

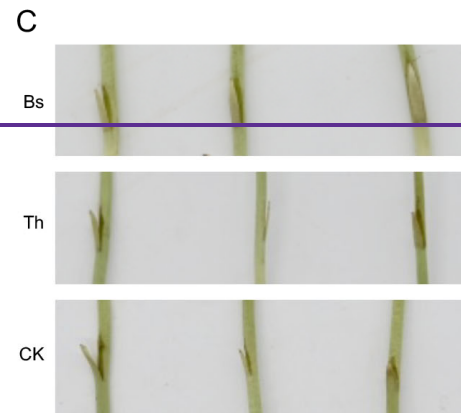
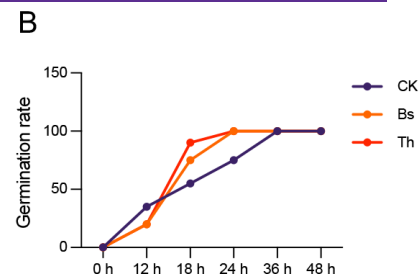
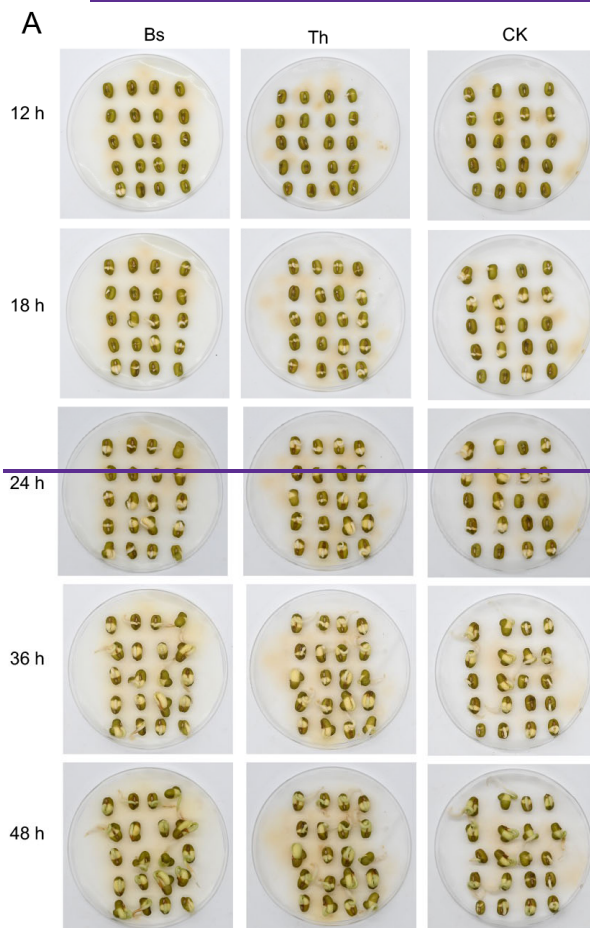
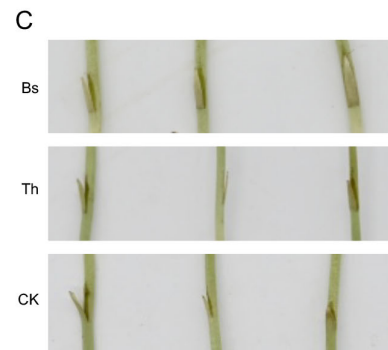
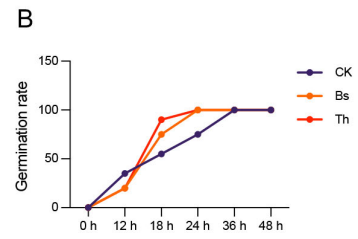
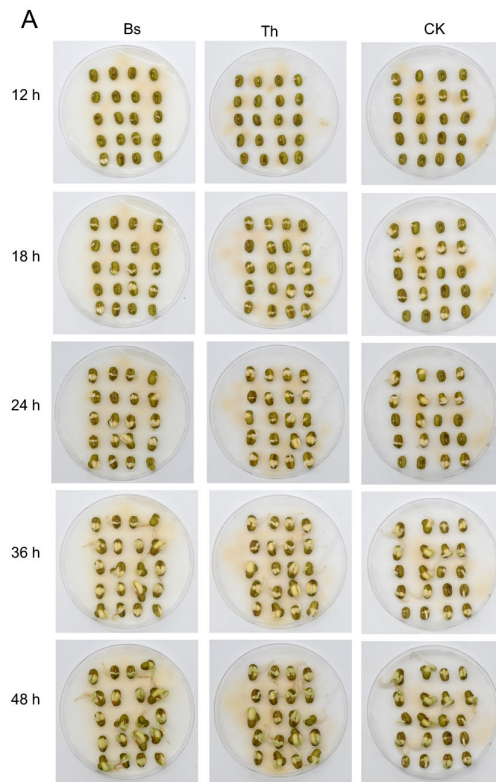
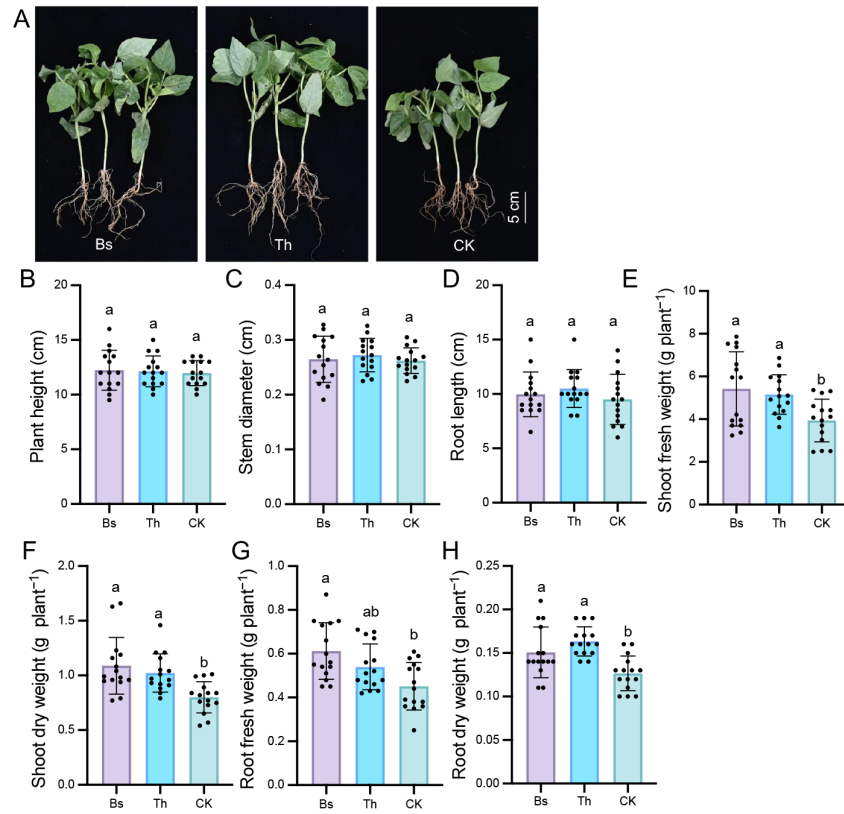


Figure S1. Inoculation with Bs and Th has no toxic effect on mungbean seed germination and seedling growth. (A) Germination of mungbean seeds at different time points under Bs and Th treatment and without treatment. (B) Germination rates