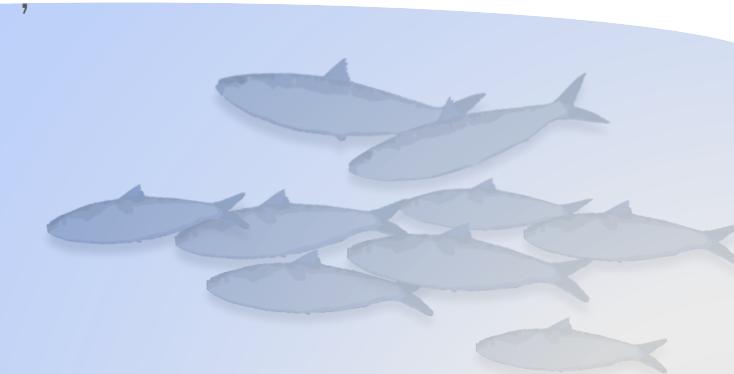


Recent Expansion of Tropical Small Pelagic Fish in Japanese Coastal Waters: Case Studies of *Encrasicholina punctifer* and *Sardinella aurita*

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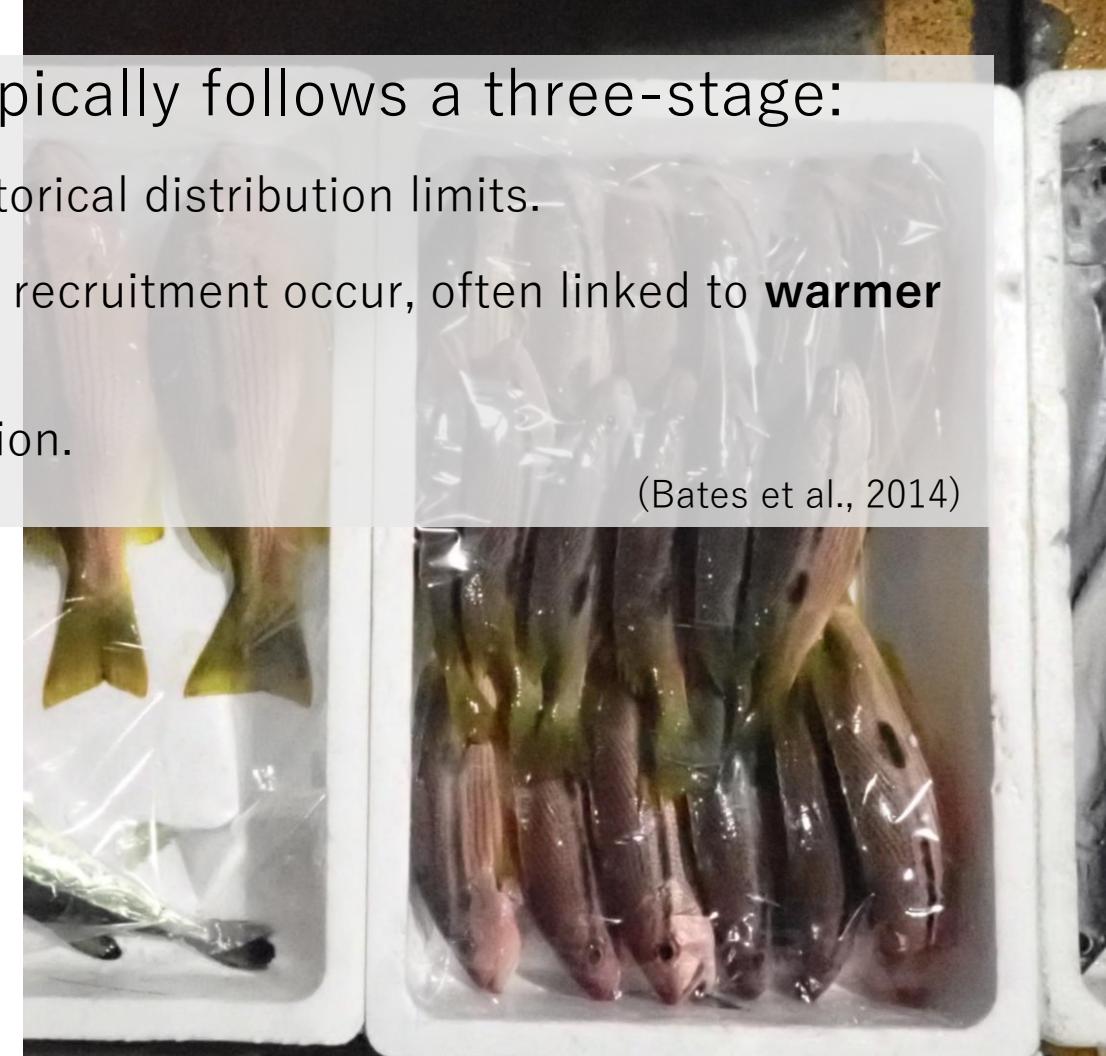
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Increasing Occurrence of Tropical Fish in Japanese Coastal Waters

