

Figure 1. Map of study region with centralized locations of each longline set considering drift and soak time. Red dots represent recreational ports sampled.

Table 1: Description of spatial and temporal sampling scheme for non-empty stomachs collected between 2018 and 2019 for *Thunnus albacares* and *Thunnus obesus*.

Sampling Event	Year	Gear	Region	Latitude	Longitude	Ordinal days	Species	SFL (cm)	Non-empty Stomachs
1	2018	LL	HAT	35.38-35.42	-74.57- -74.06	218-219	BET	96.5	1
2	2019	LL	HAT	36.21-36.41	-72.52- -72.47	199-201	YFT	68.8-120.5	10
3	2018	RR	SMAB	37.04-38.66	-74.62- -73.23	195-237	BET	76.1-131.6	15
4	2019	RR	SMAB	37.04-38.66	-74.62- -73.23	174	YFT	94.3-162.7	35
5	2019	RR	SMAB	37.04-38.66	-74.62- -73.23	193-217	BET	107.6-113.8	14
6	2018	RR	NMAB	38.45-39.97	-73.49- -71.32	165-207	YFT	63.5-150.5	58
7	2018	RR	NMAB	38.45-39.97	-73.49- -71.32	228-289	BET	-	0
8	2019	RR	NMAB	38.45-39.97	-73.49- -71.32	161-174	YFT	82.6-119.3	47
9	2019	LL	NMAB	37.65-38.00	-74.03- -73.65	311-318	BET	-	0
10	2018	RR	SNE	39.48-40.55	-71.83- -68.19	202	YFT	91.4-108.5	65
11	2019	LL	SNE	39.80-39.91	-71.03- -69.63	259-279	BET	72.3-151.8	9
12	2019	LL	SNE	40.05-40.77	-68.63- -66.47	229-234	YFT	61.9-108.3	93
								117.8-135	5
								65.9-111.2	88
								105.1-133.2	12
								64.3-118.6	89
								94.9-139.6	82
								77.3-121.3	52
								110.3-174.7	7
								72.68-98.25	3
								115.5-146.8	9
								104.1-117.7	2
								86.9-146.4	33
								64.69-162.27	29

Table 3: Phylum, families, and species of prey identified in 574 non-empty *Thunnus albacares* stomachs sampled from 2018-2019. Bolded families were identified exclusively through genetic barcoding while bolded species were identified either exclusively through genetic barcoding or gross identification and genetic barcoding.

Phylum	Family	Species	Weight (g)	Number	%FO _i	%MW _i
Arthropoda			670.33	3,904	46.86	12.16
	Aristeidae		0.37	1	0.17	<0.01
	Euphausiidae		3.04	21	3.14	0.22
	Hyperiididae		452.00	3,033	21.60	5.81
		<i>Themisto sp.</i>	452.00	3,033	21.60	
	Idoteidae		23.44	129	7.32	0.93
		<i>Idotea spp.</i>	23.44	129	7.32	
	Lycaeidae		2.03	14	1.22	0.02
	Brachyura (<i>infraorder</i>)		32.59	362	12.98	1.30
	Penaeidae		3.29	21	1.91	0.06
		<i>Cerataspis petiti</i>	3.29	21	1.91	
	Phronimidae		28.01	106	6.97	0.41
		<i>Phronima sp.</i>	28.01	106	6.97	
	Phrosinidae		84.54	186	7.84	1.28
		<i>Phrosina semilunata</i>	81.55	186	7.54	
	Portunidae		3.98	5	0.70	0.13
		<i>Portunus sp.</i>	3.07	3	0.52	
Scyllaridae		0.28	1	0.17	<0.01	
Stomatopoda (<i>order</i>)		5.17	25	3.14	0.31	
Unidentified Arthropoda		31.31	–	10.11	1.68	
Chordata			19,975.78	1,701	78.05	46.60
	Alepisauridae		176.67	4	0.52	0.14
		<i>Alepisaurus ferox</i>	176.67	4	0.52	
	Ammodytidae		1,511.32	227	3.14	1.92
		<i>Ammodytes sp.</i>	1,511.32	227	3.14	
	Ariommatidae		7.35	4	0.52	0.06
		<i>Ariomma bondi</i>	7.35	4	0.52	
	Balistidae		43.39	26	2.61	0.48
	Bramidae		44.10	12	1.57	0.18
		<i>Brama brama</i>	2.33	1	0.17	
		<i>Pterycombus brama</i>	30.07	10	1.05	
		<i>Pteraclis sp.</i>	10.88	1	0.17	
	Carangidae		208.26	196	8.01	1.61
		<i>Cranx crysos</i>	65.00	3	0.52	
		<i>Selene setapinnis</i>	119.80	185	6.10	
		<i>Seriola zonata</i>	10.98	1	0.17	
		<i>Trachurus lathamii</i>	9.31	3	0.52	
		<i>Decapterus punctatus</i>	0.73	1	0.17	
	Coryphaenidae		127.85	6	1.05	0.51
		<i>Coryphaena hippurus</i>	127.85	6	1.05	
	Cottidae		0.6	1	0.17	0.01
	Dactylopteridae		39.89	58	4.01	0.74
		<i>Dactylopterus volitans</i>	39.89	58	4.01	
	Exocoetidae		524.58	73	3.83	2.13
		<i>Cheilopogon heterurus</i>	99.59	19	0.70	
	Gempylidae		356.03	44	2.61	0.38
		<i>Gempylus serpens</i>	2.72	1	0.17	
		<i>Nealotus tripes</i>	294.23	38	1.39	
		<i>Nesiarchus nasutus</i>	15.40	4	0.17	
		<i>Ruwettus pretiosus</i>	3.26	1	0.17	
	Hemiramphidae		77.21	2	0.35	0.27
		<i>Hemirampus brasiliensis</i>	77.21	2	0.35	
	Luvaridae		25.1	2	0.35	0.03
	<i>Luvarus imperialis</i>	25.1	2	0.35		
Monacanthidae		1,960.20	206	9.23	3.62	
	<i>Aluterus monoceros</i>	1,575.88	128	3.14		
	<i>Stephanolepis hispidus</i>	62.92	7	1.05		
Myctophidae		31.57	15	1.39	0.19	
	<i>Ceratoscopelus maderensis</i>	5.68	4	0.17		
	<i>Diaphus spp.</i>	2.07	3	0.35		
Nomeidae		6.22	3	0.35	0.01	
	<i>Cubiceps Pauciradiatus</i>	6.22	3	0.35		
Ogcocephalidae		1.5	4	0.35	0.02	
Paralepididae		115.16	37	2.61	0.62	
	<i>Arctozenous risso</i>	12.91	1	0.17		
	<i>Paralepis brevirostris</i>	24.54	5	0.17		

