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Original Article

The marine Heterobranchia (Mollusca: Gastropoda) fauna of the Aeolian archipelago (Tyrrhenian Sea). First contribution: Lipari and Vulcano

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Abstract: It is here presented the first faunistic list of the marine Heterobranchia fauna of Lipari and Vulcano, the two southernmost islands of the Aeolian archipelago. Through the examination of ten dive sites (six in Lipari and four in Vulcano), it was found a total of 30 marine Heterobranchia species (1 Rhodopoidea, 1 Pleurobranchida, 21 Nudibranchia, 1 Cephalaspidea, 1 Umbraculida and 5 Sacoglossa). Specifically, in Lipari 26 species were found, while in Vulcano 18 taxa. This numerical difference between the two islands might be related to the higher presence of different environments and habitats in Lipari compared to Vulcano.

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Introduction

Lipari and Vulcano are two of the seven islands (together with Alicudi, Filicudi, Salina, Panarea, and Stromboli) located in the Tyrrhenian Sea, which constitute the Aeolian archipelago (Fig. 1A-C). This latter takes this name from the Greeks' credence that in such area there was the reign of Aeolus, king of the winds, and its sons (Platania et al., 1934). Lipari and Vulcano are the closest among the Aeolian islands to the coast of Sicily (about 38.5 km from Milazzo for the former and 30 km for the latter) (Treccani, 2023a, b). Lipari (Fig. 1C), with an extension of 37.6 km^2, is the largest island of the Aeolian archipelago (Treccani, 2023a). Its western coasts are characterized by high cliffs and lava flows which, due to the action of the sea, present several caves, arches, rocks, and pinnacles. Instead, almost all the coasts of the eastern side are featured with large bays. Probably, the most peculiar coastal stretch of the island is the northeastern one with its pumice and obsidian flows. This coastal stretch was distraught by past pumice-extracting activity. These latter have strongly altered the environment of the island (Marta, 2019). The island presents within its border a Site of Community Importance (SCI) called "Isola di Lipari" (ITAO30030) (Lo Cascio and Pasta, 2004).

Vulcano (Fig. 1C) is the southernmost and the third largest island (22 Km^2) of the Aeolian archipelago. It can be divided into five parts: the Vulcanello peninsula, the Alluvial part, the Lentia mountains, the Old Vulcano, and the Fossa di Vulcano (Keller, 1980). The Vulcanello peninsula is the northernmost part of the island and presents coasts with low lava platforms. This peninsula is connected to the main part of the island by a large horizontal alluvial part which presents only beaches on its protected coasts. From this area toward the west develops the area of Lentia mountains. This stretch of coast is characterized by lava flows forming high cliffs. The coasts of the Old Vulcano part develop from the southernmost part of the Lentia mountains (west coast) to almost all of the eastern part of the island. These coasts present both lava flows and beaches. Fossa di Vulcano, with its crater, is the central part of the island. Its coasts are directed northward and are characterized by lava flows of different heights (Keller, 1980). Vulcano is one of the only two Aeolian islands (with Stromboli) that present nowadays volcanic activities (INGV, 2023).

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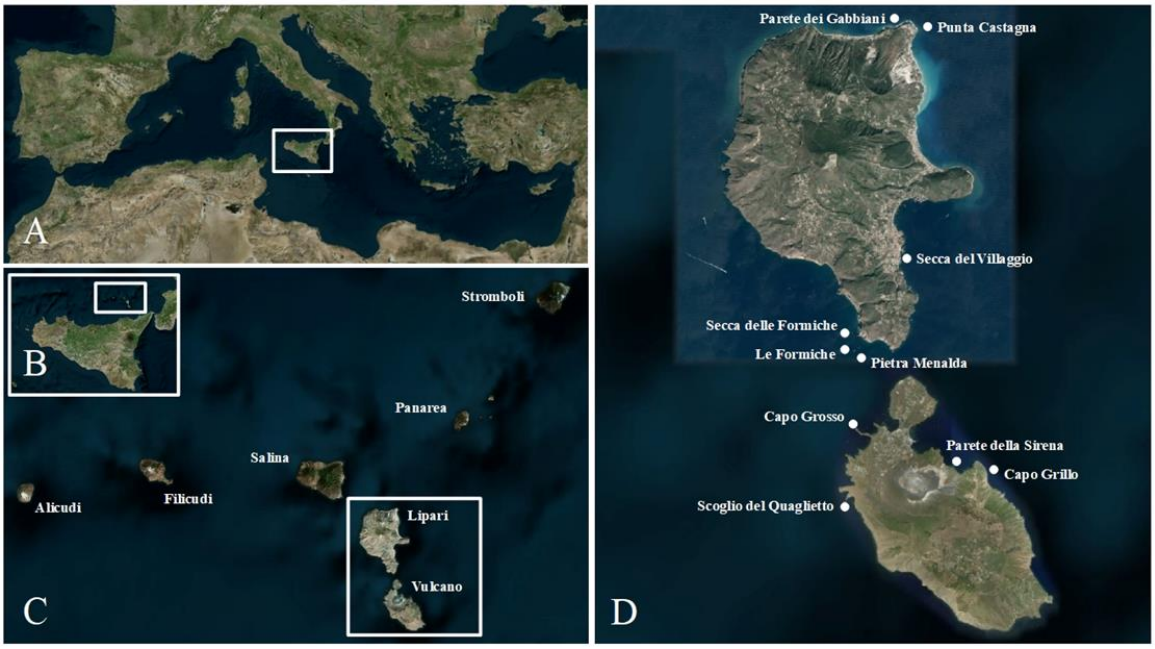

Figure 1. A: The Mediterranean Sea and location of Sicily; B: Sicily and location of the Aeolian archipelago; C: the islands of the Aeolian archipelago and location of Lipari and Vulcano; D: Lipari and Vulcano with the examined dive sites.

