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The nudibranchs (Gastropoda Heterobranchia) of the central-eastern coast of Sicily, II: Suborder Doridina

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ABSTRACT Through the present study, new data on the biology and ecology of dorids along the central-eastern coast of Sicily (Italy), whose knowledge was previously scant and fragmentary, have been here provided. After a brief description of this group of nudibranchs, for each species data on morphology, abundance, location and depth, substrates and habitats, seasonality and remarks are here given. Moreover, through this study, two species, *Crimora papillata* Alder et Hancock, 1862 and *Geitodoris portmanni* (Schmekel, 1972) are reported for the first time for the central-eastern coast of Sicily. This study highlighted that along this area there is almost the 28% of the total Mediterranean dorid fauna. Consequently, only through a continuous monitoring, it is possible to achieve a good knowledge of any group of marine heterobranchs in a given area.

KEY WORDS Doridina; Marine Heterobranchia; New reports; Nudibranchia; Sicily.

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INTRODUCTION

The dorids are all those nudibranchs that present a shape of the body generally compact, often dorso-ventrally flattened or slug-shaped; notum that extends beyond the head and completely surrounds the rhinophores during ontogenesis; anus, gills and nephroproct located in a posterior-median position (Schmekel & Portmann, 1982; Wägele & Willan, 2000). The high number of anatomical and physiological adaptations presented by this group of nudibranchs allowed them to colonize numerous marine habitats and to use as food sources several organisms such as sponges, bryozoans, barnacles, tunicates, polychaetes, hydrozoans, other opisthobranchs etc. (Thompson & Brown, 1984; McDonald & Nybakken, 1997; Valdés, 2004). All this enabled the dorids to be the opistobranch group with the highest number of known species (about 2000) (Valdés, 2004).

Odhner subdivided the dorids in four groups (Franc, 1968): Gnathodoridacea, Anadoridacea (Phanerobranchia), Eudoridacea (Cryptobranchia), and Porodoridacea (Porostomata).

Within the Gnathodoridacea, Odhner (1934) included the forms that he considered primitive or aberrant. The Anadoridacea (Phanerobranchia) present various morphological forms. Some of them have a body generally elongated and slender with the edge of the mantle indicated by the presence of numerous papillae. These forms possess further papillae in the area of gills (dorso-medial), probably for their protection. Other forms present an oval and dorso-ventrally flattened notum, with the gills located at the rear between the foot and the mantle. In all cases, the gills can be contractile but not retractable within a gill cavity, which is never present (Franc, 1968). The Eudoridacea (Cryptobranchia) present a uniform morphology, indeed the notum surrounds and covers completely the foot. Moreover, both the rhinophores and the gills are retractable inside special cavities. The gill tuft is always arranged around the anus, with a star or a semi-

circle shape (Franc, 1968). In the Porodoridacea (Porostomata) the mouth is a narrow pore. Within this group, there are dorids that present a general aspect (notum, anus and gill tuft position, gill tuft shape) very similar to the previous group, and other ones that instead have not the usual dorsal gill tuft, but present secondary lateral gills between the mantle and the foot.

In literature, the phanerobranch condition (total absence of a gill cavity) was always considered as more primitive than the cryptobranch one (presence of a gill cavity within which the gill tuft can be retracted), evaluated as the most advanced (Odhner, 1934; Franc, 1968; Rudman, 1998; Wägele & Willan, 2000). In the last years, this dogma was completely overturned through several studies that highlighted that there are "phanerobranch" dorids provided with gill cavity (Martynov et al., 2009; Martynov & Korshunova, 2015) and several "phanerobranch" dorid species that present, almost in the embryonic stages, the rudiments of the typical "cryptobranch" gill cavity (Martynov, 2011; Martynov & Korshunova, 2015).

Nowadays, the suborder Doridina is subdivided in two infraorders: Bathydoridoidei and Doridoidei (Bouchet et al., 2017; MolluscaBase, 2021). The latter (the principal group of this suborder) is subdivided in six superfamilies: Chromodoridoidea Bergh, 1891; Doridoidea Rafinesque, 1815; Onchidoridoidea Gray, 1827; Phyllidioidea Rafinesque, 1814; Polyceroidea Alder & Hancock, 1845 and [unassigned] Doridoidei (temporary name).