at different time points. (C) Phenotype of the hypocotyl of mungbean seedlings three days after inoculation.



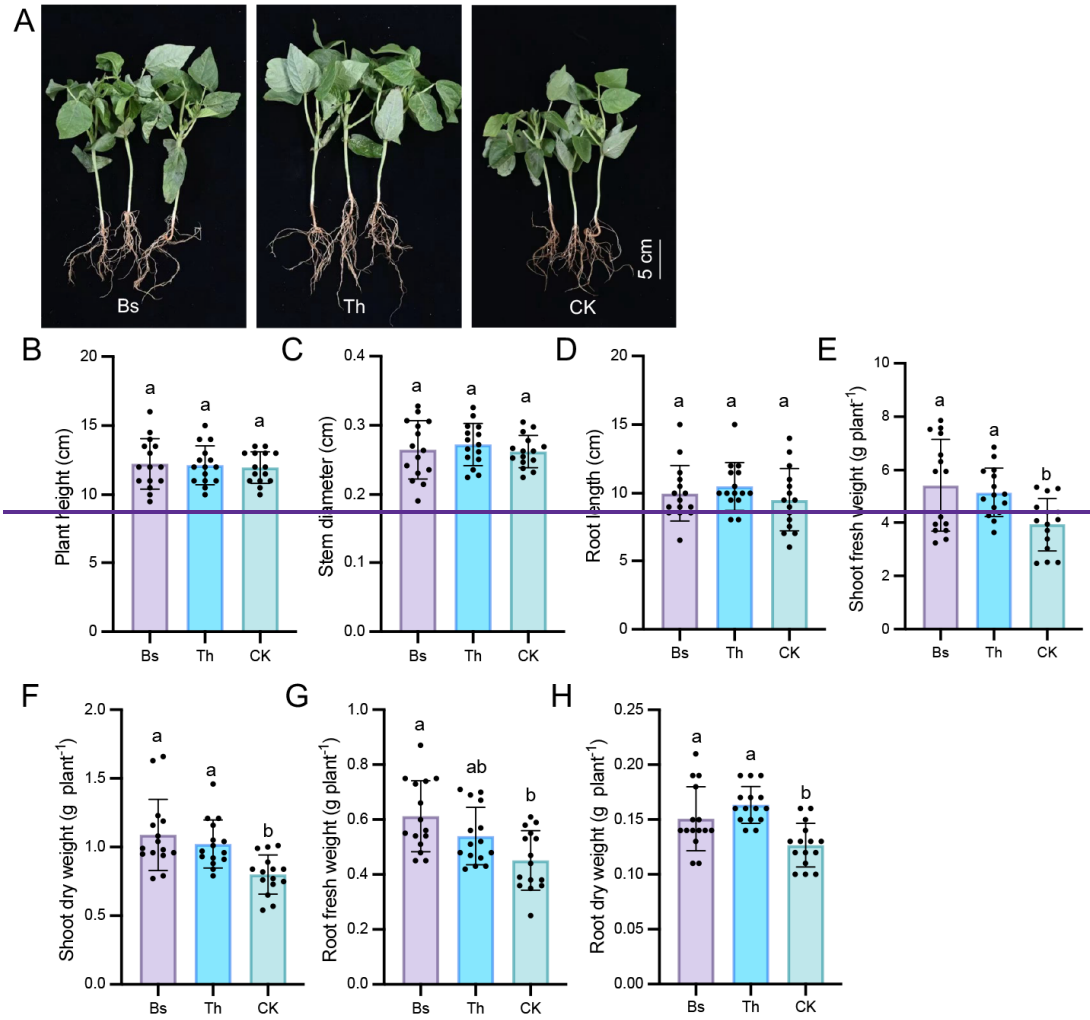
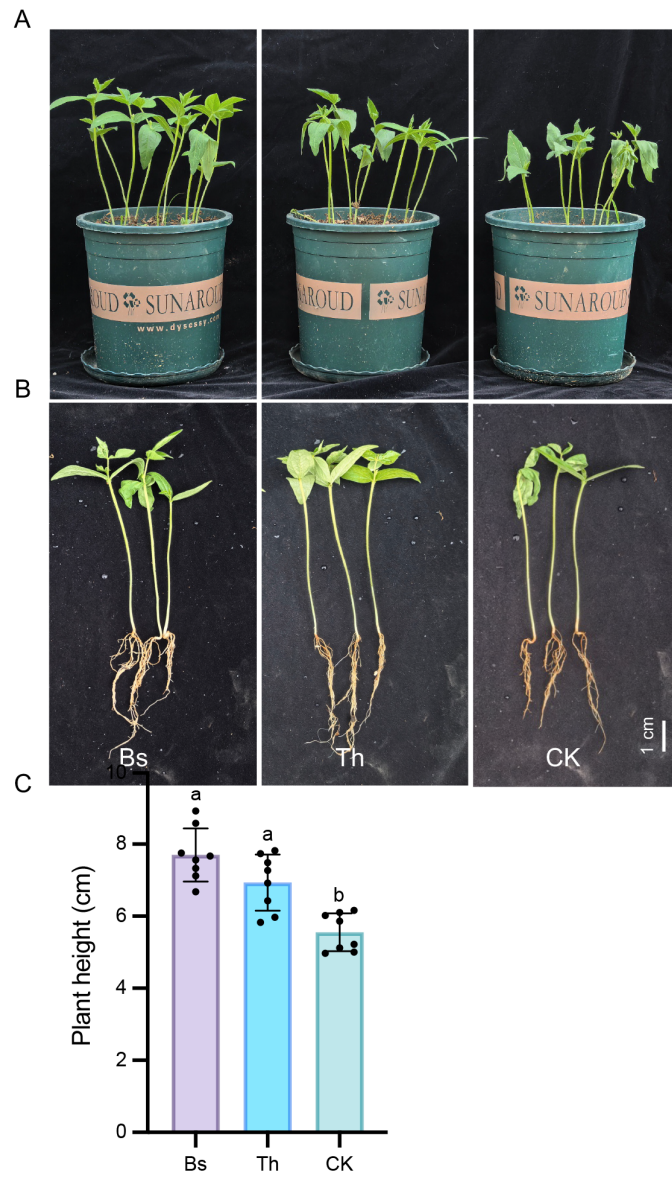


Figure S2. Inoculation of *B. subtilis* and *T. harzianum* promoted the growth of mungbean seedlings. (A) Representative images of plants inoculated with Bs and Th at seedling stage. (B-H) Effects of Bs and Th treatments on plant height (B), stem diameter (C), root length (D), shoot fresh weight (E), shoot dry weight (F), root fresh weight (G), and root dry weight (H) of mungbean seedlings. The standard error is represented by an error bar based on three independent biological replicates using five plants per treatment (n=15). Significance test was performed using one-way ANOVA followed by Tukey's multiple comparisons test. Different letters indicate significant difference ($P < 0.05$). Bs represents the treatment with *Bacillus subtilis*, Th represents the treatment with *Trichoderma harzianum*. Without microbial inoculant was used as the CK.