- The **range expansion of tropical species** typically follows a three-stage:
 - 1. Initial arrival:** Individuals appear beyond their historical distribution limits.
 - 2. Establishment:** Overwintering, reproduction, and recruitment occur, often linked to **warmer winter temperatures.**
 - 3. Persistence:** Stable presence and local reproduction.

→ **Identifying which stage a species is in helps assess the future sustainability of its availability.**



(Bates et al., 2014)

Fisheries Collaboration in Response to Tropical Species Expansion

- In response to environmental changes, fisheries institutes along the Pacific coast of Japan are actively **sharing data and field observations**

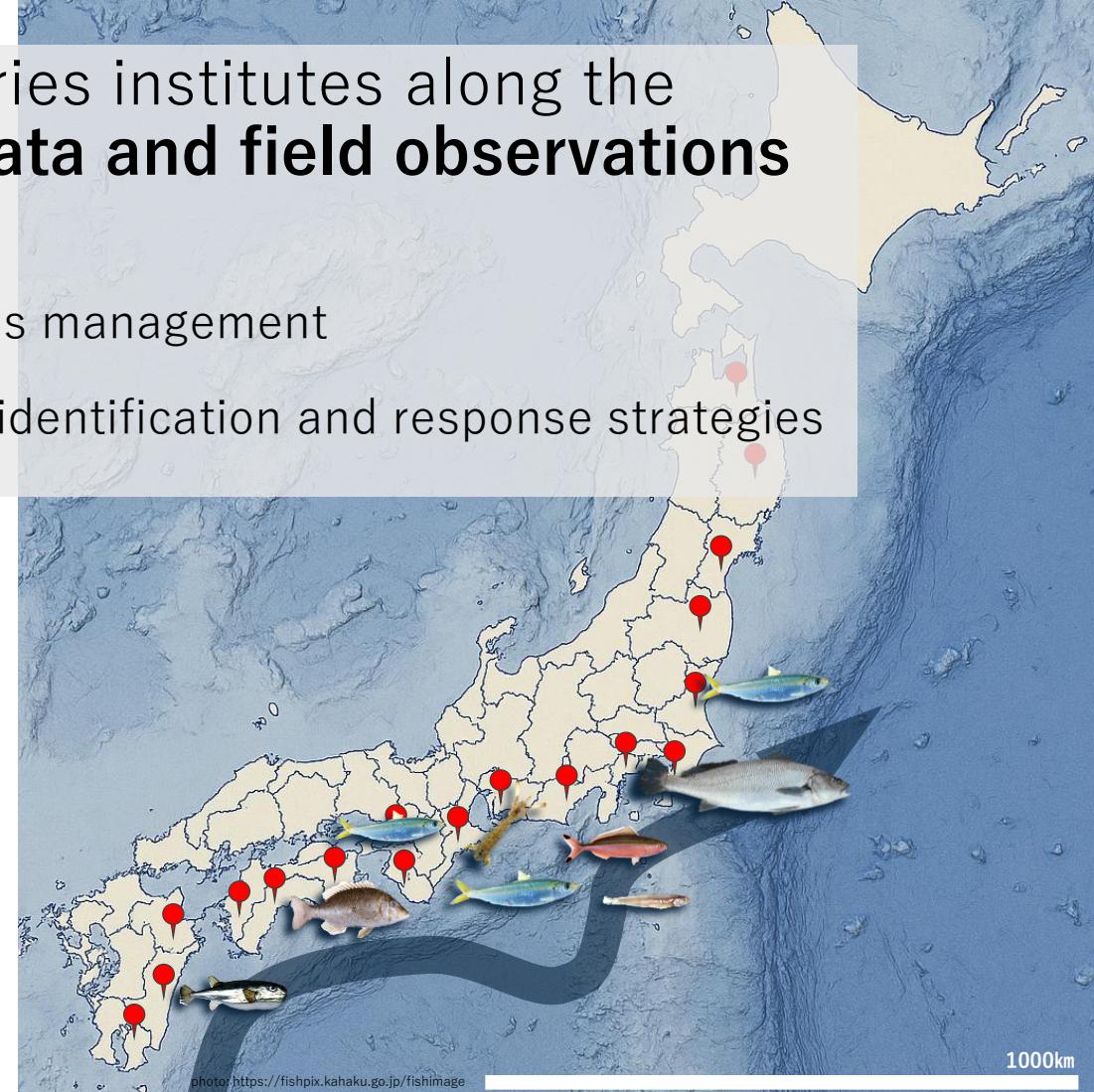
(Watai et al., 2024).