	Phycidae	-	49.97	1	0.17	0.03
		<i>Urophycis regia</i>	49.97	1	0.17	
	Pricanthidae		5.09	4	0.70	0.16
		<i>Priacanthus arenatus</i>	5.09	4	0.70	
	Psychrolutidae		0.33	1	0.17	<0.01
	Salpidae		149.07	514	17.07	2.51
	Scomberesocidae		803.23	29	2.96	1.83
		<i>Scomberesox saurus</i>	736.60	29	2.79	
	Scombridae		11,964.72	134	16.55	11.51
		<i>Auxis spp.</i>	2,907.30	12	1.57	
		<i>Auxis rochei</i>	3,958.60	30	3.31	
		<i>Auxis thazard</i>	45.88	1	0.17	
		<i>Euthynnus alletteratus</i>	165.68	15	0.52	
		<i>Scomber colias</i>	151.27	2	0.35	
	Sparidae		71.76	1	0.17	0.14
	Syngnathidae		17.95	20	3.14	0.69
	Tetraodontidae		49.54	75	6.10	0.69
		<i>Canthigaster rostrata</i>	1.78	1	0.17	
		<i>Sphoeroides maculatus</i>	3.70	7	0.87	
	Trachipteriidae		0.16	1	0.17	0.17
	Zeiidae		17.6	1	0.17	0.07
	Unidentified Chordata		1,589.64	-	57.143	15.92
Mollusca			20,782.51	875	79.27	41.24
	Alloposidae		24.17	5	0.70	0.22
		<i>Haliphron atlanticus</i>	24.17	5	0.70	
	Argonautidae		139.00	137	10.98	1.25
	Atlantidae		1.67	7	0.88	0.01
	Brachioteuthidae		0.71	2	0.35	<0.01
	Cavoliniidae		1.74	8	1.74	0.05
	Lepidoteuthidae		1.22	2	0.35	<0.01
		<i>Lepidoteuthis grimaldii</i>	1.22	2	0.35	
	Loliginidae		360.60	48	2.10	0.82
		<i>Loligo pealeii</i>	360.60	48	2.10	
	Octopoteuthidae		1.17	2	0.35	0.01
	Ommastrephidae		16,198.62	648	31.53	19.01
		<i>Illex illecebrosus</i>	16,193.00	647	30.66	
		<i>Orinototeuthis antillarum</i>	5.62	1	0.17	
	Thysanoteuthidae		10.41	3	0.52	0.03
		<i>Thysanoteuthis rhombus</i>	10.41	3	0.52	
	Tremoctopodidae		25.6	6	1.05	0.16
	Vitreledonellidae		0.82	7	1.05	0.03
	Unidentified Mollusca		4,016.83	-	68.99	19.66

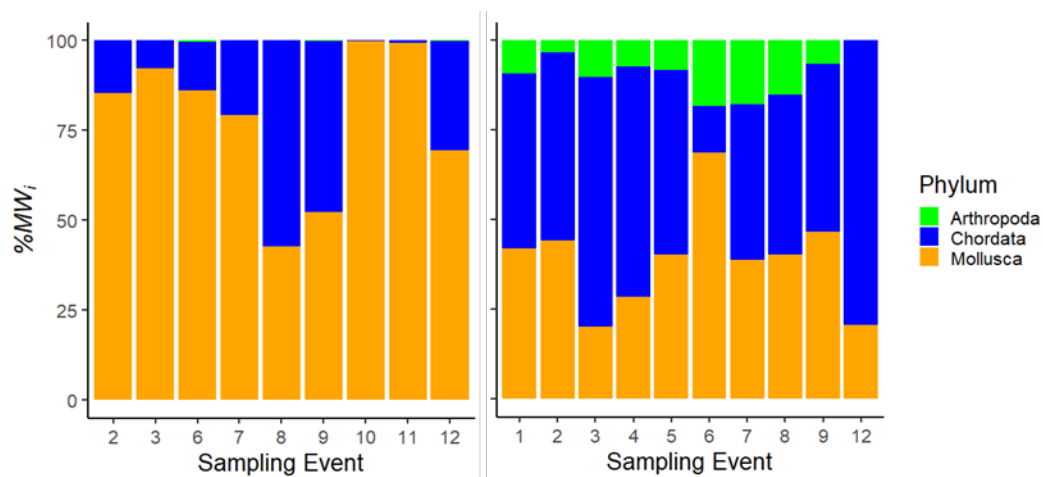


Figure 2. %MW_i of prey phylum for bigeye (left) and yellowfin (right) by sampling events.

Table 4: Phylum and families of prey identified in 188 non-empty *Thunnus obesus* stomachs sampled from 2018-2019. Bolded families were identified exclusively through genetic barcoding while bolded species were identified either exclusively through genetic barcoding or gross identification and genetic barcoding.

Phylum	Family	Species	Weight (g)	Number	%FO _i	%MW _i
Arthropoda			17.03	47	15.96	0.18
	Aristeidae		8.41	4	1.60	0.03
	Euphausiidae		0.18	4	1.60	0.01
	Hyperiididae		3.73	23	0.53	0.05
		<i>Themisto sp.</i>	3.73	23	0.53	
	Idoteidae		2.13	12	6.38	0.04
		<i>Idotea spp.</i>	2.13	12	6.38	
	Brachyura (<i>infraorder</i>)		0.18	3	1.60	0.02
	Phronimidae		0.25	1	0.53	<0.01
		<i>Phronima sp.</i>	0.25	1	0.53	
	Phrosinidae		0.56	4	2.13	<0.01
		<i>Phrosina semilunata</i>	0.56	4	2.13	
	Unidentified Arthropoda		1.59	–	5.85	0.04
Chordata			4,023.00	466	78.72	32.87
	Alepisauridae		34.48	4	2.13	0.12
		<i>Alepisaurus ferox</i>	34.48	4	2.13	
	Ammodytidae		520.37	25	1.60	1.54
		<i>Ammodytes sp.</i>	520.37	25	1.60	
	Ariommatidae		4.85	1	0.53	0.01
		<i>Ariomma bondi</i>	4.85	1	0.53	
	Centrolophidae		4.26	1	0.53	0.02
		<i>Hyperoglyphe perciformis</i>	4.26	1	0.53	
	Gempylidae		676.06	112	19.68	3.74
		<i>Gempylus serpens</i>	2.13	1	0.53	
		<i>Nealotus tripes</i>	646.61	110	15.96	
		<i>Nesiarchus nasutus</i>	4.21	1	0.53	
	Monacanthidae		280.36	24	4.79	2.00
		<i>Aluterus monoceros</i>	238.74	18	3.19	
		<i>Stephanolopis hispidus</i>	10.74	1	0.53	
	Myctophidae		879.75	187	18.62	5.33
		<i>Ceratoscopelus maderensis</i>	267.41	73	3.19	
		<i>Symbolophorus veranyi</i>	313.99	79	10.11	
	Paralepididae		394.85	61	8.51	1.17
		<i>Arctozenus risso</i>	79.60	11	1.06	
		<i>Magnisudis atlantica</i>	15.37	1	0.53	
	Phycidae		48.09	2	1.06	0.12
		<i>Urophycis regia</i>	48.09	2	1.06	
	Salpidae		26.8	41	10.64	1.37
	Scomberesocidae		36.40	3	1.06	0.37
		<i>Scomberesox saurus</i>	36.40	3	1.06	
	Scombridae		274.49	2	1.06	0.33
		<i>Auxis rochei</i>	268.85	1	0.53	
	Scyliorhinidae		112.16	1	0.53	0.04
		<i>Scyliorhinus retifer</i>	112.16	1	0.53	
	Syngnathidae		0.69	2	0.53	0.05
	Unidentified Chordata		844.29	–	70.75	17.17
Mollusca			19,152.44	560	90.96	66.95
	Argonautidae		206.74	24	10.64	2.06
	Atlantidae		0.02	1	0.53	<0.01
	Brachioteuthidae		3.27	4	2.13	0.02
	Cavoliniidae		0.05	2	1.60	<0.01
	Gonatidae		24.46	18	3.19	0.15
		<i>Gonatus steenstrup</i>	24.46	18	3.19	
	Histioteuthidae		413.55	47	4.26	1.06
		<i>Histioteuthis reversa</i>	413.55	47	4.26	
	Lepidoteuthidae		30.44	1	0.53	0.06
		<i>Lepidoteuthis grimaldii</i>	30.44	1	0.53	
	Loliginidae		79.80	9	2.13	0.04
		<i>Loligo pealeii</i>	79.80	9	2.13	
	Octopoteuthidae		0.32	2	1.06	<0.01
	Ommastrephidae		13,820.03	452	45.75	27.40
		<i>Illex Illecebrosus</i>	13,820.03	452	45.75	
	Unidentified Mollusca		4,458.86	–	87.77	35.67

