

On the Distribution of Shrimp Larvae (Crangon crangon L.)  
in the Estuary of the Elbe

by  
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During the years 1949 to 1962 the hydrography and hydrobiology of the estuaries of the rivers Elbe, Weser and Ems have been studied at the Institut für Küsten- und Binnenfischerei. During the course of these investigations 13 cruises aboard the research cutter "Uthörn" were carried out in the Elbe estuary. Selected stations were occupied to take water samples for the determination of temperature, salinity, pH, alkalinity, oxygen, nitrogen, phosphate and silicate, and at the same time to make vertical plankton catches by means of a Helgoland-type egg net, which partly were made in steps from 5 m to 5 m. Usually, at each cruise two trips, one at low and one at high tide, were performed, in order to obtain at each station 2 samples at different times. Apart from these materials vertical plankton catches were regularly carried out near Cuxhaven. The results obtained on the hydrography of the area with regard to the composition of the plankton have been previously published (2, 3, 4).

The aim of this paper is to report on some observations relevant to the distribution of shrimp larvae in the Elbe estuary. A special publication is in press (Archiv für Fischereiwissenschaft, 14 I/II, 1963). While the post-larval stages of Crangon can be found in an area extending far into the oligo-halinikum of the estuary which reaches up to Pagensand, the larval stages of Crangon have been found exclusively in the poly-halinikum resp. meio-meso-halinikum of the estuary, and were never met in waters having a salinity of less than 10‰. The larvae may be transported farther up river under certain hydrographic conditions, but they are then transported in water masses having a salinity of more than 10‰.

The observations made over 14 years show that the Crangon larvae were found in the poly-halinikum in considerable abundance during the months of May and June. During May 14% and during June 58% of the total larvae catch were obtained. Larvae were not found in January and February, when surface water temperatures were below 4°C. In those years having had winters without ice the first larvae were caught during March. The first occurrence of larvae in the year is obviously bound to water temperature. After the mild winter 1950 for example the first larvae were observed during March, while in March 1962, when water temperatures of the coastal waters were found to have been between 1.1 and 3.1°C only, no larvae could be detected. There are also other indications that the larvae abundance is related to temperature. So in May 1954, when water temperature was between 8.5 and 10.0°C, 25 larvae were caught on an average, while in May 1951 47 larvae were averagely counted at water temperatures between 11.0° and 13.0°C.

Crangon larvae were mostly represented by stages 3-5 (determination of stages according to Ehrenbaum (1)). No special rule can be concluded as to the distribution of the single developmental stages of the larvae. However, the youngest stages were found exclusively in those stations of the research area being farthest off-shore, which is a confirmation of previous findings that the larvae of Crangon hatch in the deeper off-shore waters.

In the course of the year there is a shifting of the main distribution centre of Crangon larvae within the Elbe estuary from Cuxhaven - lightvessel Elbe 3 towards lightvessel Elbe 2 and towards lightvessel Elbe 1. In April/May the larvae have a distribution maximum in the vicinity of the lightvessel Elbe 3, from May to July near lightvessel 2 and

later during autumn and winter even more off-shore. It is also noteworthy to mention that during low tide the abundance of Crangon larvae was found to be greater than at high tide. This was generally the case at all stations.

Finally, it could be shown that Crangon larvae are dispersed in all water layers, however, their number was found generally to increase with depth.

References

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