

C. Korsi Dumenyo

Department of Agricultural Sciences
Tennessee State University
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Summary

A Ph.D. with expertise in bacterial genetics and genomics, host-microbe interaction, gene regulation, quorum sensing, plant tissue culture and genetic transformation and student training at the BS, MS and PhD levels.

Education

University of Missouri-Columbia

Degree: Ph.D. in Plant Pathology, May 2000

Tuskegee University, Alabama

Degree: M.S. in Plant & Soil Sciences, May 1994

University of Ghana, Legon, Ghana

Degree: B.Sc. (Honours) Crop Science, Sept 1990.

Professional Experience

Research Asst Prof, Department of Agricultural Sciences, Tennessee State University, Nashville. Aug. 2008 to Present. Research program with the focus on understanding the genetic mechanisms underlying pathogenesis of Plant Pathogenic soft rot *Erwinia* and *Pseudomonas* species which cause many diseases on diverse crop diseases. Using reporter transposon mutagenesis to catalogue and understand the roles of various genes in the pathogens ability to produce virulence factors and cause disease.

Research Asst Prof, Institute of Agricultural & Environmental Research, Tennessee State University, Nashville. Aug. 2005 to Aug. 2008. Established a research program with the focus on understanding the genetic mechanisms underlying pathogenesis of plant pathogenic *Pseudomonas* and soft rot *Erwinia* species which cause many diseases on many plant diseases. Also to study the roles of several genes in the virulence of the pathogen. Worked to develop molecular genetic-based biocontrol approaches for bacterial diseases on ornamental crops.

Post-doctoral Scientist, Department of Plant Pathology, University of California-Riverside. May 2000 to July 2005. Undertook research to understand the genetic mechanisms underlying pathogenesis of *Xylella fastidiosa*, the causal bacterium of Pierce's disease of grapes and many other plant diseases. Studied the role of several genes in the virulence of the pathogen. Worked on developing molecular genetic and biocontrol approaches for the diseases caused by *Xylella fastidiosa*. Also studied gene expression profiling of *X. fastidiosa* using microarrays to identify and characterize the genes involved in *rsmA*'s control of biofilm formation and pathogenicity.

Graduate Research Assistant, Department of Plant Microbiology & Pathology, University of Missouri-Columbia. August 1993 to May 2000. Conducted research on molecular genetic determinants of pathogenesis by the bacterial pathogens, *Erwinia amylovora*, *Pectobacterium (Erwinia) carotovora*, and *Pseudomonas syringae*. Worked towards the PhD degree

Graduate Research Assistant, Center for Plant Biotechnology Research, Tuskegee University, Alabama. August 1991 to August 1993. Conducted research on genetic transformation and tissue culture of sweetpotato. Worked on the development of an *in vitro* tissue regeneration protocol for sweetpotato.

Active Grants

Title: Strengthening Agricultural and Environmental Research at Tennessee State University: Student Experiential Training in Current Techniques for Environmental Analysis
Period: October 2007 to September 2009

Funding agency: USDA-CSREES
Amount: \$ ~200,000.00
Role: Co-Investigator

Title: Strengthening Agricultural Biotechnology: Assessing perceptions of farmers and consumers and providing training workshops for stakeholders in Ghana.
Period: February 2008 – February 2009
Funding agency/organization: USDA Foreign Agricultural Service
Total Amount: \$ 100,000.00
Role: Co-Investigator

Past Grants:

Construction of a genome-wide promoter-probe library of the pathogen, *Erwinia carotovora* to screen of host signal-induced and -repressed genes. Tenn. State Univ. Faculty Research Award. 12,000.00

Identification of an experimental host plant for the analysis of *Xylella fastidiosa* pathogenicity. Temecula Valley Winegrowers Association John Moramarco Scholarship Award. A \$5000.00 competitive research grant. 2003.

Honors and Awards

1999. Superior Graduate Achievement Award, University of Missouri Graduate School.

1993. 2nd Place Graduate Paper, Sigma Xi Research Symposium, Tuskegee University.

Honor Society Membership

Sigma Xi, The Scientific Research Society. Elected full member 2001

Professional Affiliations

American Society for Microbiology (since 1995)

American Phytopathological Society (since 1994).

