

Supplementary material

Potential effects of bycatch from the squat lobster fisheries in central Chile: a survey data approach

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The following supporting material contains the additional analysis not presented in the methods session, but used to interpret and discuss the results.

Discriminating species between two groups using Bray–Curtis dissimilarities

SIMPER

Similarity Percentages (SIMPER) ANALYSIS R output

cumulative contributions of most influential species:

\$`3_4`

MERGAY HIPMAC HETREE MACMAG MURGAU

0.4641459 0.5627922 0.6341746 0.6925294 0.7378915

\$`3_1`

MURGAU MERGAY HIPMAC

0.3233337 0.6176709 0.7161951

\$`3_2`

MURGAU MERGAY HIPMAC CANPOR

0.3830498 0.5518773 0.6689123 0.7219602

\$`4_1`

MURGAU HIPMAC MERGAY CANPOR

0.4333520 0.5572023 0.6469885 0.7000863

\$`4_2`

MURGAU MERGAY HIPMAC CANPOR

0.3781922 0.5881231 0.6965071 0.7532640

\$`1_2`

MERGAY HIPMAC MURGAU CANPOR COEACO TRAHEL

0.3019567 0.4364764 0.5466706 0.6344739 0.6877867 0.7313129

Raw frequency of occurrence (FRO) of main species per group:

Table S1. Species data used for the study with its respective taxonomic group, abbreviation, scientific name and frequency of occurrence (FRO)

Taxonomic group	Abbreviation	Scientific name	FRO
Osteichthyes	MERGAY	<i>Merluccius gayi</i>	99.98
Crustacea	MURGAU	<i>Mursia gaudichaudi</i>	99.98
Osteichthyes	HIPMAC	<i>Hippoglossina macrops</i>	49.87
Crustacea	CANPOR	<i>Cancer porteri</i>	21.84
Crustacea	HETREE	<i>Heterocarpus reedi</i>	17.3
Chondrichthyes	COEACO	<i>Coelorinchus aconcagua</i>	15.78
Osteichthyes	EPICRA	<i>Epigonus crassicaudus</i>	10.88
Chondrichthyes	TRAHEL	<i>Trachyrinchus helolepis</i>	9.53
Mollusca	OCTSP	<i>Octopus</i> sp.	8.85
Osteichthyes	COECHI	<i>Coelorinchus chilensis</i>	8.42
Osteichthyes	NEZPUL	<i>Nezumia pulchella</i>	7.7
Osteichthyes	MACMAG	<i>Macruronus magellanicus</i>	7.68
Osteichthyes	OPHPAC	<i>Ophichthus pacifici</i>	5.74
Chondrichthyes	PSASCO	<i>Psammobatis scobina</i>	5.47
Crustacea	LIBGRA	<i>Libidoclaea granaria</i>	4.77
Chondrichthyes	HEXGRI	<i>Hexanchus griseus</i>	4.65
