

# Notes

## Lady Crabs, *Ovalipes ocellatus*, in the Gulf of Maine

J. C. A. BURCHSTED<sup>1</sup> and FRED BURCHSTED<sup>2</sup>

<sup>1</sup> Department of Biology, Salem State College, Salem, Massachusetts 01970 USA

<sup>2</sup> Research Services, Widener Library, Harvard University, Cambridge, Massachusetts 02138 USA

Burchsted, J. C. A., and Fred Burchsted. 2006. Lady Crabs, *Ovalipes ocellatus*, in the Gulf of Maine. *Canadian Field-Naturalist* 120(1): 106-108.

The Lady Crab (*Ovalipes ocellatus*), mainly found south of Cape Cod and in the southern Gulf of St. Lawrence, is reported from an ocean beach on the north shore of Massachusetts Bay (42°28'60"N, 70°46'20"W) in the Gulf of Maine. All previously known Gulf of Maine populations north of Cape Cod Bay are estuarine and thought to be relicts of a continuous range during the Hypsithermal. The population reported here is likely a recent local habitat expansion.

Key Words: Lady Crab, *Ovalipes ocellatus*, Gulf of Maine, distribution.

The Lady Crab (*Ovalipes ocellatus*) is a common member of the sand beach fauna south of Cape Cod. Like many other members of the Virginian faunal province (between Cape Cod and Cape Hatteras), it has a disjunct population in the southern Gulf of St. Lawrence (Ganong 1890). The Lady Crab is of considerable ecological importance as a consumer of macrobenthic invertebrates, and is of biogeographic interest as a member of a large disjunct fauna. However, the distribution of the Lady Crab in the Gulf of Maine is unclear from the literature. Here we gather and discuss available reports of the Lady Crab in the Gulf of Maine and report an additional site that may represent a recent habitat expansion. This paper is intended as a basis for further work on Lady Crab distribution and for monitoring changes.

Lady Crabs have not generally been reported from the Gulf of Maine. Field guides (Gosner 1978; Meinke 1981; Miner 1950) and a review of tidal flats (Whitlatch 1982) give their northern limit as Cape Cod except for the disjunct Gulf of St. Lawrence population. Recent distributional studies of Gulf of Maine crabs show Lady Crabs on the south shore of Cape Cod and onto Georges Bank but no further north (Williams and Wigley 1977; Stehlik et al. 1991). This confirms the older work of Rathbun (1930). Williams (1984), and the update by Nizinski (2003), give the range briefly as Prince Edward Island to Georgia, but in this they may elide the northern New England gap. Pollock (1998) states the range as Virginian and Acadian, but again the range between the southern Gulf of St. Lawrence and Cape Cod is unspecified. The Lady Crab is not listed in Bay of Fundy, Maine, and New Hampshire checklists (Croker 1972; Brinkhurst et al. no date; Linkletter et al. 1977; Perkins and Larsen 1975) and distributional studies of the fauna of Maine sand beaches (Larsen and Doggett 1990) and mud

flats (Larsen and Doggett 1991). Lady Crabs were not found in intensive local studies of western Cape Cod Bay (Davis and McGrath 1984) or Ipswich Bay (Dexter 1944).

Berrick (1986) reports Lady Crabs as common on Cape Cod Bay sand flats (which commonly reach 20°C in summer). The few other published records of Lady Crabs in the Gulf of Maine are from warm, estuarine habitats. Bousfield and Thomas (1975) identify a group of three warm water species which tend to co-occur (*Balanus improvisus*, *Urosalpinx cinera*, and *Ovalipes ocellatus*) but do not specify locations for the Lady Crab. Members of this group occurred in 1963 at: Cape Cod Bay, Duxbury and Cape Ann (Massachusetts); Cape Neddick and Boothbay Harbor (southern Maine); and the Bay of Fundy. Bousfield found Lady Crabs at Sesuit Harbor, East Dennis, Massachusetts, in 1964 (Judith Price, personal communication). Lady Crabs are reported in Salem Sound, Massachusetts, in 1997 by Chase et al. (2002). Although Dexter (1947) found no Lady Crabs in an intensive study of a tidal inlet at Annisquam (Gloucester, Massachusetts) in 1933-1940, he later (Dexter 1985) found them there during what he terms a period of warm water from 1952 to 1964.