Panel activities

Panel of Judges for Competitive Grants Program, USDA-CREES, 2008

Panel of Judges for Student Research Presentations, Alabama A&M University

Panel of Judges of Competitive Poster, 14th Biennial Research Symposium of Association of Research Directors of 1890 Land Grant Universities. April 2006, Atlanta, GA

Manuscript Reviewer for:

Plant Disease

HortTechnology

Engineering in Life Sciences

Publications

Xiang Yang Shi, C. Korsi Dumenyo, Rufina Hernandez-Martinez, Hamid Azad, and Donald A. Cooksey. 2007. Characterization of Regulatory Pathways in *Xylella fastidiosa*: Genes and Phenotypes Controlled by *algU*. *Appl. Envir. Microbiol* 73: 6748-6756.

J. L. Bi & C. K. Dumenyo & R. Hernandez-Martinez & D. A. Cooksey & N. C. Toscano. 2007. Effect of Host Plant Xylem Fluid on Growth, Aggregation, and Attachment of *Xylella fastidiosa*. *J. Chem Ecol.* 33: 493-500

R. Hernandez-Martinez, H. S. Costa, C. K. Dumenyo, and D. A. Cooksey. 2006. Differentiation of strains of *Xylella fastidiosa* infecting grape, almonds and oleander using a multiprimer PCR Assay. *Plant Disease* 90:1382-1388

Costa, H.S., Raetz, R., Pinkard, T., Gispert, G., Hernandez-Martinez, R., Dumenyo, C. K., and Cooksey, D.A. 2004. Plant hosts of *Xylella fastidiosa* in and near Southern California vineyards. *Plant Disease.* 88:1255-1261.