- **Exchanging information** for adaptive fisheries management
- **Sharing field knowledge** to improve species identification and response strategies

→ **Publishing reports on species occurrence and distribution to support adaptive management and enhance regional collaboration.**



(e.g., Saguchi et al., 2024; Suzuki, 2024)



Information Exchange on Tropical-Origin Species in Coastal Japan

Case Studies: Range Expansion of ...

Encrasicholina punctifer

- 1950s: First records in central Japan (e.g., Suruga Bay) (Nakai et al., 1969)
- 2010s–2020s: Expanded to southwestern and central coastal areas (e.g., Shibusu Bay, Osaka Bay) (e.g. Omi et al., 2024)

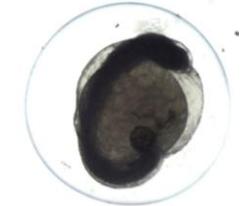


(Shao et al., 2024)

Sardinella aurita

- Rarely observed in Japan during the 20th century
- Rapid increase since the early 2000s
- Especially along the southern Pacific coast

(Hata et al., 2020)



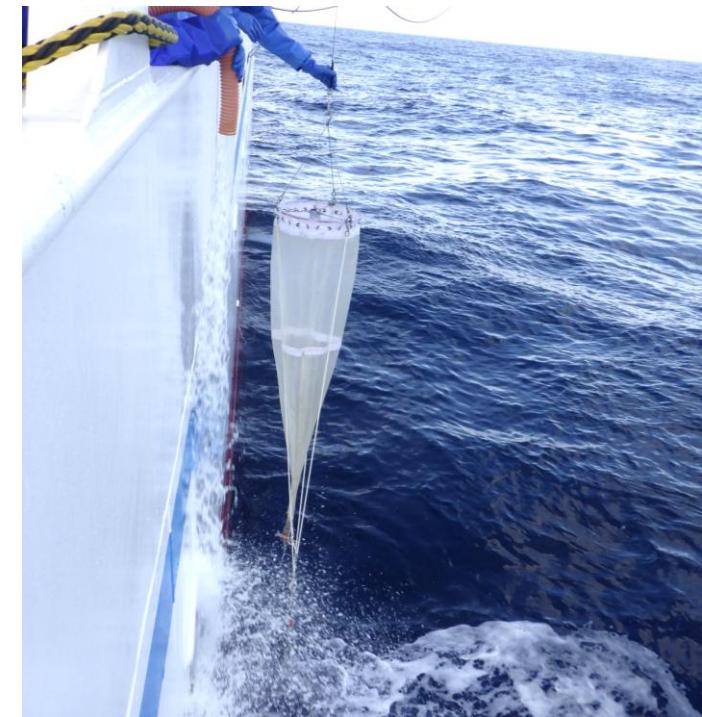
Main case studies informed by:

