

## **Gregory L. Boyer**

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### **RESEARCH INTERESTS**

The chemistry and biochemistry of biologically active natural products from plants and algae including toxins, siderophores, allelopathic agents, and growth regulators. Special interests include the chemistry / ecology of marine and freshwater harmful algal blooms such as cyanobacteria, red tides and brown tides, the development of automated monitoring systems for these blooms, rapid detection methods for toxic cyanobacteria and paralytic shellfish poisoning (PSP) toxins, optimization of large scale algal culture facilities for bioproducts productions, and the biochemistry of iron in forest and aquatic (marine and freshwater) ecosystems.

### **EDUCATION:**

Ph.D., University of Wisconsin - Madison, 1980, (Biochemistry).

A.B., University of California - Berkeley, 1975, (Biochemistry).

A.S., Reedley College (Reedley, Calif.), 1973, (Chemistry).

### **PROFESSIONAL EXPERIENCE:**

2007-present: Director, Great Lakes Research Consortium, Syracuse, NY 13210

1998-present: Professor of Chemistry, State University of New York, College of Environmental Science and Forestry, (SUNY-CESF) Syracuse NY 13210.

1991-1998: Associate Professor of Chemistry, SUNY-CESF.

1994 Visiting Scientist, Biology Dept., Woods Hole Oceanographic Institute, Woods Hole, MA

1986-1991 Joint Academic Appointment in the Faculty of Environmental Sciences, SUNY-CESF.

1985-1990 Assistant Professor of Chemistry, SUNY-CESF.

1983-1984 Research Associate, Dept. of Oceanography, Univ. of British Columbia, Vancouver, BC.

1980-1982 Research Associate, Michigan State Univ. - DOE, Plant Research Labs. East Lansing, MI.

1975-1980 Research Assistant, Department of Biochemistry, University of Wisconsin, Madison, WI.

### **HONORS and Supporting Activities:**

NRSA predoctoral trainee - Cell & Molecular Biology (1976-79), Life member; Phi Beta Kappa - Alpha (UC-Berkeley Honor Soc.) and Alpha Gamma Sigma (Reedley College Honor Soc.), International Expert for IAEA (International Atomic Energy Agency) on PSP toxins (1999), Participant in EPA's "Creating a Cyanotoxin Target List for the Unregulated Contaminant Monitoring Rule" taskforce (2001), Participant in NOAA - Sea Grant's workshop entitled "Developing a National Plan for Remediation of Harmful Algal Blooms", Steering committee for "National Plan for Marine Biotoxins-2004; Elected member of the US National Harmful Algal Bloom Advisory Committee (2005-2008), Invited External Reviewer for EPA Toxicological Reviews of Cyanobacteria Toxins (2007), Elected to the Governing Body of the Northeast Algal Society 1999-2010; Recipient; State University of New York Research Foundations 2003 Award for Excellence in the Pursuit on Knowledge. Recipient; ESF award for integrating outreach activities with Teaching and Research -2005. Recipient; ESF 2009 Exemplary Researcher Award ; Chief Research Scientist; Source Sentinel Corporation; Chief Scientist, Centers for Excellent in Ocean Science Education (COSEE) research cruises 2005, 2008 and 2009, Participate in more than 15 International Research Cruises (eight times as Senior or lead Scientist).

### **SELECTED PROFESSIONAL SOCIETIES:**

American Society of Limnology and Oceanography, North East Algal Society, Phycological Society of America, American Littoral Society, American Water Resources Association. International Association for Great Lakes Research, International, Society for the Study of Harmful Algal Blooms, Member, AOAC Joint taskforce on Marine and Freshwater Toxins. North American Lake Management Society.