Regarding the central-eastern coast of Sicily, recently, Lombardo & Marletta (2020a) published the first list of the marine heterobranchs of this area. Through this work, it was found that along the central-eastern coast of Sicily there are 27 dorid species. Since in Lombardo & Marletta (2020a) only data on sites and bathymetric ranges were reported for each species, it was considered necessary, through the present study, to complete this information with data on dorids' biology and ecology, with the aim to increase the knowledge of this nudibranch group for this specific area of the Ionian coast of Sicily.

MATERIAL AND METHODS

The present study was conducted between 2017 and the August of 2021 in five sites located along the central-eastern coasts of Sicily. The sites of Ognina (37°31'50.4" N – 15°07'10.8" E) and Bellatrix (37°32'03.2" N – 15°07'35.2" E), located both within the municipality of Catania, are the southernmost and the most anthropized ones than the other areas examined. Along the coast in front of these two sites, there are several apartment buildings and bathing establishments. Moreover, in their immediate proximity, there is a sewerage and a harbour. Given the proximity of these two sites (about 540 m) and the similarity of environmental conditions, they were considered as a single site called Catania. The sites of Scalo Pennisi (37°38'23.2" N – 15°11'04.6" E) and Acque Fredde (37°38'15.7" N – 15°10'52.1" E) are the northernmost ones and both are located in the hamlet of Santa Tecla, in the municipality of Acireale.

These sites present the most natural environmental conditions and due to their proximity (about 390 m), they were considered as a single site called Santa Tecla. The site of Santa Maria La Scala (37°36'46.5" N – 15°10'31.4" E), located within the homonymous hamlet of the municipality of Acireale, is sited between the northernmost and the southernmost sites.

It presents intermediate conditions between those of Catania and Santa Tecla. Throughout this study, a total of 358 (141 in Catania, 110 in Santa Maria La Scala and 107 in Santa Tecla) scuba dives were performed between 9:00 and 11:30 a.m., twice a week (marine-weather conditions allowing). For each site, it was always conducted the same underwater path between 0 and 45 m of depth (where the geomorphology of the seabed made it possible), during which all the dorid specimens encountered were photographed through an Olympus TG-4. The photos were subsequently examined to extrapolate all information regarding the species, depth, substrate, period of the year and any further observations. For the identification of dorid species the following texts were mainly consulted: Schmekel & Portmann (1982), Trainito & Doneddu (2014).

Regarding the identification of phytobenthos, the algal species were examined in the laboratory using the identification keys of Cormaci et al. (2012; 2014; 2017; 2020). Moreover, for the identification of zoobenthos the text principally used was Trainito & Baldacconi (2014). Instead for the sponge identification, it was consulted Bal-

dacconi & Trainito (2013). For each dorid species included in this study, the following information are provided: Morphology, Abundance, Location and depth, Substrates and habitats, Seasonality, Remarks.

Regarding to the information on species' abundance, the same definitions presented in Lombardo (2021) are here used: Rare means those species that are encountered once in a while or are very difficult to find; Uncommon refers to species that are not seen on every dive or that you have to look for to find; Common refers to those species that are easy to find for various reasons (colour, behaviour, lifestyle); Very common means those species that are like the common but much more numerous and conspicuous. Some species presents intermediate abundance categories.

RESULTS

Systematics

Ordo NUDIBRANCHIA Cuvier, 1817
Subordo DORIDINA
Infraordo DORIDOIDEI
Familia CALYCIDORIDIDAE Roginskaya, 1972
Genus *Diaphorodoris* Iredale et O'Donoghue, 1923

Diaphorodoris alba Portmann et Sandmeier, 1960 (Figs. 1, 2)

Morphology. This species presents, for a large part of the body, an opalescent white colouration. The notum is edged by a thick yellow line which in turn is flanked on the outside by a white line. Sometimes the innermost part of the yellow line can possess orange nuances. The rhinophores are lamellated and at their maximum extension present the distal parts opalescent white coloured, instead, the rest of the rhinophores' surface is almost entirely transparent. This allows to see the cavity present between each rhinophore and the notum. The gills are white-grey coloured and each of them possesses an opalescent white line which runs along its entire main axis. The gills are always rear facing. The tail presents an opalescent white dorsal crest.

Abundance. In total, through this study, 84 specimens of *D. alba* were observed. Consequently, this species can be considered as uncommon.

Location and depth. This species was documented in all the examined sites from 12 to 39.2 m of depth.

