

Mediterranean Marine Science

Vol 23, No 3 (2022)

VOL 23, No 3 (2022)



Different patterns of population structure and genetic diversity of three mesopelagic fishes in the Greek Seas

XENIA SARROPOULOU, DIMITRIS TSAPARIS,
KONSTANTINOS TSAGARAKIS, NICHOLAS
BADOUVAS, COSTAS S. TSIGENOPOULOS

doi: [10.12681/mms.28567](https://doi.org/10.12681/mms.28567)

To cite this article:

SARROPOULOU, X. ., TSAPARIS, D. ., TSAGARAKIS, K. ., BADOUVAS, N. ., & TSIGENOPOULOS, C. S. (2022). Different patterns of population structure and genetic diversity of three mesopelagic fishes in the Greek Seas. *Mediterranean Marine Science*, 23(3), 536–545. <https://doi.org/10.12681/mms.28567>

Different patterns of population structure and genetic diversity of three mesopelagic fishes in the Greek Seas

**Xenia SARROPOULOU, Dimitris TSAPARIS, Konstantinos TSAGARAKIS, Nicholas BADOUVAS
and Costas S. TSIGENOPOULOS**

Mediterranean Marine Science, 23 (3) 2022

Table S1. General information on the *H. benoiti* specimens used in the present study.

AA	Specimen ID	Region	LONG (DD)	LAT (DD)	COI		12S		16S	
					Haplotype	Genbank	Haplotype	Genbank	Haplotype	Genbank
Hb_01	Bg_Kor_aut_01	Corinthian Gulf	38.10/	22.81/	HHB_COI_01	OK353945	HHB_12S_01	OK354211	HHB_16S_01	OK354267
Hb_02	Bg_Kor_aut_02				HHB_COI_01	OK353946	HHB_12S_01	OK354212	HHB_16S_01	OK354268
Hb_03	Bg_Kor_aut_06				HHB_COI_01	OK353947	HHB_12S_01	OK354213	HHB_16S_01	OK354269
Hb_04	Bg_Kor_aut_07				HHB_COI_01	OK353948	HHB_12S_01	OK354214	HHB_16S_01	OK354270
Hb_05	H.b_Kor_sp_01				HHB_COI_01	OK353949	HHB_12S_01	OK354215	HHB_16S_01	OK354271
Hb_06	H.b_Kor_sp_02				HHB_COI_01	OK353950	HHB_12S_01	OK354216	HHB_16S_02	OK354272
Hb_07	H.b_Kor_sp_03				HHB_COI_01	OK353951	HHB_12S_01	OK354217	HHB_16S_01	OK354273
Hb_08	Hb_Kor_aut_04				HHB_COI_01	OK353952	HHB_12S_01	OK354218	HHB_16S_01	OK354274
Hb_09	Hb_Kor_sp_06				HHB_COI_01	OK353953	HHB_12S_02	OK354219	HHB_16S_02	OK354275
Hb_10	Hb_Kor_aut_06				HHB_COI_01	OK353954	HHB_12S_01	OK354220	HHB_16S_02	OK354276
Hb_11	H.b_Kor_sp_07				HHB_COI_01	OK353955	HHB_12S_01	OK354221	HHB_16S_01	OK354277
Hb_12	Hb_Kor_sp_09				HHB_COI_01	OK353956	HHB_12S_01	OK354222	HHB_16S_01	OK354278
Hb_13	Hb_Kor_aut_09				HHB_COI_01	OK353957	HHB_12S_03	OK354223	HHB_16S_01	OK354279
Hb_14	Hb_Kor_sp_10				HHB_COI_01	OK353958	HHB_12S_03	OK354224	HHB_16S_01	OK354280
Hb_15	Hb_Sar_sp_02	Saronic Gulf	37.64/	23.20/	HHB_COI_01	OK353959	HHB_12S_01	OK354225	HHB_16S_03	OK354281
Hb_16	Hb_Sar_sp_03				HHB_COI_01	OK353960	HHB_12S_01	OK354226	HHB_16S_02	OK354282
Hb_17	Hb_Sar_sp_05				HHB_COI_01	OK353961	HHB_12S_01	OK354227	HHB_16S_02	OK354283
Hb_18	Hb_Sar_sp_08				HHB_COI_01	OK353962	HHB_12S_01	OK354228	HHB_16S_02	OK354284
Hb_19	Hb_Sar_sp_09				HHB_COI_01	OK353963	HHB_12S_01	OK354229	HHB_16S_02	OK354285
Hb_20	Hb_Sar_sp_10				HHB_COI_01	OK353964	HHB_12S_01	OK354230	HHB_16S_02	OK354286
Hb_21	Hb_Sar_11				HHB_COI_02	OK353965	HHB_12S_04	OK354231	HHB_16S_02	OK354287
Hb_22	Hb_Sar_12				HHB_COI_01	OK353966	HHB_12S_01	OK354232	HHB_16S_04	OK354288
Hb_23	Hb_Sar_13				HHB_COI_01	OK353967	HHB_12S_01	OK354233	HHB_16S_05	OK354289
Hb_24	Hb_Sar_14				HHB_COI_01	OK353968	HHB_12S_01	OK354234	HHB_16S_06	OK354290
Hb_25	Hb_Sar_15				HHB_COI_01	OK353969	HHB_12S_01	OK354235	HHB_16S_01	OK354291
Hb_26	Hb_Sar_16				HHB_COI_01	OK353970	HHB_12S_01	OK354236	HHB_16S_07	OK354292
Hb_27	Hb_Sar_17				HHB_COI_01	OK353971	HHB_12S_01	OK354237	HHB_16S_02	OK354293
Hb_28	Hb_Sar_18				HHB_COI_01	OK353972	HHB_12S_01	OK354238	HHB_16S_08	OK354294

