Seasonal occurrence pattern of leptocephali in the north Satsunan area, southern Japan

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Introduction

■Many leptocephali are found in the Satsunan area, southern Japan throughout the year.

■They may include important fishery-targeting species. (e.g. *Anguilla* spp., *Conger* spp., *Muraenesox* spp.)

■The purpose is to clarify the seasonal and spatial occurrence pattern of leptocephali in the north Satsunan area in relation to the Kuroshio.

Materials and methods

■ **Field surveys**

- Field surveys were condected from February in 2015 to August in 2018 by RV Nansei-maru and in November in 2015 and November in 2017 by RV Kagoshima-maru.
- Study stations were fixed 15 stations in the inshore of Kuroshio path, 2 stations in Kuroshio path and 2 stations in the offshore of Kuroshio path.
- Specimens were collected by the ORI net (diameter, 160 cm; mesh size, 335 μm) which was obliquely towed from the bottom (ca. 10 m above the depth) to the surface at approximately 2 knots for 30 min.
- Specimens were preserved in 99.5 % ethanol.

■ **Analyses**

- Species identification by morphological and genetic methods (16SrRNA)* and morphological measurements *16Sar-L (CGCCTGTTTATCAAAAACAT), 16Sbr-H (GGTCTGAACTCAGATCACGT) (Kurogi et al. 2016)

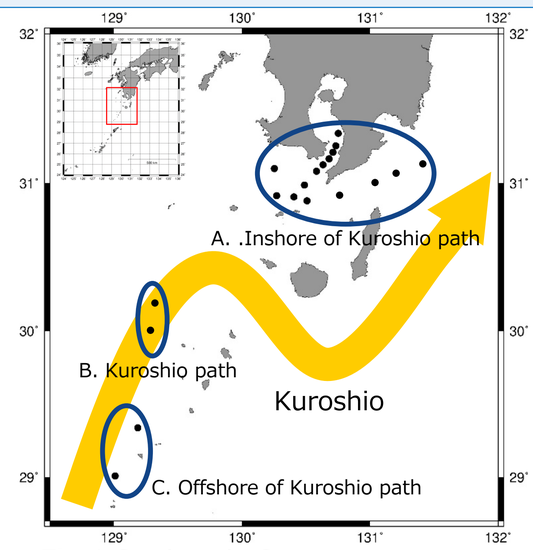

Fig.1 Stations in Satsunan area

Results and discussion

Table 1. Seasonal occurrence of leptocephali in inshore of Kuroshio path

Family	Species	Spring	Summer	Autumn	Winter	Total
Congridae	Congrinae spp.		1	9	-	10
	Gnasophis spp.	13	5	66	-	84
	Ariosoma spp.	4	26	5	-	35
	Unidentified	23	11	11	1	46
Chlopsidae	*Kaupichthys japonicus*	-	-	1	-	1
	Robinsia catherinae	-	2	-	-	2
Muraenidae	Muraeninae spp.	2	4	1	1	8
	Gymnothorax minor	3	2	-	-	5
	Enchelycore lichenosa	-	1	-	-	1
	Unidentified	-	2	1	-	3
Ophichchidae	Ophichthinae spp.	-	12	1	-	13
	Myrophinae spp.	2	-	1	-	3
	Unidentified	3	3	1	-	7
Nettastomatidae	*Saurenchelys lateromaculata*	-	3	4	-	7
	Saurenchelys stylura	-	-	3	-	3
	Saurenchelys spp.	-	3	1	-	4
	Unidentified	-	3	3	-	6
Nemichthyidae	*Nemichthys scolopaceus*	-	2	-	-	2
	Nemichthys spp.	-	1	-	-	1
Muraenesocidae	*Muraenesox* spp.	2	118	1	-	121
Derichthyidae	*Derichthys serpentinus*	-	3	-	-	3
Synaphobranchidae	Unidentified	-	-	24	-	24

