Food and Agriculture Organization of the United Nations

IOTC-2024-WPDCS20-11

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DEVELOPMENT OF A DATABASE ON FISH BIOLOGY AND ECOLOGY TO SUPPORT THE IOTC SCIENCE PROCESS

20TH WORKING PARTY ON DATA COLLECTION AND STATISTICS (WPDCS20)

CAPE TOWN, 26TH - 30TH NOVEMBER 2024

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Background: Morphometric Conversions

- Length is easier to measure than weight
- Morphometric relationships and conversion factors are used to:
    i. Harmonise size measurements
    ii. Compute weight from length
- Weights are instrumental in data processing to: (i) derive raising factors for extrapolation, (ii) estimate species composition of the catch from size-frequency samples, and (iii) compute reporting coverage for catches reported in numbers

Tropical Tunas: Length-Weight Relationships vary with gear

Species	Equation	Gears	N	MinFL	MaxFL	a	b	Reference
BET	RD = a*FL^b	GN;PL;PS	2,156	29.5	174	2.2170e-05	3.012110	Chassot et al. 2016
	GG = a*FL^b	LL;OT	12,047	70.0	187	1.5921e-05	3.041541	Geehan and Pierre 2013
	RD = a*GG+b	LL;OT	12,047	70.0	187	1.1300e+00	0.000000	Geehan and Pierre 2013
SKJ	RD = a*FL^b	ALL	1,762	30.0	73	4.9700e-06	3.392920	Chassot et al. 2016
YFT	RD = a*FL^b	GN;PL;PS	25,386	29.0	166	2.5490e-05	2.966700	Chassot et al. 2016
	GG = a*FL^b	LL;OT	15,133	72.0	177	9.4007e-06	3.126844	Geehan and Pierre 2013
	RD = a*GG+b	LL;OT	15,133	72.0	177	1.1300e+00	0.000000	Geehan and Pierre 2013

Neritic Species: Little information on Relationships

Code	Species	Length type	a	b	Min length	Max length	Reference
LOT	Longtail tuna	FL	2.0000e-05	2.83000	40	120	Kaymaram et al. (2011)
KAW	Kawakawa	FL	2.6000e-05	2.90000	20	65	IPTP (1989)
FRI	Frigate tuna	FL	1.7000e-05	3.00000	20	45	IPTP (1989)
BLT	Bullet tuna	FL	1.7000e-05	3.00000	10	40	IPTP (1989)
COM	Narrow-barred Spanish mackerel	FL	1.1760e-05	2.90020	20	200	IPTP (1989)
GUT	Indo-Pacific king mackerel	TL	1.0000e-05	2.89445	15	68	Dutta et al. (2012)

Billfish Species: Multiple Relationships Available

Code	Species	Ocean	Equation	a	b	N	Reference
MLS	Striped marlin	Indian	LJFL = a*EFL+b	1.334000	0.839500	443	Ward (pers. com)
		Western-Central Pacific	LJFL = a*EFL+b	1.120000	7.330000	397	Sun et al. 2011
		Western-Central Pacific	LJFL = a*EFL+b	0.834000	36.610000	301	Kopf et al. 2011
BUM	Blue marlin	Atlantic	LJFL = a*TL+b	0.763000	2.000000	258	Prager et al. (1995)
		Atlantic	LJFL = a*PFL+b	1.261000	7.696000	732	Prager et al. (1995)
		Atlantic	LJFL = a*EFL+b	1.096000	8.887000	250	Prager et al. (1995)
		Atlantic	LJFL = a*PAL+b	2.156000	61.656000	453	Prager et al. (1995)
		Indian	LJFL = a*EFL+b	0.983000	28.630000	53	Setyadji et al. (2016)
		Indian	LJFL = a*PFL+b	1.115000	31.674000	53	Setyadji et al. (2016)
		Indian	EFL = a*PFL+b	1.163000	-1.019000	53	Setyadji et al. (2016)
		Indian	LJFL = a*EFL+b	1.106317	8.018586	26	Ward (pers. Com)*

