

Dr. Cyril E. Broderick, Sr.

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EDUCATION

Doctor of Philosophy (Ph.D.) in Plant Science (Physiology).....1979 to 1982

Department of Plant Science

University of New Hampshire

Durham, New Hampshire 03824

Date of Graduation: May, 1982

Dissertation: Morpho-physiology of photosynthesis and translocation in
Cucurbita maxima Duchense (Winter Squash)

Master of Science (M.Sc.) in Crop Physiology.....1974 to 1976

Department of Agronomy

Iowa State University

Ames, Iowa 50010

Date of Graduation: May, 1976

Thesis: The physiology of the response of *Glycine max* L. Merrill to several plant
growth regulators

Bachelor of Science (B.Sc.) in Agriculture.....1970 to 1973

College of Agriculture and Forestry

University of Liberia

Monrovia, Liberia

Date of Graduation: December, 1973

St. John's Episcopal High School

Robertsport, Grand Cape Mount County, Liberia

Date of Graduation: December, 1969 (High School Certificate)

HONORS AND AWARDS: NSF-QEM Award to Washington, D.C. Meeting, 2007; Delaware State University Mini-Grant Award, 2003; USDA Group Honor Award for Excellence for Grape Germplasm Research, 1998; USDA/ARS Capacity Building Research Award, 1997; Three (3) Delaware State University Professional Development Research Awards, 1995 and 1996; USDA/ARS Capacity Building Teaching Award, 1993; Research Grants, Firestone Plantations Company, 1988, 1989, and 1990; Fulbright Travel Award to the African Studies Association in Boston, MA., 1983; University of Liberia Research Awards; University of Liberia Professional Award, 1979 to 1982; Fulbright Scholar Award; 1974 to 1976; College of Agriculture and Forestry Honor Awards, U of Liberia, 1973; High School Valedictorian; 1969;

WORK EXPERIENCE:

Vice-President for Academic Affairs.....September 2009 to December 2010

William V. S. Tubman University

Harper, Maryland County, LIBERIA

During a period of Sabbatical Leave, Dr. Broderick planned and executed programs and instruction in reopening the civil-war closed university in Maryland County, Liberia, thereby building a new university from the William V. S. Tubman Technical College in Harper, Maryland County, Liberia. Dr. Broderick also used the period of the sabbatical to compile information on plant science, agriculture, and forestry in Africa for his text to be published with Xlibris at a later date.

Professor.....September 2017 to Present

Dr. Broderick serves in teaching and conducting research in producing results and extending efforts to carrying out research in revealing results that enhance agriculture in its many diverse applications.

Associate Professor.....September 1996 to 2017

Led efforts to promote the Department, the College and the University to more fully delve in research by pursuing research objectives and participating in national and global research priorities.

Assistant Professor.....September 1992 to 1996

Taught classes and led students with research topics in developing perspectives in agriculture, including plant and soil science, plant physiology and breeding.

Adjunct Professor.....September, 1991 to January, 1992

Taught classes and led students with research topics in developing perspectives in agriculture, including plant and soil science, plant physiology and breeding.

Department of Agriculture and Natural Resources

Delaware State University

1210 North DuPont Highway

Dover, DE 19901-2275

Teach courses in the plant sciences, including plant cell and tissue culture, plant physiology, olericulture and general horticulture, vegetable gardening, plant propagation and greenhouse management, scientific writing, and computer literacy in agriculture and natural resources, among other courses.

Conduct research in the plant sciences, with plant hormones and other growth regulators; investigates physiological and biotechnological aspects of plant

growth and development, utilizing techniques in plant cell and tissue culture and some molecular biology. Work with herbs, medicinal plants, and horticultural crops, including grapevines, cherry, cranberry Lima beans and other important plant species.

Manager, Botanical Research Department.....July, 1988 to 1991

Firestone Plantations Company

Harbel, Liberia

Head Office: Firestone Latex and Synthetic Rubber Company, Akron, Ohio

Managed the affairs of the Botanical Research Department, including its research laboratory, projects, and workforce of the Department.

