Supplementary Figures

A novel *Neobacillus* species enhances root growth and abiotic stress tolerance in diverse host plants

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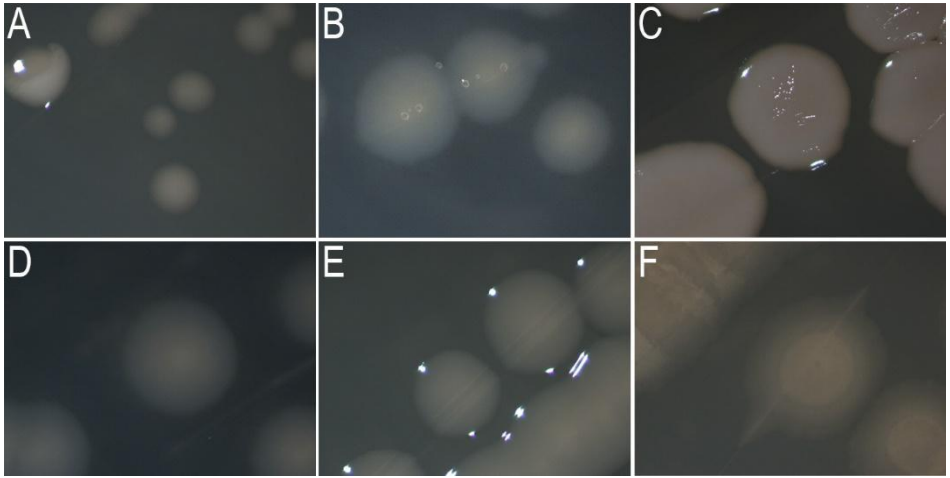


Fig. S1 Colony morphology of bacterial isolates obtained from *Medicago truncatula* root tissues. Colony morphology of isolates 9.1–9.5 (A–E) and the novel plant growth-promoting rhizobacterial isolate 9.6, *Neobacillus* sp. strain B4567 (F)



Fig. S2 Time-course analysis of the growth-promoting effect of the *Neobacillus* sp. strain B4567 on tomato plants. Representative images of control plants (A, C, E, G) and plants inoculated with *Neobacillus* sp. strain B4567 (B, D, F, H) plants at 0, 4, 10, and 18 days post-inoculation (dpi)

