

The Group of "Environmental Microbiology"- CIBNOR

Final Productivity 2007

(Numbers in parenthesis near journal's name are the *scientific impact, 2006*)
(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" -	7
- Publications in national journals	3
- Submitted papers -	7
- Publications in books -	10
- Publications in websites -	1
- Presentations in conferences	15
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- Total productivity (without conferences) for 2007	28

- **Average "Impact Factor" of all published and "in press" papers: 2.05**

PUBLISHED AND "IN PRESS" PUBLICATIONS

PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Bashan, Y., Khaosaad, T., Salazar, B.G., Ocampo, J. A. Wiemken, A. Oehl, F. and Vierheilig, H. 2007. Mycorrhizal characterization of the boojum tree, *Fouquieria columnaris*, an endemic ancient tree from the Baja California Peninsula, Mexico. **Trees Structure and Function** **21**: 329-335 (**1.461**) (PC 6.2)
2. Yabur, R., Bashan Y., Hernández-Carmona G. 2007. Alginate from the macroalgae *Sargassum sinicola* as a novel source for microbial immobilization material in wastewater treatment and plant growth promotion. **Journal of Applied Phycology** **19**: 43-53. (**0.776**) (P.C. 6.2)
3. Flores-Mireles, A.L., S.C. Winans, and G. Holguín. 2007. Molecular Characterization of Diazotrophic and Denitrifying Bacteria Associated with Mangrove Roots. **Applied and Environmental Microbiology** **73**: 7308–7321. (**3.532**)
4. Strangmann, A., Bashan, Y. and Giani, L. 2007. Methane in pristine and impaired mangrove soils and its possible effect on establishment of mangrove seedlings. **Biology and Fertility of Soils** (**1.405**). (PC 6.2) (In Press)

5. de-Bashan, L.E., Antoun, H., and Bashan Y. 2007. Involvement of indole-3-acetic-acid produced by the microalgae growth-promoting bacterium *Azospirillum* spp. in growth promotion of *Chlorella vulgaris*. **Journal of Phycology** (2.58) (PC 6.2) (Accepted)
6. de-Bashan L.E., Trejo A., Huss V.A.R., Hernandez J.-P. and Bashan, Y. 2007. *Chlorella sorokiniana* UTEX 2805, a heat and solar-irradiance tolerant microalgae and its potential for wastewater treatment under extreme hot desert conditions. **Bioresource Technology** (2.018) (In press)
7. de-Bashan, L.E., Magallon, P., Antoun, H., and Bashan Y. 2007. Participation of glutamate dehydrogenase and glutamine synthetase in ammonium absorption by *Chlorella vulgaris* jointly immobilized with the microalgae growth-promoting bacterium *Azospirillum brasilense*. **Journal of Phycology** (2.58) (Accepted) (PC 6.2)

PUBLICATIONS IN NATIONAL JOURNALS

8. Bashan, Y., Puente, E., Romero, B., Li, C.Y., and de-Bashan, L.E. 2007. Mountain breakers. **Tzabar 13**: 2-11 (Cactus and Succulent Society of Israel). (P.C. 6.2)
9. Bashan, Y. 2007. Mangrove restoration in Baja California. **Blazing star 8** (3): 7-8. (Newsletter of the North American Native Plants Society) (P.C. 6.2)
10. Holguin, G. 2008. El lenguaje entre bacterias y plantas. **Ciencia** (In press) (PC 3.2)

