Supplementary material. Use of bacteria in agriculture and their effects on plant physiology.

Species	**Bacteria**	**Purposes**	**Physiological changes**	**Reference**
Lathyrus sativus L. (pea)	Consortium: *Rhizobium leguminosarum* (M5), *Pseudomonas fluorescens* (K23), *Luteibacter* sp., *Variovorax* sp.	Metal stress control	Increase in chlorophyll and soluble sugars; Biosynthesis of phenolic compounds, carotenoids and proline; Stress mitigation by modulating SOD, CAT, APX and GPOX.	Abdelkrim et al. (2018)
Lycopersicon esculentum L. (tomato)	*Bacillus subtilis*, *Bacillus amyloliquefaciens*, *Pseudomonas fluorescens*, *Pseudomonas aeruginosa*	Biological control	Reduction of disease severity, production of siderophores, hydrogen cyanide and AIA	Abo-Elyousr et al. (2019)
Citrullus lanatus (watermelon)	*Paenibacillus polymyxa* (SN-22), *Sinomonas atrocyanea* (NSB-27)	Biological control	Reduction in the severity of the disease; increase in total chlorophyll content, plant height, total fresh and dry mass.	Adhikari et al. (2017)
Solanum lycopersicum (tomato)	*P. fluorescence* (YsS6), *P. migulae* (8R6) and its ACC deaminase-deficient mutants	Salt stress control and growth promotion	Increased growth, greater fresh and dry biomass, greater chlorophyll content and greater number of flowers and flower buds.	Ali et al. (2014)
Brassica juncea L. (mustard)	*Bacillus cereus* (NAD-7), *Bacillus casamancensis* (MKS-6)	Water stress control	Greater relative water content and plant biomass production; membrane stability index, total chlorophyll content and photosynthetic parameters; ROS homeostasis by increasing SOD, APX, CAT	Asha et al. (2021)
Triticum aestivum L. (wheat)	Arthrobacter *protophormiae* (SA3) , *Dietzia natronolimnaea* (STR1), *Bacillus subtilis* (LDR2)	Control of water and saline stress	Increases AIA content; Reduction of ABA and ACC content for salt stress; Increased expression of the TaDREB2 gene; greater efficiency of photosystem II, greater assimilation of CO2, greater stomatal conductance and improved transpiration levels	Barnawal et al. (2017)
Oryza sativa (rice)	*Burkholderia pyrrocinia* (BRM-32113), *Pseudomonas fluorescens* (BRM-32111)	Biological control	Reduction of AUDPC; Increase in the CO2 assimilation rate; Increase in APX enzyme activity.	Bueno et al. (2017)
Phaseolus coccineus L. (bean)	*Bacillus pummilus* (S4), *Bacillus mycoides* (S7)	Growth promotion	Increased photosynthesis, water use efficiency and chlorophyll content in leaves. Increased SOD and POD activity. Increase in grain yield, protein content and carbohydrate content.	Stefan et al. (2013)
Zea mays L. (corn)	*Bacillus mojavensis* (JK07), *Rhodopseudomonas palustres*	Salt stress control	Increases the expression of genes related to the production of antioxidant enzymes: SOD, APX, CAT and PPC; Increased salt tolerance.	Feng et al. (2019)

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Salvia oficialis (common sage)	*Pseudomonas fluorescens* (Pf Ap1, Pf Ap18) e duas *Pseudomonas putida* (Pp Ap9, Pp Ap14)	Growth promotion	Increased shoot and root biomass, leaf phosphorus content, essential oil yield, total phenolics and flavonoid content.	Ghorbanpour et al. (2016)
Camelina sativa L. (false-linen)	*Pseudomonas migulae* (8R6) e *Pseudomonas fluorescens* (YsS6)	Salt stress control	Increased production of ACC deaminase and expression of the acdS gene; reduces decline in shoot length and shoot mass; Increase in chlorophyll content and photosynthetic yield.	Heydarian et al. (2021)
Triticum aestivum L. (Wheat)	*Bacillus methylotrophicus* (M4-1)	Salt stress control	Increased levels of K, Mg, Na and total N and organic matter in the rhizosphere soil were positively correlated with wheat growth and salt tolerance.	Ji et al. (2020)