Table: Table 4. Stomachs sampled from *Kajikia albida*, *Makaira nigricans*, *Tetrapturus georgii*, and *Thunnus alalunga*

Sp.	2018	2019	2020
Blue marlin	6	10	1
White marlin	13	21	2
Roundscale spearfish	20	21	3
Albacore	0	25	6

Sp.	No. stomachs	Total prey weight (g)	n prey items
Blue marlin	17	7431.3	87
White marlin	36	7073.02	262
Roundscale spearfish	44	7594.55	525
UNK	3	761.98	19
Yellowfin tuna	2	769.389	86
Albacore	31	597.7445	197
Total	103	23630.239	979

Table 5: Phylum and families of prey items identified in *Kajikia albida*, *Makaira nigricans*, and *Tetrapturus georgii* stomachs sampled between 2019-2020 n=93

	%MW	%FO	Weight (g)
Arthropoda			
Cavoliniidae	0.000172	1.075269	0.04
Euphausiidae	0.000215	1.075269	0.05
Hyperiididae	0	1.075269	0
Megalopae	0.092344	3.225806	2.15
Phronimidae	0.001546	1.075269	0.36
Phrosinidae	0.03547	1.075269	8.26
Unidentified			
Arthropoda	0.000859	2.150538	0.2
Chordata			
Alepisauridae	2.514914	4.301075	351.21
Ariommatidae	0.475086	3.225806	27.89
Belonidae	0.29119	1.075269	12.56
Carangidae	4.849252	11.82796	517.75
Coryphaenidae	1.39534	3.225806	223.72
Echeneidae	0.918348	1.075269	55.48

	Gempylidae	0.131797	2.150538	37.1
	Hemiramphidae	2.727716	15.05376	597.5
	Lestidiidae	0.001913	1.075269	0.26
	Luvaridae	0.034802	2.150538	4.59
	Myctophid	0.705773	8.602151	70.68
	Paralepididae	0.019125	2.150538	4.48
	Scombridae	36.56819	60.21505	11326.54
	Sternoptychidae	0.640914	3.225806	55.69
	Tremoctopodidae	0.191765	2.150538	21.14
	Tremoctopodidae	0.191765	2.150538	21.14
	Unidentified			
	Chordata	16.51191	62.36559	1995.99
Mollusca				
	Alloposidae	0.166049	2.150538	1.64
	Argonautidae	0.693168	4.301075	36.81
	Cephalopod parts	0.738505	6.451613	114.51
	Cephalopoda	0.022425	2.150538	12.92
	Histioteuthidae	0.250917	6.451613	27.53
	Octopoda	0.240719	7.526882	57.45
	Ommastrephidae	21.31575	44.08602	6065.26
	Unidentified			
	Mollusca	8.257299	47.31183	378.17

Table 6: Phylum and families of prey items identified in *Thunnus alalunga* stomachs sampled between 2019-2020 n=31

Higher Classification	%FO	N	Total Weights (g)	%W	%MW
Cephalopod	90.9		480.661	79.70	
Ommastrephidae	68.18	75	276.552	45.85	28.76045721
Argonautidae	22.72	5	0.53	0.0879	0.14216128
Loliginidae	13.63	18	71.38	11.84	2.422286196
Brancheoteuthidae	4.55	1	1.04	0.1724	0.176259237
Parts			131.159	21.75	25.36085723
Crustacean	0.5		46.03	7.632	
Phrosinidae	36.36	18	30.22	5.011	6.690770789
Megalapae	22.72	15	0.84	0.139	0.265581875
Phronimidae	9.09	16	0.24	0.0398	0.23954575
Euphausiidae	4.55	5	0.11	0.0182	0.013500743
Lycaeidae	13.63	4	0.65	0.108	0.15497319
Hyperiididae	4.55	2	0.26	0.0431	0.031910846
Scyllaridae	4.55	2	0.22	0.0365	0.041111649
Unidentified Crustacean	4.55	1	6.93	1.149	2.049446975
Parts			6.56	1.088	4.456436792
Gastropoda	18.18		0.72	0.1194	
Cavolinidae	18.18	9	0.72	0.1194	0.239937438
Other	18.18		0.79	0.131	
Salpidae	13.63	3	0.79	0.131	0.15724756
Seaweed	9.09	2	0.03	0.00497	0.02655699
Teleostii	72.72		69.5435	11.53	
Alepisauridae	4.55	2	0.23	0.0381	0.090830108
Lampridae	4.55	1	0.48	0.0796	0.081350417
Unidentified Fish	40.9	18	23.4335	3.885	4.554256445
Parts			45.4	7.527	19.11919141

Table 7: Unique prey items identified by genetic barcoding and hard parts from *Kajikia albida*, *Makaira nigricans*, and *Tetrapturus georgii* stomachs.

Unique Barcoding	Sp.	Family	Class	Common Name
	<i>Ariomma bondi</i>	Ariommatidae	Actinopterygii	Silver-rag driftfish
	<i>Luvarus imperialis</i>	Luvaridae	Actinopterygii	Luvar fish
	<i>Cubiceps pauciradiatus</i>	Hemiramphidae	Actinopterygii	Halfbeak fish
	<i>Thunnus atlanticus</i>	Scombridae	Actinopterygii	Blackfin tuna
	<i>Seriola gracilis</i>	Nomeidae	Actinopterygii	Driftfish
	<i>Aluterus scriptus</i>	Monacanthadae	Actinopterygii	Scrawled filefish
	<i>Aluterus monoceros</i>	Monacanthadae	Actinopterygii	Unicorn leatherjacket filefish
	<i>Euthynnus alletteratus</i>	Scombridae	Actinopterygii	Little tunny
	<i>Lopholatilus chamaeleonticeps</i>	Malacanthidae	Actinopterygii	Great northern tilefish
Unique from hard part ID				
	<i>Histioteuthis reversa</i>	Histioteuthidae	Cephalopoda	Strawberry squid
	<i>Tremoctopus violaceus</i>	Tremoctopodidae	Cephalopoda	Blanket octopus
	<i>Argonauta</i> sp.	Argonautidae	Cephalopoda	Paper nautili octopus
	<i>Haliphron atlanticus</i>	Alloposidae	Cephalopoda	Seven arm octopus
		Enoploteuthidae	Cephalopoda	

