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**Zooplankton Biomass along a Transect at 165°E in the
Subarctic Pacific Ocean: Results in 1999-2000**

by

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ABSTRACT

Data on the biomass and composition of zooplankton collected with a Norpac net and an ORI net by the *Hokko maru* and *Shouyo maru* along a transect of 165°E, between 51°-40°N. Zooplanktons were sampled after sunset at 11 stations. We obtained whole wet weight and each classified wet weight at different latitudes and domains. The biomass collected by the Norpac net was more abundant in the Subarctic Domain than the Transition Domain, but not significant. In the both domains, copepods were most abundant, followed by chaetognaths. The biomass collected by the ORI net was more abundant in the Transition Domain, copepods were most abundant group in both domains.

INTRODUCTION

The production of zooplankton is influenced by ocean environmental change and climate change (Kaiho et al., 1996; Beamish and Bouillon 1993; Planque and Taylor 1998), and zooplankton biomass affect Pacific salmon (*Oncorhynchus* spp.) production (Beamish and Bouillon 1993; Beamish 1993). Zooplankton in the Pacific Ocean is important prey for Pacific salmon (Ito 1964), therefore zooplankton biomass could be important factor regulating the growth, survival and production of Pacific salmon. This report provides the biomass and composition of zooplankton collected in June to July during the period 1999-2000 at transect of 165°E, between 51°-40°N.

MATERIALS AND METHODS

The samples of zooplankton were collected after sunset at 11 stations along a transect of 165°E, between 51°-40°N, using a remodeled Norpac net (0.45 m diameter opening, 1.95 m length, 0.335 mm mesh size) and an ORI net from June to July in 1999-2000 (Mori 1992, Motoda 1994). The Norpac net was towed vertically from 150 m in depth to surface with a speed of 1m per second and the ORI net was towed just bellow the sea surface with a speed of 2 knot. The samples were fixed in 10% buffered formalin.

Zooplankton sorted to the following categories at the laboratory: euphausiids, copepods, amphipods, pteropods, appendicul-arians, chaetognaths, ostracods, jellyfishes, salps, fishes,

squids, and others (polychaets, decapods, eggs etc.). We obtained each classified wet weight and whole wet weight. Large (> 2cm) jelly fishes and salps were not included for data analysis.

We determine the location of the Subarctic Domain (station 1-6) and the Transition Domain (station 7-11) based on temperature and salinity (Favorite et al., 1976), and examined relationships between latitude, domain and biomass of zooplankton.

RESULTS

In the Subarctic Domain, the total biomass and each classified zooplankton was not different between Norpac net and ORI net (ANOVA, $p > 0.05$), on the other hand, the total biomass and copepods biomass were significantly different between the nets in the Transition Domain (ANOVA, $p < 0.01$; Fig. 1).

The each classified weight of zooplankton collected by the Norpac net differed between the Subarctic Domain and the Transition Domain, but total biomass did not differ significantly between the domains (ANOVA, $p > 0.05$). In both domains, copepods were the most abundant group, followed by chaetognaths. The biomass of chaetognaths, jellyfishes, salps, and squids were more abundant in the Subarctic Domain, but the biomass of copepods and euphausiids were not different from latitude and domains (Fig. 2, Table 1, 2).

The each classified weight of zooplankton collected by the ORI net differed significantly between domains (ANOVA, $p < 0.05$). The total biomass was more abundant in the Transition Domain. The same as results of Norpac net, copepods were the most abundant group in both domains. The biomass of amphipods, pteropods, and chaetognaths were more abundant in the Sub-arctic Domain, on the other hand, copepods and euphausiids were more abundant in the Transition Domain (Fig. 3, Table 3, 4).

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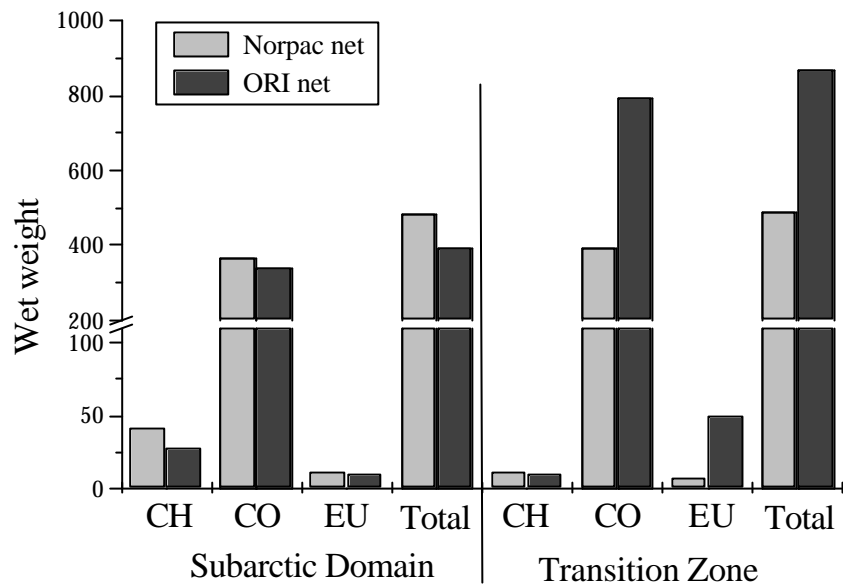


Fig. 1. The total wet weight and each classified weight (CH: chaetognaths, CO: copepods, EU: euphausiids) of zooplankton collected by the Norpac net and ORI net. Light grey and dark grey indicates Norpac net and ORI net respectively.