Projects included the collection, tabulation, and publication of meteorological data from the Research Center; breeding and evaluation of clones of Ethrel (Ethephon) stimulation; chemical analyses of Hevea leaves and the determination of annual nutritional requirement of *Hevea* trees in the estate plantings at Harbel.

Other efforts embody the establishment of a new botanical garden at the Center, including the development of a vegetable and fruit crop research project.

Chairman, Department of Agronomy..... 1986
to 1988 & **Associate Professor of Plant Science**

College of Agriculture and Forestry

University of Liberia

Monrovia, Liberia

Led teaching and research efforts in the Department of Agronomy; developed plans for the granting of agronomy specialization degree.

Conducted research into the physiology of various tropical crops, paying specific attention to anatomical features as observable through phase-contrast microscopes.

Served in the administration of various college programs, including serving as Acting Dean of the College of Agriculture and Forestry on several occasions.

Assistant Professor of Plant Science.....June, 1982 to
May, 1986

College of Agriculture and Forestry

University of Liberia

Monrovia, Liberia

Taught courses in plant science, including courses in olericulture, pomology, agronomy, and plant breeding and physiology; also led and conducted laboratory exercises and research trials in various aspects of plant science and environmental physiology. These duties sometimes developed into semester-long:- to annual research projects.

Instructor of Plant Science.....June, 1976 to
May, 1979
College of Agriculture and Forestry
University of Liberia
Monrovia, Liberia

Taught courses in olericulture, agronomy, and various other first courses in the curriculum in the College, including farm practice courses.

Carried out field trials and experiments with several crops. Led various, laboratories in the plant sciences, including plant physiology, plant breeding and horticulture, rice agronomy and crop protection.

PUBLICATION

Book(s) and Book chapter(s)

Broderick, Cyril E., Sr. 2019. Plant Science, Agriculture, and Forestry in Africa South of the Sahara. With a Special Guide for Liberia and West Africa. [Chttps://www.xlibris.com/en/bookstore/bookdetails/535784-plant-science-agriculture-and-forestry-in-africa-south-of-the-sahara](https://www.xlibris.com/en/bookstore/bookdetails/535784-plant-science-agriculture-and-forestry-in-africa-south-of-the-sahara).

Broderick, Cyril E. 2007. ESCAPE – Liberia, Africa, and the USA: The Surrender of Harbel -War, Accommodation, and Reconciliation for Peace, Agricultural m Development and Economic Prosperity. BookSurge, Inc., Charleston, South Carolina, United States of America.

Tucker, A. O. , M. J. Maciarelo and **C. E. Broderick.** 1994. File and the Essential Oils of the Leaves, Twigs, and Commercial Root Teas of *Sassafras albidum* (Nutt.) Nees (Lauraceae. In G. Charalambous ed. *Spices, Herbs and Edible Fungi.* Elsevier, B. V.

Some Recent Refereed Journal & Proceedings Articles

Broderick, C. E. and Cooke, P. H. 2020. Phosphoenolpyruvate Carboxylase (PEPC) Presents New Opportunities for Food Security and Space Exploration. *EC Agriculture* 6.7: 28- 34.

Broderick, C. E. and Appleton, N. S. 2018. A Case Study for Liberian Agroforestry: Science and the Implementation of a Co-Management Prospectus for Agriculture and Forestry. *Forest Res Eng Int J.*2(4):214–224.

Kering, M. and **C. E. Broderick.** 2018. Potassium and Manganese Fertilization and the Effects on Millet Seed Yield, Seed Quality, and Forage Potential of Residual Stalks. *Agricultural Sciences, Vol.9 No.7.*

Cooke, P., G. Bao, **C. Broderick,** M. Fishman, L. Liu and C. Onwulata. 2010. Quality and utilization of food co0-products and residues. Pro. SPIE 7729, 77291U(2010).

Broderick, C. E. and P. H. Cooke. 2009. Fruit composition, tissues, and localization of antioxidants and capsaicinoids in *Capsicum* peppers by fluorescence microscopy. B. Patil (Ed.) Proc. IInd IS on Human Health Effects of F & V. Acta Hort 841, ISHS 2009.