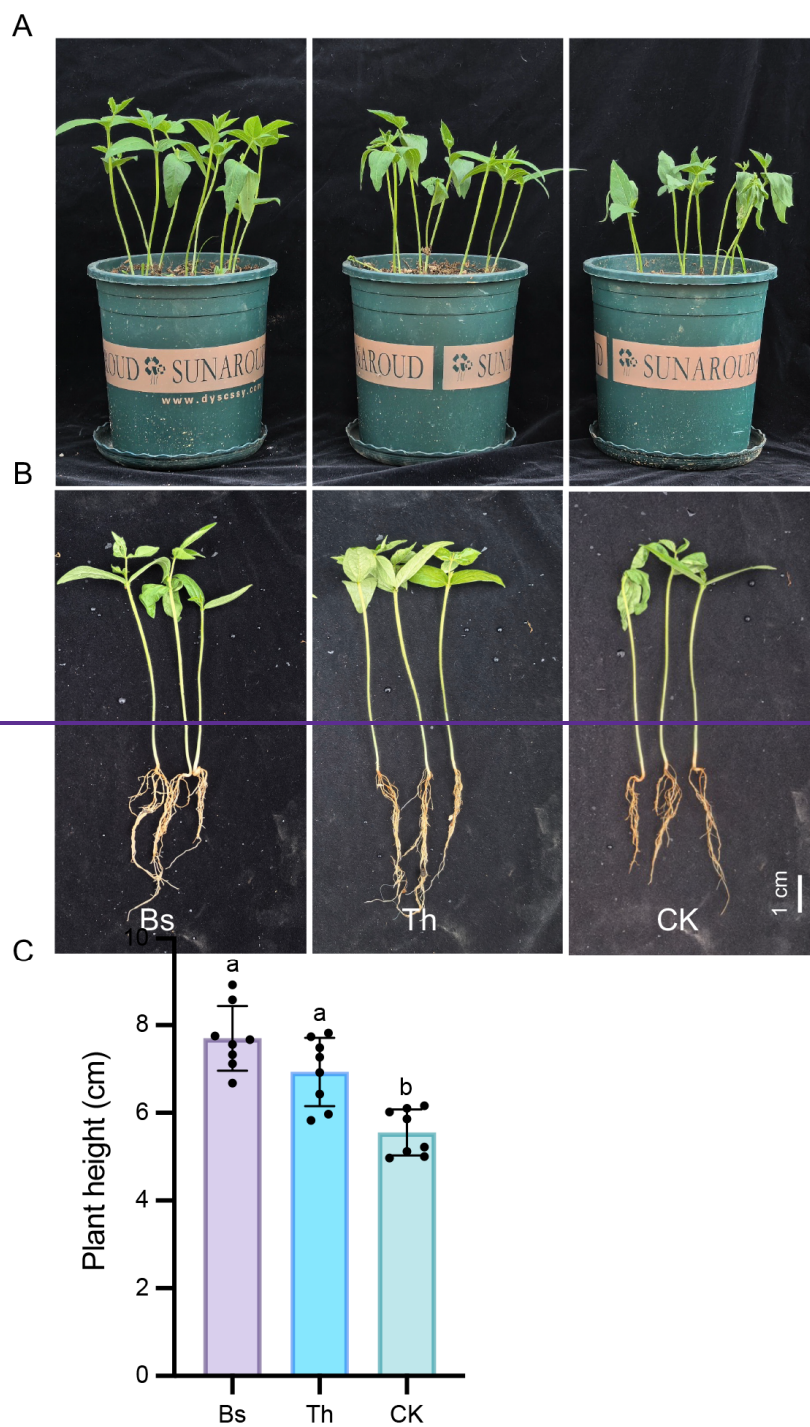
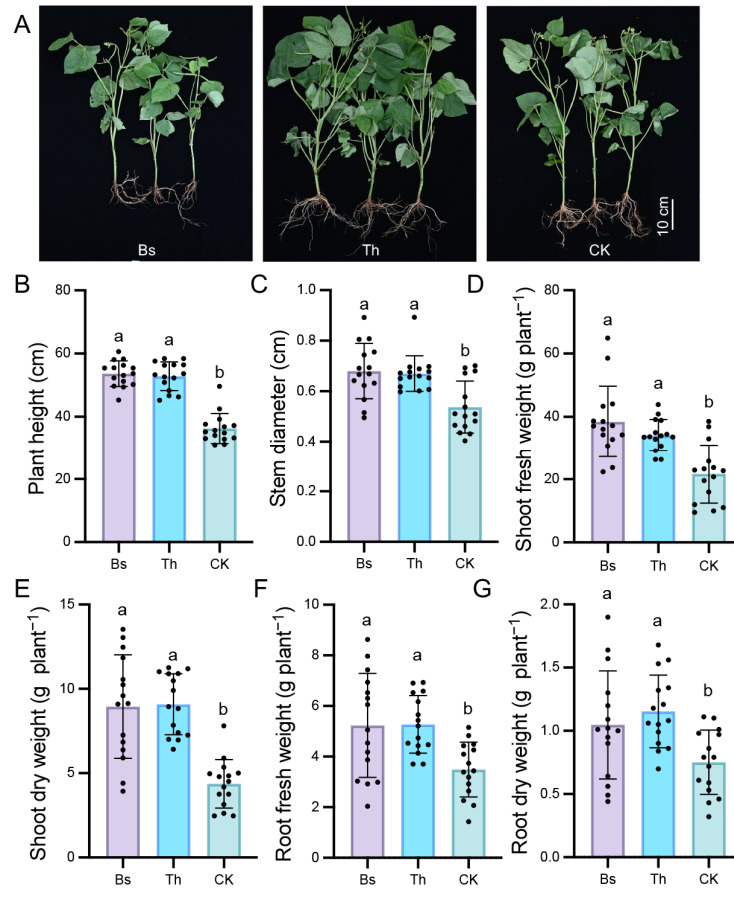


Figure S3. Pot experiments confirmed that inoculation of Bs and Th promoted the growth of mungbean seedlings. (A-B) Phenotype of mungbean seedlings four weeks after the application of *B. subtilis* and *T. harzianum*. (C) Effects of Bs and Th treatments on mungbean plant height. Significance test was performed using one-way ANOVA followed by Tukey's multiple comparisons test. Values