

**Free shrimp cocktail for everyone! Trophic relationships of 13 elasmobranchs in Central Patagonia, Southwestern Atlantic.**

Aquatic Sciences

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**Supplementary material**

**ESM 1** Trophic level of the prey categories obtained from Ebert and Bizarro (2007) used to calculate the trophic position of the elasmobranchs analyzed in the present study

Group code	Description	Trophic level
INVERT	Other invertebrates and unidentified invertebrates	2.5
POLY	Polychaetes and other marine worms	2.6
MOLL	Molluscs (excluding cephalopods) and unidentified mollusks	2.1
SQUID	Squids	3.2
CEPH	Octopi, cuttlefishes and unidentified cephalopods	3.2
AMPH	Amphipods and isopods	3.18
DECA	Decapod crustaceans	2.52
OCRUST	Other crustaceans and unidentified crustaceans	2.4
CHOND	Chondrichthyan fishes	3.65
FISH	Teleost and agnathan fishes	3.24

Ebert, D.A. & J.J. Bizarro, 2007. Standardized diet compositions and trophic levels of skates (Chondrichthyes: Rajiformes: Rajoidei). In *Biology of Skates*, 115-131 pp. Springer, Dordrecht.

**ESM 2** Major prey groups and most consumed species reported in previous studies for Argentina on the diet of the 13 elasmobranch species included in this study

Species	Author/s	Region	Major prey groups
<b>Gatuzo</b> <i>(Mustelus schmitti)</i>	Our study	Central Patagonia (41°–47°S)	%FO: Decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> ) and Brachyura ( <i>Peltarion spinosulum</i> ) and polychaetes (family Eunicidae)
	Belleggia et al., 2011	Argentine continental shelf (34°45'S-41°S)	%FO: Decapod crustaceans Brachyura ( <i>Loxopagurus loxochelis</i> , <i>Peltarion spinosulum</i> ), polychaetes (Maldanidae) and fish ( <i>Engraulis anchoita</i> )
	Belleggia, 2012	Northern Argentine continental shelf (36°-39.3°S)	%FO: Polychaetes (Maldanidae), decapod crustaceans Brachyura ( <i>Peltarion spinosulum</i> ) and fish ( <i>Engraulis anchoita</i> )
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Decapod crustaceans Brachyura ( <i>Peltarion spinosulum</i> ), polychaetes and fish ( <i>Raneya brasiliensis</i> )
	Chiaramonte & Petovello, 2000	Ría Deseado and Mar del Plata (47°45'S- 65°55'W)	%FO: Decapod crustaceans Brachyura ( <i>Cyrtograpsus angulatus</i> ) and fishes ( <i>Austroatherina incisa</i> and <i>Sprattus fuegensis</i> )
	Menni et al., 1986	Buenos Aires province	%FO: Crustaceans, polychaetes and fishes
	Molina & Cazorla, 2011	Bahía Anegada (39.96°-40.60°S)	%FO: Decapod crustaceans Brachyura ( <i>Neohelice granulata</i> ) and polychaetes
	Molina, 2012	Bahía Anegada	%FO: Decapod crustaceans Brachyura ( <i>Neohelice granulata</i> ) and polychaetes
	Oliver et al., 1968	Mar del Plata (38°20'S)	%FO: Decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> ) and Brachyura ( <i>Corystoides chilensis</i> ) and polychaetes
	Sánchez & Prenski, 1996	San Jorge gulf (45°-47°S)	%W: Decapod crustaceans Brachyura (family Majidae) and polychaetes
	Van der Molen & Caille, 2001	Bahía Engaño (43°04'-43°24'S)	%FO: Decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> ) and polychaetes
<b>Tiburón espinoso</b> <i>(Squalus acanthias)</i>	Our study	Central Patagonia (41°–47°S)	%FO: Fish ( <i>Merluccius hubbsi</i> ) and decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> )
	Barone, 2006		