Conversion Factors: Variable and Little Information available

Species	Commonname	Processing	Raising Factor
ALB	Albacore	GGT	1.1
BET	Bigeye tuna	GGT	1.09
BET	Bigeye tuna	HDD	1.43
BIL	Billfish	GGT	1.33
BIL	Billfish	TAL	1.43
BLM	Black Marlin (White marlin; WM)	GGT	1.33
BLM	Black Marlin (White marlin; WM)	TAL	1.43
BLS	Black Shark (Silky shark)	HDD	1.33
BLZ	Indo-Pacific Blue Marlin (BUM)	GGT	1.13
BLZ	Indo-Pacific Blue Marlin (BUM)	TAL	1.43
BSH	Blue shark	HDD	1.33
BSH	Blue shark	GGT	1.13
BTS	Bigeye Thresher shark	GGT	1.13
FAL	Silky shark (black shark)	HDD	1.33
FAL	Silky shark (black shark)	TAL	1.55
FAL	Silky shark (black shark)	GGT	1.13
LEC	Black Escolar	HDD	1.33
MLS	Stripped Marlin	GGT	1.13
MLS	Stripped Marlin	TAL	1.2
MSK	Mackerel sharks, Porbeagles, White sharks	HDD	1.33
MSK	Mackerel sharks, Porbeagles, White sharks	PDD	1.55
OIL	Oilfish	HDD	1.33
OIL	Oilfish	GGT	1.13
SBF	Southern bluefin tuna	GGT	1.15
SBF	Southern bluefin tuna	HDD	1.43
SFA	Indo-Pacific sailfish	HDD	1.33
SFA	Indo-Pacific sailfish	GGT	1.13
SFA	Indo-Pacific sailfish	TAL	1.43
SKH	Sharks nei	TAL	1.55
SKH	Sharks nei	GGT	1.13