with different letters indicate a statistically significant difference ($P < 0.05$).



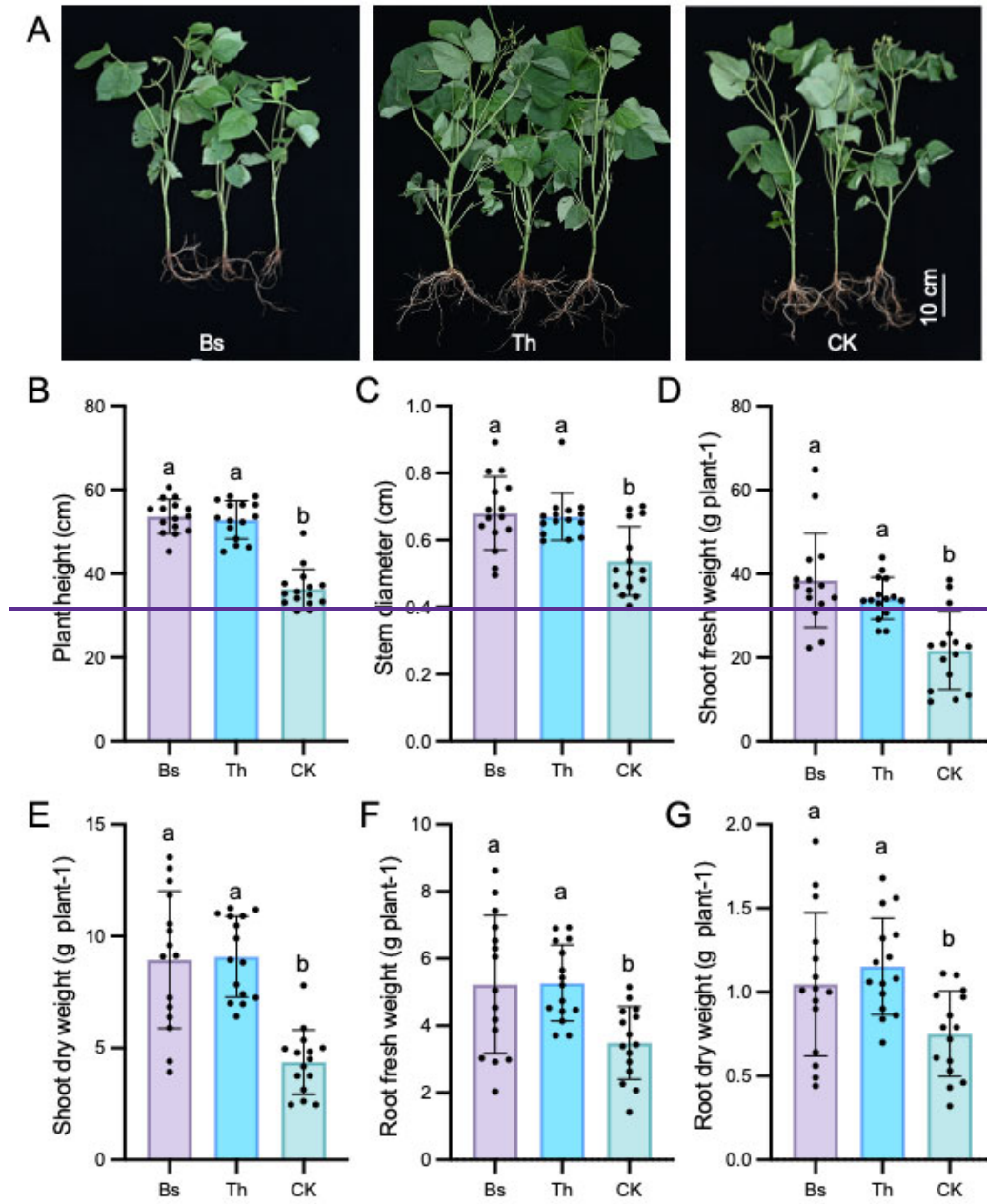
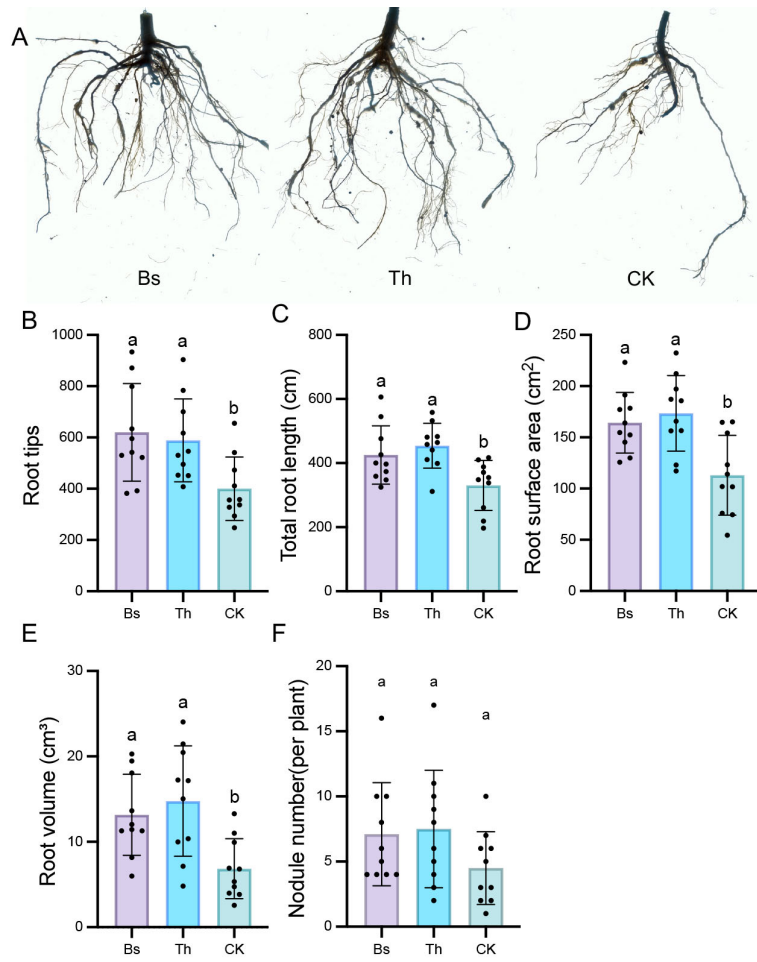


Figure S4. Bs and Th treatments promote the growth of mungbean plants at the flowering stage. (A) Representative images of mungbean plants at the flowering stage under Bs and Th treatments and the uninoculated control. (B–G) Effects of Bs and Th treatments on growth-related traits of mungbean plants at the flowering stage: plant height (B), stem diameter (C), shoot fresh weight (D), shoot dry weight (E), root fresh weight (F), and root dry weight (G). The standard error is represented by an error bar based on three independent biological replicates using five plants per treatment (n=15). Significance test was performed using one-way ANOVA followed by Tukey's multiple comparisons test. Different letters indicate significant difference ($P < 0.05$).



