

SUPPLEMENTARY MATERIAL

INTERNATIONAL MICROBIOLOGY

Isolation of endophytic strains of *Bacillus thuringiensis* from wild plant seeds: A potential new biotechnological development.

Areli Cando-Narvaez¹, M. Cristina Del Rincón-Castro², M. Socorro González-Elizondo³, Jorge E. Ibarra^{1*}

¹Departamento de Biotecnología y Bioquímica, Centro de Investigación y de Estudios Avanzados del IPN-Unidad Irapuato, Apartado Postal 629, Irapuato, Gto. Mexico; ²DICIVA, Universidad de Guanajuato, Irapuato, Gto., Mexico; ³CIIDIR- Durango, Instituto Politécnico Nacional, Durango, Dgo., Mexico.

***: Corresponding author:** Jorge E. Ibarra, jorge.ibarra@cinvestav.mx.

ORCID: [0000-0002-1013-8260](https://orcid.org/0000-0002-1013-8260).

Table S1

TABLE S1. Detail of data accumulated from the collected seeds used to isolate endophytic strains of *Bacillus thuringiensis*

Species	Family	Common name	Municipality	State	Latitude	Longitude	Date (d/m/y)	Endophytic Bt	Species (16S)	% Identity	Species (hag)	% Identity	Subspecies	cry gene	% Identity	β-exotoxi	Toxicity
<i>Lepidium virginicum</i> L.	Brassicaceae	Virginia pepperweed	Irapuato	Guanajuato	20.71892	-101.329061	28/04/2021	LBIT-1291	<i>thuringiensis</i>	99.48	<i>thuringiensis</i>	99.53			99.64	Positive	<i>C. elegans</i>
<i>Dysphania graveolens</i> (Willd.) Mosyakin & Clemants	Amaranthaceae	Fetid goosefoot	Tepetlaoxtoc	State of Mexico	19.58272	-98.821052	17/09/2021	LBIT-1296	<i>thuringiensis</i>	99.87	<i>thuringiensis</i>	98.17					
<i>Opuntia jocosella</i> F.A.C. Weber	Cactaceae	Cactus-pear	Tepetlaoxtoc	State of Mexico	19.600755	-98.820565	17/09/2021	LBIT-1298	<i>thuringiensis</i>	99.93	<i>thuringiensis</i>	98.31					
<i>Medicago polymorpha</i> L.	Fabaceae	Burclover	Tepetlaoxtoc	State of Mexico	19.582263	-98.821367	17/09/2021	LBIT-1299	<i>thuringiensis</i>	100	<i>thuringiensis</i>	100	<i>israelensis</i>			Positive	
<i>Mimosa aculeticarpa</i> Ortega	Fabaceae	Cat-claw	Tepetlaoxtoc	State of Mexico	19.596339	-98.818039	17/09/2021	LBIT-1300	<i>thuringiensis</i>	99.83	<i>thuringiensis</i>	98.31					
<i>Tithonia tubaeformis</i> (Jacq.) Cass.	Asteraceae	Tree marigold	Tepetlaoxtoc	State of Mexico	19.600743	-98.820855	17/09/2021	LBIT-1301	<i>thuringiensis</i>	100	<i>thuringiensis</i>	100	<i>israelensis</i>			Positive	
<i>Anoda cristata</i> (L.) Schlecht.	Malvaceae	Crested anoda	Tepetlaoxtoc	State of Mexico	19.58272	-98.821052	17/09/2021	LBIT-1302	<i>thuringiensis</i>	99.54	<i>thuringiensis</i>	98.44					
<i>Amelanchier denticulata</i> (Kunth) K.Koch	Rosaceae	Toothed Serviceberry	Tepetlaoxtoc	State of Mexico	19.600755	-98.820565	17/09/2021	LBIT-1303	<i>thuringiensis</i>	99.93	<i>thuringiensis</i>	98.44					
<i>Vachellia farnesiana</i> (L.) Wight & Arn.	Fabaceae	Mealy false acacia	Tepetlaoxtoc	State of Mexico	19.600755	-98.820565	17/09/2021	LBIT-1305	<i>thuringiensis</i>	100	<i>thuringiensis</i>	99.9	<i>thompsoni</i>			Positive	<i>M. sexta</i>