Suzuki, 2024 – Recent records of *Encrasicholina punctifer* in Japanese waters
Saguchi et al., 2024 – Occurrence of *Sardinella aurita* on the Pacific coast

Study Methods

- Interview surveys:
 - Hearing from prefectural officers
 - Market data used to confirm occurrence and catch records
- Egg and larval surveys:
 - Monthly plankton sampling using Norpac nets (0–150 m depth).
- Field surveys:
 - Conducted in Saiki Bay (Oita) and other prefectures
 - Targeted juvenile and adult sardines and anchovies
 - Species composition of *shirasu* catch monitored

(Saguchi et al., 2024; Suzuki, 2024)



Occurrence of *Encrasicholina punctifer* by Prefecture (2022)



Prefecture	Size (TL)	Bycatch Rate / Notes
Kanagawa	juvenile (50–70 mm) post-larvae (~30 mm)	Possibly >50% <i>E. punctifer</i>
Shizuoka	juvenile (38–45 mm) post-larvae (20–30 mm)	10-30% among anchovy larvae
Aichi	juvenile / adult (58–80 mm)	2% by weight in anchovy catch
Mie	juvenile / adult (58–80 mm)	Bycatch confirmed; rate not specified
Ōita	larvae (18–49 mm)	Bycatch rate: 8–17% (Sep–Oct)

Presence by Prefecture

- Confirmed
- Not confirmed



(Suzuki, 2024)

Occurrence of *Sardinella aurita* by Prefecture (2022-2023)



Prefecture	Size (TL)	Notable Catch Events
Kanagawa	33–36 mm (larval stage)	2023 Aug: confirmed in <i>shirasu</i> catch
	adult	2015: 1.4 t, 2016: 0.9 t, 2018: 0.9 t 2019–: tens to hundreds of kg annually
Shizuoka	20–25 mm (larval stage)	2023 Aug: mixed in <i>shirasu</i> catch (1–3%)
Aichi	50–180 mm (varied by month/year)	2022 Sep: 241 t, Oct: 100 t, Dec: 0.5 t
Mie	80–200 mm (varied by month/year)	2022 Nov: 1.1 t, Dec: 29.1 t (Kumano-nada)
Osaka	119–153 mm	2022 Sep: “several tons/day” reported
Others	Not specified or limited data	Catch confirmed; often labeled as “mixed” or “miscellaneous”

Presence by Prefecture

- Confirmed (Red dot)
- Not confirmed (Grey dot)

