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Supplementary tables

Table S1. List of *Bt* strains and their contribution to their antagonistic effects on different pathogenic bacteria.

Sl. No.	*Bacillus* strain	Isolated from	Pathogenic bacteria	Compounds	Reference
1	*Bt* subsp. *tochigiensis* HD868	Collected from USDA (Brownsville, TX, USA) and BGSC (*Bacillus* Genetic Stock Center, Columbia, OH, USA)	*Bacillus cereus*	Tochicin (bacteriocin)	(169)
2	*Bt* BMG1.7	Soil	*Streptococcus pyogenes, Listeria monocytogenes*	Thuricin 7 (bacteriocin)	(170)
3	*Bt* B439	Collected from Netherlands Institute for Dairy Research, Ede, The Netherlands	*Bacillus cereus*	Thuricin 439 (bacteriocin-like peptide)	(171)
4	*Bt* subsp. *thuringiensis* B1	Collected from *Bacillus* Genetic Stock Center 4A3	*Erwinia carotovora*	AHL-lactonase enzyme	(172)
5	*Bt* subsp. *kurstaki* B2	Collected from *Bacillus* Genetic Stock Center 4D1	*Erwinia carotovora*	AHL-lactonase enzyme	(172)
6	*Bt* subsp. *wuhanensis* B17	Mycogen PSS2A1	*Erwinia carotovora*	AHL-lactonase enzyme	(172)
7	*Bt* B18	laboratory collection	*Erwinia carotovora*	AHL-lactonase enzyme	(172)
8	*Bt* subsp. *kurstaki* B22	laboratory collection	*Erwinia carotovora*	AHL-lactonase enzyme	(172)
9	*Bt* subsp. *israelensis* B23	Collected from *Bacillus* Genetic Stock Center4Q7	*Erwinia carotovora*	AHL-lactonase enzyme	(172)
10	*Bt* COT1	laboratory collection	*Erwinia carotovora*	AHL-lactonase enzyme	(172)
11	*Bt* subsp. *israelensis* B23Δai, ΔaiiA::Tc	Collected from *Bacillus* Genetic Stock Center	*Erwinia carotovora*	AHL-lactonase enzyme	(172)
12	*Bt* subsp. *morrisoni* (LBIT 269)	Mexican strains	*Bacillus cereus, Vibrio cholerae*	Proteinaceous *Bt*-BLIS (Group A)	(56)
13	*Bt* subsp. *kurstaki* (LBIT 287)	Mexican strains	*Bacillus cereus, Vibrio cholerae*	Proteinaceous *Bt*-BLIS (Group A)	(56)
14	*Bt* subsp. *kenyae* (LBIT 404)	Mexican strains	*Bacillus cereus*	Proteinaceous *Bt*-BLIS (Group B)	(56)

