

SUPPLEMENTARY MATERIAL

Strategies to facilitate the bioprospection of properties of agronomic interest in microbial culture collections and a successful case of selection to mitigate drought stress in maize

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Table S1 Bacterial strains selected from the “Diazotrophic and Plant Growth-Promoting Bacteria Culture Collection of Embrapa Soybean” for evaluation of *in vitro* and *in vivo* plant-growth promoting traits and culture medium used for their growth.

No.	Strain ID	Culture medium	No.	Strain ID	Culture medium
1	<i>Bradyrhizobium diazoefficiens</i> CNPSo 6	YMA ¹	51	<i>Pseudomonas</i> sp. CNPSo 2625	TSA
2	<i>Bradyrhizobium japonicum</i> CNPSo 7	YMA	52	<i>Bacillus velezensis</i> CNPSo 2657	TSA
3	<i>Bradyrhizobium elkanii</i> CNPSo 9	YMA	53	<i>Bacillus</i> sp. CNPSo 2658	TSA
4	<i>Bradyrhizobium elkanii</i> CNPSo 14	YMA	54	<i>Achromobacter</i> sp. CNPSo 2660	YMA
5	<i>Rhizobium tropici</i> CNPSo 103	YMA	55	<i>Agrobacterium</i> sp. CNPSo 2707	YMA
6	<i>Azorhizobium caulinodans</i> CNPSo 139	YMA	56	<i>Pseudomonas fluorescens</i> CNPSo 2719	TSA
7	<i>Rhizobium giardinii</i> CNPSo 171	YMA	57	<i>Bacillus</i> sp. CNPSo 2723	TSA
8	<i>Neorhizobium</i> (= <i>Rhizobium</i>) <i>huautlense</i> CNPSo 206	YMA	58	<i>Bacillus</i> sp. CNPSo 2725	TSA
9	<i>Rhizobium leucaenae</i> CNPSo 224	YMA	59	<i>Gluconacetobacter azotocaptans</i> CNPSo 2783	DYGS
10	<i>Rhizobium leucaenae</i> CNPSo 229	YMA	60	<i>Ochrobactrum oryzae</i> CNPSo 2784	YMA
11	<i>Agrobacterium</i> sp. CNPSo 675	YMA	61	<i>Azospirillum thioophilum</i> CNPSo 2786	DYGS
12	<i>Methylobacterium</i> sp. CNPSo 989	YMA	62	<i>Pantoea ananatis</i> CNPSo 2797	YMA
13	<i>Rhizobium tropici</i> CNPSo 1018	YMA	63	<i>Pantoea ananatis</i> CNPSo 2798	YMA
14	<i>Paraburkholderia nodosa</i> CNPSo 1204	YMA	64	<i>Pseudomonas fluorescens</i> CNPSo 2799	TSA
15	<i>Paraburkholderia nodosa</i> CNPSo 1213	YMA	65	<i>Pseudomonas</i> sp. CNPSo 2835	TSA
16	<i>Agrobacterium</i> sp. CNPSo 1235	YMA	66	<i>Pseudomonas</i> sp. CNPSo 2844	TSA
17	<i>Paraburkholderia nodosa</i> CNPSo 1294	YMA	67	<i>Pseudomonas</i> sp. CNPSo 2851	TSA
18	<i>Paraburkholderia nodosa</i> CNPSo 1299	YMA	68	<i>Pseudomonas</i> sp. CNPSo 2856	TSA
19	<i>Paraburkholderia nodosa</i> CNPSo 1301	YMA	69	<i>Pseudomonas</i> sp. CNPSo 2864	TSA
20	<i>Paraburkholderia nodosa</i> CNPSo 1307	YMA	70	<i>Pseudomonas</i> sp. CNPSo 2878	TSA
21	<i>Rhizobium</i> sp. CNPSo 1627	YMA	71	<i>Pseudomonas</i> sp. CNPSo 2887	TSA
22	<i>Agrobacterium</i> sp. CNPSo 1668	YMA	72	<i>Bradyrhizobium</i> sp. CNPSo 2907	YMA
23	<i>Chromobacterium violaceum</i> CNPSo 1947	LB ²	73	<i>Paraburkholderia guartelaensis</i> CNPSo 2995	YMA
24	<i>Chromobacterium violaceum</i> CNPSo 1950	LB	74	<i>Paraburkholderia guartelaensis</i> CNPSo 3008	YMA

