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corresponding author: leonarda.capuano@uniba.it**PRELIMINARY DATA ON VIDEO INSPECTIONS OF BENTHOPELAGIC FAUNA IN MEDITERRANEAN COSTAL HABITATS****STUDIO PRELIMINARE SULLA FAUNA BENTHOPELAGICA IN HABITAT COSTIERI MEDITERRANEI TRAMITE VIDEO-ANALISI**

**Abstract** - This study explores benthopelagic fauna associated with rhodolith beds and oyster banks using the MEMO baited lander in three Mediterranean areas: Egadi Islands (Southern Tyrrhenian Sea), and offshore Vieste and Monopoli (Southern Adriatic Sea), at depths between 70–90 m, totaling 43 hours of video. Species abundance values, standardized by recording time, were analyzed in relation to geographic area and habitat type. Direct observation facilitated the documentation of behavioral patterns and interspecific interactions. This approach offers valuable preliminary insights into the faunal composition and abundance of vulnerable Mediterranean habitats.

**Keywords:** biodiversity, baited lander, oyster bank, rhodolith bed, bioconstruction.

**Introduction** – Marine bioconstructions, by contributing to the formation of complex and heterogeneous habitats, play a key role in promoting and sustaining biodiversity. Calcareous red algae can enhance habitat heterogeneity through the formation of rhodolith beds, recognized as biodiversity hotspots (Bracchi *et al.*, 2019). Animal organisms, such as oysters in shallow waters, also create three-dimensional structures that enrich biodiversity (Angeletti & Taviani, 2020). Both structures offer refuge to sponges, mollusks, crustaceans, and fish (Ingrosso *et al.*, 2018). Given growing threats from human activities, invasive species and climate change, low-impact tools like baited landers are essential for studying these vulnerable ecosystems. This study employs the MEMO (Marine Environment MONitoring system) lander to examine benthopelagic fauna linked to coastal mediterranean habitats such as rhodolith beds and oyster banks in the central Mediterranean, assessing species composition and abundance in different geographic sites and habitats.

**Materials and methods** – The MEMO baited lander is a device designed for acquiring video and environmental parameters, capable of operating at depths of up to 1200 meters for 24 consecutive hours (D'Onghia *et al.*, 2018). It was deployed in a bathymetric range between 55 and 99 m at eight video-inspection stations: two off the coast of Vieste (VI), four off Monopoli (MN) (Southern Adriatic Sea) and two off the Egadi Islands (EGD) (Southern Tyrrhenian Sea), for a total of 43 hours of video recording (Tab. 1). In MN two stations were realized on muddy bottoms and two deployments were carried out on the oyster banks.

Tab. 1 – Stations of video-inspection by means of the MEMO lander.

Stazioni di rilevamento video mediante il lander MEMO.

	<b>Vieste</b>	<b>Monopoli</b>		<b>Egadi Islands</b>
<b>Station code</b>	VI_39 VI_61	MN_1_OUT MN_2_OUT	MN_3_IN MN_4_IN	EGD_194 EGD_199
<b>Habitat</b>	oyster bank	Muddy bottoms	oyster banks	rhodolith beds
<b>Depth</b>	55-72 m	99 m	92-96 m	87-97 m
<b>Recording time</b>	10 h	12 h	12 h	9 h

Taxa were identified to the lowest possible taxonomic level based on morphology. For each species, using Adobe Premiere Pro software (Adobe Inc., San Jose, CA, USA), First Arrival Time and the maximum individuals observed every 10 seconds (MaxN) were recorded and standardized per hour (N/h). Data were organized into an abundance matrix (N/h) and fourth-root transformed to balance the weight of dominant and rare species. A Bray-Curtis similarity matrix was then used to perform Hierarchical Cluster Analysis (HCA) and SIMPER procedure. All analyses were performed using the PRIMERv7 software (Clarke and Gorley, 2015).

