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The black goby *Gobius niger* Linnaeus, 1758 in the Marchica Lagoon (Alboran Sea, Morocco): spatio-temporal distribution, its environmental drivers, and the site-related footprint

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Fig. S1: A neighbour-joining tree including all the species of *Gobius* that are represented in the GenBank by a targeted fragment of the 16S rRNA gene. The tree was created in MEGA X using 1000 bootstrap replicas and the Kimura 2-P substitution model. The scale bar represents the number of expected substitutions per site.

Table S1. Summary of species included in the phylogenetic tree, with accession numbers and locations of each species.

Species	Accession number	Locations	References
Gobius niger	KJ128783 KF415385 EF218645 AF067269 FJ460203 FJ460202 FJ460201 FJ460192 AF491118 ON847339 ON847340 ON847341 ON847342	Sweden Baltic Sea (unspecified) Italy, Ancona Mediterranean Turkey Turkey Turkey Turkey Canary Islands Greece Greece Greece Greece	Ericson, 2020 Agoretta, 2013 Giovannotti, 2007 Penzo, 1998 Turan, 2016 Turan, 2016 Turan, 2016 Turan, 2016 Ruber, 2003
Gobius paganellus	AF518216 EF218651 FJ460204 AF067271	Unpublished Italy, Ancona Turkey Mediterranean	Giovannotti, 2007 Turan, 2016 Penzo, 1998
Gobius bucchichi	EF218642 FJ460197 AF067268	Italy, Napoli Turkey Mediterranean	Giovannotti, 2007 Turan, 2016 Penzo, 1998
Gobius cobitus	EF218644 FJ460198	Italy, Ancona Turkey	Giovannotti, 2007 Turan, 2016
Gobius cruentatus	EF218641	Italy, Napoli	Giovannotti, 2007
Gobius auratus	AF067267	Mediterranean	Penzo, 1998
Gobius xanthocephalus	AF491117	Spain, Gran Canaria, Puerto Rico	Ruber, 2003
Gobius vitatus	GQ485305	Turkey	Turan, 2016
Gobius couchi	FJ460199	Turkey	Turan, 2016
Gobius geniporus	FJ460200	Turkey	Turan, 2016

Table S2. Mean abundance of *Gobius niger* at different stations.

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
October	41	3	1	17	1	2	345	470	610	20	4	1	9	5	3	30	18	92	32	70
Novomber	37	21	1	0	0	3	150	130	28	29	5	1	2	1	2	16	60	58	70	116
December	22	6	10	7	2	1	63	88	20	1	0	0	0	1	8	1	4	9	40	66
January	11	14	1	49	0	6	90	52	12	7	1	0	0	1	1	3	14	13	51	30
February	2	16	9	0	0	24	67	103	60	3	4	1	18	7	0	5	17	80	57	40
March	10	26	5	0	0	5	113	76	56	3	1	0	0	3	5	7	20	102	60	30
April	6	93	8	0	1	1	74	116	78	3	0	0	5	3	1	15	26	110	108	144
May	12	176	143	0	62	5	66	494	49	6	9	1	22	3	15	29	8	87	103	113
June	130	6	3	0	0	1	9	300	69	4	5	0	50	0	10	68	15	100	44	90
July	36	174	5	0	0	3	196	643	121	9	2	0	14	0	3	0	36	190	11	90
August	43	6	56	0	0	26	190	230	24	19	8	2	4	5	5	2	45	19	27	80
September	94	37	6	0	53	7	42	430	25	19	3	3	48	1	27	9	0	41	36	43
Mean abundance	37	48	21	6	10	7	117	261	96	10	4	1	14	3	7	15	22	75	53	76

Table S3. Pairwise comparisons of *Gobius niger* abundance in term of factor station.

	S1	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S2	S20	S3	S4	S5	S6	S7	S8
S10	0.023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S11	0.005	0.039	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S12	0.005	0.005	0.016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S13	0.071	0.601	0.065	0.016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S14	0.005	0.016	0.468	0.056	0.042	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S15	0.012	0.400	0.271	0.016	0.295	0.116	-	-	-	-	-	-	-	-	-	-	-	-	-
S16	0.162	0.588	0.036	0.005	0.934	0.012	0.230	-	-	-	-	-	-	-	-	-	-	-	-
S17	0.300	0.056	0.005	0.005	0.395	0.009	0.012	0.468	-	-	-	-	-	-		-	-	-	-
S18	0.075	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	-	-	-	-	-	-	-	-	-	-
S19	0.326	0.005	0.005	0.005	0.005	0.005	0.005	0.009	0.009	0.297	-	-	-	-	-	-	-	-	-
S2	0.681	0.056	0.005	0.005	0.171	0.005	0.033	0.160	0.350	0.329	0.855	-	-	-	-	-	-	-	-
S20	0.051	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.964	0.184	0.326	-	-	-	-	-	-	-
S3	0.409	0.627	0.110	0.005	0.795	0.033	0.393	0.855	0.975	0.012	0.048	0.275	0.009	-	-	-	-	-	-
S4	0.009	0.540	0.809	0.312	0.329	0.647	0.953	0.295	0.042	0.005	0.005	0.042	0.005	0.312	-	-	-	-	-
S5	0.080	0.988	0.556	0.534	0.639	0.553	0.654	0.622	0.269	0.005	0.005	0.073	0.005	0.536	0.809	-	-	-	-
S6	0.009	0.455	0.300	0.005	0.301	0.163	0.964	0.243	0.030	0.005	0.005	0.023	0.005	0.448	0.925	0.758	-	-	-
S7	0.016	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.247	0.023	0.059	0.215	0.012	0.005	0.005	0.005	-	-
S8	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.0059	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.078	-
S9	0.296	0.005	0.005	0.005	0.009	0.005	0.005	0.009	0.026	0.960	0.657	0.557	0.944	0.073	0.005	0.005	0.005	0.797	0.056

Table S4. Meristic characters of *Gobius niger* from the Mediterranean Sea. N: number; m: mean; M: mode; S: standard deviation; Sm: standard error of the mean.

