



Co-funded by
the European Union

ICCAT CIRCULAR # 04856 /2024

Preliminary Results

Contributors

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Acknowledgement



Co-funded by
the European Union



This work was carried out under the provision of the ICCAT. The contents of this document do not necessarily reflect the point of view of ICCAT, which has no responsibility over them, and in no ways anticipate the Commission's future policy in this area.

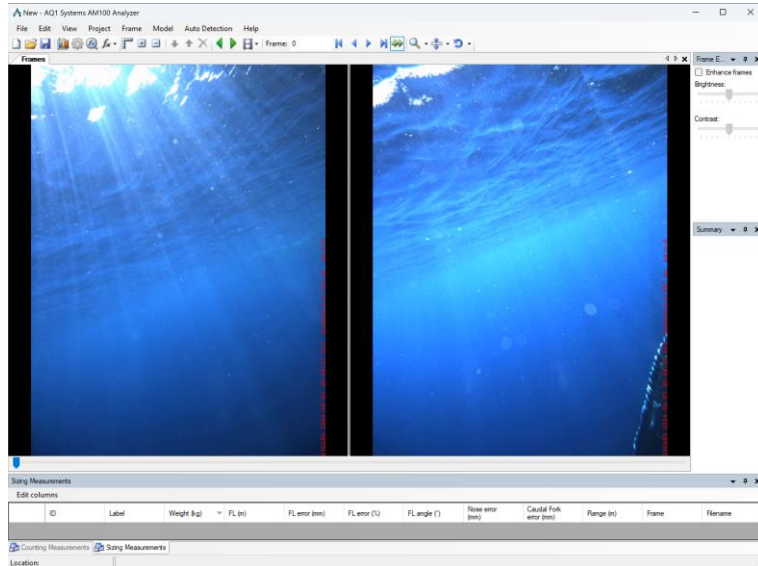
This work has been carried out within the scope of the project REM-BFT, and co-funded by the European Union through the EU Grant Agreement No. 101103829, and a voluntary contribution by the United States.

Project status - ICCAT CIRCULAR # 04856 /2024

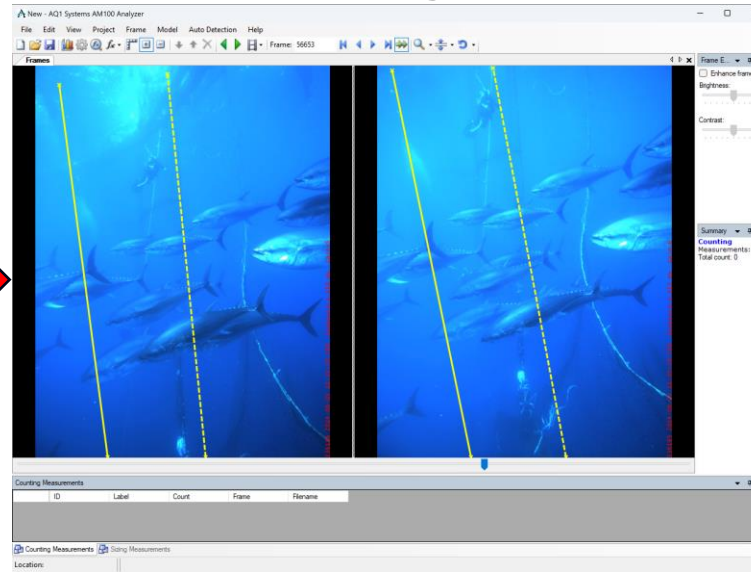
- AM100 derived tender videos provided before September processed manually and with AQ1 Gen 2 AI
- 6 transfers provided last week AI size processed only. Awaiting full manual results
- GOPRO footage processed where possible. Footage is mostly sub optimal instead using farm provided transfer footage to train/test Gen 2 AI
- Waiting on provision of additional transfer cage, trap and pre harvest videos.
- Waiting on official 5th fish and 100% manual measure results from UPV for comparison with AI results
- Trial at this stage lacks accuracy assessment – cage full off tagged and or physically measured tuna assessed against stereo camera captured and derived Manual & AI measurements
- AQ1 AI ready for Beta testing – Will be provided free to farms who provided training data