We have found Lady Crab shells washed up on an ocean beach adjacent to the Essex and Ipswich river estuaries (Crane Beach, Ipswich, Massachusetts, 42°41'30"N, 70°46'20"W; 1995 and 1996). Fefer and Schettig (1980) mention, but do not specify, one or more southern Maine (south of Saco) locations from unpublished data by Doggett, Larsen, and Sykes. They were not found in the 1873 U.S. Fisheries Bureau investigation of Casco Bay which discovered several other warm water species (Verrill 1874). There are no records for the northern Maine cold water region (north of the Sheepscot River estuary) identified by Bousfield and Laubitz (1972) and confirmed by Larsen and

Doggett (1990). In the northern Gulf of Maine, there are several reports of Lady Crabs in the Bay of Fundy: Bousfield and Leim (1960) report Lady Crabs in the Minas Basin and Channel in 1922 (Bass River and Scotman Bay, noted also in Rathbun 1930) and again in 1959 (Bass River, Diligent River, and a cheliped on beach at Kingsport).

Bousfield and Thomas (1975) state that their Gulf of Maine records of Lady Crabs are from warm (circa 20°C summer temperatures – similar to their range south of Cape Cod) brackish water pockets or from estuaries with two-layer circulations where endemic warm-water populations could be maintained as described by Bousfield (1955) and Sponaugle et al. (2002). Bousfield and Thomas (1975) suggest these estuarine populations are relicts from the Hypsithermal warm era (9500-3000 years Before Present). The many Virginian invertebrates and marine algae now extending north to Cape Cod with additional disjunct populations in the southern Gulf of St. Lawrence had continuous ranges at that time. The short abstract by Dexter (1985) provides no details, but his 1952-1964 warm period may correspond to the 1951-1954 warming reported by Loder et al. (2001), with the crabs becoming locally extinct during the succeeding cold period (1959-1967). Dexter's observations suggest the possibility that the estuarine distribution is dynamic, populations becoming extinct and reestablished with changing conditions.

For the ten years we have been keeping records, Lady Crabs have been commonly found living on an ocean beach, called Preston Beach in Marblehead and Phillips Beach contiguously to the south in Swampscott, on the north shore of Massachusetts Bay (42°28'60"N, 70°46'20"W). There is no nearby estuarine habitat and the beach is exposed to heavy surf (unlike the Cape Cod Bay flats) [Leo et al. 2003]. Salem Sound is about six coastline miles to the north around the headlands of Marblehead/Marblehead Neck. This is the first reported exposed ocean beach location for Lady Crabs in the Gulf of Maine. Phillips Beach is in an area of wind-driven summer upwelling that keeps summer temperatures around 15-16°C (Geyer et al. 1992). Lady Crabs were commonly found swimming in shallow water and buried in sand just above low tide line. The habitat is thus very like that of the Lady Crab south of Cape Cod. Most of the living animals were found on the southern portion of the beach. This area is influenced by groundwater seepage on the high beach. Old faunal lists for Swampscott and vicinity yield no records of Lady Crabs: Grabau (1898) for Nahant, Revere, and Phillips Beach; Pearse (1913) for Nahant. This suggests our Massachusetts population may mark a local habitat expansion.

Discovery of other ocean beach populations and determination of the status of the estuarine populations would help clarify the distribution and habitat associations of Lady Crabs in the Gulf of Maine.

## Acknowledgments

We thank E. L. Bousfield for information on his collections and Judith C. Price of the Canadian Museum of Nature for searching the collections for Lady Crab records.