Chondrichthyes	DIPFLA	<i>Dipturus flavirostris</i>	4.61
Osteichthyes	GENMAC	<i>Genypterus maculatus</i>	4.32
Crustacea	LOPPAR	<i>Lophorochinia parabranchia</i>	3.35
Chondrichthyes	HALCAN	<i>Halaelurus canescens</i>	3.02
Mollusca	DOSGIG	<i>Doscidiscus gigas</i>	2.72
Chondrichthyes	BATMUL	<i>Bathyraja multispinis</i>	2.65
Chondrichthyes	CENCRE	<i>Centroscymnus crepidater</i>	2.65
Crustacea	HALDIO	<i>Haliporoides diomedae</i>	2.56
Chondrichthyes	DEACAL	<i>Deania calcea</i>	2.43
Osteichthyes	EPTPOL	<i>Eptatretus polytrema</i>	2.1
Crustacea	PARGRA	<i>Paralomis granulata</i>	1.81
Osteichthyes	POLPOL	<i>Polystotrema polytrema</i>	1.77
Chondrichthyes	ACUNIG	<i>Aculeola nigra</i>	1.68
Crustacea	PTEARM	<i>Pterygosquilla armata</i>	1.57
Mollusca	BENSP	<i>Benthoctopus</i> sp.	1.54
Osteichthyes	TRAVIL	<i>Trachyrinchus villegai</i>	1.44
Chondrichthyes	DIPTRA	<i>Dipturus trachyderma</i>	1.41
Osteichthyes	GENBLA	<i>Genypterus blacodes</i>	1.41
Mollusca	OPISP	<i>Opisthoteuthis</i> sp.	1.34
Osteichthyes	PROJUG	<i>Prolatilus jugularis</i>	1.19
Mollusca	OCTMIM	<i>Octopus mimus</i>	1.04
Chondrichthyes	CENNIG	<i>Centroscyllium nigrum</i>	0.8
Crustacea	GLYALA	<i>Glyphocrangon alata</i>	0.79
Crustacea	CANEDW	<i>Cancer edwarsi</i>	0.71
Osteichthyes	CALCAL	<i>Callorhynchus callorhynchus</i>	0.68
Chondrichthyes	DISTSC	<i>Discopyge tschudii</i>	0.64
Osteichthyes	GENCHI	<i>Genypterus chilensis</i>	0.55
Crustacea	LIBSMI	<i>Libidoclaea smithii</i>	0.51
Crustacea	HEPCHI	<i>Hepatus chilensis</i>	0.49
Chondrichthyes	RAJBRE	<i>Raja brevicaudata</i>	0.48
Osteichthyes	PACSUS	<i>Pachycara suspectum</i>	0.44
Mollusca	AENSP	<i>Aeneator</i> sp.	0.4
Mollusca	OCTVUL	<i>Octopus vulgaris</i>	0.35
Osteichthyes	SEBCAP	<i>Sebastes capensis</i>	0.35
Chondrichthyes	TORTRE	<i>Torpedo tremens</i>	0.35
Chondrichthyes	CENSP	<i>Centroscyllium</i> sp.	0.33
Crustacea	ESTOMATOPODA	ESTOMATOPODA	0.33
Chondrichthyes	RAJSP	<i>Raja</i> sp.	0.31
Chondrichthyes	ETMGRA	<i>Etmopterus granulosus</i>	0.29
Chondrichthyes	RHIMUL	<i>Rhinoraja multispinis</i>	0.29
Osteichthyes	APHPOR	<i>Aphos porosus</i>	0.26

