

The Group of "Environmental Microbiology"- CIBNOR

Final Productivity, 2006

(Numbers in parenthesis near journal's name are the **scientific impact, 2005**)
(Codes refer to the strategic project responsible for the publication)

Summary

- Original publications in peer-reviewed, scientific <u>international</u> journals.	
Published and "in press" -	12
- Publication in national journal	4
- Submitted papers -	6
- Publications in books -	9
- Publications in websites -	4
- Presentations in conferences	9
=====	
- Total productivity (without conferences) for 2006	35

- **Average "Impact Factor" of all published and "in press" papers: 1.9**

PUBLISHED AND "IN PRESS" PUBLICATIONS

PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Hernandez, J.-P., de-Bashan, L. E. and Bashan Y. 2006. Starvation enhances phosphorus removal from wastewater by the microalga *Chlorella* spp. co-immobilized with *Azospirillum brasilense*. **Enzyme and Microbial Technology** 38:190-198 (**1.705**) (PC 6.0)
2. Puente, M.E., Rodriguez-Jaramillo, M.C., Li, C.Y. and Bashan, Y. 2006. Image analysis for quantification of bacterial rock weathering. **Journal of Microbiological Methods** 64: 275-286 (**2.297**) (PC 6.0)
3. Gonzalez-Acosta, B., Bashan, Y., Hernandez-Saavedra, N.Y., Ascencio, F., and De la Cruz-Agüero, G. 2006. Seasonal seawater temperature as the major determinant for populations of culturable bacteria in the sediments of an intact mangrove in an arid region. **FEMS Microbiology Ecology** 55: 311-321 (**2.787**) (PC 6.0)
4. Bashan, Y., Bustillos J. J., Leyva, L. A., Hernandez J.-P., and Bacilio M., 2006. Increase in auxiliary photoprotective photosynthetic pigments in wheat seedlings induced by *Azospirillum brasilense*. **Biology and Fertility of Soils** 42: 279–285 (**1.143**) (PC 6.0)

5. Diocares R., Morey T., and Holguin G. 2006. Producing and dispensing small quantities of $^{15}\text{N}_2$ gas at atmospheric pressure. **Analytical Biochemistry** **352**: 302-304. (2.67)(PC 3.2)
6. Holguin, G., Gonzalez-Zamorano, P., de-Bashan, L.E., Mendoza, R., Amador, E., and Bashan, Y. 2006. Mangrove health in an arid environment encroached by urban development – a case study. **Science of the Total Environment** **363**: 260-274 (2.224) (PC 3.2 and PC 6.0)
7. Bashan, Y., Vierheilig, H., Salazar, B.G., and de-Bashan, L.E. 2006. Primary colonization and breakdown of igneous rocks by endemic, succulent elephant trees (*Pachycormus Discolor*) of the deserts in Baja California, Mexico. **Naturwissenschaften** **93**: 344–347 (1.953) (PC 6.0)
8. Rodriguez, H., Mendoza, A., Cruz, M.A., Holguin, G., Glick B.R., and Bashan, Y. 2006. Pleiotropic physiological effects in the plant growth-promoting bacterium *Azospirillum brasilense* following chromosomal labeling in the *clpX* gene. **FEMS Microbiology Ecology** **57**: 217-225 (2.787) (PC 6.0)
9. Bacilio M., Hernandez, J.-P., and Bashan, Y. 2006. Restoration of giant cardon cacti in barren desert soil amended with common compost and inoculated with *Azospirillum brasilense*. **Biology and Fertility of Soils** **43**: 112-119 (1.143) (PC 6.0)
10. Rodriguez, H., Fraga, R., Gonzalez, T., and Bashan, Y. 2006. Genetics of phosphate solubilization and its potential applications for improving plant growth-promoting bacteria. **Plant and Soil** **287**: 15-21 (PC 6.0) (1.703).
11. Yabur, R., Bashan Y., Hernández-Carmona G. 2006. Alginate from the macroalgae *Sargassum sinicola* as a new source for microbial immobilization material for wastewater treatment and plant growth promotion. **Journal of Applied Phycology** (0.992) (In Press) (P.C. 6.0)
12. Bashan, Y., Khaosaad, T., Salazar, B.G., Ocampo, J.A., Oehl, F., and Vierheilig, H. 2006. Mycorrhizal characterization of *Fouquieria columnaris*, the boojum tree, an ancient tree from Baja California, Mexico. **Trees Structure and Function** (1.386) (In Press) (PC 6.0)