- Meinhardt, L. W., Ribeiro, M. P. M. A., Coletta-Filho, H. D., Dumenyo, C. K., Tsai, S. M., and Bellato, C. M. 2003. Genotypic analysis of *Xylella fastidiosa* isolates from different hosts using sequences homologous to the *Xanthomonas rpf* genes. *Molecular Plant Pathology*. 4: 327-335.
- Ma, W., Cui, Y., Liu, Y., Dumenyo, C. K., Mukherjee, A. and Chatterjee, A. K. 2001. Molecular characterization of global regulatory RNA species that control pathogenicity factors in *Erwinia amylovora* and *Erwinia herbicola* pv. *gypsophillae*. *Journal of Bacteriology* 2001 183: 1870-1880
- Keen, N. T., Dumenyo, C. K., Yang, C.-H. and Cooksey, D. A. 2000. From rags to riches: insights from the first genomic sequence of a plant pathogenic bacterium. *Genome Biology* 1:1019.1-1019.4
- Dumenyo, C. K. Chatterjee, A. and Chatterjee, A. K. 2000. *Erwinia*. In: Otis C. Maloy and Timothy D. Murray (Ed.) *Encyclopedia of Plant Pathology*. Pages 430-432. John Wiley and Sons.
- Dumenyo, C. K. Chatterjee, A. and Chatterjee, A. K. 2000. Pectate lyase. In: Otis C. Maloy and Timothy D. Murray (Ed.) *Encyclopedia of Plant Pathology*. Pages 744-746. John Wiley and Sons.
- Dumenyo, C. K. Chatterjee, A. and Chatterjee, A. K. 2000. Pectin lyase In: Otis C. Maloy and Timothy D. Murray (Ed.) *Encyclopedia of Plant Pathology*. Pages 746-747. John Wiley and Sons.
- Dumenyo, C. K. Chatterjee, A. and Chatterjee, A. K. 2000. Phytobacteriology In: Otis C. Maloy and Timothy D. Murray (Ed.) *Encyclopedia of Plant Pathology*. Pages 762-769. John Wiley and Sons.
- Dumenyo, C. K. Chatterjee, A. and Chatterjee, A. K. 2000. Polygalacturonase. In: Otis C. Maloy and Timothy D. Murray (Ed.) *Encyclopedia of Plant Pathology*. Pages 793-795. John Wiley and Sons.
- Dumenyo, C. K. Chatterjee, A. and Chatterjee, A. K. 2000. Extracellular proteins: Secretion pathways. In: Otis C. Maloy and Timothy D. Murray (Ed.) *Encyclopedia of Plant Pathology*. Pages 440-443. John Wiley and Sons.
- Chatterjee, A. K., Dumenyo, C. K., Liu, Y. and Chatterjee, A. 2000. *Erwinia*: genetics of pathogenicity factors. In: J. Lederberg (Ed), *Encyclopedia of Microbiology*. Vol 2, 2nd Edition, Pages 236-259, Academic Press.
- Cui, Y., Mukherjee, A., Dumenyo, C. K., Liu, Y. and Chatterjee, A. K. 1999. *rsmC* of the soft rotting bacterium *Erwinia carotovora* subsp. *carotovora* negatively controls extracellular enzyme and harpinEcc production and virulence by modulating levels of regulatory RNA (*rsmB*) and RNA-binding protein (RsmA). *Journal of Bacteriology* 181:6042-6052.
- Dumenyo, C. K., Mukherjee, A., Chun, W. and Chatterjee, A. K. 1998. Genetic and physiological evidence for the production of *N*-acyl homoserine lactone analogs by *Pseudomonas syringae* pv. *syringae* and other fluorescent plant pathogenic *Pseudomonas* species. *European Journal of Plant Pathology* 104:569-582.
- Mukherjee, A., Cui, Y., Liu, Y., Dumenyo, C. K. and Chatterjee, A. K. 1996. A global regulatory gene controls secondary metabolites, motility, and pathogenicity factors in *Erwinia amylovora*. *Acta Horticulturae* 411: 237-241
- Cui, Y., Madi, L., Mukherjee, A., Dumenyo, C. K. and Chatterjee, A. K. 1996. The RsmA- mutants of *Erwinia carotovora* subsp. *carotovora* strain Ecc71 overexpress *hrpNEcc* and elicit a hypersensitive reaction-like response in tobacco leaves. *Molecular Plant-Microbe Interactions* 9:565-573
- Mukherjee, A., Cui, Y., Liu, Y., Dumenyo, C. K. and Chatterjee, A. K. 1996. Global regulation in *Erwinia* species by *Erwinia carotovora rsmA*, a homologue of *Escherichia coli csrA*: repression of secondary metabolites, pathogenicity and hypersensitive reaction. *Microbiology (UK)* 142: 427-434.
- Cui, Y., Chatterjee, A., Liu, Y., Dumenyo, C. K. and Chatterjee, A. K. 1995. Identification of a global repressor, *rsmA*, of *Erwinia carotovora* subsp. *carotovora* that controls extracellular enzymes, *N*-(3-oxohexanoyl)-L-homoserine lactone and pathogenicity in soft rotting *Erwinia* species. *Journal of Bacteriology* 177:5108-5115
- Chatterjee, A., Cui, Y., Liu, Y., Dumenyo, C. K. and Chatterjee, A. K. 1995. Inactivation of *rsmA* leads to overproduction of extracellular pectinases, cellulases and proteases in *Erwinia carotovora* subsp. *carotovora* in the absence of the starvation/cell density-sensing signal, *N*-(3-oxohexanoyl)-L-homoserine lactone. *Applied & Environmental Microbiology* 61:1959-1967.
- Porobo-Dessai, A., Gosukonda, R. M., Blay, E., Dumenyo, C. K. and Prakash, C. S. 1995. Plant regeneration of sweetpotato (*Ipomoea batatas* L.) from leaf explants *in vitro* using a two-stage protocol. *Scientia Horticulturae* 62:217-224.