Arabidopsis thaliana L. (starweed)	*Achromobacter* sp. (5B1); *Achromobacter* sp. (B124) *Achromobacter xylosoxidans* (P35)	Growth promotion	Auxin redistribution. Increased number of cells expressing auxin modulators, increased auxin responsiveness in lateral root primordia.	Jiemez-Vazquez et al. (2020)
Cucumis sativus L. (cucumber)	*Rhodobacter sphaeroides*, *Lactobacillus plantarum* e *Saccharomyces cerevisiae*	Growth promotion	Increase in shoot length, root length, shoot fresh mass, shoot dry mass and chlorophyll content, secretion of IAA and/or organic acids; Increased content of 17 amino acids.	Kang et al. (2014)
Capsicum annuum L. (pepper)	*Bacillus amyloliquefaciens*	Growth promotion, control of water, saline and heavy metal stress	Increased levels of: chlorophyll, salicylic acid, sugar, amino acids and proline; Regulation of the host antioxidant system and hormones; Induces the expression of stress-related genes (CaXTHs, CaWRKY2, CaBI-1, CaPTI1 and CaBiPs).	Kazerooni et al. (2021)
Cicer arietinum L. (chickpea)	*Bacillus subtilis*, *Bacillus thuringiensis* e *Bacillus megaterium*	Water stress control and growth promotion	Greater shoot and root biomass, higher Fv/FM ratio and greater accumulation of proteins, sugars and phenolic compounds; Accumulation of succinate, leucine, disaccharide, saccharic acid, glyceric acid, malonate, 5-oxo-L-proline, trans-cinnamate, aminoacyl-tRNA; Increased biosynthesis of primary and secondary metabolites and amino acid metabolism	Khan et al. (2019a)
Triticum durum Desf. (Wheat)	*Acinetobacter pittii*, *Acinetobacter oleivorans*, *Acinetobacter calcoaceticus* e *Comamonas testosterona*	Water and saline stress control	Positive regulation in the amount of fraction of light absorbed by photosystem II (PSII), quantum yield ratio of non-regulatory constitutive non-photochemical quenching (PQ), chlorophyll fluorescence (qTQ) and variable chlorophyll fluorescence (qTV).	Khanghahi et al. (2020)
Zea mays L. (maize)	*Klebsiella* sp. (Br10, *Klebsiella pneumoniae* (Fr1), *Bacillus pumilus* (S1r1) e *Acinetobacter* sp. (S3r2) e *Bacillus subtilis* (UPMB10)	Promoting growth and productivity	Biologically fixes atmospheric N_2 and delays N remobilization in the corn plant for greater ear yield.	Kuan et al. (2016)

Species	Bacteria	Purposes	Physiological changes	Reference
Arabidopsis thaliana L. (starweed)	*Paenibacillus polymyxa* (E681)	Growth promotion and biological control	Growth promotion and biological control Increased expression of proteins related to defense/stress functions, such as: phytoalexins, Improved levels of antioxidant defense, photosynthesis and plant hormones.	Kwon et al. (2016)
Abies nordmanniana (pine)	*Bacillus* e *Paenibacillus*	Growth promotion	Improves seed germination; Increased level of reserve and soluble carbohydrates; Increases GST and GR activities in the plant; Increases root growth; Increased chlorophyll level.	Garcia-Lemos et al. (2020)
Medicago sativa L. (alfafa)	*Enterobacter aerogenes* (LJL-5) e *Pseudomonas aeruginosa* (LJL-13)	Growth promotion	Increased shoot height, fresh and dry mass, yield and crude protein content of alfalfa plants.	Liu et al. (2018)
Zea mays L. (maize)	*Bacillus velezensis* (D3)	Water stress control	Improvement of physiological parameters, such as: photosynthesis rate, stomatal conductance, vapor pressure, water use efficiency and transpiration rate.	Nadeem et al. (2020)
Solanum lycopersicum L. (tomato)	*Pseudomonas* sp. (S3)	Growth promotion	Increase in root/shoot length, root/shoot fresh mass and root/shoot dry mass, photosynthetic pigment content, increased accumulation of osmolytes (proline and total soluble sugar). Increased antioxidant activities (catalase and peroxidase) and phenolic content in tomato plants under saline stress.	Pandey; Gupta (2020)