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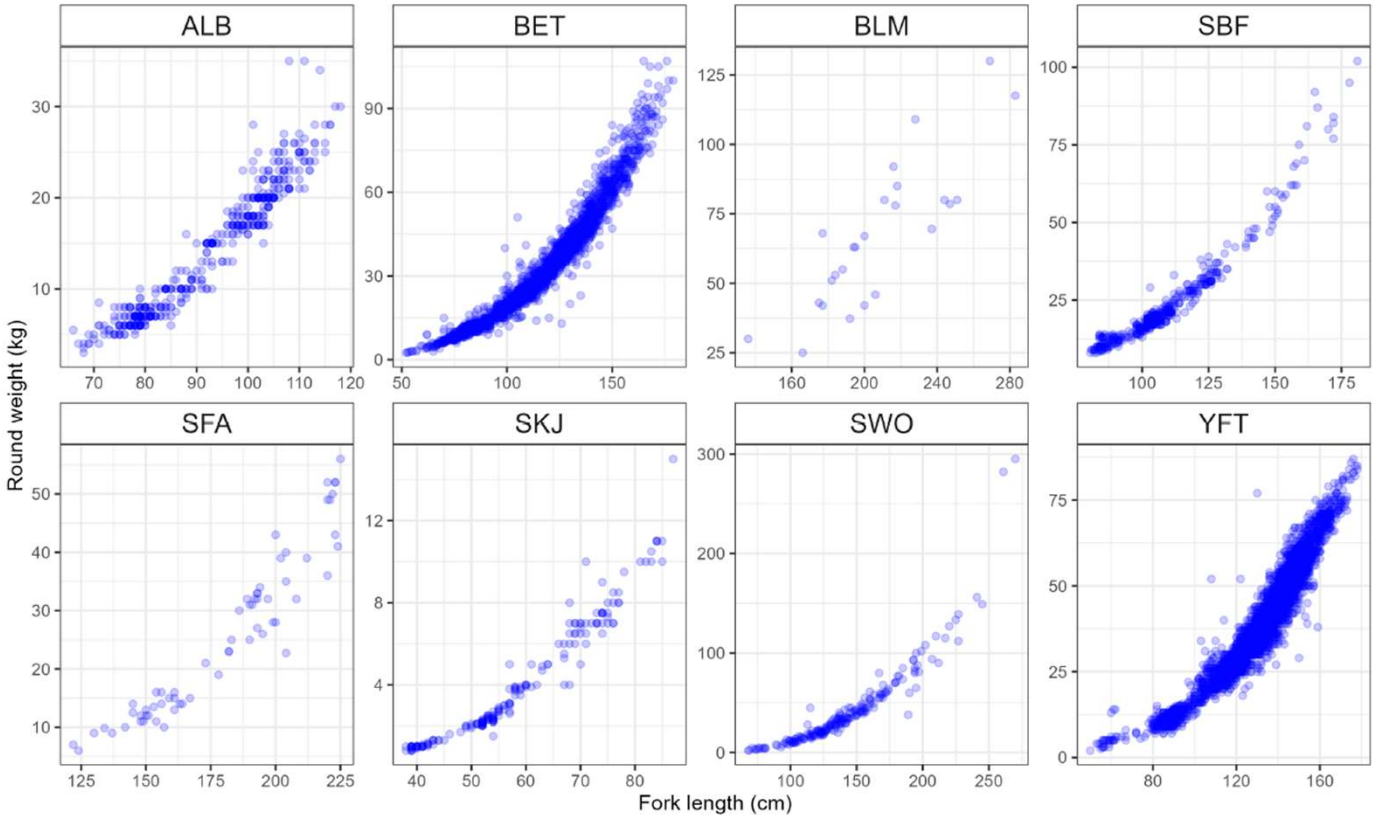
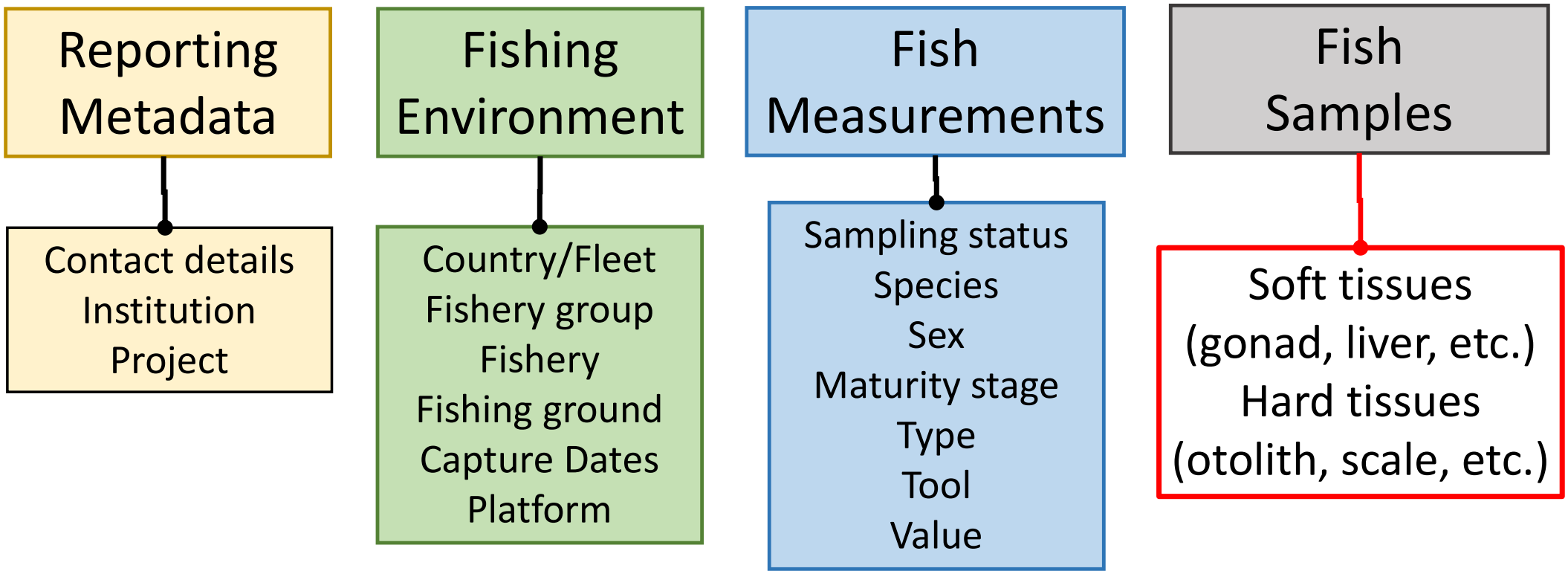
Morphometric Data available at the IOTC Secretariat

