The specific changepoints along the *Sparus aurata* juvenile lifetime profile reveal differences between estuarine nursery habitats

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Previous studies have demonstrated that trace elements and stable isotopes in fish otoliths vary based upon geologic and environmental factors (e.g. temperature and salinity) and can record spatially-explicit chemical signatures for determining movements, connectivity or source locations. With the goal of understanding habitat-specific chemical signatures, we sampled juvenile gilthead seabream, *Sparus aurata,* using a shore seine weekly in spring/summer 2023 in essential nursey habitats on the eastern Adriatic coast. Geochemical and stable isotope analysis were completed for $^{87}Sr/^{86}Sr$ ratios and trace elements (e.g. Sr/Ca, Mg/Ca) using a laser ablation split-stream (LASS) protocol at University of Idaho, USA. Changepoint analysis identified transition points across otolith transects and identified signatures that were representative of nursery habitats in which fish were sampled. Elemental ratios were combined with Sr isotope ratios to determine if nursery areas could be separated consistently with a suite of chemical fingerprints. Results showed that chemical differences could separate between the two locations with classification errors of less than 10%, but that both age and the timing of sampling can affect chemical signatures. Through the first growing season of 0^+ fish, differences between sites became less distinct, highlighting the importance of concentrating on specific time points. The inclusion of Sr isotopes improved the classification as their differences among sites are independent of thermal or physiological processes, however because the sites are relatively close the differences in isotope ratios were small. This study highlights the potential utility for chemically identifying the source habitats of bream and linking habitat areas to growth.