15	*Bt* subsp. *entomocidus* (LBIT 420)	Mexican strains	*Bacillus cereus*	Proteinaceous *Bt*-BLIS (Group B)	(56)
16	*Bt* subsp. *tolworthi* (LBIT 524)	Mexican strains	*Bacillus cereus*	Proteinaceous *Bt*-BLIS (Group B)	(56)
17	*Bt*	aiiA gene deleted (AHL-degrading enzyme)	*Erwinia carotovora*	quorum quenching mechanism	(173)
18	*Bt* subsp. *morrisoni* (LBIT 269)	bacterial stock collection held at CINVESTAV, Campus Guanajuato, Mexico	Broad spectrum, including: *Streptococcus* spp.*, Staphylococcus* spp.*, Listeria monocytogenes, Bacillus* spp.*, E. coli, Pseudomonas aeruginosa, Shigella* spp.	Morricin 269 (*Bt*-BLIS)	(174)
19	*Bt* subsp. *kurstaki* (LBIT 287)	bacterial stock collection held at CINVESTAV, Campus Guanajuato, Mexico	Broad spectrum, including: *Streptococcus* spp.*, Staphylococcus* spp.*, Listeria monocytogenes, Bacillus* spp.*, E. coli, Pseudomonas aeruginosa, Shigella* spp.	Kurstacin 287 (*Bt*-BLIS)	(174)
20	*Bt* subsp. *kenyae* (LBIT 404)	bacterial stock collection held at CINVESTAV, Campus Guanajuato, Mexico	Broad spectrum, including *Streptococcus* spp.*, Staphylococcus* spp.*, Listeria monocytogenes, Bacillus* spp.	Kenyacin 404 (*Bt*-BLIS)	(174)
21	*Bt* subsp. *entomocidus* (LBIT 420)	bacterial stock collection held at CINVESTAV, Campus Guanajuato, Mexico	Broad spectrum, including Gram-positive bacteria (*Streptococcus* spp.*, Staphylococcus* spp.*, Listeria monocytogenes, Bacillus* spp.)	Entomocin 420 (*Bt*-BLIS)	(174)
22	*Bt* subsp. *tolworthi* (LBIT 524)	bacterial stock collection held at CINVESTAV, Campus Guanajuato, Mexico	Broad spectrum, Gram-positive bacteria (*Streptococcus* spp.*, Staphylococcus* spp.*, Listeria monocytogenes* and *Bacillus* spp.)	Tolworthcin 524 (*Bt*-BLIS)	(174)
23	*Bt* subsp. *morrisoni* (LBIT 269)	Mexican strains	*Staphylococcus aureus* (bovine mastitis)	Morricin 269	(175)
24	*Bt* subsp. *kurstaki* (LBIT 287)	Mexican strains	*Staphylococcus aureus* (bovine mastitis)	Kurstacin 287	(175)
25	*Bt* subsp. *kenyae* (LBIT 404)	Mexican strains	*Staphylococcus aureus* (bovine mastitis)	Kenyacin 404	(175)
26	*Bt* subsp. *entomocidus* (LBIT 420)	Mexican strains	*Staphylococcus aureus* (bovine mastitis)	Entomocin 420	(175)
27	*Bt* subsp. *tolworthi* (LBIT 524)	Mexican strains	*Staphylococcus aureus* (bovine mastitis)	Tolworthcin 524	(175)
28	*Bt* BUPM103	Isolated from Tunisian soil samples	*Agrobacterium* subsp. (crown gall disease), *Listeria monocytogenes, Bacillus cereus*	Bacthuricin F103 (bacteriocin, ~11 kDa)	(176)
29	*Bt* subsp. *entomocidus* HD110	Collected from *Bacillus* Genetic Stock Center collection (Columbus, USA)	Not reported	Thuricin S (bacteriocin)	(177)

30	*Bt* subsp. *entomocidus* HD9	Collected from *Bacillus* Genetic Stock Center collection (Columbus, USA)	Not reported	Thuricin S (bacteriocin)	(177)
31	*Bt* subsp. *tolworthy* HD125	Collected from *Bacillus* Genetic Stock Center collection (Columbus, USA)	Not reported	Thuricin S (bacteriocin)	(177)
32	*Bt*-Bn1	*Balaninus nucum*	*Pseudomonas syringae, Pseudomonas savastanoi, Paucimonas lemoignei*	Not reported	(178)
33	*Bt BT*J-S-1	Soil samples of Assam	*Ralstonia solanacearum*	Antibacterial (in consortia)	(52)
34	*Bt* CR-371	Collected from Hokkaido University, Japan	*Ralstonia solanacearum*	Disease suppression (bacterial wilt and root-knot nematode)	(179)
35	*Bt* UFV-56	*Eucalyptus* rhizosphere/rhizoplane	*Ralstonia solanacearum*	Bacterial wilt suppression	(54)
36	*Bt* KB1	*Arabidopsis thaliana* (apoplastic fluid)	*Botrytis cinerea* and *Pseudomonas syringae* pv. tomato	Not reported	(53)
37	*Bt*	oil-contaminated places	*Bacillus cereus, Staphylococcus aureus, Streptococcus pyogenes, Klebseilla pneumonia, Pseudomonas aeruginosa* and *Acenetobacter* sp.	Decanoic acid, oleamide	(153)
38	*Bt* Cry−B		*B. cereus, E. faecium* wild type, *E. faecium* ATCC 19,434	Thurincin H	(180)
39	*Bt* LZX01	Membrane bioreactor (MBR)	Not reported	Degrades C8-HSL (autoinducer molecule)	(50)
40	*Bt*	Qatar	the foodborne pathogen *B. cereus* and the human pathogen *Staphylococcus aureus*	Thuricin 466, Thuricin 4Q7; Thuricin 466 is protein and Thuricin 4Q7 is a glycoprotein in nature	(49)

Table S2. List of *Bt* strains and their contribution to plant health and protection through biological control of fungal diseases.

