Food and Agriculture Organization of the United Nations

Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien
iotc ctoi

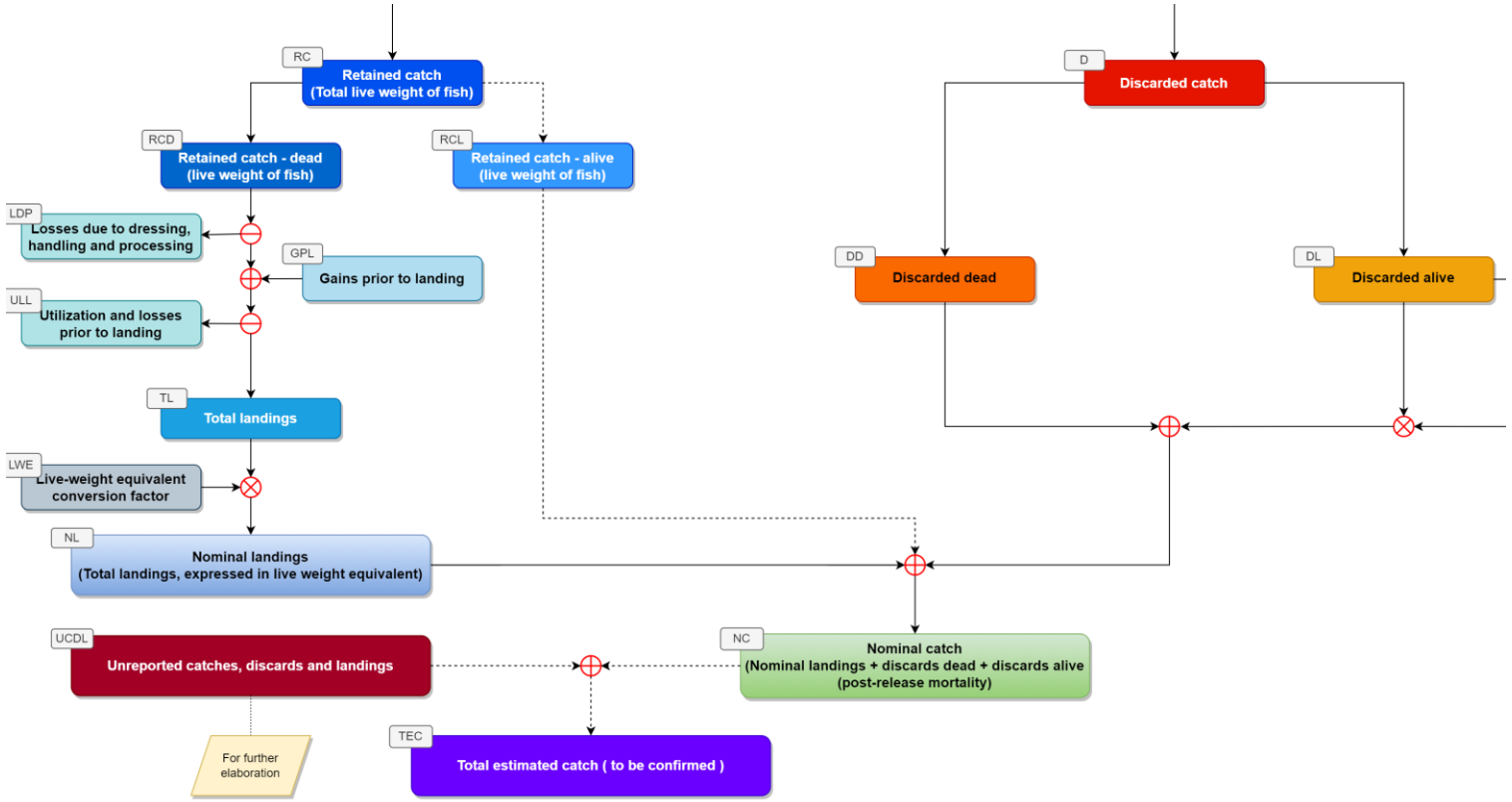
AN OVERVIEW OF THE MORPHOMETRIC DATA AVAILABLE ON SHARKS AT THE IOTC SECRETARIAT

IOTC SECRETARIAT

PURPOSE

To provide participants in the 18th Session of the IOTC Working Party on Ecosystems and Bycatch (WPEB18) with a review of the morphometric data available on pelagic sharks caught or interacted with by fisheries for tuna and tuna-like species in the IOTC area of competence.