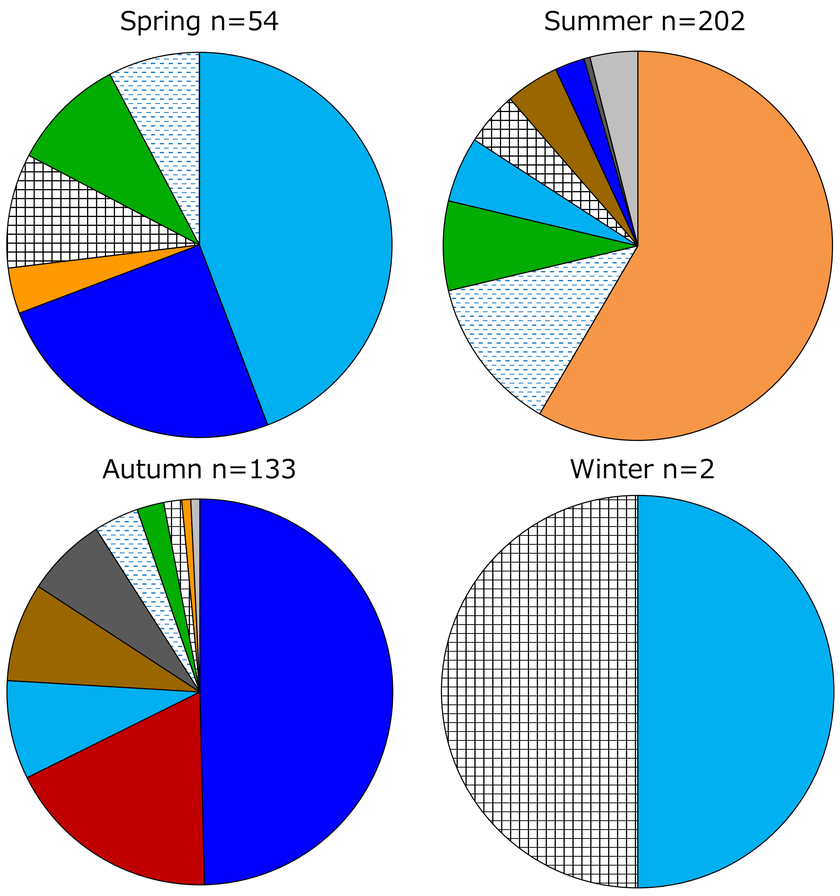

Fig. 2 Seasonal species composition of leptocephali in inshore of Kuroshio path

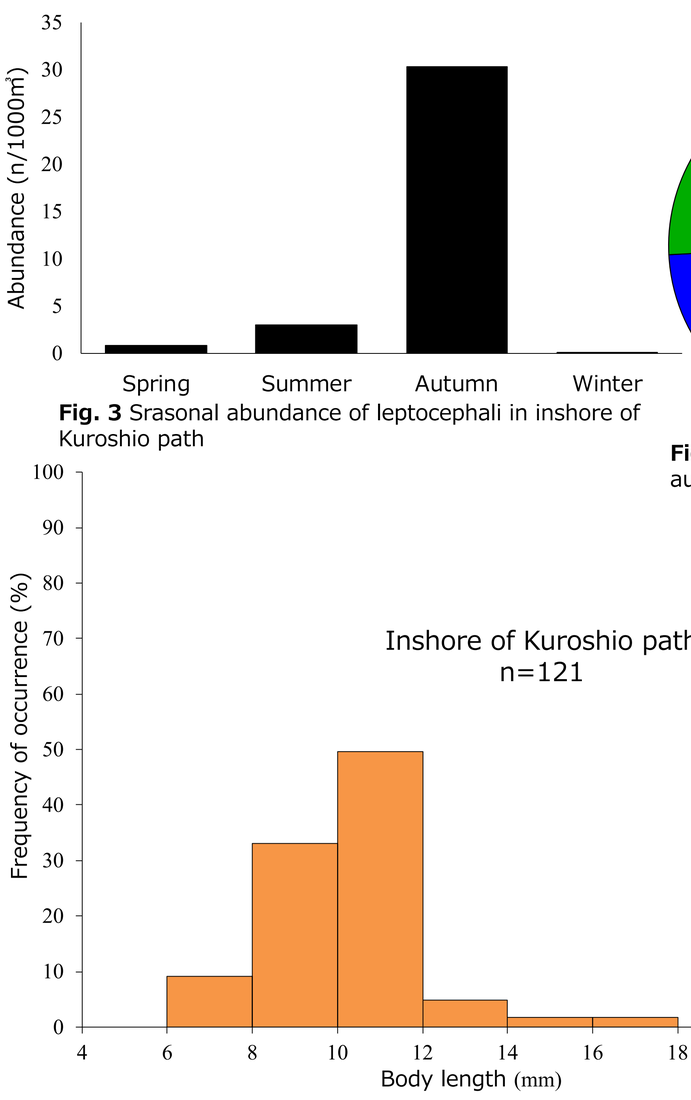

Fig. 3 Srasonal abundance of leptocephali in inshore of Kuroshio path

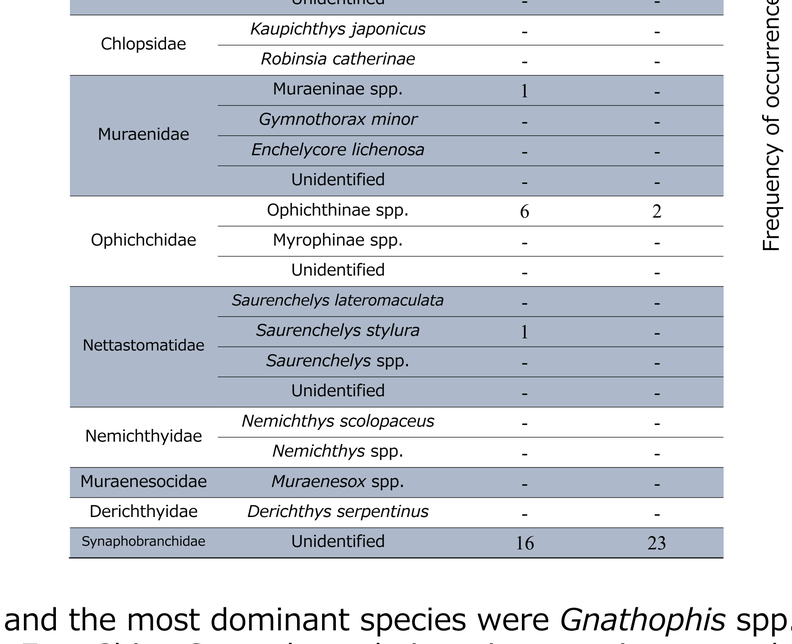

Fig. 4 Body length composition of *Muraenesox* spp. in inshore of Kuroshio path

Table 2. Occurrence of leptocephali in Kuroshio path (B) and offshore of Kuroshio path (C) in autumn

Family	Species	B	C
Congridae	Congrinae spp.	-	-
	Gnasophis spp.	7	11
	Ariosoma spp.	-	-
	Unidentified	-	-
Chlopsidae	*Kaupichthys japonicus*	-	-
	Robinsia catherinae	-	-
Muraenidae	Muraeninae spp.	1	-
	Gymnothorax minor	-	-
	Enchelycore lichenosa	-	-
	Unidentified	-	-
Ophichchidae	Ophichthinae spp.	6	2
	Myrophinae spp.	-	-
	Unidentified	-	-
Nettastomatidae	*Saurenchelys lateromaculata*	-	-
	Saurenchelys stylura	1	-
	Saurenchelys spp.	-	-
	Unidentified	-	-
Nemichthyidae	*Nemichthys scolopaceus*	-	-
	Nemichthys spp.	-	-
Muraenesocidae	*Muraenesox* spp.	-	-
Derichthyidae	*Derichthys serpentinus*	-	-
Synaphobranchidae	Unidentified	16	23