PUBLICATIONS IN NATIONAL JOURNALS

13. Bashan, Y, Puente M. E., and Salazar, B. 2006. Uso de los Microorganismos del desierto como recurso para recuperar suelos erosionados. **Revista Latinoamericana de Microbiología** **48**: 154-161 (PC 6.0)

14. Bashan, Y., Puente, M.E., Romero, B., and Li, C.Y. 2006. Mountain breakers. **Tzabar 13**: (accepted) (in Hebrew) (PC 6.0)
15. Holguin, G. 2006. El lenguaje entre bacterias y plantas. **Ciencia** (accepted) (PC 3.2)
16. Bashan, Y., Puente M.E., Salazar, B., de-Bashan, L.E., Bacilio, M., Hernandez, J.-P., Leyva L.A., Romero, B., Villalpando R., and Bethlenfalvay G.J. 2006. Reforestación de tierras erosionadas en el desierto: el papel de las bacteria promotoras de crecimiento en plantas y la material orgánica. **Suelos Ecuatoriales** (PC 6.0) (accepted)

PUBLICATIONS IN INTERNATIONAL BOOKS

17. Poghosyan A., Holguin G., Bacilio M. 2006. Papaya diseases, ecology and control. In: Encyclopedia of Pest Management. Dekker Pub. , New York, NY, USA. (In press) (PC 3.2)
18. Bashan, Y., Puente M. E., de-Bashan L.E., and Hernandez J.-P. 2007. Environmental uses of plant growth-promoting bacteria. In: Plant Microbe interactions. (Ed). E. Ait Barka. Research Signpost, Trivandrum, Kerala, India (In press) (PC 6.0)
19. Rodriguez, H., Fraga, R., Gonzalez, T., and Bashan, Y. 2007. Genetics of phosphate solubilization and its potential applications for improving plant growth-promoting bacteria. In: Recent Advances on Microbial Phosphate Solubilization. (Eds) C. Rodriguez-Barrueco and E. Velazquez. Springer, Dordrecht, The Netherlands. (In press) (PC 6.0)
20. de-Bashan L.E., and Bashan Y. 2007. Fertilizer potential of phosphorus recovered from wastewater treatments. In: Recent Advances on Microbial Phosphate Solubilization. (Eds) C. Rodriguez-Barrueco and E. Velazquez. Springer, Dordrecht, The Netherlands. (In press) (PC 6.0)
21. de-Bashan, L.E., Hernandez, J.P., and Bashan, Y. 2007. Microalgae growth-promoting bacteria as “helpers” for microalgae: a novel approach for removing ammonium and phosphorus from municipal wastewater. In: Recent Advances on Microbial Phosphate Solubilization. (Eds) C. Rodriguez-Barrueco and E. Velazquez. Springer, Dordrecht, The Netherlands. (In press) (PC 6.0)