The island presents a SCI called "Isola di Vulcano" (ITAO30027) (Lo Cascio and Pasta, 2004) and, in the recent past, also an Oriented Natural Reserve (ONR) called "Isola di Vulcano" (Angelini et al., 2009; Wikipedia, 2023).

These two islands (like the other five of the Aeolian archipelago) are located at a point that is interesting both by the waters of the Messina Strait, Atlantic Ocean and also those of the Mediterranean Levantine sector (Angelini et al., 2009). Consequently, this confluence of different water masses should cause the presence of a rich and diverse marine fauna along the islands of this archipelago. Compared to the terrestrial fauna of this group of islands, which has been historically deeply studied and for which the data are easily accessible (e.g. Lo Cascio and Pasta, 2004; Angelini et al., 2009; Fattorini, 2010), the information on the marine faunas of Lipari and Vulcano are scant and difficult to find, apart from fish fauna, marine mammal fauna (Angelini et al., 2009) and some data about soft bottom molluscs (Giacobbe and Spanò, 1997, 1998).

As regards the marine Heterobranchia fauna, no study has ever been carried out in the Aeolian archipelago. This informal group of marine gastropods (called Opisthobranchia in the past), presents twelve taxa (Acteonoidea, Cephalaspidea, Runcinida, Aplysiida, Pteropoda, Umbraculida, Ringiculimorpha, Pleurobranchida, Nudibranchia, Acochlidiimorpha, Sacoglossa and Rhodopoidea), is probably one of the most famous groups of marine critters wanted by worldwide enthusiasts (especially underwater photographers) due to the flamboyance of the body shapes and colourations of its members (Prkić et al., 2018). These molluscs, commonly called "sea slugs", present a huge diversity in body organization caused by their evolutive tendency leading to the reduction and loss of the shell (Gosliner, 1994; Rudman and Willan, 1998). Because of this trend, marine Heterobranchia includes both shelled prosobranch-like animals and highly modified shell-less ones (Gosliner, 1994).

The only information about marine Heterobranchia for the two islands here considered is the finding in the waters of Lipari of two species of the order Cephalaspidea: *Cylichna cylindracea* (Pennant, 1777) and *Roxania utriculus* (Brocchi, 1814) (Giacobbe and Spanò, 1997-1998). Consequently, the present study aims to provide the first faunistic list of the marine heterobranchs present in the waters of Lipari and Vulcano, which will contribute as a starting point for future research regarding these molluscs.

Table 1. The examined dive sites at Lipari and Vulcano with the corresponding coordinates and days of activity.

Island	Dive site	Coordinates	Date
Lipari	Punta Castagna	(38°31'19.8"N 14°57'49.2"E)	03/07/23
	Secca del Villaggio	(38°27'41.1"N 14°57'27.3"E)	04/07/23
	Parete dei Gabbiani	(38°31'24.2"N 14°57'17.6"E)	05/07/23
	Secca delle Formiche	(38°26'36.2"N 14°56'24.3"E)	06/07/23
	Pietra Menalda	(38°26'20.9"N 14°56'30.1"E)	06/07/23
	Le Formiche	(38°26'27.9"N 14°56'20.7"E)	07/07/23
Vulcano	Capo Grillo	(38°24'33.2"N 14°59'06.0"E)	03/07/23
	Parete della Sirena	(38°24'34.5"N 14°58'27.2"E)	04/07/23
	Scoglio del Quaglietto	(38°23'58.0"N 14°56'19.4"E)	05/07/23
	Capo Grosso	(38°25'09.0"N 14°56'30.4"E)	07/07/23

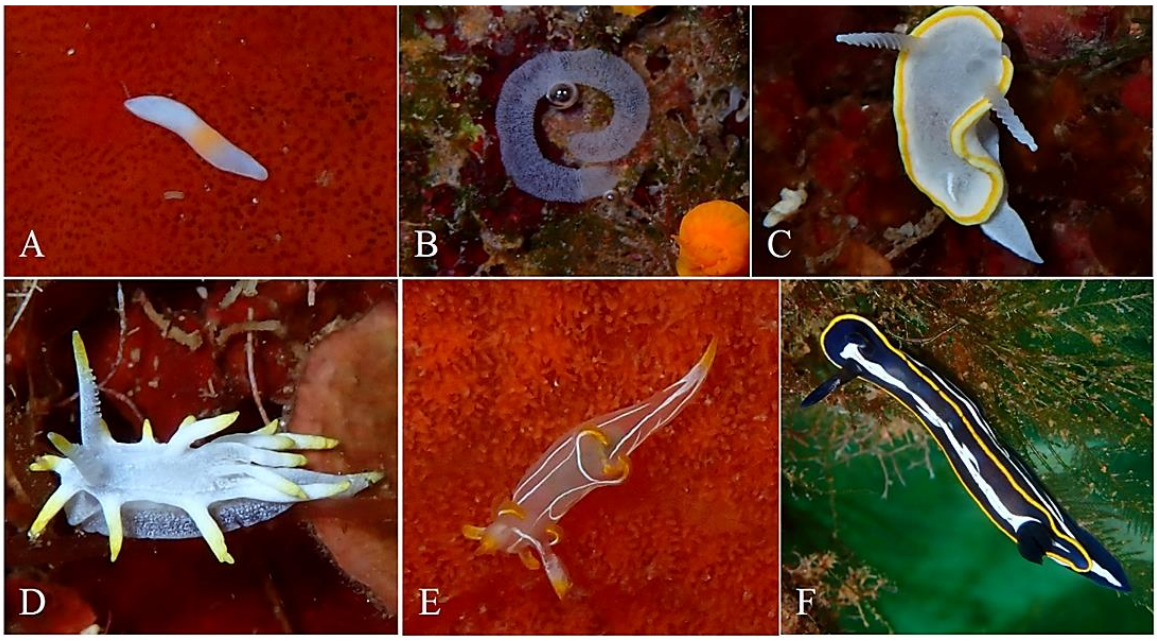

Figure 2. A: *Rhodope* sp., B: *Berthella* sp. egg mass, C: *Diaphorodoris alba*, D: *Okenia picoensis*, E: *Trapania lineata*, and F: *Felimare fontandraui* (adult chromatic pattern) (photos A. Lombardo).