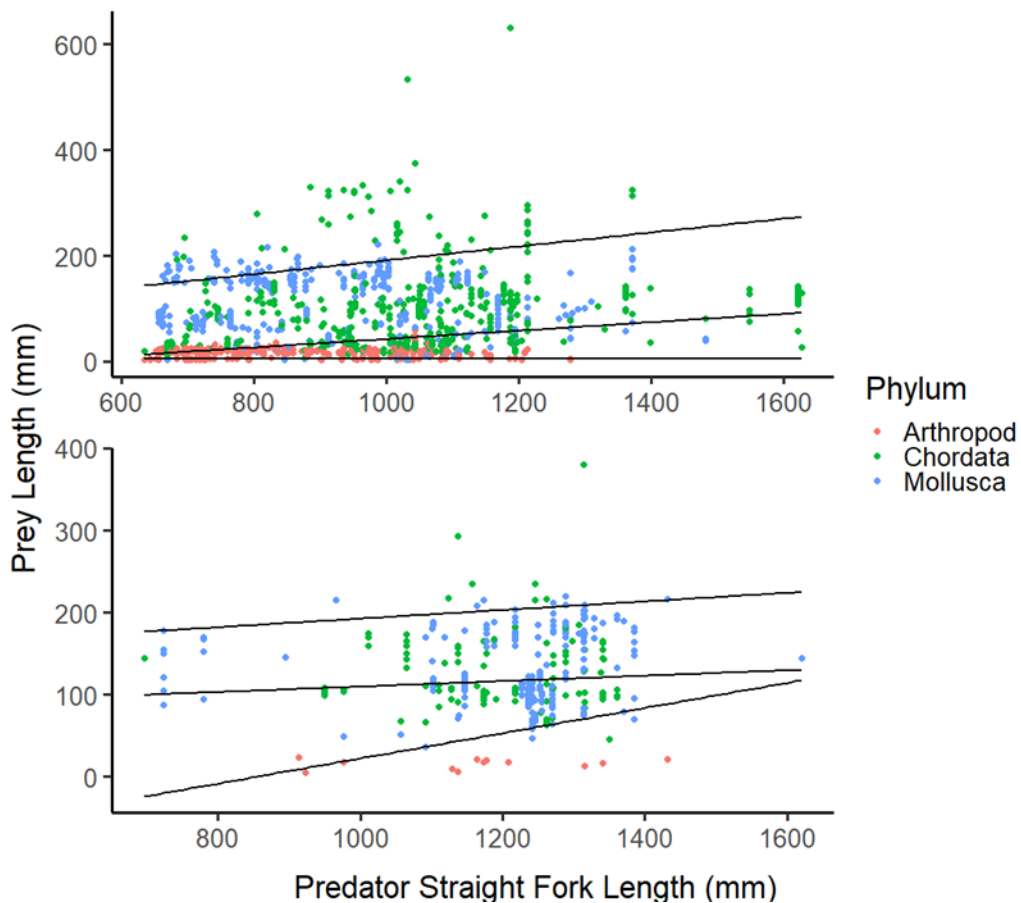


Figure 3. Predator/prey length relationships for YFT (top) and BET (bottom) with 5th, 50th, and 95th quantiles

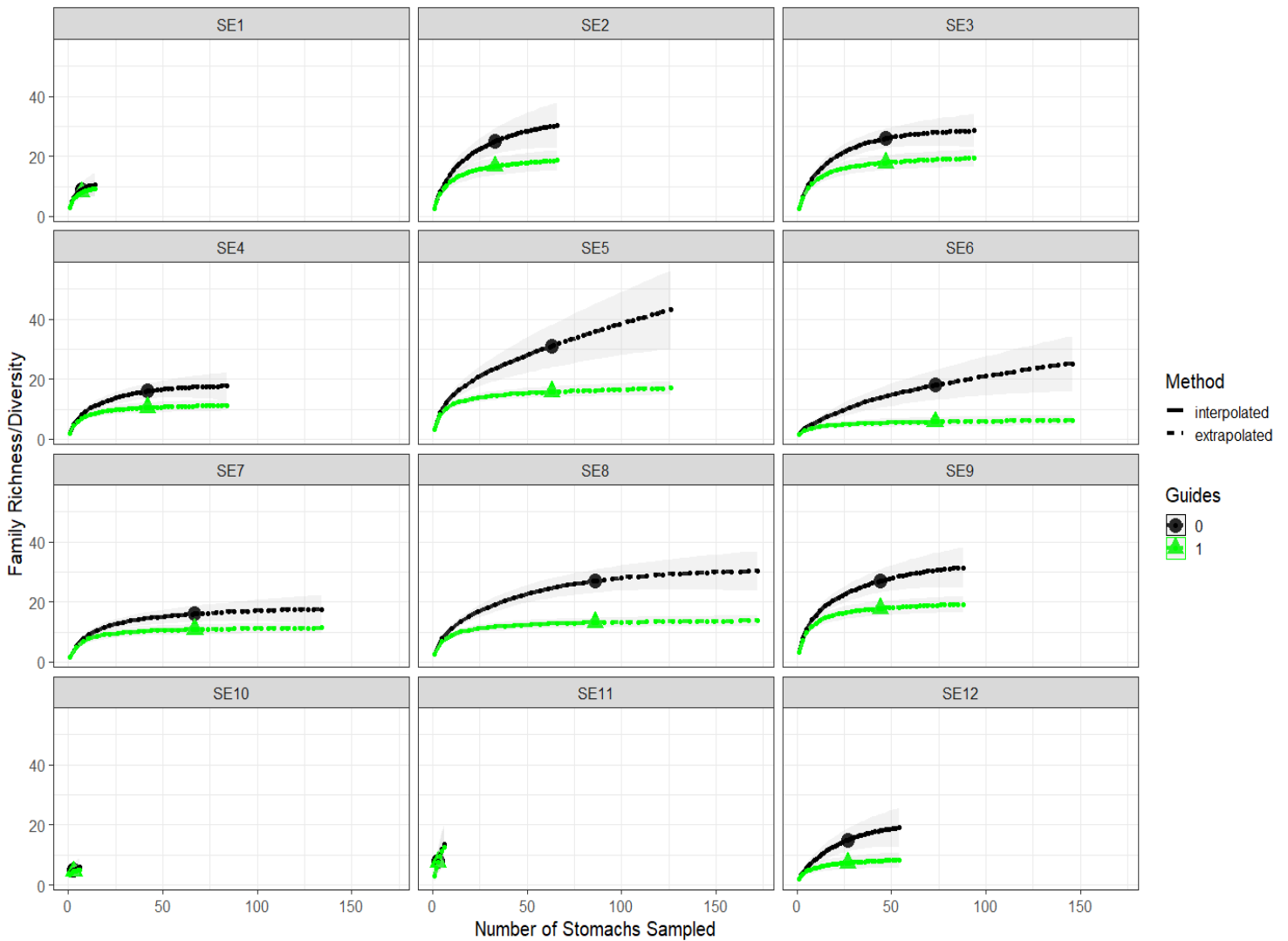
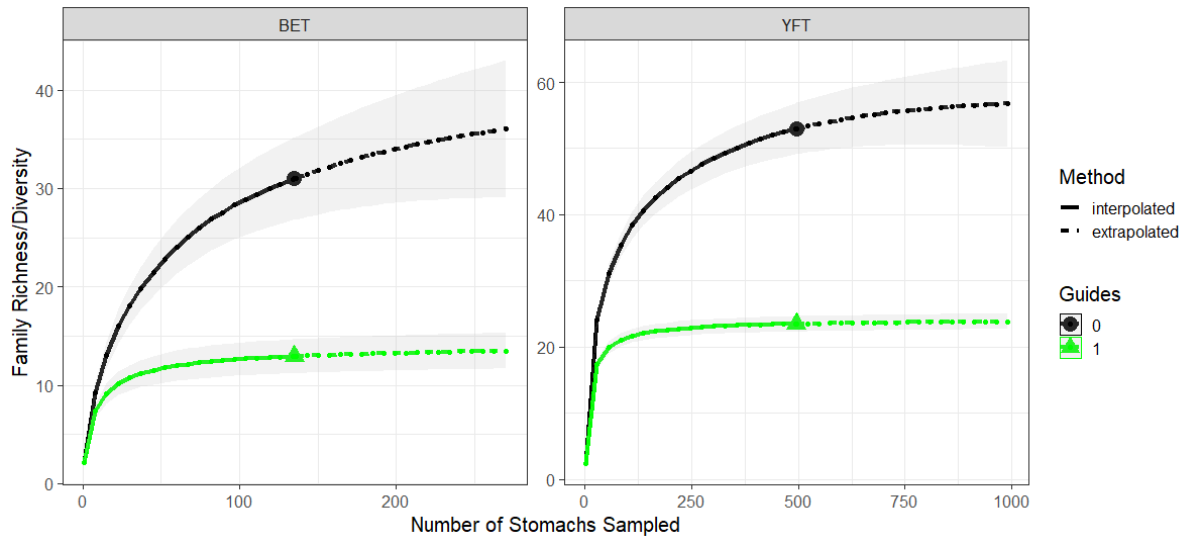


