



Status report on
Zooplankton Productivity Measurements
in the Western North Pacific and Its Marginal Waters

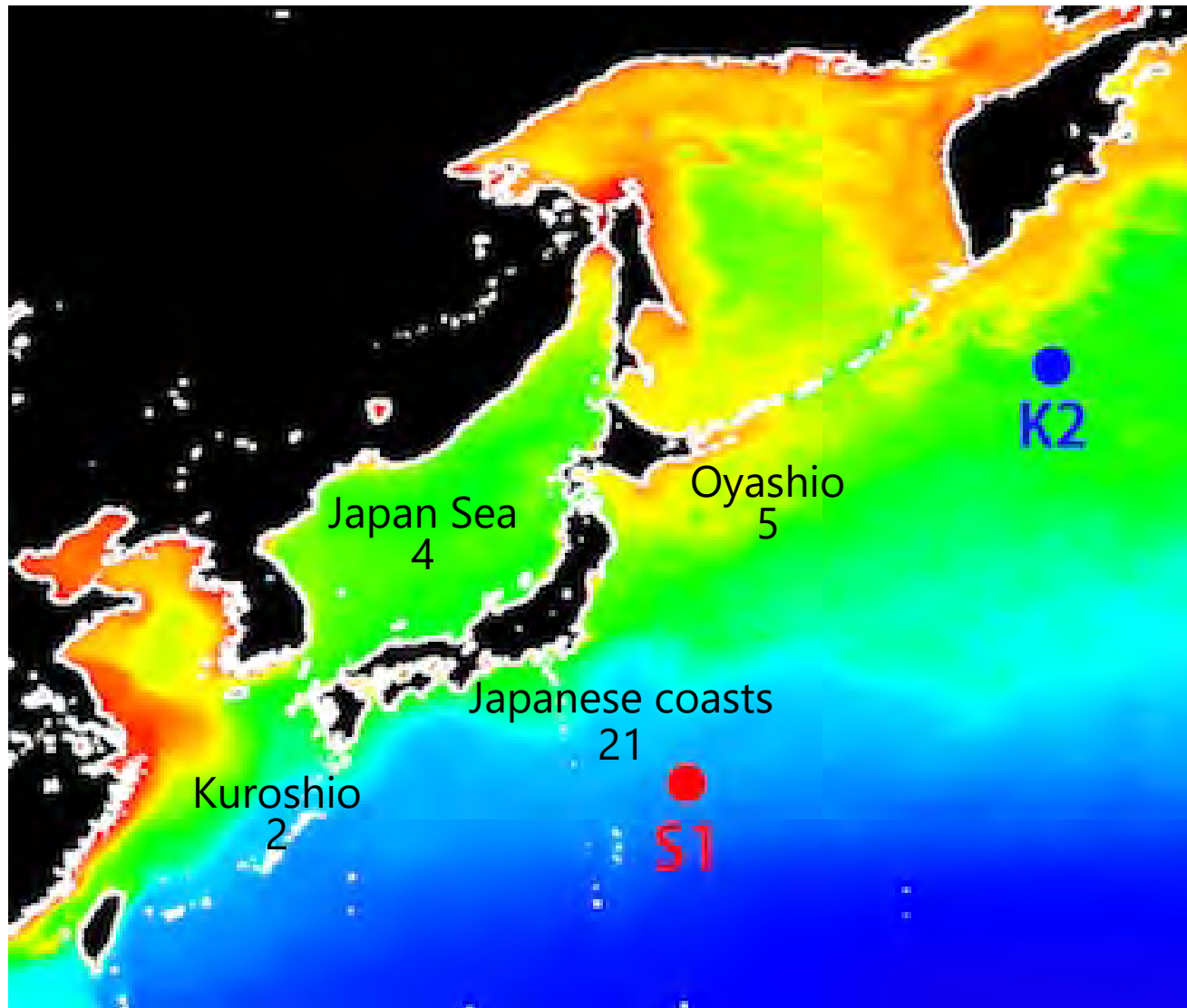
Yokohama, Japan
October 25, 2018

Toru Kobari (Kagoshima University, Japan)
Kazuaki Tadokoro (Tohoku National Fisheries Institute, Japan)