Continued

Table S1 continued

AA	Specimen ID	Region	LONG (DD)	LAT (DD)	COI		12S		16S	
					Haplotype	Genbank	Haplotype	Genbank	Haplotype	Genbank
Hb_29	Hb_NAT_02	North Aegean Sea	39.81	23.93	HHB_COI_01	OK353973	HHB_12S_01	OK354239	HHB_16S_02	OK354295
Hb_30	Hb_NAT_03				HHB_COI_01	OK353974	HHB_12S_05	OK354240	HHB_16S_02	OK354296
Hb_31	Hb_NAT_04				HHB_COI_01	OK353975	HHB_12S_01	OK354241	HHB_16S_02	OK354297
Hb_32	Hb_NAT_05				HHB_COI_01	OK353976	HHB_12S_01	OK354242	HHB_16S_02	OK354298
Hb_33	Hb_NAT_07				HHB_COI_01	OK353977	HHB_12S_06	OK354243	HHB_16S_02	OK354299
Hb_34	Hb_NAT_08				HHB_COI_01	OK353978	HHB_12S_01	OK354244	HHB_16S_02	OK354300
Hb_35	Hb_NAT_09				HHB_COI_01	OK353979	HHB_12S_01	OK354245	HHB_16S_02	OK354301
Hb_36	Hb_NAT_10				HHB_COI_01	OK353980	HHB_12S_01	OK354246	HHB_16S_02	OK354302
Hb_37	Hb_NAT_11				HHB_COI_01	OK353981	HHB_12S_01	OK354247	HHB_16S_02	OK354303
Hb_38	Hb_NAT_12				HHB_COI_01	OK353982	HHB_12S_01	OK354248	HHB_16S_02	OK354304
Hb_39	Hb_NAT_14				HHB_COI_01	OK353983	HHB_12S_01	OK354249	HHB_16S_09	OK354305
Hb_40	Hb_NAT_16				HHB_COI_01	OK353984	HHB_12S_01	OK354250	HHB_16S_02	OK354306
Hb_41	Hb_NAT_18				HHB_COI_01	OK353985	HHB_12S_01	OK354251	HHB_16S_10	OK354307
Hb_42	Hb_NAT_20				HHB_COI_01	OK353986	HHB_12S_01	OK354252	HHB_16S_11	OK354308
Hb_43	Hb_Her_01	Cretan Sea	35.45/	25.07/	HHB_COI_01	OK353987	HHB_12S_01	OK354253	HHB_16S_02	OK354309
Hb_44	Hb_Her_02				HHB_COI_01	OK353988	HHB_12S_01	OK354254	HHB_16S_02	OK354310
Hb_45	Hb_Her_03				HHB_COI_01	OK353989	HHB_12S_01	OK354255	HHB_16S_02	OK354311
Hb_46	Hb_Her_05				HHB_COI_01	OK353990	HHB_12S_01	OK354256	HHB_16S_02	OK354312
Hb_47	Hb_Her_06				HHB_COI_01	OK353991	HHB_12S_01	OK354257	HHB_16S_02	OK354313
Hb_48	Hb_Her_07				HHB_COI_01	OK353992	HHB_12S_01	OK354258	HHB_16S_02	OK354314
Hb_49	Hb_Her_08				HHB_COI_03	OK353993	HHB_12S_01	OK354259	HHB_16S_12	OK354315
Hb_50	Hb_Her_09				HHB_COI_01	OK353994	HHB_12S_01	OK354260	HHB_16S_02	OK354316
Hb_51	Hb_Her_10				HHB_COI_01	OK353995	HHB_12S_01	OK354261	HHB_16S_02	OK354317
Hb_52	Hb_Her_11				HHB_COI_01	OK353996	HHB_12S_01	OK354262	HHB_16S_13	OK354318
Hb_53	Hb_Her_12				HHB_COI_01	OK353997	HHB_12S_01	OK354263	HHB_16S_02	OK354319
Hb_54	Hb_Her_13				HHB_COI_01	OK353998	HHB_12S_01	OK354264	HHB_16S_14	OK354320
Hb_55	Hb_Her_14				HHB_COI_01	OK353999	HHB_12S_01	OK354265	HHB_16S_02	OK354321
Hb_56	Hb_Her_15				HHB_COI_01	OK354000	HHB_12S_01	OK354266	HHB_16S_02	OK354322

Table S2. General information on the *M. muelleri* specimens used in the present study.