Materials and Methods

The field activities were carried out from the 3rd of July 2023 to the 7th of July 2023 in several areas located along the coasts of Lipari and Vulcano. Specifically, for each of the ten localities here examined (see below) it was performed a scuba dive of the duration of about 60 minutes during the morning. Overall, the examined dive sites located along the coast of Lipari were six: Punta Castagna, Secca del Villaggio, Parete dei Gabbiani, Secca delle Formiche, Pietra Menalda and Le Formiche (Table 1). Punta Castagna presents a steep slope bottom (developing beyond 40-50 m of depth) with huge rocky outcrops scattered on the sandy pumice substrate brought into this area by the pumice quarry in its proximity. Coastward the bottom has low rocky outcrops on an almost horizontal seabed with a high presence of pumice sands. Secca del Villaggio has a shallowly sloping sandy bottom (until 20-25 m of depth) covered by a *Posidonia oceanica* (Linnaeus) Delile meadow on which there are scattered rocky outcrops. Parete dei Gabbiani is characterized by a huge rocky step wall (developing beyond 40-50 m of depth) on a sandy pumice substrate. Coastward, there are low rocky outcrops scattered on an almost horizontal bottom with a high presence of pumice sand. Secca delle Formiche is a large submerged rocky outcrop divided into two parts, which lean on a sandy

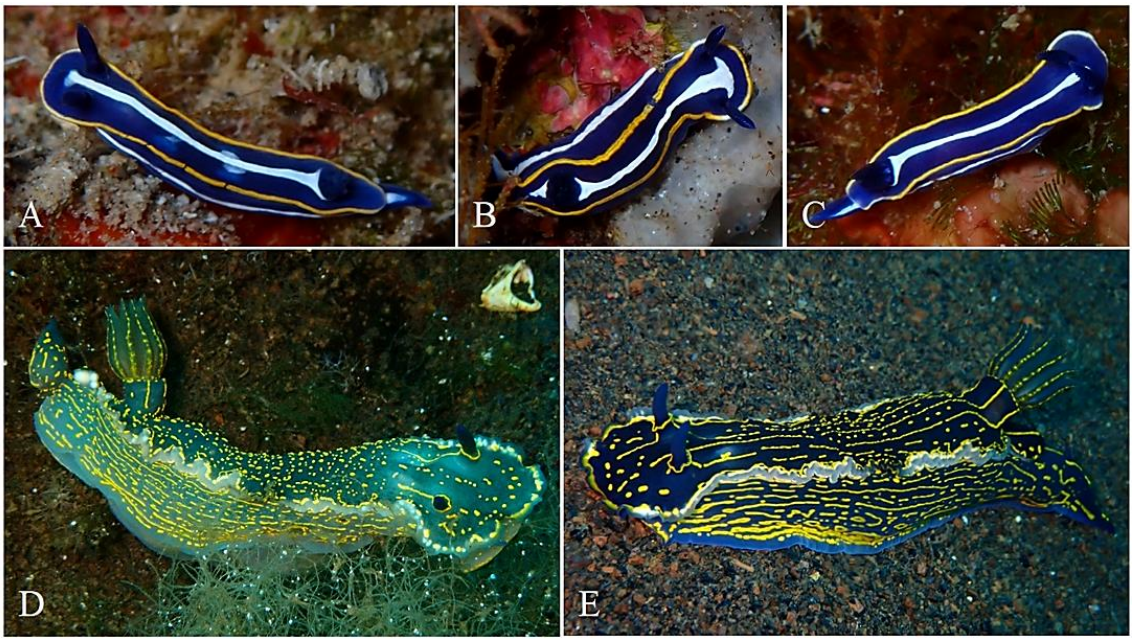

Figure 3. A: *Felimare fontandraui* (pre-adult chromatic pattern), B: *F. fontandraui* (intermediate colouration between juvenile and pre-adult form), C: *F. fontandraui* (juvenile chromatic pattern), D: *Felimare picta* (green morph), and E: *F. picta* (blue morph) (photos A. Lombardo).

Figure 4. A: *Felimare tricolor* (morph one), B: *F. tricolor* (morph two), C: *Felimida binza* (morph one), D: *F. binza* (morph two), and E: *Felimida krohni* (morph one) (photos A. Lombardo).

horizontal bottom with a maximum depth of 30 m. Pietra Menalda is a small stack that develops underwater until 30 m of depth. There are several rectangular rocky blocks piled up on each other along the walls of the stack. Overall, this latter leans on a sandy horizontal bottom. Le Formiche are two huge underwater rocky outcrops that develop in proximity to a stack. These form two large rocky walls externally and a small canyon internally. Collectively, these rocky outcrops arise from a sandy bottom covered by *P. oceanica* meadows with a maximum depth of about 25-30 m.

