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Marine biodiversity in the dark: an ecological assessment of a unique submerged cave system in the eastern Mediterranean Sea

Vasilis RESAIKOS, Stelios KATSANEVAKIS, Marios PAPAGEORGIOU, Georgios OIKONOMIDIS, and Carlos JIMENEZ

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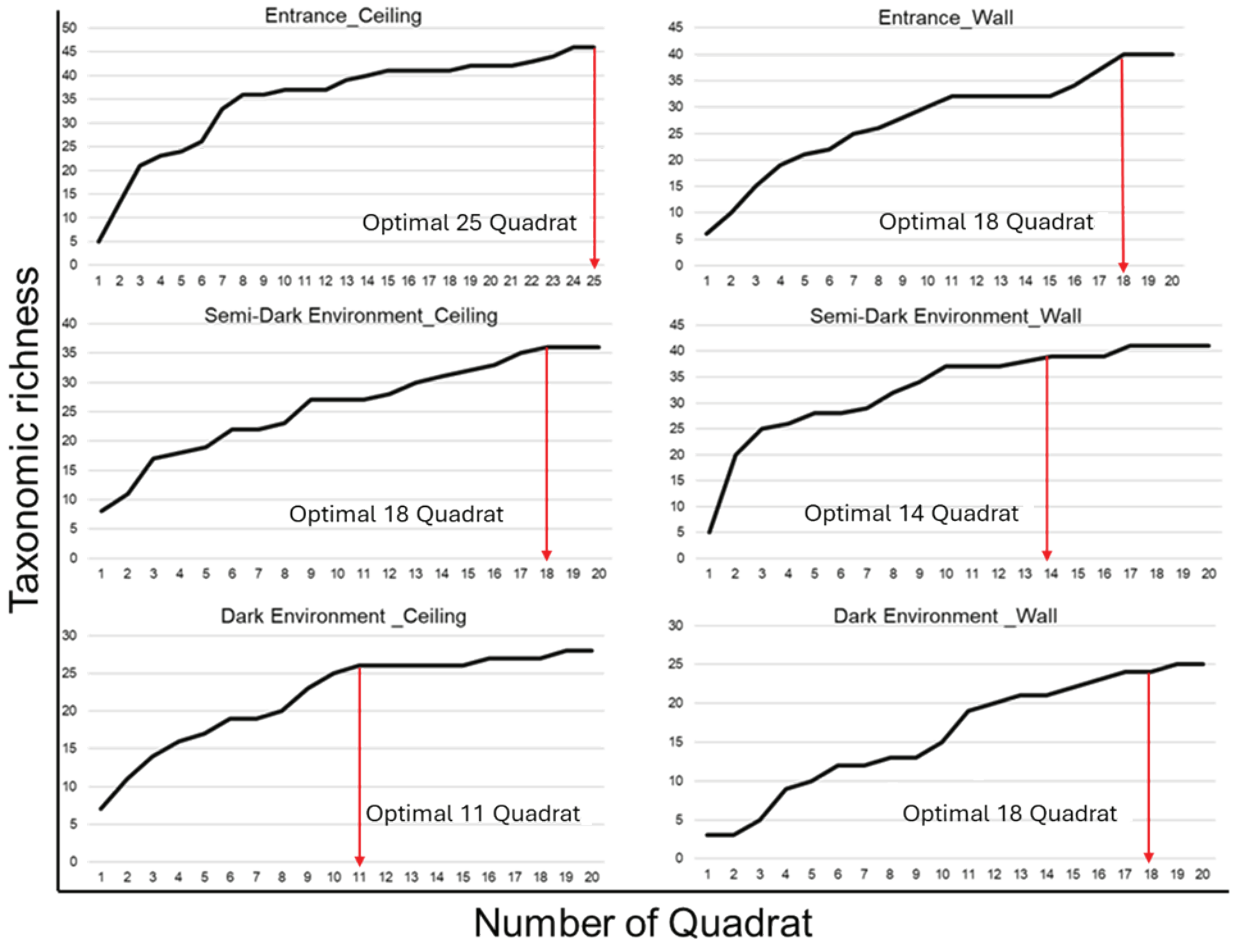

Fig. S1*:* Rarefaction curves to estimate the expected number of species (taxonomic richness) according to the number of photo-quadrats from different sections of the Jubilee Shoals cave: (A) Entrance zone ceiling; (B) Entrance zone wall; (C) Semi-dark zone ceiling; (D) Semi-dark zone wall; (E) Dark zone ceiling; (F) Dark zone wall. The optimal number of photo quadrats necessary for a proper representation are shown with red arrows.

