

# MetaZooGene



**Toward a new global view of marine zooplankton biodiversity based on DNA metabarcoding and reference DNA sequence databases**



**Chaired by Ann Bucklin  
(University of Connecticut, USA)**



**Presented by Junya Hirai  
(The University of Tokyo, Japan)**

**WG157 Members: 23 members from 19 countries**

## DNA Barcoding of zooplankton

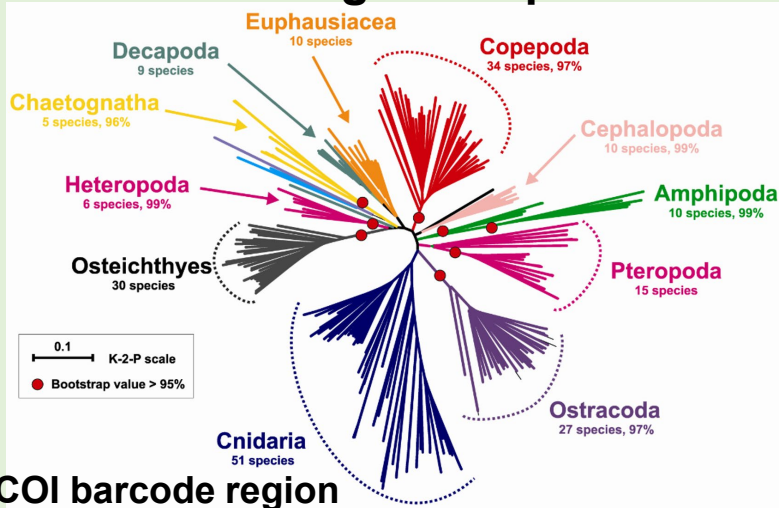


Figure: Bucklin et al. (2010)

## Metabarcoding of zooplankton

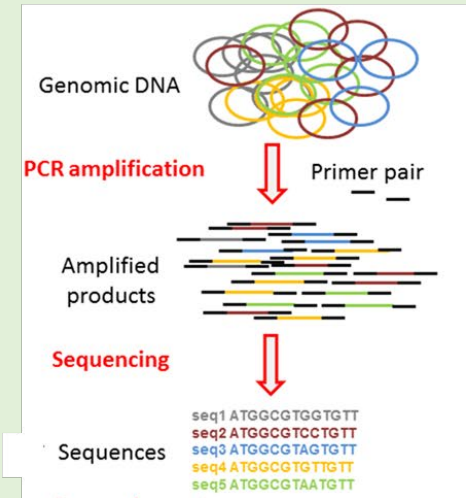


Figure: Corell and Rodríguez-Ezpeleta (2014)



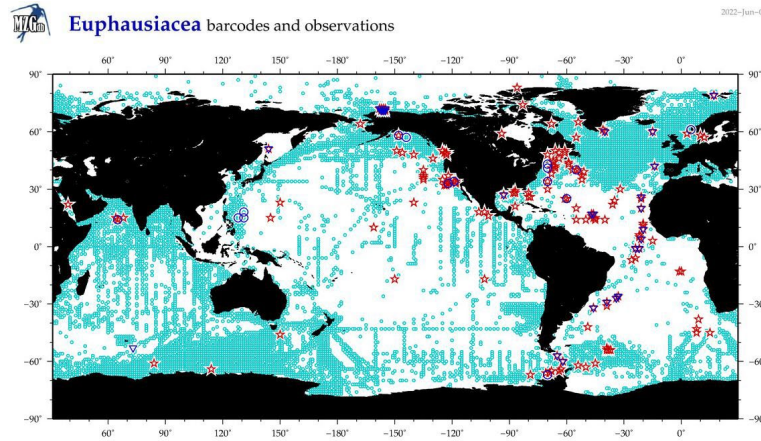
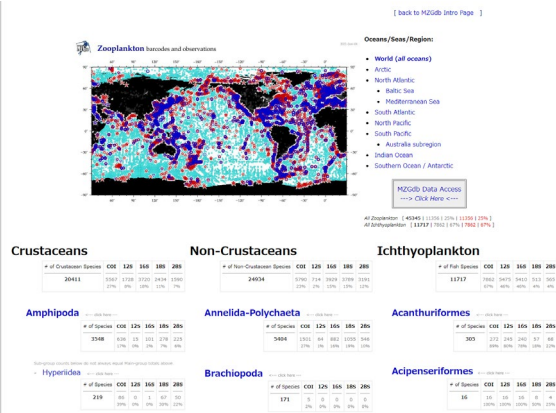
# MetaZooGene Barcode Atlas & Database (MZGdb)

Todd O'Brien (NOAA Fisheries, USA)

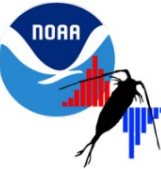
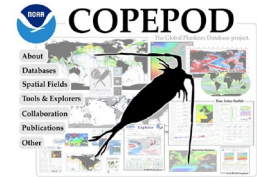


- Over 218,299 COI sequences for 11,356 species of marine zooplankton
- MZGdb expanded to include 18S rRNA & other gene regions; adding fish & protists
- Searchable by taxonomic group and ocean region