## **PUBLICATIONS OF GREGORY L. BOYER:**

1. Boyer, G.L., E.J. Schantz, and H.K. Schnoes (1978) Characterization of 11-hydroxysaxitoxin sulfate, a major toxin in scallops exposed to blooms of the poisonous dinoflagellate, *Gonyaulax tamarensis*. J.C.S. Chem. Comm. 20: 889-890.
2. Boyer, G.L., C.F. Wichmann, J. Mosser, E.J. Schantz, and H.K. Schnoes (1979) Toxins isolated from Bay of Fundy Scallops. In: Toxic Dinoflagellate Blooms, D.L. Taylor, H.H. Seliger, eds. Elsevier-North Holland, New York. pp. 373-376.
3. Wichmann, C.F., C.L. Divan, G.L. Boyer, E.J. Schantz, and H.K. Schnoes (1981) Neurotoxins from *Gonyaulax excavata* and the Bay of Fundy scallops. Tetrahedron Letters 22(21): 1941-1944.
4. Boyer, G.L. and J.A.D. Zeevaart (1982) Isolation and quantitation of B-D-glucopyranosyl abscisate from leaves of *Xanthium* and Spinach. Plant Physiol. 70: 227-231.
5. Zeevaart, J.A.D. and G.L. Boyer (1982) Metabolism of abscisic acid in *Xanthium strumarium* and *Ricinus communis*. In: Plant Growth Substances 1982, P.F. Wareing, ed. Springer Verlag, New York, pp. 335-342.
6. Zeevaart, J.A.D. and G.L. Boyer (1984) Accumulation and transport of abscisic acid and its metabolites in *Ricinus* and *Xanthium*. Plant Physiol. 74: 934-939.
7. Hall, S., S.D. Darling, G.L. Boyer, P.B. Reichardt, and H.-W. Liu (1984) Dinoflagellate neurotoxins related to saxitoxin: Structures of toxins C3 and C4, and confirmation of the structure of neosaxitoxin. Tetrahedron Letters 25(33): 3537-3538.
8. Boyer, G.L. and J.A.D. Zeevaart (1986) 7'-hydroxy abscisic acid; an artifact of feeding racemic abscisic acid to *Xanthium strumarium*. Phytochemistry 25: 1103-1105.
9. Boyer, G.L., J.J. Sullivan, R.J. Andersen, P.J. Harrison, and F.J.R. Taylor (1986) Toxin production in three isolates of *Protogonyaulax* sp. In: Toxic Dinoflagellates, D.M. Anderson, A.W. White, and D.G. Baden, eds., Elsevier, pp 281-286.
10. \*Boyer, G.L., J.J. Sullivan, M. LeBlanc, and R.J. Andersen (1986) The assimilation of PSP toxins by the copepod *Tigriopus* from dietary *Protogonyaulax tamarensis*. In: Toxic Dinoflagellates, D.M. Anderson, A.W. White, and D.G. Baden, eds., Elsevier, pp 407-412.
11. Zeevaart, J.A.D., G.L. Boyer, K. Cornish, and R. Creelman (1986) Metabolism of abscisic acid. In: Plant Growth Substances 1985, M. Bopp, ed., Springer-Verlag, pp. 101-107.
12. Boyer, G.L., J.J. Sullivan, R.J. Andersen, F.J.R. Taylor, P.J. Harrison, and A.D. Cembella (1986) The use of HPLC to investigate the production of paralytic shellfish toxins by *Protogonyaulax* sp. in culture. Mar. Biol. 93: 361-369.
13. Boyer, G.L., B.V. Milborrow, P.F. Wareing, and J.A.D. Zeevaart (1986) The nomenclature of abscisic acid and its metabolites. In; Plant Growth Substances 1985, M. Bopp, ed., Springer-Verlag, pp. 99-100.
14. Boyer, G.L., A.H. Gillam, and C.G. Trick (1987) Iron Ecology and Uptake. In: The Cyanobacteria - A Comprehensive Review, P. Fay and C. van Baalen, eds., Elsevier Biomedical, pp. 415-436.
15. Zeevaart, J.A.D., and G.L. Boyer (1987) Photoperiodic Induction and the Floral Stimulus in *Perilla*. In: The Manipulation of Flowering, J.G. Atherton, ed. Butterworths, London, pp. 269-277.
16. Cembella, A.D., J.J. Sullivan, G.L. Boyer, F.J.R. Taylor, and R.J. Andersen (1987) Toxin variability within the *Protogonyaulax tamarensis* / *catenella* species complex. Biochem. Syst. Ecol. 15:171-186.
17. Whitefleet, J., G.L. Boyer, and H.K. Schnoes (1987) Isolation and spectral characteristics of four toxins from the dinoflagellate *Ptychodiscus brevis*. Toxicon 24:1075-1090.

18. Boyer, G.L., J.J. Sullivan, R.J. Andersen, P.J. Harrison, and F.J.R. Taylor (1987) The effects of nutrient limitation on toxin production in *Protogonyaulax tamarensis*. *Marine Biol.* 96: 123-128.
19. Boyer, G.L. and S.S. Dougherty (1988) Identification of abscisic acid in the seaweed *Ascophyllum nodosum*. *Phytochemistry*, 27: 1521-1522.
20. Omholt, T.E. and G.L. Boyer (1988) The reduction of iron in squash callus cultures. *J. Plant Nutr.*, 11(6-11): 1227-1235.
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23. Speirs, R.J., and G.L. Boyer (1991) Analysis of <sup>55</sup>-Fe Labeled hydroxamate siderophores by high-performance liquid chromatography. *J. Chrom.* 537:259-267.
24. Boyer, G.L. (1991) HPLC separation of Iron Chelators. *J. Chromato. Science.* 29:319
25. Boyer, G.L., and D.J. Nicholson (1991) Occurrence of abscisic acid in unicellular green algae. *Plant Physiol.* 96s:76.
26. Aronson, D.B., and G.L. Boyer (1992) *Frankia* produces a hydroxamate siderophore under iron limitation. *J. Plant Nutr.* 15:2193-2201.
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  58. Atkinson, J. F., M. L. Green, M. Sultan, R. Becker, and G. L. Boyer (2005) Monitoring algal blooms in the Great Lakes. In: "Proceedings, 8th International Conference of Remote Sensing for Marine and Coastal Environments, Halifax, Nova Scotia, Canada, May 17-19, 2005" missing page numbers
  59. Becker, R., M. Sultan, J. Atkinson, G. Boyer, and E. Konopko (2005) Spatial and temporal variations of algal blooms in the lower Great Lakes. In: "Proceedings, 8th International Conference on Remote Sensing for marine and Coastal Environments, Halifax, Nova Scotia, Canada, May 17-19, 2005 missing page numbers
  60. Hotto, A., M. Satchwell, and G. Boyer (2005) Seasonal Production and Molecular Characterization of Microcystins in Oneida Lake, New York, USA. *Environmental Toxicology*. 20:243-248.
  61. Gobler, C. J., D. J. Lonsdale, and G. L. Boyer (2005) A review of causes, effects, and potential management of harmful brown tide blooms caused by the alga *Aureococcus anophagefferens* (Hargraves et Sieburth). *Estuaries*. 28:726-749
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