- Broderick, Cyril E.** 2007. Plant Selection and Resource Conservation for Sustainable Agriculture in Delaware. *Journal of Environmental Monitoring and Restoration (JEMREST)* 3: 229-236.
- Broderick, Cyril E.** and Peter H. Cooke. 2007. Fluorescence Imaging of Habanero and Bell Pepper Fruits. *Microscopy Microanalysis* 13: 276-277.
- Broderick, Cyril E.** 2006. Gluten in foods Liberians eat: Implications about sulfur and nitrogen metabolism in agriculture and human health *Liberian Studies Journal* 31(1):54-62
- Broderick, Cyril E. Sr.** 2004. Sulfur Requirements, Fertilizer Supply and Use are Critical to Sub-Saharan Agriculture. *Journal of the Pennsylvania Geographical Society* 42(1):74-90.
- Broderick, Cyril E.** 2000. A study of perceptions of the importance of plants and biotechnology by diverse population groups. A paper presented at the 1999 Professional Agricultural Workers Conference, Tuskegee, Alabama.
- Broderick Cyril E.** and James L. S. Kiazolu. 1999. Environmental Changes to Liberian Agriculture. *Liberian Studies Journal* 24:53-65.
- Broderick, C. E.** 1998. Liberian Agriculture: History and Status Towards the Twenty-first Century. *Liberian Studies Journal* 23(1)42-77.
- Broderick, C. E.** and Gloria K. Meade. 1997. Osmolality, water potential and plant homeostasis in vitro. In *Proceedings of the 54th Annual Professional Workers Conference (December 5-7, 1996), Tuskegee University. Natural Resources and Development: Community Development Issues*, pp. 261-272.
- Broderick, C. E.** 1995. Changes in the Climate at Harbel, Liberia *Biological Agriculture and Horticulture* 12:133-149.
- Broderick, C. E.** 1995. The down-sizing of agriculture: Implications for the professional worker and sustainable development. In *Proceedings of the 52nd Annual Professional Workers Conference (December 4-6, 1994), Tuskegee University. Local communities and sustainable development*, pp. 31-42.

Journal Abstracts and Other Synoptic Publications

- Broderick, Cyril E., Sr.** 2001. Ethylenediurea (EDU) and the desiccation effects of high concentrations of ozone on the jade plant (*Crassula argentea*). *Journal of the Society of In Vitro Biology* 37(3):28-A.
- Broderick, Cyril E. Sr.** and G. A. Jones, III. 2001. Germination and Seedling Development of St. John's Wort (*Hypericum perforatum* L.) Vary in Response to Different Wavelengths of Light. *HortScience* 36(3): 448.
- Broderick, C. E.** and G. A. Jones, III. 2001. Ethylenediurea (EDU) and the desiccation effects of high concentrations of ozone of the jade plant (*Crassula argentea*). *J. Soc. For In Vitro Biology* 37(3):28A.
- Broderick, C. E.** 1999. Promotion of germination and seedling development of Lima beans (*Phaseolus* spp.) by nickel chloride An Abstract in. *Hortscience*: 34 (3):513.
- Broderick, C. E.** 1999. Promotion of germination and seedling development of Lima beans (*Phaseolus* spp.) by nickel chloride An Abstract in. *Hortscience*: 34 (3):513.
- Broderick, C. E.,** G. K. Meade, J. E. Lewis and H. M. Walton. 1997. Differences in Thiadiazol (TDZ) and Auxin Media Osmolality and Variation in Tissue Response in *Hypericum perotatum* L. in *In Vitro Biology*

Broderick, C. E. 1996. Osmolality, Water Potential, and Plant Homeostasis in Vitro in four Test Species. A paper presented at the 54th Professional Agricultural Workers Conference at Tuskegee University, December 8 through 10, 1996.