AA	Specimen ID	Region	LONG (DD)	LAT (DD)	COI		12S		16S	
					Haplotype	Genbank	Haplotype	Genbank	Haplotype	Genbank
Mm_01	Mm_Kor_01	Corinthian Gulf	38.36	22.12	HMM_COI_01	OK337619	HMM_12S_01	OK356812	HMM_16S_01	OK354001
Mm_02	Mm_Kor_02				HMM_COI_02	OK337620	HMM_12S_01	OK356813	HMM_16S_01	OK354002
Mm_03	Mm_Kor_03				HMM_COI_03	OK337621	HMM_12S_01	OK356814	HMM_16S_01	OK354003
Mm_04	Mm_Kor_04				HMM_COI_04	OK337622	HMM_12S_02	OK356815	HMM_16S_01	OK354004
Mm_05	Mm_Kor_05				HMM_COI_02	OK337623	HMM_12S_01	OK356816	HMM_16S_02	OK354005
Mm_06	Mm_Kor_06				HMM_COI_02	OK337624	HMM_12S_01	OK356817	HMM_16S_03	OK354006
Mm_07	Mm_Kor_07				HMM_COI_02	OK337625	HMM_12S_01	OK356818	HMM_16S_01	OK354007
Mm_08	Mm_Kor_08				HMM_COI_02	OK337626	HMM_12S_01	OK356819	HMM_16S_01	OK354008
Mm_09	Mm_Kor_10				HMM_COI_02	OK337627	HMM_12S_03	OK356820	HMM_16S_04	OK354009
Mm_10	Mm_Kor_11				HMM_COI_04	OK337628	HMM_12S_02	OK356821	HMM_16S_01	OK354010
Mm_11	Mm_Kor_12				HMM_COI_02	OK337629	HMM_12S_01	OK356822	HMM_16S_05	OK354011
Mm_12	Mm_Kor_13				HMM_COI_02	OK337630	HMM_12S_01	OK356823	HMM_16S_01	OK354012
Mm_13	Mm_Kor_16				HMM_COI_04	OK337631	HMM_12S_01	OK356824	HMM_16S_01	OK354013
Mm_14	Mm_Kor_17				HMM_COI_05	OK337632	HMM_12S_01	OK356825	HMM_16S_01	OK354014
Mm_15	Mm_Sar_01	Saronic Gulf	37.73	23.22	HMM_COI_02	OK337633	HMM_12S_01	OK356826	HMM_16S_01	OK354015
Mm_16	Mm_Sar_02				HMM_COI_02	OK337634	HMM_12S_01	OK356827	HMM_16S_01	OK354016
Mm_17	Mm_Sar_03				HMM_COI_02	OK337635	HMM_12S_01	OK356828	HMM_16S_01	OK354017
Mm_18	Mm_Sar_04				HMM_COI_02	OK337636	HMM_12S_04	OK356829	HMM_16S_01	OK354018
Mm_19	Mm_Sar_06				HMM_COI_02	OK337637	HMM_12S_01	OK356830	HMM_16S_01	OK354019
Mm_20	Mm_Sar_08				HMM_COI_02	OK337638	HMM_12S_01	OK356831	HMM_16S_06	OK354020
Mm_21	Mm_Sar_09				HMM_COI_02	OK337639	HMM_12S_01	OK356832	HMM_16S_01	OK354021
Mm_22	Mm_Sar_10				HMM_COI_02	OK337640	HMM_12S_01	OK356833	HMM_16S_01	OK354022
Mm_23	Mm_Sar_13				HMM_COI_02	OK337641	HMM_12S_01	OK356834	HMM_16S_01	OK354023
Mm_24	Mm_Sar_14				HMM_COI_02	OK337642	HMM_12S_01	OK356835	HMM_16S_01	OK354024
Mm_25	Mm_Sar_16				HMM_COI_02	OK337643	HMM_12S_01	OK356836	HMM_16S_01	OK354025
Mm_26	Mm_Sar_17				HMM_COI_04	OK337644	HMM_12S_01	OK356837	HMM_16S_01	OK354026
Mm_27	Mm_Sar_18				HMM_COI_02	OK337645	HMM_12S_01	OK356838	HMM_16S_01	OK354027
Mm_28	Mm_Sar_19				HMM_COI_02	OK337646	HMM_12S_05	OK356839	HMM_16S_01	OK354028
Mm_29	Mm_Lim_01	North Aegean Sea	39.92	24.89	HMM_COI_02	OK337647	HMM_12S_01	OK356840	HMM_16S_01	OK354029
Mm_30	Mm_Lim_04				HMM_COI_02	OK337648	HMM_12S_01	OK356841	HMM_16S_07	OK354030
Mm_31	Mm_Lim_05				HMM_COI_02	OK337649	HMM_12S_01	OK356842	HMM_16S_06	OK354031
Mm_32	M.m_Lim_07				HMM_COI_04	OK337650	HMM_12S_01	OK356843	HMM_16S_08	OK354032
Mm_33	M.m_Lim_08				HMM_COI_02	OK337651	HMM_12S_01	OK356844	HMM_16S_01	OK354033
Mm_34	Mm_Lim_11				HMM_COI_02	OK337652	HMM_12S_01	OK356845	HMM_16S_01	OK354034
Mm_35	Mm_Lim_12				HMM_COI_02	OK337653	HMM_12S_01	OK356846	HMM_16S_01	OK354035
Mm_36	M.m_Lim_13				HMM_COI_06	OK337654	HMM_12S_01	OK356847	HMM_16S_01	OK354036
Mm_37	M.m_Lim_14				HMM_COI_04	OK337655	HMM_12S_01	OK356848	HMM_16S_01	OK354037
Mm_38	M.m_Lim_15				HMM_COI_02	OK337656	HMM_12S_06	OK356849	HMM_16S_01	OK354038
Mm_39	Mm_Lim_16				HMM_COI_07	OK337657	HMM_12S_01	OK356850	HMM_16S_09	OK354039
Mm_40	M.m_Lim_17				HMM_COI_02	OK337658	HMM_12S_01	OK356851	HMM_16S_01	OK354040
Mm_41	M.m_Lim_19				HMM_COI_07	OK337659	HMM_12S_01	OK356852	HMM_16S_01	OK354041
Mm_42	M.m_Lim_20				HMM_COI_07	OK337660	HMM_12S_01	OK356853	HMM_16S_01	OK354042