The dive sites explored along the coast of Vulcano were four: Capo Grillo, Parete della Sirena, Scoglio del Quaglietto and Capo Grosso (Table 1). Capo Grillo is a slope composed of volcanic ashes, with a high

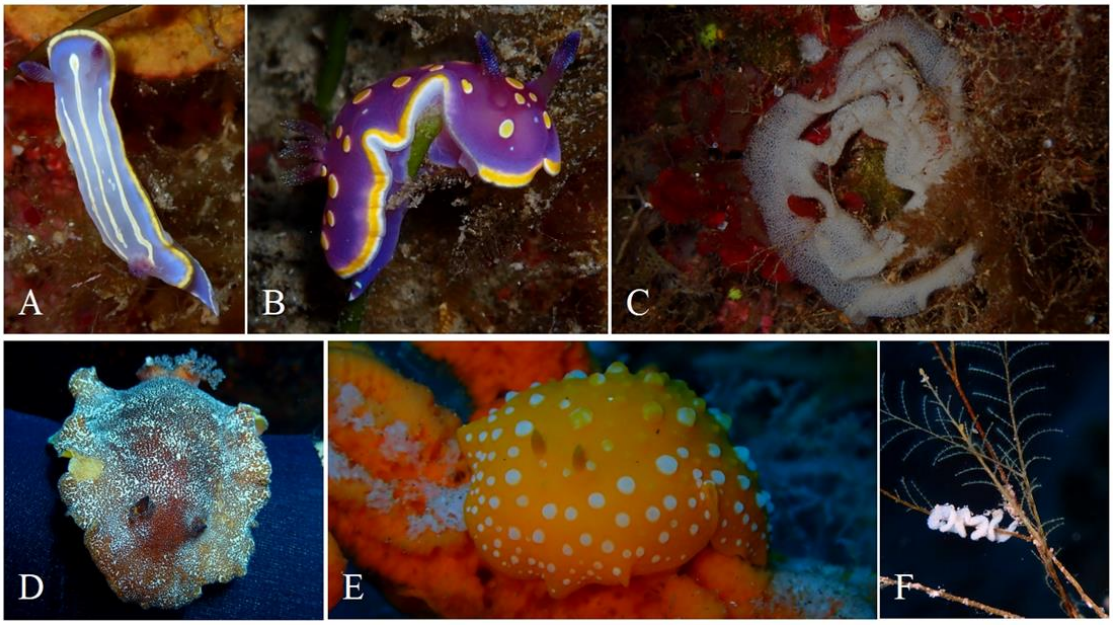

Figure 5. A: *F. krohni* (morph two), B: *Felimida luteorosea,* C: *Discodorididae* sp. egg mass, D: *Platydoris argo*, E: *Phyllidia flava*, and F: *Doto* sp. egg mass (photos A. Lombardo).

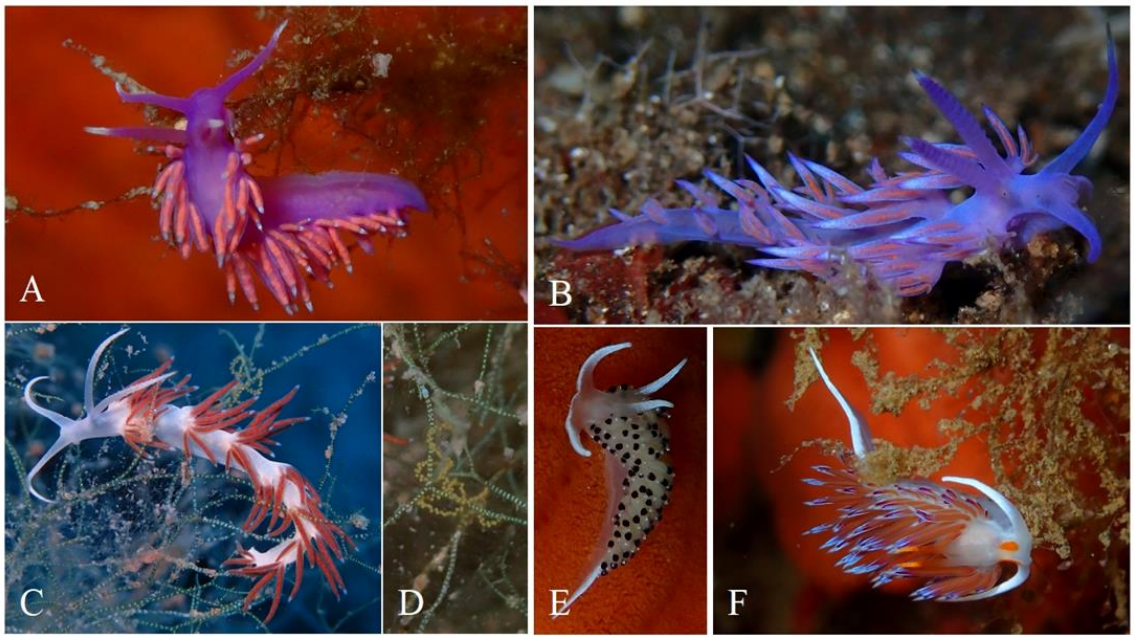

Figure 6. A: *Edmundsella pedata*, B: *Flabellina affinis*, C: *Paraflabellina gabinierei*, D: a *P. gabinierei's* egg mass, E: *Caloria elegans*, and F: *Cratena peregrina* (photos A. Lombardo).

inclination and scattered small rocky outcrops, which develop beyond 40-50 m of depth. The coastward part is almost horizontal, and it is characterized by small rocky outcrops and a small *Cymodocea nodosa* (Ucria) Asch meadow. Parete della Sirena is a vertical wall that goes down beyond 40-50 m of depth characterized by low water transparency caused by sulphur emissions (the water is turbid and yellowish). Its coastward part is constituted by small rocks with a sandy substrate of volcanic ash and gravel, which in some areas is covered by *Halophila stipulacea* (Forsskål) Ascherson meadows. Scoglio del Quaglietto is a huge stack that develops underwater until a depth of 35 m. It leans on a sandy bottom with scattered small rocky outcrops. Capo Grosso is a large vertical wall that perfectly follows the coast profile. It goes down until a depth of 35 m stopping on a sandy bottom.