Figure 4. Sample-size based rarefaction and extrapolation curves by family and sampling event for *Thunnus albacares* (above) and *Thunnus obesus* (below). Shaded areas represent 95% confidence intervals based on reference data permutated 100 times. Shapes are observed richness and diversity, solid lines represent interpolated values, and dotted lines represent extrapolated values. Guides indicate parameter q of order 0 (species richness) and 1 (shannon diversity). Observed richness was compared with richness at $2 \cdot n$ (double observed sample size) to determine if observed sample sizes reflected estimates of true diversity and richness. (Chao et al. 2014)

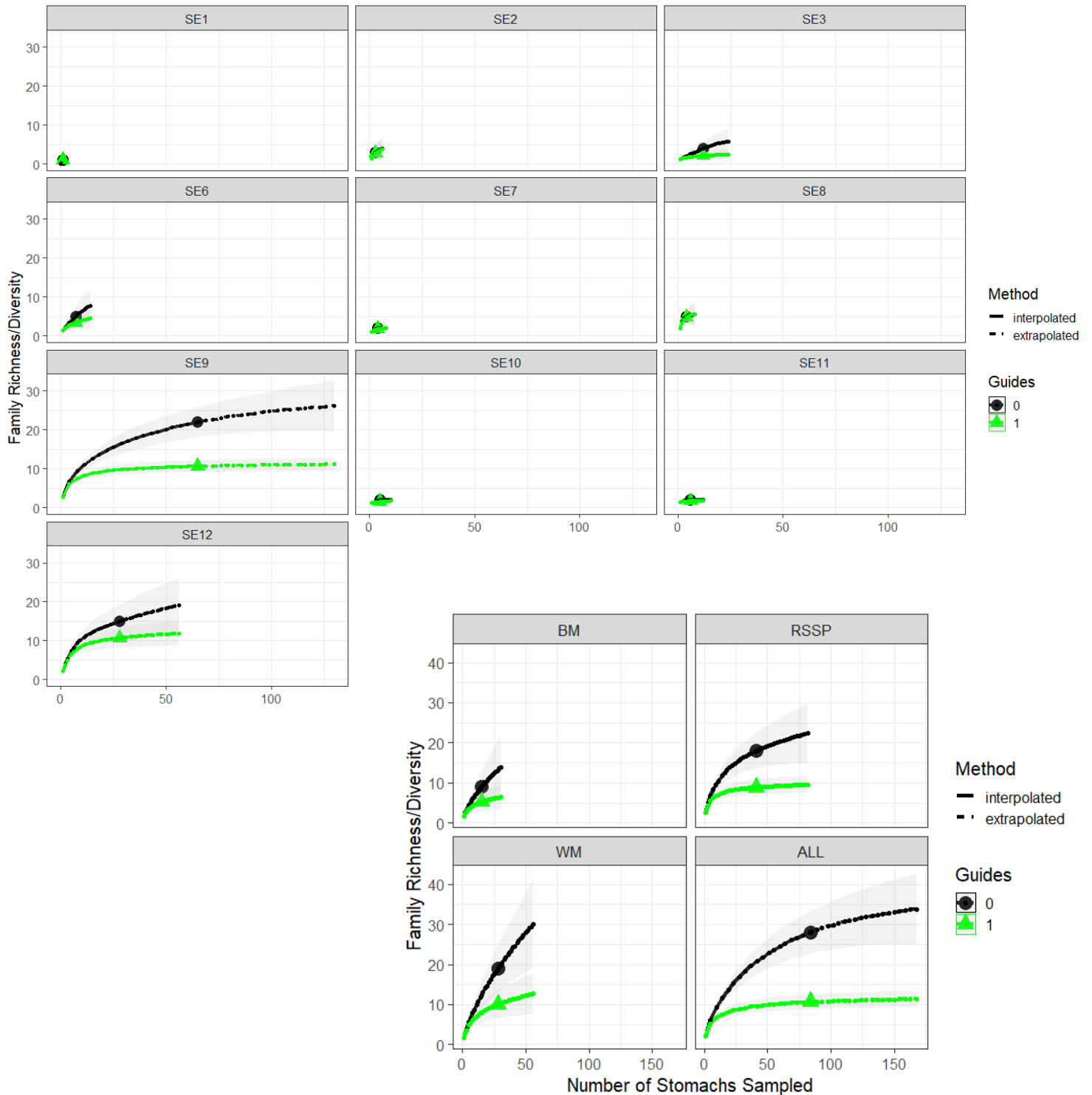


Figure 5. Sample-size based rarefaction and extrapolation curves by family and sampling event for *Kajikia albiga*, *Makaira nigricans*, *Thunnus alalunga*, and *Tetrapturus georgii*. Shaded areas represent 95% confidence intervals based on reference data permuted 100 times. Shapes are observed richness and diversity, solid lines represent interpolated values, and dotted lines represent extrapolated values. Guides indicate parameter q of order 0 (species richness) and 1 (shannon diversity).

