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Unveiling the Mesopelagic Ichthyofauna in Korean Waters: Ecological Significance and the Need for Precautionary Management

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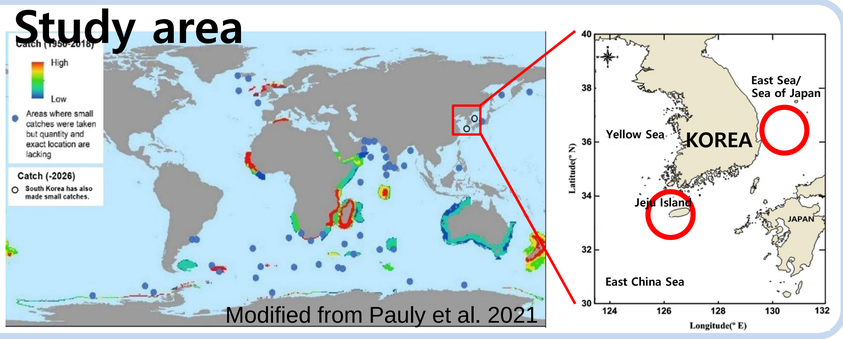
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Introduction

- Mesopelagic fishes (200–1,000 m) support marine food webs and carbon cycling through diel vertical migration.
- Taxonomic and quantitative data on mesopelagic fishes remain scarce in Korean waters.
- By reviewing international literature and domestic records, we identified 24 mesopelagic fish species across 13 families with documented occurrences in Korean waters.
- This literature-based inventory provides the first comprehensive taxonomic baseline for mesopelagic fishes in Korean waters, supporting future surveys and precautionary management.

Study area



Materials & Methods

2.1 Data Collection and Sources

- **Domestic records:** Korean marine fish records were compiled from the National Institute of Biological Resources (NIBR) national species inventory (2025).
- **Global Reference:** Mesopelagic fish taxonomy and distributions were compiled from FAO (1980).
- **Regional datasets:** Records included the Northwest Pacific (31 species), Northeast Pacific (65 species), Central and Southeast Atlantic (552 species), and Western Indian Ocean (473 species).

2.2 Comparative Analysis and Taxonomic Validation

- **Nomenclature Verification:** Scientific names were standardized to account for taxonomic revisions and synonyms.
- **Cross-Comparison:** Korean records were cross-referenced with regional datasets to identify potential mesopelagic species.

2.3 Literature Verification and Species Characterization

- Literature was reviewed to assess occurrence evidence, depth ranges, life stages, and ecological traits.

Results

- Cross-referencing domestic records with international literature identified 24 mesopelagic species across 13 families, with Bramidae, Nomeidae, and Gempylidae showing the greatest species richness.
- Records mainly involved larvae and juveniles in southern Korean waters, particularly the South Sea and waters around Jeju Island.

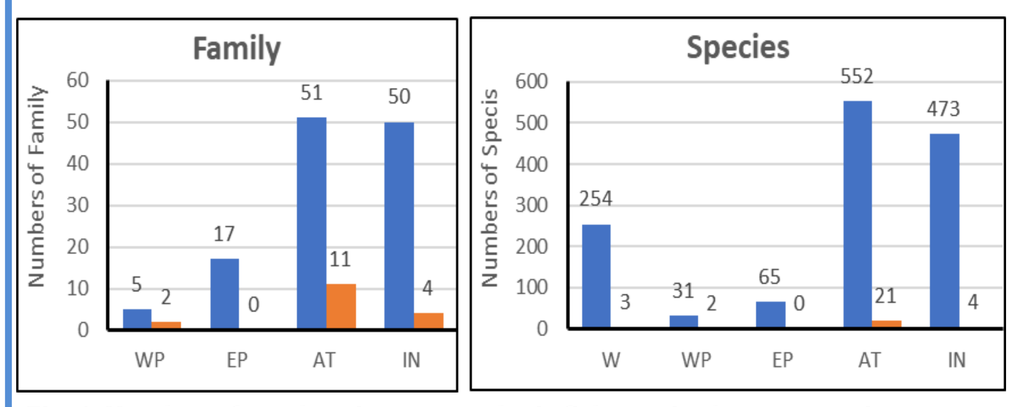


Fig. 1. Number of overlapping mesopelagic fish species between major ocean basins and Korean waters.

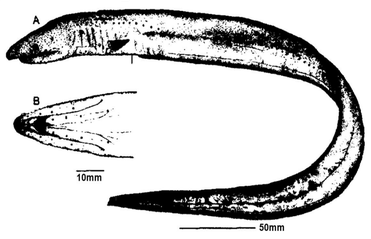
Table1. Overlapping mesopelagic fish species occurring in Korean waters in comparison to major ocean basins. W: World Ocean (based on Lindberg 1971 after FAO 1980), **WP**: The West Pacific Ocean (Sassa et al. 2007), **EP**: The East Pacific Ocean CalCoFI area (Davison et al. 2015), **AT**: The Central and South East Atlantic Sea (FAO 2020), and **IN**: The Western Indian Ocean (FAO 2023).

