

Structure and zonation of demersal fish assemblages off the Azores Archipelago (mid-Atlantic)

Gui M. Menezes^{1,*} Michael F. Sigler², Helder M. Silva¹, Mario R. Pinho¹

¹Departamento de Oceanografia e Pescas, Universidade dos Açores, Cais de Santa Cruz, 9901-862 Horta, Portugal

²US National Marine Fisheries Service, Alaska Fisheries Science Center, Auke Bay Laboratory, 11305 Glacier Highway, Juneau, Alaska 99801, USA

*Email: gui@notes.horta.uac.pt

Marine Ecology Progress Series 324:241–260 (2006)

Appendix 1. Major groups and families of all fish species collected during the Azores cruise surveys (1995 to 2000). Areas are indicated as follows: 1 – Princesa Alice and Azores banks; 2 – Central Islands (Faial, Pico, Graciosa, São Jorge, and Terceira); 3 – Eastern Islands (Flores and Corvo); 4 – Mar da Prata bank; 5 – Other small seamounts and pinnacles; 6 – Western Islands (São Miguel and Santa Maria). Abundance categorization: A – dominant, B – frequent, C – common, D – rare; lifestyle categories: P – pelagic, B – benthic, BP – benthopelagic; zoogeographic affinity: CIRCG – circumglobal, CIRC-TROP – circumtropical, EA – Eastern Atlantic, MED – Mediterranean, END – endemic, AMPHIA – amphiatlantic, MACR – Macaronesian, WIDE – wide distribution, TROP – tropical, SUB – subtropical, TEMP – temperate. Categories of prey-distribution patterns considered: EP – epibenthic, BP – benthopelagic, P – pelagic

Family	Species	Abundance categorization	Occurrence by area	Life-style	Geographic distribution		Prey distribution patterns
					Patterns	Climate	
from FishBase							
<i>Chondrichthyes (26 Species; 10 Families)</i>							
TRIAKIDAE	<i>Galeorhinus galeus</i>	B	1-4,6	BP	AMPHIA-MED	SUB	BP
CARCHARHINIDAE	<i>Prionace glauca</i>	D	1-5	P	CIRCG	TEMP-TROP	P
SPHYRNIDAE	<i>Sphyrna zygaena</i>	D	2	BP	WIDE	SUB	EP-BP
SCYLIORHINIDAE	<i>Galeus murinus</i>	C	4	B	EA	TEMP	BP
HEXANCHIDAE	<i>Heptranchias perlo</i>	D	2	BP	CIRCG	TEMP-TROP	BP
DALATIIDAE	<i>Etmopterus princeps</i>	C	1	BP	AMPHIA	TEMP-SUB	BP
	<i>Etmopterus pusillus</i>	B	1-4,6	BP	WIDE	SUB-TROP	BP
	<i>Etmopterus spinax</i>	B	1-5	BP	EA-MED	TEMP-TROP	BP
	<i>Etmopterus</i> sp. (not identified)						
	<i>Centroscymnus crepidater</i>	B	1-2,5,6	BP	WIDE	TEMP-TROP	P-BP
	<i>Centroscymnus coelolepis</i>	C	6	B	WIDE	TEMP-SUB	P-BP
	<i>Centroscymnus cryptacanthus</i>	B	1-3,6	B	AMPHIA	SUB	P-BP
	<i>Dalatias licha</i>	C	1-3	BP	WIDE	TEMP-TROP	BP
	<i>Squaliolus laticaudus</i>	D	1	BP	CIRC-TROP	TROP	P-BP
	<i>Somniosus rostratus</i>	C	6	B	WIDE	SUB	P-BP
CENTROPHORIDAE	<i>Deania profundorum</i>	B	1-6	BP	WIDE	TEMP-TROP	EP-BP
	<i>Deania</i> cf. <i>calcea</i>	B	1-6	BP	WIDE	TEMP-SUB	EP-BP

	<i>Centrophorus granulosus</i>	C	1,4	BP	WIDE	TEMP-SUB	BP
	<i>Centrophorus squamosus</i>	B	1,4,6	BP	WIDE	TEMP-TROP	P-BP
TORPEDINIDADE	<i>Torpedo nobiliana</i>	D	3	B	AMPHIA	SUB	BP
RAJIDAE	<i>Dipturus batis</i>	C	1-6	B	EA-MED	SUB	EP-BP
	<i>Dipturus oxyrinchus</i>	D	5	B	EA-MED	TEMP-SUB	EP
	<i>Leucoraja fullonica</i>	D	1,4	B	EA-MED	TEMP-SUB	EP-BP
	<i>Raja clavata</i>	B	1-4,6	B	EA	SUB	EP
DASYATIDAE	<i>Dasyatis pastinaca</i>	D	2-3	B	AMPHIA-MED	SUB	BP
	<i>Pteroplatytrygon violacea</i>	C	2	P	CIRCG	SUB-TROP	BP

