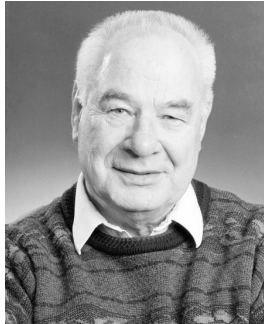


## REMEMBERING DR. JAMES “JIM” EDWARD STEWART OF THE NSIS

PETER G. WELLS\*

*International Ocean Institute – Canada,  
Dalhousie University, Halifax, NS.*



**James "Jim" Edward Stewart**

The NSIS lost a long-time supporter, and dedicated marine scientist with the passing on March 1st, 2018, at age 89, of Dr. James “Jim” Edward Stewart. He was a member of NSIS for many years, President of NSIS from 1992 to 1994, and Editor of the PNSIS from 2000 to 2008. Jim was a prominent marine scientist who had a long career in Halifax and Dartmouth, NS. This short piece commemorates and records Jim’s many contributions to marine science. It includes a bibliography of his work, compiled by the author.

Born in Anyox, British Columbia (BC), Jim “paid his way through university by working as a logger in the coastal forests of British Columbia. He studied microbiology and biochemistry at the University of British Columbia and later at the University of Iowa.” (Halifax Today 2018). He began his career as a federal scientist with the Fisheries Research Board of Canada in 1958, based in Halifax, NS, and completed it as an Emeritus Scientist with the Department of Fisheries and Oceans (DFO) at the Bedford Institute of Oceanography (BIO), Dartmouth, NS. Jim spent many productive years in active research at the former Halifax Fisheries Research Laboratory, on Lower Water

\* Author to whom correspondence should be addressed: oceans2@ns.sympatico.ca

Street. He then moved to BIO in 1986 as Director of the Biological Sciences Branch, responsible for freshwater and marine programs. He eventually returned to research and after formal retirement in 1996, continued to work at BIO.

I first met Jim in the mid-1970s to discuss a shared interest in lobster biology and the general responses of marine organisms to oil pollution. It was a few years after the *Arrow* bunker C spill in Chedabucto Bay, NS, where both of us had been briefly involved in assessing the impacts of that spill on local fisheries. I recall his great warmth and interest in what I was doing, being a young biologist at the time. Jim went on to assess the microbial degradation of that spill and the effects of oil spill dispersants on biodegradation (see the papers by Mulkins-Phillips and Stewart). Based on that work, he served on the US National Academy of Sciences 1973 oil pollution review group, contributing to the first extensive review of oil in the sea (NAS 1975).

Throughout his career, however, Jim's primary interest was on topics relevant to fisheries species and their management. His initial passion was research on the diseases and disease defense mechanisms of lobsters, as shown by his extensive publication record on this topic. He was an international expert on the bacterial pathogen, *Gaffkya homari*, and its pathogenicity to lobsters and other decapod crustaceans. His research greatly "contributed to the economic viability of the lobster fishery, through the replacement of wooden plugs with rubber bands, now used by fishermen to prevent movement of the claws of the captured animals; this change significantly reduced gaffkemia transfer and incidence" (M. Sinclair, pers.comm.). As Head of the Disease and Nutrition Section, Jim also investigated various aspects of lobster, molluscan and fish aquaculture, including the need to consider aquaculture within the broader framework of integrated coastal management (Stewart 2001). After moving to BIO and back into research, he returned to another interest, toxigenic marine algae, making major contributions very late in life (Stewart 2014).

Several colleagues have recollections of Jim. John Castell, a former DFO scientist now living in NB, recalls that "I was always impressed with Jim's interest and knowledge in a wide diversity of research programs. He was an inspiration to all of his research team" (pers. comm.). Bob Cook, former Director of the Biological Station at St. Andrews, NB, remembers that "Jim had established an incredible team of scientists and professionals in the fisheries disease and

nutrition field at the Halifax Laboratory” (pers.comm.). Mike Sinclair and Rene Lavoie, both of whom knew and worked with Jim at BIO, remember that “an additional feature of his management style was his focus on excellence and his encouragement of young scientists to publish their research findings; he was a demanding research manager but one who led by example” (pers. comm.).