Family	Species	Ocean	References in Korean waters
Pseudocarchariidae	*Pseudocarcharias kamoharai*	AT, IN	Kim et al. (2005), Jeong et al. (2016), Kang et al. (2025)
Synaphobranchidae	*Dysomma anguillare*	AT	Lee and Kim (2000)
Sternoptychidae	*Maurolicus japonicus*	AT, WP	Kim et al. (2008), Kim and Cho (2013), Kim et al. (2007)
Gonostomatidae	*Sigmops gracilis*	AT	Lee and Kim (2013), Lee et al. (2020)
Paralepididae	*Lestrolepis intermedia*	AT	Kim et al. (2007)
Trachipteridae	*Desmodema polystictum*	AT, IN	Ji et al. (2009)
	Zu cristatus	AT	Ji et al. (2009)
Bregmacerotidae	*Bregmaceros atlanticus*	AT	Lee et al. (2017)
	Bregmaceros nectabanus	AT	Jang and Kim (2021)
Bramidae	*Pterycombus petersii*	AT	Park et al. (2007)
	Taractes asper	AT	Yoon et al. (2022)
	Brama dussumieri	AT	Lee and Kim (2015)
	Taractes rubescens	AT	Lee et al. (2019)
Gempylidae	*Gempylus serpens*	AT	Myoung et al. (2013)
	Ruvettus pretiosus	AT	Kim and Song (2017)
	Lepidocybium flavobrunneum	AT	Song et al. (2020)
Scombridae	*Thunnus obesus*	AT, IN	Kim et al. (2011)
Nomeidae	*Psenes arafurensis*	AT	Lee et al. (2016)
	Psenes cyanophrys	AT	Myoung et al. (2001)
	Psenes maculatus	AT	Myoung et al. (2001)
	Nomeus gronovii	AT, IN	Lee et al. (2015)
Neoscopelidae	*Neoscopelus microchir*	W	Kim et al. (1988), Bañón et al. (2022)
Myctophidae	*Benthosema pterotum*	W	Lee et al. (2020), Lee et al. (2022)
	Dasyscopelus asper	WP	Lee et al. (2022)

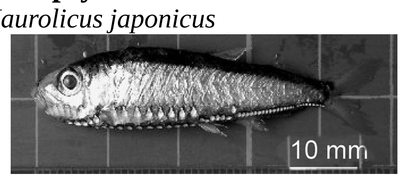
Pseudocarchariidae
Pseudocarcharias kamoharai



