

DNA BARCODING TO EVALUATE THE BIODIVERSITY IN THE MARMARA, AEGEAN AND MEDITERRANEAN SEAS

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ABSTRACT

Cataloguing the biodiversity of life in earth is not a simple task. We still know only a minor fraction (10-15%) of life's diversity and current taxonomic methods may be inadequate or too slow to capture and manage biodiversity. This percentage is expected to be lower for marine taxa. Biodiversity in the oceans was recently estimated at just about 393,000 metazoan species, belonging to 31 phyla, of which only half have been identified so far. Yet it seems that the true number and identification of marine species will never be known, because of our limited access to large parts of the oceans depths, the unprecedented species extinction, and the presence of taxonomically problematic taxa. The anthropogenic impacts on the marine environments, primarily at the continental shelf, further highlight the urgent need for accurate, fast and effective documentation of marine biodiversity, whereas at the same time the number of morphological taxonomists decline and hence limits our ability to keep up with identifying and studying new species. The Mediterranean Sea is a hot spot for bioinvasion where more than 335 alien species have been reported most of which came from the Red Sea through the Suez Canal. Although there is no doubt that the number of foreign species is even higher, we do not have effective tools for investigating this troublesome situation.

Following the understanding that classical taxonomic tools are able to identify only a fraction of the existing biodiversity, a decade of using the mitochondrial (COI) and chloroplastial (rbcL, matK, trnL) genes as molecular barcodes for the identification of fauna and flora, respectively, revolutionized taxonomy by creating the global web for barcoding terrestrial biota, and the marine barcoding shortly afterwards. Based on this global initiative and in the view of the anticipated changes in the Mediterranean, two years ago we started to establish the scientific infrastructure for barcoding the Turkey coasts biodiversity, for a long-term barcoding research. We rely on the knowledge and skills of available taxonomists, on innovative molecular methods based on specific DNA sequences and on a connection with Global BoLD database. So far, we have identified and uploaded to the BoLD international database 230 marine specimens, 100 of which are fish, 35 arthropods, 35 mollusks, 6 annelids, 6 polychaetes, 11 echinoderms and 37 plants all with museum voucher tags. The sequence data, chromatogram, trace files and primer details for specimens were submitted to the Barcode of Life Data System.

Keywords: Biodiversity, DNA barcoding, COI, trnL, matK