Spartina densiflora (morraça)	*Pantoea agglomerans* (RSO6 e RSO7) e *Bacillus aryabhattai* RSO25	Heavy metal stress control	Decreases the Oxidative Stress Index (IEO); Increased PAL expression as a pathway to control metal stress.	Paredes-Páliz et al. (2018)
Saccharum officinarum (sugar-cane)	*Pseudomonas putida* GB-1	Promotion of growth and control and water stress	Increase in the size of the root system; Increase in CO_2 assimilation Improvement in proline content in leaves and roots.	Rampazzo et al. (2018)
Trema micrantha (1); *Cariniana estrellensis* (2)	*Azospirillum brasilense* (Ab-V5), *Bacillus* sp., *Azomonas* sp. e *Azorhizophillum* sp.	Water stress control	*T. micranta*: increased protein and starch in leaves and roots, photosynthesis, carboxylation efficiency; increase in dry mass of roots and shoots; reductions in H_2O_2, lipid peroxidation, water potential and proline. *C. strellensis*: increased photosynthesis and instant carboxylation efficiency, higher starch content in leaves and roots and higher protein content in leaves; lower levels of hydrogen peroxide and lipid peroxidation.	Tiepo et al. (2018)

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Oryza sativa (rice)	*Bacillus amyloliquefaciens* (SN13)	Control of water, saline and thermal stress	Accumulation of osmoprotectors and expression of marker genes; Increase in proline and soluble sugar content.	Tiwari et al. (2017)
Arabidopsis thaliana (starweed)	*Pseudomonas simiae* WCS417, *Pseudomonas capeferrum* (WCS358), *Pseudomonas defensor* (WCS374)	Growth promotion	It produces volatile organic compounds (VOCs) which induce the MYB72 transcription factor.	Zamioudis et al. (2015)
Glycyrrhiza uralensis Fisch. (licorice)	*Bacillus pumilus*	Water stress control	Improves the integrity of the cellular structure of the chloroplast and mitochondria. Increase in chlorophyll content, photosynthetic parameters and water use efficiency.	Zhang et al. (2019)
Triticum sp. (wheat)	*Proteus mirabilis* R2, *Pseudomonas balearica* RF-2 e *Cronobacter sakazakii* RF-4	Growth promotion and water stress control	Growth promotion and water stress control Increased plant growth, leaf area and biomass under water stress. Higher water content; Reduction of cell injury and electrolyte leakage, greater stability of the cell membrane. Greater expression of APX and RBC cytosolic genes. Increased SOD activity.	Zia et al. (2021)
Arachis hypogaealeva (peanut)	*Brachybacterium saurashtrense* (JG06)	Growth promotion	Increased shoot and root length, fresh and dry mass. Increase in total chlorophyll and carotenoids. Low electrolyte leakage and lipid peroxidation, high membrane stability and higher total amino acid content. 263 genes were expressed.	Alexander et al. (2021)
Saccharum officinarum (sugar cane)	*Bacillus xiamenensis* (PM14)	Growth promotion and biological control	Increase in fresh mass, root length, plant height, length and diameter of sugar cane; Increase in antioxidant enzymes, photosynthetic pigments (chlorophylls and carotenoids) and proline content can lead to induced systemic resistance against red rot.	Amna et al. (2020)

Species	**Bacteria**	**Purposes**	**Physiological changes**	**Reference**
Triticum aestivum L. (wheat)	*Alcaligenes faecalis* (SBN01) e *Alcaligenes faecalis* (SBN02)	Salt stress control	Increase in CAT, gelatinase and ammonia; Increased growth parameters and plant biomass, decreasing lipid peroxidation induced by ROS, while increasing the accumulation of osmolytes, photosynthetic pigments and improving photosystem II.	Babar et al. (2021)