Continued

Table S2 continued

AA	Specimen ID	Region	LONG (DD)	LAT (DD)	COI		12S		16S	
					Haplotype	Genbank	Haplotype	Genbank	Haplotype	Genbank
Mm_43	Mm_Her_01	Cretan Sea	35.47	25.16	HMM_COI_07	OK337661	HMM_12S_01	OK356854	HMM_16S_01	OK354043
Mm_44	Mm_Her_03				HMM_COI_08	OK337662	HMM_12S_01	OK356855	HMM_16S_01	OK354044
Mm_45	Mm_Her_04				HMM_COI_09	OK337663	HMM_12S_01	OK356856	HMM_16S_01	OK354045
Mm_46	Mm_Her_06				HMM_COI_04	OK337664	HMM_12S_07	OK356857	HMM_16S_01	OK354046
Mm_47	Mm_Her_07				HMM_COI_02	OK337665	HMM_12S_01	OK356858	HMM_16S_01	OK354047
Mm_48	Mm_Her_09				HMM_COI_04	OK337666	HMM_12S_08	OK356859	HMM_16S_01	OK354048
Mm_49	Mm_Her_11				HMM_COI_02	OK337667	HMM_12S_01	OK356860	HMM_16S_01	OK354049
Mm_50	Mm_Her_12				HMM_COI_02	OK337668	HMM_12S_09	OK356861	HMM_16S_01	OK354050
Mm_51	Mm_Her_13				HMM_COI_02	OK337669	HMM_12S_10	OK356862	HMM_16S_01	OK354051
Mm_52	Mm_Her_15				HMM_COI_02	OK337670	HMM_12S_06	OK356863	HMM_16S_01	OK354052
Mm_53	Mm_Her_16				HMM_COI_02	OK337671	HMM_12S_01	OK356864	HMM_16S_01	OK354053
Mm_54	Mm_Her_17				HMM_COI_02	OK337672	HMM_12S_06	OK356865	HMM_16S_01	OK354054
Mm_55	Mm_Her_18				HMM_COI_02	OK337673	HMM_12S_01	OK356866	HMM_16S_10	OK354055
Mm_56	Mm_Her_19				HMM_COI_02	OK337674	HMM_12S_01	OK356867	HMM_16S_01	OK354056

Table S3. General information on the *B. glaciale* specimens used in the present study.

