Further Indications of Clostridium botulinum in Latin American Waters

B. Q. WARD, E. S. GARRETT, AND G. B. REESE

Technological Laboratory, Bureau of Commercial Fisheries, Pascagoula, Mississippi 39567

Received for publication 6 June 1967

The presence of Clostridium botulinum of various types in fish and shellfish taken near the coasts of Venezuela and Columbia has been reported (B. J. Carroll, E. S. Garrett, G. B. Reese, and B. Q. Ward, Appl. Microbiol. 14:837, 1966). The geographic area encompassed by that limited survey has been enlarged by the recent return to this laboratory of sediments from Brazil, and of assorted animals from waters of Nicaragua and Honduras (collected by the scientific staff of the Bureau of Commercial Fisheries Exploratory Fishing and Gear Research vessel Oregón).

Procedures used were, with few exceptions, those of Carroll et al. (1966). Each sediment was collected from the water’s edge in a sterile Econocup. At the laboratory, the sample was introduced by use of an alcohol-flamed spatula, into a cooked-meat tube until the sediment column at the bottom of the tube attained a height of approximately 1 inch. Any animal specimens tested were used as individuals and were never combined into homogenates. The entire intestinal tract of each specimen constituted an inoculum.

Animal specimens were taken between 2 and 13 February 1967, in an area delimited by the figures 13°28'N to 16°01'N and 81°56'W to 83°36'W. Net sets varied between 26 and 158 fathoms. Bottoms were of several types: coral-shell, sand-shell, sand, or mud-sand. The 82 specimens were as follows: Bellator sp. (2), Chloroscombrus chrysurus (2), congrid eels (2), Cyclopetta fimbriata (1), Diplectrum formosum (5), Eucinostomus sp. (3), Halieutichthys sp. (1), juvenile flatfish (3), Lutjanus synagris (3), Ogcocephalus sp. (8), Ophidium sp. (6), Porichthys porosissimus (1), Prionodes phoebe (16), Prionotus sp. (14), Rhomboplites aurorbens (1), scorpionfish (1), Sphaeroides niphelus (2), Squilla empusa (1), Synodus sp. (8), tilefish (1), and Upeneus parvus (1). Mouse inoculation tests showed only two of the Ogcocephalus (batfish) specimens to be contaminated by C. botulinum. These two were collected on 12 January from a coral-shell bottom at 90 fathoms, at coordinates 13°48'N to 81°57'W. By mouse protection tests, both were type C.

Sediments were collected from Açude Araras, Pentecoste Reservoir, Açude Oros, and the ocean beaches of Fortaleza, all in the Brazilian State of Ceara, between 23 November 1966 and 13 December 1966. Samples were of brown or red sand, a few of which contained limited amounts of humus or gravel. Of 5 Açude Araras samples, one (sand and humus) contained type C; of 9 Pentecoste Reservoir samples, one (red sand) contained type A; and of 12 brown sands from Fortaleza, two contained type B, and one a type F. All other sediments were negative.

By mouse test, 7 of 114 samples were indicative of the presence of C. botulinum. The results are in rough agreement with incidence figures reported for the upper Gulf of Mexico (B. Q. Ward, B. J. Carroll, E. S. Garrett, and G. B. Reese, Appl. Microbiol. 15:629, 1967). Mouse protection testing, however, revealed a pattern of types reminiscent of that encountered by Carroll et al. To date, the area between the upper Gulf coast and the Central and South American sampling areas (Mexico, from Yucatan to the Texas border) has not been investigated. In view of the large and increasing contributions of Mexican fisheries to U.S. markets, delineation of the possible limits of any hypothetical, more northerly, predominantly type E zone; of a southerly, predominantly A to C zone; and of a transitional zone in Mexican waters could be of practical significance.