Substrates and habitats. This dorid was found on different algal and animal substrates: *Halopteris filicina* (Grateloup) Kützing; *H. scoparia* (Linnaeus) Sauvageau; *Dictyota dichotoma* (Hudson) J. V. Lamouroux; *D. implexa* (Desfontaines) J. V. Lamouroux; *Zonaria tournefortii* (J. V. Lamouroux) Montagne; turfs of filamentous red and brown algae with detritus; *Peyssonnelia* sp.; *Rhodymenia* sp. covered by detritus; and calcareous red algae with detritus; the poriferous *Crambe crambe* (Schmidt, 1862); *Hexadella* sp. and *Petrosia (Petrosia) ficiformis* (Poiret, 1789) with bryozoans and detritus; on encrusting bryozoans not identified; *Reptadeonella violacea* (Johnston, 1847); *Myriapora truncata* (Pallas, 1766); *Diplosolen* cf. *obelium* (Johnston, 1838); *Tricellaria* sp. and *Beania* cf. *magellanica* (Busk, 1852). Generally, *D. alba* is mainly found in sciaphilous environments. It is characteristic of vertical walls rich in bryozoans, sponges and detritus.

Seasonality. This species is sporadically present all year round.

Remarks. Throughout this study the breeding activity was documented only once, specifically in July. In June, it was observed a specimen during the laying of an egg mass (Fig. 2). This was ribbon shaped with the eggs white coloured. The egg mass had the same diameter of the animal, and it was laying in anti-clockwise direction on a calcareous red algae covered by entoprocts and detritus. Rarely, some specimens presented the yellow edge of the notum with missing pieces.

Diaphorodoris papillata Portmann et Sandmeier, 1960 (Figs. 3, 4)

Morphology. This dorid presents an opalescent white body colouration. The notum is edged by an evident yellow line. Numerous red papillae are present along almost the whole surface of the notum. The rhinophores are lamellated and possess a white-grey colouration distally, while they are generally transparent proximally. This allows to observe the space that connects the rhinophores to the notum. The gills, transparent grey or white coloured, are posteriorly oriented and present on each principal axe an evident white or yellowish line. The tail possesses a white or yellowish coloured dorsal crest.

ABUNDANCE. Throughout this study it was noted a remarkable difference in the number of individuals encountered in each of the examined sites: 66 in Catania, 68 in Santa Maria La Scala and 223 in Santa Tecla. Consequently, *D. papillata* seems to be an uncommon species in the first two sites and common in the third site (see remarks).

LOCATION AND DEPTH. this dorid was documented in all the examined sites from 7 to 37.9 m of depth.

SUBSTRATES AND HABITATS. *Diaphorodori papillata* was observed above the following substrates: *H. filicina*; *H. scoparia*; *Z. tournefortii*; *Padina pavonica* (Linnaeus) Thivy; *Palmophyllum crassum* (Naccari) Rabenhorst; *D. dichotoma*; entanglements of *D. implexa*, *Caulerpa cylindracea* Sonder, *Jania* sp. and pseudoparenchymatous red algae; turfs of filamentous red and brown algae covered by detritus; *Peyssonnelia* sp.; naked calcareous red algae or covered by tuft of filamentous red algae; the bryozoans *M. truncata* (also heavily covered with detritus and other bryozoans); *D.* cf. *obelium*; encrusting bryozoans; in crevices with entoprocts and on tunicates of the species *Aplidium elegans* (Giard, 1872). Generally, this nudibranch is found in the same environments as *D. alba*, but unlike the latter, it can be observed also in lit environments.

SEASONALITY. Usually this dorid can be found all year round. The site of Santa Tecla was the only one in which peaks in the number of individuals were documented in March, April and May. The breeding activity was documented in March, April, May, June, August, September and December.

REMARKS. Between 2017 and the present time, it was noted an evident decrease in the number of specimens in all the examined sites. Presently, *D. papillata* can be considered an uncommon species. Occasionally, specimens, with a more yellowish body than the usual one, were encountered (Fig. 4).