PUBLICATIONS IN NATIONAL BOOKS

22. Bethlenfalvay G.J., Bashan, Y., Carrillo-Garcia, A., and Stutz, J. 2006. Mycorrhizae as biological components of resource islands in the Sonoran desert. In: **Arbuscular micorrhizae in arid and semiarid environments**. (Eds) Montaña, N. M., Camargo- Ricalde, S. L., García-Sánchez, R., Monroy-Ata, A. Published by: Mundi Prensa, the National Institute of Ecology-Mexico, Autonomous National University of Mexico and the Autonomous Metropolitan University of Mexico, Mexico City, Mexico (in press)
23. Bashan, Y., de-Bashan, L.E., Hernandez, J.-P., Puente, M.E., Bacilio, M., and Leyva , L.A. 2006. Microbial synthetic inoculants. In: **Biofertilizers as a sustainable technology**. (Eds.) Díaz Franco, A., Mayek-Pérez, N., Mendoza-Herrera, A. and Maldonado-Moreno, N. Published by COTACYT-Plaza and Valdéz, Monterrey, Mexico (In press).
24. Bashan, Y. 2006. Microbial inoculants as potential major input in Mexican agriculture – Preface. In: **Biofertilizers as a sustainable technology**. (Eds.) Díaz Franco, A., Mayek-Pérez, N., Mendoza-Herrera, A. and Maldonado-Moreno, N. Published by COTACYT-Plaza and Valdéz, Monterrey, Mexico (In press).

PUBLICATION IN CONFERENCE BOOK

25. Bashan Y., Hernández J.-P., Puente M. E., de-Bashan L.E., and Leyva L.A. 2006. Inoculantes microbianos sintéticos: son el futuro para la agricultura? In: **Proceedings of the 22nd International week of parasitology**. Edited by Gallegos, G. Published by: Antonio Narro University, Saltillo, Mexico (in press).

PUBLICATIONS IN WEBSITES

26. Bashan, Y. 2006. Vertical soil core sampler. In: <http://www.bashanfoundation.org/soilcore.html>
27. Bashan, Y. 2006. Horizontal soil sampler. In: <http://www.bashanfoundation.org/horizontal.html>
28. Morey, T., and Bashan, Y. 2006. Device for producing large-sized polymer beads (2 - 4 mm). <http://www.bashanfoundation.org/device.html>. 5 pages + PowerPoint presentation.

29. Bashan, Y., Toledo, G., and Hernandez, J.-P. 2006. Restoration of arid-zone mangroves in Balandra Lagoon in Baja California Sur, Mexico. <http://www.bashanfoundation.org/balandra/balandra.html>. Text, 4 PowerPoint presentations and a video presentation.

SUBMITTED PUBLICATIONS

PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Puente, M.E., Li, C.Y., and Bashan, Y. 2006. Endophytic bacteria in cacti seeds accelerate rock-weathering and are needed for development of cactus seedlings. **Environmental Microbiology** (4.559) (PC 6.0)
2. de-Bashan, L.E., Antoun, H., and Bashan Y. 2006. Involvement of indole-3-acetic-acid produced by the microalgae growth-promoting bacterium *Azospirillum* spp. in growth promotion of *Chlorella vulgaris*. **FEMS Microbiology Ecology** (2.787) (PC 6.0)
3. Holguin G., Dávila-Lule, A., Flores-Mireles A.L., Villicaña C., and Geraldo N. 2006. Acyl homoserine lactone-producing bacteria from mangrove roots with plant-growth promoting properties. **Microbiology** (3.173)
4. Flores-Mireles A.L., Winans S.C., Holguin, G. 2006. Molecular characterization of diazotrophic and denitrifying bacteria associated with mangrove roots. **Applied and Environmental Microbiology** (3.818)
5. Leyva L.A., and Bashan Y. 2006. Effect of gluconic acid on its metabolic enzymes in *Azospirillum brasilense* associated with mesquite roots. **FEMS Microbiology Ecology** (2.787). (PC 6.0)
6. Puente M.E., and Bashan Y. 2006. Survival and pH reduction capacity of rock-weathering, plant growth-promoting bacteria in slurries of rocky substrates. **FEMS Microbiology Ecology** (2.787). (PC 6.0)