<i>Salvia microphylla</i> Benth.	Lamiaceae	Baby sage	Durango	Durango	23.853292	-104.764465	18/09/2021	LBIT-1306	<i>thuringiensis</i>	100	<i>thuringiensis</i>	98.93		<i>cry14-like</i>	99.37		
<i>Buddleja scordoides</i> Kunth	Scrophulariaceae	Escobilla butterflybush	Nuevo Ideal	Durango	24.931318	-104.78	23/09/2021	LBIT-1307	<i>thuringiensis</i>	99.87	<i>thuringiensis</i>	99.07					
<i>Allium</i> sp.	Amaryllidaceae	Little onion	Nuevo Ideal	Durango	24.93145	-104.788122	23/09/2021	LBIT-1309	<i>thuringiensis</i>	99.93	<i>thuringiensis</i>	99.07		<i>cry14-like</i>	99.19		
<i>Cyperus andinus</i> Palla ex Kük.	Cyperaceae	Rusby's flatsedge	Durango	Durango	23.853292	-104.764465	18/09/2021	LBIT-1310	<i>thuringiensis</i>	99.93	<i>thuringiensis</i>	97.64					
<i>Dalea bicolor</i> Humb. & Bonpl. ex Willd.	Fabaceae	Silver dalea	Nuevo Ideal	Durango	24.931318	-104.78	24/09/2021	LBIT-1311	<i>thuringiensis</i>	99.91	<i>thuringiensis</i>	99.08					
<i>Pinus chihuahuana</i> Engelm.	Pinaceae	Chihuahuana pine	Durango	Durango	23.853292	-104.764465	18/09/2021	LBIT-1312	<i>thuringiensis</i>	99.8	<i>thuringiensis</i>	97.87		<i>cry14-like</i>	99.1		
<i>Heterosperma pinnatum</i> Cav.	Asteraceae	Wingpetal	Durango	Durango	24.051389	-104.610278	02/09/2021	LBIT-1314	<i>thuringiensis</i>	99.76	<i>thuringiensis</i>	98.31					
<i>Kali tragus</i> (L.) Scop.	Amaranthaceae	Tumbleweed	Durango	Durango	24.051389	-104.610278	02/09/2021	LBIT-1315	<i>thuringiensis</i>	99.87	<i>thuringiensis</i>	98.95					
<i>Datura</i> sp.	Solanaceae	Pricklyburr	Durango	Durango	24.051389	-104.610278	02/09/2021	LBIT-1317	<i>thuringiensis</i>	100	<i>thuringiensis</i>	98.93		<i>cry14-like</i>	99.28		
<i>Sonchus oleraceus</i> L.	Asteraceae	Common sowthistle	Durango	Durango	24.051389	-104.610278	02/09/2021	LBIT-1318	<i>thuringiensis</i>	99.93	<i>thuringiensis</i>	97.25		<i>cry14-like</i>	99.82		
<i>Solanum rostratum</i> Dunal	Solanaceae	Common sowthistle	Durango	Durango	24.051389	-104.610278	02/09/2021	LBIT-1319	<i>thuringiensis</i>	99.93	<i>thuringiensis</i>	83.69				Positive	
<i>Abies concolor</i> var. <i>martinezii</i> Silba	Pinaceae	White fir	Madera	Chihuahua	29.28314	-108.201193	11/09/2021										
<i>Ageratum houstonianum</i> Mill.	Asteraceae	Blue milk	Tepetlaoxtoc	State of Mexico	19.602659	-98.820291	17/09/2021										
<i>Amaranthus hybridus</i> L.	Amaranthaceae	Smooth amaranth	Tepetlaoxtoc	State of Mexico	19.582171	-98.821304	17/09/2021										
<i>Argemone mexicana</i> L.	Papaveraceae	Mexican Prickly-Poppy	Chilchota	Michoacán	19.869115	-102.133847	07/05/2021										
<i>Baccharis palmeri</i> Greenm.	Asteraceae	Plummer's Baccharis	Durango	Durango	23.853292	-104.764465	02/09/2021										