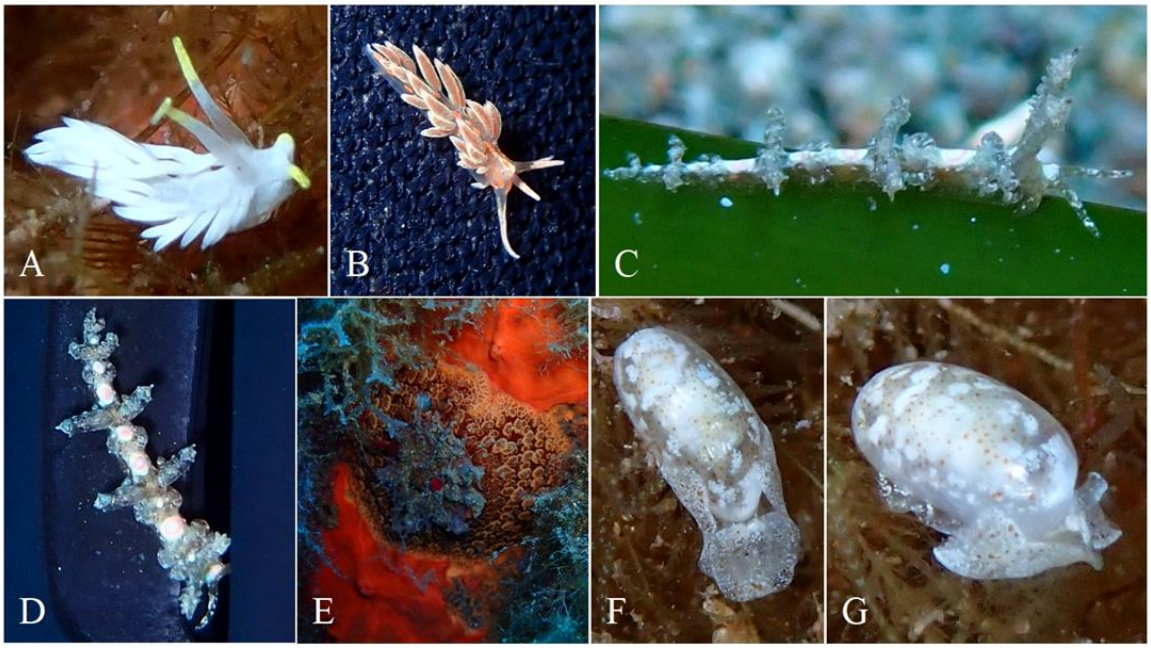

Figure 7. A: *Dicata odhneri*, B: *Facelina rubrovittata*, C: *Limenandra nodosa* right lateral view, D: *L. nodosa* dorsal view, E: *Umbraculum umbraculum*, F: *Roxaniella jeffreysi* dorsal view, and G: *R. jeffreysi* right lateral view (photos A. Lombardo).

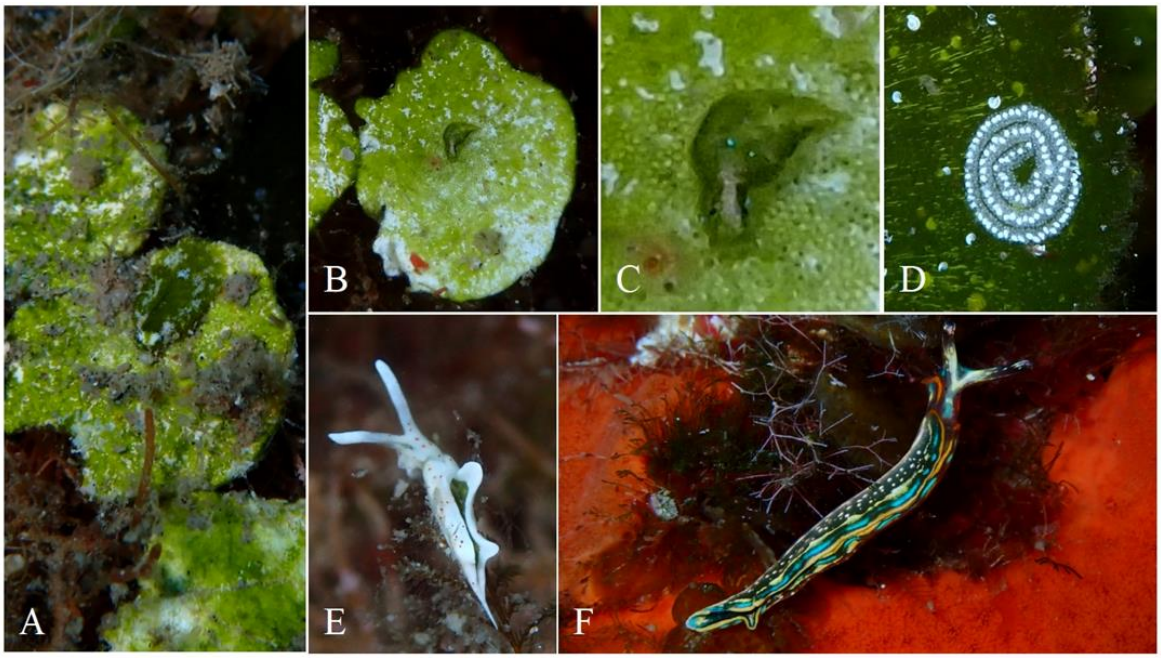

Figure 8. A: *Bosellia mimetica*, B: *Elysia hetta*, C: close look of *E. hetta*, D: *Elysia* sp. egg mass, E: *Elysia timida*, and F: *Thuridilla hopei* (photos A. Lombardo).

