring; 4. ST - Stimulin; 5. BM5_2 - BactoMix5 in autumn

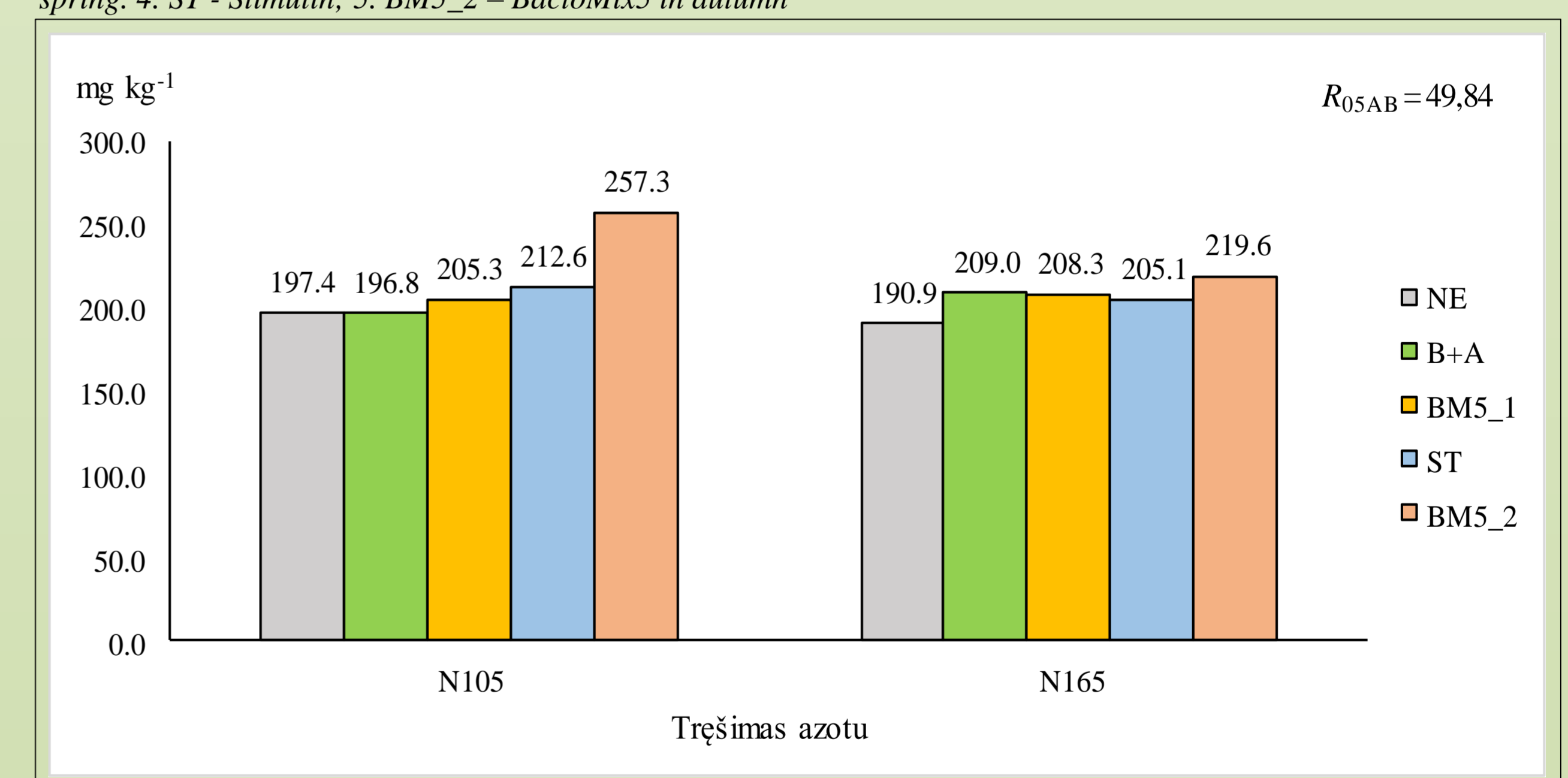
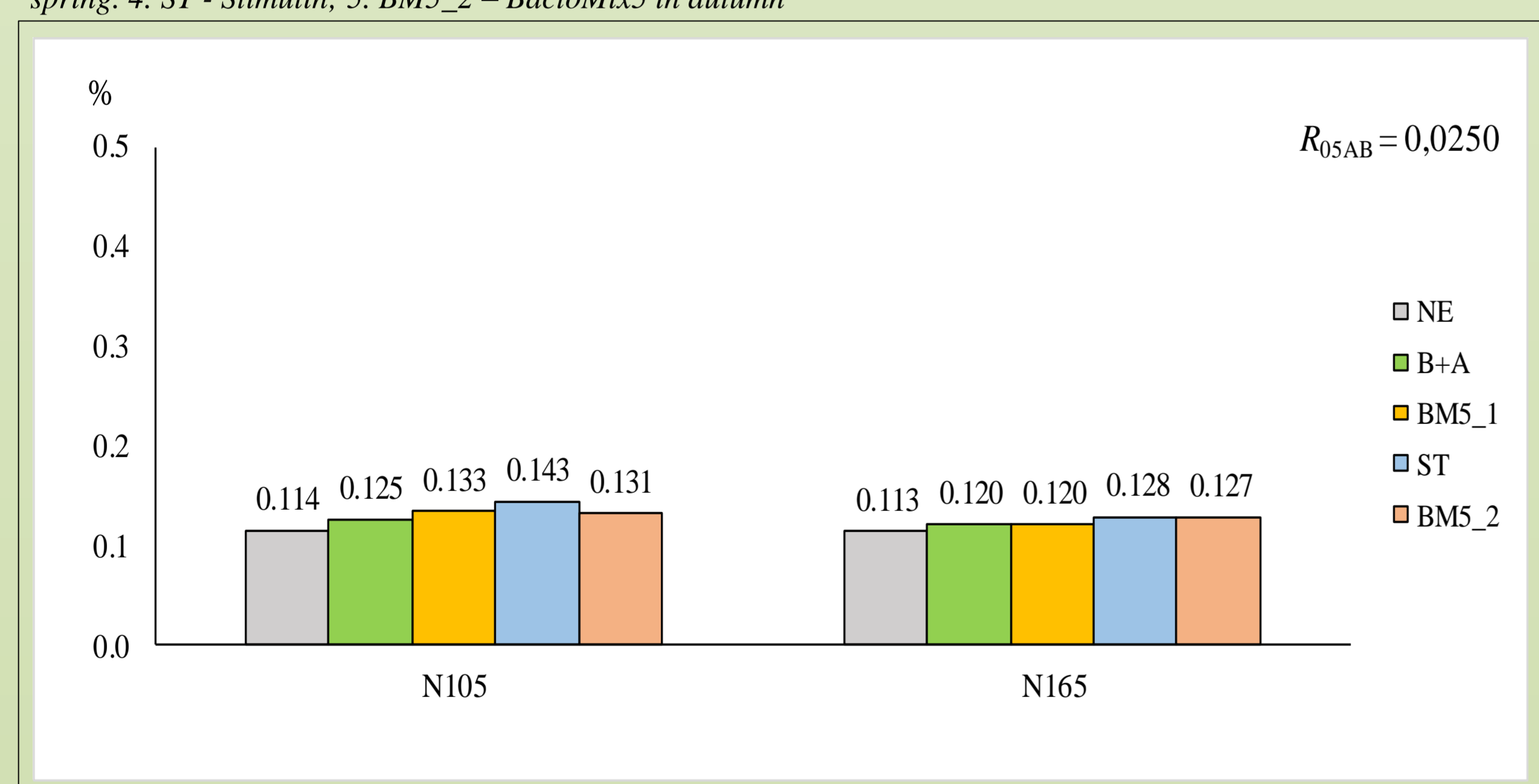


