



# COLLABORATIVE RESEARCH SURVEY ON MARINE FISHERIES RESOURCES AND ENVIRONMENT IN THE GULF OF THAILAND 2018

## Composition and abundance of zooplankton in the Gulf of Thailand

Itchika Sivaipram<sup>1\*</sup>, Bunyawat Ponyong<sup>1</sup>,

Porntep Punnarak<sup>1</sup>, Tipawan Bunpent<sup>1</sup>, Kunita Kokubo<sup>1</sup>,

Vichaya Gunbua<sup>2</sup>, and Rakkiet Punsri<sup>3</sup>

<sup>1</sup>Chulalongkorn University,

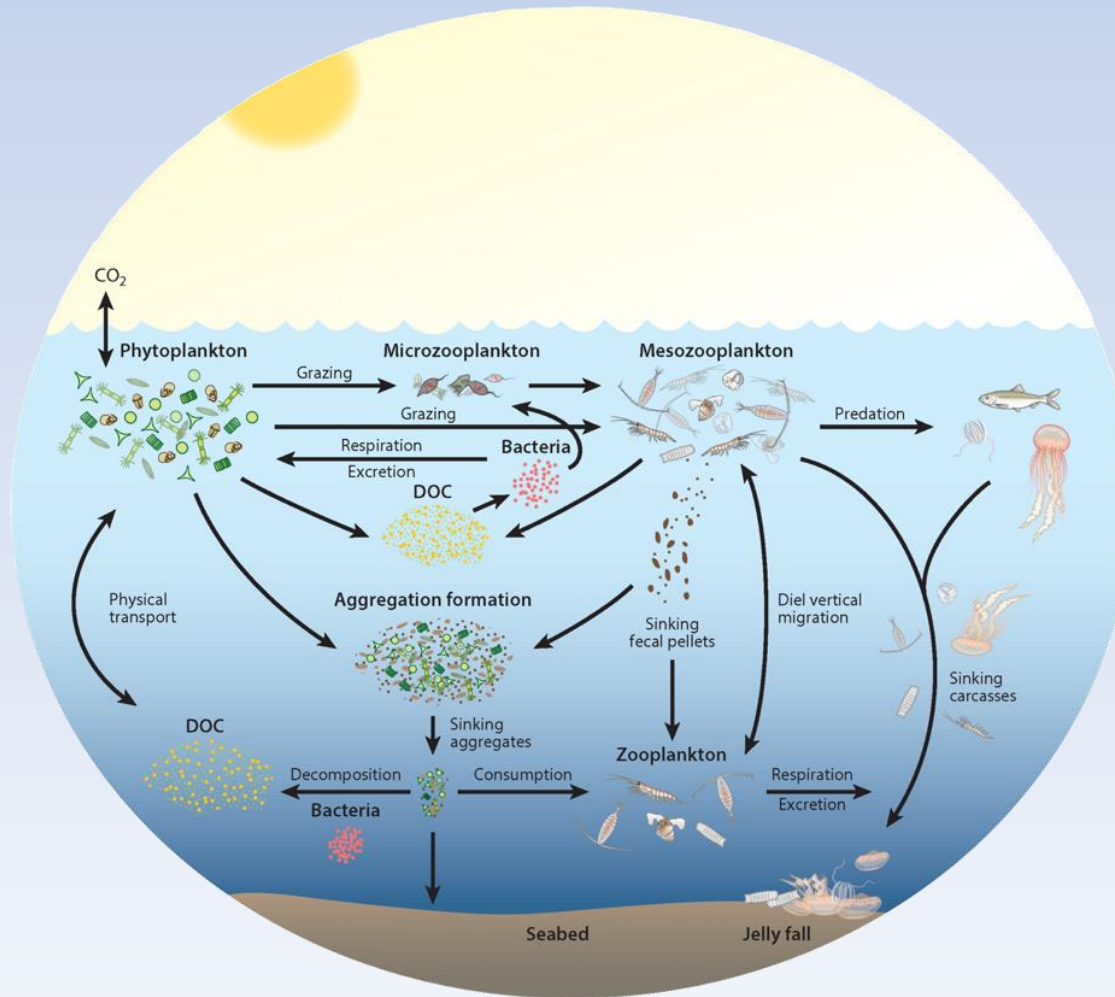
<sup>2</sup>Burapha University, and <sup>3</sup>SEAFDEC