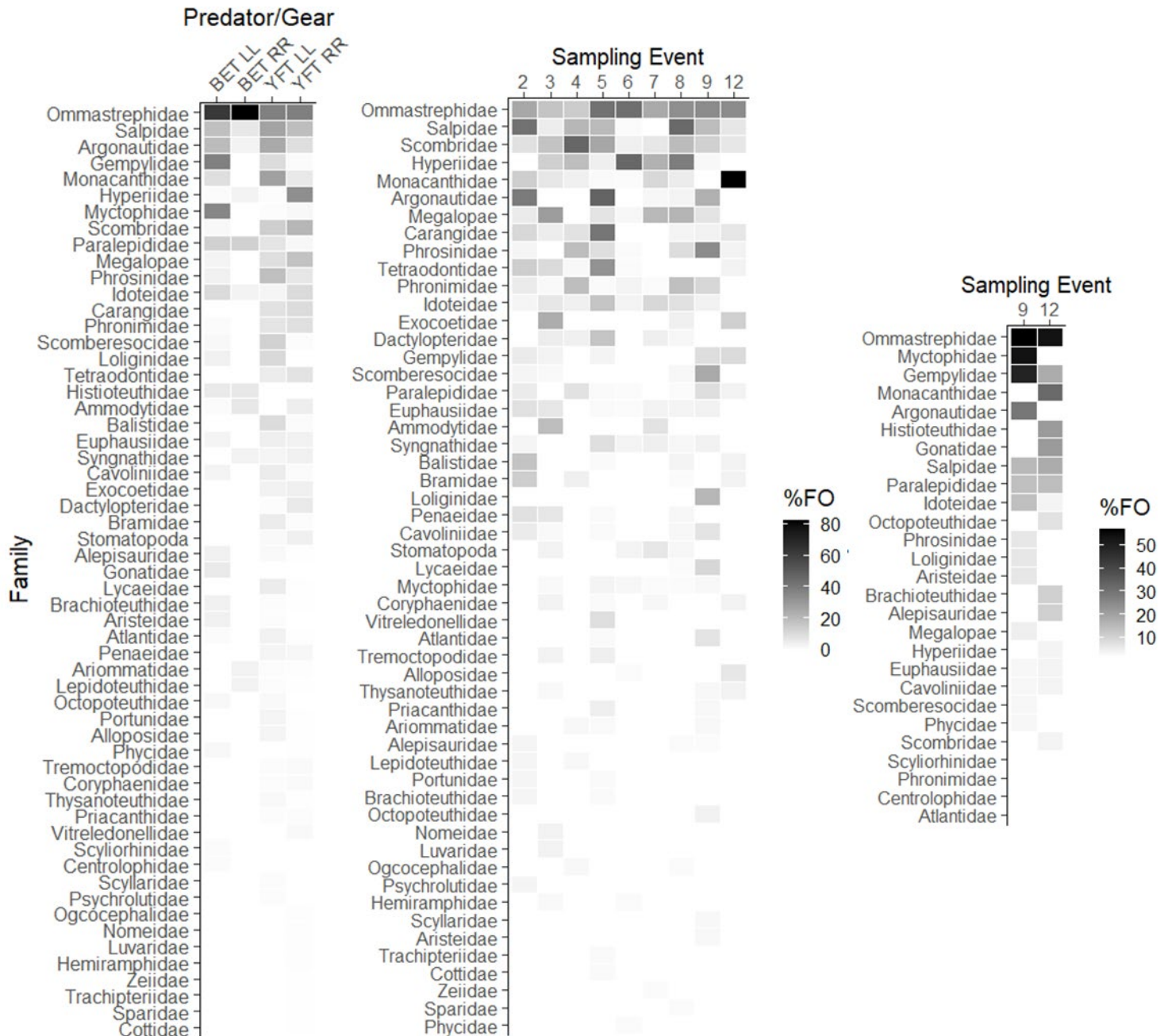


Figure 6. %FO_i of prey families between predator specific capture gear (left), yellowfin (middle) and bigeye (right) sampling events where $n > 28$. Color scales are the same among %FO_i for yellowfin sampling events and predator specific capture gear comparisons.

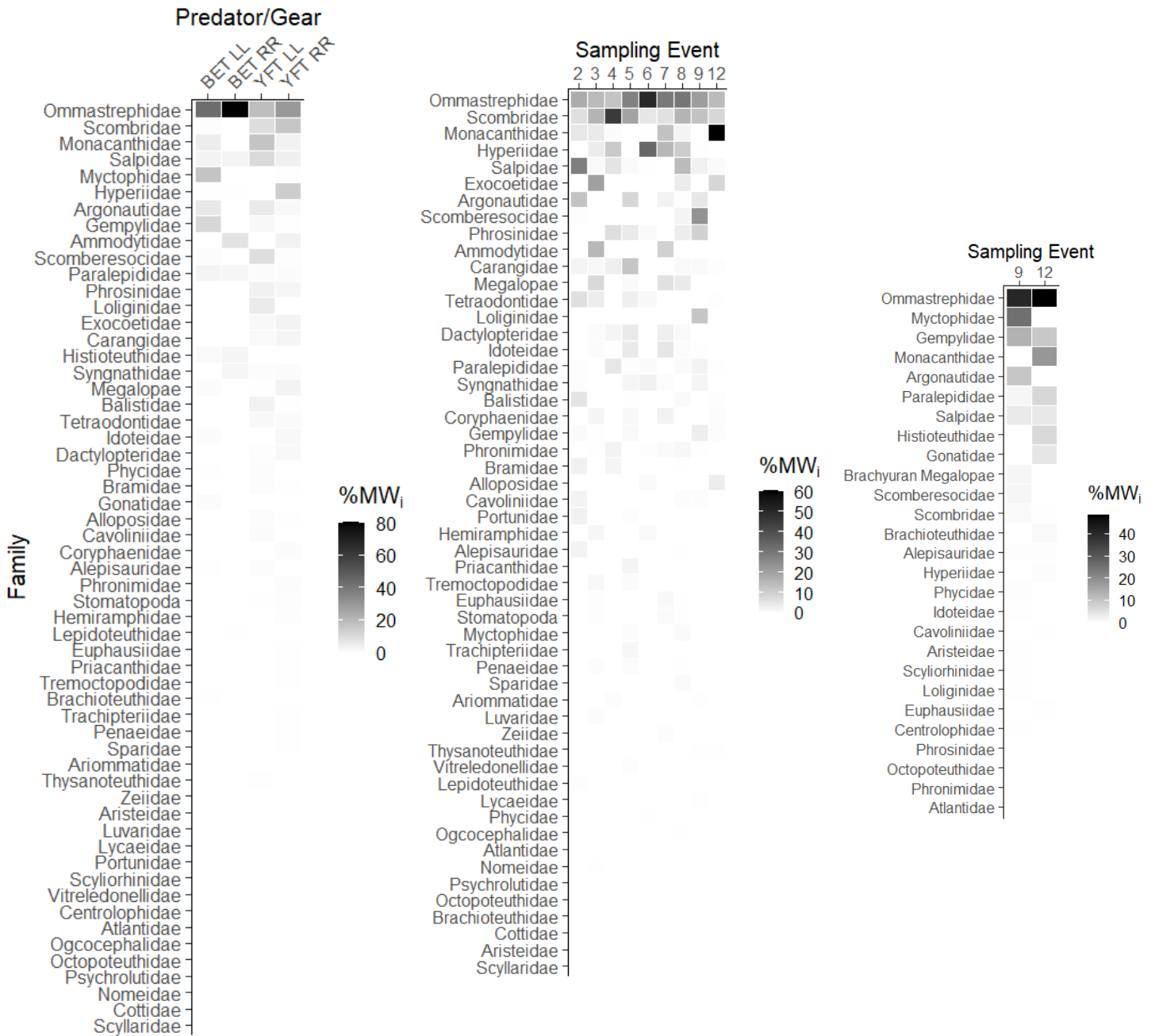


Figure 7. %MW_i of prey families between predator specific capture gear (left), yellowfin (middle) and bigeye (right) sampling events where n>28.

