

# The Group of "Environmental Microbiology"- CIBNOR

## Final productivity 2005

(Numbers in parenthesis near journal's name are the scientific impact, 2004)  
(Codes refer to the strategic project responsible for the publication)

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### Summary

- Original publications in peer-reviewed, scientific <u>international</u> journals.	
Published and "in press" -	9
- Publication in national journal	1
- Submitted papers -	6
- Publications in books -	6
- Publications in websites -	4
- Presentations in conferences	11
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- Total productivity (without conferences) for 2005	26

- **Average "Impact Factor" of all published and "in press" papers: 2.132**

### PUBLISHED AND "IN PRESS" PUBLICATIONS

#### PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Bashan, Y. and de-Bashan, L.E. 2005. Fresh-weight measurements of roots provide inaccurate estimates of the effects of plant growth-promoting bacteria on root growth: a critical examination. **Soil Biology and Biochemistry** 37:1795-1804 (2.234) (PC 5.2)
2. de-Bashan, L.E., Antoun, H., and Bashan, Y. 2005. Cultivation factors and population size control uptake of nitrogen by the microalgae *Chlorella vulgaris* when interacting with the microalgae growth-promoting bacterium *Azospirillum brasilense*. **FEMS Microbiology Ecology** 54: 197-203 (2.769) (PC 5.2)
3. 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 (1.759)(PC 5.2)
4. Holguin, G., Gonzalez-Zamorano P., de-Bashan L.E., Mendoza, R., Amador E. and Bashan Y. 2005. Mangrove health in an arid environment encroached by urban development – a case study. **Science of the Total Environment** (1.925) (In Press) (PC 5.2 and PC 3.2)

5. Puente, M.E., Rodriguez-Jaramillo, M.C., Li, C.Y. and Bashan, Y. 2005. Image analysis for quantification of bacterial rock weathering. **Journal of Microbiological Methods** (2.146) (In Press) (PC 5.2)
6. Bashan, Y., Bustillos J. J., Leyva, L. A., Hernandez J.-P., and Bacilio M., 2005. Increase in auxiliary photoprotective photosynthetic pigments in wheat seedlings induced by *Azospirillum brasilense*. **Biology and Fertility of Soils** (1.276) (In press)(PC 5.2)
7. Rodriguez, H., Fraga, R., Gonzalez, T., and Bashan, Y. 2006. Genetics of phosphate solubilization and its potential application for improving plant growth-promoting bacteria. **Plant and Soil** (in Press) (PC 5.2) (1.542).
8. Gonzalez-Acosta, B., Bashan, Y., Hernandez-Saavedra, N. Y., Ascencio, F., and De la Cruz-Agüero, G. 2005. Seasonal seawater temperature as the major determinant for populations of culturable bacteria in the sediment of intact semi-arid mangroves. **FEMS Microbiology Ecology** (2.769)(PC 5.2)(In Press)
9. Rodriguez, H., Mendoza, A., Cruz, M.A., Holguin, G., Glick B.R., and Bashan, Y. 2005. Pleiotropic physiological effects in the plant growth-promoting bacterium *Azospirillum brasilense* following chromosomal labeling in the *clpX* gene. **FEMS Microbiology Ecology** (2.769) (PC 5.2)

### **PUBLICATION IN NATIONAL JOURNAL**

10. Bashan, Y., and de-Bashan, L.E. 2005. Crawling devil. A rare cactus in continuous motion. **Tzabar** 12: 2-9 (in Hebrew) (Cactus and succulents society of Israel).

### **PUBLICATIONS IN A REVIEWED INTERNATIONAL BOOK**

11. Bashan, Y. and de-Bashan, L.E. 2005. Bacteria / Plant growth-promotion. In: **Encyclopedia of soils in the environment**. (Editor-in-Chief) D. Hillel, Elsevier, Oxford, U.K. Vol. 1., pp. 103-115. 2200 p. (PC 5.2)

### **PUBLICATIONS IN INTERNATIONAL BOOKS**

12. 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. 2005. Reforestation of eroded lands; the effect of plant growth-promoting bacteria and organic matter. In: **Materia organica y microorganismos en la agricultura Colombiana**. (Ed) Sociedad Colombiana de la Ciencia del Suelo, Medellin, Colombia. 15 p. (Available only as CD) (PC. 5.2)