SPECIES_CODE	SPECIES	FL_RD	FL_HG	FL_TL	FL_SF	FL_HL	FL_BH
YFT	Yellowfin tuna	4732	482	304	1483	0	0
BET	Bigeye tuna	2710	1348	284	1694	199	199
BSH	Blue shark	702	20	44	1	0	0
ALX	Long snouted lancetfish	536	0	0	0	0	0
SBF	Southern bluefin tuna	493	0	0	0	0	0
ALB	Albacore	482	13	4	59	0	0
PLS	Pelagic stingray	273	0	0	0	0	0
SWO	Swordfish	209	74	38	3	0	0
SKJ	Skipjack tuna	187	18	7	22	0	0
LEC	Escolar	140	4	23	2	0	0
SMA	Shortfin mako	68	0	0	0	0	0
SFA	Indo-Pacific sailfish	64	23	14	0	0	0
SSP	Shortbill spearfish	64	0	0	0	0	0
POR	Porbeagle	52	0	0	0	0	0
FAL	Silky shark	43	4	5	1	0	0
WAH	Wahoo	32	14	8	1	0	0
BLM	Black marlin	25	8	8	0	0	0

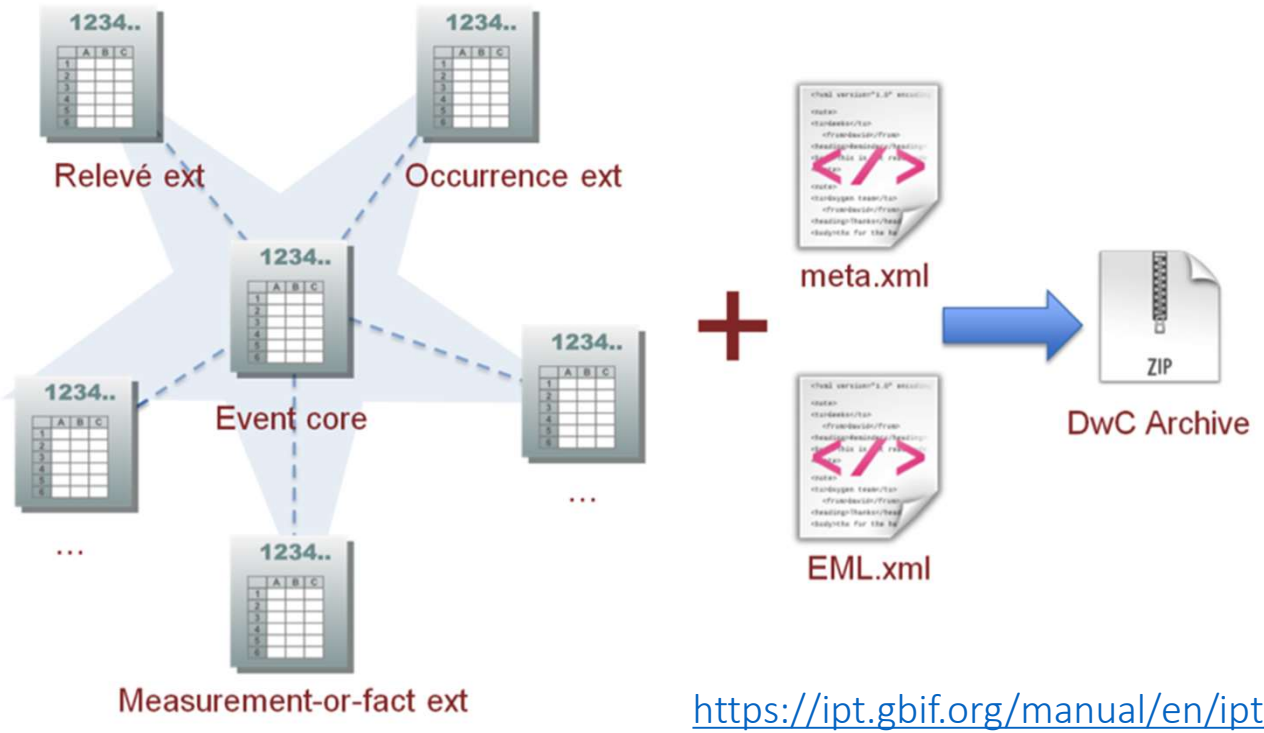
Morphometric Data available at the IOTC Secretariat



