GOVERNMENT OF WESTERN AUSTRALIA
Department of Biodiversity, Conservation and Attractions
Biodiversity and Conservation Science

Report on genetic identification of unknown whale tissue sample T018381 (Fauna lab) T00107 (Marine)

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The tissue sample (T018381), suspected to potentially be a Cuvier's beaked whale (*Ziphius cavirostris*) was collected from an animal stranded at Bremer Bay (20/12/2024) and received from Kelly Waples in Jan 2025.

DNA was extracted from the tissue sample using a TNES extraction method. The Displacement Loop primers Wada-D-Loop Forward/Wada-D-Loop Reverse (Region 1) were used to amplify non-coding mitochondrial D-Loop DNA using a Shaw hot start PCR program. This region produced a strong single PCR product. The PCR product was sequenced using the same Forward and Reverse primers at the Western Australian State Agricultural Biotechnology Centre (SABC) Murdoch University. Sequence data was edited, Forward and Reverse sequences aligned and a consensus sequences obtained using the Geneious sequence alignment editor.

The sequenced region produced a consensus alignment sequence read of 887bp. This sequence region was queried using the blastn suite (megablast) for highly similar sequences (https://blast.ncbi.nlm.nih.gov/Blast.cgi).

The queried sequence was significantly aligned to 108 sequences in the Ziphiidae family, with the top 63 hits in the Mesoplodon genus with following hits with other *Mesoplodon* species and then other whale and dolphin species (Fig 1). Of the sequences producing significant alignment, the top 23 hits had the highest Maximum Scores, highest Total Scores, highest Query Coverages, lowest E values, and highest Percent Identities, with *Mesoplodon grayi*, Gray's beaked whale (Fig 2).

100 sequences selected

Organism	Blast Name	Score	Number of Hits	Description
Ziphiidae	whales & dolphins		108	
. Mesoplodon	whales & dolphins		63	
. . Mesoplodon grayi	whales & dolphins	1633	23	Mesoplodon grayi hits
. . Mesoplodon densirostris	whales & dolphins	1410	22	Mesoplodon densirostris hits
. . Mesoplodon europaeus	whales & dolphins	1376	9	Mesoplodon europaeus hits
. . Mesoplodon stejnegeri	whales & dolphins	1354	6	Mesoplodon stejnegeri hits
. . Mesoplodon bidens	whales & dolphins	1349	3	Mesoplodon bidens hits
. Berardius bairdii	whales & dolphins	1269	16	Berardius bairdii hits
. Ziphius cavirostris	whales & dolphins	1264	24	Ziphius cavirostris hits
. Berardius minimus	whales & dolphins	1245	4	Berardius minimus hits
. Hyperoodon ampullatus	whales & dolphins	1238	1	Hyperoodon ampullatus hits

Figure 1. Number of significant alignments (Hits) for tissue sample T018381.