AM100 AI Workflow

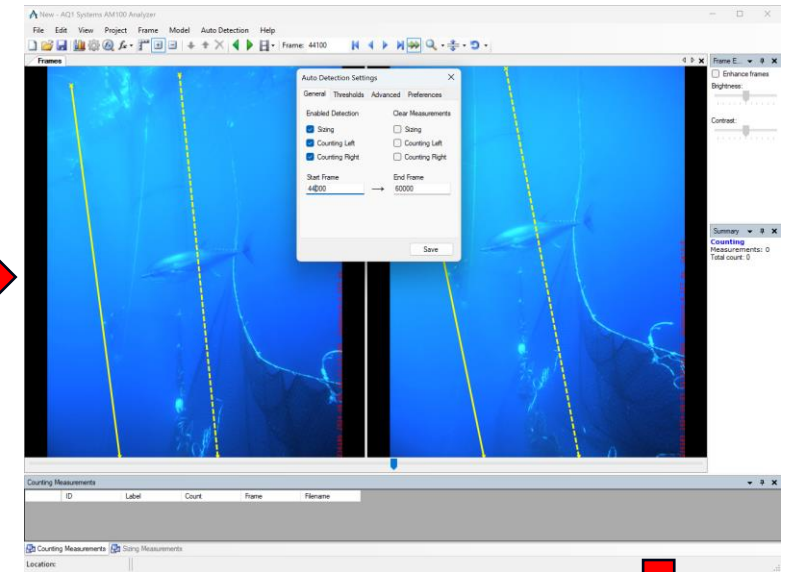
New Project



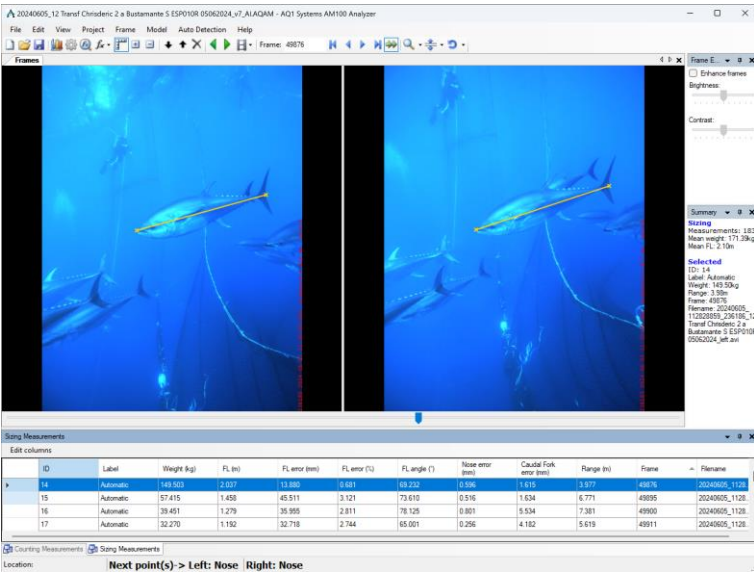
Set Counting Lines



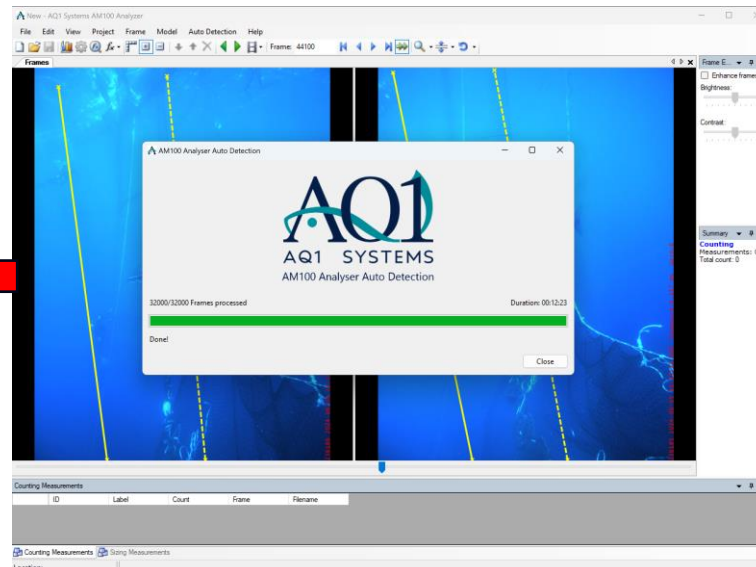
Filter Frames



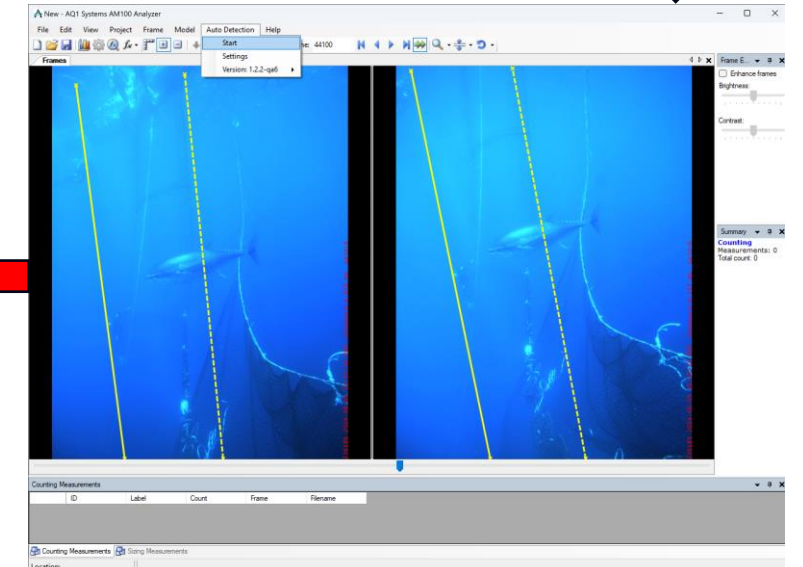
Count 274 – Measurements 183



Wait 12 minutes



Start AI

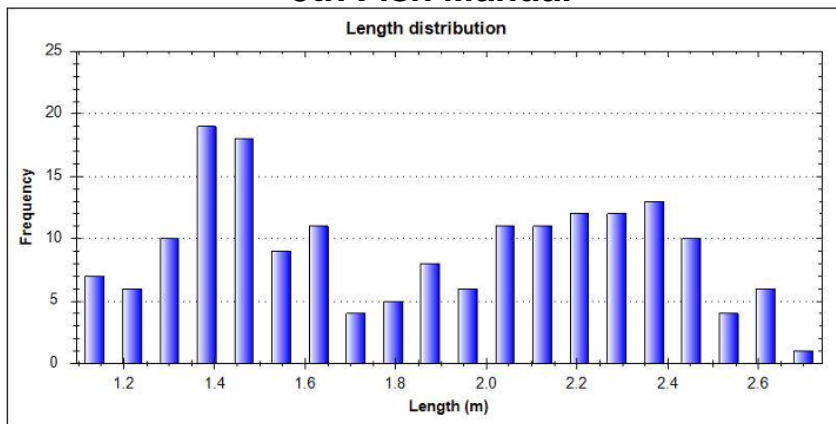


Next point(s) -> Left: Nose Right: Nose

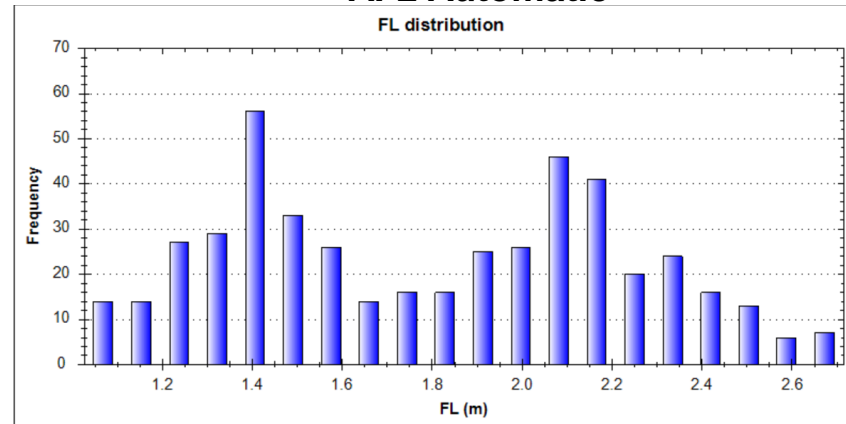
Transfer 8 – Single video

- Fair quality – Too close to gate looking in, fish missed at bottom
- Count Manual 878 – AI 869. Difference due to camera position
- Manual 5th Fish Method – Mean FL 1.853 m from 183 samples
- AI-2 Method – Mean FL 1.799 from 469 samples
- AI-2 Method – 53% of Fish sampled
- 5.4 cm Mean FL Difference from Manual or 2.9% of FL