13. de-Bashan L.E. and Bashan Y. 2005. Fertilizer potential of phosphorus recovered from wastewater treatments. In: **Microbial phosphate solubilization**. Edited by E. Velázquez-Pérez and C. Rodríguez-Barrueco, Kluwer Academic Publishers, Dordrecht, The Netherlands (In press). (PC 5.2).
14. Rodríguez, H., Fraga, R., González, T., and Bashan, Y. 2005. Genetic modifications of phosphate solubilizing bacteria to be used as agricultural inoculants. In: **Microbial phosphate solubilization**. Edited by E. Velázquez-Pérez and C. Rodríguez-Barrueco, Kluwer Academic Publishers, Dordrecht, The Netherlands (In press). (PC 5.2)
15. Whitmore, R.C., Brusca R.C., González-Zamorano, P., Mendoza-Salgado R., Amador-Silva E.S., Holguin G., Mclvor C.C. 2005. The Ecological importance of mangrove ecosystems in Baja California Sur. In: **Biodiversity, ecosystems, and conservation in northern Mexico**. Cartron, J.-C. and Ceballos, G. (editors), Oxford University Press. (PC 3.2) (In press)
16. Poghosyan A., Holguin G., Bacilio M. 2005. Papaya diseases, ecology and control. In: **Encyclopedia of Pest Management**. Dekker Pub. , New York, NY, USA. (In press) (PC 3.2)

### **PUBLICATIONS IN WEBSITES**

17. de-Bashan, L.E. and Donato, J.C. 2005. Desmid microalgae from lakes in the Andean highland paramo ecosystem of Colombia (South America). In: <http://www.bashanfoundation.org/paramo/paramoweb.htm>. 25 pages. (Designed by J.P. Hernandez).
18. Bashan Y., de-Bashan L.E., Puente M. E., Leon de la Luz J.-L., and Leyva L.A.. 2005. A mobile desert plant – The rare crawling devil cactus of Baja California, Mexico is potentially threatened. In: <http://www.bashanfoundation.org/crawlingweb/icrawling.htm>. 32 pages (Designed by J.P. Hernandez).
19. Bashan Y., González-Zamorano P., and Salazar B. 2005. Restoration of hurricane-damaged mangroves at Punta del Mogote, Baja California Sur, Mexico. In: <http://www.bashanfoundation.org/conservation2.html>. 23 pages + 3 PowerPoint presentations. (Designed by N. Bashan).
20. Bashan, Y. 2005. In memoriam; Dr. Roy Bowers (1949-1997). In: <http://www.bashanfoundation.org/gmaweb/roywebsite/iroy.htm>. 120+ pages. (Designed by J.P. Hernandez).

## **SUBMITTED PUBLICATIONS**

### **PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS**

1. Puente, M.E., Li, C.Y., and Bashan, Y. 2005. Seed endophytic bacteria that colonize rock-weathering desert plants accelerate rock degradation and soil formation and are essential for the growth of cactus seedlings in this environment. **Proceedings of the Natural Academy of Science, USA** (10.272) (PC 5.2)
2. Bashan, Y., Vierheilig, H., Salazar, B., and de-Bashan, L.E. 2005. Primary colonization and breakdown of igneous rocks by endemic, succulent elephant trees (*Pachycormus Discolor*) of the deserts in Baja California, Mexico. **Plant Biology** (1.42) (PC 5.2)
3. Bacilio, M., Hernandez, J.-P., and Bashan, Y. 2005. Restoration of giant cardon cacti in barren desert soil amended with common compost and inoculated with *Azospirillum brasilense*. **Biology and Fertility of Soils** (1.276) (P.C. 5.2)
4. Yabur R., Bashan Y., Hernández-Carmona G. 2005. Alginate from the macroalgae *Sargassum sinicola* as a new source for microbial immobilization material for wastewater treatment and plant growth promotion. **Journal of Biotechnology** (2.323) (P.C. 5.2)
5. de-Bashan, L.E., Antoun, H., and Bashan Y. 2005. Involvement of indole-3-acetic-acid produced by the microalgae growth-promoting bacterium *Azospirillum* spp. in growth promotion of *Chlorella vulgaris*. **Applied and Environmental Microbiology** (3.81) (P.C. 5.2)