Sl. No.	***Bacillus* strain**	**Isolated from**	**Fungus**	**Activity**	**Reference**
1	*Bt* serotype 1	Collected from the laboratory of Microbiology (Faculté des Sciences de Tunis)	*Fusarium roseum* var. *sambucinum*	Chitinase production *in vivo* condition	(181)
2	*Bt* var. *darmstadiensis* serotype 1	Collected from the laboratory of Microbiology (Faculté des Sciences de Tunis)	*Fusarium roseum* var. *sambucinum*	Chitinase production *in vivo* condition	(181)

3	*Bt* var. galle- riae serotype 5a 5b	Collected from the laboratory of Microbiology (Faculté des Sciences de Tunis)	*Fusarium roseum* var. *sambucinum*	Chitinase production in *in vivo* condition	(181)
4	*Bt* CMB26	Soil	*Colletotrichum gloeosporioides*	Fengycin (lipopeptide)	(182)
5	*Bt* var. *israelensis*	Shrimp wastes	*Sclerotium rolfsii, Aspergillus terreus, Aspergillus flavus, Nigrospora* sp., *Rhizopus* sp., *Aspergillus niger, Fusarium* sp., *Aspergillus candidus, Absidia* sp., *Helminthosporium* sp., *Curvularia* sp., *Aspergillus fumigatus*	Chitinase production	(183)
6	*Bt* H3	Nature	*Pyricularia grisea, Thantephorus cucumris, Fusarium vasinfectum, Fusarium gramineum, Fusarium oxysporum*	Chitinase production, Antifungal activity	(184)
7	*Bt* NM101-19	Rhizosphere of plants in Egypt	*Rhizoctonia* sp., *Trichoderma harzianum,* *Fusarium oxysporum, Penicillum chrysogenum*	Chitinase production	(185)
8	*B. thuringiensis* subsp. *thuringiensis* strain 202	Obtained from the State Research Institute of Genetics and Selection of Industrial Microorganisms located in Moscow, Russia	*Fusarium oxysporum* f. sp. *lycopersici*	inhibition of oxidative phosphorylation and respiration results in direct effects on mitochondrial functions or indirect effects through the induction of cellular stress responses	(186)
9	*Bt* 199	wheat rhizospheric soil	*Fusarium oxysporum lycopersici*	Induced systemic resistance	(187)
10	*Bt* TB72	rhizosphere soil associated with the Shandong YingYangYuan Food Technology Co. Ltd., Jinan, China	*Colletotrichum gloeosporioides*	production of 2-nonanone, β-benzeneethanamine, 2-decanone and thymol	(188)
11	*Bt* SM1	Farmland soil sample (IIT-Kharagpur campus, India)	*Candida albicans*	Fengycin (lipopeptide)	(62)
12	*Bt* SM2	Farmland soil sample (IIT-Kharagpur campus, India)	*Aspergillus niger*	Fengycin (lipopeptide)	(62)
13	*Bt* 58-2-1	Winter wheat plants (China)	*Urocystis tritici*	Chitinase production	(189)
14	*Bt* 37-1	Winter wheat plants (China)	*Urocystis tritici*	Chitinase production	(189)
15	*Bt* subsp. *kurstaki* LFB-FIOCRUZ (CCGB) 257	moist soil from the Morretes Village, Paranaguá, Paraná State, Brazil	*Fusarium verticillioides MRC 826*	Inhibition of fumonisin production	(190)