Supported by Southeast Asian Fisheries Development Center  
Training Department, Samut Prakan, Thailand



# Importance of zooplankton



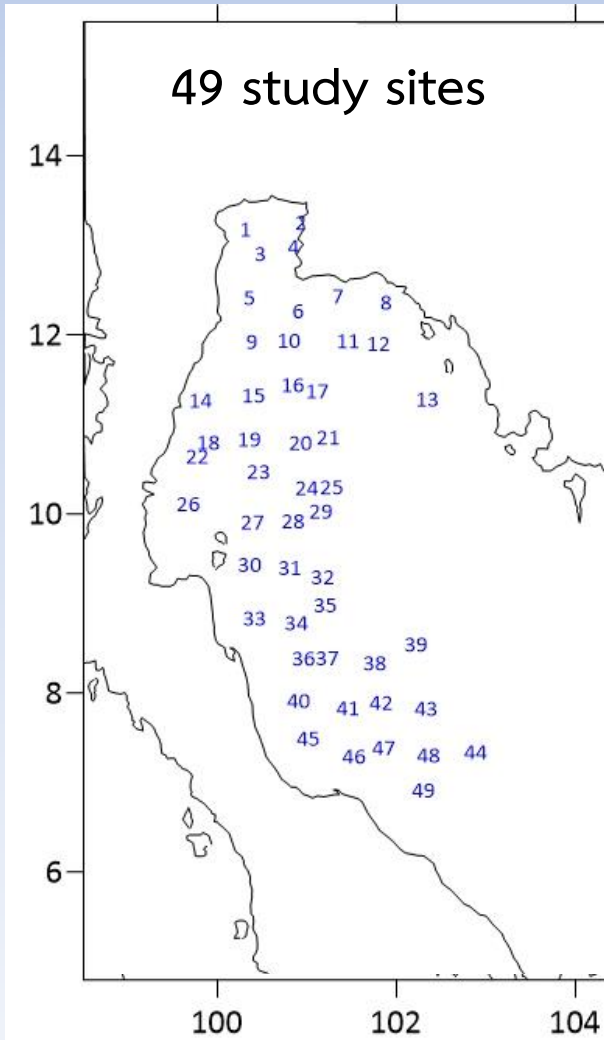
Zooplankton and biogeochemical cycling

Steinberg and Landry (2017)

# Objectives

- Investigate abundance and biomass of zooplankton the Gulf of Thailand (GoT)
- Characterize zooplankton community in the GoT
- Examine the relationship between zooplankton abundance and environmental conditions





# Methods

## 1. Zooplankton sampling

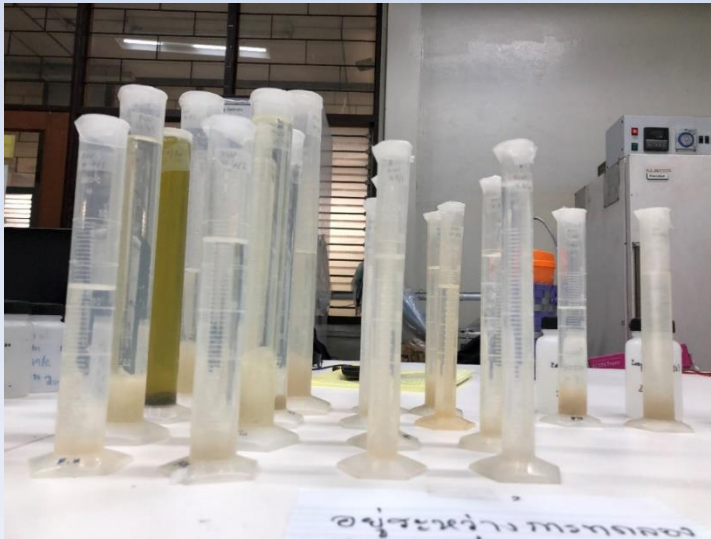
- Oblique towed with 315  $\mu\text{m}$  plankton net
- Preserved in 5% buffered formalin