### **PUBLICATIONS IN SCIENTIFIC NATIONAL REVIEWED JOURNAL**

6. Holguin, G. 2005. El lenguaje entre bacterias y plantas. **Ciencia** (PC 3.2)

### **PRESENTATIONS IN CONFERENCES**

1. Hernández, J.P. 2005. Utilización de microorganismos benéficos para propositos ambientales. Fundación Reto Colombia, Universidad del Tolima, Marzo 29, 2005. Ibagué, Colombia (**Invited lecture**).
2. Bashan, Y. 2005. La Ciencia trabaja para la Sociedad: la microbiología ambiental. In: Ciclo de Conferencias "Ciencia y Sociedad: Vínculo para el Progreso"(Simposium Público). Organizado por: Programa de Acercamiento de la Ciencia a la Educación (PACE)(CIBNOR), 16-20.5.2005. La Paz, Mexico (**Ponente magistral; Key-note lecture**).

3. Bashan Y. and Puente, M.E. 2005. Use of microorganisms and organic matter on soil bioremediation processes. National conference of soil science; organic matter and microorganisms in the Colombian agriculture. 22-23.9.2005. Medellin, Colombia (**Ponente magistral; Key-note lecture**).
4. Bacilio M., Holguin G., Arce M., and Verdugo V. 2005. Aclimatación de plantas de papaya usando bacterias estimuladoras del crecimiento vegetal. VII congreso nacional de la fijación biológica de nitrógeno” 26-28.10. 2005, Centro de Ciencias Genómicas, UNAM, Cuernavaca, Morelos, Mexico.
5. Flores-Mireles A. L., Holguin G., Eberhard A., Winans Stephen. 2005. “Bacterias desnitrificantes y fijadoras de N<sub>2</sub> asociadas a raíces de mangle” VII congreso nacional de la fijación biológica de nitrógeno”, 26-28.10. 2005, Centro de Ciencias Genómicas, UNAM, Cuernavaca, Morelos, Mexico (**Invited Lecture**).
6. Bashan, Y. 2005. Microbial synthetic inoculants; are they the future? Expo Narro, 22<sup>nd</sup> International week of parasitology. November 9-11, 2005. Saltillo, Mexico (**Ponente magistral; Key-note lecture**).
7. de-Bashan, L.E. 2005. Phycoremediation: use of microalgae and bacteria for wastewater treatment. Special seminar in: Dept. of Biology, National University of Colombia. 2.11.2005. Bogota, Colombia (**Invited lecture**)
8. Davila-Lule A., Galindo T., Vanegas J., Holguin G., Bashan Y., Sánchez Nieves J., Polania J., Toledo G., Vazquez P., Rojas A., Moreno M., Puente E., and MacNair M. 2005. “Bacterias promotoras del crecimiento vegetal en manglares”. Primer taller sobre manglares de la península de Baja California: diagnóstico y perspectivas de investigación. Noviembre 3 y 4, 2005, La Paz, BCS., Mexico.
9. Villicaña C., Holguin G., Flores-Mireles A.L., Eberhard A., Davila-Lule A., Geraldo N., Lopez de Los Santos Y., and Carrillo A. 2005 “Comunicación celular entre bacterias del manglar”. Primer taller sobre manglares de la península de Baja California: diagnóstico y perspectivas de investigación”. Noviembre 3 y 4, 2005. La Paz, BCS., Mexico.
10. Bashan, Y., Puente, M.E., and Salazar, B. 2005. The use of desert microorganisms as a resource to abate soil erosion. First national symposium on microbial models with impact on health, agriculture and biotechnology, 1-2.12. 2005. Puebla, Mexico. (**Invited lecture**).

## **LOCAL CONFERENCE**

11. Bashan, Y. 2005. Co-authorship of scientific articles. Special seminar. The group of “Philosophy of Science”, 14.12.2005. CIBNOR, La Paz, Mexico. (**Invited lecture**).