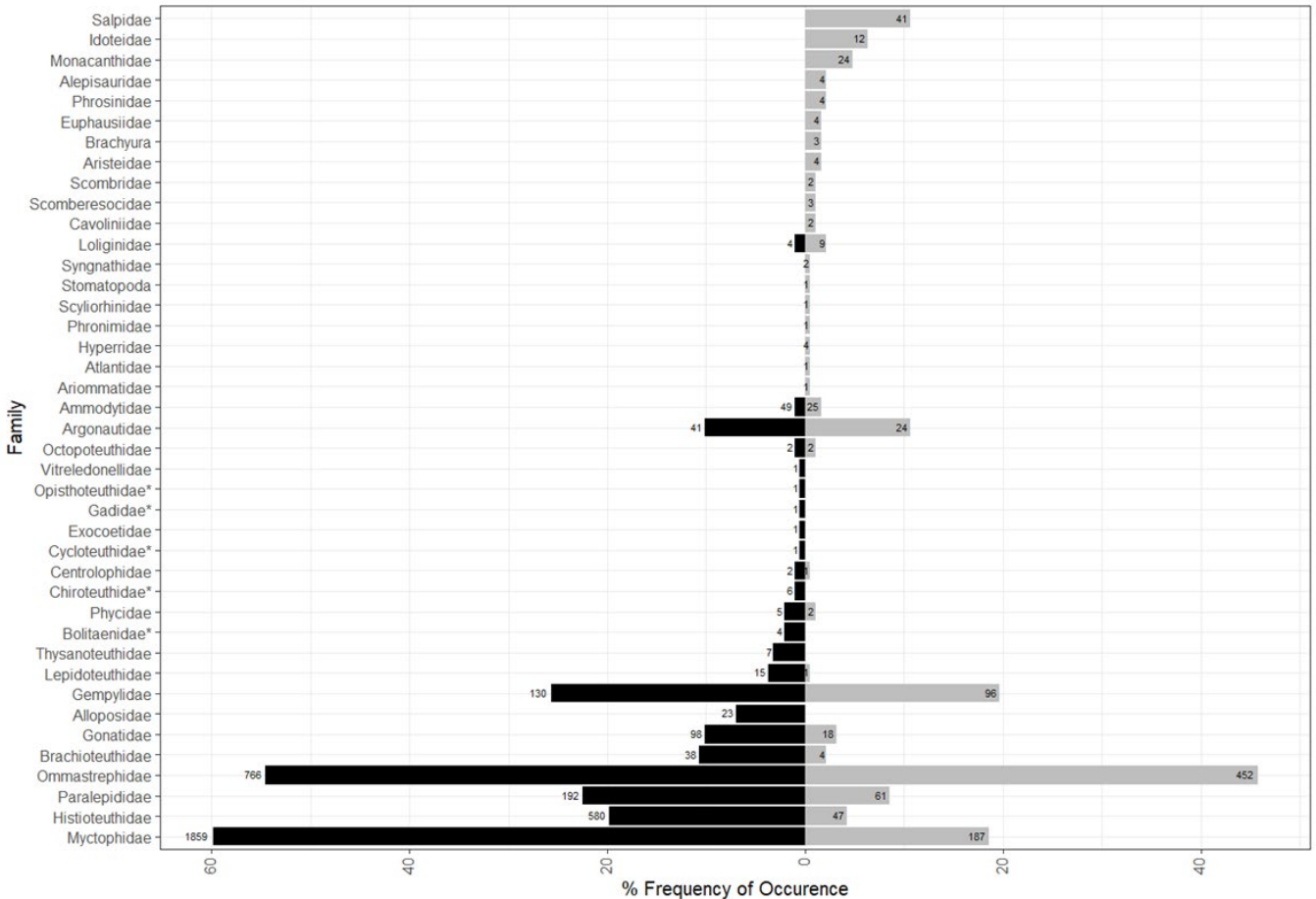
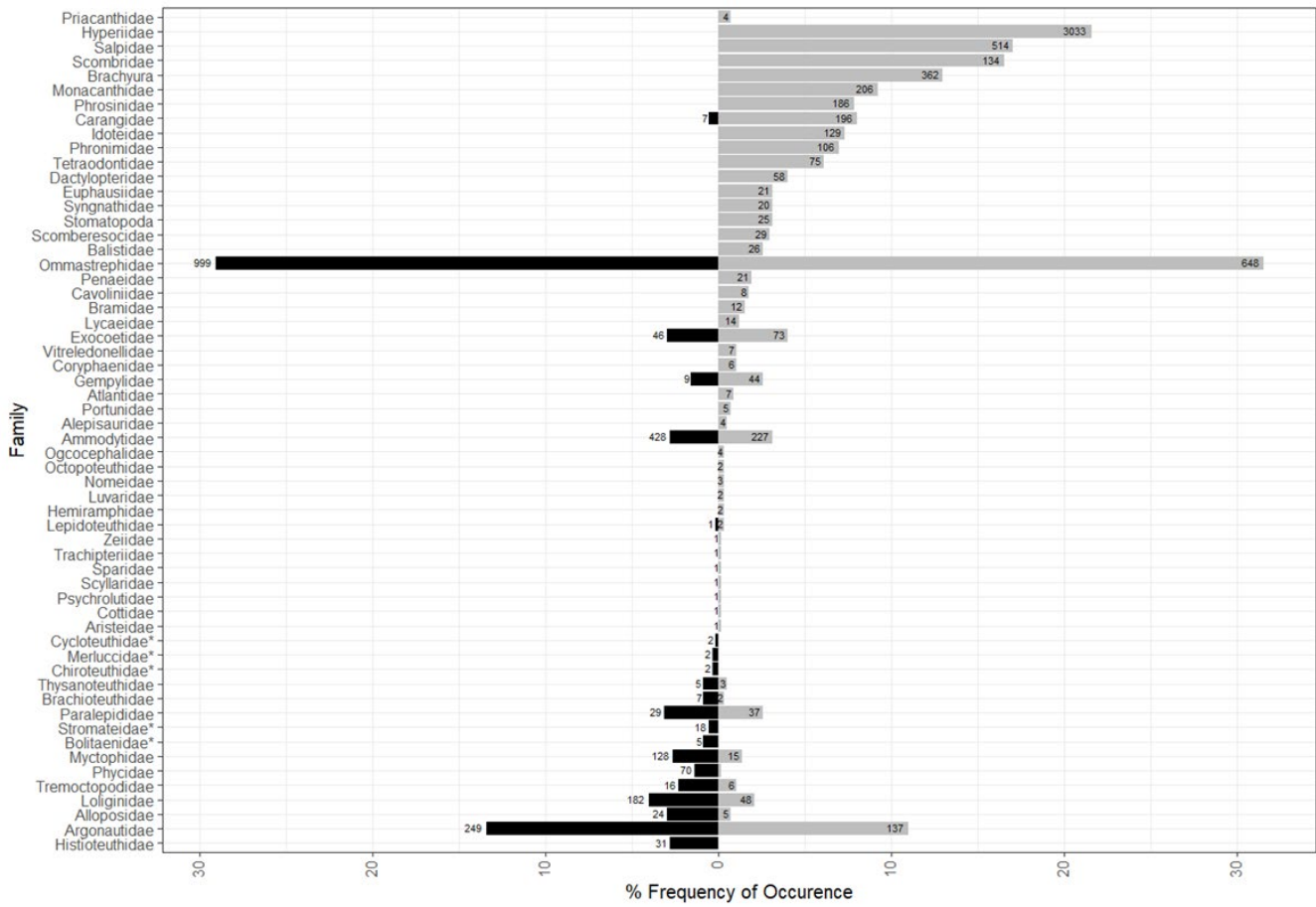


Figure 8. Number of individuals and frequency of occurrence comparisons between hard parts (black) and prey associated with tissue (white) for families detected in non-empty stomachs of 188 *Thunnus obesues* (bottom) and 574 *Thunnus albacares* (top).