25	<i>Chromobacterium violaceum</i> CNPSo 1952	LB	75	<i>Bradyrhizobium yuanmingense</i> CNPSo 3084	YMA
26	<i>Chromobacterium violaceum</i> CNPSo 1954	LB	76	<i>Paraburkholderia sabiae</i> CNPSo 3136	YMA
27	<i>Chromobacterium violaceum</i> CNPSo 1958	LB	77	<i>Paraburkholderia atlantica</i> CNPSo 3155	YMA
28	<i>Chromobacterium violaceum</i> CNPSo 1963	LB	78	<i>Paraburkholderia franconis</i> CNPSo 3157	YMA
29	<i>Pseudomonas soli</i> CNPSo 1987	TSA ³	79	<i>Bacillus</i> sp. CNPSo 3218	TSA
30	<i>Neorhizobium galegae</i> CNPSo 2061	YMA	80	<i>Paenibacillus</i> sp. CNPSo 3221	TSA
31	<i>Sinorhizobium mexicanus</i> CNPSo 2067	YMA	81	<i>Pantoea</i> sp. CNPSo 3282	DYGS
32	<i>Azospirillum brasilense</i> CNPSo 2083	DYGS ⁴	82	<i>Microbacterium</i> sp. CNPSo 3287	DYGS
33	<i>Azospirillum brasilense</i> CNPSo 2084	DYGS	83	<i>Delftia</i> sp. CNPSo 3288	DYGS
34	<i>Pseudomonas lurida</i> CNPSo 2218	TSA	84	<i>Paenibacillus</i> sp. CNPSo 3309	DYGS
35	<i>Pseudomonas</i> sp. CNPSo 2220	TSA	85	<i>Agrobacterium pusense</i> CNPSo 3315	YMA
36	<i>Pseudomonas</i> sp. CNPSo 2222	TSA	86	<i>Agrobacterium</i> sp. CNPSo 3348	YMA
37	<i>Pseudomonas fluorescens</i> CNPSo 2224	TSA	87	<i>Bradyrhizobium rederickii</i> CNPSo 3426	YMA
38	<i>Paenibacillus polymyxa</i> CNPSo 2227	TSA	88	<i>Bradyrhizobium rederickii</i> CNPSo 3443	YMA
39	<i>Bradyrhizobium pachyrhizi</i> CNPSo 2259	YMA	89	<i>Azospirillum halopraeferens</i> CNPSo 3601	DYGS
40	<i>Pantoea</i> sp. CNPSo 2344	YMA	90	<i>Rhizobium</i> sp. CNPSo 3610	YMA
41	<i>Bacillus</i> sp. CNPSo 2383	TSA	91	<i>Paracoccus</i> sp. CNPSo 3707	TSA
42	<i>Bacillus velezensis</i> CNPSo 2384	TSA	92	<i>Niveispirillum irakense</i> CNPSo 3756	DYGS
43	<i>Pantoea</i> sp. CNPSo 2493	YMA	93	<i>Azospirillum rugosum</i> CNPSo 3757	DYGS
44	<i>Azoarcus indigens</i> CNPSo 2541	DYGS	94	<i>Paenibacillus</i> sp. CNPSo 3854	TSA
45	<i>Pantoea agglomerans</i> CNPSo 2602	TSA	95	<i>Microbacterium</i> sp. CNPSo 3855	YMA
46	<i>Bacillus aryabhatai</i> CNPSo 2603	TSA	96	<i>Enterobacter</i> sp. CNPSo 3867	YMA
47	<i>Pseudomonas</i> sp. CNPSo 2604	TSA	97	<i>Agrobacterium</i> sp. CNPSo 4041	YMA
48	<i>Bacillus subtilis</i> CNPSo 2605	TSA	98	<i>Agrobacterium</i> sp. CNPSo 4045	YMA
49	<i>Bacillus subtilis</i> CNPSo 2606	TSA	99	<i>Pseudomonas</i> sp. CNPSo 4132	TSA
50	<i>Bacillus subtilis</i> CNPSo 2620	TSA	100	<i>Pseudomonas</i> sp. CNPSo 4140	TSA

YMA: Modified Yeast Mannitol Agar [31];
 LB: Luria-Bertani [31];
 TSA: Trypticase Soy Agar;
 DYGS: [32].

