

CV - DONALD P. CHENEY

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Education

B.S. - University of Massachusetts, Amherst, MA. in Botany (1967)
Ph.D. - University of South Florida, Tampa, FL. in Biology (1975)

Professional Experience and Positions

1998: Visiting Scientist, Boyce Thompson Institute for Plant Research, at Cornell Univ., Ithaca, NY
1986-present: Associate Professor (with tenure), Dept. of Biology, Northeastern University.
1993-present: Appointed Fellow of the Barnett Institute of Chemical Analysis and Materials Science, Northeastern University
1990: Participant, Office of Naval Research course "Ecophysiology and Molecular Biology of Marine Macrophytes", Hopkins Marine Station of Stanford University
1987-1988: University Research Fellow, Plant Genetic Manipulation Group, Prof. E. Cocking's Laboratory, Dept. of Botany, University of Nottingham, U.K.
1980-1986: Assistant Professor, Department of Biology, Northeastern University
1985-1986: Guest Assistant Scientist, Brookhaven National Laboratory, Long Island, NY.
1987: Invited Co-Instructor of workshop, "Seaweed protoplast and tissue culture", Norwegian Institute of Technology, Division of Biotechnology, Trondheim, Norway,
1979-1980: Guest Investigator, Environmental Systems Laboratory, Woods Hole Oceanographic Institution, Woods Hole, MA.
1975-1980: Post Doctoral Fellow - Research Associate and Sea Grant PI, Jackson Estuarine Laboratory, University of New Hampshire, Durham, NH.

Honors, Awards and Appointments (from 1988)

1997: Invited Member of Task Force to design new "Marine Biotechnology" exhibit at the New England Aquarium, Boston, MA
1995: Appointed member of the Massachusetts Water Resource Authority Outfall Monitoring Task Force, which is responsible for overview of Boston Harbor cleanup project
1994: Invited Organizer/Co-Chairman, "Microalgal and Macroalgal Biotechnology" Symposium, International Phycological Congress, Qingdao, China
1992: Recipient, Northeastern University Inventor Award
1989: Invited Organizer/Chairman, "Protoplast and tissue culture applications to the seaweed industry" Symposium, 13th International Seaweed Symposium, Phi Honor Society; "Improved marine plants through genetic engineering"
1988: Keynote speaker, British Phycological Society Annual Meeting, "Recent progress in marine algal protoplasts and tissue culture technology", University of Surrey, UK.
1988 to present: Member of Editorial Board, The Journal of Applied Phycology

Research Interests

Marine biotechnology, particularly the biotechnology and genetic improvement of marine macroscopic algae: including cell and tissue culture of phycocolloid and biopharmaceutical - producing, as well as, edible macroalgae; protoplast fusion, genetic manipulation and genetic engineering of commercially valuable macroalgae; mariculture of macroalgae for the production of nutraceuticals including PUFAs and antioxidants; integrated land-based seaweed - fish aquaculture for bioremediation of effluent and production of high-value feed supplements.

Selected Publications, Patents, Talks, Abstracts and Theses

Publications:

Cheney, D.P., A. Mathieson and D. Schubert, 1981. The application of genetic improvement techniques to seaweed cultivation: I Strain selection in the carrageenophyte *Chondrus crispus*. Proc. Intern. Seaweed Symp.: 10: 559-567.

Abbott, I. and D. Cheney, 1982. Commercial uses of algal products: introduction and bibliography. In: Selected Papers in Phycology, Vol. 2, B. Parker and J. Rosowski (Eds.), Phycological Soc, Amer., Lawrence KA, pp. 779-787.

Cheney, D.P., 1984. Genetic modification in seaweeds: applications to commercial utilization and cultivation. In: Biotechnology in the Marine Sciences, R. Colwell et. al. (Eds.), Wiley-Interscience, NY. pp. 161-175.

Cheney, D., E. Mar, N. Saga and J. van der Meer, 1986. Protoplast production and culture in the agar-producing seaweed *Gracilaria tikvahiae* (Rhodophyta), J. Phycol. 22: 238-243.

Cheney, D., 1986. Genetic engineering in seaweeds: applications and current status. In: Algal Biomass Technologies: An Interdisciplinary Perspective, W. Barclay and R. McIntosh (Eds.), Beih. Nova Hedwigia 83: 22-29.

Cheney, D.P., A.H. Luistro and P.M. Bradley, 1987. Carrageenan analysis of *Agardhiella subulata* tissue culture and whole plants. Hydrobiologia 151/152: 161-166.

Cheney, D.P., 1990. Genetic improvement of seaweeds through protoplast fusion. In: Economically important maine plants of the Atlantic: Their biology and cultivation, C. Yarish and C. Penniman (Eds.), Univ. of Conn. Sea Grant Program, pp 15-25.

