The Soil Re-Union
Science for Healthy Soils

4th International and
16th National Congress
of the Serbian Society
of Soil Science

Serbian
Society of
Soil Science

THE BOOK OF ABSTRACTS

Vrdnik, Fruške Terme, Serbia,
20-23. October 2025

Congress Organizer: Serbian Society of Soil Science
Co-organization: Institute of Field and Vegetable Crops,
National Institute of the Republic of Serbia

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THE EFFECT OF PRE-INOCULATION ON WHEAT SEED PROTECTION

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ABSTRACT

Pre-inoculation of seeds allows farmers to avoid daily inoculation, to focus on sowing and protecting seeds in the earliest period of seed germination. By using pre-inoculated seeds, farmers save time during sowing and reduce manpower requirements. Pre-inoculated seeds maintain bacterial viability for as long as possible, and this depends on a number of factors. The long-term viability of bacterial cells on pre-inoculated seeds depends on the bacterial species and the ability of the bacteria to survive in specific conditions, as well as the adhesive substances and cell protectors in the inoculant formulation. Inoculation is more common with liquid fertilizers than with inoculants that act as biopesticides. In this study, the bacterial strain *Priestia megaterium* BHC 5.5 was used for pre-inoculation of wheat seeds and protection of seedlings against *Fusarium poae*. In our previous research, the bacterial strain BHC 5.5 showed the ability to suppress the growth of the phytopathogenic fungus *F. poae*. Two hundred wheat seeds were soaked in a bacterial suspension (50 mL, 10^9 CFU mL^{-1}) for 5 minutes and then allowed to air dry. The dried seeds were stored at 22°C for periods of 0, 1, 2 and 3 months. Pre-inoculated seeds (20 seeds per treatment) without and with *F. poae* infection were placed monthly in Petri dishes on moist filter paper. Infection of pre-inoculated seeds was performed by placing the seeds in a Petri dish with *F. poae* for 10 minutes. In addition, the germination of uninoculated and infected uninoculated seeds was done in same manner. Petri dishes were kept for one week in a transparent sealed box. Final seed germination percentage (FG %) was calculated: germinated seeds in samples / total planted seeds x 100. The relative seed germination index (RSGI%) was calculated as follows: germinated uninfected pre-inoculated seeds/ germinated infected pre-inoculated seeds x 100. In each month, the pre-inoculated wheat seeds showed FG of 100%, except for the germination of seeds stored for two months (90%).The final seed germination percentage of the infected pre-inoculated seeds were 90%, 85%, 70% and 55% of the seeds stored for 0, 1, 2 and 3 months, respectively. The RSGI of the infected pre-inoculated seeds was the same as the FG for seeds stored for 0, 1 and 3 months. For

the pre-inoculated seeds for 2 months, the RSGI was 77%. The FG of the infected seeds was only 40%.

Pre-inoculation of wheat seeds with the bacterial strain *P. megaterium* BHC 5.5 provided protection to the seeds and increased germination from 40% to 85% in the treatment where the pre-inoculated seeds were stored for one month. Pre-inoculation two months before sowing also showed satisfactory results in wheat seed protection. Further research will include the development of inoculant formulation with BHC 5.5 as a biocontrol agent in the protection of pre-inoculated wheat seeds.

Key words: pre-inoculation, wheat seed, *Priestia megaterium*, seed germination, *F. poae* biocontrol, seed protection

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