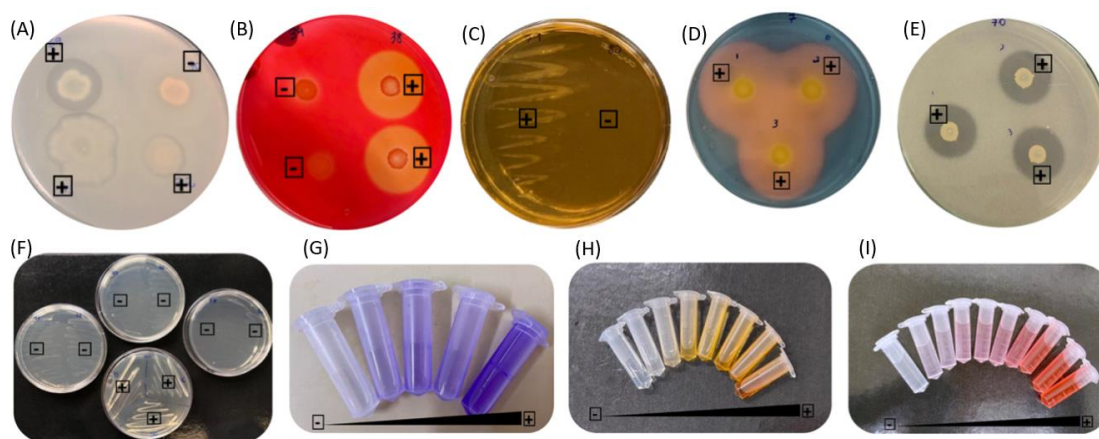


Figure S1. Examples of control and positive results, respectively, for each of the ten traits evaluated *in vitro*: (A) protease and (B) cellulase activities, (C) growth under low water activity, (D) siderophore synthesis, (E) phosphate solubilization, (F) ACC deaminase activity, (G) biofilm formation, (H) EPS production, and (I) IAA (indole-3-acetic acid) synthesis. Properties evaluated in 100 bacterial strains from the “Diazotrophic and Plant Growth-Promoting Bacteria Culture Collection of Embrapa Soybean”.



Figure S2. View of the experiment with maize grown inoculated with the 100 bacterial strains from the “Diazotrophic and Plant Growth-Promoting Bacteria Culture Collection of Embrapa Soybean”, grown on sterile substrate (Experiment I) and submitted to water restriction.



Figure S3. View of the experiment with maize grown inoculated with 15 bacterial strains from the “Diazotrophic and Plant Growth-Promoting Bacteria Culture Collection of Embrapa Soybean”, selected in Experiment I. Plants grown on non-sterile soil (Experiment II) and submitted to water restriction.

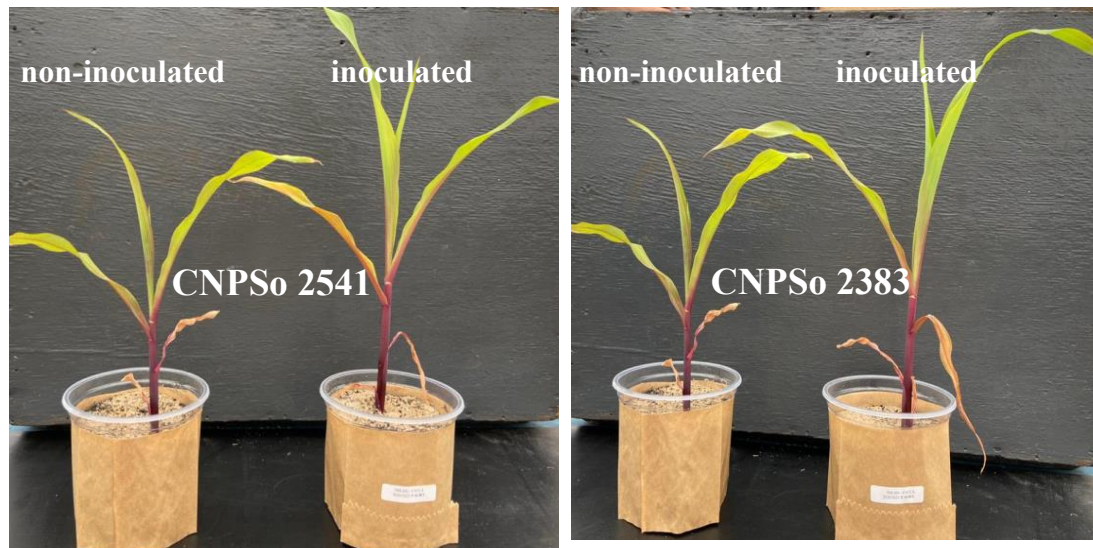


Figure S4. Growth of maize in sterile substrate under water restriction conditions (Experiment I) and inoculation with two promising strains in the mitigation of water stress. Non-inoculated and inoculated plants with *Azoarcus indigenes* CNPSO 2541 and *Bacillus* sp. CNPSO 2383.