## NATIONAL AND REGIONAL COMMUNITY SERVICES

1. **Papaya's strategic internal project** of CIB (Dra. Holguin and Dr. Bacilio)
2. **Ecological restoration strategic internal project** of CIB (Dr. Bashan and Dra. Puente)
3. **Reforestation of 1500 m<sup>2</sup> 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. Bashan, Dra. Puente, Dr. Bacilio, Biol. Salazar). (PC 5.2)
4. **Restoration of the mangroves in Punta del Mogote**. Final vegetative and batimetry analyses one year after restoration of the system. (Dr. Bashan, M.Sc. Gonzalez-Zamorano, Biol. Salazar, Biol. Villalpando) (PC 5.2).
5. **Radio program**. Un mar de ciencia en el desierto; La microbiologia ambiental y programa de acercamiento de la ciencia a la educacion. Emisora: XEBCS radio cultural del Instituto Estatal de Radio y TV, 14.6.2005, programa No. 142 (Dr. Bashan, M.Sc. Gonzalez de Bashan y Dr. Mejia) (PC 5.2).
6. **Presentation for Children**. Uso de las algas. In: Jueves para ninos ambiental en la playa magica. Casa de la Cultura de La Paz, BCS, Mexico. 29.9.2005 (M.Sc. Juan Pablo Hernandez).
7. **TV program**. Uso de las algas. Interview program "Al medio dia". XHKTV Channel 10, La Paz, BCS, Mexico. 28.9.2005. (M.Sc. Juan Pablo Hernandez).

## INTERNATIONAL COMMUNITY SERVICES AND SCIENTIFIC RECOGNITION

1. **Member of the International evaluating committee** of Institute of Biotechnology, The National University of Colombia, Bogota, Colombia, April 2005 (Yoav Bashan)
2. **National recognition of project**. The Project "Bioremediation of wastewater" was recognized by the Ministry of Ecology of Mexico as exemplary, and was selected as a "success case" of applied research to be presented to the President of Mexico (5.8.2005).
3. **A top download article**. The paper on removing of phosphorus from wastewater (Water Research 38: 4222-4246) originated from this project reached the 2<sup>nd</sup> place in number of worldwide downloads in the "Top 25 articles" of all times of the high impact journal "Water Research". (ScienceDirect.com; September 6, 2005)

**4. Revision of manuscripts for national and International Journals and funding agencies: Total: 53**

Name of reviewer	Name of the journal/agency	Country	Number of manuscripts
Yoav Bashan	Biology and Fertility of Soils	Germany	14
	Microbiological Research	Germany	2
	Plant Growth Regulation	Germany	1
	Plant and Soil	Netherlands	2
	Water Research	Netherlands	5
	Resources, Conservation & Recycling	Netherlands	1
	Applied and Environmental Microbiology	USA	4
	Biological Control	USA	2
	Journal of Clinical Microbiology	USA	1
	Biotechnology and Bioengineering	USA	1
	Oceanides	Mexico	1
	Australian Journal of Experimental Agriculture	Australia	1
	Environmental and Experimental Biology	France	1
	Acta Oecologia	France	1
	Annals of Microbiology	Italy	2
	Journal of Vegetation Science	Sweden	1
	Bioresource Technology	UK	1
	Letters in Applied Microbiology	UK	1
	Indian Journal of Marine Science	India	1
	Applied Microbiology and Biotechnology	Japan	1
ScienceAsia	Thailand	1	
CONACYT	Mexico	3	
Ph.D. thesis; Gujarat Univ.	India	1	
Luz de-Bashan	Process Biochemistry	France	1
	Bioresource Technology	UK	1
Drora Kaplan	Annals of Microbiology	Italy	1
	Journal of Environmental Management	USA	1

## RESEARCH STAYS

### At CIBNOR:

1. Dr. Horst Vierheilig. Institute of Plant Protection, University of Agriculture and Science, Vienna, Austria. **Project:** "Mycorrhizae occurrence in the living-fossil endemic tree Cirio". March 2005 (with Dr. Bashan) (PC 5.2).
2. Eng. X. He, and cDr. M. Li, Tropical Forestry Research Institute, Goangzhou, PRC (China). **Project:** Inoculation of mangroves with plant growth promoting bacteria. September-November 2005 (with Dr. Bashan) (PC 5.2).
3. 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 M.Sc. de-Bashan) (PC 5.2).
4. Prof. Stephen Winans. Cornell University, Ithaca, New York. **Project:** Cell-cell communication in mangrove rhizosphere bacteria. November 2005 (with Dra. Holguin) (P.C. 3.2).