		North and Central Argentine Patagonian Sea (40°S - 46°S)	%IRI: Cephalopods ( <i>Illex argentinus</i> ) and fish ( <i>Merluccius hubbsi</i> )
	Belleggia et al., 2012	Argentine continental shelf (35°-55°S)	%FO: Cephalopods ( <i>Illex argentinus</i> ) and fish ( <i>Merluccius hubbsi</i> )
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Fish ( <i>Engraulis anchoita</i> )
	García de la Rosa & Sánchez, 1997	Argentine Sea (34°-47° S)	%FO: Ctenophores ( <i>Pleurobrachia pileus</i> ), fish ( <i>Merluccius hubbsi</i> ) and cephalopods ( <i>Illex argentinus</i> )
	García de la Rosa, 1998	Argentine continental shelf (34°-55° S)	%FO: Fish ( <i>Merluccius hubbsi</i> ), cephalopods ( <i>Illex argentinus</i> ) and ctenophores ( <i>Pleurobrachia pileus</i> )
	Koen Alonso, 1999	Northern and central Patagonia (41°-47°S)	%FO: Cephalopods ( <i>Illex argentinus</i> ) and fish ( <i>Merluccius hubbsi</i> )
	Koen Alonso et al., 2002	Northern and central Patagonia	%W: Cephalopods ( <i>Illex argentinus</i> ), fish ( <i>Merluccius hubbsi</i> ) and ctenophores ( <i>Pleurobrachia pileus</i> )
	Menni, 1985	Argentine Sea	Fishes
	Sánchez & Prenski, 1996	San Jorge gulf	%W: Fish ( <i>Merluccius hubbsi</i> ), cephalopods ( <i>Illex argentinus</i> ) and ctenophores
<b>Tiburón pintarroja (<i>Schroederichthys bivius</i>)</b>	Our study	Central Patagonia (41°–47°S)	%FO: Decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> ), fish ( <i>Merluccius hubbsi</i> ) and polychaetes
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Polychaetes ( <i>Aphroditella</i> spp.)
	Matallanas et al., 1993	Beagle Channel (54°53'S, 67°-68°W)	%IRI: Decapod crustaceans Anomura ( <i>Munida subrugosa</i> )
	Menni et al., 1979	Argentine continental shelf	Fishes, polychaetes and crustaceans
	Sánchez & Prenski, 1996	San Jorge gulf	%W: In summer: cephalopods, decapod crustaceans Anomura ( <i>Munida</i> ) and polychaetes. The rest of the year: stomatopods and polychaetes
	Sánchez et al., 2009	Southwest Atlantic Ocean (34°-54°S)	%W: SJG: stomatopods ( <i>Pterigosquilla armata armata</i> ), decapod crustaceans Brachyura (family Majidae and <i>Peltarion spinosulum</i> ), Dendrobranchiata ( <i>Pleoticus muelleri</i> ) and Anomura ( <i>Munida gregaria</i> )
<b>Squatina (<i>Squatina guggenheim</i>)</b>	Our study	Central Patagonia (41°–47°S)	%FO: Fishes ( <i>Merluccius hubbsi</i> and <i>Raneya brasiliensis</i> ) and cephalopods ( <i>Illex argentinus</i> )

	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Fish ( <i>Engraulis anchoita</i> )
	Colonello, 2005	Bonaerense Biogeographic District (34°-42°S)	%IRI: Fish ( <i>Cynoscion guatucupa</i> )
	Milessi et al., 2019	Río de La Plata (36°24'-36°54'S)	%W: Decapod crustaceans Dendrobranchiata ( <i>Peisos petrunkevitchi</i> and <i>Artemesia longinaris</i> )
	Oyarsún González et al., 2003	Uruguay and northern Argentina	Fish ( <i>Engraulis anchoita</i> )
	Vögler et al., 2003	Argentine-Uruguayan Common Fishing Zone (34°00'-39°30' S)	%N: Fish ( <i>Engraulis anchoita</i> )
	Vögler et al., 2009	Argentine-Uruguayan Common Fishing Zone	%IRI: 23-60 cm TL: Fishes ( <i>Engraulis anchoita</i> and <i>Patagonotothen longipes</i> )/61-80 cm TL: Decapod crustaceans Dendrobranchiata (Penaeidae) and fishes ( <i>Cynoscion guatucupa</i> and <i>Merluccius hubbsi</i> )/81-91 cm TL: Fish ( <i>Patagonotothen ramsayi</i> ) and cephalopods ( <i>Illex argentinus</i> )
<b>Cazón (<i>Galeorhinus galeus</i>)</b>	Our study	Central Patagonia (41°–47°S)	%FO: Fish ( <i>Merluccius hubbsi</i> ), cephalopods ( <i>Illex argentinus</i> and <i>Octopus tehuelchus</i> ) and decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> )
	Elías et al., 2004	Northern Patagonian gulfs (42°-43°S)	Fishes ( <i>Merluccius hubbsi</i> , <i>Genypterus blacodes</i> , <i>Raneya brasiliensis</i> , <i>Odontesthes sp.</i> ) and cephalopods ( <i>Illex argentinus</i> )
	Koen Alonso, 1999	Northern and central Patagonia (41°-47°S)	%IRI: Fish ( <i>Merluccius hubbsi</i> ) and cephalopods ( <i>Illex argentinus</i> and <i>Enteroctopus megalocyathus</i> )
	Lucifora, 2003	Bahía Anegada (39.96°-40.60°S)	%IRI: Fishes ( <i>Raneya brasiliensis</i> , <i>Cynoscion guatucupa</i> and <i>Porichthys porosissimus</i> )
	Lucifora et al., 2006	Bahía Anegada	%FO: Fishes ( <i>Raneya brasiliensis</i> , <i>Cynoscion guatucupa</i> and <i>Porichthys porosissimus</i> )
	Menni, 1985	Argentine Sea	Fishes ( <i>Dules auriga</i> and <i>Engraulis anchoita</i> )
<b>Torpedo (<i>Discopyge tschudii</i>)</b>	Our study	Central Patagonia (41°–47°S)	%FO: Polychaetes (Family Eunicidae)
	Arrighetti et al., 2005	Mar del Plata	%W: Clam siphons ( <i>Amiantis purpurata</i> ) and polychaetes