Familia GONIODORIDIDAE H. Adams et A. Adams, 1854

Genus *Okenia* Menke, 1830

Okenia longiductis Pola, Paz-Sedano, Macali, Minchin, Marchini, Vitale, Licchelli et Crocetta, 2019 (Fig. 5)

MORPHOLOGY. This species presents a grey transparent general body colouration. Along almost all the body's surface there are numerous brown-cream spots and dots. These can be more or less spaced out from each other. *O. longiductis* possesses from five to eight lateral papillae arranged as follows: two in front of the rhinophores, three-four on each side of body and one-two located posterior to the gills. Dorsally there are three papillae in front of the gills, that are arranged transversely to the body and one-two longitudinally disposed behind the rhinophores. Each rhinophore possesses from four to six lamellae. The gills' number varied from six to seven.

ABUNDANCE. Sixteen (16) specimens were encountered during this study. This species can be considered as rare.

LOCATION AND DEPTH. *Okenia longiductis* was observed in all the examined sites from 3.1 to 6.4 m of depth (Lombardo & Marletta, 2021a; present study).

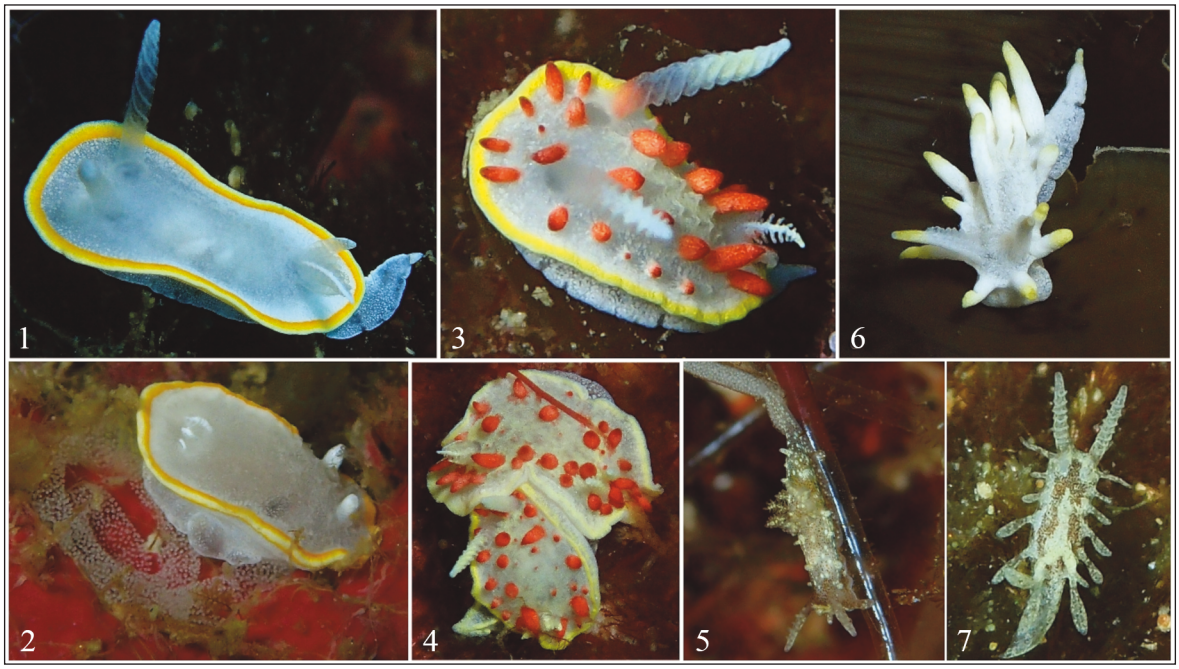
SUBSTRATES AND HABITATS. This dorid was exclusively found (usually with its egg masses) above the colonies of the bryozoan *Amathia* sp. (Lombardo & Marletta, 2021a; present study).

SEASONALITY. This species was observed in July, August, October and November in the examined areas. The egg masses, white coloured and with their peculiar shape, were found in July and August (Lombardo & Marletta, 2021a; present study).

REMARKS. Although *O. longiductis* is a very cryptic species above the bryozoan *Amathia* sp., the finding of its peculiar egg masses (that, when present, are easy to see above the bryozoan) greatly facilitates the animal observation.