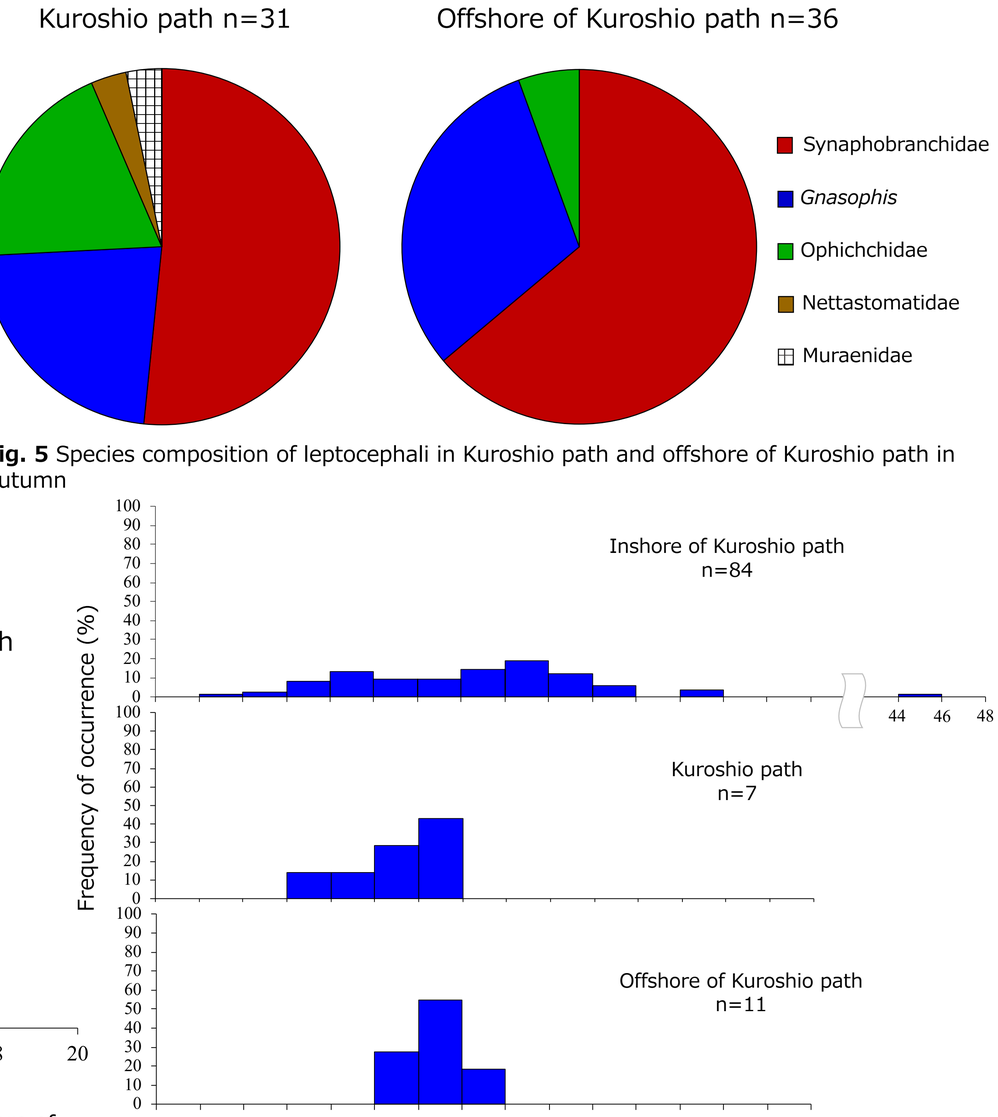

Fig. 5 Species composition of leptocephali in Kuroshio path and offshore of Kuroshio path in autumn