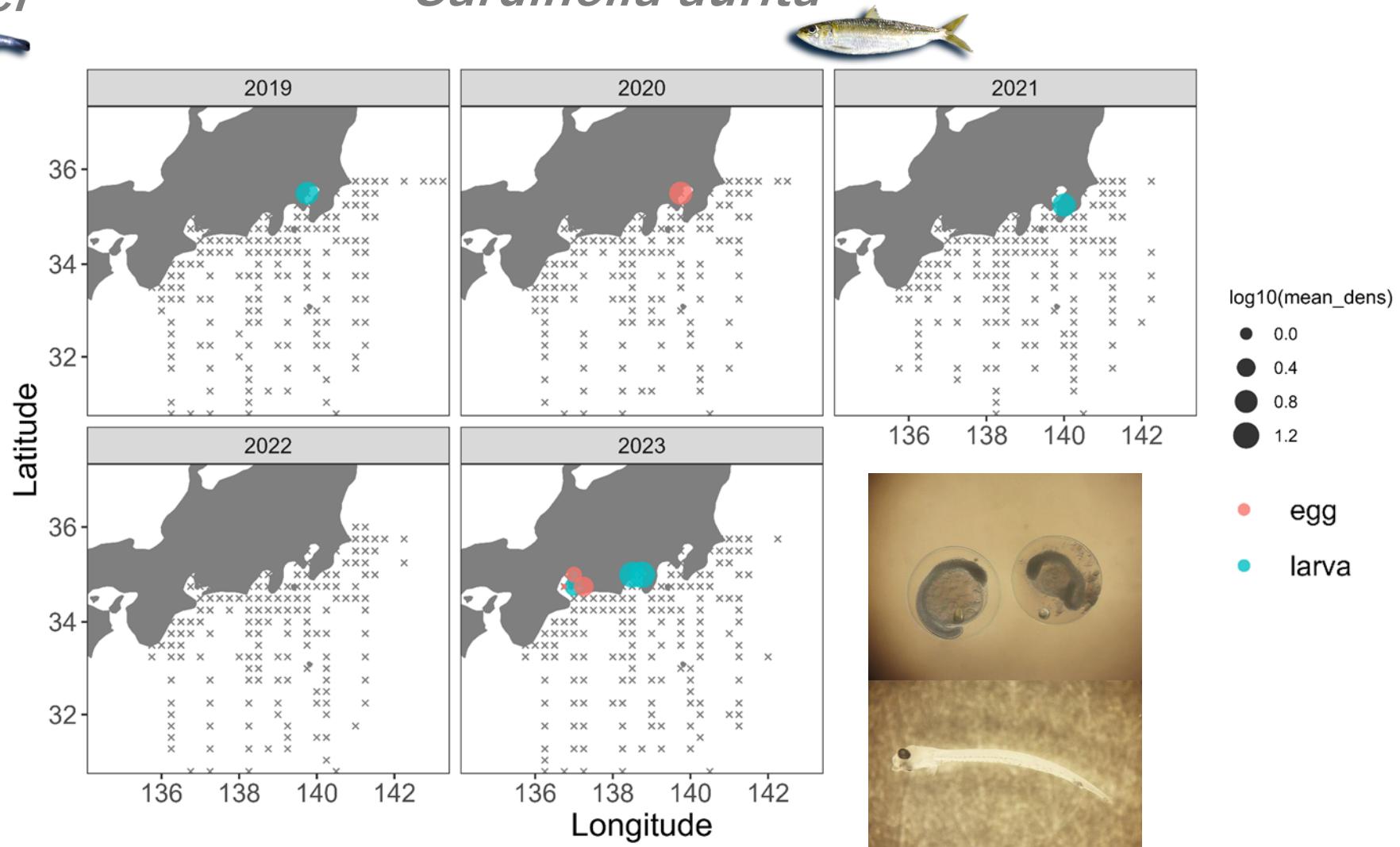


Egg and Larval Survey Results (2019–2023)