<i>Bidens pilosa</i> L.	Asteraceae	Beggar's tick	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Bouteloua hirsuta</i> Lag.	Chloridoideae	Hairy grama	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Bouvardia ternstrofia</i> (Cav.) Schtdl.	Rubiaceae	Firecracker-bush	Tepetlaoxtoc	State of Mexico	19.600644	-98.817831	17/09/2021										
<i>Brassica rapa</i> L.	Brassicaceae	Rape mustard	Tepetlaoxtoc	State of Mexico	19.583435	-98.821194	17/09/2021										
<i>Chloris</i> sp.	Poaceae	Windmill grass	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Commelina coelestis</i> Willd.	Commelinaceae	Blue Spiderwort	Tepetlaoxtoc	State of Mexico	19.592886	-98.812424	16/09/2021										
<i>Crotalaria pumila</i> Orl.	Fabaceae	Low rattlebox	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Cuphea aequipectata</i> Cav.	Lythraceae	Cuphea	Tepetlaoxtoc	State of Mexico	19.600755	-98.820565	17/09/2021										
<i>Cyperus phaeolepis</i> Boeckeler	Cyperaceae	Flatsedge	Durango	Durango	23.853292	-104.764465	02/09/2021										
<i>Echinochloa colona</i> (L.) Link	Poaceae	Jungle ricegrass	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Eriochloa acuminata</i> (J. Presl) Kunth	Poaceae	Taperlip cupgrass	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Euphorbia</i> sp.	Euphorbiaceae	Spurge	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Eysenhardtia polystachya</i> (Kunth) Sarg.	Fabaceae	Desert kidneywood	Tepetlaoxtoc	State of Mexico	19.600755	-98.820565	17/09/2021										
<i>Galinisoga</i> sp.	Asteraceae	Galant-soldier	Tepetlaoxtoc	State of Mexico	19.598049	-98.820216	17/09/2021										
<i>Garrya wrightii</i> Torr.	Garryaceae	Wright's silk-tassel	Madera	Chihuahua	29.652145	-108.524773	07/09/2021										
<i>Gymnosperma glutinosum</i> (Spreng.) Less.	Asteraceae	Gumhead	Tepetlaoxtoc	State of Mexico	19.600755	-98.820565	17/09/2021										
<i>Hedeoma</i> sp.	Lamiaceae	False pennyroyal	Nuevo Ideal	Durango	24.9312	-104.790038	23/09/2021										
<i>Helianthus laciniatus</i> A. Gray	Asteraceae	Alkali sunflower	Durango	Durango	24.05138889	-104.6102778	02/09/2021										
<i>Ipomoea purpurea</i> (L.) Roth	Convolvulaceae	Common morning-glory	Tepetlaoxtoc	State of Mexico	19.581949	-98.821095	17/09/2021										
<i>Juniperus deppeana</i> Steud.	Cupressaceae	Alligator juniper	Durango	Durango	23.853292	-104.764465	02/09/2021										
<i>Kalstroemia</i> sp.	Zygophyllaceae	Caltrop	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Macroptilium gibbosifolium</i> (Ortega) A. Delgado	Fabaceae	Variable-leaf bush bean	Tepetlaoxtoc	State of Mexico	19.592886	-98.812424	16/09/2021										
<i>Megacorax gracielanus</i> W. L. Wagner	Onagraceae	Hierba de la gallina	C. de Comonfort	Durango	25.08632	-104.952721	23/09/2021										
<i>Opuntia ficus-indica</i> (L.) Mill.	Cactaceae	Indian fig cactus	Tepetlaoxtoc	State of Mexico	19.600743	-98.820855	17/09/2021										