PRESENTATIONS IN CONFERENCES

1. Hernandez, J.-P., de-Bashan, L. E. and Bashan Y. 2006. Desarrollo de una novel estrategia combinada para el biotratamiento de agua residual y la recuperación de suelos erosionados utilizando bacterias promotoras de crecimiento en microalgas (MGPB) y microalgas coinmovilizadas juntas en polímeros. In: **Primer Taller de difusión de Avances y Resultados**. Organized by: El Consejo Nacional de Ciencia y Tecnología (CONACYT) y la Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT). 2-3.3.2006, La Paz, Mexico.
2. Bashan, Y. 2006. Who is an author or co-author of a scientific paper? Institutional seminar. Organized by: The ethics commission of CIBNOR. 17.3.2006. La Paz, Mexico. (**Invited lecture**).
3. Bashan Y., Puente M. E. y Salazar B. 2006. Uso de los Microorganismos del desierto como recurso para recuperar suelos erosionados. 35th National Congress of Microbiology. 4–7.4 2006, Oaxtepec, Morelos, Mexico. p. 69. (**Invited lecture**)
4. de-Bashan, L.E. 2006. Immobilization of microalgae for nutrient removal from wastewater. In: The microalgae forum - cycle of conferences. CIBNOR, April 28, 2006, La Paz, Mexico (**Invited lecture**).
5. Bashan, Y. 2006. Bacteria for “face-lifting” of extreme cases of desertification. Special seminar, Department of Soils and Food Engineering, Laval University, Quebec, Canada, May 25, 2006. (**Invited lecture**).
6. Bashan, Y. 2006. Bacteria for rehabilitating extreme cases of desertification. Special seminar, Chinese Academy of Forestry, Institute of Tropical Forestry, Guangzhou, P.R. China, August 21, 2006. (**Invited lecture**).
7. Bashan, Y. 2006. Mangrove restoration in Mexico. Special seminar, Chinese Academy of Forestry, Institute of Tropical Forestry, Guangzhou, P.R. China, August 21, 2006. (**Invited lecture**).
8. Bacilio M., Hernández J.- P. and Bashan Y. 2006. Mejoramiento del crecimiento de plántulas de cardón (*Pachycereus pringlei*) utilizando composta y bacterias promotoras del crecimiento vegetal (*Azospirillum brasilense*). VI Congreso Nacional de Biotecnología Agropecuaria y Forestal. Instituto Tecnológico de la Universidad de Sonora. Ciudad Obregón, Mexico, 22-25 October, 2006.
9. Bashan, Y., Puente, M.E., and Salazar, B. 2006. Use of desert microorganisms as resource to recover eroded soils. Special seminar in the Department of Developing Technology. National Polytechnique Institute/CICIMAR, 23.11.2006, La Paz, Mexico. (**Invited lecture**).

PRESENTATION OF AN INTERNATIONAL COURSE

1. Lecturer in the international mini-course for graduate students and researchers on: “**Plant growth-promoting bacteria for mangrove reforestation in tropical areas- theory and practice**”. Chinese Academy of Forestry, Institute of Tropical Forestry and Guangdong Forestry Institute, Guangzhou, August 19-31, 2006, Guangzhou, P.R. China (44 h) (Yoav Bashan).

NATIONAL AND REGIONAL COMMUNITY SERVICES

1. **Papaya’s strategic internal project** of CIB (Dra. Holguin and Dr. Bacilio)
2. **Plant growth-promoting bacteria to solve environmental problems. strategic internal project** of CIB (Dr. Yoav Bashan, Dra. Esther Puente, Dra. Holguin and Dr. Bacilio) (P.C. 6.0)
3. **Reforestation of 1500 m² of eroded land in Reserva de El Comitan** by planting 1500 native trees of 4 species treated with beneficial microorganisms and compost. Reforestation completed. Financed by SEP-CONACYT (Dr. Yoav Bashan, Dra. Esther Puente, Biol. Bernardo Salazar). (PC 6.2)

