

The Group of "Environmental Microbiology"- CIBNOR

Final 2009

(Number in parenthesis near journal's name is the impact factor, 2009)

Summary

- Original publications in peer-reviewed journals	
Published and "in press" -	10
- Submitted papers -	7
- Publications in books -	3
- Publications in websites -	1
- Invited presentations in conferences	11
=====	
- Total productivity (without conferences) for 2009	21

- **Average "Impact Factor" of all published papers in 2009: 2.422**

PUBLISHED AND "IN PRESS" PUBLICATIONS

PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Lopez, B.R., Bashan, Y., Bacilio, M., De la Cruz-Agüero, G. 2009. Rock-colonizing plants: abundance of the endemic cactus *Mammillaria fraileana* related to rock type in the southern Sonoran Desert. **Plant Ecology 201**: 575–588 (1.567)
2. Hartmann A., and Bashan, Y. 2009. Ecology and application of *Azospirillum* and other plant growth-promoting bacteria (PGPB) - special issue. **European Journal of Soil Biology 45**: 1-2 (1.247)
3. Hernandez, J.-P., de-Bashan, L.E., Rodriguez, D.J., Rodriguez, Y., and Bashan Y. 2009. Growth promotion of the freshwater microalga *Chlorella vulgaris* by the nitrogen-fixing, plant growth-promoting bacterium *Bacillus pumilus* from arid zone soils. **European Journal of Soil Biology 45**: 88-93 (1.247)
4. Bashan, Y., Salazar, B., Puente, M. E., Bacilio, M., and Linderman, R.G. 2009. Enhanced establishment and growth of giant cardon cactus in an eroded field in the Sonoran Desert using native legume trees as nurse plants aided by plant growth-promoting microorganisms and compost. **Biology and Fertility of Soils 45**: 585–594 (1.757)

5. Bashan, Y., Salazar, B., and Puente, M.E. 2009. Responses of native legume desert trees used for reforestation in the Sonoran Desert to plant growth-promoting microorganisms in screen house. **Biology and Fertility of Soils** **45**:655–662 (1.757)
6. Puente, M.E., Li, C.Y., and Bashan, Y. 2009. Rock-degrading endophytic bacteria in cacti. **Environmental and Experimental Botany** **66**: 389-401 (3.164)
7. Puente, M.E., Li, C.Y., and Bashan, Y. 2009. Endophytic bacteria in cacti seeds can improve the development of cactus seedlings. **Environmental and Experimental Botany** **66**: 402-408 (3.164)
8. de-Bashan, L.E., and Bashan, Y. 2010. Immobilized microalgae for removing pollutants: Review of practical aspects. **Bioresource Technology** **101**: 1611–1627 (4.253)
9. Bashan, Y., and de-Bashan, L.E. 2009. How the plant growth-promoting bacterium *Azospirillum* promotes plant growth--a critical assessment. **Advances in Agronomy** **107**: (3.8) (commissioned paper)
10. Perez-Garcia, O., de-Bashan, L.E., Hernandez, J.-P., and Bashan, Y. 2009. Efficiency of growth and nutrient removal from wastewater by heterotrophic, autotrophic, and mixotrophic cultures of *Chlorella vulgaris* jointly immobilized with *Azospirillum brasilense*. **Journal of Phycology** (2.270) (accepted)

PUBLICATIONS IN INTERNATIONAL BOOKS

1. Bashan, Y., de-Bashan, L.E. and Toledo G. 2009. Restoration of mangroves by plant-microbe interaction in the arid environment of Baja California Sur, Mexico. In: **Revised World Atlas of Mangrove for Conservation and Restoration of Mangrove Ecosystems**. Spalding M. and Kainuma, M. (Eds). Published by: Earthscan, London, UK (In Press).
2. Bashan, Y., and de-Bashan, L.E. 2010. Microbial populations of arid lands and their potential for restoration of deserts. In: **Soil biology and agriculture in the tropics**. Dion, P. (ed). Soil Biology Series. Springer, Berlin, Heidelberg, Germany (DOI 10.1007/978-3-642-05076-3_6, in press).