5th Fish Manual



AI-2 Automatic

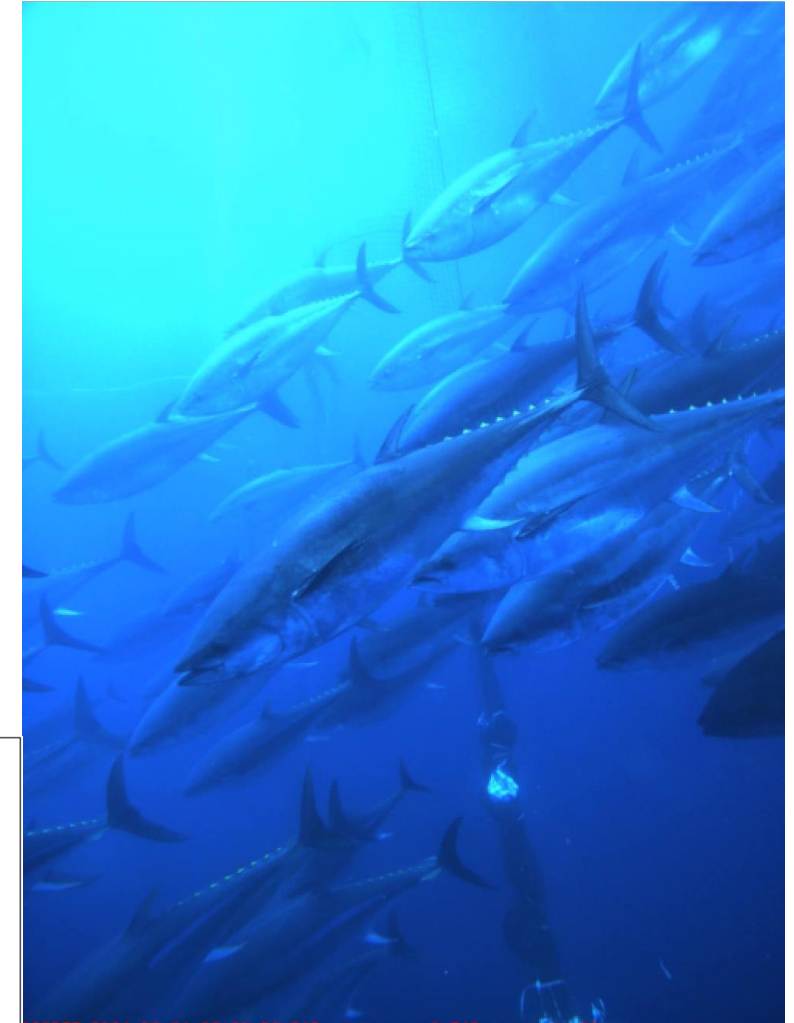
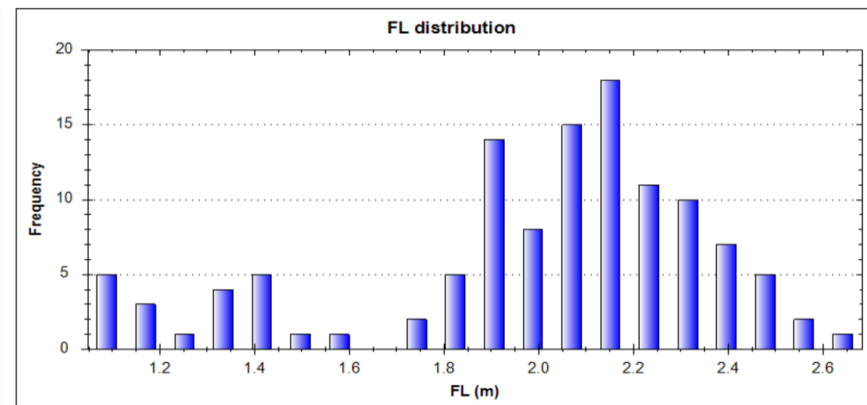
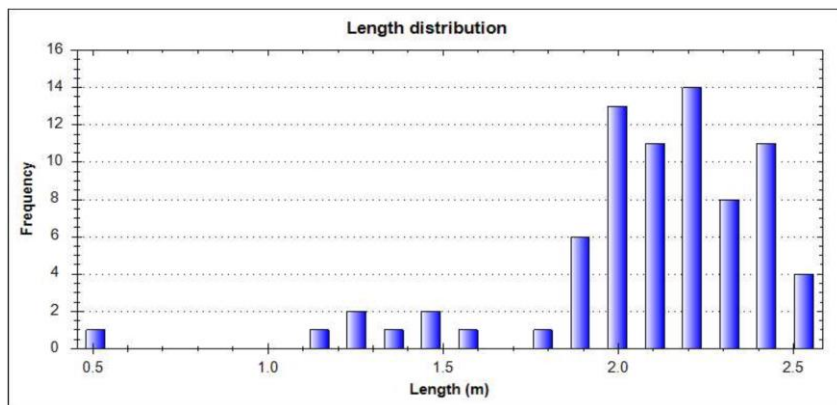


Transfer 11 – Single video

- Fair - Poor quality – Too close to gate with fish obscured and missed
- Count Manual 376 – AI 356. Difference due to camera position
- Manual 5th Fish Method – Mean FL 2.083 m from 76 samples
- AI-2 Method – Mean FL 1.995 from 119 samples
- AI-2 Method – 31% of Fish sampled
- Largest difference in all transfers 8.8 cm or 4.2% of total Manual FL
- Manual FL decreasing as more fish sampled

5th Fish Manual

AI-2 Automatic



Transfer 12 – 2 Videos

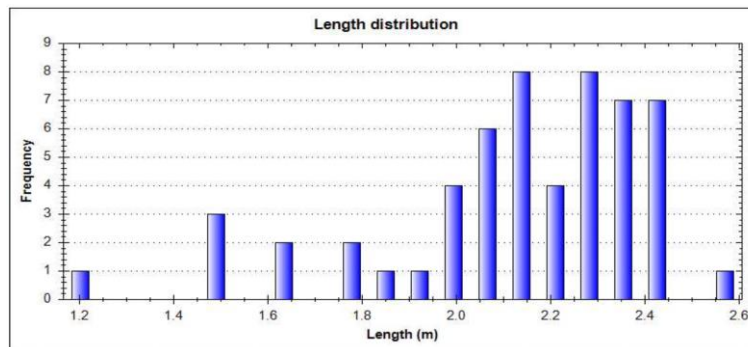
- Eric's video fair quality. Willy's Unusable
- Count Manual 274 – AI 277. Difference due to false positives - flipper
- Manual 5th Fish Method – Mean FL 2.122 m from 55 samples
- AI-2 Method – Mean FL 2.099 from 185 samples
- AI-2 Method – 67% of Fish sampled
- 2.3 cm or 1.1% Difference from Manual FL