AA	Specimen ID	Region	LONG (DD)	LAT (DD)	COI		12S		16S	
					Haplotype	Genbank	Haplotype	Genbank	Haplotype	Genbank
Bg_01	Bg_Kor_sp_01	Corinthian Gulf	38.15/ 38.10	22.73/ 22.81	HBG_COI_01	OK353887	HBG_12S_01	OK354057	HBG_16S_01	OK354114
Bg_02	Bg_Kor_sp_02				HBG_COI_01	OK353888	HBG_12S_01	OK354058	HBG_16S_01	OK354115
Bg_03	Bg_Kor_aut_04				HBG_COI_01	OK353889	HBG_12S_01	OK354059	HBG_16S_01	OK354116
Bg_04	Hb_Kor_sp_04				HBG_COI_02	OK353890	HBG_12S_01	OK354060	HBG_16S_02	OK354117
Bg_05	Bg_Kor_aut_05				HBG_COI_01	OK353891	HBG_12S_02	OK354061	HBG_16S_01	OK354118
Bg_06	Bg_Kor_aut_09				HBG_COI_01	OK353892	HBG_12S_01	OK354062	HBG_16S_03	OK354119
Bg_07	Bg_Kor_aut_10				HBG_COI_03	OK353893	HBG_12S_03	OK354063	HBG_16S_01	OK354120
Bg_08	Bg_Kor_aut_11				HBG_COI_01	OK353894	HBG_12S_01	OK354064	HBG_16S_04	OK354121
Bg_09	Bg_Kor_aut_12				HBG_COI_01	OK353895	HBG_12S_04	OK354065	HBG_16S_01	OK354122
Bg_10	Bg_Kor_aut_13				HBG_COI_01	OK353896	HBG_12S_01	OK354066	HBG_16S_01	OK354123
Bg_11	Bg_Kor_aut_14				HBG_COI_04	OK353897	HBG_12S_01	OK354067	HBG_16S_01	OK354124
Bg_12	Bg_Kor_aut_16				HBG_COI_01	OK353898	HBG_12S_01	OK354068	HBG_16S_01	OK354125
Bg_13	Bg_Kor_aut_17				HBG_COI_05	OK353899	HBG_12S_01	OK354069	HBG_16S_01	OK354126
Bg_14	Bg_Kor_aut_18				HBG_COI_01	OK353900	HBG_12S_01	OK354070	HBG_16S_01	OK354127
Bg_15	Bg_Sar_sp_01	Saronic Gulf	37.61/ 37.64	23.27/ 23.20	HBG_COI_01	OK353901	HBG_12S_01	OK354071	HBG_16S_01	OK354128
Bg_16	Bg_Sar_sp_02				HBG_COI_06	OK353902	HBG_12S_01	OK354072	HBG_16S_05	OK354129
Bg_17	Bg_Sar_sp_03				HBG_COI_01	OK353903	HBG_12S_01	OK354073	HBG_16S_06	OK354130
Bg_18	Bg_Sar_sp_04				HBG_COI_01	OK353904	HBG_12S_01	OK354074	HBG_16S_01	OK354131
Bg_19	Bg_Sar_sp_05				HBG_COI_07	OK353905	HBG_12S_05	OK354075	HBG_16S_01	OK354132
Bg_20	Bg_Sar_sp_06				HBG_COI_01	OK353906	HBG_12S_01	OK354076	HBG_16S_07	OK354133
Bg_21	Bg_Sar_sp_07				HBG_COI_08	OK353907	HBG_12S_01	OK354077	HBG_16S_08	OK354134
Bg_22	Bg_Sar_sp_09				HBG_COI_01	OK353908	HBG_12S_01	OK354078	HBG_16S_01	OK354135
Bg_23	Bg_Sar_sp_10				HBG_COI_01	OK353909	HBG_12S_01	OK354079	HBG_16S_01	OK354136
Bg_24	Bg_Sar_sp_11				HBG_COI_01	OK353910	HBG_12S_01	OK354080	HBG_16S_01	OK354137
Bg_25	Bg_Sar_sp_12				HBG_COI_01	OK353911	HBG_12S_01	OK354081	HBG_16S_01	OK354138
Bg_26	Bg_Sar_sp_13				HBG_COI_09	OK353912	HBG_12S_01	OK354082	HBG_16S_05	OK354139
Bg_27	Bg_Sar_sp_18				HBG_COI_10	OK353913	HBG_12S_01	OK354083	HBG_16S_01	OK354140
Bg_28	Bg_Sar_sp_19				HBG_COI_01	OK353914	HBG_12S_01	OK354084	HBG_16S_01	OK354141
Bg_29	Bg_NAT_01	North Aegean Sea	39.81	23.93	HBG_COI_11	OK353915	HBG_12S_01	OK354085	HBG_16S_01	OK354142
Bg_30	Bg_NAT_02				HBG_COI_10	OK353916	HBG_12S_01	OK354086	HBG_16S_01	OK354143
Bg_31	Bg_NAT_03				HBG_COI_12	OK353917	HBG_12S_01	OK354087	HBG_16S_09	OK354144
Bg_32	Bg_NAT_06				HBG_COI_13	OK353918	HBG_12S_06	OK354088	HBG_16S_05	OK354145
Bg_33	Bg_NAT_07				HBG_COI_01	OK353919	HBG_12S_01	OK354089	HBG_16S_10	OK354146
Bg_34	Bg_NAT_08				HBG_COI_14	OK353920	HBG_12S_07	OK354090	HBG_16S_01	OK354147
Bg_35	Bg_NAT_09				HBG_COI_01	OK353921	HBG_12S_01	OK354091	HBG_16S_01	OK354148
Bg_36	Bg_NAT_11				HBG_COI_01	OK353922	HBG_12S_01	OK354092	HBG_16S_11	OK354149
Bg_37	Bg_NAT_12				HBG_COI_15	OK353923	HBG_12S_01	OK354093	HBG_16S_01	OK354150
Bg_38	Bg_NAT_14				HBG_COI_01	OK353924	HBG_12S_01	OK354094	HBG_16S_01	OK354151
Bg_39	Bg_NAT_15				HBG_COI_16	OK353925	HBG_12S_01	OK354095	HBG_16S_01	OK354152
Bg_40	Bg_NAT_16				HBG_COI_13	OK353926	HBG_12S_08	OK354096	HBG_16S_01	OK354153
Bg_41	Bg_NAT_17				HBG_COI_01	OK353927	HBG_12S_01	OK354097	HBG_16S_01	OK354154
Bg_42	Bg_NAT_19				HBG_COI_17	OK353928	HBG_12S_01	OK354098	HBG_16S_01	OK354155