	García, 1984	Mar del Plata	%FO: Polychaetes and amphipods (gamarids)
	Menni & Stehmann, 2000	Argentina, Uruguay and Brazil	Polychaetes and amphipods (gamarids)
	Sánchez & Prenski, 1996	San Jorge gulf	%W: Polychaetes
	Spath et al., 2013	Uruguay and northern Argentina (34°-38°S)	%IRI: Polychaetes, clam siphons ( <i>Amiantis purpurata</i> ) and amphipods
	Spath, 2014	Southwest Atlantic	%IRI: Polychaetes (family Gliceridae), clam siphons ( <i>Amiantis purpurata</i> ) and amphipods
	Spath et al., 2015	San Jorge gulf	%N: Polychaetes (family Orbiniidae)
<b>Extenta</b> <i>(Psammobatis extenta)</i>	Our study	Central Patagonia (41°–47°S)	%FO: Amphipods (Gamarids) and decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> )
	Barbini, 2011	Buenos Aires and Uruguayan coastal ecosystem (34°-41°S)	%FO: Amphipods (family Ampeliscidae) and decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> )
	Barbini & Lucifora, 2012	Southwest Atlantic (34°-38°S)	%IRI: Amphipods ( <i>Ampelisca</i> spp.) and decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> )
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Amphipods (Gammaridae unidentified)
	Braccini & Pérez, 2005	Quequén port (38°37'S)	%IRI: Amphipods (Gammaridae) and decapod crustaceans Dendrobranchiata (Penaeoidea unidentified)
	Mabragaña, 2007	Argentine continental shelf (34°-42°S)	%FO: Amphipods and decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> and <i>Pleoticus muelleri</i> )
<b>Normani</b> <i>(Psammobatis normani)</i>	Our study	Central Patagonia (41°–47°S)	%FO: Decapod crustaceans Anomura ( <i>Grimothea gregaria</i> ) and Dendrobranchiata ( <i>Pleoticus muelleri</i> )
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Amphipods (Gammaridae) and polychaetes (Family Onuphidae)
	Mabragaña et al., 2005	Southwest Atlantic (37°-50°S)	%FO: Crustaceans and polychaetes unidentified
	Mabragaña, 2007	Argentine shelf (34°-54°S)	%FO: Amphipods (Gammaridae), isopods (Serolidae), decapod crustaceans Brachyura ( <i>Peltarium spinosulum</i> ) and polychaetes
	Mabragaña & Giberto, 2007	Central Patagonia (41°–48°S)	%IA: Isopods (Serolidae), decapod crustaceans Brachyura ( <i>Peltarium spinosulum</i> ) and polychaetes

