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E-mail: Crowley@ucr.edu
- Education:** B.S. 1979 University of Kentucky - Agriculture
M.S. 1981 University of Kentucky - Horticulture
Ph.D. 1986 Colorado State University - Forest and Wood Science
Interdisciplinary Program in Cell and Molecular Biology
- Employment:** Professor, Soil Microbiology
University of California, Riverside, CA 2000 - Present
- Associate Professor, Soil Microbiology
University of California, Riverside, CA 1997 - 2000
- Assistant Professor, Soil-Plant Relations
University of California, Riverside, CA 1990 - 1997
- Postdoctoral Research Associate
University of Texas at Austin, Austin, TX 1988 - 1990
University of Florida, Gainesville, FL 1986 - 1988
- Research:** Microbial ecology. Bioremediation and use of plant microbial systems for degradation of organic soil contaminants. Trace metal nutrition of plants and microorganisms.
- Teaching:** Environmental Quality ENSC 2
Soil Conditions and Plant Growth SLSC 134
Soil Ecology SLSC 120
Microbial Ecology MCBL 211
- Interdepartmental Program in Microbiology
Interdepartmental Program in Environmental Toxicology
Interdepartmental Program in Environmental Sciences
Cooperating Faculty Member College of Engineering
- Patents:** Method for biodegradation of polychlorinated biphenyl compounds.
Patent 5,968,360 Oct. 19, 1999
- Awards:** B.F. Goodrich National Collegiate Inventors Program
Student Advisor Winner - 1996 All Collegiate Competition
- J. Environ. Quality Editor's Citation for Excellence in Manuscript Review 1997
- Fulbright Senior Specialist, University of Sao Paulo, Brazil, October 2007

Publications:**Edited Books**

1. Manthey, J.A., D.E. Crowley, and D.G. Luster. 1993. *Biochemistry of Metal Micronutrients in the Rhizosphere*. Lewis Publishers, Ann Arbor, MI. 392 pg.

Book Chapters (Last 5 Years):

7. Crowley, D.E. and Z. Rengel. 1999. Biology and chemistry of nutrient availability in the rhizosphere. In: Z. Rengel. (ed.) *Mineral Nutrition of Crops: Fundamental Mechanisms and Implications*. Haworth Press, NY. p. 1-40.
8. Crowley, D.E., E.S. Gilbert, A. Singer, D. Newcombe, and C-H. Yang. 1999. Bioremediation of organic contaminants using repeated applications of xenobiotic degrading bacteria. In: R. Fass, Y Flashner, and S. Reuveny (eds.) *Novel Methods for Bioremediation of Organic Pollution*. Plenum Press. NY. p. 273-284.
9. Crowley, D.E. 2000. Function of microbial siderophores in the plant rhizosphere. In: R. Pinton, Z. Varanini, and P. Nannipieri (eds.) *Biochemistry and Role of Organic Substances at the Soil Plant Interface*. Marcel Dekker, Inc. p. 223-261.
10. Crowley, D.E., A. Singer, and E. Luepromchai. 2000. Cometabolism of xenobiotics in the plant rhizosphere. In: R.E. Hoagland and R.M. Zablotowitz (eds.) *Pesticide Biotransformations in Plants and Microorganisms: Similarities and Divergences*. Am. Chem. Soc., Washington, D.C. p. 333-352.
11. Newcombe, D.A. S.N. Bradley, T.B. Hammill, D. E. Crowley, and R. L. Crawford. 2000. Biodegradation of agricultural chemicals. In: C.J. Hurst (ed.) *Manual of Environmental Microbiology*. 2nd ed. Am. Soc. Microbiol. Press. Wash. DC. p. 1038-1048.
12. Crowley, D.E. and S. Alvey. 2002. Influence of pH on soil microbial processes. In: Z. Rengel (ed) *Handbook of Plant Growth*. Marcel Dekker, Inc., New York. pp. 351-382.
13. Crowley, D.E. and R.S. Dungan. 2002. Microbial processes affecting metals. In: Gabriel Bitton (ed.) *Encyclopedia of Environmental Microbiology*. Wiley Press, New York. p. 1878-1893.
14. Crowley, D.E. 2005. In: L. Barton and J. Abadia. *Microbial siderophores in the plant rhizosphere. Iron Nutrition in Plants and Rhizospheric Microorganisms*. Springer, NY. p 169-198.