Bradley, P.M. and D.P. Cheney, 1990. Some effects of plant growth regulators on tissue cultures of the marine red alga *Agardhiella subulata* (Gigartinales, Rhodophyta). Hydrobiologia 204/205: 353-360.

Graber, M., W. Gerwick and D. Cheney, 1996, The isolation and characterization of Agardhilactone, a novel oxylipin from *Agardhiella subulata*. Tetrahedron Letters 7:4635-4638.

Cheney, D. B. Rudolph, L. Wang, B. Metz, K. Watson, K. Roberts and I. Levine, 1998. Genetic manipulation and strain improvement in commercially valuable red seaweeds. In: New developments in marine biotechnology, Y. Le Gal and H. Halvorson, (eds.), Plenum Press, NY, pp. 101-104.

Rorrer, G., W. Gerwick, and D. Cheney, 1998. Production of bioactive compounds by cell and tissue cultures of marine seaweeds in bioreactor systems. In: New developments in marine biotechnology, Y. Le Gal and H. Halvorson, (eds.), Plenum Press, NY, pp. 65-67.

Levine, I. and D. Cheney, 1998, North American *Porphyra* cultivation: from molecules to markets. In: New developments in marine biotechnology, Y. Le Gal and H. Halvorson, (eds.), Plenum Press, NY, pp. 141-144.

Huang, Y., S. Maliakal, D. Cheney and G. Rorrer, 1998. Comparison of development, photosynthesis and growth of filament clump and regenerated microplantlet cultures of *Agardhiella subulata* (Rhodophyta, Gigartinales), 1998. J. Phycology 34: 893-901.

Cheney, D.P., 1999. Strain improvement of seaweeds thru genetic manipulation: current status. *World Aquaculture* 30: 55-56 & 65.

Cheney, D., 1999. Developing seaweed aquaculture in the northeast US and Canada: species and strain improvement. *Bull. Aquaculture Assoc. Canada* 99-1: 23-26.

Kunimoto, M., H. Kito, Y Yamamoto, D. Cheney, Y. Kaminishi and Y. Mizukami, 1999. Discrimination of *Porphyra* species based on small subunit ribosomal RNA gene sequence. *J. Applied Phycol.* 11: 203-209.

Watson, K, D. Cheney, and I. Levine, 2000. Biomonitoring of an aquacultured introduced seaweed, *Porphyra yezoensis* (Rhodophyta, Bangiophycidae) in Cobscook Bay, Maine, USA. In: *Maine Bioinvasions: Proceedings from the First National Conference*, J. Pederson, (ed), MIT Sea Grant Program, pp. 260-264.

Patents Received

- 1). US Patent No. 5,365,018, issued Nov. 15, 1994, D. Cheney and LZ Wang; "Methods of causing somatic hybridization between two species of algae"
- 2). US Patent No. 5,426,040, issued June 20, 1995, D. Cheney and C. Duke; "Methods for producing improved strains of seaweed by fusion of spore-protoplasts, and resultant seaweeds and phycocolloids"
- 3). US Patent No. 5,585,544, issued Dec. 17, 1996, D. Cheney and LZ Wang; "Method of causing somatic hybridization between two species of algae"

Patents Pending

- 1). PCT International Patent Application; D. Cheney, K. Watson and K. Roberts, "Strain manipulation and improvement in the edible seaweed *Porphyra*".
- 2). PCT International Patent application; D. Cheney, "Genetic transformations of multicellular marine algae, resultant strains and their products".

Invited National and International Symposium Contributions

Cheney, D. 2001. Invited Speaker, Symposium on "Algal Genomics", Phycological Society of America Annual Meeting, "*Agrobacterium* - mediated genetic transformation in the macroscopic marine red alga *Porphyra yezoensis*," Estes Park, Colorado, June, 2001; abstract published in *J. Phycol.* 37 (Suppl): p. 11.

Cheney, D., 1998. Invited Speaker, Special Symposium on "Cold-Water Seaweed Aquaculture", Aquaculture Canada '98 Meeting, "What genetic modification and strain improvement can contribute to the success of seaweed aquaculture in the Maritime Provinces", St. Johns, Newfoundland, June, 1998; abstract published in *Proceedings*.

Cheney, D, 1998. Invited Speaker. World Aquaculture Society Triennial Meeting, Macroalgae Cultivation Symposium, "Genetic modification and strain improvement of seaweeds for aquaculture". Los Vegas, Feb. 1998; abstract published in *Proceedings*

Cheney, D., 1997. Invited Special Symposium speaker, 6th International Phycological Congress, "Strain improvement through protoplast fusion/somatic hybridization in commercial red seaweeds"; Leiden, The Netherlands, August, 1998; abstract published in *Phycologia*, V. 36, Suppl. pg 16.