As Editor of the PNSIS, Jim and a colleague (Stewart and Safer 2005) wrote a seminal article on the history of the Halifax Fisheries Research Laboratory, and edited a series of marine science essays recognizing the upcoming 50<sup>th</sup> anniversary of BIO (Stewart 2006). His broad interests and technical skills were quite extraordinary, exemplifying his capacity to address some key problems in marine and fisheries science as a whole.

In his personal life, Jim was devoted to his family and greatly enjoyed working outdoors. Living in Allen Heights at the Head of St. Margarets Bay, NS, he took “great pride and pleasure in landscaping and in harvesting and splitting his own firewood” (Halifax Today 2018).

In retirement, Jim routinely attended NSIS lectures; his presence there will be greatly missed. Above all, he will be remembered as a hard-working, dedicated and highly productive scientist, a wonderful model to all others in the marine sciences following in his footsteps.

## BIBLIOGRAPHY<sup>1</sup> OF THE CONTRIBUTIONS OF JAMES EDWARD STEWART

(References are listed in chronological order to illustrate the progress of his career)

**Stewart, J.E., & Castell, C.H.** (1960). Inhibition of bacterially produced trimethylamine. *Journal of the Fisheries Research Board of Canada* 17(4): 595-596.

**Stewart, J.E., & MacDonald, J.F.** (1962). A report to the fishing industry regarding lobster disease (Gaffkaemia). Circular No. 9, New Series, of the Technological Station, Halifax, N.S. of the Fisheries Research Board of Canada. August 8, 1962. 2 p.

**Stewart, J.E.** (1963). An arrangement for automatically and reproducibly controlling and varying illumination in biological experiments. *Journal of the Fisheries Research Board of Canada* 20(4): 1103-1107.

<sup>1</sup> Not having access to Dr. Stewart’s CV, this list was the result of searches in my personal marine science library and on the web. Although the aim was to be exhaustive, the listing should be considered representative rather than definitive of his many written contributions.

- Stewart, J.E., Hoogland, P.L., Freeman, H.C., & Waddell, A.E.J.** (1963). Amino acid composition of representatives of eight bacterial genera with reference to aquatic productivity. *Journal of the Fisheries Research Board of Canada* 20(3): 729-734.
- Stewart, J.E., & Power, H.E.** (1963a). A continuous flow, seawater aquarium suitable for experimental work with live marine animals. Circular No. 13, New Series, of the Technological Station, Halifax, N.S. of the Fisheries Research Board of Canada. March 30, 1963. 7 p.
- Stewart, J.E., & Power, H.E.** (1963b). A sea water aquarium for marine animal experiments. *Journal of the Fisheries Research Board of Canada* 20(4): 1081-1084.
- Ronald, K., Macnab, H.C., Stewart, J.E., & Beaton, B.** (1964). Blood properties of aquatic vertebrates. I. Total blood volume of the Atlantic cod, *Gadus morhua* L. *Canadian Journal of Zoology* 42: 1127-1132.
- Stewart, J.E., & Cornick, J.W.** (1964). A report to the fishing industry regarding the tolerance of lobsters for fluoridated water and for various woods. Circular No. 17, New Series, of the Technological Station, Halifax, N.S. of the Fisheries Research Board of Canada. May 19, 1964. 2 p.
- Li, M.F., & Stewart, J.E.** (1965). A quantitative study of the effects of naturally occurring supplements on the growth of rainbow trout (*Salmo gairdneri*) gonadal cells. *Canadian Journal of Microbiology* 11: 9-14.
- Stewart, J.E., & Cornick, J.W.** (1965). Lobster (*Homarus americanus*) tolerance for tris buffer, sodium fluoride, and sea water extracts of various woods. *Journal of the Fisheries Research Board of Canada* 21(6): 1549-1551.
- Stewart, J.E., & Power, H.E.** (1965). A unit suitable for holding and displaying live lobsters. Circular No. 21, New Series, of the Halifax Laboratory of the Fisheries Research Board of Canada. 6 p.
- Ackman, R.G., Stewart, J.E., & Power, H.E.** (1966). Free fatty acid formation in cod livers sterilized by irradiation. *Journal of the Fisheries Research Board of Canada* 23(1): 155-156.
- Cornick, J.W., & Stewart, J.E.** (1966). Microorganisms isolated from the hemolymph of the lobster (*Homarus americanus*). *Journal of the Fisheries Research Board of Canada* 23(9): 1451-1454.
- Foley, D.M., Stewart, J.E., & Holley, R.A.** (1966). Isobutyl alcohol and methyl pentynol as general anesthetics for the lobster, *Homarus americanus* Milne-Edwards. *Canadian Journal of Zoology* 44: 141-143.
- Li, M.F., Stewart, J.E., & Drinnan, R.E.** (1966). In vitro cultivation of cells of the oyster, *Crassostrea virginica*. *Journal of the Fisheries Research Board of Canada* 23(4): 595-599.
- Stewart, J.E., Cornick, J.W., Spears, D.I., & McLeese, D.W.** (1966). Incidence of *Gaffkya homari* in natural lobster (*Homarus americanus*) populations of the Atlantic region of Canada. *Journal of the Fisheries Research Board of Canada* 23(9): 1325-1330.
- Stewart, J.E., Dingle, J.R., & Odense, P.H.** (1966). Constituents of the hemolymph of the lobster, *Homarus americanus* Milne Edwards. *Canadian Journal of Biochemistry* 44: 1447-1459.