Meristic characters	N	Ranges	m	M	S	Sm
Rays on the first dorsal fin	60	6	6	6	0	0
Rays on the 2nd dorsal fin	60	13-14	13.80	14	0.4	0.05
Rays at the anal fin	60	11-13	12.46	13	0.56	0.07
Rays on the pectoral fin	60	15-18	16.75	17	0.64	0.08
Rays at the ventral fin	60	9-11	9.86	10	0.64	0.08

Table S5. Meristic characters of *Gobius niger* from Marchica Lagoon. N: number; m: mean; M: mode; S: standard deviation; Sm: standard error of the mean.

Meristic characters	N	Ranges	m	M	S	Sm
Rays on the first dorsal fin	60	6	6	6	0	0
Rays on the 2nd dorsal fin	60	13-14	13.75	14	0.43	0.05
Rays at the anal fin	60	12-13	12.56	13	0.49	0.06
Rays on the pectoral fin	60	15-17	16.13	16	0.42	0.05
Rays at the ventral fin	60	9-10	9.08	9	0.27	0.03

Table S6. Morphometric characters of *Gobius niger* from the Mediterranean Sea. N: number; m: mean; M: mode; S: standard deviation; Sm: standard error of the mean.

Morphometric characters	N	Ranges	m	M	S	Sm
Total length	60	9.8-16	13.40	13.5	1.42	0.218
Standard length	60	8.3-13	11.02	11	1.11	0.14
Head length	60	2.4-4	3.11	3	0.40	0.05
Snout length	60	0.6-1.5	1.05	1	0.20	0.02
Body height	60	1.5-3.1	2.52	2.5	0.24	0.0
Eye diameter	60	0.3-0.5	0.41	0.4	0.05	0.00

Table S7. Morphometric characters of *Gobius niger* from the Marchica Lagoon. N: number; m: mean; M: mode; S: standard deviation; Sm: standard error of the mean.

Morphometric characters	N	Ranges	m	M	S	Sm
Total length	60	7.3-13	10.38	11	1.40	0.18
Standard length	60	6-10.5	8.47	9	1.10	0.14
Head length	60	1.5-2.8	2.27	2.5	0.39	0.05
Snout length	60	0.5-1.2	0.88	1	0.15	0.01
Body height	60	0.8-2.4	1.73	1.5	0.35	0.04
Eye diameter	60	0.3-0.4	0.32	0.3	0.04	0.00

Table S8. Length-length relationships between various morphometric characters measured in *Gobius niger* from the Mediterranean Sea. TL: Total length; SL: Standard length; HL: Head length; BH: Body height; ED: Eye diameter; SnL: Snout length; N: number of specimens; a: intercept of relationship; b: slope of relationship; R^2: coefficient of determination.

Allometry equations Log y = a Log x + Log b	y (cm)	Range y (cm)	x (cm)	Range x (cm)	N	R^2	p-value
Log TL= 1.0287 Log SL + 0.0548	13.40	9.8-16	11.02	8.3-13	60	0.94	<0.05
Log HL = 1.1235 Log SL – 0.6795	3.11	2.4-4	11.02	8.3-13	60	0.78	<0.05
Log BH = 0.5207 Log SL – 0.1423	2.52	1.5-3.1	11.02	8.3-13	60	0.25	<0.05
Log ED = 0.5583 Log HL– 0.670	0.41	0.3-0.5	3.11	2.4-4	60	0.24	<0.05
Log SnL= 1.3554 Log HL – 0.6485	1.05	0.6-1.5	3.11	2.4-4	60	0.67	<0.05

Table S9. Length-length relationships between various morphometric characters measured in *Gobius niger* from the Marchica Lagoon. TL: Total length; SL: Standard length; HL: Head length; BH: Body height; ED: Eye diameter; SnL: Snout length; N: number of specimens; a: intercept of relationship; b: slope of relationship; R^2: coefficient of determination.

Allometry equations Log y = a Log x + Log b	**y (cm)**	**Range y (cm)**	**x (cm)**	**Range x (cm)**	**N**	**R^2**	**p-value**
Log TL = 1.0302 Log SL + 0.5988	10.38	7.3-13	8.47	6-10.5	60	0.98	<0.05
Log HL= 1.1009 Log SL -0.6670	2.27	1.5-2.8	8.47	6-10.5	60	0.68	<0.05
Log BH = 1.3937 Log SL -1.058	1.73	0.8-2.4	8.47	6-10.5	60	0.76	<0.05
Log ED= 0.2950 Log HL -0.593	0.32	0.3-0.4	2.27	1.5-2.8	60	0.18	<0.05
Log SnL= 0.7141 Log HL -0.3128	0.88	0.5-1.2	2.27	1.5-2.8	60	0.52	<0.05