PUBLICATIONS IN INTERNATIONAL BOOKS

11. Rodríguez, H., Fraga, R., Gonzalez, T., and Bashan, Y. 2007. Genetics of phosphate solubilization and its potential applications for improving plant growth-promoting bacteria. In: **First International Meeting on Microbial Phosphate Solubilization**. Velazquez-Perez, E.; Rodriguez-Barrueco, C. (Eds.) Series: Developments in Plant and Soil Sciences , Vol. 102. Springer, Dordrecht, The Netherlands. pp. 15-21. ISBN: 978-1-4020-4019-1 (PC 6.2)
12. de-Bashan L.E., and Bashan Y. 2007. Fertilizer potential of phosphorus recovered from wastewater treatments. In: **First International Meeting on Microbial Phosphate Solubilization**. Velazquez-Perez, E.; Rodriguez-Barrueco, C. (Eds.) Series: Developments in Plant and Soil Sciences , Vol. 102. Springer, Dordrecht, The Netherlands. pp. 179-184. ISBN: 978-1-4020-4019-1 (PC 6.2)

13. 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: **First International Meeting on Microbial Phosphate Solubilization**. Velazquez-Perez, E.; Rodriguez-Barrueco, C. (Eds.) Series: Developments in Plant and Soil Sciences , Vol. 102. Springer, Dordrecht, The Netherlands. pp. 185-192. ISBN: 978-1-4020-4019-1 (PC 6.2).
14. Bashan, Y., Puente M. E., de-Bashan L.E., and Hernandez J.-P. 2008. Environmental uses of plant growth-promoting bacteria. In: **Plant-Microbe interactions**. (Ed). E. Ait Barka and C. Clement. Research Signpost, Trivandrum, Kerala, India (In press) (PC 6.2)
15. Bashan, Y., de-Bashan, L.E. and Toledo G. 2008. Potential importance of mangrove-microbe interaction for conservation and restoration of mangroves in the arid environment, 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: International Society for Mangrove Ecosystems, Okinawa, Japan (commissioned paper). (PC 6.2)

PUBLICATIONS IN NATIONAL BOOKS

16. de-Bashan, L.E., Holguin, G., Glick, B.R. and Bashan, Y. 2007. Bacterias promotoras de crecimiento en plantas para propositos agricolas y ambientales. In: **Microbiologia agrícola: hongos, bacterias, micro y macrofauna, control biológico, planta-microorganismo**. (Eds.) Ferrera-Cerrato, R., and Alarcon, A. Chapter 8. Published by: Editorial Trillas, Mexico City, Mexico. pp. 170-224. (PC 6.2)
17. Holguin, G., and Bashan, Y. 2007. La importancia de los manglares y su microbiologia para el sostenimiento de las pesquerias costeras. In: **Microbiologia agrícola: hongos, bacterias, micro y macrofauna, control biológico, planta-microorganismo**. (Eds.) Ferrera-Cerrato, R., and Alarcon, A. Chapter 10. Published by: Editorial Trillas, Mexico City, Mexico. pp. 239-253. (PC 6.2)
18. Bethlenfalvay G.J., Bashan, Y., Carrillo-Garcia, A., and Stutz, J. 2007. Mycorrhizae as biological components of resource islands in the Sonoran desert. In: **Micorrizas arbusculares en ecosistemas áridos y semiáridos**. (Arbuscular micorrhizae in arid and semi-arid ecosystems). Montañó, N. M., Camargo- Ricalde, S. L., García-Sánchez, R., Monroy-Ata, A. (Eds). Published by: Mundi Prensa, the National Institute of Ecology-SEMARNAT, and the Autonomous Metropolitan University, Iztapalapa, Mexico. pp. 147-169. (PC 6.2)

19. Bashan, Y., de-Bashan, L.E., Hernandez, J.-P., Puente, M.E., Bacilio, M., and Leyva, L.A. 2007. 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: Plaza y Valdéz, Editores, Mexico City, Mexico (In press). (PC 6.2)
20. Bashan, Y. 2007. 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: Plaza y Valdéz, Editores, Mexico City, Mexico (In press). (PC 6.2)

PUBLICATIONS IN WEBSITES

21. Bashan Y., Hernandez J.-P., and Carrillo A. 2007. Device for producing very small polymer beads (100–200 µm). At: <http://www.bashanfoundation.org/bead.html>. 5 pages + PowerPoint presentation. (PC 6.2)