PUBLICATIONS IN A NATIONAL BOOK

3. Holguin G., Vázquez P., Sánchez J., Lopez de Los Santos Y., Flores A.L., Melgarejo L. M., Vanegas J., Galindo T., Dávila A., Polanía J. and Ruiz, M. 2009. Microbiología del manglar In: **Los manglares de la Península de Baja California**. (Eds.) Serviere-Zaragoza, E., Felix-Pico, E.F., Riosantena-

Rodriguez, R., Leon de la Luz, J.L. (*in Spanish*)(accepted) (no Publisher so far).

PUBLICATION IN WEBSITE

1. Hernandez J.-P. 2009. A method for automated fast production of large-sized polymer beads (2–4 mm). In: <http://bashanfoundation.org/scientifictools.html>

SUBMITTED PUBLICATIONS

PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Vovides, A.G., Bashan, Y., Lopez-Portillo, J.A., and Guevara R. 2009. Nitrogen fixation in pristine, reforested, and impaired mangrove forests of an arid zone. **Restoration Ecology** (1.892)
2. Bashan, Y., Salazar, B., Moreno, M., Lopez, B.R., and Linderman, R.G. 2009. Reforestation of eroded desert soil with native trees: effects of inoculation with plant growth-promoting microorganisms, limited amounts of compost and water and plant density. **Forest Science** (1.664)
3. Bacilio, M., Vazquez, P., and Bashan, Y. 2009. Water versus spacing; a possible growth preference among young individuals of the giant cardon cactus of the Baja California Peninsula. **Environmental and Experimental Botany** (2.301)
4. Perez-Garcia, R.O., Bashan, Y., and Puente M.E. 2009. Organic carbon supplementation of municipal wastewater is essential for heterotrophic growth and ammonium removing by the microalgae *Chlorella vulgaris*. **Journal of Phycology** (2.811)
5. de-Bashan, L. E., Hernandez, J.-P., Bashan, Y., and Maier, R. M. 2009. Growth of quailbush in acidic, metalliferous desert mine tailings: effect of *Azospirillum brasilense* Sp6 on biomass production and rhizosphere community structure. **Applied and Environmental Microbiology** (3.8)
6. de-Bashan, L.E., Hernandez, J.-P., Bashan, Y., and Maier, R. M. 2009. *Bacillus pumilus* ES4, a candidate plant growth-promoting bacterium to enhance establishment of plants in neutral, low metal content and in acidic, high metal content mine tailings. **Environmental and Experimental Botany** (2.301)
7. Lopez, B.R., Bashan, Y., and Bacilio, M., 2009. Endophytic bacteria of *Mammillaria fraileana*, an endemic rock colonizing cactus of the Southern Sonoran Desert. **Plant Biology** (1.944)