Photo by Nopporn Manajit

## 2. Biomass estimation

Settled Volume Measurement  
(Postel. et al, 2000)



## 3. Zooplankton Identification and enumeration

Samples from 49 stations were identified and counted under stereomicroscope



# Methods

## 4. Data analysis

- Non-metric dimensional scaling (MDS) :  
zooplankton community
- Spearman rank correlation using BIOENV procedure for Biota and Environment matching in Primer V.6: relationship between zooplankton abundance and environmental conditions, including temperature, salinity, dissolved oxygen (DO), pH, and chlorophyll *a*

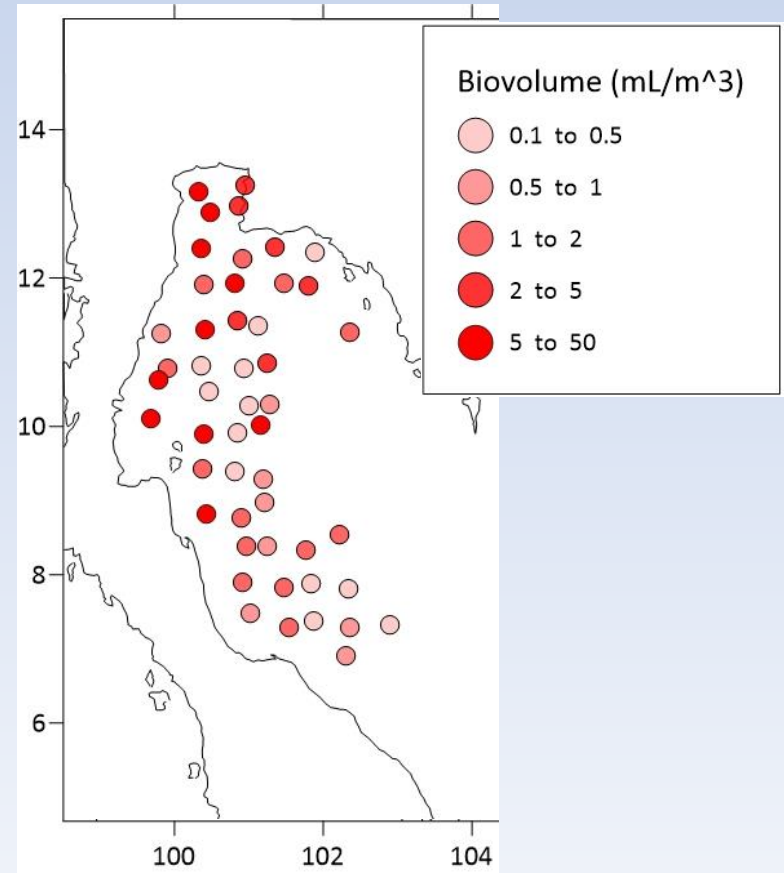
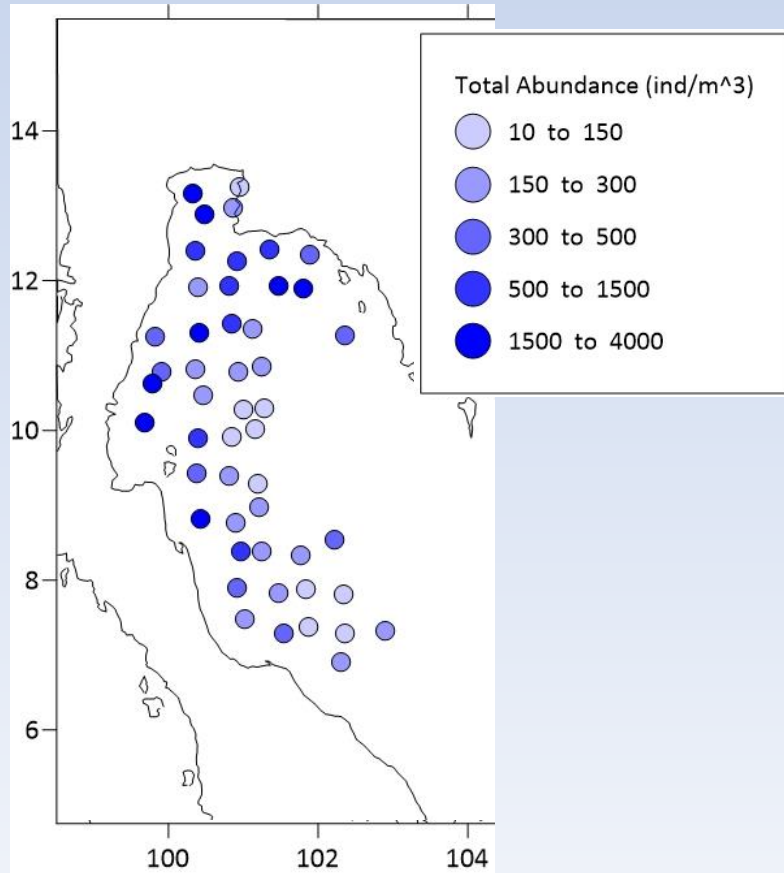
# List of zooplankton taxa found in Gulf of Thailand during Aug-Sep 2018