Okenia picoensis Paz-Sedano, Ortigosa et Pola, 2017 (Fig. 6)

MORPHOLOGY. This species presents an opalescent white body and all the tips of the body's extremities yellow coloured. Generally, the animals possess two papillae in front of the rhinophores, two behind the gills (that do not exceed the tip of the tail in length), three on each side of the body and one dorsally located on a crest between rhinophores and the gill tuft. The gills are four and resemble in shape the body's papillae. Each rhinophore has from seven to nine lamellae. Nevertheless, some specimens present variations in the number of papillae. For example, individuals with a total



Figures 1–7. Calycidorididae and Goniodorididae. Fig. 1: *Diaphorodoris alba*. Fig. 2: a *D. alba* specimen during egg mass deposition. Fig. 3: *Diaphorodoris papillata*. Fig. 4: two yellowish *D. papillata* specimens during breeding. Fig. 5: *Okenia longiductis*. Fig. 6: *Okenia picoensis*. Fig. 7: *Okenia problematica* (photos by A. Lombardo).

of 12-14 papillae (that surrounded the notum) were observed. A particular specimen presented, on each side of the body, only two papillae.

Abundance. 12 specimens of *O. picoensis* were found during this study.

Location and depth. The individuals were observed in all the examined sites from 14.9 to 22.8 m of depth (Crocetta et al., 2021; Lombardo & Marletta, 2021; present study).

Substrates and habitats. *Okenia picoensis* was found above different substrates: on a small rocky wall covered by a turf of red algae, bryozoans, and sponges (Crocetta et al., 2021); *D. dichotoma*, *H. filicina*, among an entanglement of filamentous brown and red algae covered by detritus, on an unidentified filamentous red alga, and on a small rocky wall covered by turfs of red algae and tunicates (Lombardo & Marletta, 2021) and on *Z. tournefortii* (present study).

Seasonality. This species was found from March to July (Crocetta et al., 2021; Lombardo & Marletta, in press; present study).

Remarks. See Lombardo & Marletta (2021).

Okenia problematica Pola, Paz-Sedano, Macali, Minchin, Marchini, Vitale, Licchelli et Crocetta, 2019 (Fig. 7)

Morphology. This species presents an opalescent white-grey body colouration. Along almost the entire surface of the dorsum, flanks and part of the tail, there are numerous brown dots that collectively form blotches. The most characteristic dots-blotches pattern is present on most of the dorsum. This pattern develops roughly from the space between the rhinophores and, continuing on the notum, it bifurcates in two when encounters the dorsal ridge (that is located behind the rhinophores and in front of the gills). Along the edges of the notum there are several papillae arranged as follows: two in front of the rhinophores, one on the side of each rhinophore, four papillae on each side of the body (in the space between rhinophores and gills); behind the gills there are, on each side of the body, two papillae that originate from a common peduncle. All the papillae become larger and longer in anterior-posterior direction. Dorsally, between the rhinophores and the gills, there is a ridge from which a papilla originates. Each rhinophore presents seven lamellae. The gills are four in number and are cream-yellow coloured.

ABUNDANCE. Throughout this study, only two specimens were found. This species can be considered as rare.

LOCATION AND DEPTH. Both the individuals were documented in the site of Catania at 14.5 and 17.4 m of depth (Lombardo & Marletta, 2020b).

SUBSTRATES AND HABITATS. The two animals were observed above thalli of *H. scoparia* (Lombardo & Marletta, 2020b).

SEASONALITY. Only in May (Lombardo & Marletta, 2020b).

REMARKS. See Lombardo & Marletta (2020b).

Genus *Trapania* Pruvot-Fol, 1931

Trapania lineata Haefelfinger, 1960 (Figs. 8–10)

MORPHOLOGY. This dorid presents a grey transparent body colouration, through which it is possible to observe its internal parts. All the body's appendages (including the point of the tail) have the tips yellow orange coloured. Most of the body's surface is crossed by thin bright white lines which are joined together forming a continuous pattern. This latter can be simple or complex. Generally, the lines tend to be continuous with each other, at other times they are discontinuous and chaotic. In addition to the lamellated rhinophores and the smooth oral tentacles, there are other three pairs of appendages: a propodial tentacle behind to each of the oral ones, an appendage which originates from the base of each rhinophores and that elongates behind each of them, surrounding it, and an appendage originating on each side of the gill area, probably to protect it.

ABUNDANCE. Throughout this study 16 specimens were found. This species can be considered as rare.

LOCATION AND DEPTH. *Trapania lineata* was documented in the examined areas from 4.6 to 35 m of depth.