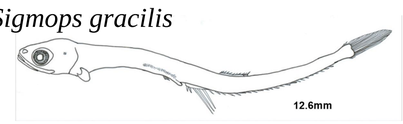
Synaphobranchidae
Dysomma anguillare



Sternoptychidae
Maurolicus japonicus



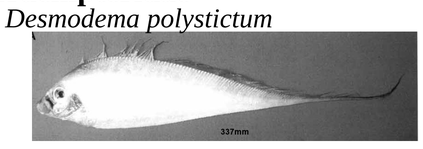
Gonostomatidae
Sigmops gracilis



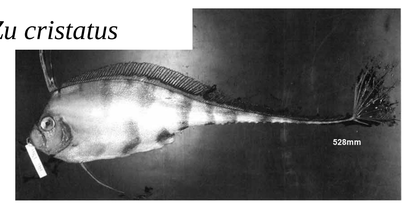
Paralepididae
Lestrolepis intermedia



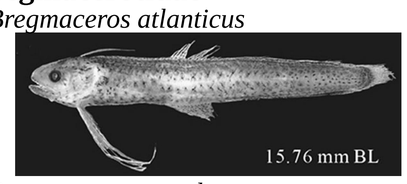
Trachipteridae
Desmodema polystictum



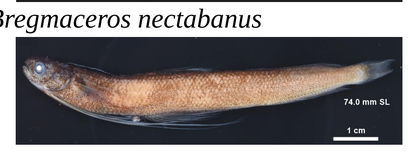
Zu cristatus



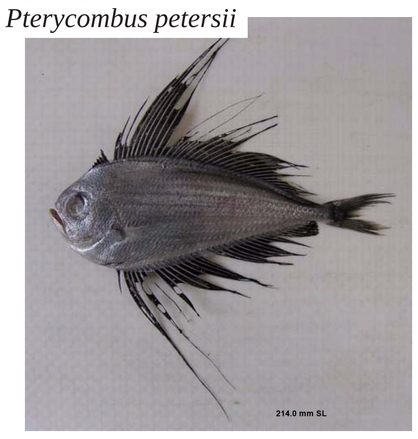
Bregmacerotidae
Bregmaceros atlanticus



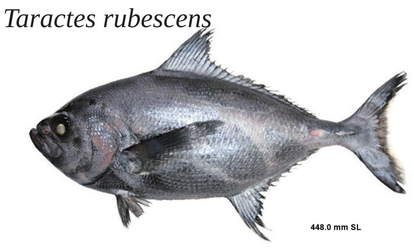
Bregmaceros nectabanus



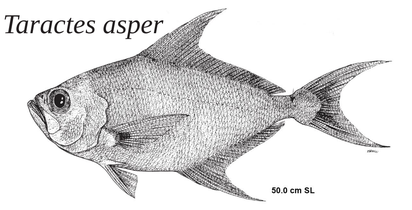
Bramidae
Pterycombus petersii



Taractes rubescens



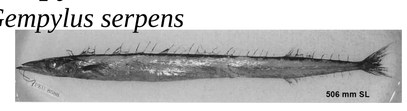
Taractes asper



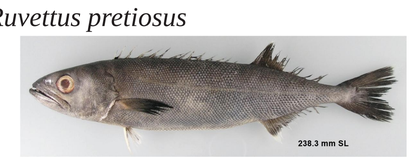
Brama dussumieri



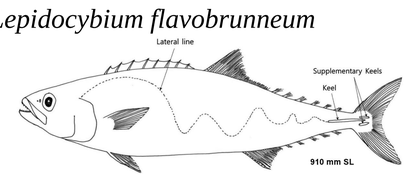
Gempylidae
Gempylus serpens



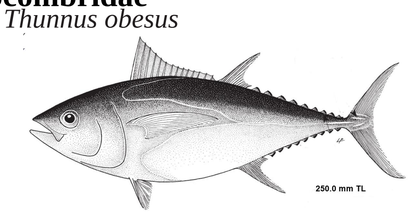
Ruvettus pretiosus



Lepidocybium flavobrunneum



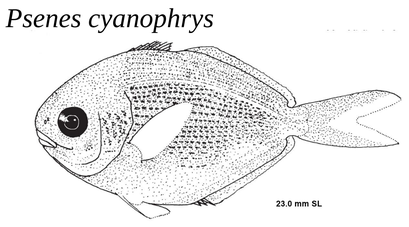
Scombridae
Thunnus obesus



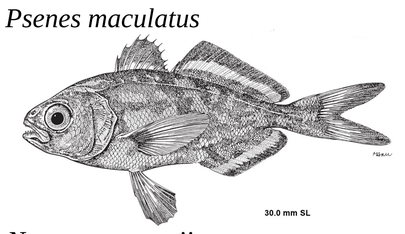
Nomeidae
Psenes arafurensis



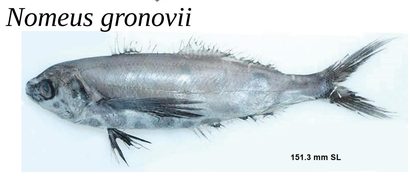
Psenes cyanophrys



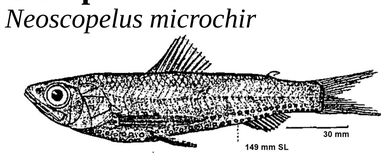
Psenes maculatus



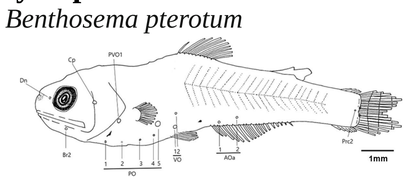
Nomeus gronovii



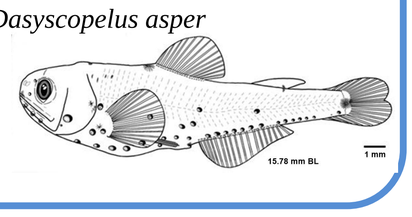
Neoscopelidae
Neoscopelus microchir



Myctophidae
Benthosema pterotum



Dasyscopelus asper



Discussion & Conclusion

- Given their roles in marine food webs and carbon cycling, mesopelagic fishes warrant precautionary management in Korean waters. Long-term monitoring and quantitative biomass assessments are needed to assess climate-driven changes and inform adaptive management.
- Priorities include integrated surveys using multi-frequency acoustics, midwater trawling, and eDNA, alongside specimen examination and DNA barcoding to refine species inventories. These efforts would support UN Sustainable Development Goals (SDGs) 13 (Climate Action) and 14 (Life Below Water).

References

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FAO (2020) Identification guide to the mesopelagic fishes of the central and south east Atlantic Ocean. FAO Species Identification Guide for Fishery Purposes, FAO, Rome, p 346

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