Erik - Fair

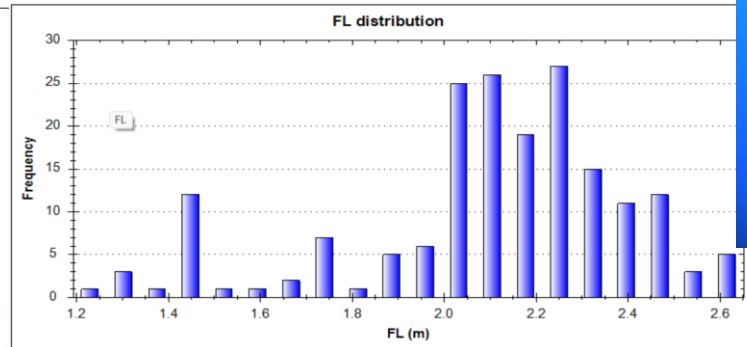
Willy - Unusable



5th Fish Manual

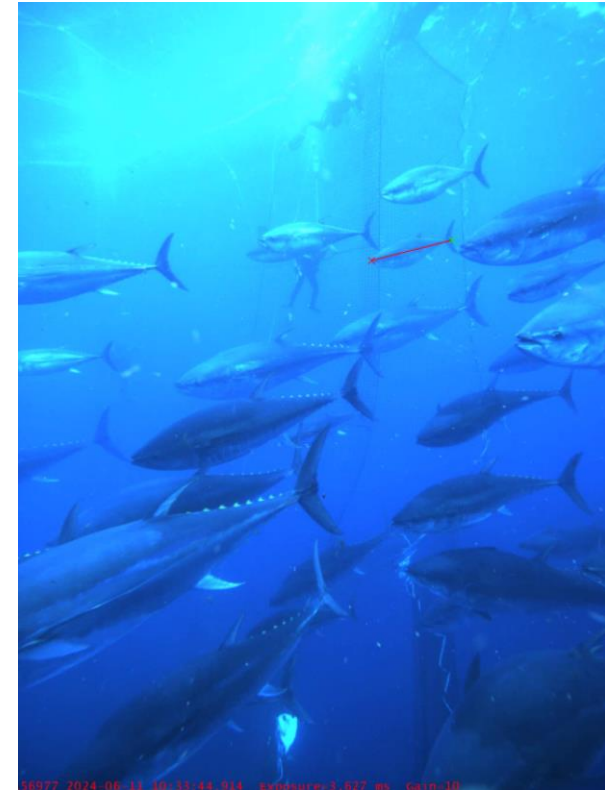


AI-2 Automatic

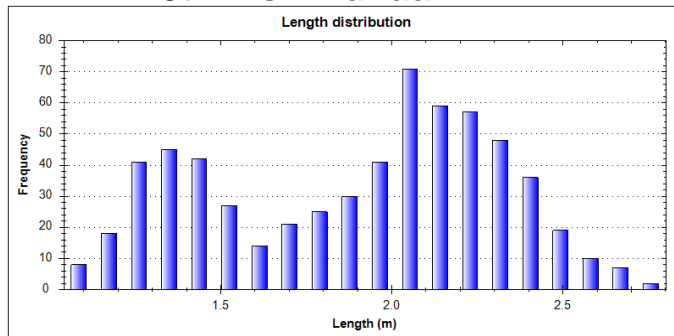


Transfer 20 – 2 Videos

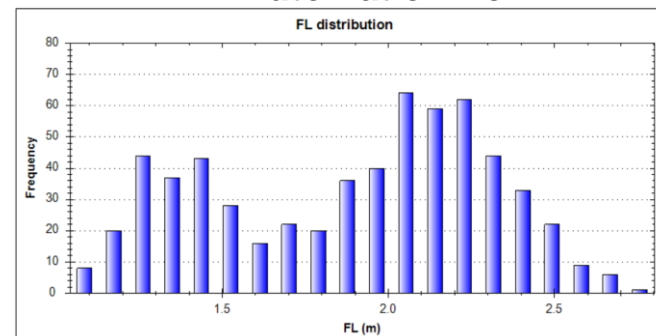
- Erics and Willys video fair quality
- Count Manual 1373 – AI 1349. Difference due fish not fully visible
- Manual 5th Fish Method – Mean FL 1.92 m from 281 samples
- AI-2 Method ERIC – Mean FL 1.892 from 614 samples
- AI-2 Method WILLY – Mean FL 1.915 from 736 samples
- AI-2 Method – ERIC 45% & WILLY 54% of Fish sampled
- Close agreeance between AI analysis from different recordings
- 1.5% total FL difference from 5th Fish Manual Method



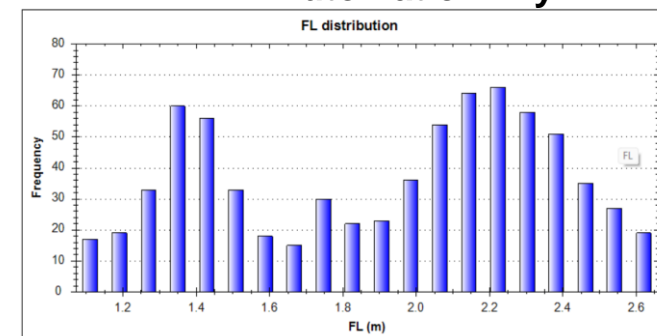
5th Fish Manual



AI-2 Automatic Eric



AI-2 Automatic Willy

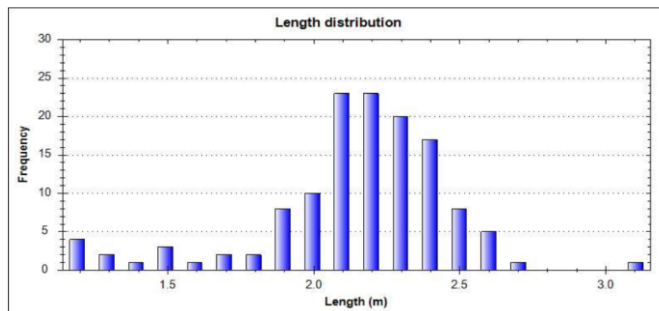


Transfer 21 – 2 Videos

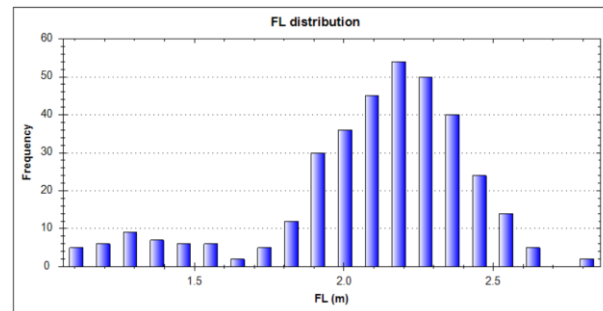
- Erics and Willys video fair quality
- Count Manual 653 – AI 648. Difference due fish not fully visible
- Manual 5th Fish Method – Mean FL 2.145 m from 131 samples
- AI-2 Method ERIC – Mean FL 2.090 from 358 samples
- AI-2 Method WILLY – Mean FL 2.090 from 313 samples
- AI-2 Method – ERIC 54% & WILLY 47% of Fish sampled
- Very close agreeance between AI analysis from different cameras
- 2.6% total FL difference from 5th Fish Manual Method



