In memoriam Kimon T. Bird (1951–1996)

D. Wilson Freshwater[1] & M. Dennis Hanisak[2]
[1]*Center for Marine Science Research, 7205 Wrightsville Avenue, Wilmington, NC 28403, USA*
[2]*Harbor Branch Oceanographic Institution, 5600 US 1 North, Fort Pierce, FL 34946, USA (Corresponding author)*

To the great sorrow of his many friends and colleagues, Dr Kimon T. Bird died suddenly on 29 October 1996, one day before his forty-fifth birthday. He is survived by his wife Susan. Kimon was born on 30 October 1951, in San Antonio, Texas, but lived much of his childhood in Europe where his father worked for the United States Civil Service. He attended school in England and Spain before returning to the U.S. and finishing high school in Texas. In 1973, Kimon received his B.S. from the University of Texas at Austin, where Mike Wynne was an early phycological influence. Kimon moved west to the University of Southern California and received his Master's in 1975. During that time, Kimon worked at the marine lab on Santa Catalina Island, mixing research with sustenance by diving for dinner after finishing the day's work. He served as the marine botanist on the Valley Foundation Expedition to the Line Islands, a position he would also fill on a Scripps Institution of Oceanography Expedition to Baja California. After finishing his Master's, Kimon worked at the Marine Science Institute, University of California at Santa Barbara, for one year before going to the University of South Florida as a doctoral student of Clinton Dawes. For those familiar with Kimon's apparent deprecation of floristic and taxonomic work, it is interesting to note that, as well as serving as the marine botanist on the previously mentioned cruises, he also conducted a marine floristic survey of Guatemala while a student at USF!

Upon the completion of his Ph. D. in 1979, Kimon spent the next two years as a postdoctoral fellow with John Ryther at Harbor Branch Oceanographic Institution, and in collaboration with Dennis Hanisak. Kimon then worked as a Project Manager for the Gas Research Institute (GRI) before retuming to Harbor Branch in 1984 as a Research Scientist in what was then called the Division of Applied Biology (= Aquaculture). When John Ryther retired, Kimon became the Acting Division Director and, subsequently, Division Director. In 1989, he left Harbor Branch to become Program Coordinator of the Marine Biotechnology Program at the Center for Marine Science Research at the University of North Carolina at Wilmington (UNCW).

Kimon authored 58 publications (see bibliography) and was the senior editor of a book, *Seaweed Cultivation for Renewable Resources*, which will remain the definitive text on seaweed mariculture research in North America during the 1970s and 1980s. He had the unique achievement of being the inventor of the first patented seaweed strain: *Gracilaria* G16S. He was well known internationally among phycologists and was an important figure in the development of the informal

Applied Phycology Section of the Phycological Society of America. At the time of his death, Kimon had been the Editor of the *Applied Phycology Forum* for several years and had served on the editorial boards of *Journal of Phycology* and *Journal of Applied Phycology*. A skilled grant writer, he received over $1.2 million in funding during his short career.

Although the passage of time has tempered the shock of Kimon's death, an accounting of his legacy is still difficult. How does one consider Kimon T. Bird the phycologist? Clearly, his major impact was in applied science ... he sometimes referred to himself, without any condescension, as a 'biological mercenary'. Kimon believed that, if phycology was to be relevant in today's world, indeed, if phycology would persist as a discipline, the work of phycologists needed to have broader application beyond those of us who would study algae only for more fundamental, or more esoteric, reasons. In a sense, Kimon kept us honest, always asking if research projects could make a difference to the world outside phycology. This view is reflected in his own research which centered on seaweed mariculture, biochemistry of agars and carrageenans, bioremediation and restoration of marine habitats, and environmental toxicology.

Kimon's pragmatic approach was also apparent in his mentoring of students whom he nudged, pushed, and pulled towards areas where job prospects were better. He took an active interest in the whole program of his students and spent much time and energy not only making sure that their research projects worked, but also that they had adequate funding and were not floundering in their course work. Being a 'Kimon Bird student' truly meant working with Kimon, not just being under his direction.

While Kimon's roots were in basic phycology, his postdoc experience at Harbor Branch put him on the path of applied phycology. He had the amazing ability to see how research from many different fields could fit together and the finesse to bring together researchers from these different fields and make such projects happen, skills that were honed when he worked at GRI as a manager in a commercial-world environment. His return to academia at UNCW allowed him to bring together all of the key elements of his past experiences. His skilful administration of the Marine Biotechnology Program at the Center for Marine Science Research is sorely missed.