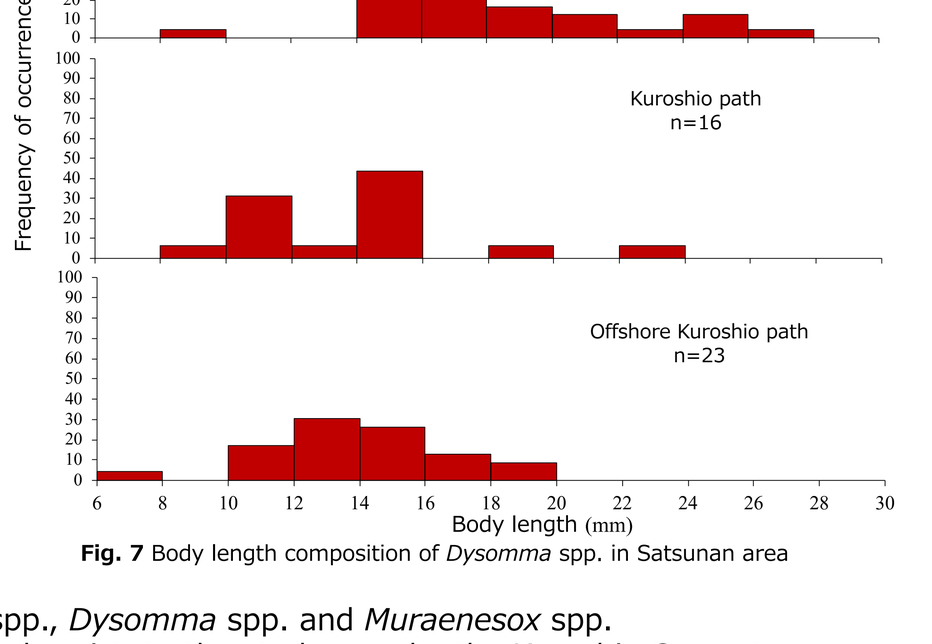

Fig. 6 Body length composition of *Gnathophis* spp. in Satsunan area

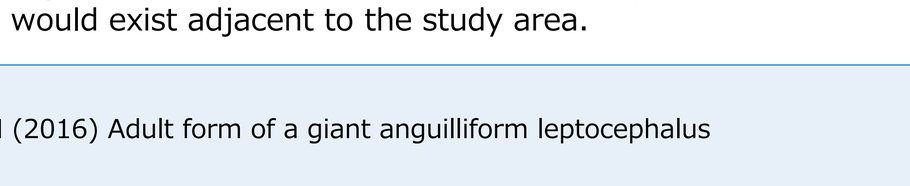

Fig. 7 Body length composition of *Dysomma* spp. in Satsunan area

- Leptocephali were identified to 22 taxonomic groups and the most dominant species were *Gnathophis* spp., *Dysomma* spp. and *Muraenesox* spp.
- Most of larvae were thought to be dispersed from the East China Sea, where their main spawning grounds exist, to the study area by the Kuroshio Current.
- *Muraenesox* spp. are composed of *M. cinereus* and *M. bagio*, both of which are important fishery-targetting species. Leptocephali of *Muraenesox* spp. included a substantial number of small individuals (< 10 mm body length), suggesting that their spawning ground would exist adjacent to the study area.

Reference

Kurogi H, Chow S, Yanagimoto T, Konishi K, Nakamichi R, Sakai K, Ohkawa T, Saruwatari T, Takahashi M, Ueno Y, Mochioka N (2016) Adult form of a giant anguilliform leptocephalus *Thalassenchelys coheni* Castle and Raju 1975 is *Congriscus megastomus* (Günther 1877). Ichthyol Res 63:239–246