INTERNATIONAL COMMUNITY SERVICES AND SCIENTIFIC RECOGNITION

1. **Nomination as Editorial Board Member:** World Applied Sciences Journal (2006) (Canada); Annals of Microbiology (2007-2009) (Italy) (Y. Bashan).
2. **Member of the Scientific Committee of an international conference:** *Azospirillum* and related PGPR: molecular ecology, plant responses and agronomic significance. Montpellier, France, August 31- September 1, 2007 (Y. Bashan).
3. **Cover page of a journal.** One of our studies (Elephant tree growing in rocks) was selected as the cover page of a respected German scientific journal, Naturwissenschaften, July issue.
4. **The project “bioremediation of wastewater”;** SEMARNAT-2002-C01-0005 received the following evaluation on its final report from its funding agency SEMARNAT: “Excelente trabajo con logros satisfactorios, un grupo de trabajadores muy bien integradas, tesisas graduadas en diferentes niveles, y con produccion magnifica de articulos en revistas de impacto de ISI”.

5. Revision of manuscripts for national and International Journals and funding agencies: Total: 64

Name of reviewer	Name of the journal/agency	Country	Number of manuscripts
Yoav Bashan	Applied and Environmental Microbiology	USA	3
	Biotechnology Progress	USA	1
	Journal of Environmental Management	USA	2
	Water Environment Research	USA	1
	Journal of Industrial Microbiology and Biotechnology	USA	1
	Biology and Fertility of Soils	Germany	11
	Journal of Plant Nutrition and Soil Science	Germany	1
	Antonie van Leeuwenhoek International Journal of General and Molecular Microbiology	Germany	1
	Aquatic Botany	The Netherlands	1
	Water Research	The Netherlands	2
	European Journal of plant pathology	The Netherlands	1
	European Journal of Soil Biology	France	3
	Plant Physiology and Biochemistry	France	2
	Soil Biology and Biochemistry	Australia	1
	Australian Journal of Botany	Australia	1
	Letters in Applied Microbiology	UK	2
	Bioresource Technology	UK	2
	Journal of Hazardous Materials	Canada	1
	ScienceAsia	Thailand	1
	Canadian Foundation for Innovation - Leader Opportunity Fund	Canada	1
National Science Foundation	USA	1	
CONACYT-Basic research grants	Mexico	6	
Ben-Gurion University of the Negev, Promotion for Professor level	Israel	1	
Esther Puente	CONACYT-Basic research grants	Mexico	3
Gina Holguin	CONACYT-Basic research grants	Mexico	1
Drora Kaplan	Bioresource Technology	UK	2
Luz de-Bashan	Water Research	The Netherlands	1
	Pesticide Biochemistry and Physiology	USA	2
	Current Microbiology	USA	1
	Chemical papers	Slovakia	1
	Journal of Hazardous Materials	Canada	3
	Annals of Microbiology	Italy	1
	SEMARNAT- Applied research grants	Mexico	1
Macario Bacilio	Journal of Industrial Microbiology and Biotechnology	USA	1

RESEARCH STAYS

At CIBNOR:

1. Dr. Drora Kaplan. Ben-Gurion University of the Negev, Sde Boquer, Israel.
Project: Enzymatic activities of microalgae involved in wastewater treatment. November 2005 - April 2006. (with Dr. Bashan and Dra. de-Bashan) (PC 6.2).
2. Prof. Jimena Sanchez. National University of Colombia, Bogota, Colombia.
Project: Inoculant formulation. November - December 2006 (with Dra. Gina Holguin, Dra. de-Bashan and Dr. Bashan) (PC 6.0).

EXTERNAL PROJECTS (total:\$ 18,722.000.00)(1,702,000 U\$\$) (11.00 pesos=1 USD).

1. 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: \$1,900,000.00; Financiado por SEMARNAT-CONACYT

Duración: Tres años (2007-2009).

Responsable: Dr. Yoav Bashan

Participants: Dra. Luz Estela de-Bashan Dra. Esther Puente., M.Sc Juan Pablo Hernández

2. Abundancia y actividad de bacterias fijadoras de nitrogeno y desnitrificantes en ecosistemas de manglar conservados y perturbados de zonas áridas y tropicales de México.