Osteichthyes (78 Species; 39 Families)

MURAENIDAE	<i>Muraena augusti</i>	D	6	B	EA-MED	SUB	BP
	<i>Muraena helena</i>	B	1-6	B	EA	SUB	BP
	<i>Gymnothorax unicolor</i>	C	2-3	B	EA-MED	SUB	EP
	<i>Enchelycore anatina</i>	D	6	B	EA-MED	SUB	BP
SYNAPHOBRANCHIDAE	<i>Synaphobranchus kaupii</i>	B	1-6	BP	WIDE	TEMP-TROP	BP
CONGRIDAE	<i>Ariosoma balearicum</i>	D	1	B	AMPHIA	SUB	BP
	<i>Conger conger</i>	B	1-6	B	EA-MED	TEMP	BP
	<i>Paraconger macrops</i>	D	3,5	B	EA	SUB	EP-BP
	<i>Gnathophis mystax</i>	D	3	B	EA-MED	SUB	EP
ALEPOCEPHALIDAE	<i>Alepocephalus rostratus</i>	B	1-4,6	B	EA-MED	TEMP-TROP	EP
AULOPODIDAE	<i>Aulopus filamentosus</i>	D	1-4	B	AMPHIA-MED	SUB	EP
CHLOROPHTHALMIDAE	<i>Chlorophthalmus agassizii</i>	D	1	B	CIRCG	TEMP-TROP	EP
SYNODONTIDAE	<i>Synodus saurus</i>	D	2-3,6	B	AMPHIA	SUB	EP
POLYMIXIIDAE	<i>Polymixia nobilis</i>	D	3	B	WIDE	SUB-TROP	EP
MACROURIDAE	<i>Caelorinchus caelorhincus</i>	B	1-6	BP	EA-MED	SUB	EP-BP
	<i>Malacocephalus laevis</i>	B	1-6	BP	AMPHIA	SUB	BP
MORIDAE	<i>Physiculus dalwigki</i>	C	1-2,5	BP	EA	SUB	BP
	<i>Gadella maraldi</i>	C	1-2,4,6	BP	EA-MED	SUB	BP
	<i>Lepidion guentheri</i>	B	1-2,5	BP	EA	SUB	BP
	<i>Lepidion eques</i>	C	1-2,5	BP	AMPHIA	TEMP	EP
	<i>Lepidion</i> spp. (not identified)						
	<i>Mora moro</i>	A	1-6	BP	WIDE	TEMP-SUB	EP-BP
PHYCIDAE	<i>Phycis phycis</i>	B	1-6	BP	EA-MED	SUB	EP-BP
	<i>Phycis blennoides</i>	B	1-5	BP	EA-MED	TEMP	BP
GADIDAE	<i>Micromesistius poutassou</i>	C	1,3	P	AMPHIA-MED	TEMP	P
	<i>Molva macrophthalmia</i>	B	1-6	B	EA-MED	SUB	BP
LOPHIIDAE	<i>Lophius piscatorius</i>	D	1-2	B	EA-MED	TEMP	EP-BP
BERYCIDAE	<i>Beryx decadactylus</i>	B	1-6	B	CIRCG	TEMP-TROP	BP
	<i>Beryx splendens</i>	B	1-6	BP	CIRCG	SUB	BP
CAPROIDAE	<i>Capros aper</i>	D	2	B	EA-MED	SUB	BP
ZEIDAE	<i>Zeus faber</i>	C	2-3,6	BP	WIDE	TEMP	BP
	<i>Zenopsis conchifer</i>	D	2	BP	WIDE	TEMP-TROP	BP
MACRORHAMPHOSIDAE	<i>Macroramphosus scolopax</i>	D	3	B	WIDE	SUB	EP-BP
SCORPAENIDAE	<i>Scorpaena azorica</i>	D	2-3,5	B	END	SUB	EP
	<i>Scorpaena scrofa</i>	C	1-3,5,6	B	EA	SUB	BP