PRESENTATIONS IN CONFERENCES

1. de-Bashan, L.E. 2009. Fitoestabilización de desechos mineros en ambiente áridos, utilizando plantas nativas y bacterias promotoras de crecimiento vegetal. Special seminar in: Group of Food Biochemistry, CIBNOR, 21.4.2009. La Paz, Mexico. (**Invited lecture**).
2. Bashan, Y., Salazar, B., and Moreno M. 2009. Restoration and recovery of hurricane-damaged mangroves using the waterfall-retreat effect and tides as a dredging tools. In: Taller: Definición de Prioridades para la restauración y conservación de manglares en la region Noroeste. June 17-18, 2009, La Paz, Baja California Sur, Mexico. (**Invited Lecture**).
3. Bashan, Y., de-Bashan, L.E., Salazar, B. and Moreno, M. 2009. Restauracion de suelos deserticos erosionados y suelos de desechos mineros con ayuda de microorganismos. In: REBIOS 2009- VII Reunion Cientifico Tecnica de Biologia del Suelo y Fijacion Biologica del Nitrogeno. July 1-3, 2009. San Miguel de Tucuman, Argentina. pp. 26 (**Plenary lecture**).
4. de-Bashan, L.E. and Bashan, Y. 2009. Plant growth-promoting bacteria and green microalgae: a convenient model for basic studies of plant-bacterium interactions. In: Special departmental seminar of the Department of Plant-Microbe Interactions, Helmholtz Centre, German Research Centre for Environmental Health. 13.7.2009, Munich, Germany (**Invited lecture**).
5. Trejo, A. 2009. The use of beads containing bacteria-microalgae as microbial inoculante for arid degraded soils. In: Special departmental seminar of the Department of Plant-Microbe Interactions, Helmholtz Centre, German Research Centre for Environmental Health. 13.7.2009, Munich, Germany (**Invited lecture**).
6. Bashan, Y., de-Bashan, L.E., Salazar, B., Hernandez, J.-P., and Moreno, M. 2009. Restoration of eroded desert soils and mine tailings using inoculated native plants. AMP lecture series of The Helmholtz Centre, German Research Centre for Environmental Health. 22.7.2009, Munich, Germany (**Invited lecture**).
7. de-Bashan, L.E., Trejo, A., and Bashan, Y. 2009. (i) Interaction between *Chlorella vulgaris* and *Azospirillum brasilense* jointly immobilized in alginate beads, and (ii) Use of leftover beads coming from the wastewater treatment as microbial inoculant. In: Special seminar, Department of Plant-Microbe Interactions, Helmholtz Centre, German Research Centre for Environmental Health. 4.9.2009, Munich, Germany (**Invited lecture**).

8. Bashan, Y., and de-Bashan, L.E. 2009. Biofertilizers for sustainable agriculture – Present status and future prospects. In: Expert Consultation on Biopesticides and Biofertilizers for Sustainable Agriculture, October 27-29, 2009, Taichung, Taiwan (**Key note lecture**)
9. de-Bashan, L.E., Bashan, Y. 2009. Bacterias promotoras de crecimiento vegetal: aislamiento y su aplicación como inoculantes. In: Special seminar, Escuela de Graduados, Facultad de Ciencias Agrarias, Universidad Austral de Chile. Noviembre 24, 2009, Valdivia, Chile. (**Invited lecture**).
10. de-Bashan, L.E., Bashan, Y. Hernández. J.-P., Trejo, A., Perez-Garcia, O. 2009. Immobilized algae for water treatment. Bioencapsulation Industrial Symposium. November 26-27, 2009, Puerto Varas, Chile. (**Invited lecture**).
11. de-Bashan, L.E., Bashan, Y. Salazar, B., Moreno, M., Hernández. J.P. 2009. Utilización de inoculantes microbianos en la recuperación de suelos desérticos erosionados en Baja California Sur. In: Reunión Nacional Germoplasma Microbiano como Recurso Genético para su Aplicación en Agricultura, Alimentación y Ambiente. SAGARPA, SUBNARGEM, Facultad de Ciencias UNAM. 2 al 4 de diciembre, 2009. México D.F. (**Invited lecture**).

DOMESTIC OUTREACH AND COMMUNITY SERVICES

1. **Plant growth-promoting bacteria to solve environmental problems in the desert. Strategic line of research of CIBNOR** (Dr. Yoav Bashan, Dra. Luz de-Bashan, Dr. Macario Bacilio and Dr. Froylan Espinoza) (P.C. 6.0)
2. **TV program.** Recuperacion de aguas residuales mediante el tratamiento con microalgas y bacterias, In: “24 Grados Latitud Científica”, Channel 8, La Paz, Mexico, February 4, 2009. (Dra. Luz de-Bashan and Dr. Yoav Bashan).

SCIENTIFIC AND POPULAR RECOGNITION AND INTERNATIONAL SERVICES

1. **Invited as editorial board member: Journal of Biomedicine and Biotechnology** (2009)(USA), **Annals of Microbiology** (2010-2012) (Germany) (Yoav Bashan).
2. 2009- **Invited as expert consultant** on biopesticides and biofertilizers for sustainable agriculture by the Asia-Pacific Association of Agricultural Research Institutions (APAARI), National Agricultural Research Systems (NARS) of Asia-Pacific countries, Taiwan (Dr. Yoav Bashan).