- Brockerhoff, H., Stewart, J.E., & Tacreiter, W.** (1967). Digestion of triglycerides by lobster. *Canadian Journal of Biochemistry* 45: 421-422.
- Li, M.F., Flemming, C., & Stewart, J.E.** (1967). Serological differences between two populations of oysters (*Crassostrea virginica*) from the Atlantic coast of Canada. *Journal of the Fisheries Research Board of Canada* 24(2): 443-446.
- Stewart, J.E., & Cornick, J.W.** (1967). In vitro susceptibilities of the lobster pathogen *Gaffkya homari* to various disinfectants and antibiotics. *Journal of the Fisheries Research Board of Canada* 24(12): 2623-2626.
- Stewart, J.E., Cornick, J.W., & Dingle, J.R.** (1967). An electronic method for counting lobster (*Homarus americanus* Milne Edwards) hemocytes and the influence of diet on hemocyte numbers and hemolymph proteins. *Canadian Journal of Zoology* 45: 291-304.
- Stewart, J.E., Cornick, J.W., Foley, D.M., Li, M.F., & Bishop, C.M.** (1967). Muscle weight relationship to serum proteins, hemocytes and hepatopancreas in the lobster, *Homarus americanus*. *Journal of the Fisheries Research Board of Canada* 24(11): 2339-2354.
- Cornick, J.W., & Stewart, J.E.** (1968a). Interaction of the pathogen *Gaffkya homari* with natural defense mechanisms of *Homarus americanus*. *Journal of the Fisheries Research Board of Canada* 25(4): 695-709.
- Cornick, J.W., & Stewart, J.E.** (1968b). Pathogenicity of *Gaffkya homari* for the crab *Cancer irroratus*. *Journal of the Fisheries Research Board of Canada* 25(4): 795-799.
- Stewart, J.E., & Dingle, J.R.** (1968). Characteristics of hemolymphs of *Cancer irroratus*, *C. borealis*, and *Hyas coarctatus*. *Journal of the Fisheries Research Board of Canada* 25(3): 607-610.
- Stewart, J.E., & Squires, H.J.** (1968). Adverse conditions as inhibitors of ecdysis in the lobster *Homarus americanus*. *Journal of the Fisheries Research Board of Canada* 25(9): 1763-1774.
- Stewart, J.E., Arie, B., Zwicker, B.M., & Dingle, J.R.** (1969). Gaffkemia, a bacterial disease of the lobster, *Homarus americanus*: Effects of the pathogen, *Gaffkya homari*, on the physiology of the host. *Canadian Journal of Microbiology* 15: 925-932.
- Stewart, J.E., Cornick, J.W., & Zwicker, B.M.** (1969). Influence of temperature on gaffkemia, a bacterial disease of the lobster, *Homarus americanus*. *Journal of the Fisheries Research Board of Canada* 26(9): 2503-2510.
- Stewart, J.E., Dockrill, A., & Cornick, J.W.** (1969). Effectiveness of the integument and gastric fluid as barriers against transmission of *Gaffkya homari* to the lobster *Homarus americanus*. *Journal of the Fisheries Research Board of Canada* 26(1): 1-14.
- Stewart, J.E., & Foley, D.M.** (1969). A precipitin-like reaction of the hemolymph of the lobster *Homarus americanus*. *Journal of the Fisheries Research Board of Canada* 26(5): 1392-1397.
- Stewart, J.E., Foley, D.M., & Ackman, R.G.** (1969). Characteristics of *Gaffkya homari*, the causative agent of the lobster disease, gaffkemia. *Journal of the Fisheries Research Board of Canada* 26(5): 1385-1389.