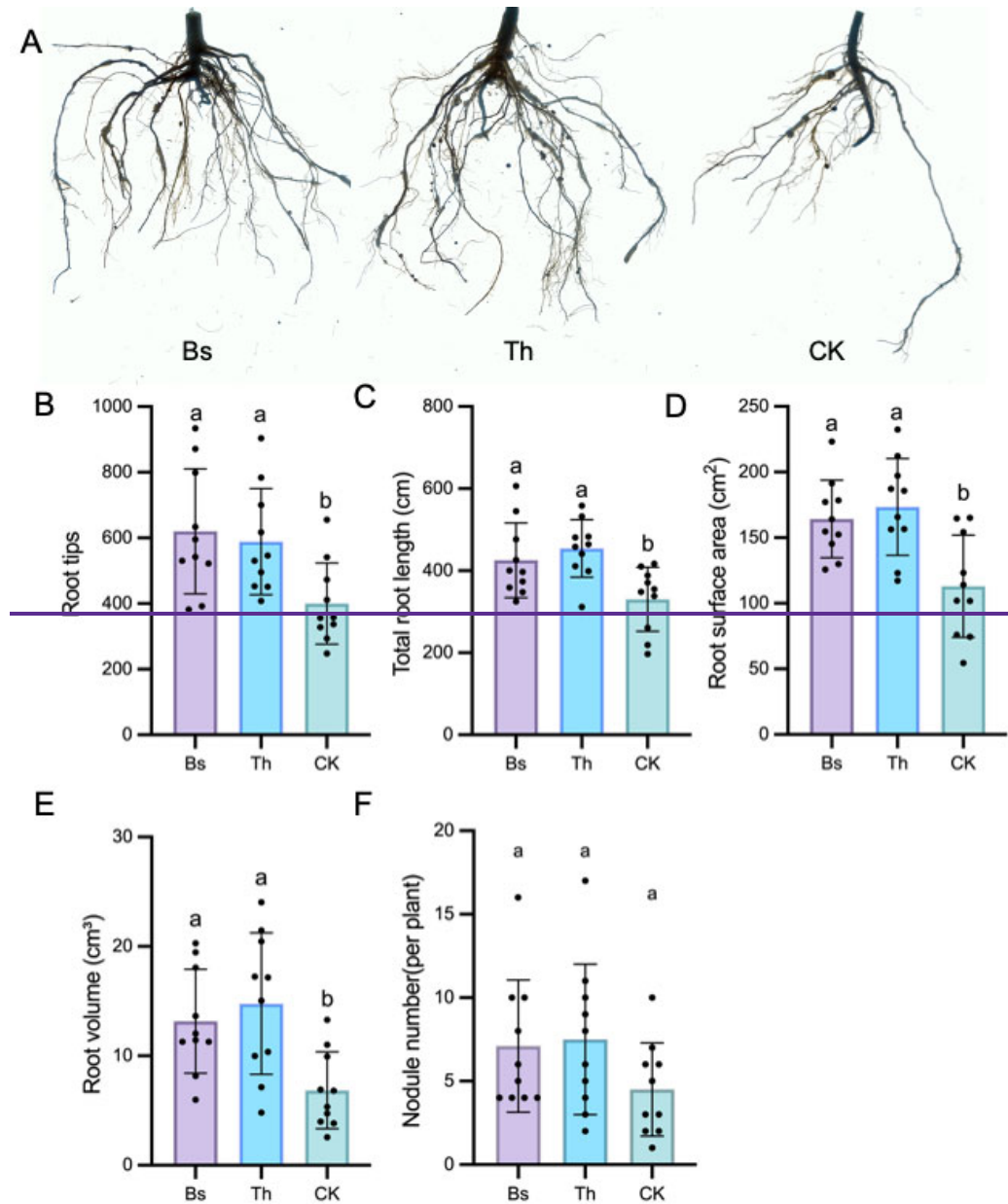


Figure S5. Bs and Th treatments improved the root growth and architecture of mungbean. (A) Representative images of the root phenotypes inoculated with Bs and Th, and uninoculated mungbean plants. (B-F) Effects of Bs and Th treatments on root tips (B), total root length (C), root surface area (D), root volume (E), and nodule number (F). Significance test was performed using one-way ANOVA followed by Tukey's multiple comparisons test. Values with different letters indicate a statistically significant difference (n=10, P < 0.05).