Monto: \$20,000.00; Financiado por CONACYT

Duración : 1 year (2007)

Responsable: Dr. Yoav Bashan

Participant: cD.Sc. Alejandra Vovides

3. Colonización de rocas por *Mammillaria fraileana* (Britt. & Rose) y efecto de la interacción cactácea-endófitas en la intemperización de rocas de ambientes áridos.

Monto: \$20,000.00; Financiado por CONACYT

Duración : 1 year (2007)

Responsable: Dr. Yoav Bashan

Participant: cD.Sc. Blanca Romero

4. 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: Dra. Esther Puente.

Participants: Dr. Yoav Bashan, Dra. Luz Estela de-Bashan, MC Juan Pablo Hernández

5. Desarrollo de una novel estrategia combinada para el biotratamiento de agua residual y la recuperación de suelos erosionados utilizando bacterias promotoras de crecimiento de microalgas (MGPB) y microalgas coinmovilizadas juntas en polimeros.

Financiado por CONACYT-SEMARNAT

Monto: \$ 1'859.900.00

Duración: Tres años (2003-2006)

Participants: Dr. Yoav Bashan, Dra. Luz Estela de-Bashan, MC Juan Pablo Hernández

6. Reforestación del desierto: el rol de los microorganismos del suelo y roca, y de las islas de recursos, en el establecimiento de plantas para la restauración de áreas perturbadas.

Financiado por SEP-CONACYT

Monto: \$ 1'513.591.00

Duración: Tres años (2003-2006)

Participants: Dr. Yoav Bashan, Biol. Bernardo Salazar, Dra M. Esther Puente, Dr. Macario Bacilio

7. Estudio de la codependencia y comunicacion entre miembros de la comunidad bacteriana de la rizosfera y arboles de mangle para el diseño de inoculantes mixtos que promuevan el crecimiento de plantas

Financiado por SEP-CONACYT

Monto: \$ 1'555.266.00

Duración: Tres años (2003-2006)

Responsable: Dra. Gina Holguin Zehfuss

Participants: Dr. Yoav Bashan, Dr. Macario Bacilio, Biol. Mar. Patricia Vazquez Correa, Dr. Stephen Winans (USA), Dr. Anatol Eberhard (USA), Dr. Jaime Polanía (Colombia).

8. Estudio de la mitigacion del estrés salino en plantas de chile utilizando composta y bacterias promotoras del crecimiento vegetal.

Financiado por SEP-CONACYT

Monto: \$ 861,000.00

Duración: Tres años (2004-2007)

Participants: Dr. Macario Bacilio Jiménez (Responsable), Dra. Gina Holguín Zehfuss, Juan A Larrinaga Mayoral, M.Sc. Vicente Verdugo, Hector J. García Monarrez (UABCS).

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: \$ 8,910,000 (785,000 US\$)

Duración: 5 years (2005-2009)

Responsable: Dra. Raina M. Maier (University of Arizona)

Participants: Drs., J. Chorover, and T.L. Thompson.(University of Arizona, Tucson), and Dr. Y. Bashan (CIBNOR)

10. The use of plant growth promoting bacteria to increase the growth of mangroves.

Financiado por Chinese Academy of Forestry, China

Monto: \$ 480,000 (42,280 USD)

Duración: Dos años (2005-2006)

Responsable: Eng. Liao Baowen, Institute of Tropical Forestry, Guangzhou, China

Participant: Dr. Y. Bashan

11. Growth promoting bacteria associated with arid-saline environment and their effect on reproduction on two species of mesquite trees

Financiado por Comision Forestal Nacional (CONAFOR), Mexico

Monto: \$ 560,000 (53,000 USD)

Duración: Tres años (2006-2008)

Responsable: Dr. Edgar Rueda, University of Sonora, Santa Ana

Participantes: Dr. Y. Bashan, Dra. Luz de-Bashan, Dra. E. Puente.