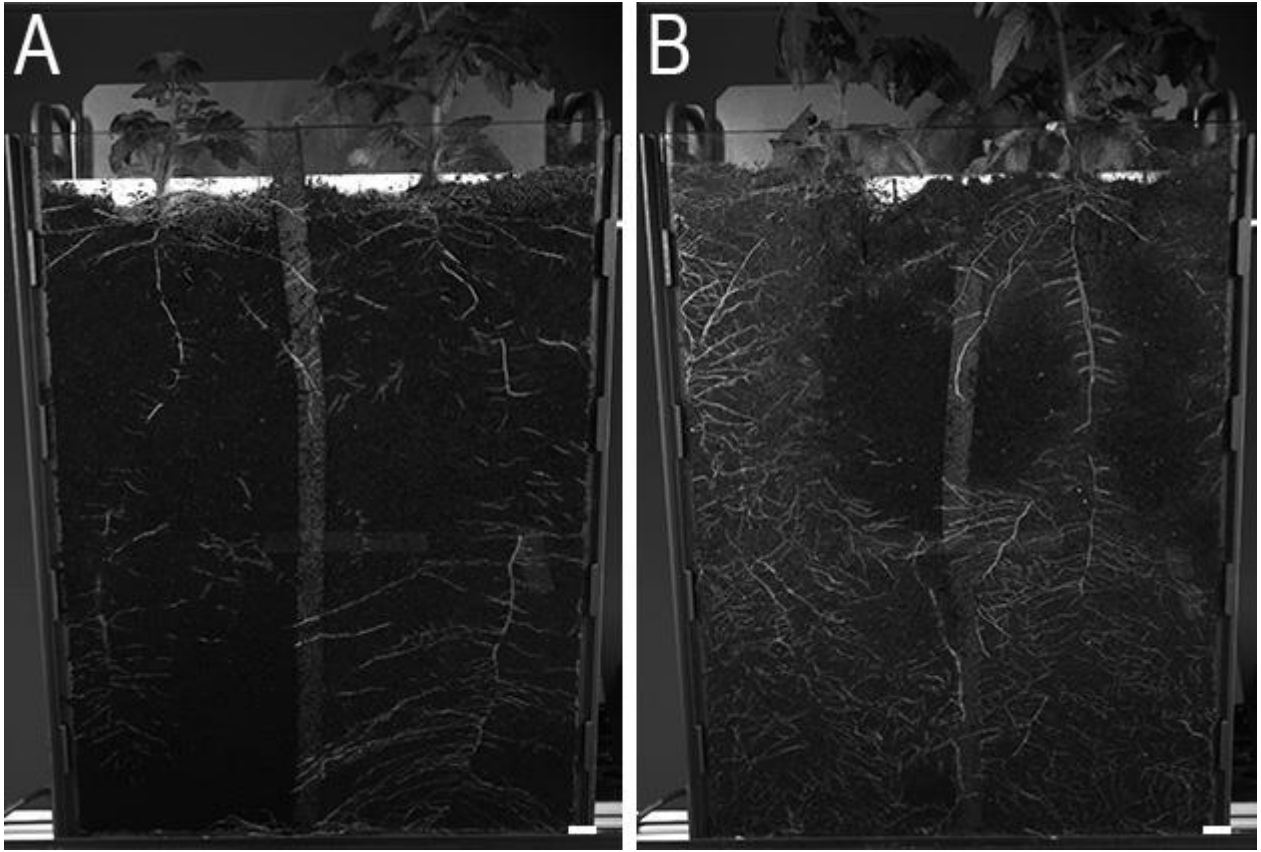


Fig. S3 Root biomass and architecture of tomato plants grown in a rhizotron system four weeks post-inoculation with the *Neobacillus* sp. strain B4567. Representative images of non-inoculated control plants (A) and plants inoculated with the *Neobacillus* sp. strain B4567 (B). The rhizotron system enabled visualization of root system size, branching pattern, and overall structural development

