

Report of Working Group 37 on Zooplankton Production Methodologies, Applications and Measurements in PICES Regions

The Working Group on *Zooplankton Production Methodologies, Applications and Measurements in PICES Regions* (WG 37) annual meeting was held at online (Zoom) on October 1, 2020 from 14:00 to 17:00 (Pacific standard time, +UTC-8), under the chairmanship of Dr. Toru Kobari (Japan) and Dr. Akash Sastri (Canada) (see *WG 37 Endnote 1*). Ten participants including national representatives and observers attended and participated in the meeting (*WG 37 Endnote 2*).

AGENDA ITEM 1

Activities done in 2020

Dr. Kobari reported on the following WG activities planned for 2020.

2020 PICES Spring School

Drs. T. Kobari, Naoki Yoshie (Ehime University) and Gen Kume (Kagoshima University) organized a 2020 PICES Spring School on “Coastal Ocean Observatory Science” planned for March 4 to 8, 2020 and hosted by Kagoshima University, Kagoshima, Japan. This Spring School was sponsored by PICES, AP-NPCOOS, Japan Society for the Promotion of Science, and Kagoshima University. This Spring School participation included 25 early career scientists from 9 countries, 3 lecturers from Japan, and 5 supporting staff. We scheduled onboard sampling, laboratory work, and lectures on monitoring of coastal environments and ecosystems using the latest instruments (*e.g.*, CTD, ADCP, scientific sonar) and analyses. Unfortunately, due to the severe COVID-19 situation, the organizers cancelled this Spring School in late February 2020.

Workshop at the PICES 2020 Annual Meeting

Drs. Hui Liu, T. Kobari, K. Suchy, and R. Hopcroft, planned to convene a workshop (*Can we link zooplankton production to fisheries recruitment?*) for the PICES 2020 Annual Meeting. Potential speakers were as follows.

- ✓ Wim Kimmerer (Zooplankton production and its consequences)
- ✓ Xianshi Jin (Fish production in the Yellow Sea, invited)
- ✓ Dave McKinnon (Zooplankton production and its consequences)
- ✓ Anthony Richardson
- ✓ Gen Kume (Gut contents analysis of fish larvae in the Kuroshio)
- ✓ A. Sastri (Zooplankton production in the eastern Pacific)
- ✓ Evgeny Pakhomov (Zooplankton size spectrum to estimate production, Canada)

Due to the COVID-19, the PICES 2020 Annual Meeting was changed to an online format and most of sessions and workshops were cancelled or postponed. After discussion, WG members decided to postpone the in-person workshop until PICES-2021 in China. Depending on the situations of the COVID-19, it is likely necessary to re-consider whether the workshop should be held online or cancelled in next year.

AGENDA ITEM 2

Terms of references

After Dr. Kobari described the working plans and progress toward the terms of references (ToR), all participants discussed progress of each ToR in turn. Particularly, the Co-Chairs asked all participants to confirm the deadline for summarizing the WG 37 final report (mid-December).

1. *Review papers on traditional and biochemical methodologies (ToR1)*

The two papers on zooplankton production methodologies have been already published.

2. *Guidelines and recommendations (procedures/protocols) of traditional and biochemical methodologies (ToR2)*

Guidelines for several of the traditional methodologies have been made by the WG members and colleagues. These materials will be included as supplemented information on the final report. It is expected that the responsible authors submit the guidelines for the artificial cohort method by the end of October. The deadline will not be extended further.

3. *Develop practical models for estimating zooplankton production to time-series (ToR3)*

Drs. Kazuaki Tadokoro and Kobari demonstrated the applications of the Ikeda-Motoda model as applied to some Japanese zooplankton data sets. Dr. Sastri will provide similar results using Canadian data sets. These results have been included in the WG 37 final report.