Proposing a Form for Collecting Biological Data and Samples



Publishing Sampling Event Data Through GBIF



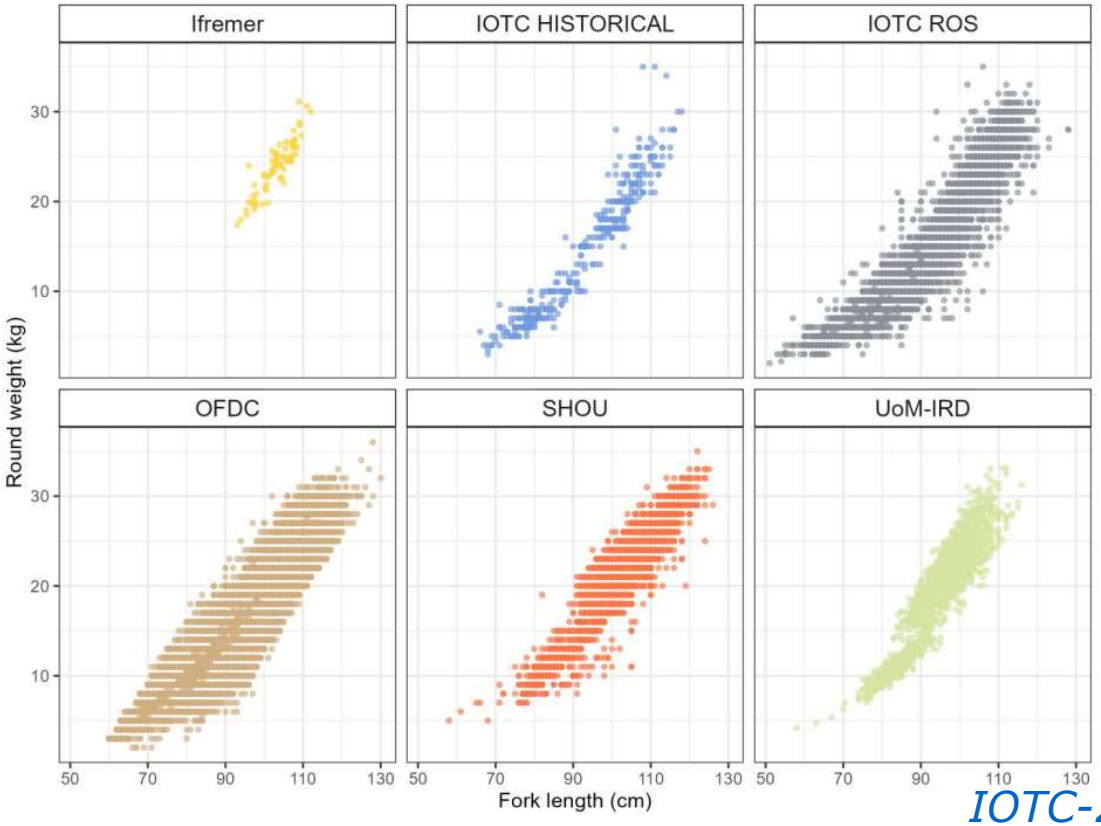
https://ipt.gbif.org/manual/en/ipt/latest/best-practices-sampling-event-data

Publishing Sampling Event Data

- **Darwin Core Event**
- **Darwin Core Occurrence**
- **Darwin Core Measurement**

e.g., InstitutionID, InstitutionCode, datasetName, eventID, samplingProtocol, eventDate, startDayOfYear, endDayOfYear, decimalLatitude, decimalLongitude, individualCount, sex, lifeStage, etc.

Sharing Morphometric Data to Develop robust Relationships



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Conclusions

- Develop a relational database model to host the data (metadata, environment, measurement, samples)
- More complex model required if includes results of the analyses performed on the samples
- Range of information available on “fishing environment”
- Collation of data to support the modelling of the variability in the relationships (e.g., gear, area)
- Improvement and harmonization of conversions
- Supports to a large-regional sampling programme (e.g., CKMR)

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Thank you for your attention!

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