Ipomoea batatas (L.) Lam. (Sweetpotato)	*Bacillus cereus* (P31) e *Achromobacter xylosoxidans* (P35)	Growth promotion	Increase in all vegetative parameters (shoot length, root length, fresh and dry mass of shoot and root) Increase in chlorophylls and carotenoids; Significant increase in N, K and P contentes.	Dawwam et al. (2013)
Mucuna pruriens (L.) DC. (mucuna)	*Enterobacter* (HS9) e *Bacillus* (G9)	Water stress control	Increase in total biomass and water use efficiency Lower ACC deaminase content in roots, resulting in lower ethylene emission in roots; Maintains higher levels of isoprene emission, protecting leaves from oxidative damage; Maintains carbon assimilation during the progression of water stress.	Brunetti et al. (2021)
Sorghum bicolor (sorghum)	*Bacillus cereus* (TCR17), *Providencia rettgeri* (TCR21) e *Myroides odoratimmus* (TCR22)	Metal stress control	Increased plant growth, antioxidant status (SOD, CAT and APX) and decreased proline and malonaldehyde contents in plants under Chromium. Reduces stress-induced oxidative damage. Reduces the accumulation of Chromium Regulates the expression of antioxidant-related synthesis genes (SOD, APX and CAT) and stress tolerance genes (sHsp).	Bruno et al. (2020)
Ocimum basilicum L. (basil)	*Pseudomonas* sp. (S1), *Bacillus lentus* (S2) e *Azospirillum brasilens* (S3)	Control of water stress	Improves growth, antioxidant status and photosynthetic pigments Significantly improves the activity of CAT, GPX, APX enzymes and chlorophyll content.	Heidari e Golpayegani (2012)
Glycine max (L) Merrill (soybean)	*Pseudomonas putida* (H-2-3)	Growth promotion, water and saline stress control	Increase in the length of the aerial part and fresh mass; Higher chlorophyll content in plants exposed to salt and drought. Increase in ABA content; Reduction of sodium (Na) content in plants under saline stress.	Kang et al. (2014)

Species	Bacteria	Purposes	Physiological changes	Reference
Saccharum officinarum (sugar cane)	*Paraburkholderia tropica* (IAC/BECa 135), *Herbaspirillum frisingense* (IAC/BECa 152), Pseudomonas *fluorescens* (IAC/BECa141) *e Kosakonia radicincitans* (IAC/BECa 95)	Growth promotion and metal stress control	Improves seedling fitness under conditions of nutritional limitation and Al stress, modulating nutritional and Al homeostasis. Changes in Al allocation and calcium (Ca) and boron (B) content between different parts of the plant (root or shoot).	Labanca et al. (2020)
Zea mays L. (maize)	*Kocuria rhizophila* Y1	Salt stress control	Regulates levels of plant hormones AIA and ABA and improves nutrient acquisition; Improves biomass production, seed germination rate; Improves photosynthetic capacity, antioxidant levels, relative water content and chlorophyll accumulation. Lower Na+ levels and electrolyte leakage Higher transcription levels of ZmGR1, ZmAPX1 genes ZmNHX1, ZmNHX2, ZmNHX3, ZmWRKY58 and ZmDREB2A.	Li et al. (2020)
Solanum lycopersicum (tomato)	*Bacillus velezensis* FMH2	Salt stress control	Increase in biomass and chlorophyll content Reduces Na^+ absorption and maintains membrane integrity, reducing lipid peroxidation and increasing the production of antioxidants; decreases K^+ and Ca^{2+} losses in root and leaf tissues.	Masmoudi et al. (2021a)
Solanum lycopersicum (tomato)	*Pseudomonas fluorescens* (G20-18)	Growth promotion and water stress control	Growth promotion and water stress control Increased chlorophyll content, decreased stomatal conductance, systemic alteration of ABA content, increased activity of carbohydrate metabolism enzymes, increased antioxidant metabolism enzymes, increased total antioxidant capacity and accumulation of metabolites secondary, and quantitative and qualitative changes in gene expression.	Mekureyaw et al. (2022)