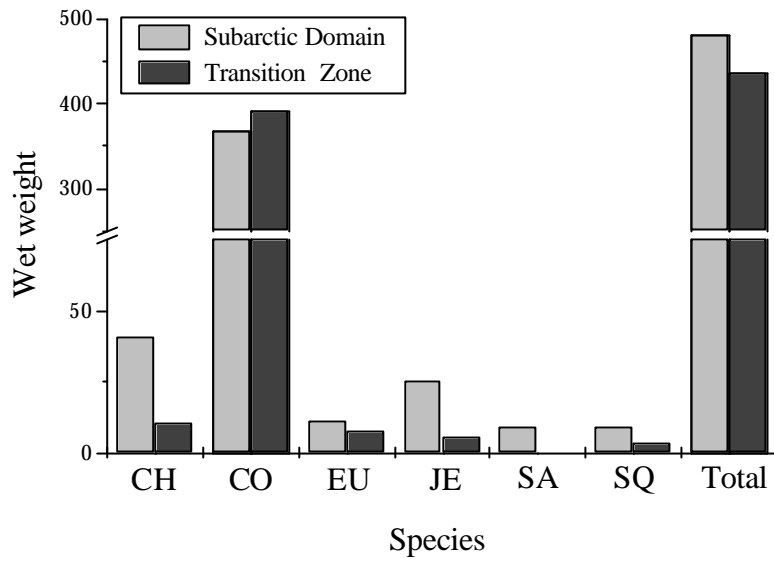


Fig. 2. The total wet weight and each classified weight (CH: chaetognaths, CO: copepods, EU: euphausiids, JE: jellyfishes, SA: salps, SQ: squids) of zooplankton collected by the Norpac net. Light grey and dark grey indicates the Subarctic Domain and the Transition Domain respectively.

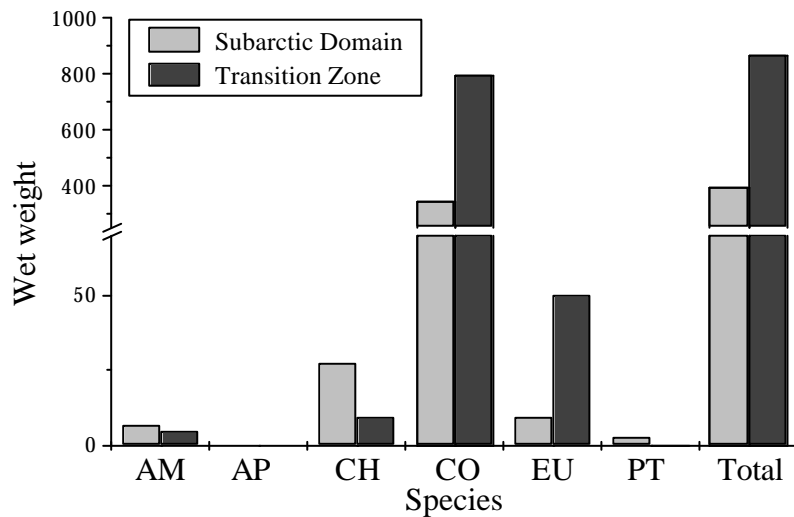


Fig. 3. The total wet weight and each classified weight (AM: amphipods, AP: appendicularians, CH: chaetognaths, CO: copepods, EU: euphausiids, PT: pteropods) of zooplankton collected by the Norpac net. Light grey and dark grey indicates the Subarctic Domain and the Transition Domain respectively.

Table 1. Zoo plankton biomass (mg/ m³) along a north-to-south transect at 165°E longitude from 50°N to 41°N latitude in the western North Pacific Ocean from late June to early July in 1999. The samples were collected with a remodelled Norpac net after sunset.