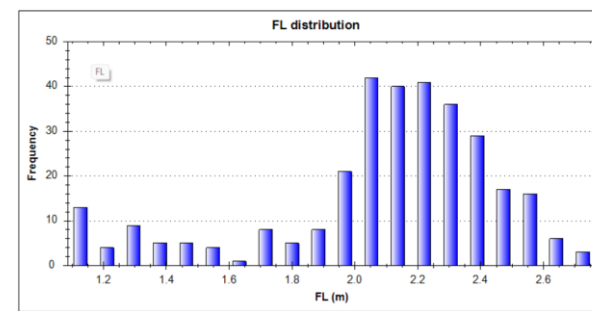
5th Fish Manual



AI-2 Automatic Eric



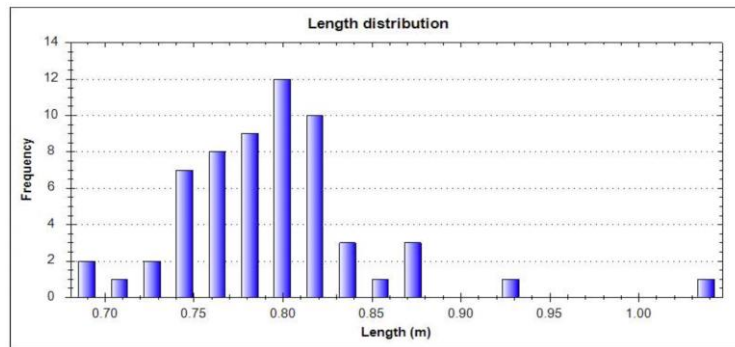
AI-2 Automatic Willy



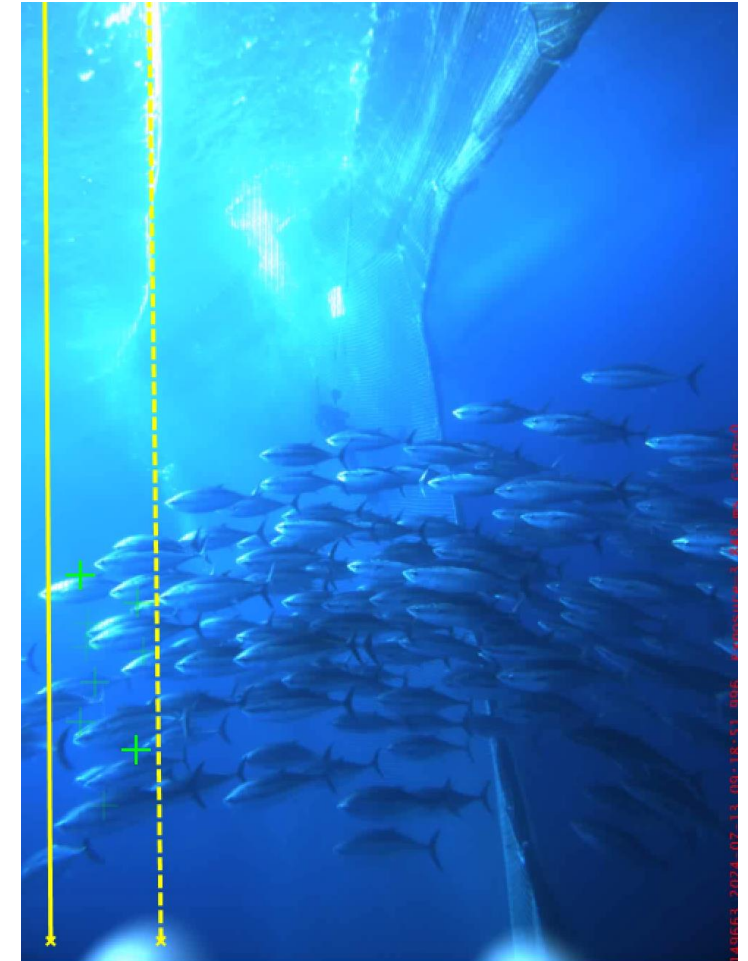
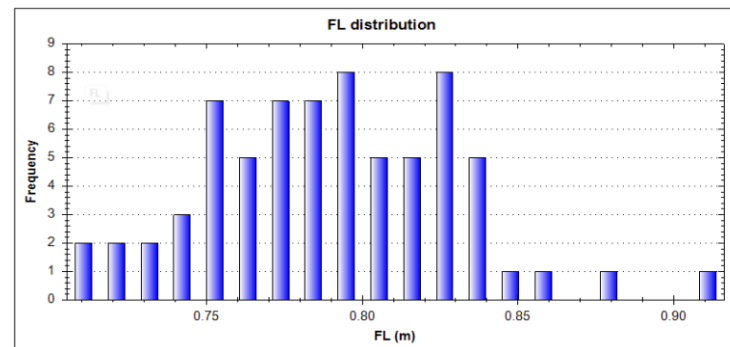
Transfer Croatia – 1 Video

- Video fair quality – Pulses of fish at distance – Large Gate
- Count Manual 296 – AI 196. Difference due fish size/density
- Manual 5th Fish Method – Mean FL 0.794 m from 60 samples
- AI-2 Method ERIC – Mean FL 0.79 from 73 samples
- Very close agreeance between Manual and AI analysis
- 0.5% total FL difference from 5th Fish Manual Method

5th Fish Manual



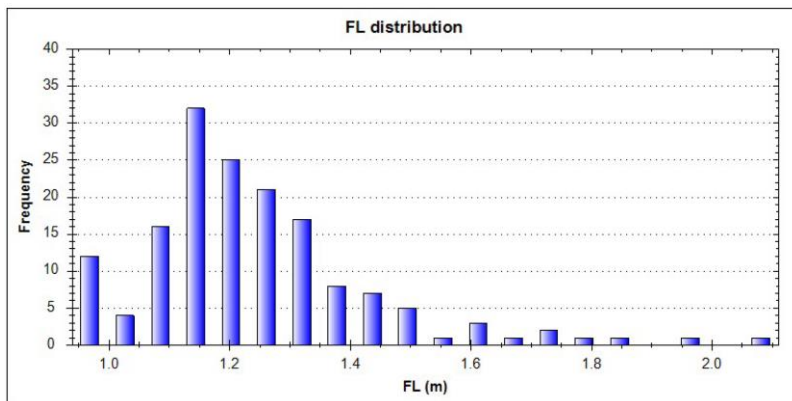
AI-2 Automatic



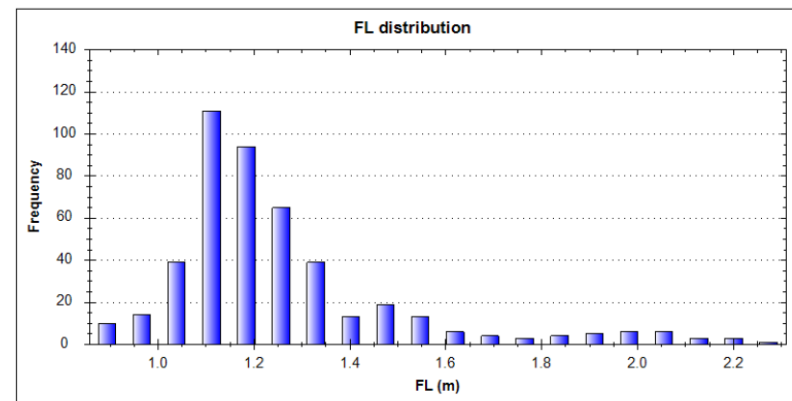
Malta Video1 MLT-2024-AUT-CG-005-MFF

- Video good quality – Great clarity some fish a high angle close to gate
- Count Manual 783 – AI 755. Difference due obscured fish
- Manual 5th Fish Method – Mean FL 1.244 m from 158 samples
- AI-2 Method – Mean FL 1.257 from 458 samples
- Very close agreeance between Manual and AI analysis
- 1.3 cm or 1% total FL difference from 5th Fish Manual Method