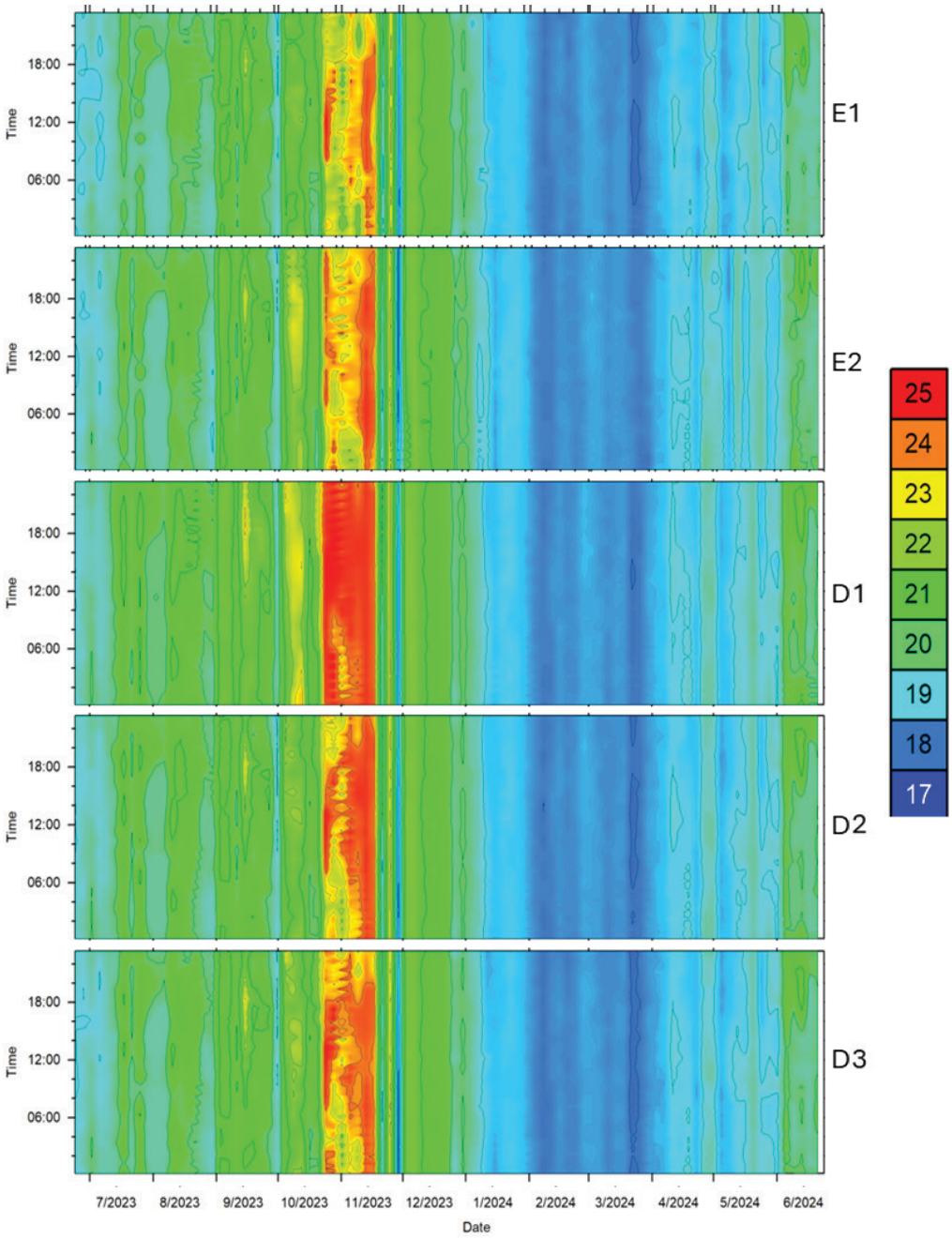

***Fig. S2**:* Temperature distribution in the different parts of the cave system.

Table S1. Measured temperature at different zones of the Jubilee Shoals cave system.