SUBMITTED PUBLICATIONS

PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Puente, M.E., Li, C.Y., and Bashan, Y. 2007. Endophytic bacteria in cacti seeds accelerate rock-weathering. **Applied and Environmental Microbiology** (3.532)
2. Puente, M.E., Li, C.Y., and Bashan, Y. 2007. Endophytic bacteria in cacti seeds are essential for development of cactus seedlings. **Applied and Environmental Microbiology** (3.532)
3. Leyva L.A., and Bashan Y. 2007. Effect of gluconic acid on its catabolic enzymes in *Azospirillum brasilense* associated with mesquite roots. **Plant Physiology and Biochemistry** (1.824).
4. Puente M.E., and Bashan Y. 2007. Survival and pH reduction capacity of rock-weathering, plant growth-promoting bacteria in slurries of rocky substrates. **Geomicrobiology Journal** (1.886).
5. Lopez, B.R., Bashan, Y., Bacilio, M., De la Cruz-Agüero, G. 2007. Patterns of abundance of the endemic rock dwelling cactus *Mammillaria fraileana* related to the rock composition in the southern Sonoran desert. **Oecologia** (3.333)
6. de-Bashan, L.E., and Bashan, Y. 2007. Polymer-immobilized microalgae for removal of pollutants- a review. **Bioresource Technology** (2.018)

7. Hernandez, J.-P., de-Bashan, L.E., Rodriguez, D.J., Rodriguez, Y., and Bashan, Y. 2007. Growth promotion of *Chlorella vulgaris* by the nitrogen fixing, plant growth-promoting bacterium *Bacillus subtilis* of arid land origin. **European Journal of Soil Biology** (0.985)

PRESENTATIONS IN CONFERENCES

1. Hernández Sánchez J-P. 2007. Fitoremediación. Microalgas para el tratamiento de agua residual. **Special seminal** in: Facultad de ciencias, Programa de Biología, Universidad del Bosque. 16.1.2007. Bogota, Colombia. **(Invited Speaker)**
2. Hernández Sánchez J-P. 2007. Trascendencia de "el estero de San Jose del Cabo" en el entorno del municipio de los Cabos. Casos de éxito en conservación. In: **Primer Foro de análisis "El estero de San Jose del Cabo"**. Organized by ITES Los Cabos, 24.2.2007. San Jose del Cabo, Mexico. **(Invited Speaker)**
3. de-Bashan, L.E. 2007. Metabolismo del amonio, acoplado con ácido indolacético en la microalga *Chlorella vulgaris* cuando esta coimmobilizada con la bacteria promotora de crecimiento en microalgas *Azospirillum brasilense*. **Special seminal** in: Grupo de Microalgas, Departamento de Biología, 14.3.2007. Universidad Nacional de Colombia, Bogotá, Colombia. **(Invited Speaker)**
4. de-Bashan, L.E. 2007. Utilización de bacterias promotoras de crecimiento en plantas para recuperar suelos desérticos erosionados. **Special seminal** in: Facultad de Agronomía, Universidad Nacional de Colombia, Bogotá, Colombia. **(Invited Speaker)**
5. Hernández-Carmona G., Yabur, R., Bashan Y., 2007. Alginate from the macroalgae *Sargassum sinicola* as a novel source for microbial immobilization in wastewater treatment and plant growth promotion. In: **29th International Seaweed Symposium**. March 26-31, 2007, Kobe, Japan.
6. Rueda-Puente, E.O., Muñoz-Salazar, R., Hernandez, J.P., Puente, E., Gonzalez de-Bashan, L.E., Bashan, Y., Tarazon-Herrera, M.A., Barron-Hoyos, J.M. 2007. Por un uso racional de los recursos naturales y protección del medio ambiente en el noroeste de México". In: **6th International and 12th National Congresses of Environmental Sciences**. Chihuahua, Chih. Mexico, 6-8 June, 2007.
7. Bacilio, M., and Bashan, Y. 2007. Reduction of salt stress in chili plantlets by the synergic action of *Azospirillum lipoferum* and humic acids. In: **Rhizosphere II**. 26-31.8.2007. Montpellier, France.
8. Vanegas-Guerrero J., Bacilio M., Sánchez-Nieves J., Holguín G. 2007. Hormonal Interplay between plant growth promoting bacteria and plants grown under saline stress. In: **Rhizosphere II**. 26-31.8.2007. Montpellier, France.