- Stewart, J.E., & Li, M.F.** (1969). A study of lobster (*Homarus americanus*) ecology using serum protein concentration as an index. *Canadian Journal of Zoology* 47: 21-28.
- Cornick, J.W., & Stewart, J.E.** (1970). Disinfection procedures for the control of blood disease (gaffkemia) in lobster storage facilities. Circular No. 42, New Series, of the Halifax Laboratory of the Fisheries Research Board of Canada. 3 p.
- Stewart, J.E., & Cornick, J.W.** (1970a). Red crab, *Geryon quinquedens*: 1) recommended live storage temperatures; 2) resistance to gaffkemia, the lobster disease. Circular No. 40, New Series, of the Halifax Laboratory of the Fisheries Research Board of Canada. 2 p.
- Stewart, J.E., & Cornick, J.W.** (1970b). Disease among stored lobsters (gaffkemia). Circular No. 41, New Series, of the Halifax Laboratory of the Fisheries Research Board of Canada. 5 p.
- Stewart, J.E., & Rabin, H.** (1970). Gaffkemia, a bacterial disease of lobsters (genus *Homarus*). p. 431-439 in Snieszko, S.F. (ed.), A Symposium on Diseases of Fishes and Shellfishes. *American Fisheries Society Special Publication* No. 5.
- Stewart, J.E.** (1972). The detection of *Gaffkya homari*, the bacterium pathogenic to lobsters (Genus *Homarus*). Fisheries and Marine Service, Halifax Laboratory. New Series Circular No. 43, 5 p.
- Stewart, J.E., & Cornick, J.W.** (1972). Effects of *Gaffkya homari* on glucose, total carbohydrates, and lactic acid of the hemolymph of the lobster (*Homarus americanus*). *Canadian Journal of Microbiology* 18: 1511-1513.
- Stewart, J.E., Horner, G.W., & Arie, B.** (1972). Effects of temperature, food, and starvation on several physiological parameters of the lobster, *Homarus americanus*. *Journal of the Fisheries Research Board of Canada* 29(4): 439-442.
- Stewart, J.E., & Zwicker, B.M.** (1972). Natural and induced bactericidal activities in the hemolymph of the lobster, *Homarus americanus*: products of hemocyte-plasma interaction. *Canadian Journal of Microbiology* 18: 1499-1509.
- Stewart, J.E., Zwicker, B.M., Arie, B., & Horner, G.W.** (1972). Food and starvation as factors affecting the time to death of the lobster, *Homarus americanus*, infected with *Gaffkya homari*. *Journal of the Fisheries Research Board of Canada* 29(4): 461-464.
- Cornick, J.W., & Stewart, J.E.** (1973). Partial characterization of a natural agglutinin in the hemolymph of the lobster, *Homarus americanus*. *Journal of Invertebrate Pathology* 21: 255-262.
- Mulkins-Phillips, G.J., & Stewart, J.E.** (1973). Surveys for hydrocarbon utilizing bacteria in Northwestern Atlantic coastal areas. p. 65-70 in Proceedings of the Conference on Oil and the Canadian Environment, University of Toronto, Toronto, ON, May 16, 1973.
- Stewart, J.E., & Arie, B.** (1973a). Paradoxical effects of salinity reductions on lobsters (*Homarus americanus*) infected with *Gaffkya homari*. *Comparative Biochemistry and Physiology* 45A: 717-730.