Zones	Average T.	Max. T.	Date Max. T.	Min. T.	Date Min. T.
E1	19.76	25.1	25-30/10/2023	17.6	22-23/03/2024
E2	19.86	24.9	25-30/10/2023	17.8	22-23/03/2024
E3	19.57	24.5	25-30/10/2023	17.7	22-23/03/2024
SD2	19.69	24.7	25-30/10/2023	17.7	22-23/03/2024
D1	20.12	24.9	25-30/10/2023	18.1	22-23/03/2024
D2	19.92	24.9	25-30/10/2023	17.9	22-23/03/2024
D3	19.87	24.6	25-30/10/2023	17.9	22-23/03/2024
D4	19.87	24.7	25-30/10/2023	17.8	22-23/03/2024

Table S2. Decreasing percentages of Higher taxonomic groups (HTG) cover and Non-living substrate (NLS) across the three cave zones. BCE: Biotic cover at the entrance zone, BCSD: Biotic cover at the semi-dark zone, BCD: Biotic cover at the dark zone, TBC: Total biotic cover.

HTG	TBC (%)	BCE (%)	BCSD (%)	BCD (%)
Porifera	32.97	37.6	28.44	31.92
NLS	32.63	14.78	34.37	49.62
Bryozoa	11.07	4.36	19.23	11.27
Rhodophyta	10.41	25.45	2.46	1.43
Cnidaria	5.42	8.25	5.71	2.26
Chlorophyta	2.91	2.74	5.53	0.91
Polychaeta	1.82	0.8	2.4	2.4
Foraminifera	1.76	4.87	0	0
Ascidiacea	0.61	0.67	1.19	0.08
Brachiopoda	0.4	0.48	0.67	0.1

Table S3. Cave sections and Positions of the taxa found in the studied cave. HTG: Higher taxonomic group, NLS: Non-living substrate; Cave sections: (see Figure 2); Position: Ceiling (C), Wall (W).

Taxon	HTG	Cave sections	Position
Miniacina miniacea (Pallas, 1766)	Foraminifera	E1,E2,E3,SD1,SD2,SD3,DZ1	C,W
Chlorophyta sp. 1	Chlorophyta	E1,E2,E3,SD1	C,W
Chlorophyta sp. 2	Chlorophyta	E1,E2	W
Palmophyllum crassum (Naccari) Rabenhorst, 1868	Chlorophyta	E2,E3	C,W
Turf Algae	Chlorophyta	E1,E2,E3	C,W
Calcareous Algae sp. 1	Rhodophyta	E1, E2, E3, SD1, SD2, SD3	C
Calcareous Algae sp. 2	Rhodophyta	E2,E3,SD1,SD2	C,W
Calcareous Algae sp. 3	Rhodophyta	E2	C,W
Calcareous Algae sp.4	Rhodophyta	E1, E2, SD1, SD2	C,W
Calcareous Algae sp.5	Rhodophyta	E1,E2,E3	C,W
Calcareous Algae sp.6	Rhodophyta	E2,E3	C,W
Calcareous Algae sp.7	Rhodophyta	E1,E2,E3	C,W
Acanthella acuta Schmidt, 1862	Porifera	E1, E2,SD1,SD2	C,W
Agelas oroides (Schmidt, 1864)	Porifera	E1, E2,E3,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Axinella sp.	Porifera	E1,E2,SD1,SD2,SD3,DZ1,DZ3,DZ4	C,W
Cacospongia mollior Schmidt, 1862	Porifera	E1,DZ3,DZ4	C,W
Clathrina sp.	Porifera	E1,SD1,SD2,DZ1,DZ2,DZ3,DZ4	C,W
Dendroxea lenis (Topsent, 1892)	Porifera	E1,E3,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Dictyoceratida	Porifera	E3,SD2	C

