

2023 Report of Working Group 45 Joint PICES/ICES Working Group on Impacts of Warming on Growth Rates and Fisheries Yields

The Joint PICES/ICES Working Group on Impacts of Warming on Growth Rates and Fisheries Yields (WG 45/WGGRAFY) held its annual WG meeting on September 19 at 5 PM Pacific Time US & Canada online, under the chairing of Drs. Paul Spencer (USA, PICES) and Shin-ichi Ito (Japan, PICES). The purpose of the meeting was to discuss: 1) updated activities and accomplishments in WG 45; 2) future schedules; and 3) requests for SB. The meeting was held online.

AGENDA ITEM 1

Introduction by Co-Chairs

The meeting began with a brief introduction of WG 45 ToR and topics of WG 45.

AGENDA ITEM 2

Introduction of members and adoption of agenda

After introduction of members (*WG 45 Endnote 1*), the agenda was adopted (*WG 45 Endnote 2*).

AGENDA ITEM 3

Reports on 2023 WG 45 (GRAFY) Activities & Accomplishments

t) New resolution for ICES

A 3-year extension of the WGGRAFY was approved by ICES. Therefore, a new resolution of WGGRAFY for ICES is developing. The new resolution extends the activity of WGRAFY to include individual variation of body size and application of size spectrum modelling approaches to evaluate the impacts on fisheries.

2) ICES Final Report

WGGRAFY submitted “End of term e-evaluation of fixed-term working groups” to ICES. WGGRAFY must submit the final report to ICES regarding 2020-2022 WGGRARY activities. Co-chairs asked the speakers at the ICES 2022 theme session to provide extended abstracts of their presentations. The extended abstracts will be added to the final report to ICES.

3) One year extension of WGGRAFY in PICES

Co-chairs shared the information to the members regarding the approval of one-year extension of WG 45 (GRAFY) at the inter-sessional SB meeting in May 2023. WG 45 (GRAFY) will extend to Oct. 2024.

4) PICES Press article for ICES 2022 Theme Session

Co-chairs reported the publication of a PICES Press article for ICES 2022 Theme Session. The lead author is an ECOP member of WG 45 (GRAFY), Zhen Lin.

5) WGGRAFY poster at ICES 2023

Co-chairs reported on the poster presentation at ICES-2024 made by WGGRAFY.

6) PICES Topic Session

Co-chairs reported on S9: BIO/FIS Topic Session “Understanding the implications of body size change for stock productivity and fisheries management” which will be held on 26th October 2023 at PICES 2023. The convenors are Paul Spencer (USA), John Morrongiello (Australia), Chenying Guo (ECOP, China), and Shin-ichi Ito (Japan). The invited speaker is an ECOP, Dr Max Lindmark (Swedish University of Agricultural Sciences). Ten ECOP presentations are scheduled in the total of 18 presentations.

AGENDA ITEM 4

Future Schedules

1) ICES 2024 Theme Session

WGGRAFY submitted the theme session proposal entitled “Impacts of warming-induced changes in body sizes on marine fish ecology and their consequences for ecosystems and associated fisheries” to ICES. The co-convenors are Alan Baudron (UK), Paul Spencer (USA), and Max Lindmark (Sweden).

The proposal was not approved at ICES after the business meeting. WG 45 (GRAFY) then submitted the proposal to PICES 2024 Topic Session.

2) WGGRAFY Final Report to PICES

The members discussed the final report to PICES which should be submitted after Oct. 2024. It was proposed to submit to a special scientific journal based on the ICES-2024 Theme Session. This was changed to a PICES-2024 Topic Session after the business meeting (WG 45 Endnote 3) presentations and WG 45 (GRAFY) related works. Another suggestion was to publish a peer-reviewed paper as WG 45 (GRAFY) in a scientific journal.