Kimon was an excellent researcher, teacher, and administrator, but his greatest contribution to those who knew him was as a model of how to live life. Possibly it was his premonition of an early death, but Kimon lived each day to the fullest, never getting angry, but keeping an upbeat disposition when faced with even the most aggravating administrative or professorial duties. It was this characteristic which really set Kimon apart and made him such a special person to all of us. He always represented his profession well. He was a dear colleague and friend. Those of us who knew Kimon will miss him.

References

Bird KT (1976) Simultaneous assimilation of ammonium and nitrate by *Gelidium nudifrons* (Gelidiales, Rhodophyta). J. Phycol. 12: 238–241.

Bird KT, McIntosh RP (1979) Notes on the marine algae of Guatemala. Rev. Biol. Trop. 27: 163–169.

Dawes CJ, Bird K, Durako M, Goddard R, Hoffman W, McIntosh R (1979) Chemical fluctuations due to seasonal and cropping effects on an algal-seagrass community. Aquat. Bot. 6: 79–86.

Bird KT, Dawes CJ, Romeo JT (1980) Patterns of carbon fixation in dark held, respiring thalli of *Gracilaria verrucosa*. Z. Planzenphysiol. 98: 359–364.

Bird KT, Dawes CJ, Romeo JT (1981) Light quality effects on carbon metabolism and allocation in *Gracilaria verrucosa*. Mar. Biol. 64: 219–223.

Bird KT, Hanisak MD, Ryther JH (1981) Changes in agar and other chemical constituents of the seaweed, *Gracilaria tikvahiae*, when used as a substrate in a methane digester. Resources and Conservation 6: 321–327.

Bird KT, Hanisak MD, Ryther JH (1981) Chemical quality and production of agars extracted from *Gracilaria tikvahiae* grown in different nitrogen enrichment conditions. Bot. mar. 24: 441–444.

Nicholson N, Hosmer H, Bird K, Hart L, Sandlin W, Shoemaker C, Sloan C (1981) The biology of *Sargassum muticum* (Yendo) Fensholt at Santa Catalina Island, California. Proc. int. Seaweed Symp. 8: 416–424.

Bird KT, Habig C, DeBusk T (1982) Nitrogen allocation and storage patterns in *Gracilaria tikvahiae* (Rhodophyta). J. Phycol. 18: 344–348.

Fannin KF, Srivastava VJ, Chynoweth D, Bird K (1983) Effects of interaction between biomass composition and reactor design on anaerobic digestion process performance. Energy from Biomass and Waste VII: 563–584. Institute of Gas Technology, Chicago.

Bird KT (1984) Seasonal variations in protein: carbohydrate ratios in a subtropical estuarine alga, *Gracilaria verrucosa*, and the determination of nitrogen limitation status using these ratios. Bot. mar. 24: 111–115.

Bird KT, Ashby AB (1984) Recent economic studies of converting biomass to methane. Energy from Biomass and Waste, Institute of Gas Technology, Chicago, 8: 975–994.

Flowers A, Bird K (1984) Marine biomass – a long term methane supply option. Hydrobiologia 116/117: 272–275.

Bird KT, Ryther J (1985) Aquatic plant aquaculture: a multiproduct/multiuse approach. Energy from Biomass: Building a Generic Technology Base. Proceedings of the Third Technical Review Meeting, November 27–29, 1984. Argonne National Laboratory, Argonne. ANL./CNSV-TM-157.

Bird KT (1986) An historical perspective on economic and systems costs of kelp cultivation for bioconversion to methane. Nova Hedwegia 83: 150–154.

Bird KT (1987) Tropical macroalgal cultivation for bioconversion to methane. Energy from Biomass and Waste, Institute of Gas Technology, Chicago 10: 1283–1292.

Bird KT (1987) Cost analyses of marine biomass for energy systems. In Bird KT, Benson PH (eds), Seaweed Cultivation for Renewable Resources. Elsevier, Amsterdam, 327–350.

Bird KT, Benson PH (eds) (1987) Seaweed Cultivation for Renewable Resources. Elsevier, Amsterdam: 381 pp.