Continued

Table S3 continued

Taxon	HTG	Cave sections	Position
Dictyonella sp.	Porifera	SD1,SD1	W
Diplastrella bistellata (Schmidt, 1862)	Porifera	E1, E2,E3,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Haliclona (Soestella) *mucosa* (Griessinger, 1971)	Porifera	E1,DS1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Hexadella pruvoti Topsent, 1896	Porifera	E1,E3,SD1,SD2,SD3,DZ2,DZ3,DZ4	C,W
Ircinia oros (Schmidt, 1864)	Porifera	DZ1	C
Ircinia sp.	Porifera	E1,SD1	C,W
Merlia sp.	Porifera	E1,E3,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Porifera sp.1	Porifera	E1,E2,E3,SD1,SD2,SD3,DZ3	C,W
Porifera sp.2	Porifera	E1,E2,E3,SD1,SD2,SD3,DZ1	C,W
Porifera sp.3	Porifera	E1,E2,E3,SD1,SD2,DZ1,DZ4	C,W
Porifera sp.4	Porifera	E1,E2,E3,SD1,SD2,DZ1,DZ3	C,W
Petrosia (Petrosia) ficiformis (Poiret, 1789)	Porifera	E1,E2,E3	C,W
Phorbas tenacior (Topsent, 1925)	Porifera	E1,SD1,SD2,DZ1,DZ2,DZ3,DZ4	C,W
Spirastella sp.	Porifera	E1,SD1,DZ1	C,W
Necrosed sponge	Porifera	E1,E2	C
Thymosiopsis cuticulatus Vacelet & Pérez, 1998	Porifera	E1, E2,E3,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Timea unistellata (Topsent, 1892)	Porifera	E1, E2,E3,SD1,SD2,SD3,DZ1	C,W
Aglaopheniidae	Cnidaria	E1,SD1	C,W
Caryophyllia sp.	Cnidaria	E1,E2,E3,SD1,SD2,SD3,DZ1,DZ4	C,W
Eudendrium sp.	Cnidaria	E2,DZ1	C
Hydrozoa	Cnidaria	E1,SD1,SD3,DZ1	C,W
Leptopsammia pruvoti Lacaze-Duthiers, 1897	Cnidaria	E1,E2,E3,SD1,SD2,SD3,DZ1,DZ2,DZ4	C,W
Madracis pharensis (Heller, 1868)	Cnidaria	E1,E2,E3,SD1,SD2,SD3,DZ1,DZ3,DZ4	C,W
Polycyathus muellerae (Abel, 1959)	Cnidaria	E3,SD3,DZ4	C
Polycyathus sp.	Cnidaria	E3,SD1,SD3,DZ4	C
Serpulidae sp.3	Polychaeta	E1,E2,E3,SD1,SD2,SD3,DZ3,DZ4	C,W
Serpulidae sp.1	Polychaeta	E1, E2,E3,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Serpulidae sp.2	Polychaeta	E1,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Brachiopoda sp.1	Brachiopoda	DZ1	C
Brachiopoda sp.2	Brachiopoda	E1,SD1,DZ1	C
Joania cordata (Risso, 1826)	Brachiopoda	E1,SD1,SD2,DZ1	C,W
Novocrania anomala (Müller, 1776)	Brachiopoda	SD2,DZ3,DZ4	C,W

Continued

Table S3 continued

Taxon	HTG	Cave sections	Position
Adeonella pallasii (Heller, 1867)	Bryozoa	E1, E2,E3,SD1,SD2,SD3	C,W
Beania mediterranea Souto, Nascimento, Reverter-Gil & Vieira, 2019	Bryozoa	E1,SD1,SD2,SD3,DZ1,DZ2,DZ4	C,W
Cheilostomatida	Bryozoa	E1,E2,E3,SD1,SD2,SD3,DZ1	C,W
Frondipora verrucosa (Lamouroux, 1821)	Bryozoa	E1,E2,E3,SD1,SD2,SD3,DZ1,DZ4	C,W
Hippellozoon sp.	Bryozoa	E1,E2,E3,SD1,SD2,SD3,DZ4	C,W
Smittina cervicornis (Pallas, 1766)	Bryozoa	E1,E2,E3,SD2	C,W
Halocynthia papillosa (Linnaeus, 1767)	Ascidiacea	E1,SD3	C,W
Lissoclinum perforatum (Giard, 1872)	Ascidiacea	E1,SD1,DZ1	C,W
Rhopalaea neapolitana Philippi, 1843	Ascidiacea	DZ1	W
Biogenic origin	NLS	E1,SD1,SD3,DZ2,DZ3,DZ4	C,W
Empty serpulid tubes	NLS	SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Deposits of Mn	NLS	E1,E2,E3,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W
Marine snow	NLS	E2,E3,DZ2,DZ3,DZ4	C,W
Sediment	NLS	E1, E2,E3,SD1,SD2,SD3,DZ1,DZ2,DZ3,DZ4	C,W