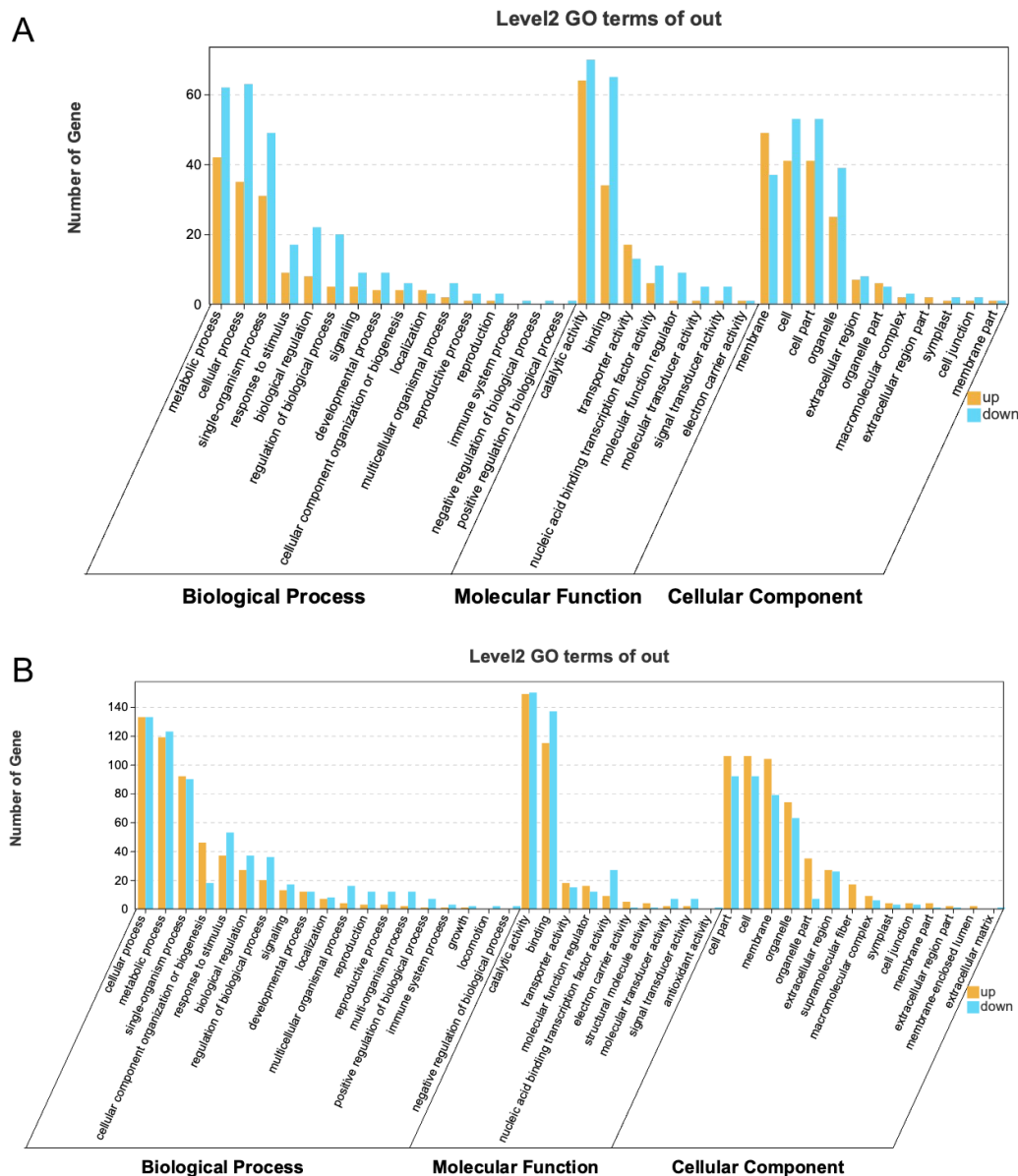


Figure S6. GO enrichment column diagram of DEGs. (A) GO enrichment of Bs vs. CK DEGs. (B) GO enrichment of Th vs. CK DEGs. BP: biological processes, CC: cellular components, MF: molecular function.

Table S1. Relative abundance of all detected microbial taxa in the mungbean rhizosphere across different treatments.