Conference and Poster Presentations

- Broderick, C. E.** 2017. Carbon dioxide measure with reference to oxygen use in respiration of *Bryophyllum sanctulum*. Paper was presented at the 2017 Middle Atlantic Regional Meeting (MARM) that will be held in Hershey, PA, June 4-6, 2017. ABSTRACT ID: 2733719.
- Broderick, Sr., Cyril E.,** Richard Baczewski, and James S. Guseh. 2015. The Provision of Technical Resources to Liberian Farmers to Stimulate and Improve Agricultural Output in Liberia. *Liberian Studies Association Journal*.
- Broderick, Cyril E.** 2007. Fruit composition, tissues, and localization of antioxidants and capsaicinoids in Capsicum peppers by fluorescence microscopy.” Second International Symposium on Human Health Effects of Fruits and Vegetables, Omni River Way Hotel, Houston, Texas.
- Broderick, Cyril E.** 2007. Plant Selection and Resource Conservation for Sustainable Agriculture in Delaware. National Conference on Agricultural and Natural Resources Conservation and Management, College of Agriculture & Natural Resources, Delaware State University.
- Broderick, Cyril E.** 2007. Poster - Fluorescence imaging of Habanero and Bell Pepper Fruits. Microscopy Society of America 2007 Conference, Miami, Florida.
- Broderick, Cyril E.** 2004. Africa, Asia and the World – A Status Report. In Addressing the technological needs of emerging African and Caribbean economies The International Society of African Scientists 2004 Conference. MBNA America Building, Delaware State University, Dover, DE, USA.
- Broderick, Cyril E.** 2001. Processed plant products as a base in the development of animal husbandry in Liberia. Liberian Studies Association Conference, University of Pennsylvania, Philadelphia, PA.
- Broderick, Cyril E.** 2000. Variation in molecular constituent of *Hypericum perforatum* L. tissues during germination and seedling development in response to sources of different light quality. Phytochemistry Society Meeting, USDA, Beltsville, MD.
- Broderick, C.E.** 2000. A preliminary study of perceptions of the Importance of plants and biotechnology by diverse population groups. A paper presented at the 1999 Professional Agricultural Workers Conference, Tuskegee Alabama.
- Broderick, C.E.** 2000. A preliminary study of perceptions of the Importance of plants and biotechnology by diverse population groups. A paper presented at the 1999 Professional Agricultural Workers Conference, Tuskegee Alabama.
- Broderick, C. E.,** G. K. Meade, and J. A. Bowen. 1996. Biotechnological Improvement of *Abelmoschus esculentus*, Moench (Okra): Step I: Callus Production in Tissue Culture and Micropropagation. A Paper/Poster Exhibit Presented, at the Transgenic Plant Symposium, Tuskegee, Alabama.
- Broderick, C. E.,** G. K. Meade, and J. A. Bowen. 1996. Tissue Culture and Micropropagation of *Hypericum perforatum* L. and *Sassafras albidum* (Nutt.) Nees: Two Steps in Route to Biotechnological Improvement. A Paper Presented at the

Biotechnology Symposium at Florida A & M University, Tallahassee, Florida, April, 1996.

- Broderick, C. E.** 1986 to 1988. Miscellaneous topics in Agriculture. In the Observer Farmer Column, Daily Observer, Monrovia.
- Broderick, C. E.** 1988 to 1990. Miscellaneous Research Reports. Botanical Research Department, Firestone Plantations Company, Harbel, Liberia
- Broderick, C. E.** 1989. Analyses of Hevea leaves for N, P, K, and Mg at Harbel, Liberia. Report of the Botanical Research Department, Harbel, Liberia.
- Broderick, C. E.** 1989. Selection of Hevea clones and their performance in large-scale trials at Harbel. Botanical Research Department Report, Firestone Plantations Company, Harbel, Liberia.
- Broderick, C. E.** 1989. Selection of Hevea clones and their performance in small-scale trials at Harbel. Botanical Research Department Report, Firestone Plantations Company, Harbel, Liberia.
- Broderick, C. E.** 1989. The Climate of Harbel, Liberia. Daily Observer, Monrovia, Liberia.
- Broderick, C. E.** 1982 to 1988. Research Reports of the College of Agriculture and Forestry, University of Liberia, Monrovia, Liberia.
- Broderick, C. E.** and E. L. Dinkins. 1986. The climate of Fendall, Louisiana, Montserrado County. West Africa Rice Development Association (WARDA), Monrovia, Liberia.
- Broderick, C. E.** 1986. Crop Production in the Tropics: A Teaching Manuscript. College of Agriculture and Forestry, University of Liberia, Monrovia, Liberia.
- Broderick, C. E.** 1982. Morpho-physiology of photosynthesis and translocation in *Cucurbita maxima* Duch. (Winter squash). University of New Hampshire, Durham, New Hampshire 03824.
- Broderick, C. E.** 1978. The response of soybeans varieties to lime and fertilizer application. College of Agriculture and Forestry, University of Liberia, Monrovia, Liberia.
- Broderick, C. E.** 1977. The effect of several fungicides on the yield of *Hibiscus esculentus*. College of Agriculture and Forestry, University of Liberia, Monrovia, Liberia.
- Broderick, C. E.** 1976. The physiology of yield response of *Glycine max* L. Memll to flowering induction by several plant growth regulators. Iowa State University Press, Ames, Iowa 50010