Species	Bacteria	Purposes	Physiological changes	Reference
Oryza sativa (rice)	*Bacillus altitudinis* (FD48) e *Bacillus methylotrophicus* (RABA6)	Water stress control	Increase in photosynthetic pigments and proline Regulation of ROS quenching enzymes that aid resilience to water stress, such as: increased activity of ROS quenching enzymes, such as CAT, SOD, APX and POD. Increased harvest index, productive tillers and grain mass.	Narayanasamy et al. (2020)
Zea mays L. (maize)	*Azotobacter* sp. (C5, C7, C8 e C9)	Salt stress control	Salt stress control Improves Na^+ exclusion and K^+ absorption Increased polyphenol and chlorophyll content; Increased proline concentration in leaves due to salinity.	Rojas-Tapias et al. (2012)
Vigna unguiculata [L.] Walp (cowpea)	*Bradyrhizobium* sp. (cepa UFLA 03-84), *Actinomadura* sp. (cepa 183-EL), *Paenibacillus graminis* (cepa MC 04.21), *Bacillus* sp. (cepa IPACC11)	Salt stress control	Salt stress control Lower H_2O_2 content in your nodules, Significant changes in the total, reduced and oxidized forms of ascorbate and glutathione. Increased SOD, CAT and phenol peroxidase activities.	Santos et al. (2018)
Mentha piperita (pepper mint)	*Pseudomonas fluorescens* (WCS417) e *Bacillus amyloliquefaciens* (GB03)	Water stress control	Increase in total phenolic content; Greater enzymatic activities; Lower proline content; Decreased membrane lipid peroxidation.	Chiappero et al. (2019)
Oryza sativa (rice)	*Pseudomonas stutzeri* e *Cupriavidus taiwanensis*	Heavy metal stress control	All bacterial strains increase the activities of antioxidant enzymes, including SOD, CAT, APX, GPX and GR Increase in growth parameters and lower arsenic levels in the roots, shoots and throughout the plant.	Thongnok et al. (2022)
Cucumis sativus L. (cucumber)	*Bacillus velezensis* (SX13), *Bacillus paralicheniformis* (SX21) e *Bacillus tequilensis* (SX31)	Growth Promotion	Improved root structures, photosynthetic parameters, increased growth rate and high degree of biomass accumulation. Higher seedling growth rate. Upregulates CsNRT1 in roots. Increase in absorption and transport rates of elements (RUBISCO, SS, PEP carboxylase and aldolase) and nitrogen metabolism (including NADPH, GS, GOGAT and GDH) in leaves. Increased levels of glucose, sucrose, fructose, soluble proteins and amino acids increased in the leaves.	Wang et al. (2022)

Species	**Bacteria**	**Purposes**	**Physiological changes**	**Reference**
Solanum lycopersicum Mill. (tomato)	*Serratia proteamaculans*	Growth promotion and biological control	Suppression of fungal growth. Improved tomato growth and chlorophyll content; Increased activity of plant defense enzymes and pathogenesis-related proteins, including GPX, SOD, PAL and β-1,3 glucanase.	Youssef et al. (2018)
Seidlitzia rosmarinus	*Bacillus pumilus* (HR0 e *Zhihengliuella halotolerans* (SB)	Control of salt stress and productivity	Increase in the content of chlorophyll, proteins, Fe, Mg and Mn; Increase in total dry biomass; Improvement in the quality index of seedlings; Increase in catalase activity, anthocyanin content; Increase in antioxidant levels. Increased quantity and quality of forage.	Zilaie et al (2022)
Beta vulgaris L. (beet)	*Streptomyces bellus* MW797036 (SB) e *Streptomyces saprophyticus* MW797316 (SS)	Growth promotion and biological control	Growth promotion and biological control Increase in dry biomass of the shoot and root; Higher levels of P and K in leaves and soil Protection effect of up to 100% respectively infested by *F. equiseti* and *F. fujikuroi*.	Aallam et al. (2022)
