Integrating Environmental DNA and Traditional DNA Barcoding Reveals Higher Zooplankton Species Richness

Zooplankton play central roles in marine food webs, energy transfer, and nutrient cycling, yet their biodiversity remains poorly documented. Environmental DNA (eDNA) metabarcoding offers a rapid way to assess species richness, but its performance relative to traditional approaches is still being evaluated. We compared hand-sorted zooplankton samples that were DNA barcoded to bulk eDNA samples that were metabarcoded at Friday Harbor Laboratories, WA, USA. Both methods recovered diverse operational taxonomic units (OTUs), but each captured unique subsets of the community. Data from previous sampling efforts were compared to an updated zooplankton database, improving our current understanding of zooplankton populations at Friday Harbor Laboratories. eDNA was highly effective for broad biodiversity discovery, while hand sorting with direct sequencing added taxa and generated voucher specimens with images, improving reference libraries. Combining these complementary approaches yields a more comprehensive picture of local zooplankton diversity and strengthens future eDNA-based biodiversity assessments.