Taxonomic group	Abbreviation	Scientific name	FRO
Osteichthyes	BONITO	<i>Sarda chiliensis</i>	0.24
Crustacea	CANCOR	<i>Cancer coronatus</i>	0.22
Mollusca	LOLGAH	<i>Loligo gahi</i>	0.2
Mollusca	ACESP	<i>Acesta</i> sp.	0.18
Crustacea	PROBAH	<i>Projasus bahamondei</i>	0.18
Osteichthyes	COEFAS	<i>Coelorinchus fasciatus</i>	0.16
Mollusca	GASTROPODA	<i>Gastropoda</i>	0.16
Osteichthyes	GEOAUS	<i>Geotria australis</i>	0.16
Osteichthyes	CAECHI	<i>Coelorinchus chilensis</i>	0.15
Osteichthyes	CHEEMM	<i>Cherublemma emmelas</i>	0.15
Osteichthyes	PARMIC	<i>Paralichthys microps</i>	0.15
Osteichthyes	CATSP	<i>Cataetix</i> sp.	0.13
Porifera	PORIFERA	<i>Porifera</i>	0.13
Osteichthyes	TRAMUR	<i>Trachurus murphyi</i>	0.13
Osteichthyes	ALESP	<i>Alepocephalus</i> sp.	0.11
Osteichthyes	OPHSP	<i>Ophichthus</i> sp.	0.11
Chondrichthyes	SYMBRE	<i>Sympterygia brevicaudata</i>	0.11
Mollusca	ACEPAT	<i>Acesta patagonica</i>	0.09
Holoturoideo	ATHCHI	<i>Athionidium chilensis</i>	0.09
Chondrichthyes	DIPCHI	<i>Dipturus chilensis</i>	0.09
Chondrichthyes	SCHCHI	<i>Schroederichthys chilensis</i>	0.09
Osteichthyes	AUSMAR	<i>Austrophycis marginatus</i>	0.07
Mollusca	BATHUM	<i>Bathybembix humboldti</i>	0.07
Chondrichthyes	BATPER	<i>Bathyraja peruana</i>	0.07
Chondrichthyes	CENGRA	<i>Centroscyllium granulatum</i>	0.07
Osteichthyes	HELLEN	<i>Helicolenus lengerichi</i>	0.07
Porifera	SPONGI	<i>Esponja</i> spp.	0.07
Osteichthyes	BERSPL	<i>Beryx splendens</i>	0.06
Chondrichthyes	APIOS	<i>Apristurus</i> sp.	0.05
Crustacea	LITSP	<i>Lithodes</i> sp.	0.05
Cnidarios	SCYPHOZOA	<i>Scyphozoa</i> sp.	0.05
Cnidarios	ACTSP	<i>Actinia</i> sp.	0.04
Osteichthyes	BASALB	<i>Bassanago albescens</i>	0.04
Crustacea	HETVIC	<i>Heterocarpus vicarius</i>	0.04
Osteichthyes	NOTSIX	<i>Notacanthus sixpinnis</i>	0.04
Chondrichthyes	ZEACHI	<i>Zearaja chilensis</i>	0.04
Equinodermos	ASTSP	<i>Aster</i> sp.	0.02
Osteichthyes	BERSPL.1	<i>Beryx splendens</i>	0.02
Osteichthyes	BRAAUS	<i>Brama australis</i>	0.02
Osteichthyes	CILGIL	<i>Cilus gilberti</i>	0.02
Osteichthyes	CONPER	<i>Congiopodus peruvianus</i>	0.02
Osteichthyes	EPTON	<i>Eptatretus</i> sp.	0.02
Mollusca	LIMMAR	<i>Limopsis marionensis</i>	0.02
Osteichthyes	NOTMAR	<i>Notophycis marginata</i>	0.02
Crustacea	PARLON	<i>Paralomis longipes</i>	0.02
Crustacea	STESUH	<i>Stereomastis suhmi</i>	0.02
Osteichthyes	STRSTE	<i>Stromateus stellatus</i>	0.02
Osteichthyes	TALAPH	<i>Talismania aphos</i>	0.02
Chondrichthyes	TOLLO_C	<i>Centroscymnus</i> sp.	0.02