Solanum lycopersicum (tomato)	*Stenotrophomonas maltophilia* (S23, S24, S26 e S28) *Bacillus* sp. (SV81), *Azotobacter chroococcum* (S11) e *Serratia marcescens* S14)	Biological control	Reduces the severity of the disease; Production of released diffusible and volatile metabolites limited the radial growth of the pathogen	Aydi-Ben-Abdallah et al. (2020)
Chlorophytum borivilianum (Safed Musli)	*Brachybacterium paraconglomeratum* (SMR20)	Salt stress control	Decreased stress ethylene production; Delays chlorosis and senescence which results in better plant performance; Increase in the amount of total leaf pigments and proline; Improves foliar absorption of nutrients.	Barnawal et al. (2016)
Zea mays L. (maize)	*Azospirillum brasilense* (Az39)	Productivity	Increase in productivity Increase in total chlorophyll content; Less damage to membranes in treatment with foliar inoculation, when associated with herbicides;	Cardozo et al. (2022)
Saccharum officinarum (sugar cane)	*Bacillus subtilis* (BSSC11) e *Bacillus megaterium* (BMSE7)	Growth promotion and water stress control	Improves nutrient levels; Improved early sprouting, increased vigor (greater fresh and dry mass of the shoot and root). Improved capacity of the antioxidant enzymatic system, with expression of SOD isoforms; Higher proline content in plants exposed to drought.	Chandra et al. (2018)

Species	**Bacteria**	**Purposes**	**Physiological changes**	**Reference**
Saccharum officinarum (sugar cane)	*Bacillus subtilis* (B9)	Growth promotion	Growth promotion Promotes growth by increasing N, P and K content. Improves photosynthetic rate, root development and chlorophyll content Cotyledon and hypocotyl of sugarcane buds germinated more quickly.	Di et al. 2022
Zea mays L. (maize)	*Bacillus* sp.	Growth promotion and alkaline stress control (others)	Improvement in photosynthetic pigment levels and soluble sugar content; Decreases proline level under stress conditions. Significantly improved soil enzymes such as dehydrogenase, alkaline phosphatase and beta-glucosidase.	Dixit et al. (2020)
Oryza sativa (rice)	*Bacillus megaterium* CCMMB583 *Bacillus subtilis* KJB06	Promotion of growth, productivity and water stress control Improved growth;	Increased levels of photosynthetic pigments, membrane stability index, relative water content, chlorophyll fluorescence, stomatal conductance, total phenols, POD, PPO, nitrogen content.	El-Mageed et al. (2022)
Oryza sativa (rice)	*Gluconacetobacter diazotrophicus* cepa Pal5 (BR 11281, ATCC49037)	Water stress control	Increase in dry biomass in shoots and roots Greater control of stomatal conductance, transpiration, and net photosynthesis; Increase in free proline levels Increase in the number of panicles per pit and crude protein; Alters the activities of the main enzymes SOD, CAT and APX.	Filgueiras et al. (2020)
Cucumis sativus L. (cucumber)	*Rhodopseudomonas palustris* (G5)	Growth promotion and salt stress control	Increase in shoot height, root length, fresh and dry mass, total chlorophyll content and soluble sugar content. Increased SOD, POD and PPO activity; Reduces H_2O_2 and MDA levels.	Ge e Zhang (2019)
Glycine max (L.) Merr (1) (soy); *Lolium multiflorum* Lam. (2) (azevém)	*Bradyrhizobium* sp. (YL-6)	Growth promotion and heavy metal stress control	Increase in the levels of photosynthetic pigments and mineral nutrients (Fe or Mg) in plant leaves; Increase in dry weights of ryegrass shoots Increased cadmium concentrations in ryegrass root Cadmium concentration in soybean roots and shoots decreased.	Guo e Chi (2014)