Peer Reviewed Journal Articles (Last 5 Years):

48. Fan, T.W.M., A.N. Lane, M. Shenker, J.P. Bartley, D.E. Crowley, and R.M. Higashi. 2001. Comprehensive chemical profiling of gramineous plant root exudates using high-resolution NMR and MS. *Phytochem.* 57:209-221.
49. Alvey, S., C-H. Yang, A. Buerkert, and D.E. Crowley 2003. Crop rotation effects on rhizosphere bacterial community structure in West African soils. *Biol. Fert. Soils.* 37: 73-82.
50. Yang, C-H, D.E. Crowley, J. Borneman, and N.T. Keen. 2001. Microbial phyllosphere populations are more complex than anticipated. *Proc. Nat. Acad. Sci.* 98:3889-3894.
51. Marschner, P., C.-H. Yang, R. Lieberei, D.E. Crowley. 2001. Soil and plant specific effects on bacterial community composition in the rhizosphere. *Soil Biol. Biochem.* 33:1437-1445.

52. Ibekwe, A.M., S.K. Papiernik, J. Gan, S.R. Yates, C-H. Yang, and D.E. Crowley. 2001. Impact of fumigants on soil microbial communities. *Appl. Environ. Microbiol.* 67: 3245-3257.
53. Shenker, M., T.W.M. Fan, and D.E. Crowley. 2001. Phytosiderophore influence on cadmium uptake by wheat and barley plants. *J. Environ. Qual.* 30:2091-2098.
54. Ibekwe, M., S. Papiernik, J. Gan, S.R. Yates, D.E. Crowley, C.H. Yang. 2001. Microcosm enrichment of 1,3-dichloropropene degrading soil microbial communities in a compost-amended soil. *J. Appl. Microbiol.* 91: 668-676
55. Lin, E. and D.E. Crowley. 2001. Duration of lag phase of *Pseudomonas fluorescens* 2-79RL starved in isolation or in the presence of soil microorganisms. *Soil Biol. Biochem.* 19: 2005-2010.
56. Marschner, P., D.E. Crowley and R. Lieberei. 2001. Arbuscular mycorrhizal infection changes the bacterial 16S rDNA community composition in the rhizosphere of maize. *Mycorrhiza* 11:297-302.
57. Ibekwe, A.M., A.C. Kennedy, P.S. Frohne, S.K. Papiernik, C-H. Yang, and D.E. Crowley. 2002. Microbial diversity along a transect of agronomic zones. *FEMS Microbiol. Ecol.* 39:183-191
58. Steddom, K., J.A. Menge, D.E. Crowley, and J. Borneman. 2002. Effect of repetitive applications of the biocontrol bacterium *Pseudomonas putida* 06909-rif/nal on citrus soil microbial communities. *Phytopathology* 92:857-862.
59. Luepromchai, E., A.C. Singer, C-H. Yang, and D.E. Crowley. 2002. Interactions of earthworms with indigenous and bioaugmented PCB degrading bacteria. *FEMS Microbiol. Ecol.* 41:191-197.
60. Valinsky, L., G.D. Vedova, A. Scupham, S. Alvey, A. Figueroa, B. Yin, R.J. Hartin, M. Chrobak, D.E. Crowley, T. Jiang, and J. Borneman. 2002. Analysis of microbial community composition using oligonucleotide fingerprinting of ribosomal RNA genes. *Appl. Environ. Microbiol.* 68:3243-3250.
61. Singer AC, C.S Wong, and D.E. Crowley. 2002. Differential enantioselective transformation of atropisomeric polychlorinated biphenyls by multiple bacterial strains with different inducing compounds. *Appl. Env. Microbiol.* 68: 5756-5759.
62. Wang, Z, A.C. Chang, L. Wu, and D.E. Crowley. 2003. Assessing the soil quality of long-term reclaimed wastewater irrigated cropland. *Geoderma* 114:261-278.
63. Cho, Y.S., J.S. Kim, D.E. Crowley, B.G. Cho. 2003. Growth promotion of the edible fungus *Pleurotus ostreatus* by fluorescent pseudomonads. *FEMS Microbiol. Lett.* 218:271-276.
64. Singer, A.C., D.E. Crowley, and I.P. Thompson. 2003. Secondary plant metabolites in microbial mediated remediation and biotransformation. *Trends in Biotechnology* 21:123-130.
65. Singer, A.C., D. Smith, W. Jury, K. Hathuc, and D.E. Crowley 2003. Impact of the plant rhizosphere and augmentation on remediation of polychlorinated biphenyl contaminated soil. *Environ. Toxicol. and Chem.* 22: 1998-2003.
66. Yang, Y.J., R.S. Dungan, A.M. Ibekwe, C. Valenzuela, D.M. Crohn, and D.E. Crowley. 2003. Effect of organic mulches on soil bacterial communities one year after application. *Biol. Fert. Soils.* 38:273-281.
67. Gan, J., Y. Zu, C. Wilen, D. Pittenger, and D.E. Crowley. 2003. Effect of planting covers on herbicide persistence in landscape soils. *Env. Sci. Technol.* 37:2775-2779.