## Literature Cited

- Berrick, S.** 1986. Crabs of Cape Cod. Cape Cod Museum of Natural History, Brewster, Massachusetts. 76 pages.
- Bousfield, E. L.** 1955. Ecological control of the occurrence of barnacles in the Miramichi estuary. National Museum of Canada, Bulletin, Biological Series 137. 65 pages.
- Bousfield, E. L., and D. R. Laubitz.** 1972. Station lists and new distributional records of littoral marine invertebrates of the Canadian Atlantic and New England Regions. National Museums of Canada, Publications in Biological Oceanography (5). 51 pages.
- Bousfield, E. L., and A. H. Leim.** 1960. The fauna of Minas Basin and Minas Channel. National Museum of Canada Bulletin 166. 30 pages.
- Bousfield, E. L., and M. L. H. Thomas.** 1975. Postglacial changes in distribution of littoral marine invertebrates in the Canadian Atlantic region. Pages 47-60 in Environmental change in the Maritimes. Proceedings of the Nova Scotia Institute of Science 27 (Supplement 3).
- Brinkhurst, R. O., L. E. Linkletter, E. I. Lord, S. A. Connors, and M. J. Dadswell.** No date. A preliminary guide to the littoral and sublittoral marine invertebrates of Passamaquoddy Bay. Environment Canada Biological Station, St. Andrews, New Brunswick. 166 pages. [Published after 1975]
- Chase, B. C., J. H. Plouff, and W. M. Castonguay.** 2002. The marine resources of Salem Sound, 1997. Massachusetts Division of Marine Fisheries Technical Report TR-6. 143 pages.
- Crocker, R. A.** 1972. Checklist with habitat notes, of some common intertidal, estuarine, and nearshore invertebrate animals of New Hampshire and Southern Maine. Jackson Estuarine Laboratory, University of New Hampshire, Durham, New Hampshire. 25 pages.
- Davis, J. D., and R. A. McGrath.** 1984. Some aspects of nearshore benthic macrofauna in western Cape Cod Bay. Pages 77-102 in Observations on the ecology and biology of western Cape Cod Bay, Massachusetts. Edited by J. D. Davis and D. Merriman. (Lecture notes on coastal and estuarine studies 11). Springer-Verlag, Berlin, New York. 289 pages.
- Dexter, R. W.** 1944. The bottom community of Ipswich Bay, Massachusetts. Ecology 25: 352-359.
- Dexter, R. W.** 1947. The marine communities of a tidal inlet at Cape Ann, Massachusetts: A study in bio-ecology. Ecological Monographs 17: 261-294.
- Dexter, R. W.** 1985. Invasions of southern marine fauna into Cape Ann, Massachusetts, during periods of warmer sea-water. American Zoologist 25 (4): A64.
- Fefer, S. I., and P. A. Schettig.** 1980. An ecological characterization of coastal Maine. Volume 4: Appendices. Publication FWS/OBS-80/29, Biological Services Program, U.S. Fish and Wildlife Service.
- Ganong, W. F.** 1890. Southern invertebrates on the shores of Acadia. Transactions of the Royal Society of Canada 8: 167-185.
- Geyer, W. R., G. B. Gardner, W. S. Brown, J. Irish, B. Butman, T. Loder, and R. Signell.** 1992. Physical ocean-