4. *Build a platform of information exchange on zooplankton production measurements through an interactive website for regional and/or global mapping (ToR4)*

Following the discussions during the WG meeting, the zooplankton production estimates for several time series (Canadian time series, Oyashio time series, and BATS) or data sets (Inland Sea of Japan and Kuroshio) were available from the WG final report. However, we have no available platform for “information exchange” on zooplankton production measurements through “an interactive website”. Drs. Kobari and Yebra will seek such platform or alternative way within a year (the extended term of the WG 37 to October 2021 has been requested to BIO).

5. *Build a network of scientists and laboratories measuring zooplankton production among PICES and ICES nations as well as developing countries (ToR5)*

The information on scientists and laboratories measuring zooplankton production among PICES and ICES member countries will be included as supplemental information for the WG final report and made available through the PICES website.

6. *Promote international collaborations among zooplankton production researchers through international organizations such as PICES, ICES, and IMBeR (ToR6)*

WG 37 organized two PICES Practical Workshops (Japan and Canada) and one PICES Spring School (Japan). While the Spring School was cancelled, WG 37 promoted international collaborations by organizing several workshops at PICES Annual Meetings and thematic sessions (Zooplankton Production Symposium and Ocean Sciences meeting) at international meetings.

7. *Publish a final report summarizing results (ToR7)*

The timeline is scheduled as follows. WG 37 will submit the final report by the end of December 2020. Note that the blank sections will be deleted if these are not submitted by mid November.

November 15: Deadline for submission of all responsible sections

December 15: Deadline for editing all sections by Co-Chairs and Dr. Yebra

Late December: Submit the WG final report to BIO for review

AGENDA ITEM 3

Bibliography for zooplankton production methodology and measurements in the PICES region

The bibliography is included in the WG final report and will be demonstrated at the PICES website.

AGENDA ITEM 4

Term of WG 37

All participants discussed the possibilities whether the WG 37 term should be extended until 2021 or closed 2020 because all scientific activities have been cancelled or extended since the last spring when COVID-19 was under the severe situations. Through the extensive discussions, all participants agreed to the following points:

- ✓ Final report of WG 37 to be submitted to BIO for review by the end of December.
- ✓ WG 37 to convene the PICES workshop (*Can we link zooplankton production to fisheries recruitment?*) postponed to the 2021 PICES Annual Meeting.
- ✓ Co-Chairs request an extension of the WG 37 term to October 2021.

WG 37 Endnote 1**WG 37 participation list**Members

Toru Kobari (Co-Chair, Japan)
 Akash Sastri (Co-Chair, Canada)
 Kazuaki Tadokoro (Japan)
 Lidia Yebra (*ex officio* member, representing ICES)
 Se-Jong Ju (Korea)
 Karyn Suchy (Canada)
 Jung-Hoon Kang (Korea)
 Russell Hopcroft (USA)
 Hui Liu (USA)

Members unable to attend

China: Qing Yang
 Korea: Min-Chul Jang, Hyung-Ku Kang
 Russia: Vladimir Napazakov
 USA: Todd O'Brien

Observer

Harold (Hal) Batchelder (PICES)

WG 37 Endnote 2**WG 37 meeting agenda**

1. Activities done in 2020
 - Spring School
 - Workshop at the PICES 2020 Annual Meeting
2. Plans to complete terms of references
 - Review papers on traditional and biochemical methodologies (ToR1)
 - Guidelines and recommendations of traditional and biochemical methodologies (ToR2)
 - Develop practical models for estimating zooplankton production to time-series (ToR3)

- Build a platform of information exchange on zooplankton production measurements through an interactive website for regional and/or global mapping (ToR4)
 - Build a network of scientists and laboratories measuring zooplankton production among PICES and ICES nations as well as developing countries (ToR5)
 - Promote international collaborations among zooplankton production researchers through international organizations such as PICES, ICES and IMBER (ToR6)
 - Publish a final report summarizing results (ToR7)
3. Others
- Bibliography for zooplankton production methodology and measurements in the PICES region