<i>Panicum virgatum</i> L.	Poaceae	Wand panic grass	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Pectis prostrata</i> Cav.	Asteraceae	Spreading chinchweed	Durango	Durango	23.853292	-104.764465	18/09/2021										
<i>Physalis</i> sp.	Solanaceae	Goose berry	Chilchota	Michoacán	19.869115	-102.133847	07/05/2021										
<i>Porophyllum linaria</i> (Cav.) DC.	Asteraceae	Pipicha	Tepetlaoxtoc	State of Mexico	19.596288	-98.810426	16/09/2021										
<i>Portulaca oleracea</i> L.	Portulacaceae	Common purslane	Tepetlaoxtoc	State of Mexico	19.600678	-98.817994	17/09/2021										
<i>Quercus grisea</i> Liebm.	Fagaceae	Gray oak	Durango	Durango	23.853292	-104.764465	18/09/2021										
<i>Raphanus raphanistrum</i> L.	Brassicaceae	Wild radish	Chignahuapan	Puebla	19.898225	-98.081375	05/06/2009										
<i>Ricinus communis</i> L.	Euphorbiaceae	Castor bean	Irapuato	Guanajuato	20.719062	-101.333132	24/06/2009										
<i>Salvia reflexa</i> Hornem.	Lamiaceae	Lance-leaf sage	Tepetlaoxtoc	State of Mexico	19.592409	-98.814325	16/09/2021										
<i>Salvia trilfolia</i> Vahl	Lamiaceae	Linden leaf sage	Tepetlaoxtoc	State of Mexico	19.595295	-98.812624	16/09/2021										
<i>Sanvitalia procumbens</i> Lam.	Asteraceae	Narrow-leaf creeping-zinnia	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Schinus molle</i> L.	Anacardiaceae	Peruvian pepper tree	Tepetlaoxtoc	State of Mexico	19.592436	-98.818813	17/09/2021										
<i>Schkuhria schkuhrioides</i> Thell.	Asteraceae	Escobilla	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Sciyos microphyllus</i> Kunth	Cucurbitaceae	Little-leaf burr-cucumber	Tepetlaoxtoc	State of Mexico	19.58447	-98.821172	17/09/2021										
<i>Solanum elaeagnifolium</i> Cav.	Solanaceae	Silver-leaf nightshade	Durango	Durango	24.051389	-104.610278	02/09/2021										
<i>Sphaeralcea angustifolia</i> (Cav.) G. Don	Malvaceae	Copper globe mallow	Durango	Durango	24.05138889	-104.6102778	02/09/2021										
<i>Stevia serrata</i> Cav.	Asteraceae	Sawtooth candyleaf	Tepetlaoxtoc	State of Mexico	19.585561	-98.820457	17/09/2021										
<i>Tagetes filifolia</i> Lag.	Asteraceae	Licorice marigold	Tepetlaoxtoc	State of Mexico	19.590699	-98.812417	16/09/2021										
<i>Tagetes lucida</i> Cav.	Asteraceae	Mexican Tarragon	Tepetlaoxtoc	State of Mexico	19.600755	-98.820565	17/09/2021										
<i>Taxodium mucronatum</i> Ten.	Cupressaceae	Montezuma bald-cypress	Texcoco	State of Mexico	19.493916	-98.89271	07/07/2021										
<i>Vachellia schaffneri</i> (S. Watson) Seigler & Ebinger	Fabaceae	Schaffner's acacia	Nuevo Ideal	Durango	24.931318	-104.788691	23/09/2021										
<i>Zea mays</i> ssp. <i>parviglumis</i> Iltis & Doebley	Poaceae	Balsas teosinte	Irapuato	Guanajuato	20.718512	-101.330072	17/04/2021										
<i>Zornia reticulata</i> Sm.	Fabaceae	Two-leaf zornia	Tepetlaoxtoc	State of Mexico	19.592886	-98.812424	16/09/2021										