Neocalanus plumchrus
(Photo from National Geographic, Japan)

Target areas

where Japanese researchers conducted zooplankton productivity measurements



Satellite image of sea surface chlorophyll (Image from JAMSTEC, Japan)

Target areas

21 productivity measurements
Japan coasts

Marine Biology (1996) 124: 527–536

© Springer-Verlag 1996

D. Liang · S. Uye · T. Onbé

Population dynamics and production of the planktonic copepods in a eutrophic inlet of the Inland Sea of Japan. I. *Centropages abdominalis*

Marine Biology (1996) 127: 219–227

© Springer-Verlag 1996

D. Liang · S. Uye

Population dynamics and production of the planktonic copepods in a eutrophic inlet of the Inland Sea of Japan. III. *Paracalanus* sp.

Marine Biology (1997) 128: 409–414

© Springer-Verlag 1997

D. Liang · S. Uye

Seasonal reproductive biology of the egg-carrying calanoid copepod *Pseudodiaptomus marinus* in a eutrophic inlet of the Inland Sea of Japan



Dr. Shin-ich Uye

Target areas

5 productivity measurements

Oyashio

Journal of Oceanography, Vol. 64, pp. 339 to 354, 2008

Review

Structure, Biomass Distribution and Trophodynamics of the Pelagic Ecosystem in the Oyashio Region, Western Subarctic Pacific

TSUTOMU IKEDA*, NAONOBU SHIGA and ATSUSHI YAMAGUCHI



Dr. Tsutomu Ikeda

Development and growth of ontogenetically migrating copepods during the spring phytoplankton bloom in the Oyashio region

T. Kobari ^{a,*}, A. Ueda ^a, Y. Nishibe ^b



Population structure, egg production and gut content pigment of large grazing copepods during the spring phytoplankton bloom in the Oyashio region

Atsushi Yamaguchi*, Yuka Onishi, Aya Omata, Momoka Kawai, Mariko Kaneda, Tsutomu Ikeda

Target areas

6 productivity measurements
Kuroshio (2) and other sites (4)

ESTIMATED ZOOPLANKTON PRODUCTION AND THEIR AMMONIA EXCRETION IN THE KUROSHIO AND ADJACENT SEAS

TSUTOMU IKEDA¹ AND SIGERU MOTODA²

Plankton Biol. Ecol. 49 (2): 58–65, 2002

plankton
biology & ecology
© The Plankton Society of Japan 2002

Production, metabolism and production/biomass (*P/B*) ratio of *Metridia pacifica* (Crustacea; Copepoda) in Toyama Bay, southern Japan Sea

TSUTOMU IKEDA¹, KAZUMASA HIRAKAWA² & NAONOBU SHIGA¹

Journal of Plankton Research Vol.21 no.12 pp.2421–2430, 1999

SHORT COMMUNICATION

Production of *Oikopleura longicauda* (Tunicata: Appendicularia) in Toyama Bay, southern Japan Sea

Mika Tomita¹, Tsutomu Ikeda and Naonobu Shiga

Methods used

for zooplankton productivity measurements

Traditional methods (after Kobari et al., in prep.)

1. Natural cohort **20** (e.g., Lian & Uye 1996a, 1996b)
including modified ones
2. Artificial cohort **0**
3. Molting rate **1** (e.g., Kobari et al. 2010)
4. Egg production **0**
5. Physiological model **5** (e.g., Ikeda & Motoda 1978)
6. Empirical models **6** (e.g., Uye et al. 1996, Ikeda et al. 2008)

Biochemical approaches (after Yebra et al., 2017)

1. Nucleic acid ratio **4** (e.g., Nakata et al. 1995; Kobari et al. 2017)
2. Chitinase **0**
3. Aminoacyl-tRNA synthetases **1** (e.g., Kobari et al. 2018)
4. DNA polymerase **0**
5. Aspartate transcarbamylase **0**
6. Nucleoside diphosphate kinase **0**