Staff and collaborations in 2006

Researchers (full time)

1. Dr. Yoav Bashan
2. Dra. Esther Puente
3. Dr. Macario Bacilio
4. Dra. Gina Holguin

Associated researchers at the rank of technician (full time)

1. Dra. Luz Gonzalez de-Bashan
2. M.Sc Juan-Pablo Hernández
3. Biol. Mar. Patricia Vazquez
4. Biol. Mar. Bernardo Salazar
5. Biol. Adan Trejo

Students (Research)

1. **Ph.D.** Luz Gonzalez de-Bashan – (2001-2006). **Graduated: May 2006** (Laval University, Quebec, Canada) (with Dr. Hani Antoun and Dr. Yoav Bashan).
2. **M.Sc.** Luis Leyva - (2003-2006). **Graduated: April 2006** (CIBNOR, La Paz, Mexico) (with Dr. Yoav Bashan).
3. **Biologist** Adan Trejo - (2005-2006). **Graduated: May 2006** (UAM, Xochimilco, Mexico City) (with Dra. Luz de-Bashan).
4. M.Sc. Blanca Romero - **D.Sc.** Student since 2004 (CIBNOR, La Paz, Mexico) (with Dr. Yoav Bashan and Dr. Macario Bacilio).
5. M.Sc. Alejandra Vovides. – **D.Sc.** Student since 2006 (Instituto de Ecologia, Xalapa, Mexico). (with Dr. Yoav Bashan).
6. M.Sc. Paola Magallon – **Ph.D.** student since 2006 (Laval University, Quebec, Canada). (with Dr. Yoav Bashan and Dr. Hani Antoun).
7. Biol. Alfonso Davila- **M.Sc** student since 2004. (CIBNOR, La Paz, Mexico) (with Dra. Gina Holguin)
8. Biol. Claudia Villicana – **M.Sc** student since 2004. (CIBNOR, La Paz, Mexico) (with Dra. Gina Holguin)
9. Biol. Mar. Yossef Lopez. **M.Sc** student since 2005 (CIBNOR, La Paz, Mexico). (with Dra. Gina Holguin)
10. Biol. Octavio Perez. **M.Sc** student since 2006 (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan)
11. cBiol. Mar. Manuel A. Rodríguez – **Licenciatura** Student since 2004 (UABCS, La Paz, Mexico) (with Dra. Gina Holguin)

12. cAgro. Emiro Ortiz - **Licenciatura**. 2006 (The National University of Colombia, Bogota, Colombia) (With Dra. Esther Puente and Dr. Yoav Bashan)
13. cAgro. Cristina Velásquez - **Licenciatura**. 2006 (The National University of Colombia, Bogota, Colombia) (with Dra. Luz de-Bashan and Dr. Yoav Bashan).
14. cAgro. Yaneth Rodríguez - **Licenciatura**. 2006 (The National University of Colombia, Bogota, Colombia) (with Dra. Luz de-Bashan and Dr. Yoav Bashan).
15. cBiol. Johana Rodríguez - **Licenciatura**. 2006 (The University of Tolima, Ibague, Colombia) (with M.Sc. Juan-Pablo Hernandez and Dr. Yoav Bashan).
16. cEng. Biotechnol. Denisse Covarrubias - **Licenciatura**. 2006 (Technical Institute of Sonora, Ciudad Obregon, Sonora, Mexico) (with Dr. Macario Bacilio)
17. cAgro. Gildardo Ojeda Ramirez. **Social Service**. 2006. (UABCS, La Paz, Mexico) (with Dr. Macario Bacilio)
18. cPh.D. Monica Mendez. **Technical training**. 2006. (University of Arizona, Tucson, Arizona, USA) (with Dr. Yoav Bashan).
19. Agro. Alvaro Garcia- **Technical training**. 2006. (The National University of Colombia, Bogota, Colombia) (With Dra. Esther Puente and Dr. Yoav Bashan)
20. Biol. Javier Vanegas. **Training for M.Sc studies** since 2006 (The National University of Colombia, Bogota, Colombia). (with Dra. Gina Holguin).
21. Biol. Tanya Galindo. **Training for M.Sc studies** since 2006 (The National University of Colombia, Bogota, Colombia). (with Dra. Gina Holguin).
22. cBiol. Katia Nakamura. **Vernao Cientifico**. 2006. (Tecnologico de Tapachula, Tapachula, Chiapas, Mexico). (with Dra. Esther puente)