Miscellaneous Refereed Publications

- Broderick, C. E.** 1987. The physiology of growth and development of rice. Lecture series, delivered to the WARDA six-month course in rice production in the West African region, WARDA, Monrovia, Liberia.
- Broderick, C. E.** 1984. Promising upland rice varieties for Liberia. West Africa Rice Development Association (WARDA), Newsletter, Monrovia, Liberia
- Broderick, C. E.** 1983. Promising soybean varieties for Liberia. College of Agriculture and Forestry, University of Liberia, Monrovia

BOOK AND PAPER REVIEWS:

1. Forseline, P., L. Towill, J. Waddell, C. Stushnoff, W. Lamboy, and J. McFerson. 1997. Recovery and Longevity of Cryopreserved Apple Buds. (For ARS Manuscript Peer Review).
2. Frick, *Lemna* Physiology Research Proposal. University of Delaware. 1997.
3. Gibson, D. M. and Lynn Gallo. Response of Mammaea to Plant Extracts USDA/ARS Cornell University, Ithaca, N.Y..1995
4. University of Delaware. *Lemna* Physiology Research Proposal. 1993.

SPECIAL INVITED CONFERENCE PREENTIONS

- Broderick, C. E.** 2006. Liberia: Beyond Self-Sufficiency in Agricultural Production. Presentation at the 2003 Liberian Studies Association Conference in Charleston, South Carolina.
- Broderick, C. E.** 2003. Plant Products as Base in the Development of Animal Husbandry for Liberia. Presentation at the 2003 Liberian Studies Association Conference in Binghamton, New York, USA.
- Broderick, C. E.** 2002. Sulfur and Plant Metabolism in the Growth, Development and Productivity of *Manihot esculenta* (Crantz): The Temperature Factor. Presentation at the Gordon Temperature Conference, Ventura, California, USA.
- Broderick, C. E.** 2002. Gluten in Foods Liberians Consume: Implications about Sulfur and Nitrogen Metabolism in Agriculture and Human Health. Liberian Studies Association Conference, University of Pennsylvania, Philadelphia, PA, USA.

MISCELLANEOUS ASSIGNMENTS AND WORK

EXPERIENCE

Summer, 2004

Employed as Visiting Research Scientist with the USDA/ARS Eastern Regional Research Institute to work on methods of mycorrhizae symbiosis and microscopy technology in plant biology..

Worked on capsaicin and Capsicum species growth and development, as well as the secondary metabolic synthesis of capsaicin.

Summer, 2003

Research Scientist with the Biotechnology Research Infrastructure Network (BRIN) and in the Plant Science and Biotechnology Laboratory at Delaware State University.

Worked on the affect of sulfur on the growth and development of *Manihot esculenta* (Cassava) ; conducted research on plant cell tissue culture, micropropagation, and their biotechnological and physiological applications for improvement of the cassava plant.

Summer, 2002

Research Scientist working in sulfur metabolism in plants in the BRIN and in the Plant Science and Biotechnology Laboratory at Delaware State University.

Worked on the affect of nickel on the growth and development of Lima beans; conducted research on plant cell tissue culture, micropropagation, and their biotechnological and physiological applications for the grape plant, the sassafras plant, and a other test species.