	<i>Scorpaena maderensis</i>	D	2-3,6	B	EA-MED	SUB	EP
	<i>Scorpaena notata</i>	C	1-3,5,6	B	EA-MED	SUB	EP
	<i>Scorpaena</i> spp. (not identified)						
	<i>Pontinus kuhlii</i>	B	1-6	B	EA-MED	TEMP-TROP	BP
SEBASTIDAE	<i>Helicolenus dactylopterus dactylopterus</i>	A	1-6	B	AMPHIA	TEMP-SUB	BP
	<i>Trachyscorpia cristulata echinata</i>	C	1,6	B	EA-MED	TEMP-SUB	BP
POLYPRIONIDAE	<i>Polyprion americanus</i>	B	1-6	B	EA-MED	SUB	BP
TRIGLIDAE	<i>Aspitrigla cuculus</i>	B	1-6	B	EA-MED	TEMP	EP
SERRANIDAE	<i>Serranus atricauda</i>	B	1-3,5,6	B	EA	TEMP	EP-BP
	<i>Serranus cabrilla</i>	C	1-3,6	B	EA-MED	TEMP-SUB	BP
	<i>Epinephelus marginatus</i>	C	2-3	B	WIDE	SUB	BP
ANTHIIDAE	<i>Anthias anthias</i>	C	1-6	B	EA-MED	SUB	BP
EPIGONIDAE	<i>Epigonus telescopus</i>	B	1-6	B	WIDE	TEMP-SUB	P
POMATOMIDAE	<i>Pomatomus saltatrix</i>	C	2,6	P	WIDE	SUB	P
CARANGIDAE	<i>Trachurus picturatus</i>	B	1-6	BP	EA-MED	SUB	BP
	<i>Seriola dumerili</i>	C	1	P	CIRCG	SUB	BP
	<i>Pseudocaranx dentex</i>	D	3	BP	WIDE	TROP	EP-BP
BRAMIDAE	<i>Pterycombus brama</i>	C	6	P	AMPHIA	SUB	P
	<i>Brama brama</i>	D	2	BP	WIDE	TEMP-TROP	P
SPARIDAE	<i>Pagellus acarne</i>	B	2-3,6	B	EA-MED	SUB	EP
	<i>Pagellus bogaraveo</i>	A	1-6	B	EA-MED	TEMP	EP-BP
	<i>Pagrus pagrus</i>	B	2-3,5-6	B	AMPHIA	SUB	EP-BP
	<i>Diplodus sargus cadenati</i>	B	2-3,6	B	EA-MED	SUB	EP
	<i>Boops boops</i>	C	2-3,6	B	EA-MED	SUB	P
LABRIDAE	<i>Bodianus scrofa</i>	D	2-3	BP	MACR	SUB	EP
	<i>Labrus mixtus</i>	D	3	B	EA-MED	SUB	EP-BP
	<i>Acantholabrus palloni</i>	D	2,6	B	EA-MED	TEMP	BP
CHIASMODONTIDAE	<i>Chiasmodon niger</i>	C	3	BP	CIRCG	SUB	P
	<i>Pseudoscopelus altipinnis</i>	C	3	P	WIDE	TEMP-TROP	P
	<i>Sphyræna viridensis</i>	D	2,6	P	EA-MED	TROP	P
GEMPYLIDAE	<i>Ruvettus pretiosus</i>	D	2-3	BP	WIDE	SUB	BP
TRICHIURIDAE	<i>Aphanopus carbo</i>	B	1-3,6	BP	AMPHIA	TEMP	BP
	<i>Benthodesmus elongatus simonyi</i>	C	1-4,6	BP	EA	TEMP	P
	<i>Lepidopus caudatus</i>	B	1-6	BP	WIDE	TEMP-SUB	BP
SCOMBRIDAE	<i>Sarda sarda</i>	C	2,6	P	AMPHIA	SUB	P
	<i>Scomber japonicus</i>	B	1-6	BP	WIDE	SUB	P
XIPHIIDAE	<i>Xiphias gladius</i>	C	1,3-4,6	P	WIDE	TEMP	P
CENTROLOPHIDAE	<i>Centrolophus niger</i>	C	1,6	BP	AMPHIA	TEMP-SUB	BP
	<i>Schedophilus ovalis</i>	C	1,4-6	BP	WIDE	SUB	BP
BOTHIDAE	<i>Bothus podas maderensis</i>	D	3	B	EA	SUB	EP
SCOPHTHALMIDAE	<i>Lepidorhombus whiffiagonis</i>	C	1-3	B	EA-MED	SUB-TEMP	EP-BP
BALISTIDAE	<i>Balistes carolinensis</i>	B	1-3,6	BP	AMPHIA	SUB	BP
TETRAODONTIDAE	<i>Sphoeroides pachygaster</i>	D	6	B	CIRCG	SUB	BP