5th Fish Manual



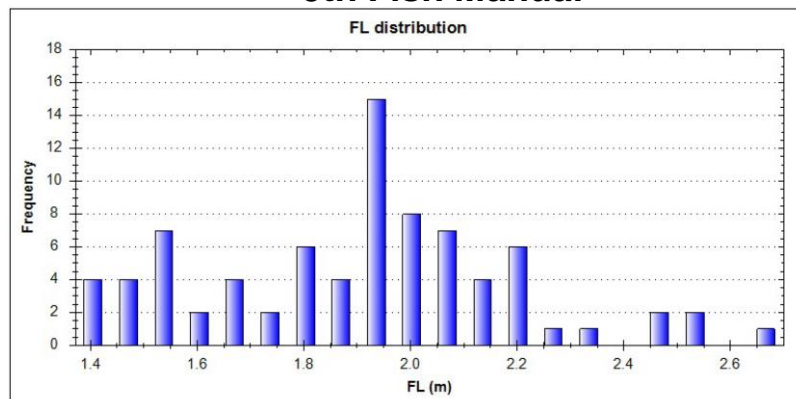
AI-2 Automatic



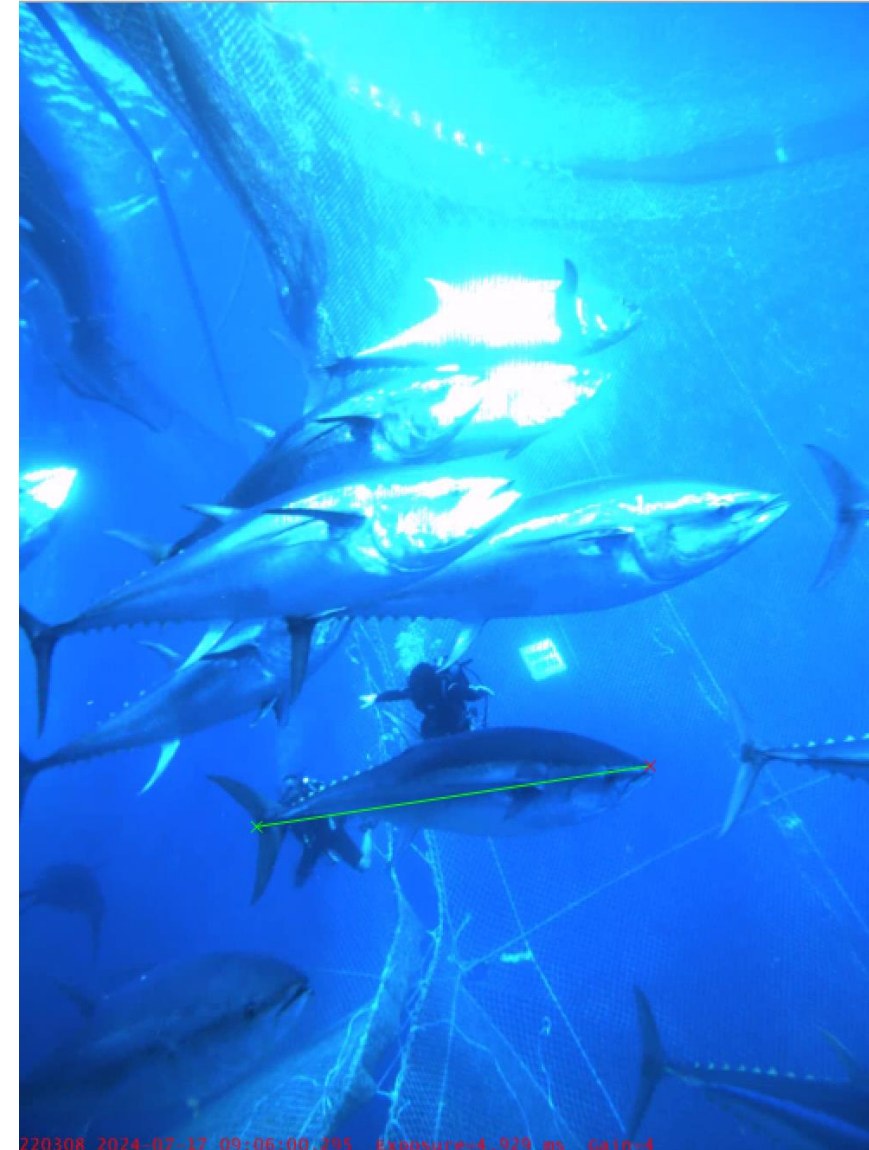
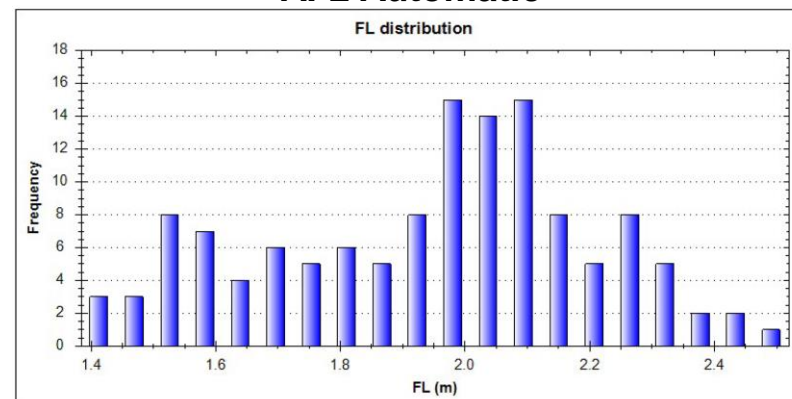
Malta Video2 MLT-2024-AUT-CG-017

- Video good quality – A bit too close to gate for accurate counting
- Count Manual 396 – AI 355. Difference due fish obstruction
- Manual 5th Fish Method – Mean FL 1.908 m from 80 samples
- AI-2 Method – Mean FL 1.943 from 130 samples
- Very close agreeance between Manual and AI analysis
- 3.5 cm or 1.8% total FL difference from 5th Fish Manual Method