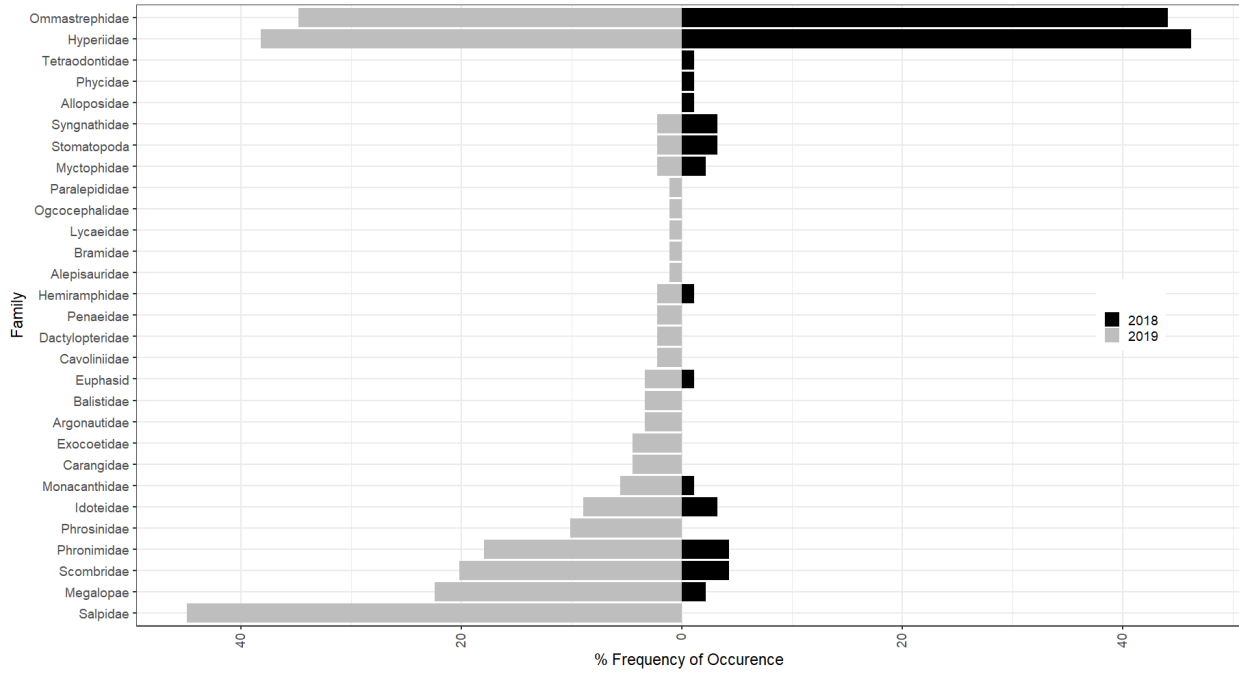


Figure 9. Interannual differences of *Thunnus albacares* prey by % Frequency of Occurrence at sampling events 6 and 8 (top) and 3 and 5 (bottom).

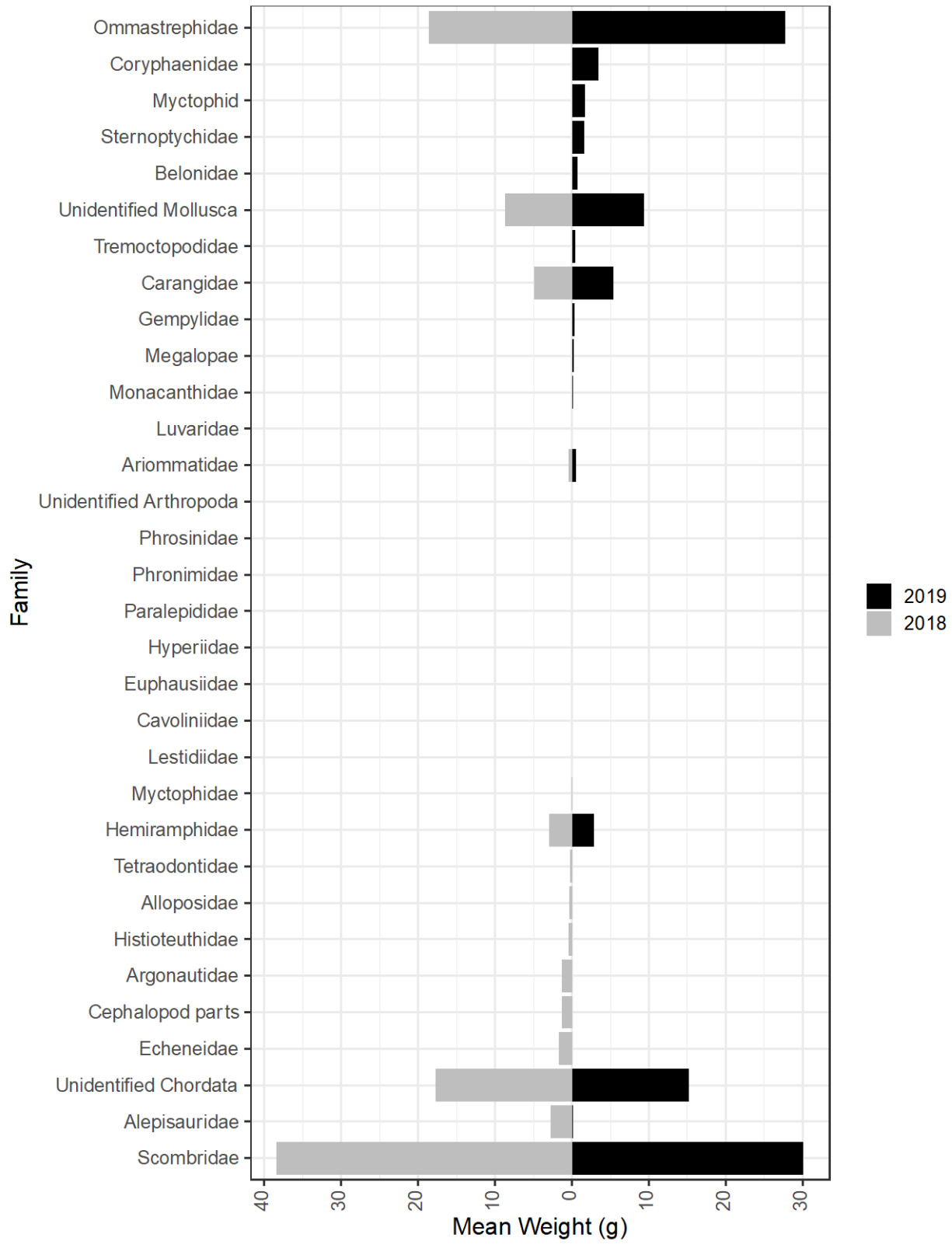


Figure 10. Interannual differences of *Kajikia albida*, *Makaira nigricans*, and *Tetrapturus georgii* prey by %MW_i from 2019-2020.



2629-2019 BET- Chain Catshark and shortfin squid(above)
2267-2018 YFT- Blotchwing Flying fish (below)





2030-2018 YFT- Seven-arm octopus
2463-2019 BET- Lanternfish





2314-2018 YFT- Black gemfish above

2393-2018 YFT- Portunid crab below



2171-2019 YFT Bullet tuna, sand lance, and crab parts



2007-2019 BET- Strawberry squid





3146-2019 RSSP



3003-2018 WM



3159-2019 BM stomach from