Figure 3. Effect of biological preparations and nitrogen rate on soil nitrogen content
 Note: 1. NE - control (without biological preparations); 2. B+A - Bactogen+Aurin; 3. BM5_1 - BactoMix5 in spring; 4. ST - Stimulin; 5. BM5_2 - BactoMix5 in autumn

Figure 4. Effect of biological preparations and nitrogen rate on soil available phosphorus content
 Note: 1. NE - control (without biological preparations); 2. B+A - Bactogen+Aurin; 3. BM5_1 - BactoMix5 in spring; 4. ST - Stimulin; 5. BM5_2 - BactoMix5 in autumn

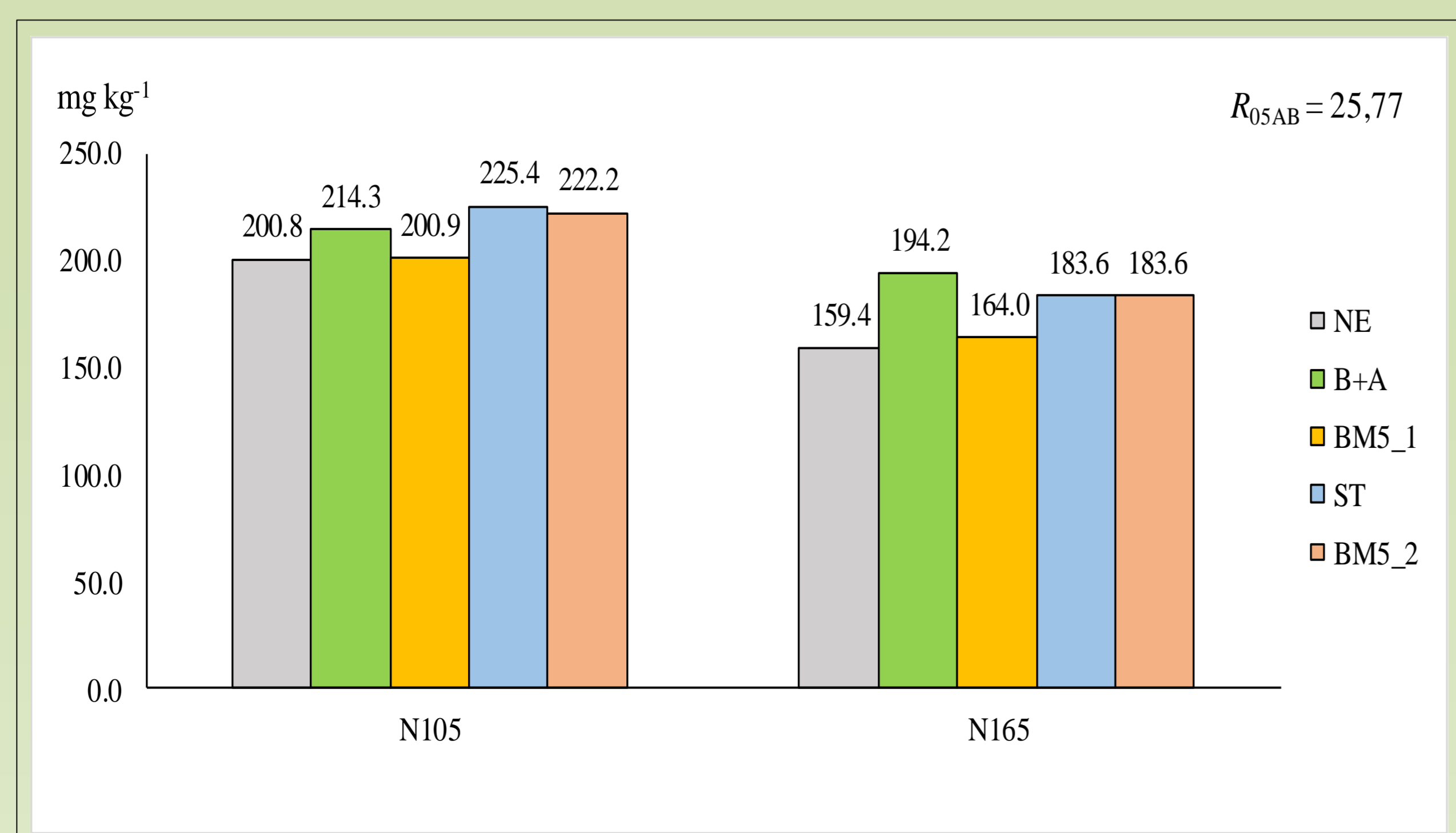


Figure 5. Effect of biological preparations and nitrogen rate on soil available potassium content
 Note: 1. NE - control (without biological preparations); 2. B+A - Bactogen+Aurin; 3. BM5_1 - BactoMix5 in spring; 4. ST - Stimulin; 5. BM5_2 - BactoMix5 in autumn

Conclusions

The use of biological preparations had positive influence on the agrochemical soil properties. Biological preparations significantly ($P < 0.05$) increased available phosphorus, potassium, nitrogen and humus content. Fertilization with a lower nitrogen rate (N105) showed a better effect of biological preparations on soil properties. In general, the use of biological preparation had positive effect on soil agrochemical properties, especially the use of BactoMix5 in autumn on the pre-stubble. The use of Bactomix5 significantly increased the humus content 1.2 time, available phosphorus and potassium - 1.3 time on the soil fertilized lower nitrogen (N105) rate.

Keywords: biological preparation; soil pH; available phosphorus; potassium; nitrogen, humus