16	*Bt* UM96	sorghum plant rhizosphere (*Sorghum* spp.) in an agricultural field in Morelia, Mexico	*Botrytis cinerea*	Chitinase production	(62)
17	*Bt* C25	Sclerotinia-infected field	*Sclerotinia minor*	Chitinase, Proteases and β-1,3-glucanase production	(191)
18	*Bt* strain	soil of field-grown tomato plants	*Verticillium dahliae* and *Verticillium longisporum*	Production of chitinases	(192)
3419	*Bt* KYC	Obtained from Plant Pathology Laboratory, Chonnam National University	*Rhizoctonia solani, Fusarium oxysporum* and *Fusarium graminearum*	secondary metabolites including lytic enzymes	(193)
20	*Bt* BCN10	Soil	*Fusarium oxysporum, Botryosphaeria* sp.*, Peni cillium expansum, Trichoderma atroviride, Colletotrichum gloeosporioides*	production of 2-pentanol, 2-methyl-1-propanol, acetoin, butanol, 1-octen-3-ol, methyl benzoate	(194)
21	*Bt SY33.3*	Obtained from various habitats in the cities of Kayseri and Adana between the years 2009 and 2010	*Fusarium oxysporum* f. sp. *niveum, Verticillium dahliae* and *Aspergillus niger*	Chitinase production	(195)
22	*Bt BMKP*	Obtained from the Laboratory of Plant Pathology, Faculty of Agriculture, Universitas Gadjah Mada identified	*Colletotrichum gloeosporioides* (Anthracnose)	chitinase and fengycin	(196)
23	*Bt CHGP12*	Laboratory collection	*Fusarium* wilt	Production of fengycin, surfactin, iturin, bacillaene, bacillibactin, plantazolicin and bacilysin	(63)
24	*Bt* 2B3-1 and *Bt* 2B2-2 strains	Laboratory collection	*Podosphaera xanthii*, powdery mildew disease within cucurbits	the synthesis of plant defense enzymes such as DPPH, antioxidant, proline production, total phenolic substance and total flavonoid content	(197)
25	*Bt* ATCC 10792	Cocoa beans	*Aspergillus carbonarius*		(198)

Table S3. List of *Bt* strains and their effectiveness in plant growth.

Sl. No.	*Bacillus* strain	Extracted from	Used for crop	Method of application	Observations	Reference
1	*Bt* subvar. Kenyae C25	Healthy lettuce plants	Lettuce (cv. Verônica and Verdinha)	Seed and substrate bacterization	Elevates root fresh weight, total fresh weight in greenhouse (non-significant in field) and enhances foliar nitrogen content	(77)
2	*Bt* NEB17	Inside nodules of soybean plants	Soybean	Coinoculation with *Bradyrhizobium japonicum*	Increase in nodule number, nodule weight, shoot weight, root weight, total biomass, total nitrogen and grain yield	(199)
3	*Bt* ATCC 33679	the American Type Culture Collection, Manassas, Virginia	Not reported	Not reported	production of catecholate-type siderophores, Bacillibactin	(84)
	Bt 10	obtained from the Microbiology Department, University of Karachi	mung bean and okra	*Bt* 10 and *Rhizobium meliloti* applied as seed dressing and soil drenching	increase in seed germination, shoot length, shoot weight, root length, root weight and root nodulation providing better plant growth with a significant decrease in infection by root infecting fungi	(200)
4	*Bt*-KR1	Kudzu vine (*Pueraria thunbergiana*) nodules	Field pea (*Pisum sativum* L.) and Lentil (*Lens culinaris* L.)	Co-inoculation with *Rhizobium leguminosarum*-PR1	Enhances legume nodulation and growth, increases in nodule number, shoot weight, root weight and overall biomass	(78)
5	*Bt* NEB17	Rhizosphere of soybean plants	Soybean (C3 dicot), Corn (C4 monocot)	Foliar spray, Root drench	Plant growth promotion, Bacteriocin production (thuricin-17)	(201)
6	*Bt* strain		Cabbage	Seed inoculation	Endophytic colonization and persistence Vegetative cells, spores and crystals in roots, shoots and leaves - Predominant colonization on roots - Surface, near stomata and inside stomata pores Likely through openings and injuries in roots, moving through the xylem to leaves	(202)