	Sánchez & Mabrugaña, 2002	South Patagonian region (48°-54°30' S)	%FO: Polychaetes and crabs unidentified
<b>Rudis</b> ( <i>Psammobatis rudis</i> )	Our study	Central Patagonia (41°-47°S)	%FO: Decapod crustaceans Anomura ( <i>Grimothea gregaria</i> ) and Dendrobranchiata ( <i>Pleoticus muelleri</i> )
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Polychaetes and decapod crustaceans Brachyura ( <i>Libidoclaea granaria</i> )
	Cristiniani, 2016	Chubut and north of Santa Cruz (41°- 48°S)	%IRI: Decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> ) and amphipods (gammarids)
	Mabrugaña et al., 2005	Southwest Atlantic	%FO: Crustaceans unidentified
	Mabrugaña, 2007	Argentine shelf (34°-54°S)	%FO: Amphipods (gamarids) and isopods (Cirolanidae, Arcturidae and Serolidae)
	Mabrugaña & Giberto, 2007	Central Patagonia (41°-48°S)	%IA: Isopods (Arcturidae and Cirolanidae) and amphipods (gamarids)
	Sánchez & Mabrugaña, 2002	South Patagonian region	%FO: Crabs unidentified
<b>Marmolada</b> ( <i>Sympterygia bonapartii</i> )	Our study	Central Patagonia (41°-47°S)	%FO: Amphipods and decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> )
	Barbini, 2011	Buenos Aires and Uruguayan coastal ecosystem	%FO: Decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> ) and Brachyura ( <i>Cyrtograpsus affinis</i> , <i>Peltarion spinosulum</i> , <i>Libinia spinosa</i> , <i>Libidoclaea granaria</i> and <i>Leurocyclus tuberculosus</i> )
	Barrera Oro & Maranta, 1996	Mar del Plata	%FO: Decapod crustaceans Dendrobranchiata, crabs unidentified and fishes
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Decapod crustaceans Brachyura (Majidae) and Dendrobranchiata ( <i>Peltarion spinosulum</i> ) and amphipods (Gammaridae)
	Estalles, 2012	San Matías gulf (41°-42°S)	%FO: Decapod crustaceans Brachyura ( <i>Peltarion spinosulum</i> )
	Estalles et al., 2015	San Matías gulf	%FO: Decapod crustaceans Brachyura ( <i>Peltarion spinosulum</i> ) and

			Dendrobranchiata ( <i>Pleoticus muelleri</i> ) and fishes ( <i>Engraulis anchoita</i> )
	Menni & Stehmann, 2000	Argentina, Uruguay and Brazil	Decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> and <i>Pleoticus muelleri</i> ) and Brachyura ( <i>Corystoides chilensis</i> , <i>Coenophthalmus tridentatus</i> and <i>Leurocyclus tuberculatus</i> )
	Milessi et al., 2019	Río de la Plata	%IRI: Decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> ) and cumaceans
	Paesch, 2000	Argentine-Uruguayan Common Fishing Zone	Decapod crustaceans Brachyura ( <i>Libidoclaea granaria</i> and <i>Peltarion spinosulum</i> ) and fishes ( <i>Raneya fluminensis</i> and <i>Merluccius hubbsi</i> )
	Sánchez & Prenski, 1996	San Jorge gulf	%W: Stomatopods and Decapod crustaceans Anomura (Munida)
	Sánchez & Mabrugaña, 2002	South Patagonian region	%FO: Crabs unidentified
<b>Acuta</b> ( <i>Sympterygia acuta</i> )	Our study	Central Patagonia (41°–47°S)	%FO: Decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> ) and amphipods
	Barbini, 2011	Buenos Aires and Uruguayan coastal ecosystem	%FO: Fishes ( <i>Dules auriga</i> and <i>Engraulis anchoita</i> ), decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> ) and Brachyura ( <i>Libinia spinosa</i> and <i>Cyrtograpsus affinis</i> )
	Barbini & Lucifora, 2016	Southwest Atlantic (33°–40°S)	%FO: Fishes ( <i>Dules auriga</i> and <i>Engraulis anchoita</i> ), decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> ) and Brachyura ( <i>Cyrtograpsus affinis</i> )
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Decapod crustaceans Brachyura (Pinnotheridae) and Dendrobranchiata ( <i>Pleoticus muelleri</i> and <i>Mysis</i> spp.), amphipods (Gammaridae) and fishes ( <i>Raneya brasiliensis</i> and <i>Paralichthys</i> spp.)
	Menni & Stehmann, 2000	Argentina, Uruguay and Brazil	Decapod crustaceans Dendrobranchiata ( <i>Artemesia longinars</i> )
<b>Raya hoccuda</b> ( <i>Zearaja brevicaudata</i> )	Our study	Central Patagonia (41°–47°S)	%FO: Decapod crustaceans Anomura ( <i>Grimothea gregaria</i> ) and Dendrobranchiata ( <i>Pleoticus muelleri</i> ) and fish ( <i>Merluccius hubbsi</i> )