Guerin JM, Bird KT (1987) Effects of culture aeration on productivity, agar yield, and agar quality of *Gracilaria* sp. Aquaculture 64: 105–110.

Bird KT (1988) Agar production and quality from *Gracilaria* sp. strain G-16: Effects of environmental factors. Bot. mar. 31: 33–39.

Bird K, Lapointe B, Hanisak D, Ryther J, Dawes C. (1988). Alternative production systems-marine biomass. In Smith W, Frank J (eds), Methane from Biomass: A Systems Approach. Elsevier Applied Science Press, New York, 249–259.

Breden C, Bird KT (1988) Use of *Poecilia latipina* (sailfin molly) for control of nuisance algae in *Gracilaria verrucosa* strain G-16 (seaweed) culture. J. World Aquacult. Soc. 19: 161–162.

Daugherty B, Bird KT (1988) Effects of salinity and temperature on productivity and agar quality of *Gracilaria verrucosa* strain G-16. Aquaculture 75: 105–113.

Dawes CJ, Bird KT, Hanisak MD (1988) Population comparisons of *Sargassum pteropleuron* Grunow in Florida. Aquat. Bot. 31: 107–123.

Bird KT, Pendoley K, Koehn F (1989) Variability in agar gel behavior and chemistry as affected by algal growth under different environmental conditions. Proceedings of the 3rd International Workshop on Recent Developments in Industrial Polysaccharides: Biomedical and Biotechnological Advances. Gordon and Breach Publishers, New York, 365–373.

Chiles TC, Bird KT (1989) A comparative study of animal erythrocyte agglutinins from marine algae. Comp. Biochem. Physiol. 94B: 107–111.

Chiles TC, Bird KT, Koehn F (1989) Influence of nitrogen availability on agar-polysaccharides from *Gracilaria verrucosa* strain G-16: structural analysis by NMR-spectroscopy. J. appl. Phycol. 1: 53–58.

Tan Tui A, Vaughan D, Chiles T, Bird K (1989) Food value of eurytopic microalgae to bivalve larvae of *Cyrtopleura costata* (Linnaeus, 1758), *Crassostrea virginica* (Gmelin, 1791) and *Mercenaria mercenaria* (Linnaeus, 1758). J. Shellfish Res. 8: 399–405.

Bird KT (1990) Economics of seaweed culture: projection for the Northeast U.S. In Yarish C, Penniman CA, Van Patten P (eds), Economically Important Marine Plants of the Atlantic. Connecticut Sea Grant Publication CT-SG-89-07, Avery Point, 141–150.

Bird KT (1990) Evidence of 4-O-methyl-a-L-galactose in the agar of *Gracilaria verrucosa* strain G-16. J. appl. Phycol. 2: 383–384.

Bird KT, Chynoweth DP, Jerger DE (1990) Effects of marine algal proximate composition on methane yields. J. appl. Phycol. 2: 207–213.

Bird KT, Ryther JH (1990) Cultivation of *Gracilaria verrucosa* strain G-16 for agar. Hydrobiologia 204/205: 347–351.

Chiles TC, Bird KT (1990) *Gracilaria tikvahiae* agglutinin. Partial purification and preliminary characterization of its carbohydrate specificity. Carbohydrate Research 207: 319–326.

Flowers A, Bird K (1991) Methane production from seaweeds. In Akatsuka A (ed.), Introduction to Applied Phycology. SPB Academic Publishing, The Netherlands, 575–587.

Lemus A, Bird B, Kapraun DF, Koehn F (1991) Agar yield, quality and standing crop biomass of *Gelidium serrulatum*, *Gelidium floridanum* and *Pterocladia capillacea* in Venezuela. Food Hydrocolloids 5: 469–479.

Bird KT, Hinson TK (1992) Seasonal variations in agar yields and quality from North Carolina agarophytes. Bot. mar. 35: 291–295.

Christopher SV, Bird KT (1992) The effects of herbicides on development of *Myriophyllum spicatum* L. cultured *in vitro*. J. envir. Quality 21: 203–207.

Bird KT (1993) Comparisons of herbicide toxicity using in vitro cultures of *Myriophyllum spicatum*. J. aquat. Pl. Mgmt 31: 43–45.