Phylum	Taxa
Protozoa	Foraminifera
	Radiolaria
	Tintinnids
Cnidaria	Hydromedusae
	Scyphomedusae
	Siphonophora
	Polyp of cnidarian
Ctenophora	Ctenophore
Annelida	Polychaeta larvae
	Tomopteridae
Sipunculida	Sipunculida Larva
Priapulida	Priapulida
Nematoda	Nematode
Platyhelminthes	Muller's larva
	Turbellaria
Nemertea	Pilidium larva
Arthropoda	Copepod nauplii
	Calanoid copepod
	Cyclopoid copepod
	Harpacticoid copepod
	nauplius of crustacean
	Cirripedia nauplii
	Cypris larvae
	Mysids
	Cladocera
	Ostracod
	Isopod

Phylum	Taxa
Arthropoda (cont.)	Zoea of Brachyura
	Megalopa of Brachyura
	Young crab
	Anomura larva
	Hyperid Amphipod
	<i>Lucifer</i> spp.
	Paguridae larvae
	Shrimp larvae
	Alima larva
	Phyllosoma larva
	Megalop of hermit crab
Chaetognatha	Chaetognatha
Mollusca	Gastropoda larva
	Bivalve larva
	Pteropods
	Heteropod
Echinodermata	Ophiopluteus larva
	Auricularia larva
	Echinopluteus larva
	Bipinnaria larva
	Doliolaria
Bryozoa	Cyphonautes larva
Brachiopoda	Brachiopod larva
Phoronida	Actinotrocha larva
Urochordata	Lavacean
	Thaliacea
Chordata	Fish eggs
	Fish larvae
	unknown eggs
	unknown ball