SUBSTRATES AND HABITATS. Generally, this species was observed above sponges of the species *Scalarispongia scalaris* (Schmidt, 1862) covered by entoprocts, in moderately shaded environments in the first few metres of depth. Nevertheless, this dorid was documented also on other algal and animal substrates: *H. filicina* covered by detritus; *H. scoparia*; *Taonia* sp.; turfs of filamentous brown and red algae; *D. implexa*; *D. dichotoma*; the sponges *Hexadella* sp. and *C. crambe*.

SEASONALITY. This nudibranch was found during January, February, March, April, June, August, September and November.

Familia POLYCERIDAE Alder et Hancock, 1845
Genus *Crimora* Alder et Hancock, 1862

Crimora papillata Alder et Hancock, 1862 (Fig. 11)

MORPHOLOGY. This species presents a general whitish body colouration. Most of the body's surface (especially the edge of the notum) is covered with numerous yellow-orange tubercles. The rhinophores are lamellated and, as the gills, possess for almost all their surface the same colouration of the tubercles.

ABUNDANCE. A single individual was found during March 2021.

LOCATION AND DEPTH. The animal was documented for the site of Santa Tecla at 17.3 m of depth.

SUBSTRATES AND HABITATS. The specimen was observed on a *Peyssonnelia* sp. thallus.

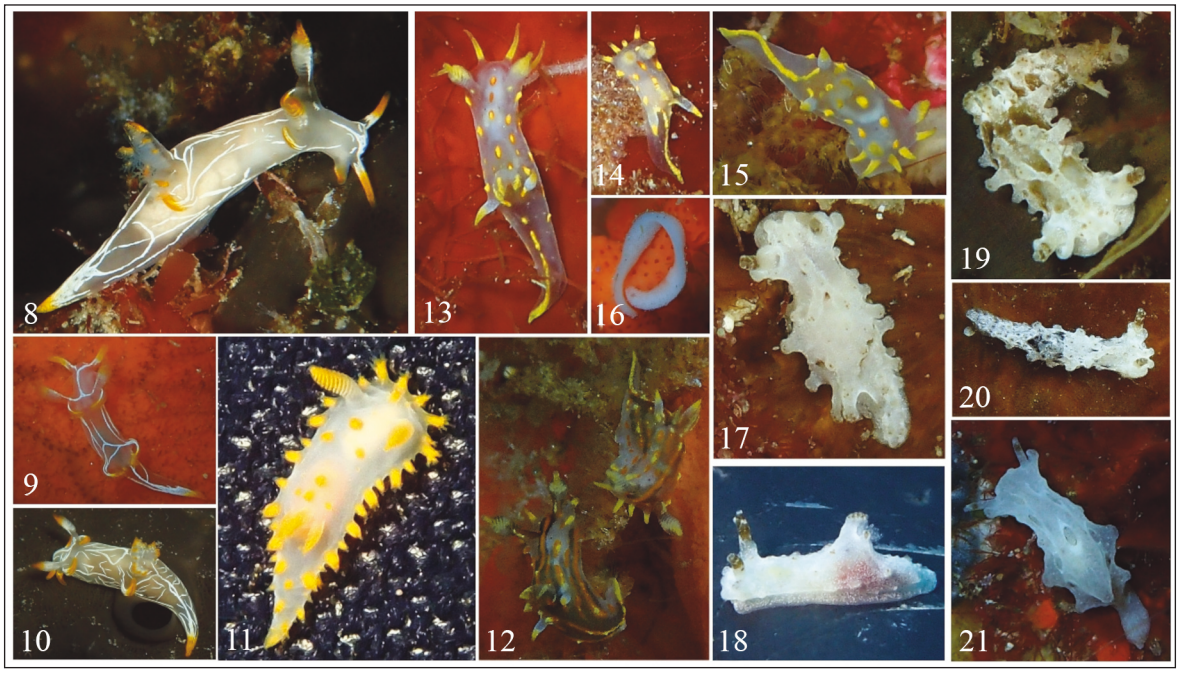
SEASONALITY. March.

REMARKS. This finding represents the first report of *C. papillata* for the central-eastern coast of Sicily.