Encrasicholina punctifer



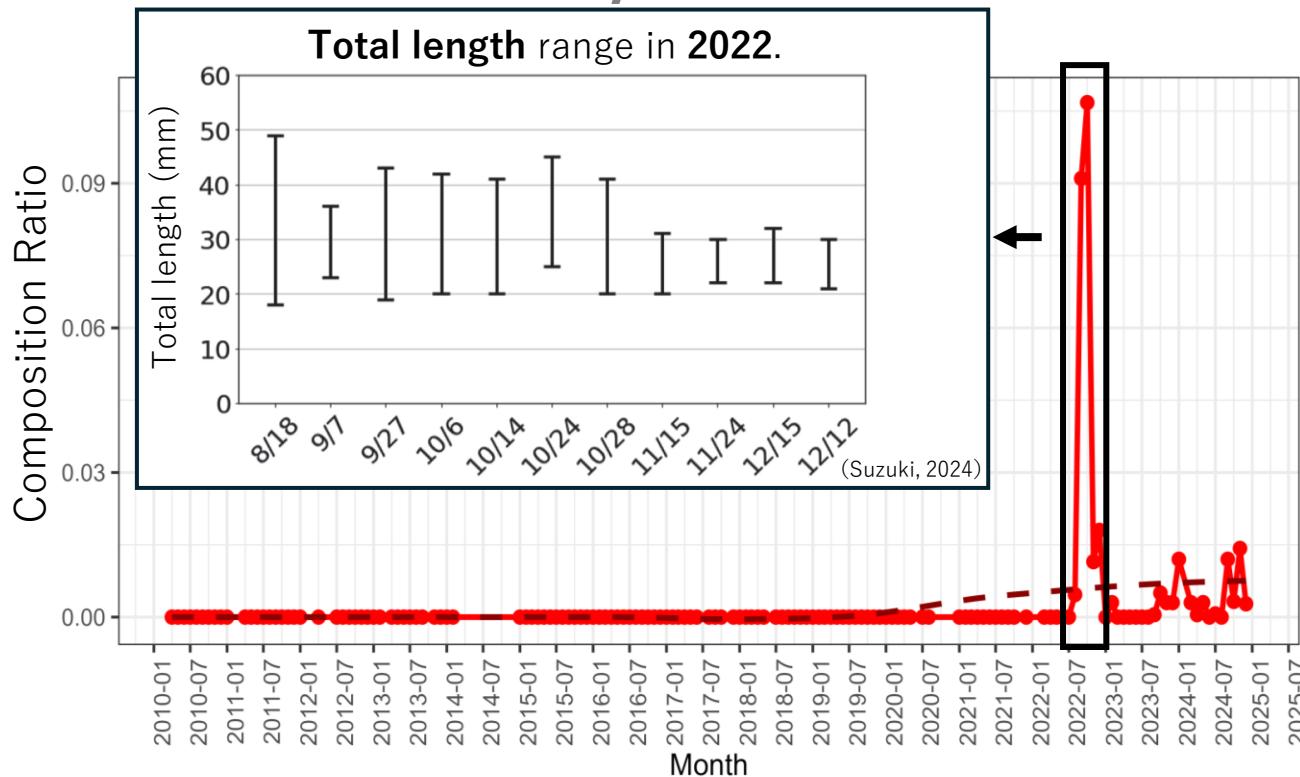
Sardinella aurita



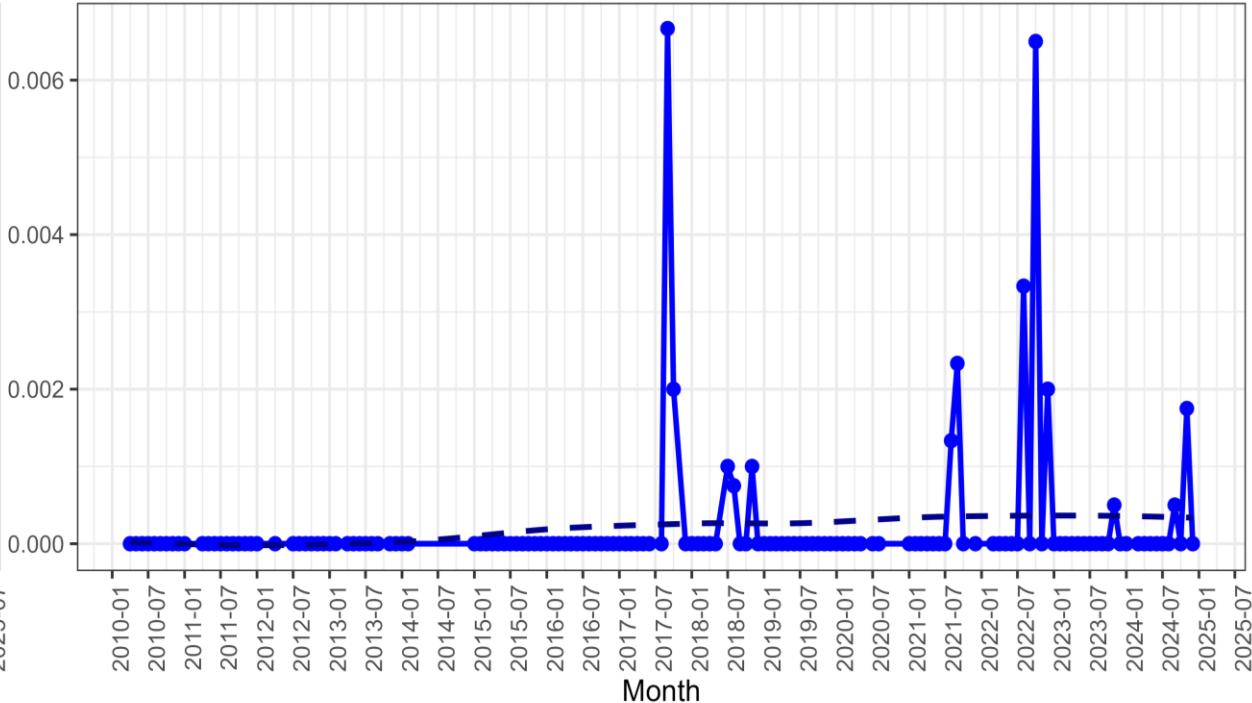
Catch Trends of *E. punctifer* and *S. aurita* in Oita Prefecture

- Monthly Trend composition

Encrasicholina punctifer



Sardinella aurita



- *E. punctifer* increased sharply in 2022 and continues to appear intermittently.
- *S. aurita* has appeared sporadically since 2017.

Key Points on *Encrasicholina punctifer* Occurrence

- **Distribution Expansion**

Simultaneous appearance in Kanagawa, Shizuoka, Aichi, Mie, and Oita (2022)