Description	Scientific Name	Max Score	Total Score	Query Cover	E value	Per. Ident	Acc. Len	Accession
Mesoplodon grayi voucher MGRM49874 mitochon...	Mesoplod...	1633	1633	100%	0.0	99.89%	16347	MW645458.1
Mesoplodon grayi voucher MGR165 mitochondrio...	Mesoplod...	1628	1628	100%	0.0	99.77%	16347	MW645456.1
Mesoplodon grayi voucher PEMN3299 mitochondr...	Mesoplod...	1628	1628	100%	0.0	99.77%	16347	MW645462.1
Mesoplodon grayi voucher MRGWA04 mitochondri...	Mesoplod...	1622	1622	100%	0.0	99.66%	16347	MW645461.1
Mesoplodon grayi voucher MGR135 mitochondrio...	Mesoplod...	1622	1622	100%	0.0	99.66%	16347	MW645448.1
Mesoplodon grayi voucher PEMN3300 mitochondr...	Mesoplod...	1616	1616	100%	0.0	99.55%	16347	MW645463.1
Mesoplodon grayi voucher M18082 mitochondrion,...	Mesoplod...	1616	1616	100%	0.0	99.55%	16347	MW645444.1
Mesoplodon grayi voucher Mgr159 mitochondrion,...	Mesoplod...	1616	1616	100%	0.0	99.55%	16347	NC_023830.1
Mesoplodon grayi voucher MGR161 mitochondrio...	Mesoplod...	1616	1616	100%	0.0	99.55%	16347	MW645454.1
Mesoplodon grayi voucher MGR164 mitochondrio...	Mesoplod...	1611	1611	100%	0.0	99.44%	16347	MW645455.1
Mesoplodon grayi voucher M22364 mitochondrion,...	Mesoplod...	1611	1611	100%	0.0	99.44%	16347	MW645445.1
Mesoplodon grayi voucher MGR138 mitochondrio...	Mesoplod...	1611	1611	100%	0.0	99.44%	16347	MW645451.1
Mesoplodon grayi voucher MGR136 mitochondrio...	Mesoplod...	1611	1611	100%	0.0	99.44%	16347	MW645449.1
Mesoplodon grayi voucher MGR139 mitochondrio...	Mesoplod...	1605	1605	100%	0.0	99.32%	16347	MW645452.1
Mesoplodon grayi voucher M15813 mitochondrion,...	Mesoplod...	1605	1605	100%	0.0	99.32%	16347	MW645443.1
Mesoplodon grayi voucher MGRTM16 mitochondri...	Mesoplod...	1605	1605	100%	0.0	99.32%	16347	MW645460.1
Mesoplodon grayi voucher MGR137 mitochondrio...	Mesoplod...	1605	1605	100%	0.0	99.32%	16347	MW645450.1
Mesoplodon grayi voucher MGRM49873 mitochon...	Mesoplod...	1600	1600	100%	0.0	99.21%	16347	MW645457.1
Mesoplodon grayi voucher M22390 mitochondrion,...	Mesoplod...	1600	1600	100%	0.0	99.21%	16347	MW645446.1
Mesoplodon grayi voucher MGR141 mitochondrio...	Mesoplod...	1600	1600	100%	0.0	99.21%	16347	MW645453.1
Mesoplodon grayi voucher MGR127 mitochondrio...	Mesoplod...	1600	1600	100%	0.0	99.21%	16347	MW645447.1
Mesoplodon grayi voucher MGRTM15 mitochondri...	Mesoplod...	1600	1600	100%	0.0	99.21%	16347	MW645459.1
Mesoplodon densirostris isolate SWFSC ID z0079...	Mesoplod...	1410	1410	100%	0.0	95.38%	16343	KF032876.2
Mesoplodon densirostris isolate SWFSC ID z0008...	Mesoplod...	1410	1410	100%	0.0	95.38%	16336	KF032871.2
Mesoplodon densirostris tRNA-Thr gene, partial se...	Mesoplod...	1410	1410	100%	0.0	95.38%	946	KY542115.1
Mesoplodon densirostris isolate SWFSC ID z0079...	Mesoplod...	1410	1410	100%	0.0	95.38%	16339	KF032872.2
Mesoplodon densirostris isolate SWFSC ID z0079...	Mesoplod...	1410	1410	100%	0.0	95.38%	16340	KF032877.2
Mesoplodon densirostris isolate SWFSC ID z0094...	Mesoplod...	1410	1410	100%	0.0	95.38%	16343	KF032878.2
Mesoplodon densirostris isolate SWFSC ID z0074...	Mesoplod...	1406	1406	100%	0.0	95.37%	16333	KF032869.2
Mesoplodon densirostris isolate SWFSC ID z0074...	Mesoplod...	1404	1404	100%	0.0	95.27%	16346	KF032868.2
Mesoplodon densirostris isolate SWFSC ID z0009...	Mesoplod...	1404	1404	100%	0.0	95.27%	16347	KF032861.2
Mesoplodon densirostris isolate SWFSC ID z0033...	Mesoplod...	1404	1404	100%	0.0	95.27%	16347	KF032862.2
Mesoplodon densirostris isolate SWFSC ID z0050...	Mesoplod...	1404	1404	100%	0.0	95.27%	16347	KF032864.2
Mesoplodon densirostris isolate SWFSC ID z0079...	Mesoplod...	1404	1404	100%	0.0	95.27%	16346	KF032873.1
Mesoplodon densirostris isolate SWFSC ID z0079...	Mesoplod...	1404	1404	100%	0.0	95.27%	16346	KF032875.2
Mesoplodon densirostris isolate SWFSC ID z0098...	Mesoplod...	1404	1404	100%	0.0	95.27%	16347	KF032866.2
Mesoplodon densirostris isolate SWFSC ID z0074...	Mesoplod...	1404	1404	100%	0.0	95.27%	16346	KF032867.2
Mesoplodon densirostris isolate SWFSC ID z0074...	Mesoplod...	1402	1402	99%	0.0	95.46%	16330	KF032870.2
Mesoplodon densirostris isolate SWFSC ID z0033...	Mesoplod...	1399	1399	100%	0.0	95.16%	16347	KF032863.2
Mesoplodon densirostris isolate SWFSC ID z0004...	Mesoplod...	1399	1399	100%	0.0	95.16%	16347	NC_021974.2
Mesoplodon densirostris isolate SWFSC ID z0079...	Mesoplod...	1384	1384	98%	0.0	95.30%	16320	KF032874.2

Figure 2. Sequences producing significant alignments for tissue sample T18381.