Continued

Table S3 continued

AA	Specimen ID	Region	LONG (DD)	LAT (DD)	COI		12S		16S	
					Haplotype	Genbank	Haplotype	Genbank	Haplotype	Genbank
Bg_43	Bg_Her_01	Cretan Sea	35.50	25.01	HBG_COI_18	OK353929	HBG_12S_01	OK354099	HBG_16S_01	OK354156
Bg_44	Bg_Her_02				HBG_COI_01	OK353930	HBG_12S_01	OK354100	HBG_16S_01	OK354157
Bg_45	Bg_Her_03				HBG_COI_03	OK353931	HBG_12S_01	OK354101	HBG_16S_01	OK354158
Bg_46	Bg_Her_04				HBG_COI_01	OK353932	HBG_12S_01	OK354102	HBG_16S_01	OK354159
Bg_47	Bg_Her_05				HBG_COI_01	OK353933	HBG_12S_01	OK354103	HBG_16S_12	OK354160
Bg_48	Bg_Her_06				HBG_COI_03	OK353934	HBG_12S_01	OK354104	HBG_16S_01	OK354161
Bg_49	Bg_Her_07				HBG_COI_01	OK353935	HBG_12S_01	OK354105	HBG_16S_01	OK354162
Bg_50	Bg_Her_08				HBG_COI_01	OK353936	HBG_12S_01	OK354106	HBG_16S_01	OK354163
Bg_51	Bg_Her_09				HBG_COI_01	OK353937	HBG_12S_01	OK354107	HBG_16S_01	OK354164
Bg_52	Bg_Her_10				HBG_COI_03	OK353938	HBG_12S_01	OK354108	HBG_16S_13	OK354165
Bg_53	Bg_Her_11				HBG_COI_19	OK353939	HBG_12S_01	OK354109	HBG_16S_01	OK354166
Bg_54	Bg_Her_12				HBG_COI_03	OK353940	HBG_12S_01	OK354110	HBG_16S_14	OK354167
Bg_55	Bg_Her_13				HBG_COI_01	OK353941	HBG_12S_01	OK354111	HBG_16S_01	OK354168
Bg_56	Bg_Her_14				HBG_COI_01	OK353942	HBG_12S_01	OK354112	HBG_16S_15	OK354169

Table S4. Information on the COI sequences from Genbank and BOLD databases used for phylogeographic analyses.

AA	Species	Sampling Location	Genbank	BOLD	Reference	Comments
1	<i>H. benoiti</i>	Balearic Sea	KC616370		-	
2	<i>H. benoiti</i>	Balearic Sea	KC616371		-	
3	<i>H. benoiti</i>	Balearic Sea	KC616372		-	
4	<i>H. benoiti</i>	Balearic Sea	KC616374		-	
5	<i>H. benoiti</i>	Sicily	KP337919		Pappalardo <i>et al.</i> , 2015	Haplotype sequence - 3 specimens
6	<i>H. benoiti</i>	Sicily	KP337920		Pappalardo <i>et al.</i> , 2015	Haplotype sequence - 2 specimens
7	<i>H. benoiti</i>	Sicily	KP337921		Pappalardo <i>et al.</i> , 2015	
8	<i>H. benoiti</i>	Sicily	KP337922		Pappalardo <i>et al.</i> , 2015	
9	<i>H. benoiti</i>	Sicily	KP337923		Pappalardo <i>et al.</i> , 2015	Haplotype sequence - 7 specimens
10	<i>H. benoiti</i>	Sicily	KP337924		Pappalardo <i>et al.</i> , 2015	
11	<i>H. benoiti</i>	Turkey	HQ167651		-	
12	<i>H. benoiti</i>	North Atlantic Ocean	EU148200		-	
13	<i>H. benoiti</i>	North Atlantic Ocean	EU148201		-	
14	<i>H. benoiti</i>	North Atlantic Ocean	EU148202		-	
15	<i>H. benoiti</i>	Gulf of Mexico	MF040977		-	
16	<i>H. benoiti</i>	Gulf of Mexico	MF041015		-	
17	<i>H. benoiti</i>	Gulf of Mexico	MF041064		-	
18	<i>H. benoiti</i>	Gulf of Mexico	MF041296		-	
19	<i>H. benoiti</i>	Gulf of Mexico	MF041355		-	