FAO-CWP CATCH CONCEPTS DIAGRAM



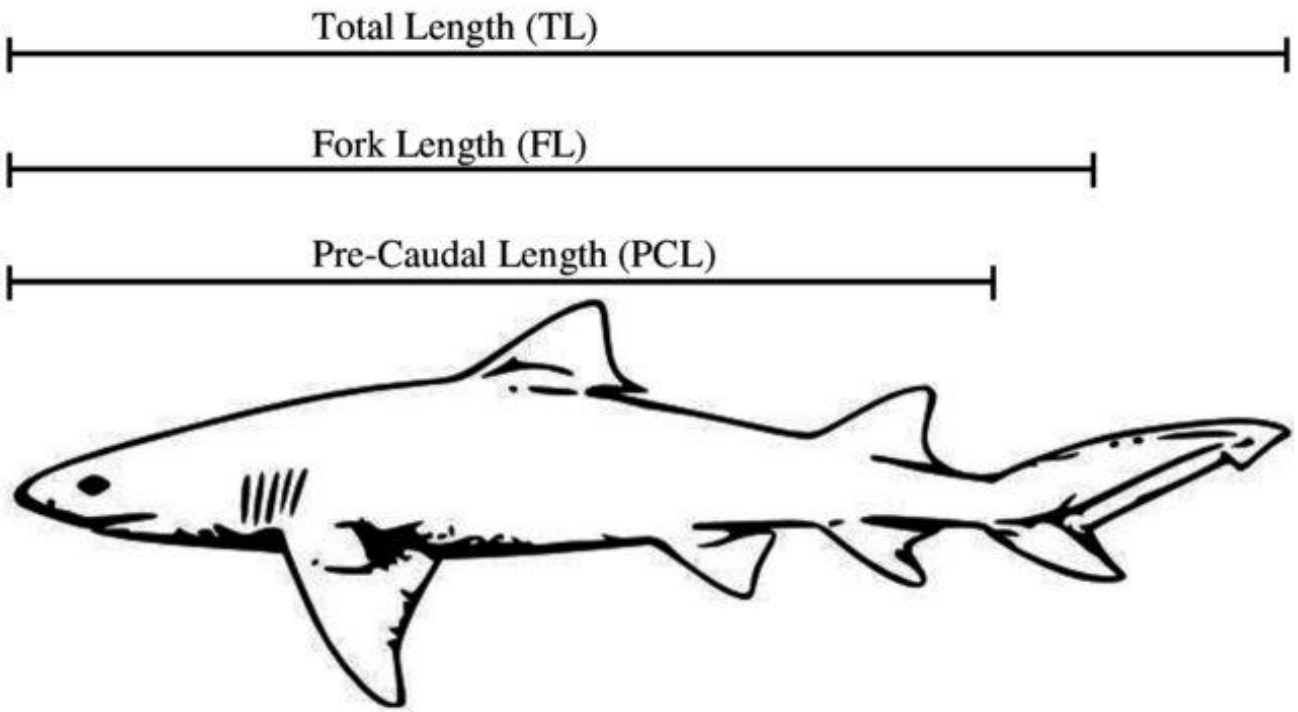
CWP27 proposal for a revised *catch concepts* diagram (FAO 2022)

SHARKS ARE PROCESSED ONBOARD LONGLINERS

Examples of sharks during transshipments from longliners (Source: IOTC Secretariat)

MORPHOMETRIC DATA

- To derive nominal landings (in live weight equivalent) from landings of dressed sharks;
- To estimate individual weights from length measurements;
- To harmonize length measurements and derive size-frequency data



LENGTH-LENGTH RELATIONSHIPS

Species	Equation	a	b	N	MinFL	MaxFL	Reference
Blue shark	TL = a + b x FL	-2.133820	1.2165450	10			Anderson et al. 2011*
	PCL = a + b x FL	-0.831809	0.9145784				Coelho et al. 2017
	TL = a + b x FL	-4.417651	1.2172855				
	TL = a + b x FL	5.319706	1.1680878	6,485	68	352	Ariz et al. 2007
Silky shark	TL = a + b x FL	2.900000	1.2000000	265			Filmalter et al. 2012
	PCL = a + b x FL	0.400000	0.9090909	214			
	TL = a + b x FL	4.404965	1.2168411	192			Anderson et al. 2011
	TL = a + b x FL	10.136700	1.1436000	520	66	247	Ariz et al. 2007