The data were collected with the photographic technique used by Lombardo and Marletta (2020): following the bottom morphology of each site, each marine heterobranch specimen and egg mass encountered were photographed through an Olympus TG-6 underwater camera and data about their depth was collected. Subsequently, the photographs were examined on the computer to identify each encountered specimen and egg mass using the relevant literature (Vicente, 1975; Schmekel and Portmann 1982; Trainito and Doneddu, 2014; Paz-Sedano et al., 2017; Prkić et al., 2018). The found species are reported in Figures 2-8. The used nomenclature is that reported in WoRMS (2023). Finally, using LibreOffice it was made a faunistic list (Table 2) that indicates the sites where each taxon was found and its

bathymetric range.

Results

Overall, a total of 30 species (1 Rhodopoidea, 1 Pleurobranchida, 21 Nudibranchia, 1 Cephalaspidea, 1 Umbraculida and 5 Sacoglossa) were found during this study (Table 2). Specifically, in Lipari 26 species were found, while in Vulcano 18 taxa. There were sites for both islands with a more or less presence of marine heterobranchs (Table 2). For Lipari, the most diverse sites were Pietra Menalda (11 species) and Parete dei Gabbiani (10). Instead, the sites with the lowest number of species were Punta Castagna (6) and Le Formiche (5), while in Secca delle Formiche and Secca del Villaggio a total of 9 and 8 species, respectively, was found.

In Vulcano, the site with the highest number of species was Parete della Sirena (13). The lowest diversity was found in the site of Scoglio del Quaglietto (4), while in the sites of Capo Grillo and Capo Grosso, 9 and 8 species were detected, respectively.

It is noteworthy that 12 of the species found through this study were documented only for the waters of Lipari (*Rhodope* sp., *Diaphorodoris alba*, *Trapania lineata*, *Felimida binza*, *F. krohni*, *F. luteorosea*, *Platydoris argo*, *Limenandra nodosa*, *Umbraculum umbraculum*, *Roxaniella jeffreysi*, *Elysia hetta* and *Elysia timida*). Instead, only 4 species were found exclusively in Vulcano: *Berthella* sp., *Felimare picta*, Discodorididae sp. and *Elysia* sp.. 14 species were present in both the examined islands (*Okenia picoensis*, *Felimare fontandraui*, *F. tricolor*, *Phyllidia flava*, *Doto* sp., *Edmundsella pedata*, *Flabellina affinis*, *Paraflabellina gabinierei*, *Caloria elegans*, *Cratena peregrina*, *Dicata odhneri*, *Facelina rubrovittata*, *Bosellia mimetica* and *Thuridilla hopei*). Of these latter, the most commonly found species was *F. fontandraui* (found in 9 sites) followed by *C. elegans*, *T. hopei* (both documented in 7 sites), *C. peregrina* and *B. mimetica* (6 sites).

Discussions

The data collected in the present study showed a difference between the number of marine Heterobranchia species in Lipari and Vulcano. Indeed, despite the close proximity between these two islands, in Lipari, it was found a higher number of species (26) than Vulcano (18). In particular, it can be noted that 12 of the 30 total species here documented were found exclusively at Lipari, while, on the contrary, 4 species were found only in the island of Vulcano. Consequently, Lipari showed a greater diversity in the marine Heterobranchia fauna compared to Vulcano. This difference might be because the environments encountered in Lipari present a higher number of morphologies and habitats compared to those explored along the coasts of Vulcano. Indeed, generally, this latter island presents a set of rather homogeneous marine environments that change only according to the versant of the island. The dive sites located on the western versant of Vulcano present almost vertical rocky walls leaning on sandy bottoms (about 30 m of depth); instead, those situated in the eastern part of the island have slopes or walls consisting mainly of volcanic ashes and gravel (about 40-50 m of depth) that become horizontal toward the coast with scattered rocks. The examined areas of Lipari have several different types of environments and habitats, derived both by natural and anthropic causes: the sites located on the north-eastern sector of the island present a slope/wall morphology with pumice sand as substrate (about 40-50 m of depth), the area located along the south-eastern coast has sandy bottoms with developed meadows of *Posidonia oceanica* and scattered rocks (about 25 m of depth) and, finally, the south-western coast is characterized by a sandy bottom with huge rocky outcrops (about 30 m of depth). Consequently, it is evident that the sea bottoms of Lipari, being more heterogeneous, can give a wider range of habitats and environments compared to those of Vulcano and thus the former ones are more prone to the establishment and growth of a higher number of marine Heterobranchia species.

Regarding the numerical difference in species among the sites of each island, it does not seem to have a real pattern. Indeed, both in Lipari and Vulcano,

Table 2. Faunistic list of the marine Heterobranchia species found in Lipari and Vulcano with their depth ranges (in meters). X= species present; *= presence of egg mass/es; += documented breeding activity. The site are abbreviated in the following way: LIPARI: P.Cast.= Punta Castagna; S.d.Vil.= Secca del Villaggio; P.d.Gab.= Parete dei Gabbiani; S.d.For.= Secca delle Formiche; P.Mena.= Pietra Menalda; L.Form.= Le Formiche; VULCANO: C.Gril.= Capo Grillo; P.d.Sir.= Parete della Sirena; S.d.Qua.= Scoglio del Quaglietto; C.Gros.= Capo Grosso.