Cheney, D., 1997. Invited Speaker, The Third Annual Marine Biotechnology Symposium at the Marine Biological Laboratory: Future Marine Food Technologies, "New developments in seaweed utilization through biotechnology", Marine Biological Laboratory, Woods Hole, MA, May, 1997 (one of only 8 invited speakers)

Cheney, D., 1996. Invited Special Conference speaker, First International Conference on Cultivation and Biotechnology of Marine Algae of Latin America, "Strain improvement in *Eucheuma* and *Kappaphycus* using modern biotechnological techniques" Cumana, Venezuela, Dec. 1996; abstract published in Proceedings

Cheney, D., 1994. Invited Speaker. 5th Intern. Phycological Congress, Qingdao, China Symposium on Microalgal and macroalgal biotechnology, "Introduction to macroalgal biotechnology: current status and future prospects".

Cheney, D., 1996. Seaweed mariculture and the use of introduced and genetically modified species, Invited Talk in "Workshop on exotic species: issues relating to aquaculture and biodiversity", organized by MIT Sea Grant Program,

Cheney, D. 1995. Macroalgal blooms: environmental causes and economic opportunities. Symposium on "Algae in contemporary environmental issues - regulator and regulated", Northeast Algal Symposium, Woods Hole, MA

Cheney, D., 1988. Genetic manipulation of marine algae through protoplast and tissue culture technology. Symposium on "Cell and Tissue Culture in Algae". 3rd International Phycological Congress, Melbourne, Australia, Proceedings pg 8

Cheney, D., 1988. Genetic manipulation of marine plants through protoplast and tissue culture technology. Symposium on "Economically Important Marine Plants of the Atlantic; Their Biology and Cultivation", Univ. Conn. Sea Grant Program, Groton, CT

Cheney, D., 1986. Genetic engineering and biotechnology in seaweeds. Symposium on "Marine Biotechnology", Pacific Technology Conference, Honolulu, HI.

Cheney, D., 1986. Marine plant biotechnology: present status and future potential. Symposium on "Prospects of Marine Biotechnology". Graduate School of Oceanography, University of Rhode Island

Cheney, D., 1985. Seaweed genetic engineering: current status and future prospects. Symposium on "Algal Biomass", American Phycological Society Meetings, AIBS. Gainesville FL.

Cheney, D., 1985. Genetic manipulation of macroalgae. Conference on: "Innovative techniques in aquaculture", sponsored by US/Japanese Natural Resources Panel on Aquaculture, NOAA, held at the WHOI, Woods Hole MA.

Cheney, D., 1984. Genetic engineering applications to seaweeds: current status. Conference on "Algal Biomass, a workshop on the present status and future directions for biotechnologies based on algal biomass production", sponsored by Solar Energy Research Inst. DOE, and Univ. of Colorado, Boulder CO.

Cheney, D., 1984. Improved phycocolloid sources through bioengineering. Conference on "Biotechnology of Marine Polysaccharides", MIT Sea Grant College Lecture and Seminar Series, MIT Boston MA.

Cheney, D., 1984. Genetic engineering applications to marine algae. Presented at AAAS Annual Meeting, Symposium on "Marine Biotechnology", New York, NY

Cheney, D., 1983. Genetic engineering in seaweeds: the problems and potentials. Conference on "Biotechnology in the Marine Sciences", National Sea Grant Meetings, San Antonio TX.

Contributed Conference Papers

1998, Cheney, D., I. Levine, B. Rudolph and D. Kapraun. Strain improvement of seaweeds for aquaculture thru biotechnology: current status and future prospects. Phycological Society of America Annual Meeting, Flagstaff, Ariz; abstract published in J. Phycology V. 34 Supplement, pp 12-13.

1998. Metz, B., D. Cheney, T. Chopin, and D. Kapraun. Genetic manipulation in *Chondrus crispus* through protoplast fusion and mutagenesis. Phycological Society of America Annual Meeting, Flagstaff, Ariz; abstract published in J. Phycology V. 34 Supplement, pp 39-40.

1997, Watson, K., K. Roberts, and D. Cheney. *Porphyra* hybridization and strain improvement for cultivation in North Atlantic. 6th International Phycological Congress, Leiden, The Netherlands, August, 1998; abstract published in *Phycologia*, V.36, Suppl. pg 16.

1996, Watson, K., K. Roberts and D. Cheney. Protoplast isolation and fusion of North Atlantic *Porphyra* species and *P. yezoensis*. Phycological Society of America Annual Meeting, Santa Cruz, CA; abstract published in J. Phycology V. 32, pg 50.