5th Fish Manual



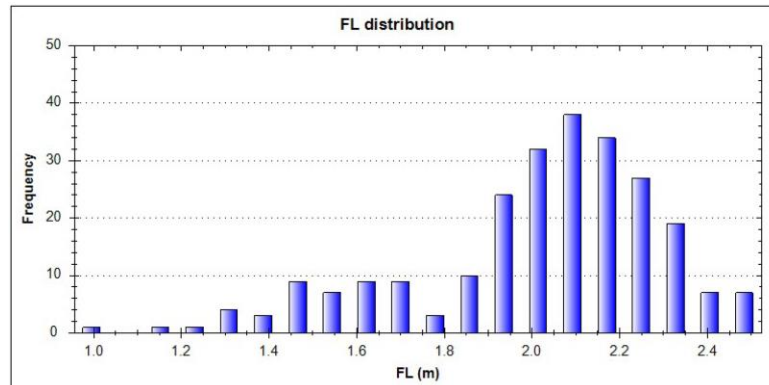
AI-2 Automatic



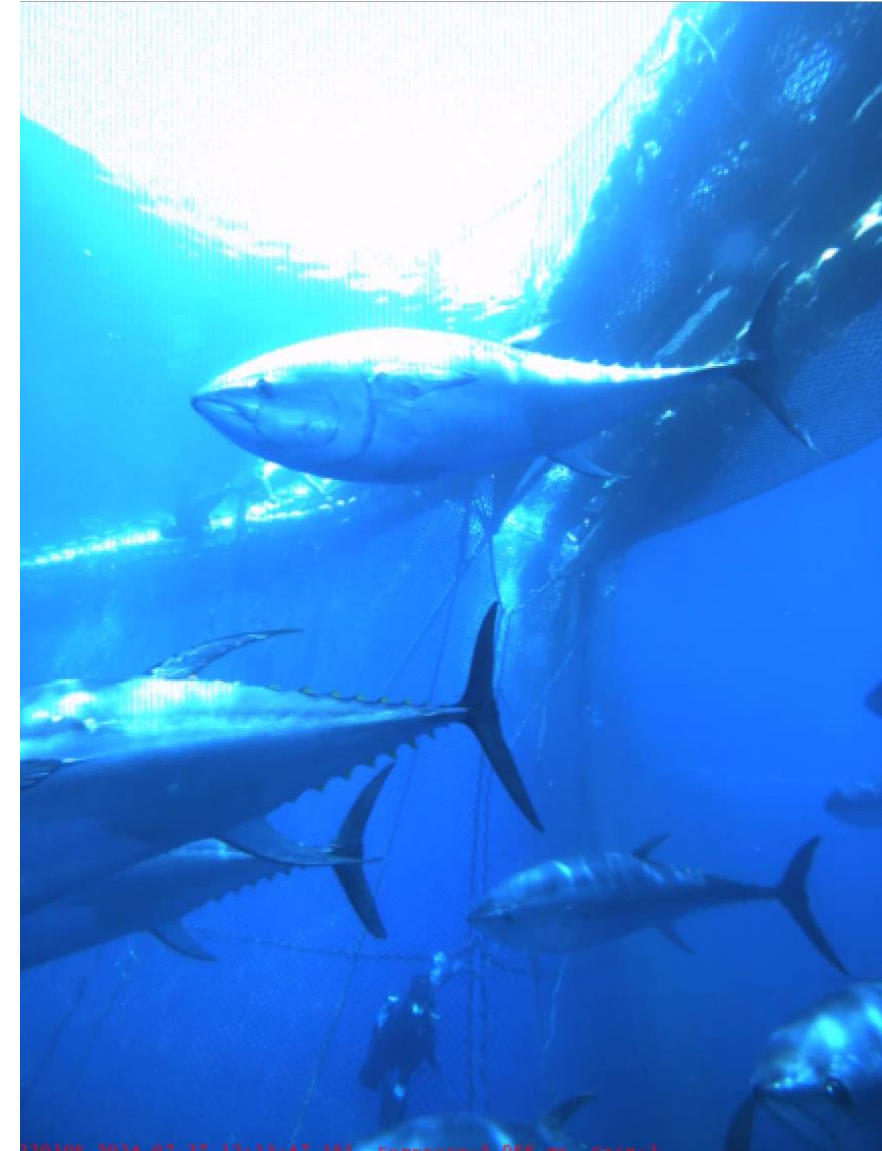
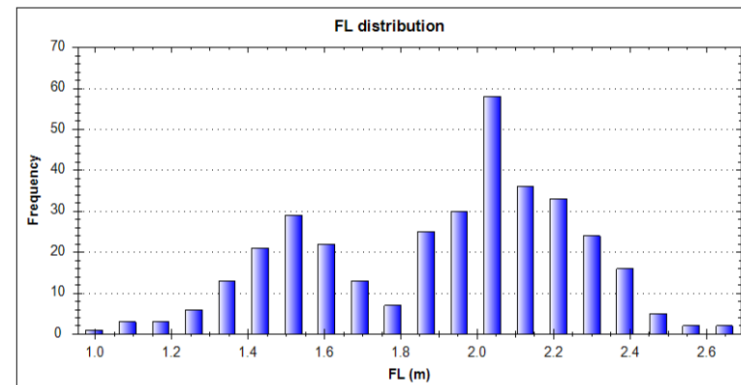
Malta Video3 MLT-2024-AUT-CG-083-MB7

- Video good quality – Too close to Gate
- Count Manual 1244 – AI 1075. Due to missed fish & obstruction
- Manual 5th Fish Method – Mean FL 2.019 m from 245 samples
- AI-2 Method – Mean FL 1.908 from 349 samples
- Poor agreeance between Manual and AI analysis
- 11.1 cm or 5.5% total FL difference from 5th Fish Manual Method

5th Fish Manual



AI-2 Automatic

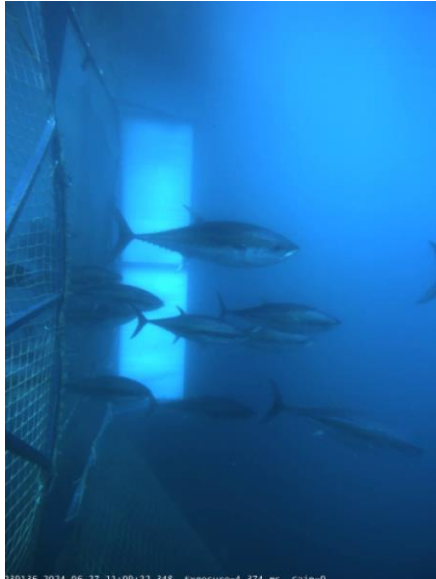


Croatian Farm Transfer Videos - Preliminary

Sizing statistical Information

Mean Range (m):	3.881
Minimum Range (m):	2.931
Maximum Range (m):	5.519
Mean weight (kg):	25.417
Minimum weight (kg):	9.147
Maximum weight (kg):	178.034
Weight S.D. (kg):	18.733
Weight CV (%):	73.704
Sample size (weight):	539
Samples out of formula range:	0

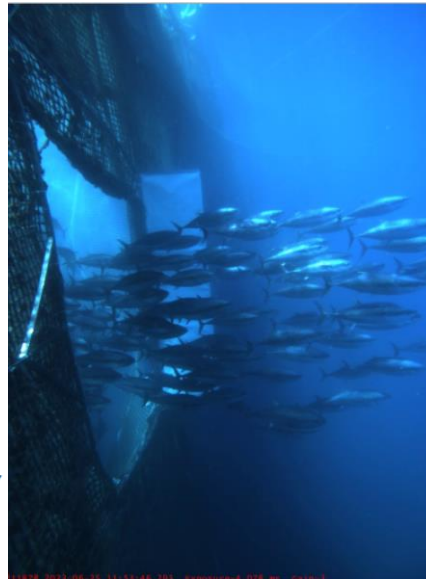
Mean FL (m) :	1.060
Minimum FL (m) :	0.768
Maximum FL (m) :	2.165
FL Mean Angle (°):	78.223
FL Minimum Angle (°):	64.997
FL Maximum Angle (°):	111.805
FL S.D. (m) :	0.199
FL CV (%):	18.773
Sample size (FL):	539



Sizing statistical Information

Mean Range (m):	5.924
Minimum Range (m):	3.729
Maximum Range (m):	7.941
Mean weight (kg):	9.054
Minimum weight (kg):	3.313
Maximum weight (kg):	19.438
Weight S.D. (kg):	1.276
Weight CV (%):	14.090
Sample size (weight):	2249
Samples out of formula range:	0