Compilation of published length-length relationships for Indian Ocean sharks. * indicates IOTC current reference relationships (IOTC-2022-WPEB18(AS)-DATA11)

LENGTH-WEIGHT RELATIONSHIPS

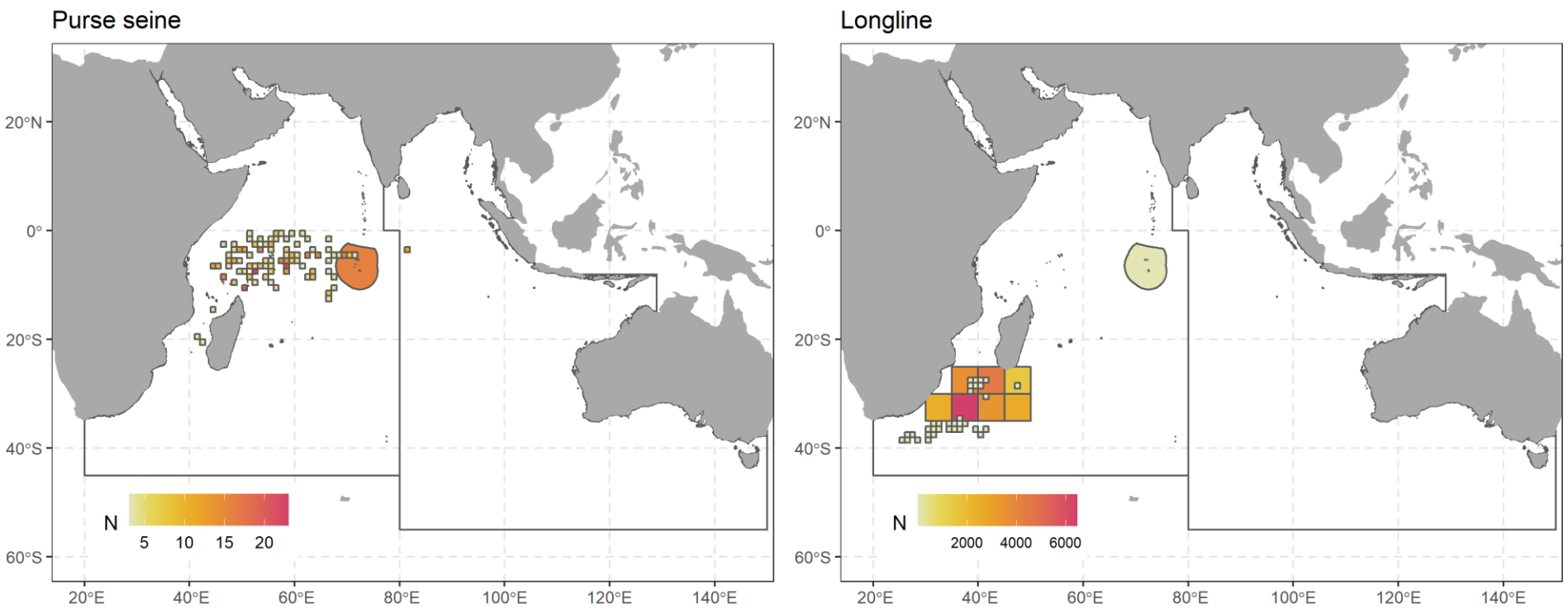
Species	Equation	a	b	N	MinFL	MaxFL	Reference
Blue shark	RD = a x FL^b	0.000015900000	2.84554	2,842	57	311	Romanov and Romanova 2009
	RD = a x FL^b	0.000002796800	3.16970	2,279	81	298	Ariz et al. 2007
	HG = a x FL^b	0.000000401890	3.36200	2,129	82	352	
	HG = a x FL^b	0.000001609450	3.09904	289	150	260	Garcia-Cortés and Mejuto 2002
	HG = a x FL^b	0.000001901630	3.07615	164	93	253	Espino et al. 2010
	HG = a x FL^b	0.000002331003	3.03269	5,039	1,633	3,406	Ramos-Cartelle et al. 2022
Silky shark	RD = a x FL^b	0.000016000000	2.91497	687	66	281	Romanov and Romanova 2009
	RD = a x FL^b	0.000004725500	3.17710	369	66	244	Ariz et al. 2007
	HG = a x FL^b	0.000012977000	2.83230	94	97	269	
	HG = a x FL^b	0.000011329400	2.91484	411	50	220	Garcia-Cortés and Mejuto 2002
	HG = a x FL^b	0.000006610192	2.97421	1,387	53	290	Ramos-Cartelle et al. 2022
Oceanic whitetip shark	RD = a x FL^b	0.000018428000	2.92450	93	57	219	Ariz et al. 2007*
	HG = a x FL^b	0.000080431000	2.44780	131	94	243	Ariz et al. 2007
	HG = a x FL^b	0.000002984460	3.15417	567	65	215	Garcia-Cortés and Mejuto 2002
Shortfin mako	RD = a x FL^b	0.000034900000	2.76544	906	70	342	Romanov and Romanova 2009
Bigeye tresher	RD = a x FL^b	0.000014130000	2.99565	185	110	256	Romanov and Romanova 2012
Tiger shark	RD = a x FL^b	0.000026140000	2.82374	676	50	351	
Great hammerhead	RD = a x FL^b	0.000002930000	3.23475	143	107	335	
Scalloped hammerhead	RD = a x FL^b	0.000021010000	2.88029	197	94	257	