AGENDA ITEM 5

Requests and other business

Requests to PICES were discussed. WGGRAFY submitted a proposed theme session “Impacts of warming-induced changes in body sizes on marine fish ecology and their consequences for ecosystems and associated fisheries” to ICES. If accepted, WG 45 (GRAFY) requests travel support for one ECOP invited speaker to the ICES-2024. However, the theme session was not approved.

WG 45 (GRAFY) requests a half-day in-person business meeting at PICES-2024 based on the strong requests from the members.

WG 45 (GRAFY) is also planning to publish a special issue or a paper as the final report to PICES. WG 45 (GRAFY) will continue to discuss this possibility.

WG 45 Endnote 1

PICES/ICES joint WG45 meeting participation list

Members

Paul Spencer (USA, Co-Chair)
Shin-ichi Ito (Japan, Co-Chair)
Yue Jin (China)
Saang-Yoon Hyun (South Korea)

Members unable to attend

Canada: Sean C. Anderson
China: Shuyang Ma, Yongjun Tian
Japan : Kunihiro Fujiwara, Takeshi Tomiyama
USA: Melissa Haltuch, Christine Stawitz

ICES Members unable to attend

Australia : John Morrongiello (Co-Chair)
UK : Alan Baudron (Co-Chair)

WG 45 Endnote 2**PICES/ICES joint WG45 meeting agenda**

1. Introduction
2. Introduction of members and adoption of the agenda
3. Reports on 2023 WG 45 (GRAFY) activities & accomplishments
4. Future directions
5. Requests and other business

WG 45 Endnote 3

Proposal for a Topic Session on
“Impacts of warming-induced changes in body sizes on marine fish ecology and their consequences for ecosystems and associated fisheries”
at PICES-2024

Potential Committee/Panel: FIS, WG 45 (GRAFY), AP-ECOP, S-CCME

Convenors: Shin-ichi Ito, Japan, goito@aori.u-tokyo.ac.jp
 Paul Spencer, USA, paul.spencer@noaa.gov
 Alan Baudron, UK, Alan.baudron@gov.scot
 Max Lindmark (ECOP), Sweden, max.lindmark@slu.se

Corresponding convenor: Shin-ichi Ito (goito@aori.u-tokyo.ac.jp)

Potential Invited Speakers: Dr. Julia Indivero, USA, jindiv@uw.edu (ECOP)

Session description (300 words):

As sea temperatures keep rising, warming impacts on marine fisheries have become increasingly prevalent. For example, temperature-induced changes in fish distribution and movement across management boundaries impact management of multi-jurisdictional fisheries. Additionally, changes in phenology can lead to mismatch between larva abundances and plankton blooms, thereby affecting recruitment and fish stocks productivity. In contrast, warming-induced changes in fish body sizes have been increasingly documented but their potential impacts have received comparatively less attention.

Changes in body size can impact other life history traits such as maturity, fecundity, diet, habitat preferences, and predator-prey interactions; all of which can alter the functioning of size-structured ecosystems and commercial fisheries. While research has thus far mainly focused on understanding how warming seas affect fish growth, the magnitude of the consequences of changes in body size and what it could mean for ecology, fisheries and ecosystems is yet to be explored.

As global warming is likely to lead to further changes in fish body sizes there is a need to assess the possible consequences facing marine ecosystems and fisheries in order to understand the challenges that lie ahead. This session aims at assessing the future consequences of changing fish body sizes occurring in warming seas. We are seeking contributions on (but not limited to) the following topics:

1. Interrelations between fish growth and other life history traits
2. Impacts of fish body sizes on species mobility, use of habitat, and migrations/distributions
3. Evidence of changes in fish body sizes affecting predator-prey interactions and their consequences on size-structured food webs
4. Impacts on commercial fisheries, including changes in yield, fishery practices, and management measures
5. Examples accounting for changes in fish body sizes in fish stocks assessment and management
6. Impacts on markets and fish sales, changes in nutritional value, and implications for food security.