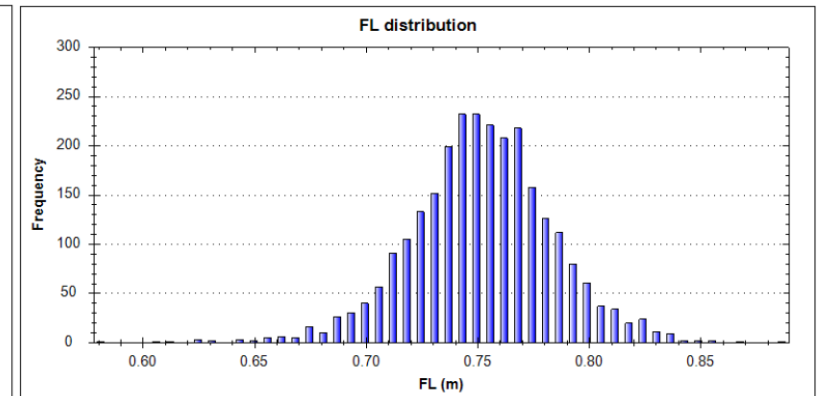
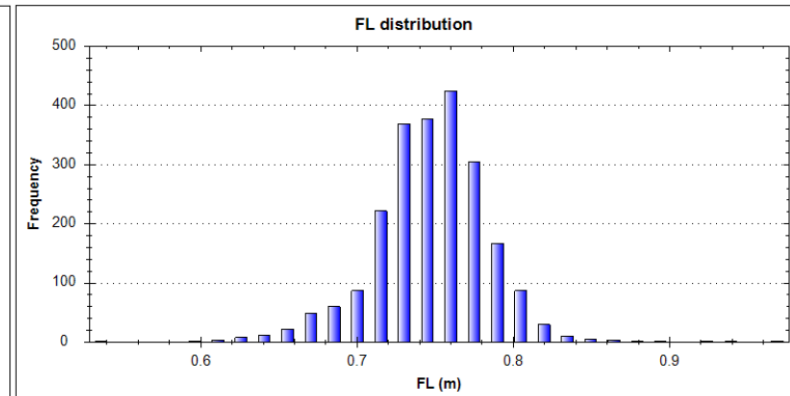
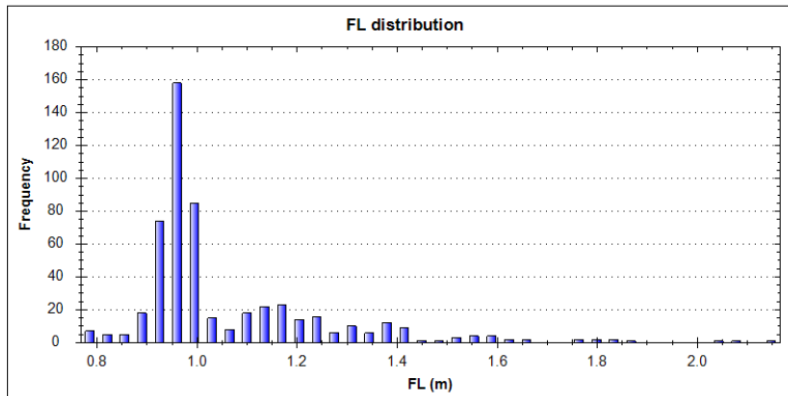
Mean FL (m) :	0.748
Minimum FL (m) :	0.529
Maximum FL (m) :	0.976
FL Mean Angle (°):	90.519
FL Minimum Angle (°):	65.004
FL Maximum Angle (°):	114.997
FL S.D. (m) :	0.037
FL CV (%):	4.897
Sample size (FL):	2249



Sizing statistical Information

Mean Range (m):	4.652
Minimum Range (m):	2.851
Maximum Range (m):	6.489
Mean weight (kg):	8.655
Minimum weight (kg):	4.056
Maximum weight (kg):	13.936
Weight S.D. (kg):	1.044
Weight CV (%):	12.065
Sample size (weight):	2679
Samples out of formula range:	0

Mean FL (m) :	0.752
Minimum FL (m) :	0.578
Maximum FL (m) :	0.889
FL Mean Angle (°):	92.598
FL Minimum Angle (°):	65.001
FL Maximum Angle (°):	114.985
FL S.D. (m) :	0.032
FL CV (%):	4.250
Sample size (FL):	2679





Preliminary Data Summary

2024 ICCAT															
Transfer	name	camera	Manual-5th fish AQ1-Malta						Ai-2				Manual 5th vs AI-2		
			Mean FL	SD	CV%	Count	samples	stat	Mean FL	count	Samples	% of Count	stats	5th-AI FL Diff (m)	FL Dif as %
8	08 Transf Tio Gel II a Playa d S	AQ1	1.853	0.443	23.905	878	183		1.799	869	469	53.42		0.054	2.9
11	LATERAL-AQ1	AQ1	2.083	0.361	17.31	376	76		1.995	356	118	31.38		0.088	4.2
12	0219 ERIC	AQ1	2.122	0.29	13.67	274	55		2.099	277	185	67.52		0.023	1.1
12	0215 WILLY	AQ1				274			1.983	186	16	5.84			
20	CAMARA ERIC	AQ1	1.92	0.417	21.702	1373	281		1.892	1349	614	44.72		0.028	1.5
20	CAMARA WILLY	AQ1				1373			1.915	1225	736	53.61			
21	CAMARA ERIC	AQ1	2.145	0.324	15.104	653	131		2.090	648	358	54.82		0.055	2.6
21	CAMARA WILLY	AQ1				653			2.090	535	313	47.93			
Croatia	20240713_TRANSEFERENCIA	AQ1	0.794	0.05	69.410	296	60		0.790	196	73	24.66		0.004	0.5
caging_video1_HRV	20240627_104931790_23913	AQ1							1.06	913	539				
caging_video2_HRV	20230625_110224880_21187	AQ1							0.748	3982	2249				
caging_video3_HRV	20240623_112109442_21187	AQ1							0.752	4747	2789				
Malta1	MLT-2024-AUT-CG-005-MFF	AQ1	1.244	0.191	15.367	783	158		1.257	755	458	58.49		-0.013	-1.0
Malta2	MLT-2024-AUT-CG-017-MM	AQ1	1.908	0.288	15.05	396	80		1.943	355	130	32.83		-0.035	-1.8
Malta3	MLT-2024-AUT-CG-083-MB	AQ1	2.019	0.285	14.119	1224	245		1.908	1075	349	28.51		0.111	5.5
											Average	41.98		0.04	1.71

Appendices- Recording Observations

- Transfer 8 – Fair - Much too close to Gate, Cannot see the leading edge of the gate and therefor missing fish. Missing fish from first pulse starting at frame 1766. Second Pulse from frame 16384 is better but still looking into gate instead of across it.
- Transfer 11 – Fair to Good – Close to gate, No full gate visible, looking into gate not across it increasing fish angle. Side to side movement of camera compromises counting
- Transfer 12 Eric – Good - Better position overall just a little far back particularly prior to the fish arriving 37174, Perfect position at 31938, have just about got it right around frame 56359 just a bit to close to the opening.
- Transfer 12 Willy –Very poor video. Sitting too high in the gate, Lots of bubbles from the diver below, No full gate visible, looking into gate not across it increasing fish angle and looking up not across so many fish are passing below the camera. Unusable
- Transfer 20 Eric & Willy – Fair to Good Quality Recording
- Transfer 21 Eric – Good. Willy – Fair. Sitting too close and a bit high on the gate, looking into the gate and not across it. Missing fish at the bottom of the frame.
- Croatia – Fair video. Very big opening, large fish pulses, Video is split into two parts.