

The development of “population thinking” in fisheries biology between 1878 and 1930



The early debate concerning the existence of several self-sustaining populations within the distributional limits of marine species centered on Atlantic herring in the northeastern Atlantic. Fr. Heincke convincingly resolved the controversy by extensive sampling of herring and sprat for the analysis of a large number of meristic and morphometric characters, and the development of new statistical methodology (including rudimentary multivariate statistics). He initially analysed the morphological variability at different parts of the life cycle of spring – and autumn – spawning herring aggregations off Kiel. This detailed study was accompanied by somewhat less-detailed sampling of herring and sprat from other locations in the Baltic Sea, North Sea, and Norwegian coastal waters. Heincke argued that a fundamental shift in both the species concept and the mechanism of speciation was required to account for the emerging empirical observations on marine fish. His observations and conclusions on the nature of geographic variability of fish species, even though revolutionary, were accepted rapidly. The influence of his studies on fisheries research, systematics, and evolutionary

biology are evaluated. In addition, the contributions of J. Schmidt and J. Hjort to population thinking are briefly addressed. It is concluded that the studies by Heincke on herring populations, as well as having a major impact on subsequent developments in fisheries biology and management (in essence the definition of management units based on geographic populations or population complexes), also had an important impact on the biometricians (Weldon, Pearson) and the development of the evolutionary synthesis in the 1920s and 1930s (through Chetverikov, Dobzhansky, and Goldschmidt). Observations on geographic patterns in populations from terrestrial systems could be generalized to the oceans on the basis of Heincke's quantitative studies on herring and sprat (and the follow-up work on other fish species). These early investigations on the very existence of marine populations by Heincke, Hjort and Schmidt are still pertinent to recruitment research and the studies underlying the definition of management units. An historical perspective may contribute to the resolution of present topical issues involving the regulation of populations.

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