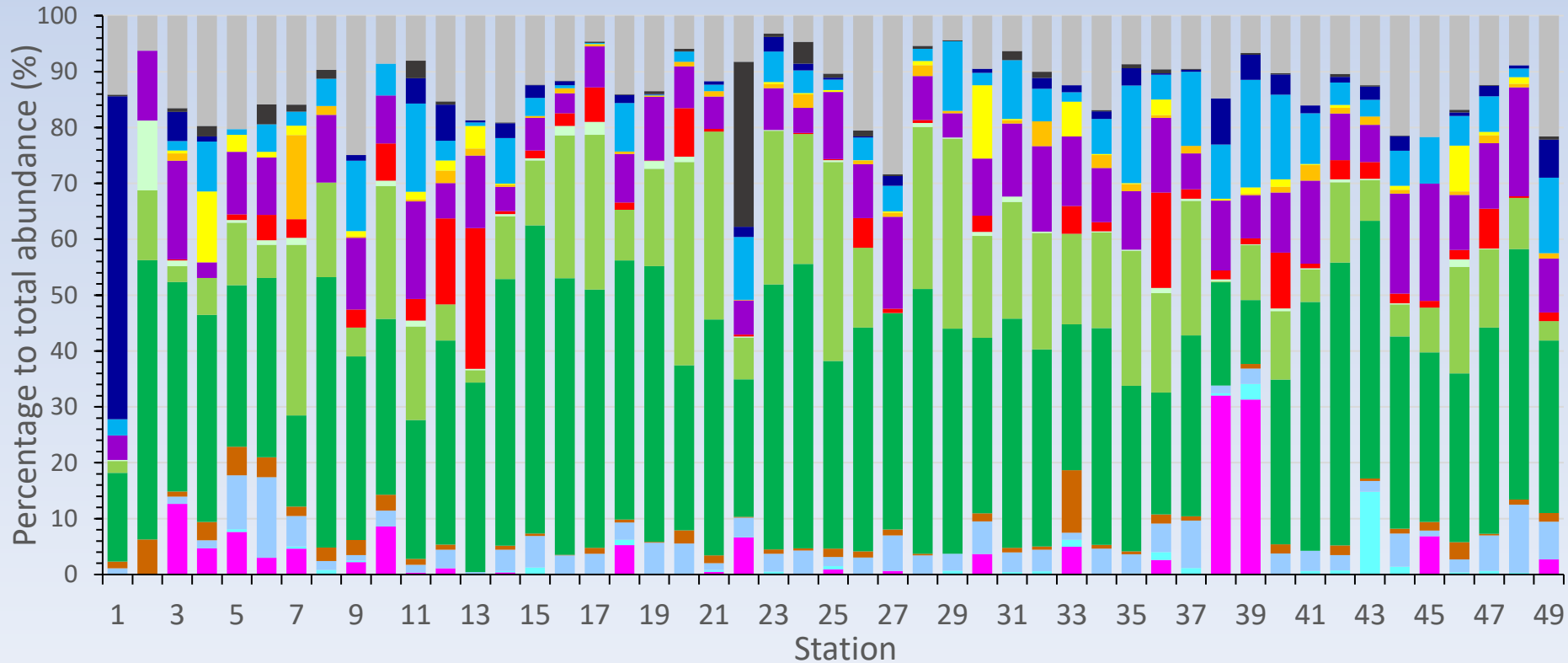
- 18 phylum 57 taxa

# Total abundance and biovolume of zooplankton collecting from the Gulf of Thailand during Aug-Sep 2018



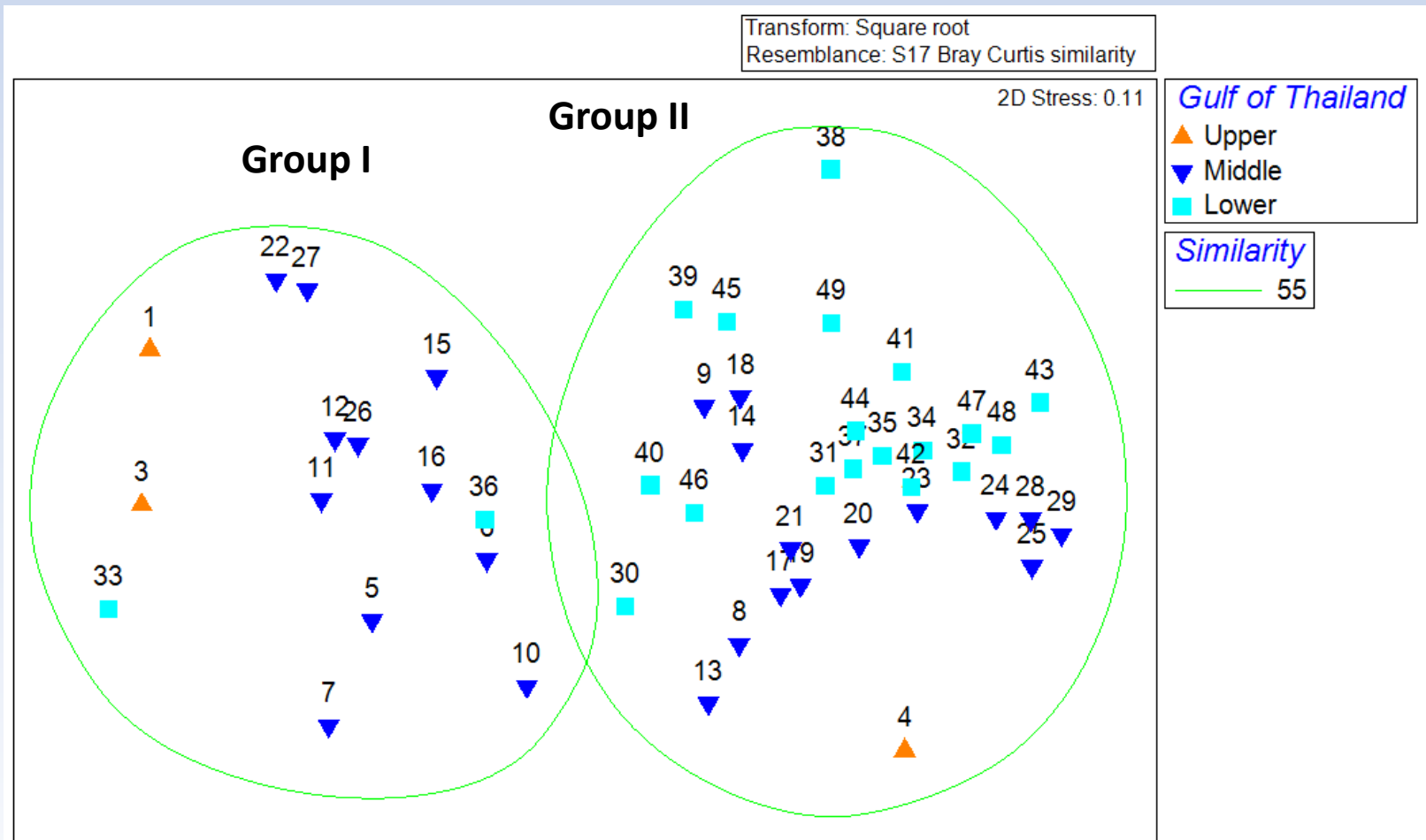


# zooplankton composition in the Gulf of Thailand during August-September 2018



- Radiolaria
  - Polychaeta larvae
  - Harpacticoid copepod
  - Gastropoda larvae
  - Thaliacea
- Ephyra
  - Calanoid copepod
  - Ostracod
  - Echinopluteus larva
  - Fish eggs
- Siphonophora
  - Cyclopoid copepod
  - Chaetognatha
  - Lavacean
  - Others

# Non-metric dimensional scaling (MDS) plots for ordination of zooplankton community composition in the Gulf of Thailand during August-September 2018