Continued

Table S4 continued

AA	Species	Sampling Location	Genbank	BOLD	Reference	Comments
20	<i>H. benoiti</i>	Gulf of Mexico	MF041389		-	
21	<i>H. benoiti</i>	Gulf of Mexico	MF041441		-	
22	<i>H. benoiti</i>	Gulf of Mexico	MF041559		-	
23	<i>H. benoiti</i>	Gulf of Mexico	MF041573		-	
24	<i>H. benoiti</i>	Gulf of Mexico	MF041579		-	
25	<i>M. muelleri</i>	Balearic Sea	KC616398		-	
26	<i>M. muelleri</i>	Balearic Sea	KC616399		-	
27	<i>M. muelleri</i>	Balearic Sea	KC616400		-	
28	<i>M. muelleri</i>	Balearic Sea	KC616401		-	
29	<i>M. muelleri</i>	Balearic Sea	KC616402		-	
30	<i>M. muelleri</i>	Balearic Sea	MT132274		Rees <i>et al.</i> , 2020	
31	<i>M. muelleri</i>	Balearic Sea	MT132275		Rees <i>et al.</i> , 2020	
32	<i>M. muelleri</i>	Balearic Sea	MT132276		Rees <i>et al.</i> , 2020	
33	<i>M. muelleri</i>	Balearic Sea	MT132277		Rees <i>et al.</i> , 2020	
34	<i>M. muelleri</i>	Balearic Sea	MT132279		Rees <i>et al.</i> , 2020	
35	<i>M. muelleri</i>	Balearic Sea	MT132280		Rees <i>et al.</i> , 2020	
36	<i>M. muelleri</i>	Balearic Sea	MT132281		Rees <i>et al.</i> , 2020	
37	<i>M. muelleri</i>	Balearic Sea	MT132282		Rees <i>et al.</i> , 2020	
38	<i>M. muelleri</i>	Balearic Sea	MT132283		Rees <i>et al.</i> , 2020	
39	<i>M. muelleri</i>	Balearic Sea	MT132284		Rees <i>et al.</i> , 2020	
40	<i>M. muelleri</i>	Sicily	KJ709557		Landi <i>et al.</i> , 2014	
41	<i>M. muelleri</i>	Sicily	KJ709558		Landi <i>et al.</i> , 2014	
42	<i>M. muelleri</i>	Levant Basin	-	BIM635-19	-	
43	<i>M. muelleri</i>	Azores	MT132252		Rees <i>et al.</i> , 2020	
44	<i>M. muelleri</i>	Azores	MT132262		Rees <i>et al.</i> , 2020	
45	<i>M. muelleri</i>	Azores	MT132270		Rees <i>et al.</i> , 2020	
46	<i>M. muelleri</i>	Azores	MT132278		Rees <i>et al.</i> , 2020	
47	<i>M. muelleri</i>	Azores	MT132298		Rees <i>et al.</i> , 2020	
48	<i>M. muelleri</i>	North Atlantic Ocean	EU148245		-	
49	<i>M. muelleri</i>	North Atlantic Ocean	EU148246		-	
50	<i>M. muelleri</i>	North Atlantic Ocean	EU148247		-	
51	<i>M. muelleri</i>	North Atlantic Ocean	KU958034		Rees <i>et al.</i> , 2017	
52	<i>M. muelleri</i>	North Atlantic Ocean	KU958039		Rees <i>et al.</i> , 2017	
53	<i>M. muelleri</i>	North Atlantic Ocean	MT132216		Rees <i>et al.</i> , 2020	
54	<i>M. muelleri</i>	North Atlantic Ocean	MT132224		Rees <i>et al.</i> , 2020	
55	<i>M. muelleri</i>	North Atlantic Ocean	MT132234		Rees <i>et al.</i> , 2020	
56	<i>M. muelleri</i>	North Atlantic Ocean	MT132238		Rees <i>et al.</i> , 2020	
57	<i>M. muelleri</i>	North Atlantic Ocean	MT132239		Rees <i>et al.</i> , 2020	
58	<i>M. muelleri</i>	North Atlantic Ocean	MT132240		Rees <i>et al.</i> , 2020	