3. 2009 – A report in **BBC- Earth News** (London, UK) about our ongoing research on accelerated formation of soil in the desert aided by plants (How cacti become 'rock busters' by Matt Walker, editor, Earth News, 19.8.2009). Available:

http://news.bbc.co.uk/earth/hi/earth_news/newsid_8209000/8209687.stm

4. **Assisting a startup biotec company in Central America.** Training of personal of Algoil S.A. (Nicaragua) in mass production of microalgae (Dr. Luz de-Bashan, Dr. Yoav Bashan and M.Sc. Juan-Pablo Hernandez).

5. Research stays abroad

1. Department of Plant-Microbe Interactions, Helmholtz Centre, German Research Centre for Environmental Health. 4.7- 5.9. 2009, Munich, Germany (Dr. de-Bashan, Dr. Yoav Bashan, cM.Sc Adan Trejo).
2. Department of Environmental Sciences, University of California, Riverside, USA. Since November 2009. (Dr. Macario Bacilio).
3. Algoil S.A., Nandaime, Nicaragua. 7-12.12. 2009. (M.Sc. Hernandez).

6. Revision of manuscripts for national and International Journals and funding agencies: Total: 60

Reviewer	Journal, or funding agency	Country	Number of manuscripts
Yoav Bashan	Journal of Phycology	USA	2
	Applied and Environmental Microbiology	USA	2
	Journal of Clinical Microbiology	USA	1
	Microbial Ecology	USA	1
	Desalinization	USA	1
	Journal of Environmental Management	USA	2
	Water Research	The Netherlands	1
	Resource, Conservation and Recycling	The Netherlands	1
	European Journal of Soil Biology	The Netherlands	5
	Plant and Soil	The Netherlands	3
	Applied Soil Ecology	The Netherlands	2
	FEMS Microbiology Letters	Germany	1
	FEMS Microbiology Ecology	Germany	1
	Biology and Fertility of Soils	Germany	7
	European Journal of Plant Pathology	Germany	1
	Journal of Plant Nutrition and Soil Science	Germany	1
	Aquatic Microbial Ecology	Germany	1
	Bioresource Technology	UK	2
	Letters in Applied Microbiology	UK	1
	Microbiological Research	France	1
	Annals of Microbiology	Italy	1
	International Journal of Molecular Sciences	Switzerland	3
University of New England, Australia; PhD Dissertation	Australia	1	
CONACYT-Basic research, grants	Mexico	8	
Luz de-Bashan	Engineering Life Science	Germany	1
	Journal of Applied Phycology	Australia	1
	European Journal of Soil Biology	The Netherlands	1
	Food Technology and Biotechnology	Croatia	1
Froylan Espinoza	International Journal of Hydrogen Energy	The Netherlands	3
	Process Biochemistry	The Netherlands	1
	Electronic Journal of Biotechnology	Chile	1
Macario Bacilio	CONACYT-Basic research, grants	Mexico	1

EXTERNAL PROJECTS (total:\$15,216,000)(1,170,000 U\$S) (13 pesos=1 USD).