68. Wang, A., J. Chen, and D.E. Crowley. 2004. Changes in metabolic and structural diversity of a soil bacterial community in response to cadmium toxicity. *Biol Fert. Soils*. 39:452-456.
69. Marschner P., D.E. Crowley, and C-H. Yang. 2004. Development of specific rhizosphere bacterial communities in relation to plant species, nutrition and soil type. *Plant and Soil*. 26:199-208.
70. Lee, S, J. Gan, J-S. Kim, and D.E. Crowley. 2004. Microbial transformation of pyrethroid insecticides in aqueous and sediment phases. *Environ. Toxicol. and Chem*. 23:1-6.
71. Park, J.W., and D.E. Crowley. 2005. Normalization of DNA extraction for accurate quantification of target genes by real-time PCR and DGGE. *Biotechniques*. 38:579-586.
72. Wang, A. and D.E. Crowley. 2005. Global gene expression responses to cadmium toxicity in *Escherichia coli*. *J. Bacteriol*. 187:3259-3266.
73. Smith, D.A., S. A. Alvey, and D.E. Crowley. 2005. Cooperative catabolic pathways within an atrazine-degrading enrichment culture isolated from soil. *FEMS Microbiol. Ecol*. 53:265-273.
74. Tam, K, C-H. Yang, D.E. Crowley, M.R. Matsumoto, and J.D. Sheppard. 2005. Comparison of PCR-DGGE and selective plating methods for monitoring the dynamics of a mixed culture population in synthetic brewery wastewater. *Biotechnol. Progress*. 21:712-719.
75. Alvey, S.A., C-H. Yang, A. Buerkert, and D.E. Crowley. 2005. Bacterial ecology of ancient Saharan salt enrichment ponds at Teguidda-n-Tessoumt. *J. Plant Nutrition and Soil Science*. 168:489-495.
76. Kwon, S.W. Kim, J-S, D.E. Crowley, C-K Lim. 2005. Phylogenetic diversity of fluorescent pseudomonads in agricultural soils from Korea. *Lett. Appl. Microbiol*. 417-423.
77. Siquenza, C., D.E. Crowley, and E. Allen. 2006. Soil microorganisms of a native shrub and exotic grasses along a nitrogen deposition gradient in southern California. *Appl. Soil Ecol*. 32:13-26.
78. Park, J-W and D.E. Crowley. 2006. Dynamic changes in *nahAc* gene copy numbers during degradation of naphthalene in PAH-contaminated soils. *Appl. Microbiol. Biotechnol*. 17: 1322-1329.
79. Koo, B-J., A.C. Chang, D.E. Crowley, A.L. Page. 2006. Characterization of organic acids from rhizosphere of corn grown on biosolids treated medium. *Comm. Soil Sci. Plant Nutr*. 37:871-887.
80. Lambais, M.R., D.E. Crowley, J.C. Cury, R.C. Bull, and R.R. Rodrigues. 2006. Bacterial diversity in tree canopies of the Atlantic Forest. *Science*. 312:1917.
81. Smith, D.A. and D.E. Crowley. 2006. Contribution of ethylamine degrading bacteria to atrazine degradation in soils. *FEMS Microbiol. Ecol*. 58:271-277.
82. Kraemer, S., D.E. Crowley, and R. Kretzschmar. 2006. Geochemical aspects of phytosiderophore-promoted iron acquisition by plants. *Adv. Agron*. 91: 1-46.
83. Kim, J.S., G. Sparovek, R. deLongo, W. deMelo, and D.E. Crowley. 2006. Bacterial diversity of terra preta and forest soil from the western Amazon. *Soil Biol. Biochem*. 39: 684-690.
84. Yi, H. and D.E. Crowley. 2007. Biostimulation of PAH degradation with plants containing high concentrations of linoleic acid. *Env. Sci. Technol*. 41: 4382-4388.
85. Kim, J.S. and D.E. Crowley. 2007. Microbial diversity in natural asphalts of the Rancho La Brea tar pits. *Appl. Env. Microbiol*. 73:4579-4591.