Compilation of published length-weight relationships for Indian Ocean sharks. * indicates IOTC current reference relationships (IOTC-2022-WPEB18(AS)-DATA11)

MORPHOMETRIC DATA SETS COLLATED FROM CPCS

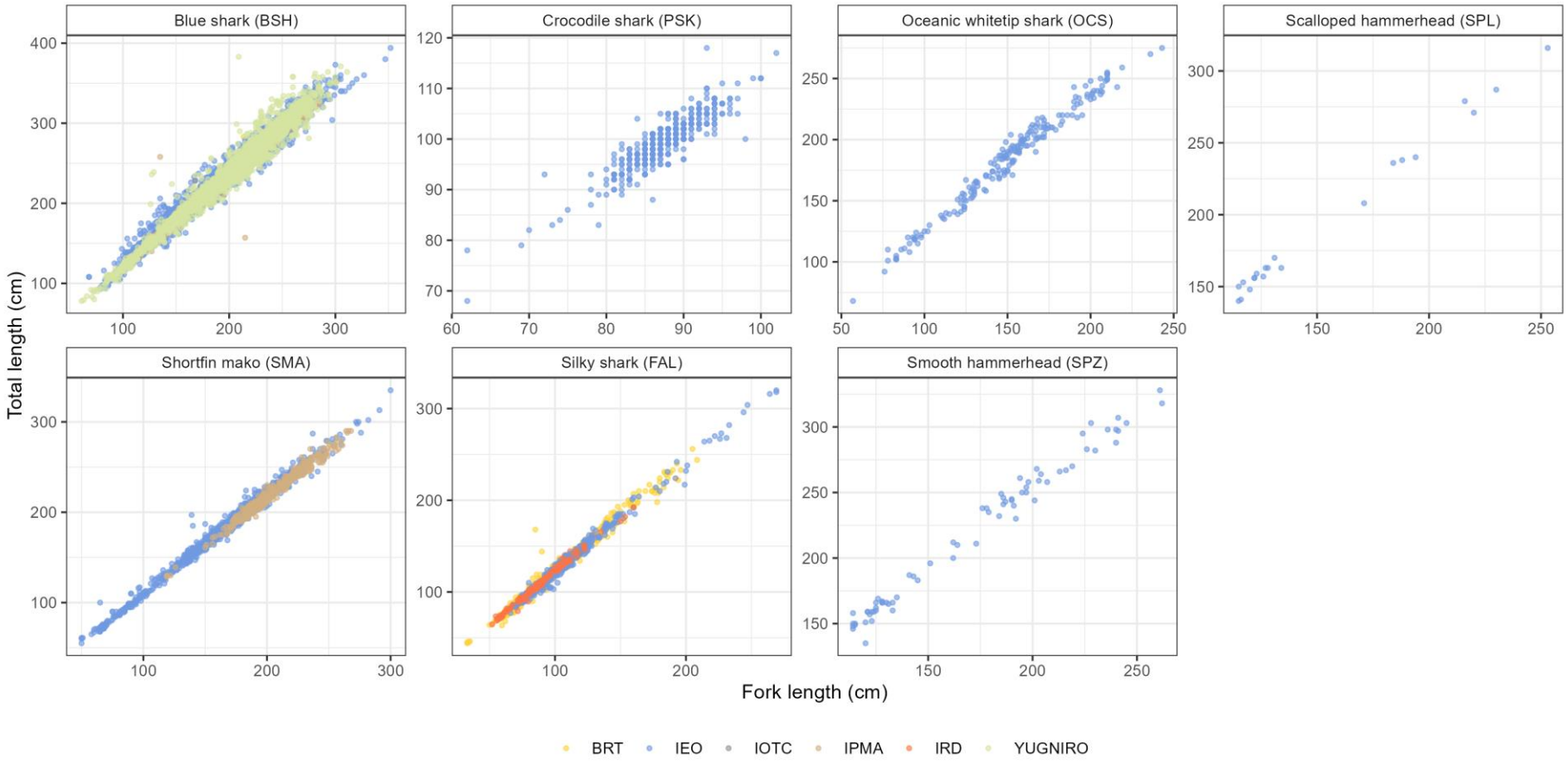
SOURCE	PROJECT	N
BRT	Market monitoring	754
IEO	National observer program	8,331
IEO	Pilot action	9,344
IOTC	ROS	934
IPMA	National observer program	2,864
IRD	Fimalter PhD.	183
YUGNIRO	Scientific cruises	2,852