- Stewart, J.E., & Arie, B.** (1973b). Depletion of glycogen and adenosine triphosphate as major factors in the death of lobsters (*Homarus americanus*) infected with *Gaffkya homari*. *Canadian Journal of Microbiology* A 19: 1103-1110.
- MacCrimmon, H.R., Stewart, J.E., & Brett, J.R.** (1974). Aquaculture in Canada. The practice and the promise. *Fisheries Research Board of Canada, Bulletin* 188: 1-84.
- Mulkins-Phillips, G.J., & Stewart, J.E.** (1974a). The effect of four dispersants on biodegradation and growth of bacteria on crude oil. *Applied Microbiology* 28: 547-552.
- Mulkins-Phillips, G.J., & Stewart, J.E.** (1974b). Effects of environmental parameters on bacterial degradation of Bunker C oil, crude oil and hydrocarbons. *Applied Microbiology* 28: 915-922.
- Mulkins-Phillips, G.J., & Stewart, J.E.** (1974c). Distribution of hydrocarbon utilizing bacteria in Northwestern Atlantic water and coastal sediments. *Canadian Journal of Microbiology* 20: 955-962.
- Paterson, W.D., & Stewart, J.E.** (1974). *In vitro* phagocytosis by hemocytes of the American lobster (*Homarus americanus*). *Journal of the Fisheries Research Board of Canada* 31: 1051-1056.
- Stewart, J.E., & Arie, B.** (1974). Effectiveness of vancomycin against gaffkemia, the bacterial disease of lobsters (Genus *Homarus*). *Journal of the Fisheries Research Board of Canada* 31: 1873-1879.
- Stewart, J.E., & Zwicker, B.M.** (1974a). Comparison of various vaccines for inducing resistance in the lobster, *Homarus americanus*, to the bacterial infection, gaffkemia. *Journal of the Fisheries Research Board of Canada* 31: 1887-1892.
- Stewart, J.E., & Zwicker, B.M.** (1974b). Induction of internal defense mechanisms in the lobster, *Homarus americanus*. p. 233-239 in Cooper, E.L. (ed.), *Contemporary Topics in Immunobiology*. Plenum Publ. Corp., New York.
- Cornick, J.W., & Stewart, J.E.** (1975). Red crab (*Geryon quinquedens*) and snow crab (*Chionocetes opilio*) resistance to infection by the lobster pathogen *Aerococcus viridans* (var.) *homari*. *Journal of the Fisheries Research Board of Canada* 32: 702-706.
- Stewart, J.E.** (1975). Gaffkemia, the fatal infection of lobsters (Genus *Homarus*) caused by *Aerococcus viridans* (var.) *homari*: a review. *Marine Fisheries Review* 37: 20-24.
- Stewart, J.E., Zwicker, B.M., & Arie, B.** (1975). Status report on gaffkemia in lobsters in Atlantic Canada. International Council for the Exploration of the Sea, Shellfish Committee K:20: 1-5. (mimeo).
- Paterson, W.D., Stewart, J.E., & Zwicker, B.M.** (1976). Phagocytosis as a cellular immune response mechanism in the American lobster, *Homarus americanus*. *Journal of Invertebrate Pathology* 27 :95-104.
- Stewart, J.E., & Castell, J.D.** (1976). Various aspects of culturing the American lobster (*Homarus americanus*), In Proceedings of the FAO Conference on Aquaculture, Kyoto, Japan. FIR:AQ/Cont/76/E:11.

