



Abstract

Contribution of the Nursery Areas to the Major Fishing Grounds of the Brazilian Sardine (*Sardinella Brasiliensis*) in Southeastern Brazilian Bight through Otolith Fingerprinting [†]

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Abstract: In the late 1970s, studies on the population structure of *S. brasiliensis* suggested the existence of two stocks, considering distinct regional somatic growth rates and spawning areas (23–25° S and 26–28° S). This scenario was further confirmed by geochemical signatures of whole otoliths combined with basic biological data regarding 2-year-old sardines collected in SW-S Brazil. However, information about sardine movements and connectivity between their main juvenile recruitment areas and the adult fishing grounds is currently limited. In this study, natal otolith elemental fingerprints (core section) of young-of-year (age 0+) and adult (age 2+) individuals were collected, respectively, in the main spawning areas (2019) and fishing grounds (2021) and evaluated. Elemental signatures of recruits were compared with those of adult fish from the same cohort to estimate connectivity between juvenile recruitment areas (RJ-22° S, SP-23° S and SC-26° S) and regional adult populations captured in the major fishing grounds (22–23° S, 24–25° S and 26–27° S). Uni- and multi-elemental chemical signatures showed significant differences for age 0+ and for age 2+. Pairwise comparisons associated age 0+ and age 2+ with the northern distribution area (RJ + SP) and differentiated them from those of SC. The leave-one-out reclassification matrix combining chemical fingerprints and reassigned the individuals to their original areas with moderate-to-high accuracy: RJ 0+ (85%), SP 0+ (80%), SC 0+ (85%), and from RJ 2+ (80%), SP 2+ (70%), SC 2+ (75%). This variability was driven by Ba/Ca, Fe/Ca, Mg/Ca, Mn/Ca, and Sr/Ca ratios. Maximum likelihood analysis suggested for the 2019 cohort that replenishment of adult populations of *S. brasiliensis* along the Brazilian coast was mostly derived from the northern recruitment area (RJ + SP = 64%). Nonetheless, an important contribution from the southern counterparts to the northern stock was detected (36%), supporting the hypothesis of meta-population structure.

Keywords: pelagic fish; fisheries; otolith microchemistry; rational management

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