M  
E  
T  
A  
Z  
O  
O  
G  
E  
N  
E



Taxa Name	Taxa Level	Barcode Data?	Number of Barcodes from any ocean	Number of Barcodes from this region	Barcode Locations and Species Occurrence Map	MZGdb Atlas v2.01
<i>Bentheuphausia amblyops</i>	Species (1)	COI 12S 16S 18S 28S	COI = 8 12S = 0 16S = 2 18S = 1 28S = 0	COI = 8 16S = 2 18S = 1		accepted T4003882 R:1:0:0:0
<i>Euphausia americana</i>	Species (2)	COI 12S 16S 18S 28S	COI = 4 12S = 0 16S = 1 18S = 0 28S = 0	COI = 4 16S = 1		accepted T4003648 R:1:0:0:0
<i>Euphausia brevis</i>	Species (3)	COI 12S 16S 18S 28S	COI = 29 12S = 0 16S = 1 18S = 1 28S = 0	COI = 29 16S = 1 18S = 1		accepted T4003771 R:1:0:0:0
<i>Euphausia crystallorophias</i>	Species (4)	COI 12S 16S 18S 28S	COI = 70 12S = 0 16S = 0 18S = 0 28S = 0	COI = 70 16S = 0 18S = 0		accepted T4003772 R:1:0:0:0
<i>Euphausia diomedea</i>	Species (5)	COI 12S 16S 18S 28S	COI = 8 12S = 0 16S = 0 18S = 0 28S = 0	COI = 8 16S = 0 18S = 0		accepted T4003773 R:1:0:0:0



Need DNA barcode data in the global ocean (e.g. western Pacific Ocean: Philippines–Japan collaboration)

## MetaZooGene Intercalibration Experiment (MZG-ICE)

- Metabarcoding analysis of a set of reference samples in 10 laboratories of WG157
  - Evaluate impact and significance of different molecular, bioinformatics, and statistical protocols
- Develop best practices for DNA metabarcoding of marine zooplankton diversity



# Patterns of Biodiversity of Marine Zooplankton Based on Molecular Analysis

ICES Journal of Marine Science – Themed Set published in 2021

Motivators from MetaZooGene (SCOR WG157)

Of 15 publications: 7 papers by co-authors from MetaZooGene WG157

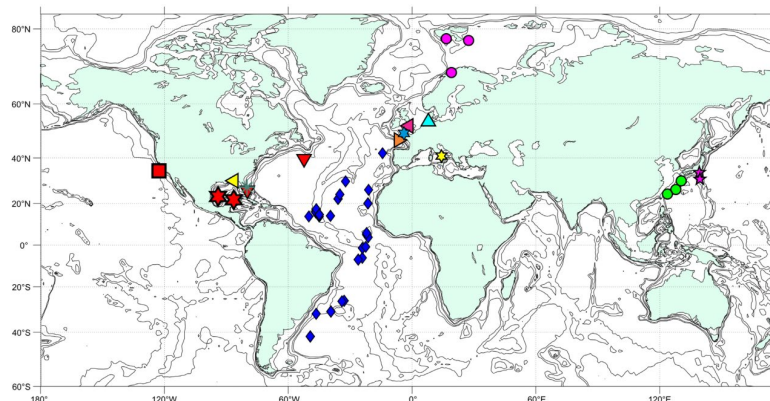


ICES Journal of Marine Science (2021), 78(9), 3281–3287. <https://doi.org/10.1093/icesjms/fsab198>

## Introduction

New insights into biodiversity, biogeography, ecology, and evolution of marine zooplankton based on molecular approaches

Ann Bucklin<sup>1,\*</sup>, Katja T.C.A. Peijnenburg<sup>2,3</sup>, Ksenia Kosobokova<sup>4</sup>, and Ryuji J. Machida<sup>5</sup>



- Brandão et al. (2021)
- Bucklin et al. (2021)
- DiCapua et al. (2021)
- Ershova et al. (2021)
- Martinez et al. (2021)
- Matthews et al, 2021
- Pappalardo et al. (2021)
- Perry et al. (2021)
- Hirai et al. (2020)
- Käse et al. (2021)
- Kulagin et al. (2021)
- Machida et al. (2021)
- Synder et al, 2021
- Semmouri et al. (2021)

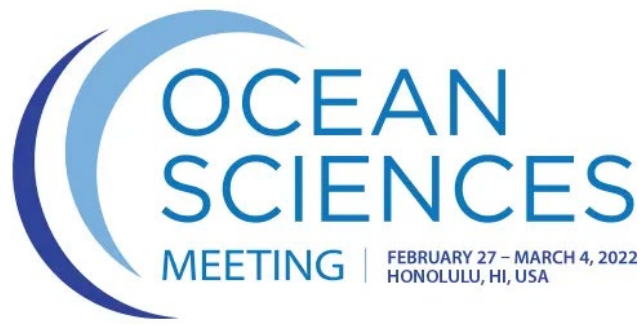
- MetaZooGene: Metabarcoding Zooplankton Diversity is endorsed as a new UN Ocean Decade Action (No. 102.2)

- The project is attached to the Ocean Decade Programme, Marine Life 2030



Metabarcoding Zooplankton Diversity  
Ocean Decade Action No. 102.2





# Ocean Sciences Meeting 2022

27 Feb – 4 Mar 2022

Hawaii, USA (Hybrid & Virtual)

## Zooplankton diversity through space and time (ME20)

Co-Chairs: Katja Peijnenburg\* (NL), Erica Goetze\* (USA), Galice Hoarau (NO), Matthew Miller (CA)

\*WG157 members

Of 28 presentations, 18 were led by early career scientists and 9 included WG157 members as co-authors



## MetaZooGene Symposium 2022

New Insights into Biodiversity, Biogeography, Ecology and Evolution  
of Marine Zooplankton Based on Molecular Approaches



Convenors: Ann Bucklin (USA); Katja Peijnenburg (NL); Leocadio Blanco-Bercial (BM); Silke Laakmann (DE)

September 23, 2022 (associated with ICES 2022 Annual Science Conference )

Dublin, Ireland (in-person & online)

Oral presentations: 19

(14 in-person, 9 early career scientist presenters)

Poster presentations: 7

(5 in-person, 5 early career scientist presenters)