Results were also visualised as a Fast Minimum Evolution distance tree (Fig 3).

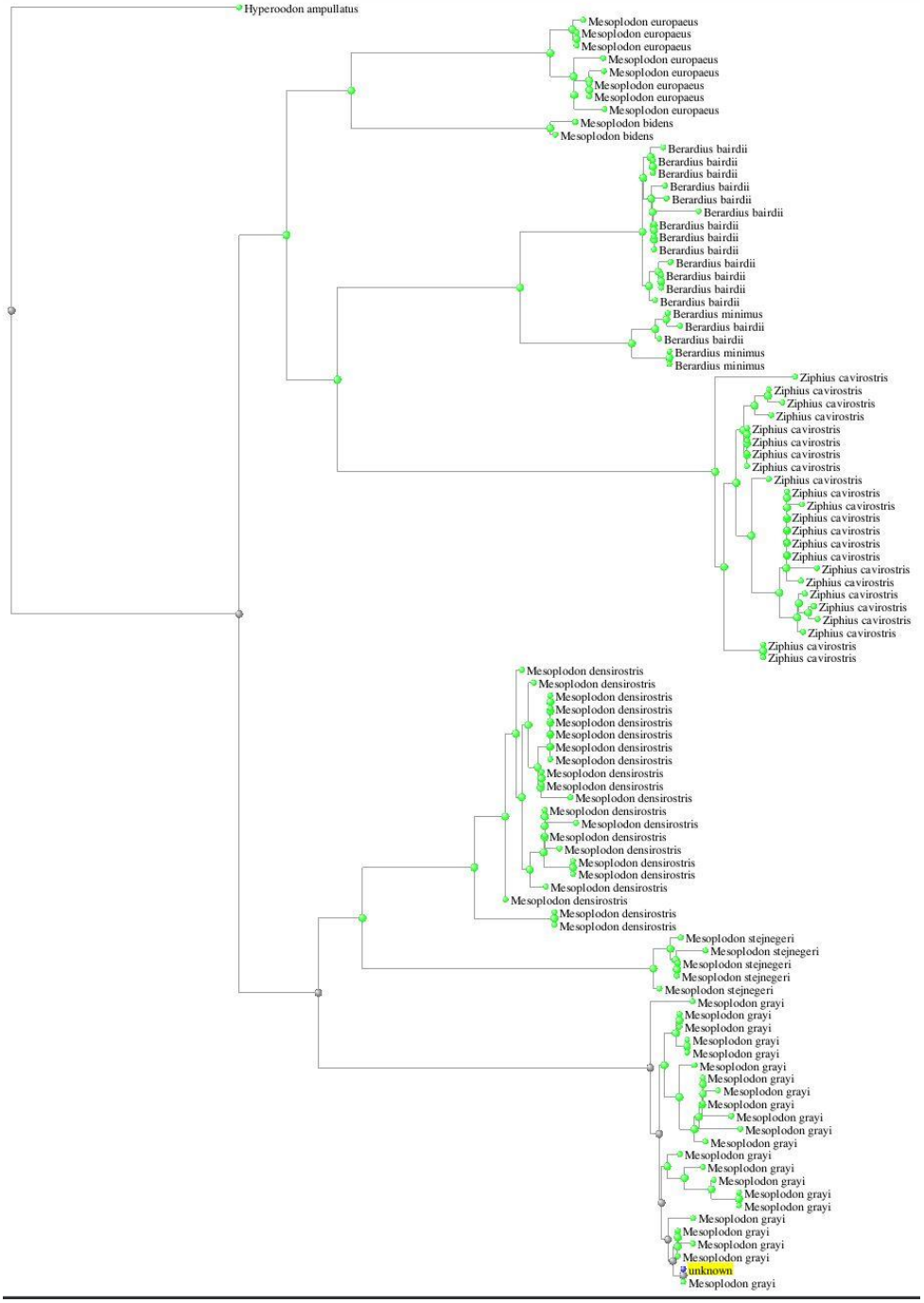

Figure 3. Yellow indicates the queried (sample) region. Green are GenBank sequence accessions with significant sequence alignment.

Conclusion

T18381 has the greatest sequence alignment with and is identified as a Gray's beaked whale, *M. grayi*.