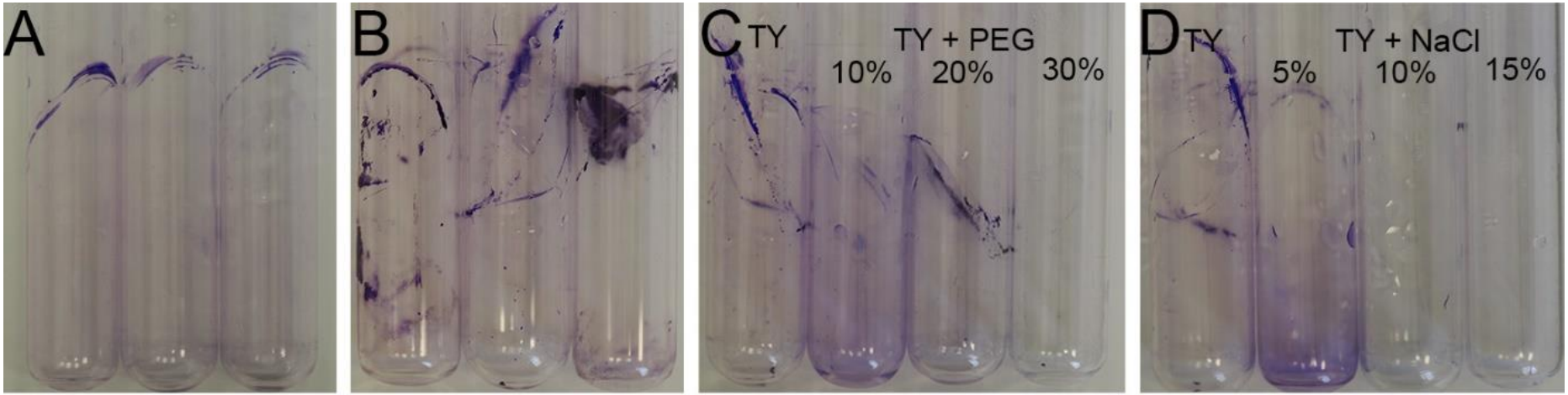


Fig. S4 Biofilm formation by *Neobacillus* sp. strain B4567 under normal and stress conditions. Representative images of biofilm formation by *Neobacillus* sp. strain B4567 after 4 (A) and 6 (B) days of incubation in TY medium. Biofilm development was additionally assessed after 6 days of incubation in TY medium supplemented with various concentrations of polyethylene glycol (PEG-6000) (C) or NaCl (D) to impose osmotic and salinity stress, respectively

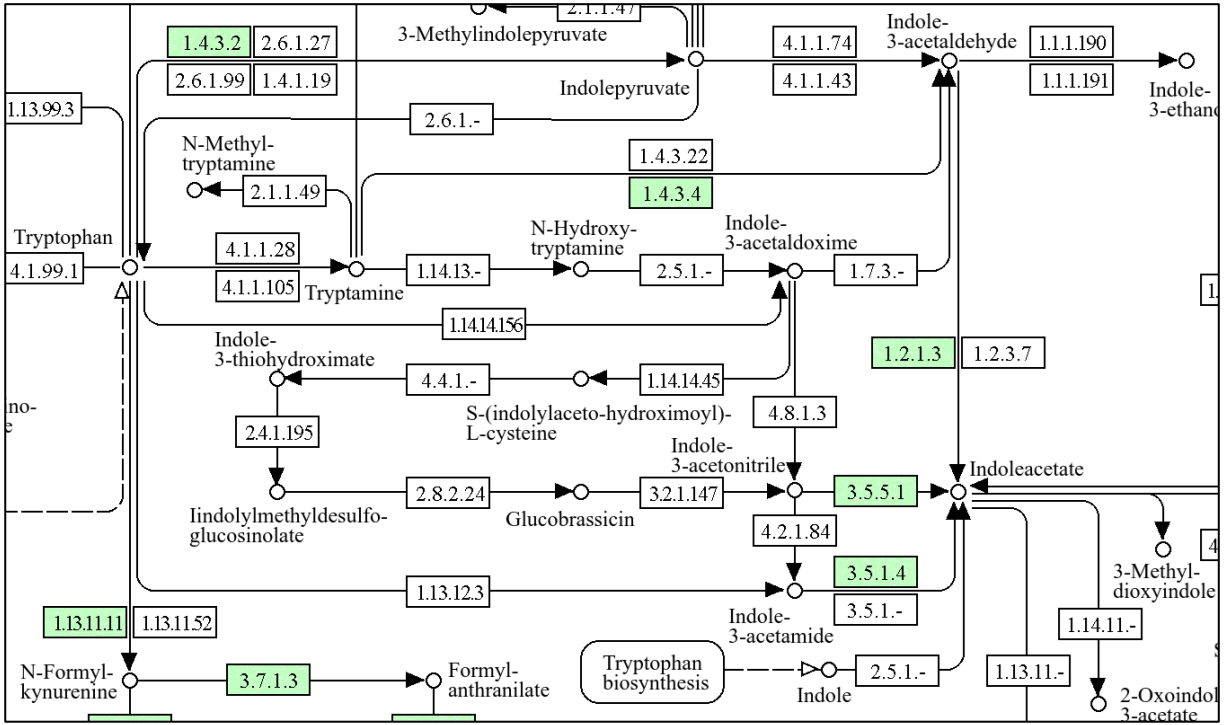


Fig. S5 Presence of indole-3-acetic acid (IAA) biosynthesis pathways in the genome of *Neobacillus* sp. strain B4567. Pathway components were identified by assigning KEGG Orthology (KO) numbers to the predicted proteins of strain B4567 using the eggNOG Mapper v3 server, followed by mapping the assigned KO numbers onto the predefined metabolic pathways by the KEGG Mapper Reconstruct tool. The potentially existing functions are highlighted in green on the metabolic pathway map