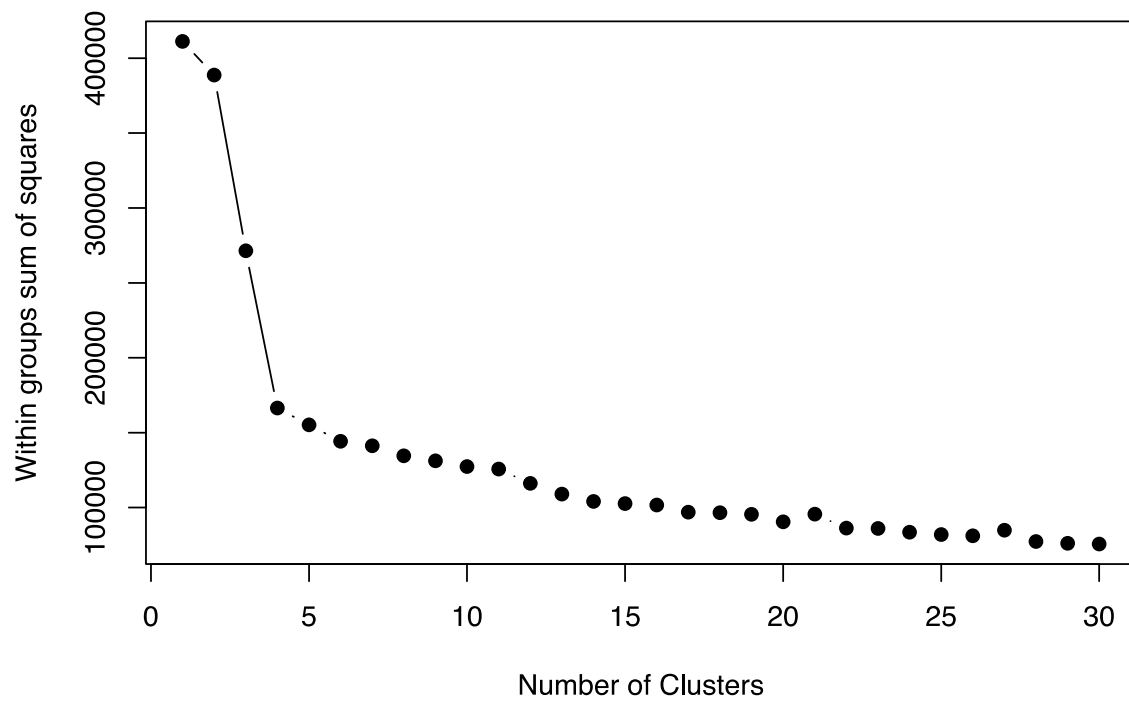


Fig. S1. Groups identified by the 'elbow' method.

k-means cluster analysis results

Within cluster sum of squares by cluster:

[1] 6791.942 ; 7568.575 ; 9274.197 ; 6351.963

(between_SS / total_SS = 89.1%)

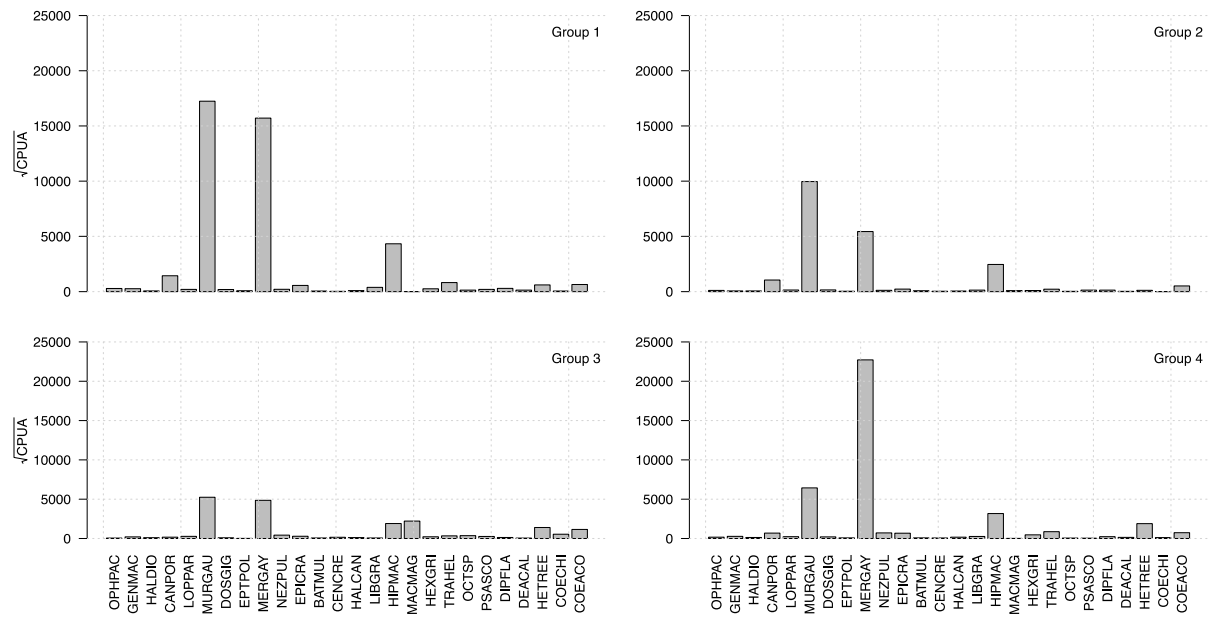


Fig. S2. PCA components explained variance.