SPATIAL DISTRIBUTION OF THE SAMPLES

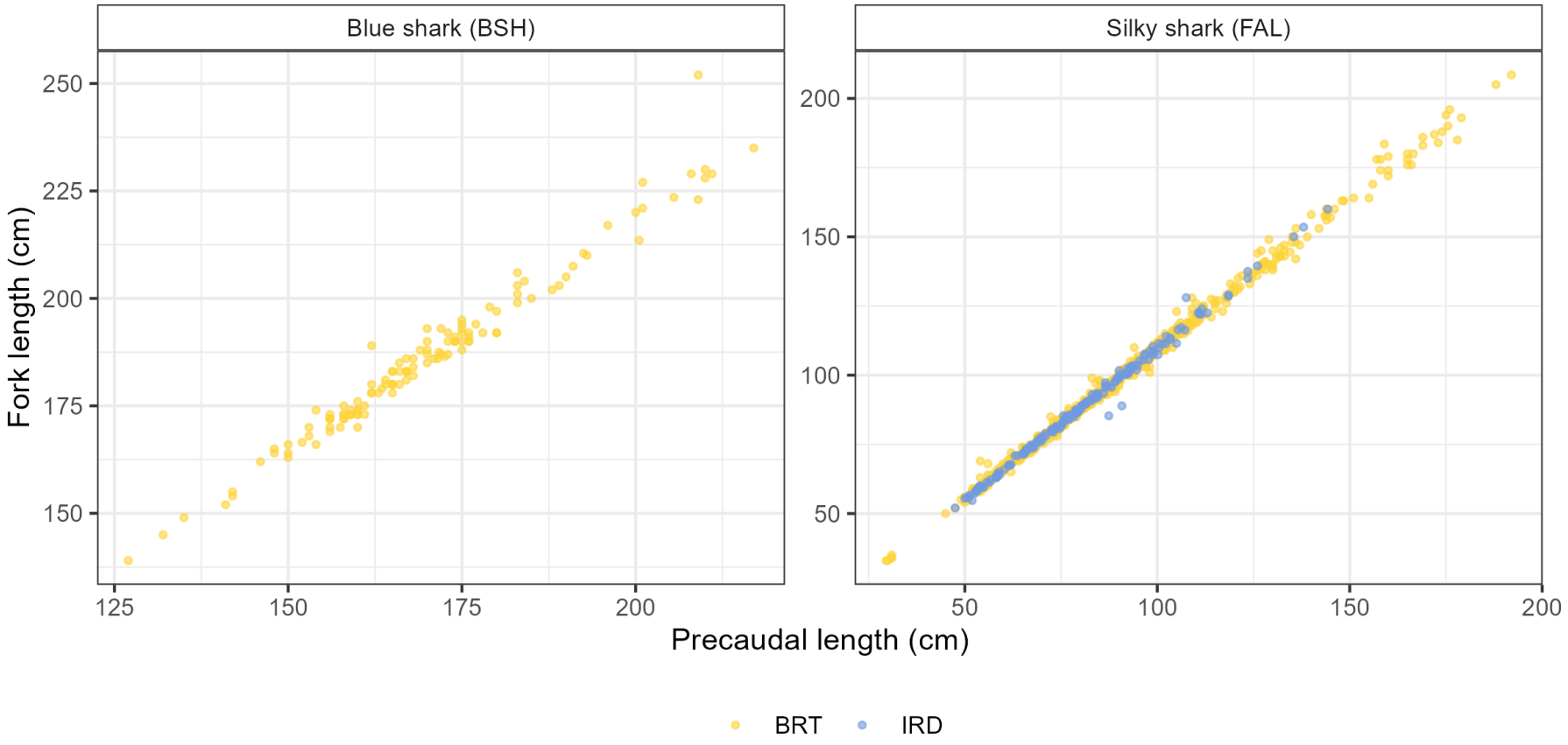


Spatial distribution of samples for which geographic information was made available (n = 10,429)