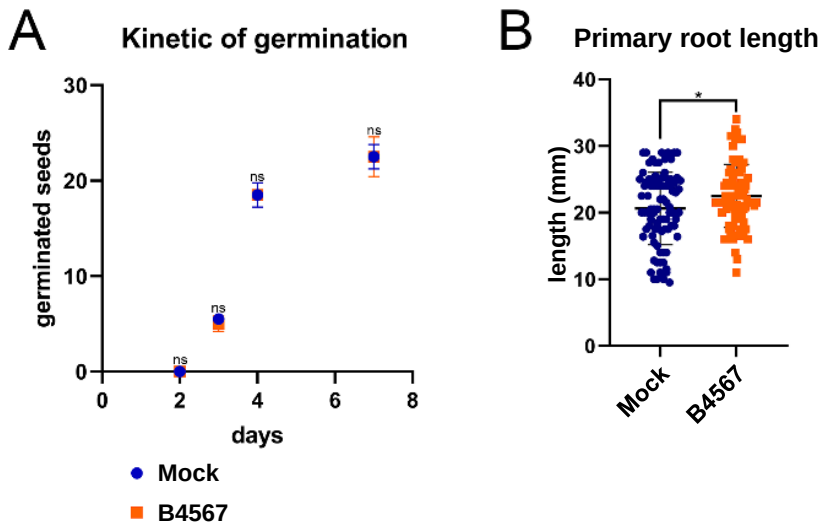


Fig. S6 Effect of *Neobacillus* sp. strain B4567 on tomato seed germination and primary root growth. Germination kinetics (A) and primary root length (radicle length) (B) of tomato seedlings grown on half-strength Murashige and Skoog (½ MS) medium without bacterial inoculation (Mock) or supplemented with a bacterial suspension adjusted to an OD_{600} of 0.1 (B4567). No significant differences were observed in germination kinetics or final germination percentage. In contrast, seedlings grown in the presence of strain B4567 developed significantly longer primary roots than control seedlings. Statistical significance was assessed using unpaired *t*-tests. Significance levels: ns, $p \geq 0.05$; *, $p < 0.05$. For the analysis of germination kinetics, 100 seeds per treatment were analyzed across four biological replicates. Primary root length was measured in 88 control seedlings grown on ½ MS medium and 89 seedlings grown on ½ MS medium supplemented with *Neobacillus* sp. strain B4567

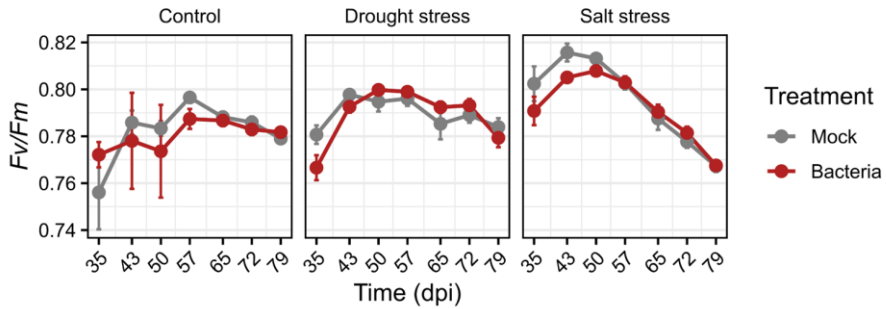


Fig. S7 Effect of bacterial treatment on the photosynthetic performance (*Fv*/*Fm*) of tomato leaves under control, drought, and salt stress conditions over time. Mean *Fv*/*Fm* values (± SE, $n = 10$) of tomato leaves under control, drought, and salt stress conditions, measured on the indicated days post-inoculation (dpi). No statistically significant differences were observed between treatment groups ($p > 0.05$; linear mixed-effects model followed by Tukey's post hoc test)