

**Table S1.** List of sequences from GenBank database added for the phylogenetic trees

GenBank ID	Original ID	Source	Locations	Note
KY682970	<i>Cystoseira barbata</i>	Rizzo et al. (2017)	Venice Lagoon, Italy	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
MF768073	<i>Cystoseira mauritanica</i>	Bruno de Sousa et al. (2019)	Cadiz, Spain	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
MF768074	<i>Cystoseira barbata f. repens</i>	Bruno de Sousa et al. (2019)	Cadiz, Spain	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
MF768075	<i>Cystoseira barbata</i>	Bruno de Sousa et al. (2019)	Cadiz, Spain	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
MT978057	<i>Treptacantha barbata</i>	Sadogurska et al. (2021)	Sicily, Italy	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
MT978058	<i>Treptacantha barbata</i>	Sadogurska et al. (2021)	Menorca, Spain	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480253	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Canary, Spain	
OK480254	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Canary, Spain	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480255	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Canary, Spain	
OK480256	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Algarve, Portugal	
OK480257	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Algarve, Portugal	
OK480258	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Tarifa, Spain	
OK480259	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Kaa Asserasse, Morocco	
OK480260	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Nadoor Lagoon, Morocco	
OK480261	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Nadoor Lagoon, Morocco	

OK480262	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Almeria, Spain	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480263	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Banyuls, France	
OK480264	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Banyuls, France	
OK480265	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Menorca, Spain	
OK480266	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Sicily, Italy	
OK480267	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Malta	
OK480268	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Numana, Italy	
OK480269	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Numana, Italy	
OK480270	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Vasto, Italy	
OK480271	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Vasto, Italy	
OK480272	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Crete, Greece	
OK480273	<i>Cystoseira compressa</i>	Neiva et al. (2022)	Haifa, Israel	
OK480303	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Gran Canaria, Spain	
OK480304	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Lanzarote, Spain	
OK480305	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480306	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480307	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480308	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480309	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480310	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480311	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480312	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480313	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480314	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480315	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	
OK480316	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Azores, Portugal	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480317	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Almeria, Spain	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480318	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Menorca, Spain	

OK480319	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Pantelleria, Italy	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480320	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Pantelleria, Italy	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480321	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Malta	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480322	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Mykonos, Greece	
OK480323	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Crete, Greece	
OK480324	<i>Cystoseira pustulata</i>	Neiva et al. (2022)	Crete, Greece	
OK480438	<i>Gongolaria barbata</i>	Neiva et al. (2022)	Menorca, Spain	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480439	<i>Gongolaria barbata</i>	Neiva et al. (2022)	Menorca, Spain	
OK480486	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Algarve, Portugal	
OK480487	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Andaluzia, Spain	
OK480488	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Andaluzia, Spain	
OK480489	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Nadoor Lagoon, Morocco	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480490	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Nadoor Lagoon, Morocco	
OK480491	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Tarifa Area, Spain	
OK480492	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Tarifa Area, Spain	
OK480493	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Tarifa Area, Spain	
OK480494	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Nadoor Area, Morocco	
OK480495	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Nadoor Area, Morocco	Used only for the phylogenetic tree of the first half of the Cox-1 gene portion
OK480496	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Nadoor Area, Morocco	
OK480497	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Nadoor Area, Morocco	
OK480498	<i>Gongolaria gibraltarica</i>	Neiva et al. (2022)	Nadoor Area, Morocco	

MH513832	<i>Cystoseira compressa</i>	Orellana et al. (2019)	Tenerife, Spain	Used only for the phylogenetic tree of the second half of the Cox-1 gene portion
MH513833	<i>Cystoseira sp.</i>	Orellana et al. (2019)	Tenerife, Spain	Used only for the phylogenetic tree of the second half of the Cox-1 gene portion
MN184240	<i>Himanthalia elongata</i>	Bringloe et al. (2019)	Norway	Outgroup for the phylogenetic tree of the first half of the Cox-1 gene portion
EU681409	<i>Himanthalia elongata</i>	Silberfeld et al. (2010)	Brittany, France	Outgroup for the phylogenetic tree of the second half of the Cox-1 gene portion