Oral and Poster Presentations

- Dumenyo, C. Korsi. 2008. A Model System for Bacterial Diseases of Ornamentals. Tenn. State University Inst. Of Ag. & Environ. Res. Seminar Series. 14 May 2008.
- Dumenyo, C. Korsi. 2007. Genetic analysis of soft rot pathogenesis. Tenn. State University Inst. Of Ag. & Environ. Res. Seminar Series. 13 June 2007.
- Shi, X., C.K Dumenyo, R. Hernandez-Martinez, H. Azad & D. Cooksey. 2006. Genetic Analysis of *algU* Gene of *Xylella Fastidiosa*. Abstract for poster presentation at 106th ASM General Meeting. Orlando, FL
- Hernandez-Martinez, R. C. Korsi Dumenyo and D. A. Cooksey. 2006. Site-directed mutagenesis of *acvB* gene in a Pierce's disease strain of *Xylella fastidiosa*. *Phytopathology* 96:S47.
- Dumenyo, C. Korsi. 2006. Functional genomic analysis of the plant pathogen, *Xylella fastidiosa*. Tenn. State University Inst. Of Ag. & Environ. Res. Seminar Series. 08 March 2006.
- Dumenyo, C. K., R. Hernandez-Martinez, T. Reignier, D. A. Cooksey. 2004. *rsmA* (*csrA*) affects biofilm formation in *Xylella fastidiosa* PD strain A05. Abst. # H-044 presented at the 104th ASM General Meeting. New Orleans, LA.
- Dumenyo, K., Hernandez-Martinez, R., Reignier, T., Azad, H., & Cooksey, D. 2003. Biological control of Pierce's disease with non-pathogenic strains of *Xylella fastidiosa*. Poster presented at the 2003 Pierce's Disease Research Symposium. Dec 1-12, 2003. Coronado, California.
- Hernandez-Martinez, R., C. K. Dumenyo, D. A. Cooksey. 2003. Gene arrays and mutational analysis to identify virulence genes in *Xylella fastidiosa*. Poster presented at the 2003 Pierce's Disease Research Symposium. Dec 1-12, 2003. Coronado, California
- Lee, S.-D.; Bianco, R.; Dumenyo, K.; Azad, H. R.; Schiller, N. L.; Cooksey, D. A. 2003. Control of Pierce's disease through degradation of xanthan gum. Poster presented at the 2003 Pierce's Disease Research Symposium. Dec 1-12, 2003. Coronado, California.
- Dumenyo, C. K., Hernandez-Martinez, H., Azad, R., and Cooksey, D. A. 2003. Site-Directed mutagenesis of specific genes in a Pierce's Disease strain of *Xylella fastidiosa*. Abstract Number: H-147 presented at the 103rd ASM General Meeting. Washington, DC.
- Hernandez-Martinez, R., Dumenyo, C. K. and Cooksey, D. A. 2002. Gene expression profile of pathogenicity factors in *Xylella fastidiosa*. *Phytopathology* 92:S36.
- Chatterjee, A. K., Dumenyo, C. K., Cui, Y., Ma, W-L., Liu, Y. and Mukherjee, A. 1999. Global regulation of gene expression in *Photorhabdus luminescens*, a symbiont of entomopathogenic nematodes: effects of an RNA-binding protein (RsmA) and a regulatory RNA (*rsmB*). Abstract No. P10. 50th Annual meeting of Society for Industrial Microbiology. August 1-5, 1999. Arlington, Virginia.
- Dumenyo, C. K., Ma, W-L., Chatterjee, A., Cui, Y., Liu, Y. and Chatterjee, A.K. 1999. Analysis of global regulator genes controlling pathogenicity factors of *Erwinia amylovora* and *E. herbicola* pv. *gypsophillae*. *Phytopathology* 89:S22.
- Mukherjee, A., Liu, Y., Cui, Y., Dumenyo, C. K and Chatterjee, A. K. 1998. *Erwinia carotovora* subsp. *carotovora*: characterization of RsmA, a RNA-binding protein which mediates post-transcriptional regulation. Abstract No. 6.145. 7th International Congress of Plant Pathology, Edinburgh, Scotland, August 6-16, 1998.
- Chatterjee, A. K., Cui, Y., Liu, Y., Dumenyo, C. K. and Mukherjee, A. 1997. Identification of a new regulatory locus, (*rsmB*, renamed *rsmC*) of *Erwinia carotovora* subsp. *carotovora* that controls extracellular enzymes, Harpin and RsmA. *Phytopathology* 87:S18
- Dumenyo, C. K., Mukherjee, A. and Chatterjee, A. K. 1996. Production of *N*-acyl homoserine lactone analogs by *Pseudomonas syringae* pv. *syringae* and other fluorescent plant pathogenic *Pseudomonas*, *Phytopathology* 86:S76
- Cui, Y., Chatterjee, A., Liu, Y., Dumenyo, C. K. and Chatterjee, A. K. 1995. Characterization of a global regulatory gene, *rsmA*, of *Erwinia carotovora* subsp. *carotovora*. *Phytopathology* 85:1186
- Dumenyo, C. K., Blay, E., Porobo-Dessai, A. and Prakash, C. S. 1993. Effect of *Agrobacterium* growth stage and culture density on the transformation efficiency of sweetpotato. Abstract No. 903. *Hortscience* 28:583.
- Prakash, C. S., Gosukonda, R., Porobo-Dessai, A., Blay, E. and Dumenyo, C. K. 1993. An efficient *in vitro* regeneration method to produce adventitious plants in sweetpotato. *Hortscience* 28:262.