9. Bashan Y. and de-Bashan L. E. 2007. *Azospirillum* and microalgae: a convenient model for basic studies of plant-bacterium interactions. In: ***Azospirillum VII and related PGPR International workshop***. August 31-September 1, 2007. Montpellier, France (**Key-note speaker**). p. 16.
10. de-Bashan L. E., Hernandez J.-P., and Bashan Y. 2007. *Azospirillum brasilense* as an enhancer of wastewater treatment with the microalgae *chlorella* spp., a novel biotechnological application. In: ***Azospirillum VII and related PGPR International workshop***. August 31-September 1, 2007. Montpellier, France (**invited speaker**). p. 10.
11. Bashan Y., Puente E., Salazar B., and Bacilio M. 2007. *Azospirillum* as a "team player" in preventing and restoring desert soil erosion. In: ***Azospirillum VII and related PGPR International workshop***. August 31-September 1, 2007. Montpellier, France. p. 33.
12. de-Bashan, L.E., Antoun, H., Magallon, P., and Bashan Y. 2007. Enhancement of microalgal physiological traits induced by *Azospirillum* spp. In: ***Azospirillum VII and related PGPR International workshop***. August 31-September 1, 2007. Montpellier, France. p. 54.
13. Bashan, Y. and Puente, M.E. 2007. The use of plant growth-promoting microorganisms for restoring desert vegetation and prevent soil erosion. 11th Argentinean Congress of Microbiology. October 10–12, 2007. Cordoba, Argentina (**Plenary lecture**).
14. de-Bashan, L.E. and Bashan Y. 2007. *Azospirillum* and green microalgae: a convenient model for basic studies of plant-bacterium interactions. In: First International Workshop in *Azospirillum*: Cell Physiology, Plant Response and Agronomic Research in Argentina 2007. October 12-13, 2007. Córdoba, Argentina. (**Invited Lecture**). p. 11.
15. de-Bashan, L.E., Hernandez, J.-P., and Bashan, Y. 2007. Microalga growth-promoting bacteria: a new venue for wastewater treatment and restoring eroded soils. 11th Argentinean Congress of Microbiology. 10–12.10. 2007. Cordoba, Argentina. (**Invited Lecture**)

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)

INTERNATIONAL COMMUNITY SERVICES AND SCIENTIFIC RECOGNITION

1. **Academic promotion** - Promotion to the academic rank of "Professor-Researcher level "E". (equivalent to a "Senior Distinguished Professor", highest academic level in Mexico) (Yoav Bashan).
2. **Nomination as Editorial Board Member:** Annals of Microbiology (2007-2009) (Italy); International Journal of Molecular Sciences (2007-2009) (Switzerland) (Yoav Bashan).

- 3. Member of the Scientific Committee of an international conference:** *Azospirillum* VII and related PGPR: molecular ecology, plant responses and agronomic significance. Montpellier, France, August 31- September 1, 2007 (Yoav Bashan).
- 4. Evaluator of an international award.** Evaluator of the international award in Applied Microbiology “Elizabeth Grose” that was presented at the 6th Simposio Latinoamericano de Biodeterioro y Biodegradacion. Bogota, Colombia, May 1-4, 2007 (Luz de-Bashan).
- 5. Evaluator of an institute.** Invited as an expert and member of an external evaluation committee of “El Colegio de la Frontera Sur”, Chiapas, Mexico. 2007-2009. (Yoav Bashan)
- 6. Chairman of a scientific session in a conference:** *Azospirillum* VII and related PGPR: molecular ecology, plant responses and agronomic significance. Montpellier, France, August 31- September 1, 2007 (Yoav Bashan).
- 7. Guest editor of a scientific journal.** 2007-2008. European Journal of Soil Biology. Special issue: *Azospirillum* and related PGPR. (Joint position with Prof. A. Hartmann, Germany).