**Results** – A total of 33 taxa were identified (Tab. 2).

Tab. 2 – Identified taxa in the stations of three Mediterranean areas and corresponding N/h values.  
Taxa identificati nelle stazioni di tre aree mediterranee e corrispondenti valori di N/h.

	VI_39	VI_61	MN_1_OUT	MN_2_OUT	MN_3_IN	MN_4_IN	EGD_194	_199
CEPHALOPODS	Cephalopoda (Cuvier, 1797)			0,7				
	<i>Eledone cirrhosa</i> (Lamarck, 1798)				0,18			
	<i>Illex coindetii</i> (Vérany, 1839)				0,18			
	<i>Octopus vulgaris</i> (Cuvier, 1797)			0,17			0,24	
CRUSTACEANS	<i>Brachyura</i> spp. Latreille, 1802			0,17		0,16		
	<i>Calappa granulata</i> (Linnaeus, 1758)						0,24	
	<i>Inachus dorsettensis</i> (Pennant, 1777)	0,25						
	<i>Polybius depurator</i> (Linnaeus, 1758)			0,33	0,67	2,39	0,64	
	<i>Pagurus</i> spp. Fabricius, 1775	0,75				0,18		
	<i>Pandalus</i> sp. Leach, 1814				0,17			
	<i>Pasiphaea</i> sp. Savigny, 1816				0,17			
	<i>Penaeus kerathurus</i> (Forskål, 1775)				0,17			
	<i>Plesionika</i> sp. Bate, 1888			0,17				
	<i>Spinolambus macrochelos</i> (Herbst, 1790)	0,12						
<i>Xanthidae</i> sp. MacLeay, 1838			0,33					
OSTEICHTHYES	<i>Boops boops</i> (Linnaeus, 1758)		0,41			0,92	0,48	
	<i>Centracanthus cirrus</i> (Rafinesque, 1810)						1,2	
	<i>Chelidonichthys cuculus</i> (Linnaeus, 1758)					0,18		
	<i>Conger conger</i> (Linnaeus, 1758)	0,25			0,17			
	<i>Diplodus vulgaris</i> (Geoffroy Saint-Hilaire, 1817)		0,41					
	<i>Mullus surmuletus</i> Linnaeus, 1758		0,41					0,45
	<i>Ophichthus rufus</i> (Rafinesque, 1810)			2,82	3,33	0,18		
	<i>Pagellus acarne</i> (Risso, 1827)						1,68	
	<i>Pagellus erythrinus</i> (Linnaeus, 1758)	0,25	1,65				0,16	
	<i>Pagellus</i> sp. Valenciennes, 1830							0,45
	<i>Seriola dumerili</i> (Risso, 1810)		2,06					
	<i>Serranus cabrilla</i> (Linnaeus, 1758)	0,25	1,65					0,48
	<i>Serranus hepatus</i> (Linnaeus, 1758)				0,17	0,18	0,16	
	<i>Soleidae</i> sp. Bonaparte, 1835			0,17				
	<i>Sparidae</i> spp. (Rafinesque, 1818)	0,5	5,76					
<i>Spicara flexuosum</i> (Rafinesque, 1810)		23,46					2,4	
<i>Spicara smaris</i> (Linnaeus, 1758)							0,24	
<i>Trachurus</i> spp. Rafinesque, 1810							44,23	

The cluster analysis, performed considering the sampling stations as the primary factor, reveal a distinct separation among the communities of the three study areas (Fig. 1). Monopoli stations constitute an isolated cluster, while the sites in Vieste and the Egadi Islands exhibit greater reciprocal affinity, showing site-specific differentiation. However, the highest biological similarity was observed between stations within the same geographic area. Consistent with the clear separation revealed by the cluster analysis, the SIMPER procedure (Area factor) identified the Monopoli area and the Egadi Islands as the sites that differ most significantly. This is due to a clearly distinct species

composition between the two areas (Tab. 3a). The SIMPER analysis was also performed using habitat as a grouping factor and the highest dissimilarity was observed between the muddy bottoms and the rhodolith beds (Tab. 3b).