86. Kim, Y.-M., I.-H. Nam, K. Murugesan K, S. Schmidt, D. E. Crowley. and Y.-S. Chang. 2007. Biodegradation of diphenyl ether and transformation of selected brominated congeners by *Sphingomonas* sp. PH-07. *Appl. Microbiol. Biotech.* 77:187-194.
87. Khalid, A. M. Arshad, and D.E. Crowley. 2008. Accelerated decolorization of structurally different azo dyes by newly isolated bacterial strains. *Appl. Microbiol. Biotech.* 78:361-369.
88. Mele, P. and D.E. Crowley. 2008. Application of self organizing maps for assessing soil biological quality. *Agric. Ecosystems Environ.* 126:139-152.
89. Khalid, A., M. Arshad, and D.E. Crowley. 2008. Decolorization of azo dyes by *Shewanella* sp. under saline conditions. *Appl. Microbiol. Biotech.* 79:1053-1059.
90. Kim, J-S, R. Dungan, and D.E. Crowley. 2008. Microarray analysis of bacterial diversity and distribution in aggregates from a desert agricultural soil. *Biol. Fert. Soils.* Online First Pub. DOI 10.1007/s00374-008-0291-5

Extramural Service

Editorial Board, *Biology Fertility of Soils* (2004-Present)

Section Editor, *Plant and Soil* (2004-Present)

Invited Talks

- 2003 Invited Speaker. Relationships between soil organic carbon and microbial community structure in soils. Nanjing China Oct 2003.

Short Course Instructor. Molecular study of soil microbial processes and diversity. Nanjing Agricultural University, Nanjing China. Oct 2003.

- 2005 Oral Presentation. Criteria for selection of Plant Species Used for Phytoremediation of PAHs. 2nd GIST/UCR Joint Seminar. UCR Campus, March 18, 2005.

Oral Presentation. Identification of plants and plant derived substances that enhance biodegradation of polycyclic aromatic hydrocarbons in soils. 3rd Int. Conf. on Phytotechnologies. Atlanta, GA. April 2005.

Seminar. Department of Environmental Sciences. UCR. Mapping of Microbial Diversity in the Atlantic Forest of Brazil. May 5, 2005.

Seminar. Department of Nematology. UCR. Rhizosphere processes affecting pollutant degradation in soils. May 11, 2005.

Seminar. Microbial diversity in the Atlantic Forest of Brazil. Universidade Federal de Goias, Campus Avancado de Jatai, Goias, Brazil. July 2005.

Television Interview. Role of microorganisms in agricultural sustainability. (6 minutes, live discussion in Portuguese) Television Jatai, Goias, Brazil. July 2005.

Oral Presentation. Comprehensive analysis of PAH degrading bacteria in the plant rhizosphere. USDA NRI Soil Biology Program PD Meeting. Newark, DE. Oct. 2005.

2006 Invited Presentation. Microbiological indicators of soil quality (In Portuguese) FertBio Conference (Combined Conference for 27th Ann Mtg of Soil Fertility and Plant Nutrition, 11th Ann. Mtg of Mycorrhiza, 9th Ann Symp. Brazilian Microbiology of Soils. Bonito, MS Brazil Sept. 2006

2007 Invited Presentation. Identification and biostimulation of PAH degrading bacteria in soils. 17th Ann Mtg of the Assoc. Environ. Health and Sciences. San Diego, CA March 19-22. 2007

Invited Talk. Bioremediation of PCB and PAH Contaminated Soils. Zeijiang Academy of Agricultural Sciences. Hangzhou, China Nov. 26, 2007

Invited Talk. Bioindicators of Soil Quality. Institute of Soil Science. ZAAS, Hangzhou, China. Nov. 27, 2007

Invited Talk. Applications of Microbial Community Analysis for Evaluation of Soil Quality and Bioremediation. Nanjing Agricultural University, Nanjing China. Dec 1, 2007