CURRICULUM VITAE
Gary E. Harman

Professional Preparation

Postdoctoral Associate (Plant Pathology), North Carolina State University 1969-70
Ph. D. Plant Pathology, Oregon State University, 1970
B.S. Botany, Colorado State University, 1966

Fields of Specialization

Biological control systems, plant-microbe interactions, pollution remediation, molecular biology and genetics of fungi

Academic Appointments

Professor, joint appointment, Department of Horticultural Sciences and Department of Plant Pathology, New York State Agricultural Experiment Station, Cornell University, 1989-present.
Professor, Department of Horticultural Sciences, New York State Agricultural Experiment Station, Cornell University, 1984-1989.
Chairman or Acting Chairman, Department of Horticultural Sciences, New York State Agricultural Experiment Station, Cornell University, 1981, 1983-1985.
Associate Professor, New York State Agricultural Experiment Station, Cornell University, 1976-1983
Assistant Professor, New York State Agricultural Experiment Station, Cornell University, 1970-1976

Entrepreneurial Roles

BioWorks, Inc., Geneva, NY markets biological products for control of plant diseases and increased plant productivity.

- Co-principal inventor.
- Consultant in development of proprietary technology.
- Cofounder.
- Various management roles including Acting CEO.

Phytobials, LLC and LTD; sister companies in the US and Europe that intend to become global providers of unique, low cost, and green microbial-plant remediation systems.

- Co-principal inventor
- Cofounder, with responsibilities for securing funding, arranging for collaborations with other academic and corporate partners and providing major input into company structure and the business plan.

Advanced Biological Marketing, a company that markets and produces microbial products for the row crop (e.g., maize and soybeans) market.

- Inventor of key technologies
- Consultant

Biomarinex, a company that is seeking to market N-acetylglucosamine as a nutriceutical.

- Co-principal inventor
- Co-developer of scale-up systems and funding opportunities.

Current Cornell Assignments

Provost's Life Sciences Advisory Council
Scientific Advisory Board, Cornell Biotechnology Program

Professional Societies and Duties

American Phytopathological Society

American Association for the Advancement of Science

Honors and Awards
Fellow, American Phytopathological Society; Award of Merit in Plant Pathology, American Phytopathological Society, NE Div.; Visiting Professor, Colorado State University; Visiting Professor, Agricultural University of Norway.

Responsibilities
Research (100%)

PUBLICATIONS

Books: 2 (one in two volumes)
Refereed Journal Articles: 113
Review and Book Chapters: 32
Patents: 14

Publications since 1998
Books:
Kubicek, C. P. and Harman, G. E. 1998. *Trichoderma and Gliocladium, Basic Biology, Taxonomy and Genetics*, Vol. 1. Taylor & Francis, London 278 pg.
Harman, G. E. and Kubicek, C. P. 1998. *Trichoderma and Gliocladium, Enzymes, Biological Control and Commercial Applications*, Vol. 2. Taylor & Francis, London 393 pg.
Vurro, M., Gressel, J., Butt, T., Haman, G. E.,.Pilgeram, A., St. Ledger, R. J. and Nuss, D. L. 2001. *Enhancing Biocontrol Agents and Handling Risks*. IOS Press, Amsterdam. 295 pg.
Articles
Lo, C-T, Nelson, E. B, and Harman, G. E. 1998. Ecological studies of transformed *Trichoderma harzianum* strain 1295-22 in the rhizosphere and on the phylloplane of creeping bentgrass. Phytopathology 88:129-136.
Björkman, T., Blanchard, L., and Harman, G. E. 1998. Growth enhancement of shrunken-2 sweet corn by *Trichoderma harzianum* KRL-AG2: Effect of environmental stress. J. Am. Soc. Hort. Sci. .123:35-45.
Lorito, M., Woo, S. L., Fernandez, I. G., Colucci, G., Harman, G. E., Pintor-Toro, J. A., Fillipone, E. Muccifora, S., Lawrence, C. B., Zoina, A., Tuzun, S., and Scala, F. 1998. Genes from mycoparasitic fungi as a source for improving plant resistance to fungal pathogens. Proc. Natl. Acad. Sci., USA 95:7860-7865.
Woo, S. L., B. Donzelli, B., Scala, F., Mach, R., Harman, G. E., Kubicek ,C. P., Del Sorbo, G., and Lorito, M. 1999. Disruption of *ech42* (endochitinase-encoding) gene affects biocontrol activity in *Trichoderma harzianum* strain P1. Molec. Plant Microbe Interact. 12:419-429.
Altomare, C., Norvell, W. A., Björkman, T. and Harman, G. E. 1999. Solubilization of phosphates and micronutrients by the plant-growth promoting and biocontrol fungus *Trichoderma harzianum* Rifai strain 1295-22. Appl. Environ. Microbiol. 65: 2926-2933.
Wong, K-W, Harman, G. E., Norelli, J. L., Gustafson, H. L. and Aldwinckle, H. S. 1999.Chitinase-transgenic lines of 'Royal Gala' apple showing enhanced resistance to apple scab. Acta Hort. 484: 595-599.
Bolar, J. P., Norelli, J. L., Wong, K-W, Hayes, C. K., Harman, G. E. and Aldwinckle, H. S. 2000. Expression of endochitinase from *Trichoderma harzianum* increases resistance to apple scab and reduces vigor. Phytopathology 90:72-77.
Harman, G. E. 2000. The myths and dogmas of biocontrol. Changes in perceptions derived from research on *Trichoderma harzianum* T-22. Plant Disease 84:373-393.
Kovach, J., Petzoldt, R and Harman, G. E. 2000. Using honey bees and bumble bees to disseminate *Tirchoderma harzianum* 295-22 to strawberries for *Botyrtis* control. Biol. Contr. 18: 235-242.