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Pisum sativum L. (pea)	*Bacillus marisflavi* (CHR JH 203) e *Bacillus cereus* (BST YS1_42)	Salt stress control	Increased plant biomass, carbohydrates, reducing sugars, proteins, chlorophylls, phenol, flavonoid content and increasing levels of antioxidant enzymes. Expression of ROS scavenging genes (PsSOD, PsCAT, PsPOX, PsNOS, PsAPX, PsChla/bBP), defense genes and cell rescue genes (PsPRP, PsMAPK, PsFDH); Higher level of gene expression and salt tolerance.	Gupta et al. (2021)
Solanum tuberosum (potato)	*Bacillus pumilus* e *Bacillus firmus* str.	Control of salt, water and heavy metal stress	Increased expression levels of ROS scavenging enzymes, APX, SOD, CAT, DHAR and GR. Proline accumulation Increase in photosynthetic efficiency	Gururani et al. (2013)
Vigna radiata L. (bean)	*Bacillus cereus* (Pb25)	Control of salt stress and productivity	Increases growth, fresh and dry biomass of roots and shoots; Relief from oxidative damage. Increased POD, SOD and CAT activities; Increase in proline accumulation, potassium, nitrogen and phosphorus.	Islam et al. (2016)
Zea mays L. (maize)	*Lysinibacillus fusiformis* (YJ4) e *Lysinibacillus sphaericus* (YJ5)	Thermal stress control	Induces resistance to osmotic and oxidative stress due to cold, by upregulating osmolytes, phenolics (proline, glycine betaine, soluble sugars and phenolic content), phytohormones (auxin, gibberellin and ACC deaminase and the lower ABA content) and antioxidant enzymes (SOD, CAT and PAL).	Jha e Mohamed, (2022)
Glycine max (L) Merrill (soybean)	*Curtobacterium* sp. (SAK1)	Salt stress control	Increase of different GA and organic acids Increase in IAA and GAs content and number of root tips, improving nutrient absorption by plants. Relief from polyphenolic oxidase and peroxidase; Deamination of ACC, leading to ethylene reduction.	Khan et al. (2019b)
Glycine max (L) Merrill (soybean)	*Bacillus aryabhattai* (ALT29) e *Arthrobacter woluwensis* (ALT43)	Salt stress control	Regulation of endogenous phytohormones (ABA and SA), antioxidants (GSH, LPO, TPP, PPO and POD); Greater absorption of ions (Na and K); Gene expression (GmFLD19 and GmNARK).	Khan et al. (2021)
Glycine max (L) Merrill (soybean)	*Klebsiella variicola* (AY13)	Water stress control	Induces adventitious root initiation. Reduces flooding stress by improving chlorophyll content, chlorophyll fluorescence quantum efficiency during and after flooding stress.	Kim et al. (2017a)
Glycine max (L) Merrill (soybean)	*Bacillus amyloliquefaciens* (H-2-5)	Growth promotion and salt stress	Regulation of phytohormones (GA and ABA) and proline content in salt-tolerant soybean plants.	Kim et al. (2017b)

Species	**Bacteria**	**Purposes**	**Physiological changes**	**Reference**
Phaseolus vulgaris L. (bean)	*Bacillus megaterium* CFBP486 (BM) e *Bacillus amylolequefaciens* CFBP486 (BM)	Ozone Stress Control (others)	Greater activity of the ACC deaminase enzyme and chlorophyll a fluorescence; Increase in biomass; Improves O_3 stress by inducing systemic resistance;	Kittipornkul et al. (2021)
Triticum aestivum L. (wheat)	*Pseudomonas libanensis* (EU-LWNA-33)	Growth promotion and water stress	Increase in shoot length, root length, fresh mass and dry mass of wheat at both moisture levels; Increased proline, glycine betaine at all levels of moisture stress;	Kour et al. (2019)
Zea mays L. (maize)	*Bacillus aquimaris* (DY-3)	Salt stress control	Increase in chlorophyll content, relative water content in the leaf, accumulation of proline, soluble sugar and total phenolic compound. Increase in SOD, CAT, POD and APX activities. Decrease in lipid peroxidation and Na^+ levels.	Li e Jiang, (2017)