Bird K, Chiles T, Longley R, Kindrick A, Kinkema M (1993) Agglutinins from marine macroalgae of the southeastern United States. J. appl. Phycol. 5: 213–218.

Bird KT, Cody BR, Jewett-Smith J, Kane ME (1993) Salinity effects on micropropagation of *Ruppia maritima* L. Bot. mar. 36: 23–28.

Kane MK, Bird KT, Lee T (1993) *In vitro* propagation of *Ipomoea pes-caprae* (Railroad Vine). J. Coast. Res. 9: 356–362.

Kapraun DF, Dutcher JA, Bird KT, Capecchi MF (1993) Nuclear genome characterization and carrageenan analysis of *Gymnogongrus griffithsia* (Rhodophyta) from North Carolina. J. appl. Phycol. 5: 99–107.

Bird KT, Jewett-Smith J (1994) Development of a medium and culture system for *in vitro* culture of the seagrass, *Halophila engelmannii*. Can. J. Bot. 72: 1503–1510.

Bird KT, Jewett-Smith J, Fonseca MS (1994) Use of *in vitro* propagated *Ruppia maritima* for seagrass meadow restoration. J. Coast. Res. 10: 732–737.

Breden PC, Bird KT (1994) Effects of environmental factors on production and characteristics of carrageenans from *Gymnogongrus griffithsiae* (Gigartinales, Rhodophyta). J. appl. Phycol. 6: 371–380.

Burdin K, Bird KT (1994) Heavy metal accumulation by carrageenan and agar producing algae. Bot. mar. 37: 467–470.

Kapraun DF, Ganzon-Fortes E, Bird KT, Trono G, Breden C (1994) Karyology and agar analysis of the agarophyte *Gelidiella acerosa* (Forsskål) Feldman et Hamel from the Philippines. J. appl. Phycol. 6: 545–550.

Dalton SR, Longley R, Bird KT (1995) Hemagglutinins and irnmunomitogens from marine algae. J. mar. Biotechnol. 2: 149–155.

Johnson JR, Bird KT (1995) The effects of the herbicide atrazine on *Ruppia maritima* L. growing in autotrophic versus heterotrophic cultures. Bot. mar. 38: 307–312.

Vergara JJ, Bird KT, Niell FX (1995) Nitrogen assimilation following NH_4^+ pulses in the red alga *Gracilariopsis lemaneiformis*: effect on C metabolism. Mar. Ecol. Progr. Ser. 122: 253–263.

Bird KT, Brown MS, Henderson TT, O'Hara CE, Robbie JM (1996) Culture studies of *Ruppia maritima* L. in bicarbonate and sucrose based media. J. exp. mar. Biol. Ecol. 199: 153–164.

Kapraun DF, Lopez-Bautista J, Bird KT (1996) DNA base composition heterogeneity in some agarophytes (Gracilariales, Rhodophyta) from Mexico and the Philippines. J. appl. Phycol. 8: 229–237.

Kapraun DF, Lopez-Bautista J, Trono G, Bird KT (1996) Quantification and characterization of nuclear genomes in commercial red seaweeds (Gracilariales) from the Philippines. J. appl. Phycol.8: 125–130.

Vergara JJ, Niell FX, Bird KT (1997) A dynamic model of transient NH_4^+ assimilation in red algae. Mar. Ecol. Progr. Ser. 148: 295–307.

Bird KT, Bourdine KS, Busch WS (1988) Marine algae as a tool for bioremediation of marine ecosystems. In Altman A (ed.),

Agricultural Biotechnology, Marcel Dekker, Inc., New York, 601–613.

Bird KT, Johnson JR, Jewett-Smith J (In press) *In vitro* culture of the seagrass *Halophila decipiens*. Aquat. Bot.

Bourdine KS, Bird KT (In press) Use of marine algae for biomonitoring of heavy metal pollution. In Ben-Zvi H (ed.), Encyclopedia of Environmental Analysis and Remediation, John Wiley and Sons, New York.

Jewett-Smith J, McMillan C, Kenworthy WJ, Bird KT (In press) Flowering and genetic banding patterns of *Halophila johnsonii* and conspecifics. Aquat. Bot.

Woodhead JL, Bird KT (In press) Efficient rooting and acclimation of micropropagated *Ruppia maritima* Loisel. J. mar. Biotechnol.