	Belleggia et al., 2016	Southwest Atlantic (35°-54°S)	%IRI: Fishes ( <i>Patagonotothen ramsayi</i> and <i>Merluccius hubbsi</i> )
	Belleggia et al., 2019	Northern Argentine continental shelf	%FO: Fish ( <i>Raneya brasiliensis</i> )
	Buren, 2004	Northern and central Patagonia (41°-47°S)	%FO: 1996-1998: cephalopods ( <i>Illex argentinus</i> ) and fishes ( <i>Patagonotothen ramsayi</i> and <i>Merluccius hubbsi</i> )/ 2000-2001: fish ( <i>Merluccius hubbsi</i> ) and isopods ( <i>Serolis schythei</i> )
	García de la Rosa, 1998	Argentine continental shelf (34°-56° S)	%FO: Decapod crustaceans Anomura (Munids) and fish ( <i>Merluccius hubbsi</i> )
	Koen Alonso, 1999	Northern and central Patagonia (41°-47°S)	%FO: Fishes ( <i>Merluccius hubbsi</i> , <i>Patagonotothen ramsayi</i> , <i>Raneya brasiliensis</i> and <i>Engraulis anchoita</i> ), cephalopods ( <i>Illex argentinus</i> ) and isopods ( <i>Serolis schythei</i> )
	Koen Alonso et al., 2001	Northern and central Patagonia (41°-47°S)	%FO: Fishes ( <i>Merluccius hubbsi</i> , <i>Patagonotothen ramsayi</i> , <i>Raneya brasiliensis</i> and <i>Engraulis anchoita</i> ), cephalopods ( <i>Illex argentinus</i> ) and isopods ( <i>Serolis schythei</i> )
	Lucifora et al., 2000	Southwest Atlantic (41°36'-42°04'S)	IRI: Fishes ( <i>Patagonotothen ramsayi</i> and <i>Merluccius hubbsi</i> ), cephalopods ( <i>Illex argentinus</i> ) and isopods ( <i>Serolis schythei</i> )
	Mabragaña et al., 2005	Southwest Atlantic (37°-50°S)	%FO: Crustaceans, fishes and molluscs unidentified
	Olivier et al., 1968	Mar del Plata	%FO: Decapod crustaceans Dendrobranchiata ( <i>Artemesia longinaris</i> and <i>Peisos petrunkevitchi</i> ) and Brachyura ( <i>Corystoides chilensis</i> )
	Sánchez & Prenski, 1996	San Jorge gulf	%W: Stomatopods, decapod crustaceans Anomura ( <i>Munida sp.</i> ) and fish ( <i>Merluccius hubbsi</i> )
	Sánchez & Mabragaña, 2002	South Patagonian region (48°-55°S)	%FO: Fishes, crustaceans and molluscs
<b>Chucho</b> <b>(<i>Myliobatis goodii</i>)</b>	Our study	Central Patagonia (41°-47°S)	%FO: Polychaetes (Family Gliceridae) and decapod crustaceans Dendrobranchiata ( <i>Pleoticus muelleri</i> )
	Molina, 2012	Bahía Anegada (39.96°-40.60°S)	%FO: Bivalves ( <i>Lasaea</i> and <i>Solen techuelchus</i> ), amphipods (Caprellidae) and polychaetes (Phyllodocidae)
	Molina & Cazorla, 2015	Bahía Anegada	%FO: Bivalves ( <i>Lasaea sp.</i> ), polychaetes (Phyllodocidae) and amphipods (Caprellidae)