1. 2009 –Molecular detection by Fluorescent in-situ hybridization technique of the interactions between plant growth-promoting bacteria and plant cells.
Amount: \$ 74,000 financed by “The German Academic exchange Service” (DAAD).
Duration: 2 months
Responsible: Dr. Yoav Bashan
2. Escalamiento de una novedosa estrategia combinada para el biotratamiento de agua residual, recuperación de suelos erosionados y producción de etanol, usando bacterias promotoras de crecimiento en microalgas (MGPB) y microalgas coinmovilizadas juntas en polímeros. Fase 1 proceso de escalamiento. Beca Postdoctoral (Dr. Froylan Espinoza).
Monto: \$276,000 Financiado por CONACYT.
Duración: Un año (2009-2010).
Responsable: Dr. Yoav Bashan
5. Estudio de la interacción y dinámica poblacional entre microalgas y bacterias promotoras de crecimiento de microalgas utilizadas en el tratamiento de aguas residuales, utilizando herramientas moleculares.
Monto: \$100, 000.00; Financiado por CONACYT
Duración: Un año (2008-2009).
Responsable: Dra. Luz de- Bashan
6. Cellular mechanisms controlling the combined growth of microalgae and microalgae growth-promoting bacteria and their contribution to eliminate nutrients (N and P) from wastewater.
Monto: \$1,383,000.00; Financiado por CONACYT-investigacion basica
Duración: Tres años (2007-2010).
Responsable: Dr. Yoav Bashan
Participants: Dra. Luz Estela de-Bashan, M.Sc Juan Pablo Hernández.
7. Escalamiento de una novedosa tecnologia para el tratamiento terciario de aguas residuales combinado con la recuperacion de suelos erosionados de zonas aridas, utilizando microalgas y bacterias coinmovilizadas.
Monto: \$1,800,000.00;
Financiado por SEMARNAT-CONACYT
Duración: Tres años (2008-2010).
Responsable: Dr. Yoav Bashan
Participants: Dra. Luz Estela de-Bashan, M.Sc Juan Pablo Hernández, Dr. Froylan Espinoza
8. Phytostabilization of mine tailings in northwestern Mexico: The role of plant-soil-microbe interactions. Financiado por CONACYT-Investigacion Basica.
Monto: \$750,000.00
Duración: Tres años (2007-2009).
Responsable: Dr. Yoav Bashan,
Participants: Dra. Luz Estela de-Bashan, MC Juan Pablo Hernández, MC Manuel Moreno, Biol. Bernardo Salazar, Dra. Esther Puente.

9. Phytostabilization of mine tailings in the southwestern united states: plant-soil-microbe interactions and metal speciation dynamics
Financiado por National Institute of Environmental and Health Sciences, USA (NIH).
Monto: \$ 10,833,000 (785,000 US\$)
Duración: 5 years (2005-2010)
Responsable: Dra. Raina M. Maier (University of Arizona)
Participants: Drs. J. Chorover (University of Arizona, Tucson), Dra. Luz de-Bashan and Dr.Y. Bashan (CIBNOR).

Staff and collaborations in 2009

Researchers (full time)

1. Dr. Yoav Bashan
2. Dr. Macario Bacilio

Staff, research (full time)

3. Dr. Luz Gonzalez de-Bashan
4. M.Sc Juan-Pablo Hernández
5. Biol. Mar. Patricia Vazquez
6. Biol. Mar. Bernardo Salazar (to August 2009).
7. M.Sc. Manuel Moreno

Post doctoral scientist

8. Dr. Froylan Espinoza

Students (Research)

9. **Dr.** Blanca Romero - **Graduated September 21, 2009** (CIBNOR, La Paz, Mexico) (with Dr. Yoav Bashan and Dr. Macario Bacilio).
10. **M.Sc** Octavio Perez. **Graduated April 17, 2009** (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan)
11. Biol. Alejandra Vovides. – **D.Sc.** Student since 2004 (Instituto de Ecología, Xalapa, Mexico). (with Dr. Jorge Lopez-Portillo and Dr. Yoav Bashan).
12. M.Sc. Paola Magallon – **Ph.D.** student since 2007 (Laval University, Quebec, Canada). (with Dr. Hani Antoun and Dr. Yoav Bashan).
13. M.Sc. Luis Leyva. **D.Sc.** Student since 2009 (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan).
14. Biol. Adan Trejo. **M.Sc** student since 2007 (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan).
15. Biol. Sergio Hernandez - **M.Sc** student since 2008 (CIBNOR, La Paz, Mexico). (with Dr. Luz de-Bashan and Dr. Yoav Bashan)
16. M.Sc. Francisco Choix. **Pre-doctoral student** since 2009. (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan and Dra. Luz de-Bashan).
17. cEng. Biotechnol. Denisse Covarrubias - **Licenciatura**. Since 2006 (Technical Institute of Sonora, Ciudad Obregon, Sonora, Mexico) (with Dr. Macario Bacilio)
18. cEng. Biotechnol. Patricia Castillón - **Licenciatura**. Since 2006 (Technical Institute of Sonora, Ciudad Obregon, Sonora, Mexico) (with Dr. Macario Bacilio).
19. cEng. Biochem - Ulises Ortega – **Professional practice**. Since 2009. (Technical Institute of La Paz, La Paz, Mexico) (with Dr. Froylan Espinoza).
20. cEng. Biochem –Felipe Ortiz- **Professional practice**. Since 2009. (Technical Institute of La Paz, La Paz, Mexico) (with Dr. Froylan Espinoza).
21. cEnviron. Eng. Noga Bashan- **Diploma**. 2009 (Technion, Israel Institute of Technology, Haifa, Israel)(with Dra. Luz de-Bashan).