- (Also in *Advances in Aquaculture*, Pillay, T.V.R., & Dill, W.A., (ed.), 1979, Fishing News Books, Farnham, Surrey, England, p. 314-319).
- Cornick, J.W., & Stewart, J.E.** (1978). Lobster (*Homarus americanus*) hemocytes: Classification, differential counts, and associated agglutinin activity. *Journal of Invertebrate Pathology* 31: 194-203.
- Mori, K., & Stewart, J.E.** (1978a). The hemolymph bactericidin of American lobster (*Homarus americanus*): adsorption and activation. *Journal of the Fisheries Research Board of Canada* 35: 1504-1507.
- Mori, K., & Stewart, J.E.** (1978b). Natural and induced bactericidal activities of the hepatopancreas of the American lobster, *Homarus americanus*. *Journal of Invertebrate Pathology* 32: 171-176.
- Stewart, J.E.** (1978a). Diseases and defense mechanisms of the lobster, *Homarus americanus*. *Marine Fisheries Review* 40(10):4-5. (MFR Paper 1329).
- Stewart, J.E.** (1978b). The lobster disease, gaffkemia, in relation to fisheries management. International Council for the Exploration of the Sea, Shellfish Committee F:16:1-8 (mimeo).
- Li, M.F., Traxler, G.S., Clyburne, S., & Stewart, J.E.** (1980). Malpeque disease: isolation and morphology of a *Labyrinthomyxa*-like organism from diseased oysters. ICES C.M. 1980/F 15: 1-9.
- Stewart, J.E.** (1980). Diseases. Ch. 6, p. 301-342, in *The Biology and Management of Lobsters*, Vol. 1, Physiology and Behavior. Cobb, J.S. and Phillips, B.F. (eds.). Academic Press, New York, London.
- Stewart, J.E., Cook, R.H., & Rosenthal, H.** (1990). An analytical approach for evaluating opportunities in mariculture and assessing research needs: a proposal. ICES C.M. 1990/F:9:14 p.
- Stewart, J.E., Mann, K.H., & Kean-Howie, J.** (1990). Report on the mollusc feeding workshop. *Bulletin of the Aquaculture Association of Canada* 90: 23-26.
- Stewart, J.E.** (1991a). Approaches to problems of diseases in aquaculture. *ICES Marine Science Symposium* 192: 206-210.
- Stewart, J.E.** (1991b). Report of the study group on the potential for culture of species. ICES C.M. 1991/E:4:4 p. +4 tables.
- Stewart, J.E.** (1991c). A brief review of the International Council for the Exploration of the Sea (ICES) on the occasion of the formation of the North Pacific Marine Science Organization. *Canadian Journal of Fisheries and Aquatic Sciences* 48: 2543-2550.
- Stewart, J.E., & Jellett, J.F.** (1991). A review of marine and freshwater biotoxins of importance to human health. In: Gordon, D.C. (ed.), *Proceedings 2<sup>nd</sup> Canadian Workshop on Harmful Marine Algae*, Bedford Institute of Oceanography, Dartmouth, NS, Oct. 2-4, 1990. *Canadian Technical Report of the Fisheries and Aquatic Sciences* 1799: 26.
- Jellett, J.F., Marks, L.J., Stewart, J.E., Dorey, M.L., Watson-Wright, W., & Lawrence, J.F.** (1992). Paralytic shellfish poison (Saxitoxin family) bioassays: automated endpoint determination and standardization of the *in vitro* tissue culture bioassay, and comparison with the standard mouse bioassay. *Toxicon* 30: 1143-1156.



- Marks, L.I., Stewart, J.E. & Hastein, T.** (1992). Evaluation of an indirect fluorescent antibody technique for detection of *Aerococcus vindans* (var.) *homari*, pathogen of homarid lobsters. *disease aquat. org.* 13: 133-138.
- Stewart, J.E.** (1993a). Infectious diseases of marine crustaceans. Ch.12, p. 319-341, in Couch, J.D. and Fournie, F., (eds.), *Pathobiology of Marine and Estuarine Organisms*. CRC Press, Boca Raton, FL.
- Stewart, J.E.** (1993b). Studies involving fish and aquatic invertebrates. p. 15-18, in J. Wong, (ed.), *Proceedings of the Canadian Council on Animal Care, Maritimes Regional Workshop on Animal Care Committees*. Canadian Council of Animal Care, Ottawa.
- Stewart, J.E., Penning-Rowell, E.C., & Thornton, S.** (1993). The LENKA project and coastal zone management in Norway. p. 257-281. In *Coastal Zone Management Selected Case Studies*, OECD, ed., OECD document, Paris, FR.
- Stewart, J.E.** (1994). Aquaculture in Atlantic Canada and the research requirements related to environmental interactions with finfish culture. p. 1-18, in Ervik, A., Kupka, P., and Wennevik, V. (Eds.). *Proceedings of the Canada-Norway Workshop on Environmental Impacts of Aquaculture*. Fisker Havet NR 13. 135 p.
- Stewart, J.E., & Subba Rao, D.V.** (1996). Phycotoxins: Physiology and Production. p. 50-56 in *Science Review 1994 & '95*. Department of Fisheries and Oceans, Maritimes Region, 1996. Fisheries and Oceans Canada, Dartmouth, NS.
- Osada, M., & Stewart, J.E.** (1997). Gluconic acid/gluconolactone: physiological influences on domoic acid production by bacteria associated with *Pseudo-nitzschia multiseries*. *Aquatic Microbial Ecology* 12: 203-209.
- Stewart, J.E., Marks, L.J., Woods, C.R., Risser, S.M., & Gray, S.** (1997). Symbiotic relations between bacteria and the domoic acid producing diatom, *Pseudo-nitzschia multiseries*, and the capacity of these bacteria for gluconic acid/gluconolactone formation. *Aquatic Microbial Ecology* 12: 211-221.
- Stewart, J.E.** (1998). Sharing the Waters: An Evaluation of Site Fallowing, Year Class Separation and Distances Between Sites for Fish Health Purposes on Atlantic Salmon Farms. *Canadian Technical Report of Fisheries and Aquatic Sciences* 2218:56 p.
- Stewart, J.E., Marks, L.J., Gilgan, M.W., Pfeiffer, E., & Zwicker, B.M.** (1998). Microbial utilization of the neurotoxin domoic acid: blue mussels (*Mytilus edulis*) and soft shell clams (*Mya arenaria*) as sources of the microorganisms. *Canadian Journal of Microbiology* 44: 456-464.
- Stewart, J.E.** (2001). A case for a comprehensive environmental data base as a tool for integrated coastal zone planning and management. *Bulletin of the Aquaculture Association of Canada* 101(1): 43-48.
- Stewart, J.E., & Safer, A.** (2005). A retrospective three quarters of a century at the Halifax Fisheries Research Laboratory. *Proceedings of the Nova Scotian Institute of Science* 43(1): 19-44.
- Stewart, J.E.** (2006a). General introduction: marine science essays. *Proceedings of the Nova Scotian Institute of Science* 43(2): 75-90.