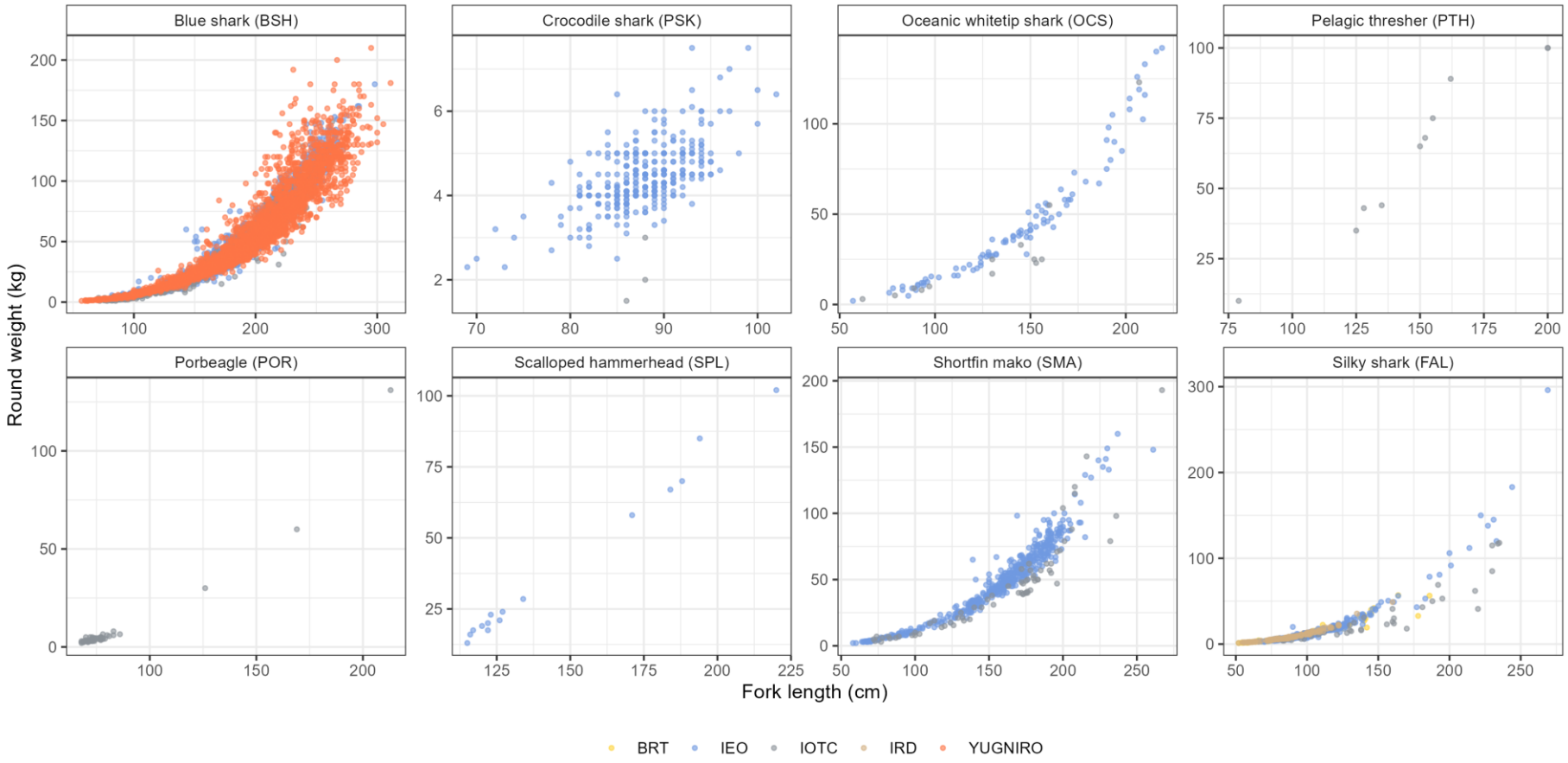
FORK LENGTH VS. TOTAL LENGTH



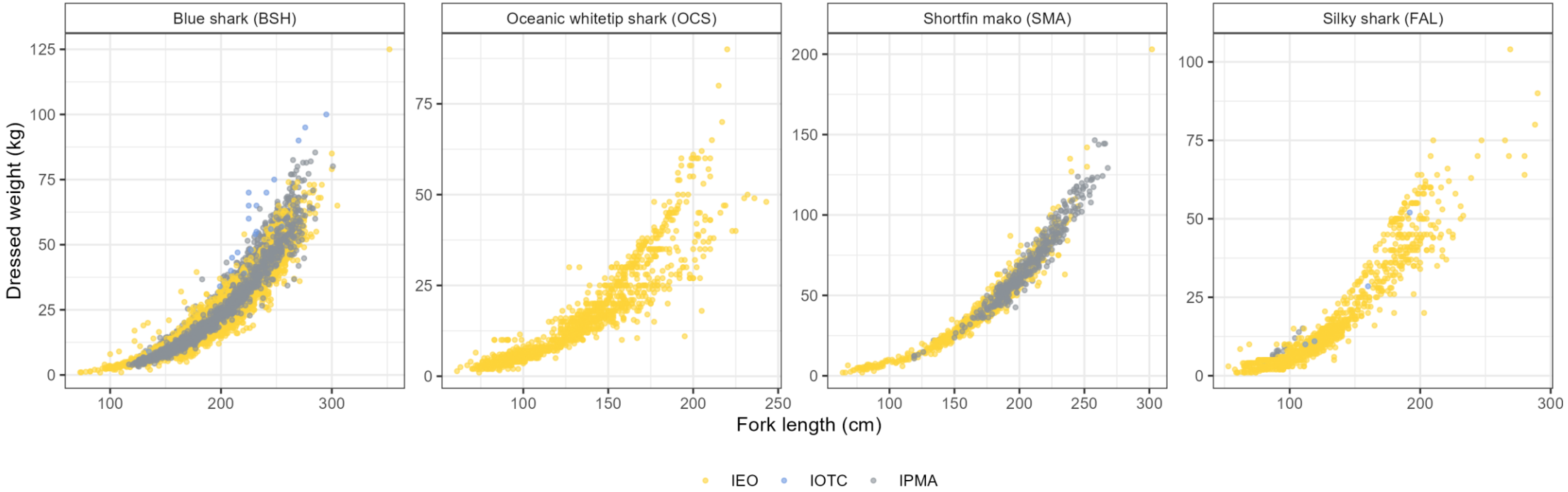
PRECAUDAL LENGTH VS. FORK LENGTH



FORK LENGTH VS. ROUND WEIGHT



FORK LENGTH VS. DRESSED WEIGHT



CONCLUSIONS

- Current relationships mainly borrowed from other oceans and need to be updated;
- Several data sets collected for sharks in the Indian Ocean through monitoring and research programmes;
- Combination of different data sets to derive robust statistical relationships and conversion factors;
- Development of a biological database at the Secretariat to host morphometric and other biological data.

REFERENCES

Ariz, J., Delgado De Molina, A., Ramos, M.L., and Santana, J.C. 2007. Length-weight relationships, conversion factors and analyses of sex-ratio, by length range, for several species of pelagic sharks caught in experimental cruises on board Spanish longliners in the South Western Indian Ocean during 2005. *In* IOTC Proceedings. IOTC, Victoria, Seychelles, 11-13 July 2007. p. 24. Available from https://www.iotc.org/documents/length-weight-relationships-conversion-factors-and-analyses-sex-ratio-length-range-several.

Ramos-Cartelle, A., Garcia-Cortés, B., Mejuto, J., Gonzalez-Gonzalez, I., Carroceda, A., and Fernandez-Costa, J. 2022. Length-weight relationships for several large pelagic sharks from the indian ocean. IOTC, Virtual meeting, 5-9 September 2022. p. 23. Available from https://iotc.org/documents/length-weight-relationships-several-large-pelagic-sharks-indian-ocean.