Continued

Table S4 continued

AA	Species	Sampling Location	Genbank	BOLD	Reference	Comments
59	<i>M. muelleri</i>	North Atlantic Ocean	MT132241		Rees <i>et al.</i> , 2020	
60	<i>M. muelleri</i>	North Atlantic Ocean	MT132242		Rees <i>et al.</i> , 2020	
61	<i>M. muelleri</i>	North Atlantic Ocean	MT132243		Rees <i>et al.</i> , 2020	
62	<i>M. muelleri</i>	North Atlantic Ocean	MT132244		Rees <i>et al.</i> , 2020	
63	<i>M. muelleri</i>	North Atlantic Ocean	MT132245		Rees <i>et al.</i> , 2020	
64	<i>M. muelleri</i>	North Atlantic Ocean	MT132246		Rees <i>et al.</i> , 2020	
65	<i>M. muelleri</i>	North Atlantic Ocean	MT132247		Rees <i>et al.</i> , 2020	
66	<i>M. muelleri</i>	North Atlantic Ocean	MT132248		Rees <i>et al.</i> , 2020	
67	<i>M. muelleri</i>	North Atlantic Ocean	MT132249		Rees <i>et al.</i> , 2020	
68	<i>M. muelleri</i>	North Atlantic Ocean	MT132250		Rees <i>et al.</i> , 2020	
69	<i>M. muelleri</i>	North Atlantic Ocean	MT132251		Rees <i>et al.</i> , 2020	
70	<i>M. muelleri</i>	North Atlantic Ocean	MT132253		Rees <i>et al.</i> , 2020	
71	<i>M. muelleri</i>	North Atlantic Ocean	MT132308		Rees <i>et al.</i> , 2020	
72	<i>M. muelleri</i>	Norway	KU958033		Rees <i>et al.</i> , 2017	
73	<i>M. muelleri</i>	Norway	KU958038		Rees <i>et al.</i> , 2017	
74	<i>M. muelleri</i>	Norway	MT132254		Rees <i>et al.</i> , 2020	
75	<i>M. muelleri</i>	Norway	MT132255		Rees <i>et al.</i> , 2020	
76	<i>M. muelleri</i>	Norway	MT132256		Rees <i>et al.</i> , 2020	
77	<i>M. muelleri</i>	Norway	MT132257		Rees <i>et al.</i> , 2020	
78	<i>M. muelleri</i>	Norway	MT132258		Rees <i>et al.</i> , 2020	
79	<i>M. muelleri</i>	Norway	MT132259		Rees <i>et al.</i> , 2020	
80	<i>M. muelleri</i>	Norway	MT132260		Rees <i>et al.</i> , 2020	
81	<i>M. muelleri</i>	Norway	MT132261		Rees <i>et al.</i> , 2020	
82	<i>M. muelleri</i>	Norway	MT132263		Rees <i>et al.</i> , 2020	
83	<i>M. muelleri</i>	Norway	MT132264		Rees <i>et al.</i> , 2020	
84	<i>M. muelleri</i>	Norway	MT132271		Rees <i>et al.</i> , 2020	
85	<i>M. muelleri</i>	Norway	MT132272		Rees <i>et al.</i> , 2020	
86	<i>M. muelleri</i>	Norway	MT132273		Rees <i>et al.</i> , 2020	
87	<i>M. muelleri</i>	Norway	MT132304		Rees <i>et al.</i> , 2020	
88	<i>M. muelleri</i>	Norway	MT132305		Rees <i>et al.</i> , 2020	
89	<i>M. muelleri</i>	Norway	MT132306		Rees <i>et al.</i> , 2020	
90	<i>M. muelleri</i>	Norway	MT132307		Rees <i>et al.</i> , 2020	
91	<i>M. muelleri</i>	Norway	MT132309		-	
92	<i>M. muelleri</i>	Norway	MT132310		-	
93	<i>M. muelleri</i>	Norway	MT132311		-	
94	<i>M. muelleri</i>	Norway	MT132312		-	
95	<i>M. muelleri</i>	Norway	MT132313		-	
96	<i>M. muelleri</i>	Norway	-	NBMF265-17	-	
97	<i>M. muelleri</i>	Norway	-	NBMF266-17	-	

Continued

Table S4 continued

AA	Species	Sampling Location	Genbank	BOLD	Reference	Comments
98	<i>M. muelleri</i>	Norway	-	NBMF267-17	-	
99	<i>M. muelleri</i>	Norway	-	NBMF268-17	-	
100	<i>M. muelleri</i>	Greenland	-	GLF028-13	-	
101	<i>M. muelleri</i>	Greenland	-	GLF332-19	-	
102	<i>M. muelleri</i>	Greenland	-	GLF333-19	-	
103	<i>M. muelleri</i>	Greenland	-	GLF334-19	-	
104	<i>M. muelleri</i>	Arctic Ocean	MT132223		Rees <i>et al.</i> , 2020	
105	<i>B. glaciale</i>	Balearic Sea	KC616366		-	
106	<i>B. glaciale</i>	Turkey	HQ167646		-	
107	<i>B. glaciale</i>	North Atlantic Ocean	EU148097		-	
108	<i>B. glaciale</i>	North Atlantic Ocean	EU148098		-	
109	<i>B. glaciale</i>	Norway	-	DSFIB492-13	-	
110	<i>B. glaciale</i>	Norway	-	NBMF180-16	-	
111	<i>B. glaciale</i>	Norway	-	NBMF278-17	-	
112	<i>B. glaciale</i>	Norway	-	NBMF279-17	-	
113	<i>B. glaciale</i>	Norway	-	NBMF280-17	-	
114	<i>B. glaciale</i>	Canada	-	CMNAF078-06	-	
115	<i>B. glaciale</i>	Canada	-	SCAFB502-07	-	
116	<i>B. glaciale</i>	Canada	-	SCAFB510-07	-	
117	<i>B. glaciale</i>	Canada	-	SCAFB856-07	-	
118	<i>B. glaciale</i>	Canada	-	SCAFB857-07	-	
119	<i>B. glaciale</i>	Canada	-	SCFAD104-09	-	
120	<i>B. glaciale</i>	Canada	-	SCFAD105-09	-	
121	<i>B. glaciale</i>	Canada	KY033571		Kenchington <i>et al.</i> , 2017	
122	<i>B. glaciale</i>	Canada	KY033572		Kenchington <i>et al.</i> , 2017	
123	<i>B. glaciale</i>	Greenland	-	DSFIB674-15	-	
124	<i>B. glaciale</i>	Greenland	-	DSFIB720-16	-	
125	<i>B. glaciale</i>	Greenland	-	GLF025-13	-	
126	<i>B. glaciale</i>	Arctic Ocean	-	DSFIB493-13	-	
127	<i>B. glaciale</i>	Arctic Ocean	-	DSFIB494-13	-	