6. Revision of manuscripts for national and International Journals and funding agencies: Total: 50

Name of reviewer	Name of the journal/agency	Country	Number of manuscripts
Yoav Bashan	Applied and Environmental Microbiology	USA	2
	Molecular Plant-Microbe Interactions	USA	1
	Journal of Environmental Management	USA	1
	Molecules	USA	1
	Desalinization	USA	1
	FEMS Microbiology Ecology	UK	1
	Bioresource Technology	UK	1
	Plant and Soils	The Netherlands	3
	European Journal of Plant Pathology	The Netherlands	1
	European Journal of Soil Biology	The Netherlands	1
	Antonie van Leeuwenhoek International Journal of General and Molecular Microbiology	The Netherlands	1
	Biology and Fertility of Soils	Germany	8
	Microbial Ecology	Germany	2
	Journal of Applied Phycology	Australia	2
	Canadian Journal of Microbiology	Canada	1
	Annals of Microbiology	Italy	1
	Food Technology and Biotechnology	Croatia	1
	Polish Journal of Environmental studies	Poland	1
	Revista Agrocienca	Mexico	2
	Revista Latinoamericana de Microbiologia	Mexico	2
	Interciencia	Venezuela	1
	Journal of Zhejiang University-Science B	P.R. China	1
National Science Foundation	USA	1	
CONACYT-Basic grants	Mexico	2	
Luz de-Bashan	FEMS Microbiology Ecology	UK	2
	Annals of Microbiology	Italy	1
	Biochemical Engineering Journal	The Netherlands	1
	Applied Microbiology and Biotechnology	The Netherlands	1
	European Journal of Soil Biology	The Netherlands	3
	Fresenius Environmental Bulletin	Germany	1
	Premio de Microbiologia Aplicada "Elizabeth Grose"	Colombia	2

TEACHING

Dr. M. Bacilio. Plant Physiology course for M.Sc students. In: Centro de investigaciones Biológicas del Noroeste, La Paz, Mexico.

EXTERNAL PROJECTS (total:\$14,284,000)(1,300,000 U\$\$) (11.00 pesos=1 USD).

1. 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 (2007-2009).

Responsable: Dr. Yoav Bashan

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

2. 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 coimmobilizadas.

Monto: \$1,800,000.00; 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

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. 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 Zehffus, Juan A Larrinaga Mayoral, M.Sc. Vicente Verdugo, Hector J. García Monarrez (UABCS).

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: 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)

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

Financiado por Comisión 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, MC. J.P. Hernandez.

Staff and collaborations in 2007

Researchers (full time)

1. Dr. Yoav Bashan
2. Dra. Esther Puente (On sick-leave January-May 2007)
3. Dr. Macario Bacilio
4. Dra. Gina Holguin (Passed away, July 2007)

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. Guadalupe Lopez (Until August 2007)

Students (Research)