Visiting Scientists

1. Dr. Drora Kaplan. Ben-Gurion University of the Negev, Sde Boquer, Israel. (Sabbatical year). Until April 2006 (with Dr. Bashan and Dra. de-Bashan).
2. M.Sc. Vicente Verdugo. Private sector, La Paz, Mexico. Until June 2006. (with Dr. Macario Bacilio)
3. Prof. Jimena Sanchez. National University of Colombia, Bogota, Colombia. November-December 2006. (with Dr. Bashan, Dra. de-Bashan and Dra. Holguin)

Group's administrator

cM.Sc. Rocio Villalpando.

Local Collaborations in 2006 at CIB

1. Dr. Fernando García-Carreño – Enzymology and Biochemistry.

Foreign and national collaborations in 2006

1. Dr. C.Y. Li, USDA – Forest Service, Corvallis Oregon, (USA)- Rock weathering by plants.
2. Dr. R.G. Linderman, USDA - ARS, Corvallis Oregon, (USA)- Use of mycorrhizae for desert vegetation.
3. Ing. B. Liao, Eng. He Xuexiang, cDr. M. Li and Dr. X. Ping, Tropical Forestry Research Institute, Goangzhou, PRC (China and Switzerland). Inoculation of mangroves with plant growth promoting bacteria.
4. Prof. Hani Antoun. Laval University, Quebec (Canada). Water Bioremediation.
5. Prof. Raina M. Maier, University of Arizona (USA). Desert re-vegetation of mine tailings.
6. Dr. Anatol Eberhard, Cornell University (USA). Homoserine lactone bacterium-bacterium recognition molecules.
7. Dr. Stephen Winans, Cornell University (USA). Homoserine lactone bacterium-bacterium recognition molecules.
8. Dr. Peter Felker. D'Arrigo Bros. Co. California (USA). Mesquite cultivation.
9. Dr. Humberto Suzan. University of Queretaro (Mexico). Mesquite enzymology and ecology.
10. Dr. Guadalupe Malda. University of Queretaro (Mexico). Conservation of rare cacti.
11. Dr. Hilda Rodriguez, Cuban Institute for Sugar By-Products, (Cuba), Molecular genetics of *Azospirillum*.
12. Prof. Jimena Sanchez, National University of Colombia, Bogota (Colombia). The use of inoculants for plant growth promoting bacteria.
13. Dr. Volker Huss, University of Erlangen (Germany). Identification of Microalgae.
14. Dr. S.R. Prabhu, International Bio Recovery Corporation (Canada). Inoculant information from India.
15. Prof. Zvi Ha-Cohen, University of Ben Gurion in the Negev (Israel). Fatty acids from microalgae.
16. Dr. Horst Vierheilig. University of Agriculture and Science (Austria). Mycorrhizae of the endemic Cirio tree.
17. Dr. Bernard Bormann, USDA – Forest Service, Corvallis Oregon, (USA)- Rock weathering by plants.
18. Dr. Drora Kaplan. University of Ben Gurion in the Negev (Israel). Re-use of water in arid zone.
19. Prof. Dr. Jutta Ludwig-Mueller, Technical University of Dresden, (Germany). Plant hormones and their regulation.
20. Prof. Joël de la Noüe, Laval University, (Canada). Wastewater treatment with microalgae.