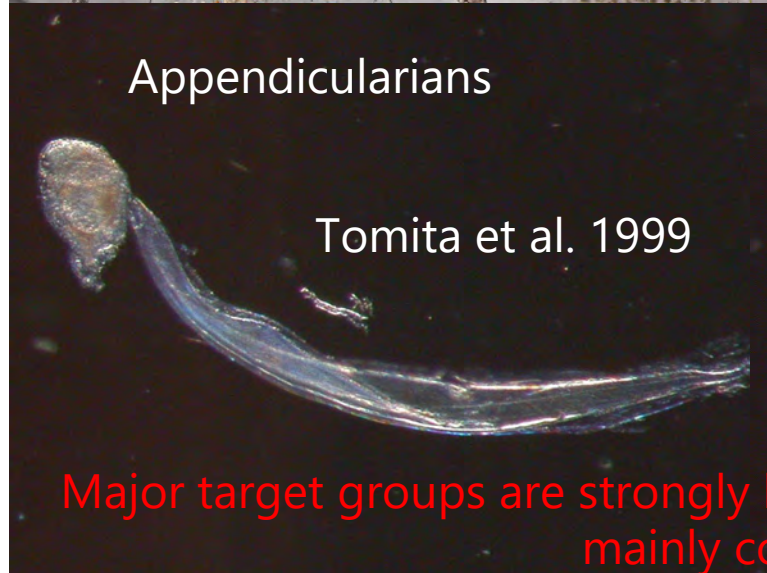
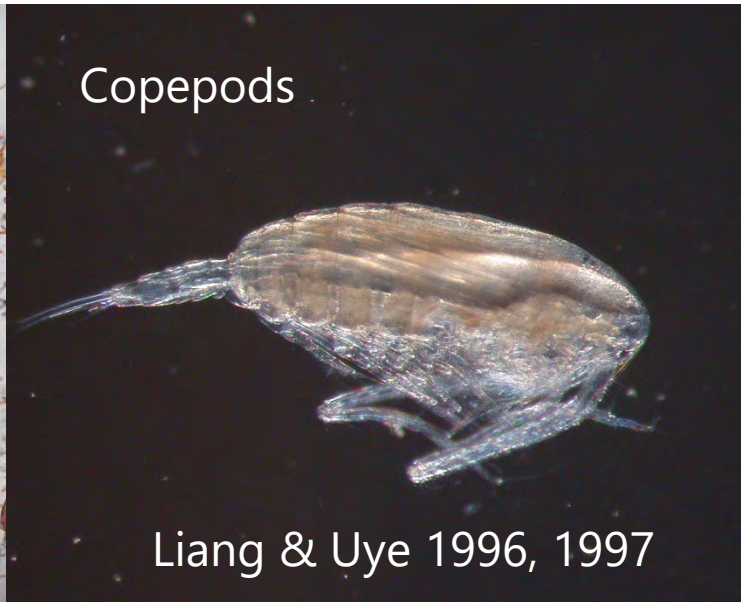
Another technique (after Yebra et al., 2017)

1. ¹⁴C NAG incorporation **0**

Production measurements are mainly based on the traditional methods,
but biochemical approaches have been recently applied

Target groups

for zooplankton productivity measurements



Major target groups are strongly biased for metazoan crustaceans, mainly copepods

Summary

1. Western North Pacific and its neighboring waters are likely “hot-spots” where zooplankton production measurements were most frequently conducted in the world.
2. These measurements are mainly based on the traditional methods, and various approaches have been applied for zooplankton population or community in the field.
3. As alternative methodologies to provide fine temporal and spatial resolutions, biochemical approaches have been recently applied.
4. Major target groups are biased for metazoan crustaceans (mainly copepods) and thus other taxonomic groups like protozoans and gelatinous forms are considerably limited.
5. Due to the expansibility of biochemical approaches or other novel techniques, comparisons of the zooplankton productivity measurements among the methods would be encouraged.