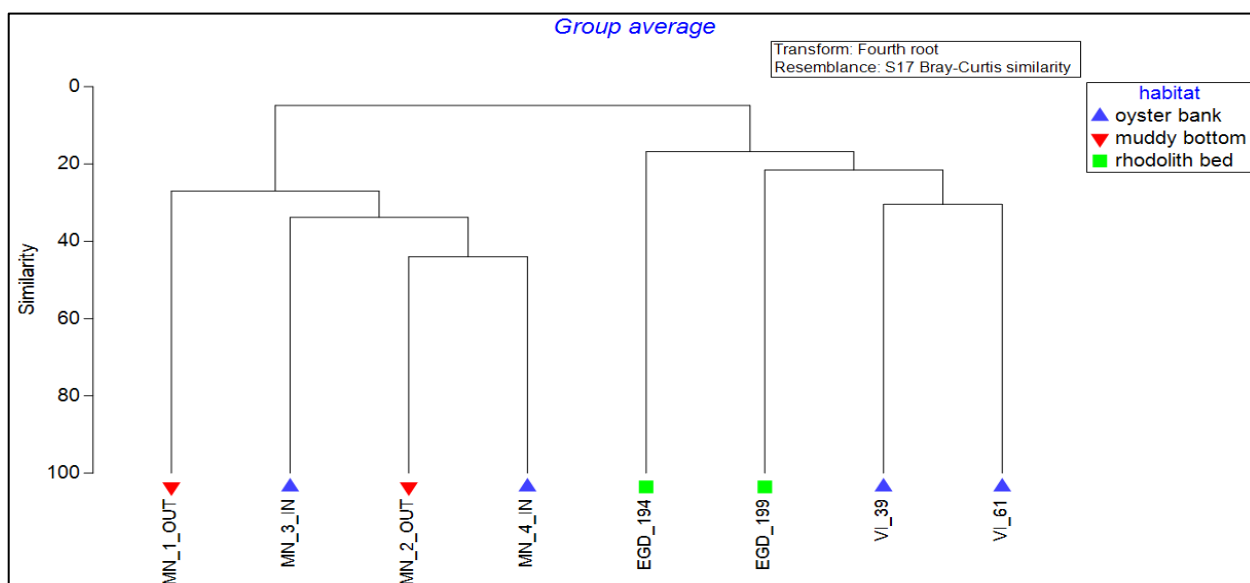


Fig. 1 – Hierarchical Cluster Analysis (HCA) dendrogram based on the communities’ composition of individual sampling stations.

*Dendrogramma della cluster analysis basata sulla composizione specifica delle singole stazioni di campionamento.*

Tab. 3 – Results of the SIMPER analysis on the composition of communities: (a) Average dissimilarity among the study areas; (b) Average dissimilarity among the different habitat types.

*Risultati dell’analisi SIMPER sulla composizione delle comunità: (a) Dissimilarità media tra le aree di studio; (b) Dissimilarità media tra le diverse tipologie di habitat.*

**a) Groups MN and EGD** Average dissimilarity = 97,59 %

Species	Group MN		Group EGD		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
<i>P. depurator</i>	0,95	0	9,77	2,22	10,01	10,01
<i>Trachurus</i> spp.	0	1,29	8,73	0,92	8,95	18,96
<i>O. rufus</i>	0,82	0	7,7	1,19	7,89	26,85
<i>S. cabrilla</i>	0	0,76	7,63	2,72	7,82	34,67
<i>M. surmuletus</i>	0	0,41	5,76	0,88	5,9	40,57
<i>Pagellus</i> sp.	0	0,41	5,76	0,88	5,9	46,47