Station			Location		Wet weight (mg / m ³)												
No.	Date	Time	Lat. (N)	Long. (E)	EU	CO	AM	PT	AP	CH	OS	JE	SA	FI	SQ	OT	Total
2	June 28	19:57	50°00'	165°00'	0	74	0	3	+	44	+	123	93	0	0	82	419
3	June 29	19:54	49°00'	165°00'	13	48	+	3	+	18	+	11	0	0	0	14	107
4	June 30	19:41	48°00'	165°00'	5	169	1	2	0	34	+	15	0	2	0	15	243
5	July 01	19:46	47°00'	165°00'	1	136	+	+	0	17	1	14	0	0	0	3	172
6	July 02	19:40	46°00'	165°01'	16	131	1	+	0	2	2	+	0	0	0	9	161
7	July 03	19:42	45°00'	165°00'	12	446	+	+	0	14	3	8	0	0	3	20	506
8	July 04	19:35	44°00'	165°00'	1	680	+	1	0	8	2	18	0	0	17	29	756
9	July 05	19:30	43°00'	165°00'	23	451	0	0	0	28	4	3	0	0	0	43	552
10	July 06	19:20	42°00'	165°01'	8	11	+	0	0	1	1	1	0	+	0	6	28
11	July 07	18:53	41°00'	164°30'	6	342	1	0	0	15	1	5	0	+	6	2	378

Table 2. Zoo plankton biomass (mg/ m³) along a north-to-south transect at 165°E longitude from 50°N to 43°N latitude in the western North Pacific Ocean in June 2000. The samples were collected with a remodelled Norpac net after sunset.

Station			Location		Wet weight (mg / m ³)												
No.	Date	Time	Lat. (N)	Long. (E)	EU	CO	AM	PT	AP	CH	OS	JE	SA	FI	SQ	OT	Total
2	June 14	21:58	50°00'	165°00'	22	477	3	+	0	64	3	19	0	0	0	4	592
3	June 15	21:45	49°00'	165°01'	16	750	4	1	8	87	2	33	0	0	0	9	910
4	June 16	22:00	48°00'	164°37'	19	384	2	0	0	63	3	6	0	0	0	10	487
5	June 17	22:07	46°38'	165°03'	+	1090	+	5	0	12	3	0	0	0	89	15	1214
6	June 18	22:06	46°02'	164°38'	7	418	+	5	0	68	4	3	0	0	0	2	507
7	June 19	21:59	44°39'	164°36'	4	795	2	3	0	2	6	2	0	0	0	7	821
8	June 20	22:08	43°39'	164°35'	1	142	+	2	0	3	3	1	0	0	0	7	159
9	June 21	21:55	43°02'	164°36'	5	267	1	1	+	13	2	4	0	0	0	7	300

EU: euphausiids, CO: copepods, AM: amphipods, PT: pteropods, AP: appendicularians, CH: chaetognaths, OS: ostracods, JE: jellyfishes (medusae, ctenophores)
 SA: salps, FI: fishes, SQ: squids, OT: others
 +: value of under 1

Table 3. Zoo plankton biomass (mg/ m³) along a north-to-south transect at 165°E longitude from 50°N to 41°N latitude in the western North Pacific Ocean from late June to early July in 1999. The samples were collected with a ORI net after sunset.

Station			Location		Wet weight (mg / m ³)							Total
No.	Date	Time	Lat. (N)	Long. (E)	EU	CO	AM	PT	AP	CH	OT	
2-1	June 28	19:57	50°00'	165°00'	4	10	1	3	0	7	4	29
2-2	June 28	19:57	50°00'	165°00'	9	33	1	5	+	13	6	67
2-3	June 28	19:57	50°00'	165°00'	10	27	1	7	0	5	5	55
3	June 29	19:54	49°00'	165°00'	0	41	4	1	0	3	3	52
4	June 30	19:41	48°00'	165°00'	1	10	5	8	+	6	5	35
5	July 01	19:46	47°00'	165°00'	5	393	3	3	+	6	5	415
6	July 02	19:40	46°00'	165°01'	12	158	2	2	+	13	5	192
7	July 03	19:42	45°00'	165°00'	17	1379	4	+	0	5	0	1405
8	July 04	19:35	44°00'	165°00'	157	405	6	2	0	2	4	576
9	July 05	19:30	43°00'	165°00'	7	17	0	1	0	1	37	63
10	July 06	19:20	42°00'	165°01'	23	33	1	0	0	0	12	69
11	July 07	18:53	41°00'	164°30'	55	998	0	0	0	0	2	1055

Table 4. Zoo plankton biomass (mg/ m³) along a north-to-south transect at 165°E longitude from 50°N to 43°N latitude in the western North Pacific Ocean in June 2000. The samples were collected with a ORI net after sunset.

Station			Location		Wet weight (mg / m ³)							Total
No.	Date	Time	Lat. (N)	Long. (E)	EU	CO	AM	PT	AP	CH	OT	
2	June 14	21:58	50°00'	165°00'	8	376	3	0	0	28	12	427
4	June 16	22:00	48°00'	164°57'	3	178	7	0	0	111	1	300
5	June 17	22:07	46°58'	165°03'	18	1468	40	0	0	97	4	1627
6	June 18	22:06	46°02'	164°58'	37	1063	11	1	0	15	2	1129
7	June 19	21:59	44°59'	164°56'	51	1492	20	0	0	39	0	1602
8	June 20	22:08	43°59'	164°55'	21	846	9	0	0	8	0	884
9	June 21	21:55	43°02'	164°56'	71	1194	0	0	0	21	0	1286

EU: euphausiids, CO: copepods, AM: amphipods, PT: pteropods, AP: appendicularians, CH: chaetognaths, OT: others
 +: value of under 1