Group's administrator

- cBiol. Mar. Isaura de la Vega y Castillo.

Foreign and national collaborations in 2009

1. Prof. Hani Antoun. Laval University, Quebec (Canada). Water Bioremediation and phosphate solubilization.
2. Prof. Raina M. Maier, and M.Sc. Julie Nielsen, University of Arizona (USA). Phytostabilization of mine tailings.
3. Dr. Humberto Suzan. University of Queretaro (Mexico). Mesquite enzymology and ecology.
4. Dr. Guadalupe Malda. University of Queretaro (Mexico). Conservation of rare cacti.
5. Dr. S.R. Prabhu, International Bio Recovery Corporation (Canada). Inoculant information from India.
6. Dr. Horst Vierheilig. Superior council of research (Spain). Mycorrhizae of desert plants. (Not active in 2009)
7. Dr. Bernard Bormann, USDA – Forest Service, Corvallis Oregon, (USA)- Rock weathering by plants.
8. Dr. Drora Kaplan. University of Ben Gurion in the Negev (Israel). Re-use of water in arid zone.
9. Dr. Robert Linderman- Plant Health Inc. Private sector, Corvallis, Oregon (USA). Reforestation of desert eroded lands.
10. Dr. C.Y. Li. USDA-Forest service (retired). Rock weathering by plants.
11. Dr. Gabor Bethlenfalvay- USDA-ARS (retired). Reforestation of desert eroded lands.
12. Dr. Jorge Lopez-Portillo and Dr. Roger Guevara, Institute of Ecology, Xalapa (Mexico). Nitrogen fixation in mangroves.
13. Dra. Concepcion Lara- CIBNOR (Mexico). Heterotrophic growth of microalgae.
14. Prof. Anton Hartmann and Dr. Michael Schmid. German Research Center for Environmental Health, München, (Germany). FISH analysis of plant-bacteria interactions.
15. Dr. David Crowley, Environmental Sciences Dep. University of California- Riverside (USA).
16. Dr. Martin Heil, CINVESTAV (Guanajuato, Mexico). Mutualism between microalgae and bacteria.
17. Dr. Salme Timmusk (Uppsala BioCenter, Uppsala, Sweden). Bacterial diversity in mine tailings.
18. Dr. Michael Cohen –Sonoma State University, California (USA). Enzymatic and molecular mechanisms of fatty acids in microalgae.
19. Dr. Alberto Mendoza- IPN Reynosa, Tamaulipas (Mexico). Enzymatic and molecular mechanisms of fatty acids in microalgae.
20. Dr. Chris Rensing- University of Arizona, Tucson (USA). Enzymatic and molecular mechanisms of fatty acids in microalgae.
21. Dr. Felipe Ascencio (CIBNOR), La Paz, Mexico. Enzymatic and molecular mechanisms of fatty acids in microalgae.
22. Lic. Frank Estrada (Algoil S.A. Nicaragua). Massive propagation of *Chlorella*.