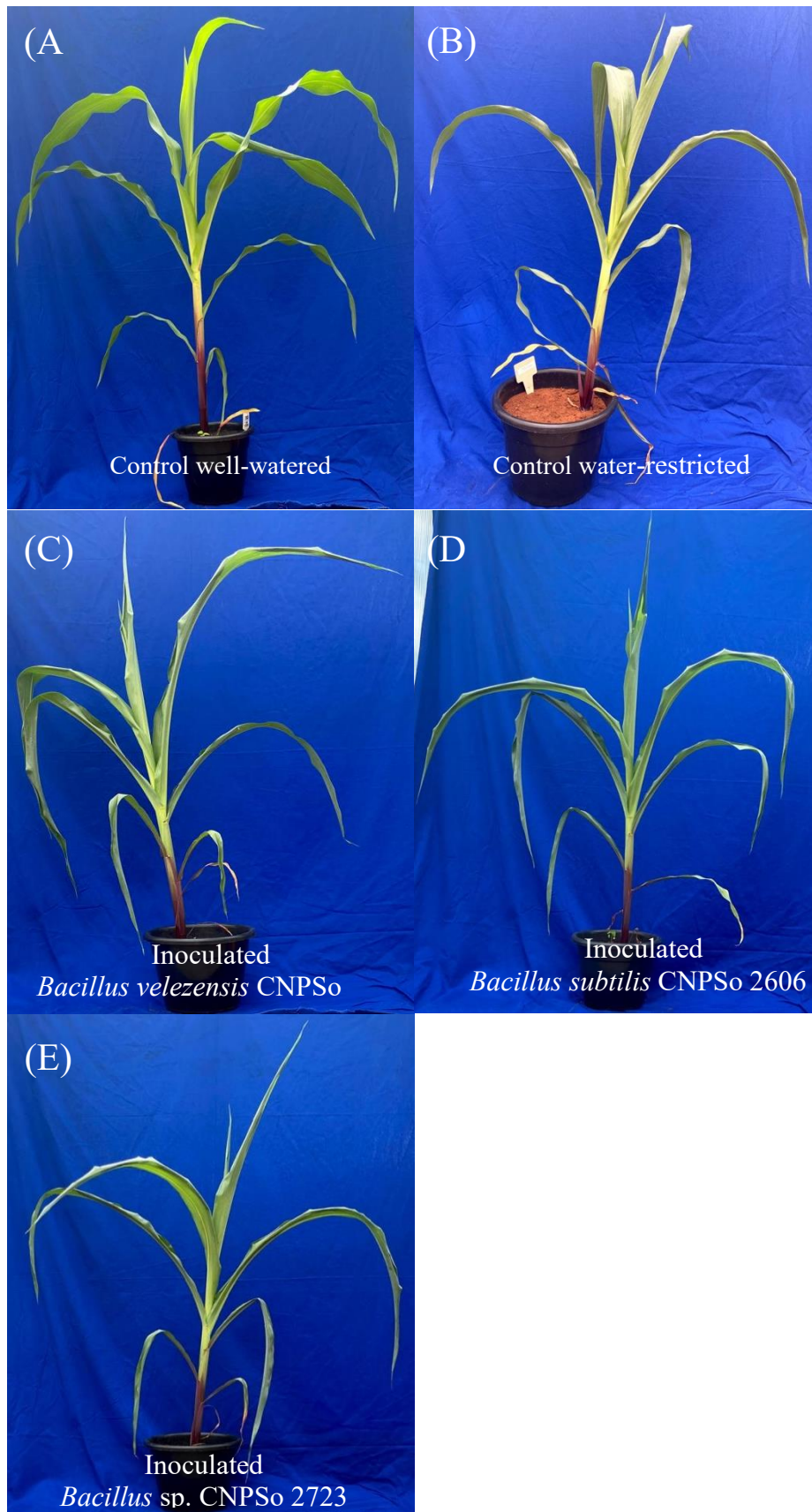


Figure S5. Maize growth in non-sterile substrate under (A) well-watered and (B) water-restricted conditions (Experiment II), inoculated with three promising strains for drought stress mitigation: (C) *Bacillus velezensis* CNPSO 2384, (D) *Bacillus subtilis* CNPSO 2606, and (E) *Bacillus* sp. CNPSO 2723, respectively.