**b) Groups muddy bottom and rhodolith bed** Average dissimilarity = 97,79 %

Species	Group muddy bottom		Group rhodolith bed		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
<i>O. rufus</i>	1,32	0	12,44	2,56	12,73	12,73
<i>Trachurus</i> spp.	0	1,29	8,28	0,86	8,47	21,2
<i>P. depurator</i>	0,83	0	7,76	2,71	7,93	29,13
<i>S. cabrilla</i>	0	0,76	6,93	3,31	7,09	36,21
<i>M. surmuletus</i>	0	0,41	5,09	0,85	5,21	41,42
<i>Pagellus</i> sp.	0	0,41	5,09	0,85	5,21	46,63

Beyond site-specific differences, it was possible to document the *in situ* behaviour of several species into all investigated communities (Fig. 2). Scavenging behaviour of *C. conger* was consistently observed at all deployments, whereas *O. rufus* exhibited distinct burrowing activity on muddy bottoms. A marked schooling tendency was documented in *Trachurus* spp., which appeared to be attracted by the light emitted from the MEMO lander. Competitive interactions were observed between *O. vulgaris* and *P. acarne*, both actively attempting to feed on the bait.

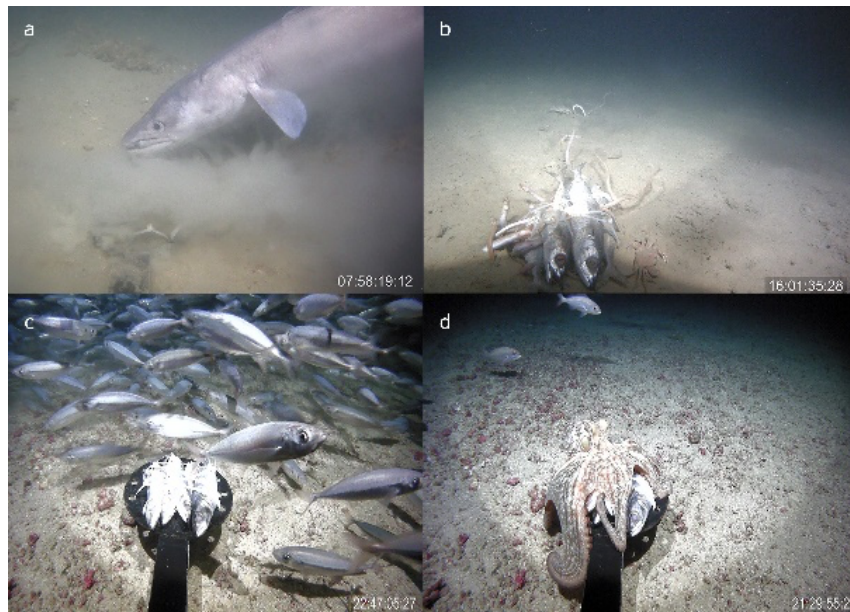


Fig. 2 – Frames showing *C. conger* (a), *O. rufus* (b), *Trachurus* spp. (c), *O. vulgaris* and *P. acarne* (d).  
Fotogrammi di *C. conger* (a), *O. rufus* (b), *Trachurus* spp. (c), *O. vulgaris* and *P. acarne* (d).

**Conclusions** – This preliminary study highlights a separation of faunal assemblages, primarily driven by geographic scale and habitat types. Cluster analysis isolates the Monopoli area from Vieste and the Egadi Islands, a separation further confirmed by the SIMPER test results. The near-total dissimilarity observed between Monopoli and the Egadi Islands could be due to the different nature of the investigated habitats. In this context, a more complex and heterogeneous habitat, such as rhodolith beds and oyster banks, appears to support a higher biodiversity. The use of low environmental impact tools, such as the MEMO lander, provides essential *in situ* small-scale distribution and behavior of benthic-pelagic species, allowing for the observation of assemblages without sampling organisms and avoiding altering the integrity of the habitat.

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