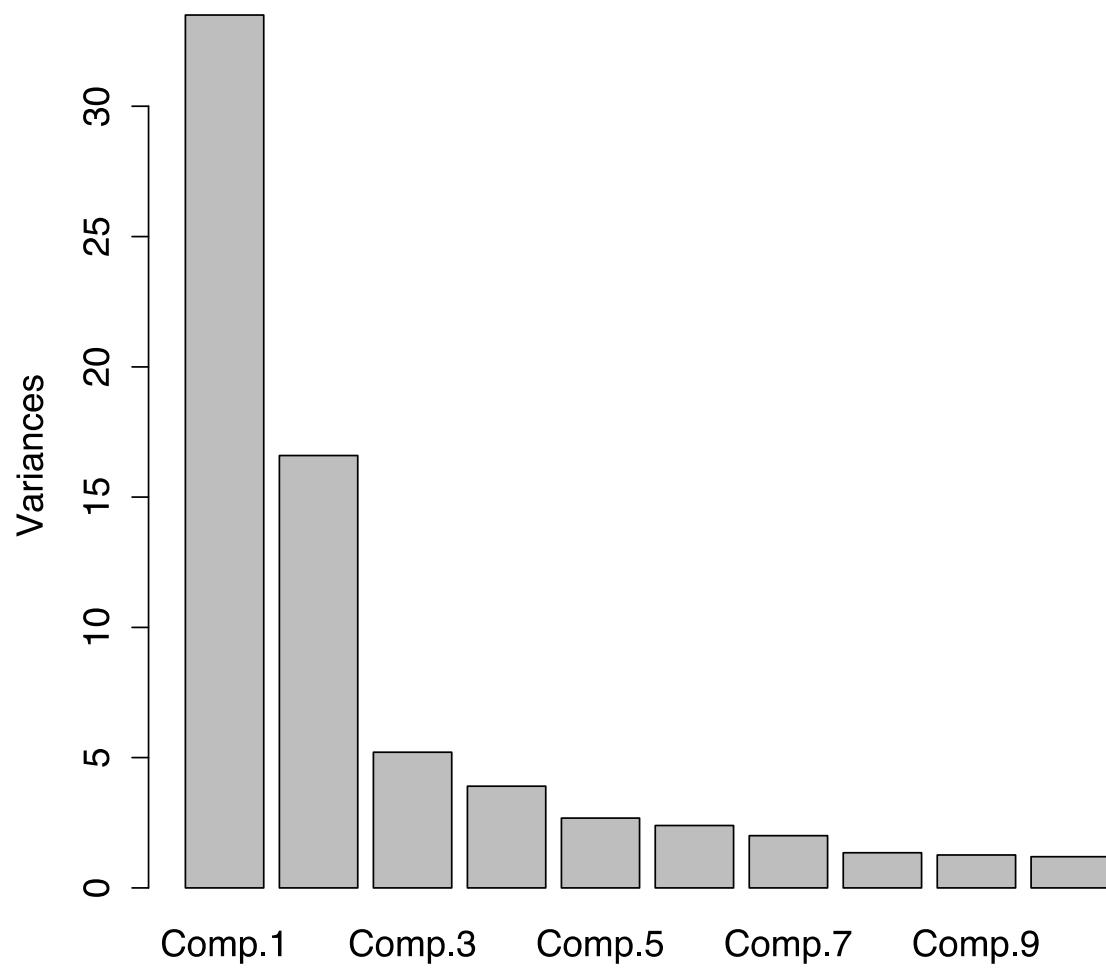


Fig. S3. Cumulative CPUA per identified group for all species used for the analysis.