### Abroad

1. Dra. Gina Holguin and Dr. Macario Bacilio. 2005. At the University of Queensland Australia. **Project:** "Nitrogen fixation of mangrove tress", May-June 2005 (With Dr. N. Duke)(P.C. 3.2)
2. Dra. Gina Holguin 2005. At the National University of Colombia, Bogota, Colombia. **Project:** "Biology of mangroves", September-October 2005 (With Profa. Sanchez) (P.C. 3.2)

## INTERNATIONAL COURSES

1. 2005 - Lecturer in the international course for graduate students and researchers on "**Microbial biodiversity- applications and perspectives in industrial and environmental biotechnology**". Presented by Yoav Bashan together with Dr. E. Casamayor (Spain), Dr. B. Patel (Australia), Dr. J. Sulfita (USA), Dr. G. Ravot and Dr. B. Ollivier (France), Dr. K. Dos Santos and Dr J. Simoes (Brazil), Dr. M. Aguilar (Argentina). Financed by: ICGEB (Italy) and organized by unit of Sanitary and Environmental Biotechnology, Pontificia Universidad Javeriana, Bogota, and Institute of Water Research, Sanitary and Conservation of Water Resources, Universidad del Valle, Cali, Colombia. Presented at Pontificia Universidad Javeriana, Bogota, Colombia. October 24-28.10. 2005 (45 hours).
2. 2005- Lecturer in the international course "**Potencial biotecnológico de microorganismos en ecosistemas naturales y agroecosistemas**". Presented by Gina Holguin and other lecturers. Organizad by Jimena Sanchez Nieves of the Department of Biology, Faculty of Science, National University of Colombia, Bogota, Colombia. 19-24.9. 2005 (48 horas)

## **EXTERNAL PROJECTS (total:\$ 16,533.000.00)(1,488,000 U\$S)**

**1. 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 coimmobilizadas juntas en polimeros.**

Financiado por CONACYT-SEMARNAT

Monto: \$ 1'859.900.00

Duración: Tres años (2003-2006)

Participantes: Dr. Yoav Bashan, cDr. Luz Estela González, MC Juan Pablo Hernández

**2. 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)

Participantes: Dr. Yoav Bashan, cBiol. Bernardo Salazar, Dra M. Esther Puente, Dr. Macario Bacilio

**3. 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

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

**4. 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)

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

**5. Obtencion, caracterizacion y evaluacion de nuevas cepas de bacterias promotoras del crecimiento de las plantas para su empleo como inoculantes en la agricultura.**

Financiado por Mexico- Cuba-CONACYT

Monto: \$ 10,725.00

Duración: Tres años (2004-2006)

Responsable: Dr. Yoav Bashan

Participantes: Dra. Hilda Rodríguez (Cuba), Dra. Gina Holguin

**6. 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: Cinco años (2005-2010)

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

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

7. 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

Participante: Dr. Y. Bashan

8. Growth promoting bacteria associated with the environment and their effect on reforestation plants.

Financiado por subsecretaria de educacion superior, Mexico

Monto: \$ 501,000 (47,800 USD)

Duración: Tres años (2005-2007)

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

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

9. 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, cDra. Luz de-Bashan, Dra. E. Puente.

10. Microorganismos asociados al ecosistema del manglar. Colaboración Colombia-Mexico

Financiado por CONACYT, Mexico

Monto: ?

Duración: Dos años (2004-2005)

Responsable: Dra. G. Holguin

11. Flujo y reciclaje de nutrientes en manglares por bacterias colonizadoras de raíces e invertebrados que habitan los sedimentos- Aplicación del conocimiento en programas de reforestación de manglares. Colaboración México-Australia

Financiado por CONACYT, Mexico

Monto: ?

Duración: Un año (2005)

Responsable: Dra. G. Holguin

Participantes: Dr. M. Bacilio, Dr. N. Duke.