- Dumenyo, C. K., and Prakash, C. S. 1993. Factors affecting the efficiency and frequency of *Agrobacterium*-mediated genetic transformation of sweetpotato (*Ipomoea batatas*). Sigma Xi Research Symposium, Tuskegee University. March 26-27, 1993. Winner of Second Place Graduate paper.
- Prakash, C. S., Dessai, A. P., Murthy, G. R., Dumenyo, C. K. He, G., Zheng, Q., Egnin, E., and Kanyand, M. 1993. Biotechnology approaches for improving sweetpotato. Paper presented at the International Symposium on Tropical Root Crops- Problems, Prospects and Future Strategies. Trivandrum, India. November 6-9, 1993.
- Dumenyo, C. K. and Ofori, I. K., 1993. Field performance of two gamma rays-induced mutant types of green gram (*Vigna radiata*) on the Accra plains. Sigma Xi Research Symposium, Tuskegee University. March 27-28, 1993.
- Dessai, A. P., Gosukonda, R., Blay, E., Dumenyo, C. K. and Prakash, C. S. 1993. Improved adventitious regeneration of sweetpotato. Poster presented at the Congress on Cell and tissue culture. June 5-9, 1993.
- Prakash, C.S., Porobo-Dessai; A., Blay; E. T., Gosukonda, R. M., Dumenyo, C. K. and Medina-Bolivar, L. F. 1992. Improved protocols for regeneration and transformation of Sweetpotato (*Ipomoea batatas*). International Conference on Biotechnology for Crop Improvement in Latin America. November 1-7 1992. Caracas, Venezuela
- Dumenyo, C. K. and Prakash, C. S. 1992. Effects of antibiotics on sweetpotato explants *in vitro*. Ninth biennial symposium of Association of Research Directors, 1890 Land Grant Universities. October 4-8 1992. Atlanta, Georgia.

Main teaching activities

Tennessee State University:

BIOL 3400 Introductory Microbial Physiology

CK Dumenyo, instructor. 3 credits, Spring 2008

Introduction to Microbial Physiology. The Course dealing with the salient features in the physiology of microorganisms. The Objective is to introduce students majoring in biology to the physiology of prokaryotic organisms with the intent to assist them in gaining a higher level of appreciation and understanding of the chemical processes required for life to exist. It is also intended that students see how the various mechanisms for sustaining life are used to classify or group microorganisms. Selected examples of the metabolism of carbohydrates, lipids, and nitrogen-containing compounds are considered as a basis for further understanding biologic phenomena

BIOL3401 Introduction to Microbial Physiology and Laboratory

CK Dumenyo, instructor, PA Agyemang, Graduate Assistant 1 credit, Spring 2008

This lab class dealing with the salient features in the physiology of microorganisms especially bacteria in the lab. Students in this class had the opportunity and experience of isolating bacteria from the natural environment of their choice, purifying the isolates and using physical, biochemical and molecular approaches to characterize their isolates. The students gained hands-on laboratory experience in the techniques are involved in the process.

Graduate Student Advisement and Committees

1. Student Name: Paul Agyemang, PhD Student in Biological Sciences
Title of Thesis (tentative): Host Regulation of Pathogenicity in soft rot *Erwinia*
Role : Dissertation Advisor
2. Student Name: Antoinette Gaston, PhD Student in Biological Sciences
Title of Thesis (tentative): Characterization of *Chromobacterium violaceum* isolated from Tennessee Copper basin
Role: Committee Member
3. Student Name: Karen Burke, PhD Student in Biological Sciences
Title of Thesis (tentative): Insecticidal proteins of *Bacillus* spp.
Role: Committee Member
4. Student Name: Caleb Kersey, PhD Student in Biological Sciences
Title of Thesis (tentative): Phytoremediation and Microbial Community Successions during recovery of lands degraded by mining.
Role (Chair/Coordinator, Member): Committee Member

Undergraduate Student training

Current:

1. Marie Blacksmith Ag. Sci Major Since Fall 2006

Past:

1. Amelia Jones Ag. Sci Major; 2005/06 Senior Project
2. Yuliya Phillips Ag. Sci. Major Fall 2007
3. Latoya Moore Ag. Sci. Major Spring 2006
4. Courtney Jackson Ag. Sci. Major Spring 2006