Taxa	**Lipari**						**Vulcano**				**Depth range (m)**
	P.Cast.	**S.d.Vil.**	**P.d.Gab.**	**S.d.For.**	**P.Mena.**	**L.Form.**	**C.Gril.**	**P.d.Sir.**	**S.d.Qua.**	**C.Gros.**	
Superfamily Rhodopoidea											
Family Rhodopidae Ihering, 1876											
Rhodope sp.				X							9.5
Order Pleurobranchida											
Family Pleurobranchidae Gray, 1827											
Berthella sp.										*	12.7
Order Nudibranchia											
Suborder Doridina											
Family Calycidorididae Roginskaya, 1972											
Diaphorodoris alba Portmann & Sandmeier, 1960				X							28.7
Family Goniodoridididae H. Adams & A. Adams, 1854											
Okenia picoensis Paz-Sedano, Ortigosa & Pola, 2017	X				X	X		X			20 – 33
Trapania lineata Haefelfinger, 1960					X						20.2 – 20.3
Family Chromodoridididae Bergh, 1891											
Felimare fontandraui (Pruvot-Fol, 1951)	X+		X	X	X	X	X	X	X	X	14.1 – 36.9
Felimare picta (R. A. Philippi, 1836)							X				10.1 – 11.6
Felimare tricolor (Cantraine, 1835)			X					X			20 – 40.3
Felimida binza (Ev. Marcus & Er. Marcus, 1963)			X	X	X						18.3 – 25
Felimida krohni (Vérany, 1846)	X				X						21.2 – 30.6
Felimida luteorosea (Rapp, 1827)			X								37.2
Family Discodoridididae Bergh, 1891											
Discodoridididae sp.								*			22.5
Platydoris argo (Linnaeus, 1767)					X*						0.5 – 9.1
Family Phyllidiidae Rafinesque, 1814											
Phyllidia flava Aradas, 1847		X		X			X	X			15 – 28.3
Suborder Cladobranchia											
Family Dotidae Gray, 1853											
Doto sp.				*				*			24.8 – 30.6

Table 2. Continued.

Taxa	Lipari						Vulcano				Depth range (m)
	P.Cast.	S.d.Vil.	P.d.Gab.	S.d.For.	P.Mena.	L.Form.	C.Gril.	P.d.Sir.	S.d.Qua.	C.Gros.	
Family Flabellinidae Bergh, 1889											
Edmundsella pedata (Montagu, 1816)			X		X*		X	X		X	11.3 – 38.3
Flabellina affinis (Gmelin, 1791)		X	X				X*	X*			9.9 – 29.2
Paraflabellina gabinierei (Vicente, 1975)				X*				X			14.9 – 24.6
Family Facelinidae Bergh, 1889											
Caloria elegans (Alder & Hancock, 1845)	X	X	X		X		X	X		X	4.9 – 38.3
Cratena peregrina (Gmelin, 1791)	X*	X*	X*+				X*	X	X		7 – 32.2
Dicata odhneri Schmekel, 1967			X			X		X			16.4 – 20
Facelina rubrovittata (A. Costa, 1866)					X	X				X	10.1 – 20.3
Family Aeolidiidae Gray, 1827											
Limenandra nodosa Haefelfinger & Stamm, 1958		X									8.4
Order Umbraculida											
Family Umbraculidae Dall, 1889 (1827)											
Umbraculum umbraculum ([Lightfoot], 1786)		X									19.8
Order Cephalaspidea											
Family Haminoeidae Pilsbry, 1895											
Roxaniella jeffreysi (Weinkauff, 1866)					X						21.3
Superorder Sacoglossa											
Family Plakobranchidae Gray, 1840											
Bosellia mimetica Trinchese, 1891			X	X*		X	X		X*	X	0.5 – 34.2
Elysia hetta Perrone, 1990		X									20.3
Elysia sp.										*	15.1 – 26.1
Elysia timida (Risso, 1818)	X										7.6
Thuridilla hopei (Vérany, 1853)		X		X	X		X	X	X	X	4.2 – 28.7
Total number of species (per dive site)	**6**	**8**	**10**	**9**	**11**	**5**	**9**	**13**	**4**	**8**	
Total number of species (per island)	**26**						**18**				
Total number of species	**30**										
Total number of families (per dive site)	**4**	**6**	**4**	**7**	**7**	**4**	**5**	**8**	**3**	**5**	
Total number of families (per island)	**13**						**9**				
Total number of families	**14**										

there is not a huge difference in species richness between the above-mentioned sites and sectors. In Lipari, although there is a numerical difference in species richness among the sites [with the higher number of species found in Pietra Menalda (11), Parete dei Gabbiani (10) and Secca delle Formiche (9)], it cannot be said what sector of the island is more abundant in species compared to the others. For example, both in the north-eastern (Punta Castagna and Parete dei Gabbiani) and south-western (Secca delle Formiche, Le Formiche and Pietra Menalda) sectors of Lipari there are sites with high and low numbers of species. Almost the same, even if with a slightly higher number of species for the eastern sector [with Parete della Sirena as the most speciose site (13)], can be said for Vulcano.