### **Staff and collaborations in 2005**

#### **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. cDr. Luz Gonzalez de-Bashan
2. M.Sc Juan-Pablo Hernández
3. M.Sc Vicente Verdugo (Until August 2005)
4. Biol. Mar. Patricia Vazquez
5. Biol. Nadia Geraldo
6. cBiol. Mar. Bernardo Salazar

### Students (Research)

1. **M.Sc.** Juan-Pablo Hernández- (2003-2005). **Graduated January 2005** (CICIMAR, IPN, La Paz, Mexico)
2. **Dr.** Ricardo Yabur (**D.Sc.**) - (2001-2005). **Graduated October 2005** (CICIMAR, IPN, La Paz, Mexico)
3. **M.Sc.** Ana Flores – (2003-2005). **Graduated November 2005.** (CIB, La Paz, Mexico)
4. M.Sc. Luz Gonzalez de-Bashan - **Ph.D.** Student since 2001 (Laval University, Quebec, Canada)
5. M.Sc. Barbara Gonzalez - **D.Sc.** Student since 2001(CIB, La Paz, Mexico)
6. M.Sc. Blanca Romero - **D.Sc.** Student since 2004 (CIB, La Paz, Mexico)
7. Eng. Luis Leyva - **M.Sc** student since 2003. (CIB, La Paz, Mexico)
8. Biol. Alfonso Davila- **M.Sc** student since 2004. (CIB, La Paz, Mexico)
9. Biol. Claudia Villicana – **M.Sc** student since 2004. (CIB, La Paz, Mexico)
10. cBiol. Mar. Manuel A. Rodríguez – **Licenciatura** Student since 2004 (UABCS, La Paz, Mexico)
11. cBiol. Mar. Yossef Lopez. **Licenciatura** Student since 2004 (UABCS, La Paz, Mexico).
12. cEng. Silke Fendrich. **Environmental Engineering** student since 2004 (Technical University of Hamburg-Harburg, Germany)
13. cBiochem. Eng. Delia de la Toba. **Professional Residency** since 2005 (Tecnologico de La Paz, La Paz, Mexico)
14. cBiol. Adan Trejo- **Licenciatura** Student since 2005 (UAM, Xochimilco, Mexico City)
15. Biol. Marion Macnair - **M.Sc** student since 2005 (University College of London, England)
16. cBiol. Elsa Samano. **Scientific summer of the Mexican Academy of Science** (ITSON, Cd. Obregon, Sonora, Mexico).
17. cEng. Clara Patron. **Scientific summer of the Mexican Academy of Science** (ITMAR, Mazatlan, Sinaloa, Mexico).
18. M.Sc. Paola Magallon – **Technical training** for Ph.D. studies (CIBNOR, La Paz, Mexico).
19. cBiol. Octavio Perez - **Technical training** (University of Guadalajara, Jalisco, Mexico).
20. M.Sc. Oscar Garcia - **Technical training** as part of doctoral studies (University of Queretaro, Queretaro, Mexico).

### 21. Group's administrator

cM.Sc. Rocio Villalpando.

### Local Collaborations in 2005 at CIB

1. Dr. Jose J. Bustillos- Pigments in inoculated plants and microalgae
2. Dr. Fernando García-Carreño – Enzymology and Biochemistry.
3. Ann Navarrete-Del-Toro – Enzymology.
4. Dr. Jose Luis Leon de la Luz – Field Botany.

### Foreign and national collaborations in 2005

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, University of Waterloo, (Canada), and Cuban Institute for Sugar By-Products, (Cuba), Molecular genetics of *Azospirillum*.
12. Dr. Jaime Polanía, National University of Colombia at Medellin (Colombia). Inoculation of mangrove seedlings with beneficial bacteria.
13. Prof. Jimena Sanchez, National University of Colombia, Bogota (Colombia). The use of plant growth promoting bacteria.
14. Dr. Volker Huss, University of Erlangen (Germany). Identification of Microalgae.
15. Dr. S.R. Prabhu, International Bio Recovery Corporation (Canada). Inoculant information from India.
16. Prof. Zvi Ha-Cohen, University of Ben Gurion in the Negev (Israel). Fatty acids from microalgae.
17. Dr. Horst Vierheilig. University of Agriculture and Science (Austria). Mycorrhizae of the endemic Cirio tree.
18. Dr. Bernard Bormann, USDA – Forest Service, Corvallis Oregon, (USA)- Rock weathering by plants.
19. Dr. Drona Kaplan. University of Ben Gurion in the Negev (Israel). Re-use of water in arid zone.
20. Dr. Ana Gonzalez. Mexican Petroleum Institute (Mexico). Restoration of mangroves.
21. Prof. Dr. Jutta Ludwig-Mueller, Technical University of Dresden, (Germany). Plant hormones and their regulation.