Annotation

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Development of free–living rhizosphere nitrogen–fixers of soybean by using biologically active preparations

Fixation of atmospheric nitrogen by rhizosphere microorganisms and converting it into forms available to plants acquires high importance in modern conditions of agricultural production with low fertilizing. The aim of the study was to establish the influence of the complex of agents of chemical and biological nature on the development of agronomically valuable rhizosphere nitrogen–fixing bacteria of Azotobacter and Clostridium genera in crops of soybeans. Experiments on the study of the effect of the Fabian herbicide, the Regoplant plant growth regulator and the Rizobofit microbiological preparation in crops of soybean of Romantika varieties on the growth of bacteria of the Azotobacter i Clostridium genera were performed during 2013–2015 years in the field and laboratory conditions of Uman National University of Horticulture.

The article presents the results of the studies on the number of rhizosphere nitrogen–fixers of soybean under the influence of different rates of the Fabian herbicide (90, 100 and 110 g/ha), methods of using the Regoplant plant growth regulator (250 ml/m – pre–sowing seed treatment, 50 ml/ha – after-sprouting application) and the Rizobofit microbiological preparation (100 ml/m – pre–sowing seed treatment). It was found that the number of bacteria of the Azotobacter genus in the rhizosphere of soybean decreased with increasing of application rate of the Fabian herbicide, while the number of microorganisms of the Clostridium genus was at the level of control. Joint application of the Fabian herbicide at minimum rate with the Regoplant plant growth regulator by the background promoted optimal impact on the development of bacteria of the Azotobacter and Clostridium genera. Pre-sowing seed treatment by the Rizobofit microbiological preparation in admixture with the Regoplant plant growth regulator forwarded their less inhibition. Bacteria of the Clostridium genus turned to be resistant to the herbicide influence, and with it the significant increase in their number was observed during application of the Rizobofit and Regoplant.

Thus, as a result of the conducted research it was found that the development of rhizosphere nitrogen–fixers in the soybean crops depends on the rates and methods of application of the studied preparations. The highest level of activity of rhizosphere nitrogen-fixers of the Azotobacter and Clostridium genera is observed before sowing at coprocessing of seeds by the Rizobofit microbiological preparation at the rate of 100 ml/t with Regoplant plant growth regulator at the rate of 250 ml/t followed by after–sprouting application of the Fabian herbicide at the rate of 90 g/ha, together with the Regoplant regulator plant growth at the rate of 50 ml/ha.

Key words*: rhizosphere nitrogen–fixers, a herbicide, a microbiological preparation, plant growth regulator, soybeans.*