Arabidopsis thaliana (starweed)	*Herbaspirillum seropedicae* (HRC54)	Growth promotion	Increase in leaf area, fresh and dry mass of shoots and roots Expression of proteins involved in the redox state of the chloroplast, including 9 photosynthesis-related proteins: TL29, CB5-E, GPX1, CSD2, TRX-M4, PRXQ, THM1, TRXF1 and ATHM2 Expression of defense-related proteins: Methionine Sulfoxide Reductase B2 (MSRB2), Actin Depolymerizing Factor 3 (ADF3) and PR-5 (pathogenesis-related-5), cysteine-rich secretory protein (CAP) and repeat family protein rich in leucine (LRR).	Leandro et al. (2019)
Poa annua L. (dog hair)	*Paenibacillus tundrae* (TS19), *Bacillus mycoides* (TS26) e *Brevibacterium frigoritolerans* (TS22)	Water stress control	Improves underground dry biomass and root-to-shoot ratio Increase in the ROS content in the plant leaf with the deepening of water stress.	Li et al. (2022)
Peganum harmala L. (rue) (1) *Lactuca sativa* L (lettuce) (2)	*Mesorhizobium tamadayense* (BKM 04), *Enterobacter xiangfangensis* (BKM 30), *Pseudomonas azotifigens* (BKM 07) e *Streptomyces caelestis* (BKM 05)	Control of salt stress and heavy metals	Root and shoot lengthening Greater amount of IAA produced in non-stressed and stressed conditions was recorded for three strains; Accumulation of osmolytes (sugars, amino acids and proline) and exopolysaccharides.	Madline et al (2021)
Vicia faba L. (lima bean)	*Bacillus subtilis* (AR5) e *Bacillus thuringiensis* (BR1)	Saline stress control	Improves plant height, aerial part dry mass, proline content, enzymatic activities. Accumulation of mineral nutrients in the aerial part of plants. Increased activities of APX, GSH, CAT, POD, PPO, SOD, and AA; Increase in the ascorbate-glutathione redox cycle.	Mahgoub et al. (2021)

Species	Bacteria	Purposes	Physiological changes	Reference
Solanum lycopersicum var. Rio grandi (tomato)	*Bacillus spizizenii* (FMH45)	Growth promotion and salt stress control	Improves biomass growth, reducing Na^+ absorption; Increasing chlorophyll levels and maintaining membrane integrity; Reduces lipid peroxidation and improves the production of antioxidants. Increased POX activity Reduces the production of H_2O_2 and MDA.	Masmoudi et al. (2021b)
Medicago sativa L.	*Serratia rubidaea* (A) e *Pseudomonas putida* (B), *Serratia* sp. (C) mais *Synorhizobium meliloti*(R)	Abiotic stress control by herbicide (others)	Increase in the microbial population; Increased plant biomass and antioxidant activities. H_2O_2 reduction MDA Reduction Increased CAT, APX and GPX	Motamedi et al. (2022)
Oryza sativa L. (rice)	*Herbaspirillum seropedicaea*	Growth promotion	Stimulates root vacuolar H+ pumps (vacuolar H^+ -ATPase and vacuolar H+ -PPase) and Increased plant growth (biomass), macronutrient content (N, P, K, Ca, Mg and S), micronutrients (Fe, B, Cu, Mo, Ni, Zn) and photosynthetic efficiency.	Ramos et al. (2020)
Solanum lycopersicum L. (tomato)	*Pseudomonas geniculata* (B11), *Achromobacter* sp. (B124), *Bacillus megaterium* (P2), *Lysinibacillus sphaericus* (B19) e *Bacillus cereus* (B40)	Salt stress control	Increase in dry mass of shoots and roots Modulates defense mechanisms; Improvement in stomatal conductance, proline content and Na^+/K^+ ratio in plant tissues. Increase in proline content and sodium content.	Naseri et al. (2022)
Brassica napus L. (canola)	*Enterobacter* sp. (S16-3) e *Pseudomonas* sp. (C16-2º)	Salt stress control	Relief of salt stress by IAA and ABA. Increase in leaf area, root length; Improves chlorophyll fluorescence indexes, relative water content, electrolyte leakage index, photosynthetic pigments (chlorophyll a, b and carotenoids), Na+ and K+ Improvement of biochemical parameters such as MDA content, H2O2 content, Improvement in total protein content, proline and antioxidant enzyme activities.	Neshat et al. (2022)