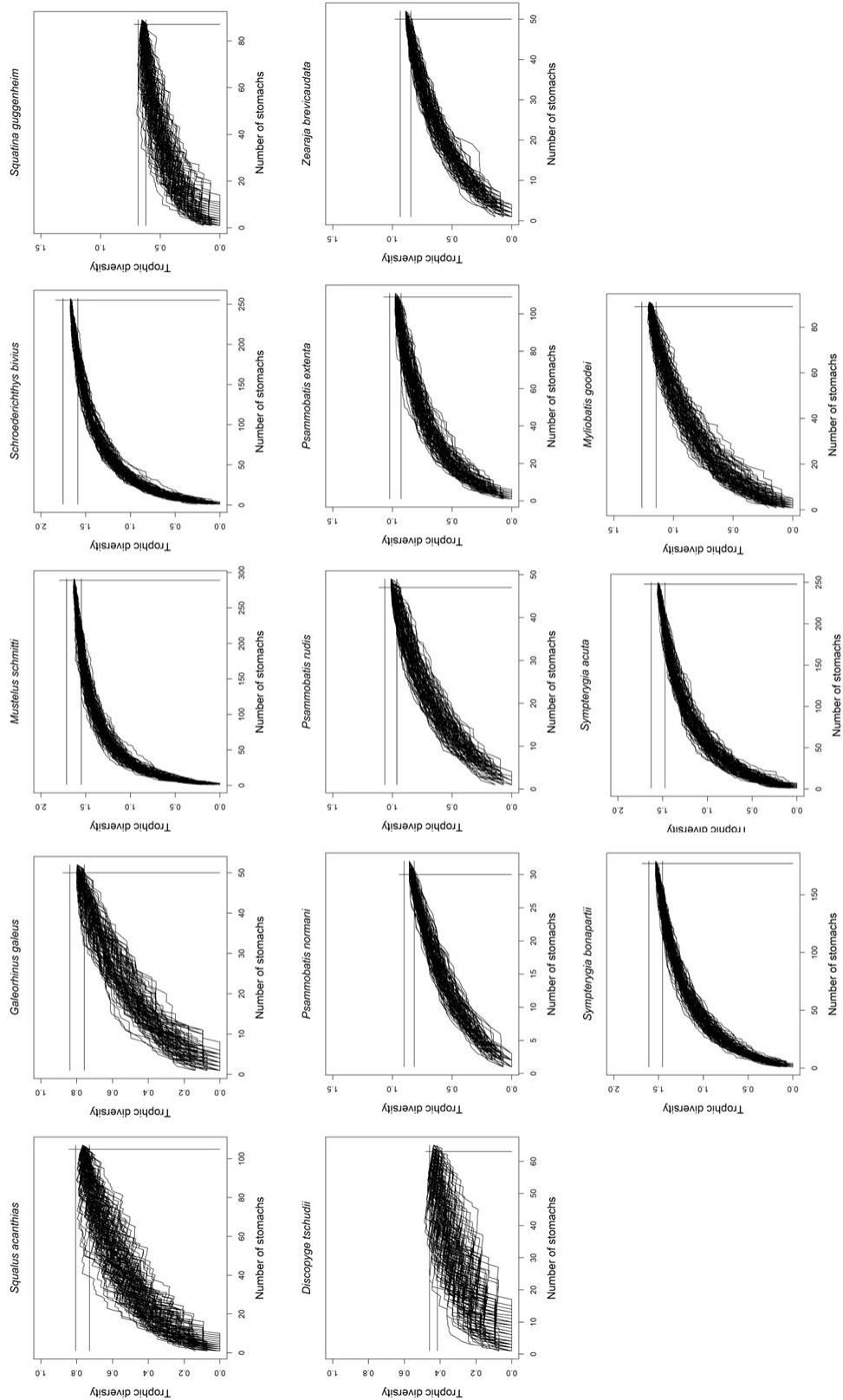
	Refi, 1975	Quequén port (38°37'S)	Crabs, stomatopods, polychaetes, amphipods and ascidians unidentified
	Ruocco, 2012	Buenos Aires and Uruguayan coastal ecosystem	Polychaetes, decapod crustaceans and amphipods (gamarids)
	Ruocco & Lucifora, 2016	Southwest Atlantic (34°-42°S)	%FO: Polychaetes ( <i>Travisia</i> spp.) and decapod crustaceans <i>Anomura</i> ( <i>Sympagurus</i> spp.)

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**ESM 3** Trophic diversity accumulation curves: cumulative numbers of randomly pooled stomachs against cumulative diversity for all stomachs sampled for the 13 elasmobranch species included in this study. Horizontal lines show Brillouin diversity index (Hz) values ( $Hz \pm 0.05 Hz$ ), and the vertical line shows value  $n-2$  ( $n$  = the number of stomachs). Diversity curves were considered asymptotic if at least the last two previous values were within  $\pm 0.05$  of the total sample trophic diversity



**ESM 4** Ordination plot obtained by NMDS for capture sites (Stress= 0.0624). Ellipses denote the 95% of interval of confidence for each group evaluated