1996, Cheney, D.. Seaweed cell and tissue culture biotechnology: uses in genetic manipulation and biopharmaceutical production. Phycological Society of America Annual Meeting, Santa Cruz, CA; abstract published in J. Phycology, V. 32 Suppl. pg 11.

1996. Cheney, D. Macroalgal biotechnology: future prospects for protoplast, cell and tissue culture technology. Northeast Algal Symposium, Woods Hole, MA

1996, Maliakal, S., D. Cheney and W. Fenical. Biosynthesis of bioactive secondary compounds in cell cultures of *Ochtodes secundiramea*. Phycological Society of America Annual Meeting, Santa Cruz, CA; abstract published in J. Phycology, V. 32 Suppl. pg 30.

1995, Cheney, D., Modern approaches to seaweed breeding through biotechnology. Phycological Society of America Annual Meeting, Breckenridge, CO; abstract published in J. Phycology, V. 31 Suppl. pg. 9.

1993, Cheney. Genetic engineering/manipulation of commercially valuable seaweeds. Amer. Assoc. Advancement of Sci., Ann. Meeting, Boston, MA, Proc.pg 245.

1992, Cheney, D. and A. Kurtzman. Progress in protoplast fusion and gene transfer in red algae. 14th Intern. Seaweed Symposium, Brittany, France, Proc. pg 68.

1992, Cheney, D., P. Bradley, J. McLachlan and C. Bird. Isozyme electrophoresis: underused methods for screening genetic differences in seaweeds? 14th Intern. Seaweed Symposium, Brittany, France, Proceedings, pg 67.

1991, Kurtzman, A. and D.P. Cheney, Direct gene transfer and transient gene

expression in a marine red alga using the biolistic method. 3rd Intern Phycological Congress, Duke Univ. NC, J. Phycol. Suppl 27: 42.

1989, Cheney, D. Interspecific protoplast fusion and somatic hybridization in the agarophyte *Gracilaria*. 13th Intern. Seaweed Symposium, Vancouver, Canada, Proc. pg A69.

1989, Cheney, D.P. Interspecific protoplast fusion and putative somatic hybrid regeneration in the agarophyte *Gracilaria*. Northeast Algal Symposium, Woods Hole, MA

1989, Bradley, P. and D.P. Cheney. Effects of plant growth regulating substances on tissue cultures of *Agardhiella subulata*. 13th Intern. Seaweed Symposium, Vancouver, Proceedings, pg A26.

1989, Bradley, P., D.P. Cheney and M.P. Gonella. Differential toxicity of herbicides to two red seaweeds (*Eucheuma spinosum* and *Gracilaria chilensis*) and a green seaweed (*Enteromorpha* sp.). Northeast Algal Symposium, Woods Hole, MA

1988, Cheney, D.P. Genetic manipulation of marine algae by protoplast fusion. 1st Intern. Symp. on Marine Molecular Biology, Center of Marine Biotechnology, Baltimore, MD, Proceedings, pg 22.

1986, Cheney, D.P., P.M. Bradley, and A. White. Tissue culture of the carrageenan-producing, anatomically-complex red seaweed *Agardhiella*. Sixth Intern. Congress of Plant Tissue and Cell Culture, Minneapolis MN, Abstracts pg 25.

1986, Bradley, P.M., D.P. Cheney and N. Saga. A new, one step method for obtaining axenic cultures of algae. Joint meetings of Amer. Soc. Limn. & Oceanol. and Phycol. Soc. Amer., Kingston RI., Abstracts p.12.

1986, Bradley, P.M. and D.P. Cheney. Morphogenetic variation in tissue cultures of the red seaweed *Agardhiella subulata*. Annual Meeting of the Botanical Society of Amer. Amherst, MA Amer J. Bot. 73: p.649.

Selected Theses

Aaron Kurtzman (MS - 1991). Direct gene transfer and transient gene expression the marine red alga *Kappaphycus alvarezii*

Le Zhong Wang (MS - 1993). Hybridization of macroscopic red algae by somatic cell fusion

Verena Gross (MS - 1994). Factors causing the nuisance algal bloom of *Pilayella littoralis* in Nahant Bay, Mass

Yang Zhang (MS - 1996). Development of protoplast fusion techniques in *Chondrus crispus*

Sanjiv Maliakal (MS - 1998). The production of halogenated monoterpenes in cultures of the red marine alga *Ochtodes secundiramea*.

Watson, Katherine (MS - 2000). Bio-monitoring of an aquaculture, non-indigenous red alga, *Porphyra yezoensis*, in Easport, Maine.