					Potential for long-term pest control, including cryptic pests like *P. xylostella* - Demonstrates novel approach for endophytic insect pest management	
7	*Bt* PU-7	Cotton rhizosphere soil in Deccan plateau, India	Not reported	Seed inoculation, soil application	IAA, Phosphate solubilizing metabolites, unidentified growth promoting compounds	(76)
8	*Bt* C110	rhizosphere of medicinal plant	Not reported	Not reported	indol-3-acetic acid (IAA), gibberellic acid (GA3) and trans-zeatin riboside (t-zr) production	(203)
9	*Bt* strain	Degraded Mediterranean area	*Zea mays*	Seed inoculation	Increased plant nutrient accumulation under drought	(204)
10	*Bt* strain	Arid soil	*Trifolium repens*	Seed inoculation	Enhances plant resilience by increasing nutrients and water content, decreasing stomatal conductance, electrolyte leakage and proline, showcasing improved drought tolerance both independently and in conjunction with arbuscular mycorrhizal fungi, making it the most resilient to osmotic stress	(205)
11	PGPR *Bt*	Not reported	Soybean	root application	Enhances plant root structure, biomass, length and nodule activity while regulating water and nitrogen balance, increase in root and nodule biomass, nodule formation and stimulation of abscisic acid production; synergistic potential with *Bradyrhizobium japonicum* for nitrogen fixation	(206)
12	*Bt* (UM96)	rhizosphere of plants	tomato	the combined application of *B. thuringiensis* UM96 and *P. fluorescens* UM16	improved the total fresh weight of the tomato seedlings and increased hypocotyl and root length	(207)
13	*Bt* strain	*Lavandula dentata*	*Lavandula dentata*	Seed inoculation	Increased plant growth, nutrition and mycorrhizal development,	(208)

					reduced oxidative damage of lipids	
14	*Bt* strain	the wheat rhizosphere in different regions of Algeria	Not reported	Not reported	biofertilization (phosphate solubilization), biostimulation (IAA production) and biocontrol activities (cyanhydric acid, siderophores and 2,3-butanediol production and antifungal activity)	(209)
15	*Bt* A5-BRSC	soil from agricultural land of North 24 Parganas district, West Bengal	Not reported	Charcoal-based biofertilizer applied to soil around plants	growth-promoting metabolites, increased nutrient availability	(210)
16	*Bt*	Soil samples of pakistan	chickpea	Combined treatment of *Bacillus subtilis*, *Bacillus thuringiensis*, and *Bacillus megaterium*	increase in root sugar content	(211)
17	*Bt* IAGS 199	obtained from the bacterial conservatory, University of the Punjab, Lahore	*Capsicum annum*	application of Putrescine and *Bt* IAGS 199 as phytostabilizers for successfully cultivating *C. annum* under Cd-contaminated conditions.	reduced electrolyte leakage (EL), hydrogen peroxide (H_2O_2) and malondialdehyde (MDA) level in treated plants.	(212)
18	*Bt* RZ2MS9	isolated from guarana plants (*Paullinia cupana*) cultivated in the Brazilian Amazon	maize	co-inoculation with *Azospirillum brasilense* Ab-V5	enhanced maize's roots and shoots dry weight	(213)
19	*Bt* strain F-BT24	Soil samples from pepper producers in Meoqui, Chihuahua	pepper	microgranules production by spray drying	Better pepper plants growth rhizosphere colonization and phytohormones production, such as indole-3-acetic acid (IAA) and gibberellic acid	(69)
20	*Bt* SE1C2	tissue interior of Catharanthus roseus grown in magnesite mining area, Salem, India	Not reported	Combined application of biochar and *Bt* SE1C2	improved enzymatic activities (acid phosphatases, alkaline phosphatases, β-glucosidase and urease)	(157)
21	*Bt* L1	Fruiting body of *Coprinus comatus* (macro-fungus)	Cd activation in soil, promoting Cd bioavailability, increasing soil	Not reported	Citric acid, succinic acid, siderophores, soluble phosphorus substances, auxin (IAA)	(159)

			available nutrients, stimulating soil microbial activity			
22	*Bt* strain T5	Not reported	*Agaricus bisporos* (Button Mushroom)	Laboratory application on mushroom mycelium growth plates	significant promotion of mycelium growth	(214)
23	*Bt* (Acc MW979616)	*Salix alba* roots	Not reported	*Bt* seeds + 0.5 g root powder	Increased shoot and root length, fresh and dry weight	(158)