1. Claudia Villicana – **M.Sc. Graduated July 2007**. (CIBNOR, La Paz, Mexico) (Director: Dra. Gina Holguin)
2. Javier Vanegas. **M.Sc. Graduated July 2007** (The National University of Colombia, Bogota, Colombia). (Director: Dra. Gina Holguin).
3. Alfonso Davila- **M.Sc. Graduated July 2007**. (CIBNOR, La Paz, Mexico) (Director: Dra. Gina Holguin)
4. Emiro Ortiz – **Agricultural engineering. Graduated February 2007** (The National University of Colombia, Bogota, Colombia) (Directors: Dra. Esther Puente and Dr. Yoav Bashan)
5. Yaneth Rodríguez - **Agricultural engineering. Graduated September 2007** (The National University of Colombia, Bogota, Colombia) (Directors: Dra. Luz de-Bashan and Dr. Yoav Bashan).
6. M.Sc. Blanca Romero - **D.Sc.** Student since 2004 (CIBNOR, La Paz, Mexico) (with Dr. Yoav Bashan and Dr. Macario Bacilio).
7. Biol. Alejandra Vovides. – **D.Sc.** Student since 2004 (Instituto de Ecología, Xalapa, Mexico). (with Dr. Yoav Bashan).
8. M.Sc. Paola Magallon – **Ph.D.** student since 2006 (Laval University, Quebec, Canada). (with Dr. Yoav Bashan and Dr. Hani Antoun).
9. Biol. Octavio Perez. **M.Sc** student since 2006 (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan)
10. Biol. Tanya Galindo. **M.Sc** student since 2006 (The National University of Colombia, Bogota, Colombia) (with Dra. Gina Holguin).
11. Biol. Adan Trejo. **M.Sc** student since 2007 (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan)

12. cBiol. Mar. Manuel A. Rodríguez – **Licenciatura** student since 2004 (UABCS, La Paz, Mexico) (with Dra. Gina Holguin)
13. cAgron. Cristina Velásquez - **Licenciatura**. Since 2006 (The National University of Colombia, Bogota, Colombia) (with Dra. Luz de-Bashan and Dr. Yoav Bashan).
14. cBiol. Johana Rodríguez - **Licenciatura**. Since 2006 (The University of Tolima, Ibague, Colombia) (with M.Sc. Juan-Pablo Hernandez and Dr. Yoav Bashan).
15. cEng. Biotechnol. Denisse Covarrubias - **Licenciatura**. Since 2006 (Technical Institute of Sonora, Ciudad Obregon, Sonora, Mexico) (with Dr. Macario Bacilio)
16. cEng. Biotechnol. Patricia Castellón - **Licenciatura**. Since 2006 (Technical Institute of Sonora, Ciudad Obregon, Sonora, Mexico) (with Dr. Macario Bacilio).
17. Lizeth Villanueva. **Verano científico**. July-August 2007. Universidad de Occidente, Unidad Guasave, Sinaloa. (with Dr. Macario Bacilio)

Group's administrator

cM.Sc. Rocio Villalpando.

Foreign and national collaborations in 2007

1. Dr. C.Y. Li, USDA – Forest Service, Corvallis Oregon, (USA)- Rock weathering by plants.
2. Ing. B. Liao, Eng. He Xuexiang, and cDr. M. Li, Tropical Forestry Research Institute, Goangzhou, PRC (China). Inoculation of mangroves with plant growth promoting bacteria.
3. Prof. Hani Antoun. Laval University, Quebec (Canada). Water Bioremediation.
4. Prof. Raina M. Maier, University of Arizona (USA). Desert re-vegetation of mine tailings.
5. Dr. Humberto Suzan. University of Queretaro (Mexico). Mesquite enzymology and ecology.
6. Dr. Guadalupe Malda. University of Queretaro (Mexico). Conservation of rare cacti.
7. Prof. Jimena Sanchez, National University of Colombia, Bogota (Colombia). The use of inoculants for plant growth promoting bacteria.
8. Dr. Volker Huss, University of Erlangen (Germany). Identification of Microalgae.
9. Dr. S.R. Prabhu, International Bio Recovery Corporation (Canada). Inoculant information from India.
10. Prof. Zvi Ha-Cohen, University of Ben Gurion in the Negev (Israel). Fatty acids from microalgae.
11. Dr. Horst Vierheilig. University of Agriculture and Science (Austria). Mycorrhizae of the endemic Cirio tree.
12. Dr. Bernard Bormann, USDA – Forest Service, Corvallis Oregon, (USA)- Rock weathering by plants.

13. Dr. Drora Kaplan. University of Ben Gurion in the Negev (Israel). Re-use of water in arid zone.