- ographic investigation of Massachusetts and Cape Cod Bays. Massachusetts Bays Program, Boston, Massachusetts. 497 pages.
- Gosner, K. L.** 1978. A field guide to the Atlantic seashore. Houghton Mifflin, Boston, Massachusetts. 329 pages.
- Grabau, A. W.** 1898. Zoology: Marine invertebrates. Pages 67-94 in Guide to localities illustrating the geology, marine zoology and botany of the vicinity of Boston. *Edited by* A. W. Grabau and J. E. Woodman. American Association for the Advancement of Science Fiftieth Anniversary Meeting, Boston, August, 1898.
- Larsen, P. F., and L. F. Doggett.** 1990. Sand beach macrofauna of the Gulf of Maine with inference on the role of oceanic fronts in determining community composition. *Journal of Coastal Research* 6: 913-926.
- Larsen, P. F., and L. F. Doggett.** 1991. The macroinvertebrate fauna associated with the mud flats of the Gulf of Maine. *Journal of Coastal Research* 7: 365-375.
- Leo, W., R. Geyer, and M. Mickelson.** 2003. Physical and biological oceanography of Massachusetts Bay. Pages 4-1 - 4-22 in Briefing for OMSAP Workshop on Ambient Monitoring Revisions, June 18-19, 2003. Report ENQUAD ms-085, Massachusetts Water Resources Authority, Boston, Massachusetts. 250 pages.
- Linkletter, L. E., E. I. Lord, and M. J. Dadswell.** 1977. A checklist of the marine fauna and flora of the Bay of Fundy. Huntsman Marine Laboratory, St. Andrews, New Brunswick. 68 pages.
- Loder J. W., J. A. Shore, C. G. Hannah, and B. D. Petrie.** 2001. Decadal-scale hydrographic and circulation variability in the Scotia-Maine region. *Deep-Sea Research Part II-Topical Studies in Oceanography* 48: 3-35.
- Meinkoth, N. A.** 1981. The Audubon Society Field Guide to North American seashore creatures. Knopf, New York. 799 pages.
- Miner, R. W.** 1950. Field book of seashore life. G. P. Putnam's Sons, New York. 888 pages.
- Nizinski, M. S.** 2003. Annotated checklist of decapod crustaceans of Atlantic coastal and continental shelf waters of the United States. *Proceedings of the Biological Society of Washington* 116: 96-157.
- Pearse, A. S.** 1913. Observations on the fauna of the rock beaches at Nahant, Massachusetts. *Bulletin of the Wisconsin Natural History Society* (n.s.) 11: 8-34; 12: 72-80.
- Perkins, L. F., and P. F. Larsen.** 1975. A preliminary checklist of the marine and estuarine invertebrates of Maine. TRIGOM Publication No. 10. 37 pages.
- Pollock, L. W.** 1998. A practical guide to the marine animals of northeastern North America. Rutgers University Press, New Brunswick, New Jersey. 367 pages.
- Rathbun, M. J.** 1930. The Cancroid crabs of America of the families Euryalidae, Portunidae, Ateleycyclidae, Cancridae and Xanthidae. U. S. National Museum Bulletin 152. 609 pages.
- Sponaugle, S., R. K. Cowen, A. Shanks, S. G. Morgan, J. M. Leis, J. S. Pineda, G. W. Boehlert, M. J. Kingsford, K. C. Lindeman, C. Grimes, and J. L. Munro.** 2002. Predicting self-recruitment in marine populations: Biophysical correlates and mechanisms. *Bulletin of Marine Science*, 70 (Supplement S): 341-375.
- Stehlik, L. L., C. L. MacKenzie, Jr., and W. W. Morse.** 1991. Distribution and abundance of four brachyuran crabs on the northwest Atlantic shelf. *Fishery Bulletin* 89: 473-492.
- Verrill, A. E.** 1874. Explorations of Casco Bay in 1873. *Proceedings of the American Association for the Advancement of Science (Portland Meeting)*, 22: 340-395.
- Whitlatch, R. B.** 1982. The ecology of New England tidal flats: a community profile. Publication FWS/OBS-81/01, Office of Biological Services, Fish and Wildlife Service, Washington, D.C. 125 pages.
- Williams, A. B.** 1984. Shrimps, lobsters, and crabs of the Atlantic coast of the Eastern United States, Maine to Florida. Smithsonian Institution Press, Washington, D.C., 550 pages.
- Williams, A. B., and R. L. Wigley.** 1977. Distribution of decapod crustacea off northeastern United States based on specimens at the Northeast Fisheries Center, Woods Hole, Massachusetts. NOAA Technical Report NMFS Circular 407. 44 pages.

Received 5 August 2004

Accepted 8 February 2006