# Zooplankton community composition in the Gulf of Thailand during August-September 2018

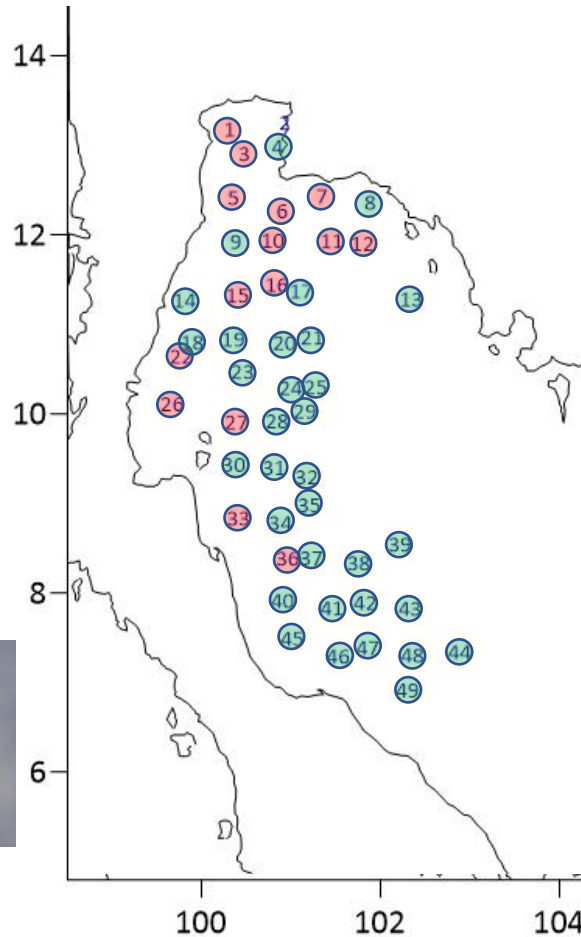
Group I	ind./m <sup>3</sup>
Calanoid copepod	553
Cyclopoid copepod	195
Chaetognatha	176
Thaliacea	185
<i>Lucifer</i> spp.	79
Ostracod	60
Siphonophore	61
Larvacean	80
Radiolaria	71
Fish eggs	67



Calanoid copepod



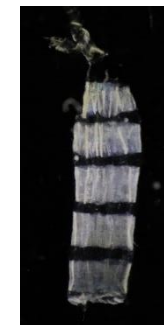
Cyclopoid copepod



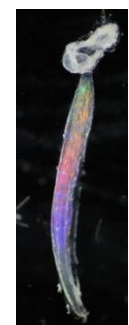
Group II	ind./m <sup>3</sup>
Calanoid copepod	86
Cyclopoid copepod	37
Chaetognatha	24
Larvacean	18
Siphonophore	8
Hydromedusae	4
Ostracod	7



Chaetognatha



Thaliacea



Larvacean

# Relationship between zooplankton abundance and environmental conditions

- Based on Spearman rank correlation using BIOENV procedure for Biota and Environment matching in Primer V.6
- zooplankton abundance was significantly correlated with combination of temperature, salinity, DO, pH, and Chlorophyll *a* (Rho =0.284,  $p < 0.01$ )

# Conclusion

- Calanoid copepod, cyclopoid copepod, and chaetognath are the three most dominant zooplankton in the Gulf of Thailand
- Zooplankton community in the Gulf of Thailand can be divided into two groups
  - I. Stations in the upper and near shore stations in middle and lower GoT: high abundance of zooplankton
  - II. Offshore stations in middle and lower GoT: low abundance of zooplankton
- Zooplankton abundance in the GoT was significantly correlated with combination of temperature, salinity, DO, pH, and Chlorophyll *a*



# Acknowledgements

- Southeast Asian Fisheries Development Center for supporting this research
- Captain, crews and scientists on the M.V. SEAFDEC for their help in the sampling
- Assist. Dr. Penjai Sompongchaikul, Dr. Sujaree Bureekul and grad students at Department of Marine Science, Chulalongkorn University for their help in the sampling



ศูนย์พัฒนาการประมงแห่งเอเชียตะวันออกเฉียงใต้  
SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER  
FISHING WORKSHOP

Thank you!!

9<sup>th</sup> 8<sup>th</sup> 7<sup>th</sup> 11<sup>th</sup> 10<sup>th</sup> 5<sup>th</sup> 4<sup>th</sup> 3<sup>rd</sup> 2<sup>nd</sup> 1<sup>st</sup> 12<sup>th</sup>