Summer, 1997

Research Scientist in the Plant Science and Biotechnology Laboratory at Delaware State University.

Worked on the affect of nickel on the growth and development of Lima beans; conducted research on plant cell tissue culture, micropropagation, and their biotechnological and physiological applications for the grape plant, the sassafras plant, and a other test species.

Summer, 1996

Research Scientist, Plant Science and Biotechnology Laboratory, Delaware State University.

Completed the installation of laboratory equipment, conducted research on plant cell tissue culture, micropropagation, and their biotechnological and physiological applications.

Summer, 1995

Visiting Scientist, USDA/ARS Federal Plant, Soil and Nutrition Laboratory, Cornell University, Ithaca, New York.

Isolation and characterization of extracts of *Hypericum perforatum*' Response of Potato Viruses to Hypericin in tissue culture.

Summer, 1995

Visiting Scientist, USDA/ARS Plant Genetic Resources Unit, Cornell University, Geneva, New York

Use of Viricides in tissue culture to eliminate viruses from field and cryopreserved grapevines

Summer, '92 & 93

Visiting Scientist - Physiology and Metabolism of Herbicides in Weeds and Crop Plants, E.1. DuPont De Nemours Stine Haskell Laboratory, Newark, Delaware 19711.

Evaluated soil and leaching properties of herbicides, and recommended methods to curb or control of herbicide leaching and movement in the soil.

PROFESSIONAL AFFILIATIONS:

Society for In Vitro Biology (1993 to Present)

American Society for Plant Physiologists (1980 to 1982)

American Society for Horticultural Science (1981 to Present)

AOAC International

Liberian Studies Association

International Society of African Scientists

American Phytochemical Society

TRAINING AND DEVELOPMENT CONFERENCES AND WORKSHOPS

Up-coming workshop on NSF-QEM pre-proposal development, Rockville, Maryland.

October 16 to 18, 1997.

Workshop on Diagnostic Virology, American Type Tissue Culture (ATCC), Rockville, Maryland. October 16 to 18, 1997.

Eleventh Biennial Research Symposium, Association of Research Directors, San Antonio Marriott Rivercenter, San Antonio Texas, October 1 to 4, 1997.

The Conference on In Vitro Biology, Washington Renaissance Hotel, Washington, D. C., June 14 to 18, 1997.

The Liberian Studies Conference at Prairie View University and Houston, Texas; April, 1997.

Teaching and Learning Through Cases and Discussion, College of Agriculture and Natural Resources, University of Maryland, The Inn and Conference Center, University of Maryland, October 3 to 5, 1996.

Professional Agricultural Workers Conference, Tuskegee, Alabama, December 5 through 10, 1996.

Workshop on Plant Biotechnology, Florida A. & M. University, Tallahassee, Florida. 1996.

Workshop on Transgenic Plants: Biology and Applications, Center for Plant Biotechnology Research, School of Agriculture and Home Economics, Kellogg Executive Conference Center, Tuskegee University, Tuskegee, Alabama, April 20 to 22, 1996.

Workshop on Recombinant DNA Technology Summer, 1995, Catholic University of America, Washington, D.C.

Conference of the Society of In Vitro Biology May, 1995, Congress on In Vitro Biology Held at the Adams Mark Hotel, Denver, Colorado: Presented paper on sassafras, and abstract is published in the Program Issue of in Vitro Cellular and Developmental Biology.

Professional Agricultural Workers Conference December, 1994 held at the Kellogg Center, Tuskegee University, Tuskegee, Alabama: Presented paper on the Downsizing of Agriculture. Paper was published in the Proceedings of the Conference in 1995/6.

Conference of Research Directors 1994, Held at the Marriott Hotel, New Orleans, LA.

Workshop on Plant Biotechnology I. Summer, 1992, Catholic University of America, Washington, DC.

Workshop on Research Problems in Sub-Saharan Africa 1987, The Ruppin Institute, Ruppin, Israel.

Conference of Association of Faculties in Agriculture in Africa. 1986, Nairobi, Kenya

Workshop on Liberian Food Security 1994, University of Liberia, Monrovia., Liberia