- **Catch Records**

Up to 17% bycatch rate in Oita; juveniles confirmed in multiple regions

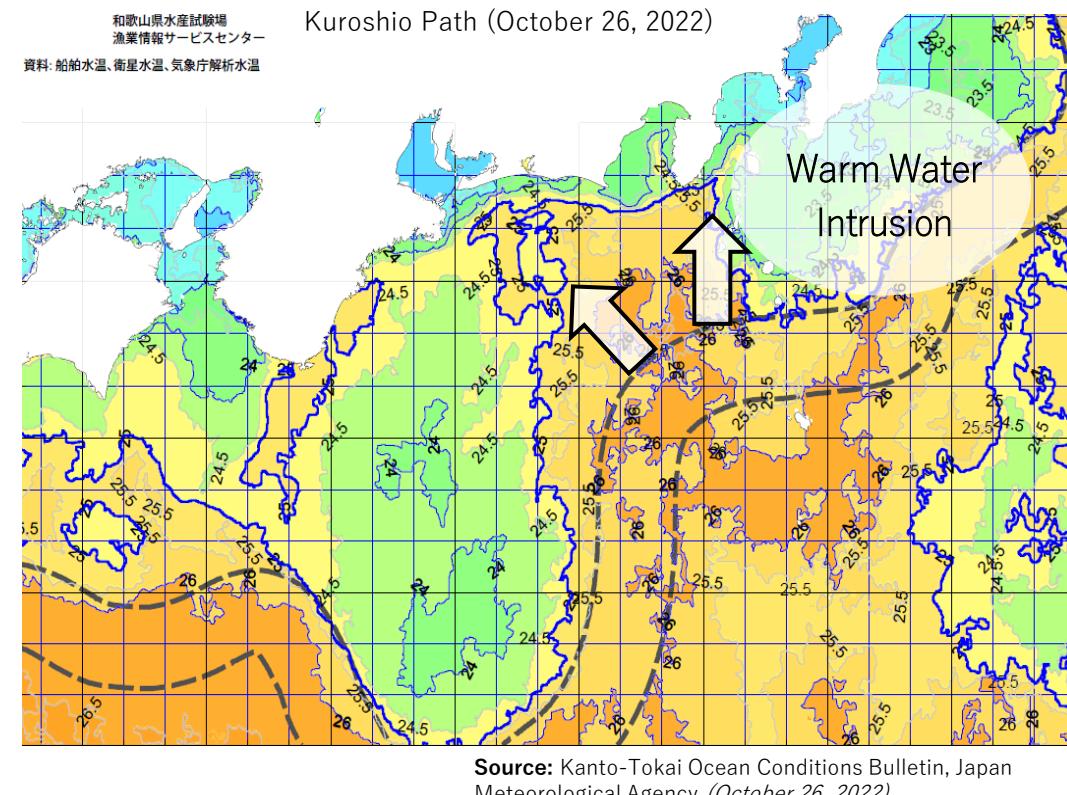
- **Spawning Indication**

Continuous juvenile presence suggests possible local reproduction

- **Environmental Link**

Appearance likely influenced by Kuroshio path shifts and warm water intrusion

(Suzuki, 2024)



Key Points on *Sardinella aurita* Occurrence

- **Catch Surge**
Up to 241 tons/month in Ise/Mikawa Bays (2022)
- **Resource Increase**
Possible strong year class since 2022
- **Juvenile Bycatch Rate**
Sporadic appearance since 2017
- **Spawning Indication**
 - Eggs and larvae observed in Ise Bay, Suruga Bay, and Tokyo Bay (2023)
- **Rapid Expansion**
Increasing abundance suggests rising importance as a fishery resource
- **Stock Assessment Issues**
Catch often recorded as “miscellaneous” or “mixed,” making assessment difficult

(Saguchi et al., 2024)



Regional Collaboration in Tracking Warm-Water Pelagic Species



Tracking species appearance

- Monitoring when, where, and which species appear
- Helps assess future distribution and spawning potential under climate variability



Sharing local expertise

- Exchanging identification methods and field responses across regions
- Provides practical insights for adaptive fisheries management



Collaborative detection and response

- Cooperation among prefectural fisheries institutes
- Enables timely detection of ecological changes and coordinated regional responses

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大分県沿岸のシラス漁で採集された
タイワンアイノコイワシとカタクチイワシの仔稚魚の識別

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Misumi Sashida, Shunta Sashida and Niosaki Kono. 2025. Identification of larvae and juveniles of *Encrasicholina punctifer* and *Engraulis japonicus*, obtained from shirasu trawl in the coastal waters of Oita Prefecture, Japan. *Ichthy. Natural History of Fishes of Japan*, 60: 20–29.

Abstract

The morphology of larvae and juveniles of two engraulid fish, *Encrasicholina punctifer* Fowler, 1938 and *Engraulis japonicus* Temminck and Schlegel, 1846 were compared based on specimens obtained from shirasu trawl in coastal waters of Oita Prefecture during August to December 2022. Larvae and juveniles of both species are similar in terms of overall body shape and melanophore pigmentation, and positions of dorsal and anal fins. The morphological features of the two species overlap significantly, and the values overlap between the two species. Therefore, the two species are difficult to distinguish based on morphological features alone. The results of this study indicate that the two species are difficult to distinguish based on morphological features alone. The results of this study indicate that the two species are difficult to distinguish based on morphological features alone.

Figure

C *Encrasicholina punctifer*
ラム日本、ハワイ諸島、仏領ポリネシアにかけての沿岸
材料と方法

C *Engraulis japonicus*
ラム日本、ハワイ諸島、仏領ポリネシアにかけての沿岸
材料と方法

(Sashida et al., 2025)

Thank you for your
attention



Processed Products of *Encrasicholina punctifer* in Taiwan