However, if we consider the differences in the family composition of each site, a clearer pattern can be seen. For Lipari, the sites that present the higher number of families are Secca delle Formiche (7 families), Pietra Menalda (7) and Secca del Villaggio (6). Instead, in Vulcano, the most diverse site at the family level is Parete della Sirena (8). Consequently, from this point of view, it can be seen that in Lipari the most diverse sites are those located along the south-western and south-eastern sectors of the island, while in Vulcano the north-eastern sector is the most diverse (Parete della Sirena present 8 families). It is interesting to note that, in Lipari, the sector with the lowest number of families is the north-estern one (4 families both for Parete dei Gabbiani and Punta Castagna), which is located along the stretch of coast interested in the past by the cumbersome pumice extraction activities, whose sandy wastes nowadays cover much of the seabed in this area. Instead, the areas with the higher number of families are found in zones not or less impacted by human activities (southwestern and south-eastern sectors). In Vulcano, the sector with the higher number of families (the north-eastern one) is subjected to strong sulphur emissions which cause low visibility and yellowish colour of the waters. The other sites examined in Vulcano do not present this latter phenomenon. Moreover, two of the sites with the lowest number of families, Capo Grosso (5) and Scoglio del Quaglietto (3), are subjected to periodic collapses of rock material and thus these areas are periodically subjected to perturbation. Consequently, it seems that there is a direct correlation between the number of marine Heterobranchia found in a certain site and the environmental condition of this latter.

Among the 30 species of marine Heterobranchia documented in Lipari and Vulcano, 3 of them, two nudibranchs and one cephalaspidean deserve special consideration. The first of them is the flabellinid nudibranch *Paraflabellina gabinierei* (Vicente, 1975), a rare species endemic to the Mediterranean Sea for which there is only scant information on literature and websites. This species was reported for the Mediterranean coasts of Spain and France, several areas of the Italian peninsula (Rimini, Elba Island, Naples, Taranto, and Lecce), Sardinia, Croatia, Greece and Turkey (Ballesteros et al., 2023a). During this study two specimens of *P. gabinierei* were found, one at Lipari (Secca delle Formiche, 24.6 m of depth) with its egg mass (Fig. 6C-D) and the other one at Vulcano (Parete della Sirena, 14. 9 m of depth). In both cases, the animals were found on a tangle of the brown algae *Dictyota* sp.. Some authors noted that this species seems to be very localized in certain areas (Salento Sommerso, 2023a). Consequently, maybe in the sites in which it was found at Lipari and Vulcano, *P. gabinierei* can maintain small stable populations.

The second nudibranch species is the goniodorid *Okenia picoensis* Paz-Sedano, Ortigosa & Pola, 2017 (Fig. 2D). This species, in the last years, aroused the attention of specialists and enthusiasts due to its numerous and sudden findings in many areas of the Mediterranean Sea (Lombardo and Marletta, 2021; Trainito et al., 2022). This species, originally described for the Azores in 2017, was found a few years later in several Mediterranean localities through many reports often not far from each other in time. Such “explosive” distribution of this species led to different assumptions about its real geographic origin (Orfanidis et al. 2021, Crocetta et al. 2021, Lombardo and Marletta 2021; Trainito et al., 2022). Nowadays *O. picoensis* is considered a species with an Atlantic-

Mediterranean distribution that has undergone recent demographic explosions (Trainito et al., 2022). During this study, a total of eight *O. picoensis* specimens were found, six at Lipari and two at Vulcano. The individuals of Lipari were found at the sites of Punta Castagna (one specimen, on a polychaete tube, 33 m of depth), Pietra Menalda [3 specimens, all on branched and encrusted bryozoans present above the sponge *Crambe crambe* (Schmidt, 1862), 20.9 and 22 m of depth] and Le Formiche (2 specimens, on branched bryozoans situated above an unidentified sponge, 20 m of depth). In Vulcano, this dorid was found only at Parete della Sirena (two specimens, on *Peyssonnelia* sp., 27.7 and 27.8 m of depth). The present reports of this species for Lipari and Vulcano further highlight the high colonisation potential of this dorid nudibranch.

The third species is the haminoeid cephalaspid *Roxaniella jeffreysi* (Weinkauff, 1866), which is considered a common Mediterranean species occurring in sedimentary bottoms of several Mediterranean and Macaronesian continental platform areas (Cachia and Mifsud, 2007; Templado et al., 2011; Oskars et al., 2017). However, the great majority of its finding concerns only the shell and not the live animal. On the contrary, there are very few documented reports of the living animal which seems to be very rare (Templado et al., 2011; Salento Sommerso, 2023b). Consequently, there is only scant data about the biology and ecology of live animals (Thompson et al., 1985; Oskars et al., 2017; Ballesteros et al., 2023b). The specimen here reported was found in the site of Pietra Menalda crawling above a tangle of *Halopteris filicina* (Grateloup) Kützing and *Dictyota* sp. at a depth of 21.3 m (Fig. 7F-G).

Examining the marine Heterobranchia fauna of Lipari and Vulcano collectively, it can be noted that it presents mainly common and uncommon Mediterranean Sea species (Trainito and Doneddu, 2014). Moreover, the fact that in only 5 days of activities, it was found a total of 30 species is remarkable and highlights the high level of biodiversity of these two islands. It is interesting to note that the almost same number of species documented for these two islands was found in 2022 at Pantelleria in the same month (July) and days (5) of research by the authors (Lombardo and Marletta, 2023). This, considering that the coastal extension of these two neighbouring islands (almost 29 and 26 km respectively for Lipari and Vulcano) combined is almost the same as that present in Pantelleria (51.5 km). Consequently, although there is a difference in the faunistic composition of marine heterobranchs between Lipari-Vulcano and Pantelleria, it seems that there is a numerical pattern in the diversity, common to these three Sicilian islands. Therefore, in the near future, it would be interesting to explore the diversity of the marine Heterobranchia fauna of the other Sicilian islands to check if this pattern is a constant or not.

In conclusion, this study reported the first faunistic list of the marine heterobranchs of Lipari and Vulcano, exploring and comparing the species composition of these two Aeolian islands and showing a high level of biodiversity as concerns this group of marine molluscs.

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