Donzelli, B. G. G., Lorito, M., Scala, F. and Harman, G. E. 2001. Cloning, sequence and structure of an gene encoding an antifungal glucan 1,3-β-glucosidase from *Trichoderma atroviride* (*T. harzianum*). Gene 277: 199-208.

Bolar, J. P., Norelli, J. L., Harman, G. E., Brown, S. K. and Aldwinckle, H. S. 2001. Synergistic activity of endochitinase and exochitinase from *Trichoderma atroviride* (*T. harzianum*) against the pathogenic fungus *Venturia inaequalis* in transgenic apple plants. Transgen. Res. 10:533-543.

Donzelli, B. G. G. and Harman, G. E. 2001. Interaction of ammonium, glucose and chitin regulates the expression of cell wall-degrading enzymes in *Trichoderma atrovir*ide strain P1. Appl. Environ. Microbiol. 67:5463-5647.

Ali, G. S., Harman, G. E., Reisch, B. I. 2003. The interaction of endochitinase, a synthetic peptide and resveratrol in controlling fungi in vitro. Eur. J. Plant Pathol. 109:639-644.

Donzelli, B. D. D., Ostroff, G. and Harman, G. E. 2003. Enhanced enzymatic hydrolysis of langostino shell chitin with mixtures of enzymes from bacterial and fungal sources. Carboh. Res. 338:1823-1833.

Harman, G. E., Petzoldt, R., Comis, A., Chen, J. 2004. Interactions between *Trichoderma harzianum* strain T22 and maize inbred line Mo17 and effects of this interaction on diseases caused by *Pythium ultimum* and *Colletotrichum graminicola*. Phytopathology 94:147-153.

Harman, G. E., Howell, C. R., Viterbo, A., Chet, I., Lorito, M. 2004. *Trichoderma* spp.—opportunistic avirulent plant symbionts. Nature Microbiol. Rev. 2:43-56.

Harman, G. E., Lorito, M. and Lynch, J. M. 2004 Uses of *Trichoderma* spp. to alleviate or remediate soil and water pollution. Adv. Appl. Microbiol. (accepted for publication).

Review Articles and Book Chapters

Harman, G. E. and Björkman, T.. 1998. Potential and existing uses of *Trichoderma* and *Gliocladium* for plant disease control and plant growth enhancement. p. 229-265. In Harman, G. E. and Kubicek, C. P. (eds), *Trichoderma and Gliocladium*. Vol. 2. Taylor & Francis, London.

Harman, G. E., Hayes, C. K., and Ondik, K. L. 1998. Asexual genetics in *Trichoderma* and *Gliocladium*: Mechanisms and implications. p. 243-270. In Kubicek, C. P. and Harman, G. E. (eds), *Trichoderma and Gliocladium*. Vol. 1. Taylor & Francis, London.

Harman, G. E. 2000. Controlling plant pathogens and improving plant growth and productivity with biologicals. p. 101-110. In Copping, L. G. (ed.). Predicting Field Performance in Crop Protection.. British Crop Protection Council Symposium Proceeding no. 74.

Harman, G. E., & Donzelli, G. G. B. 2001. Enhancing crop performance and pest resistance with genes from biocontrol fungi. P. 114-125. In M. Vurro, Gressel, J., Butt, T., Harman, G., Pilgeram, A., St. Ledger, R J. and Nuss, D. L. (Eds.), Enhancing Biocontrol Agents and Handling Risks. Amsterdam: IOS Press.

Harman, G. E. 2001. Microbial tools to improve crop performance and profitability and to control plant diseases.p. 71-84. In D. D.-S. Tzeng (Eds.), Proceedings of International Symposium on Biological Control of Plant Diseases for the New Century--Mode of Action and Application Technology. Taichung City, Taiwan: National Chung Hsing University.

Patents issued

Harman, G. E., Tronsmo, A., Hayes, C. K., Lorito, M. and Klemsdahl, S. Gene encoding endochitinase. US patent 6,020,540 issued Feb. 1, 2000.

Broadway, R. M. and Harman, G. E. Fungus and Insect Control with Chitinolytic Enzymes, US patent 6,029,299 issued May 30, 2000.

Harman, G. E., Broadway, R. M., Tronsmo, A., Lorito, M., Hayes, C. K. and DiPietro, A. Purified chitinases and use thereof. US Patent 6,251,390, issued June 26, 2001.

Harman, G. E., Lorito, M., Di Pietro, A., Hayes, C. K., Scala, F. and Kubicek, C. P. 2003. Combinations of fungal cell degrading enzyme and fungal cell membrane affecting compound. US Patent 6,512,166, issued Jan. 28, 2003.