- Stewart, J.E.** (2006b). The Halifax Fisheries Research Laboratory. *BIO-Oceans Association Newsletter* 30: 2-3. (April, 2006).
- Stewart, J.E.** (2008). Bacterial involvement in determining domoic acid levels in *Pseudo-nitzschia multiseries* cultures. *Aquatic Microbial Ecology* 50: 135-144.
- Stewart, J.E.** (2011). Enhancement by gonyautoxin V of the iron (III) reducing or binding activity produced by the dinoflagellate, *Alexandrium excavatum*. *Harmful Algae* 10: 706-712.
- Subba Rao, D.V., & Stewart, J.E.** (2011). A preliminary study of the formation of a third category of cysts by a toxigenic dinoflagellate, *Alexandrium fundyense*, in response to elevated concentrations of ammonium chloride. *Harmful Algae* 10: 512-520.
- Stewart, J.E.** (2014). A brief foray into studies on toxigenic marine algae. Ch. 35, p. 301-305, in Voyage of Discovery. Fifty Years of Marine Research at Canada's Bedford Institute of Oceanography. Nettleship, D.N., Gordon, D.C., Lewis, C.F.M., & Latremouille, M.P. (eds.). Bedford Institute of Oceanography, BIO-Oceans Association, Dartmouth, NS.

*Acknowledgements* Additional information was received from Michelle Paon, Dalhousie University, Drs. Donald Gordon, John Castell, Michael Sinclair and Bob Cook, all formerly with DFO, and Linda Marks, NSIS, and was much appreciated.

## REFERENCES

- Halifax Today.** (2018). Stewart, James Edward. [www.halifaxtoday.ca/obituaries/stewart-james-edward-852871](http://www.halifaxtoday.ca/obituaries/stewart-james-edward-852871). Posted Mar. 2, 2018.
- National Academy of Sciences (NAS).** (1975). Petroleum in the Marine Environment. National Academy of Sciences, Washington, D.C. 107 p.
- Stewart, J.E.** (2001). A case for a comprehensive environmental data base as a tool for integrated coastal zone planning and management. *Bulletin of the Aquaculture Association of Canada* 101(1): 43-48.
- Stewart, J.E.** (2006). General introduction: marine science essays. *Proceedings of the Nova Scotian Institute of Science* 43(2): 75-90.
- Stewart, J.E.** (2014). A brief foray into studies on toxigenic marine algae. Ch. 35, p. 301-305, in Voyage of Discovery. Fifty Years of Marine Research at Canada's Bedford Institute of Oceanography. Nettleship, D.N., Gordon, D.C., Lewis, C.F.M., & Latremouille, M.P. (Eds.). Bedford Institute of Oceanography, Oceans Association, Dartmouth, NS.
- Stewart, J.E., & Safer, A.** (2005). A retrospective three quarters of a century at the Halifax Fisheries Research Laboratory. *Proceedings of the Nova Scotian Institute of Science* 43(1): 19-44.