Genus *Polycera* Cuvier, 1817

Polycera quadrilineata (O.F. Müller, 1776) (Figs. 12–16)

MORPHOLOGY. This species presents a grey coloured body with several yellow-orange lines or spots arranged longitudinally and parallel to each other. In the anterior position of the head there are (generally) four papillae and just behind them, on each side of the head, there is a more or less pronounced protuberance. The rhinophores are lamellated and the gill tuft possesses a papilla on each side. All these appendages present distally a yellow to orange colouration, instead proximally they have the same body colouration. It was noted that this general pattern can vary in different individuals. In the majority of the specimens, it would appear to be a 'darkening' of the normal grey colouring of the body's surface, in the areas where the most conspicuous spots and lines are found, giving the ani-



Figures 8–21. Goniodorididae, Polyceridae and Aegiridae. Fig. 8: *Trapania lineata*. Fig. 9: a *T. lineata* specimen with a simple pattern. Fig. 10: a *T. lineata* specimen with a complex pattern. Fig. 11: *Crimora papillata*. Fig. 12: *Polycera quadrilineata* specimens with the common darker pattern. Fig. 13: a *P. quadrilineata* individual with the less common chromatic pattern. Fig. 14: a juvenile specimen. Fig. 15: the individual with six frontal papillae. Fig. 16: a *P. quadrilineata*'s egg mass. Fig. 17: *Aegires leuckartii.* Fig. 18: a small specimen with pinkish nuances. Fig. 19: an individual with an evident brownish pigmentation. Fig. 20: a specimen with blackish pigmentation. Fig. 21: *Aegires sublaevis* (photos by A. Lombardo).

mals an overall dark green body colouration. In these animals, there are numerous small tubercles which discontinuously follow the longitudinal path of the lines. Typically, these tubercles are pale yellow coloured. The areas of body's surface, in which there are not present the lines or the spots, remain grey. All of this generates a very characteristic chromatic pattern. Another *P. quadrilineata* colour type (less widespread than the previous one) is the one in which the body remains completely grey in colour and, on its surface, there are (in a longitudinal path) numerous yellow-orange spots. Some specimens present intermediate chromatic pattern between the previous ones. In a peculiar case, it was observed an individual with six head's papillae and the body white grey in colour that was covered by yellow tubercles-dots longitudinally disposed.

Abundance. Throughout this study, 68 *P. quadrilineata* specimens were found. This species can be considered as uncommon (see below).

Location and depth. This dorid was documented in all the examined areas from 5 to 38.6 m of depth.

Substrates and habitats. *Polycera quadrilineata* was observed on the following substrates: *Peyssonnelia* sp. covered by encrusting and erect bryozoans; *Feldmannophycus rayssiae* (Feldmann & G. Feldmann) H. Augier & Boudouresque; *Rhodymenia* sp.; *Contarinia squamariae* (Meneghini) Denizot; turfs of filamentous red algae and *Jania* sp.; *D. dichotoma*; *H. filicina*; among *H. scoparia* thalli; *Z. tournefortii*; on the bryozoans *M. truncate*, *B.* cf. *magellanica*, *Bugula* sp.; on the sponges *C. crambe*, *P. ficiformis* with *D.* cf. *obelium*; and on unidentified sponge covered by entoprocts. Generally, *P. quadrilineata* is a very sciaphilous species, typically present in strongly shaded environments rich in bryozoans.

Seasonality. This nudibranch was found all year round with the exception of August and September.

Remarks. *Polycera quadrilineata*, due to its small sizes and the strongly sciaphilous behaviour, is a very difficult species to found during dives. Nevertheless, it is very probable that this dorid is more common than it seems. Instead, the egg masses

(white and with a U shape) (Fig. 16) are quite common. These were found in great numbers from November to July on the same substrates on which *P. quadrilineata* was found.

Familia AEGIRIDAE P. Fischer, 1883
Genus *Aegires* Lovén, 1844

Aegires leuckartii Vérany, 1853 (Figs. 17–20)

MORPHOLOGY. This species presents a white body colouration. Almost the entire body's surface is characterized by an abundant presence of peculiar tubercles, which vary in number according to the individual size. These are numerous and evident in larger animals, while few and less developed in smaller ones. The rhinophores, smooth and wand-shaped, are surrounded at their base by some tubercles which as a whole form a sheath. Also the gills are encircled by several tubercles. Generally, the rhinophores are white-grey coloured and possess two brown band distally. In some individuals the rhinophores can present only a band or are totally brown. Usually, the smaller specimens are completely white and can have pinkish nuances on the flanks and the tail. The medium-sized individuals are white coloured and with the tubercles' tips more or less brownish, or as in a single found specimen, they have a blackish pigmentation along the body's surface. The larger individuals have a white-grey coloured body and scattered brown pigmentation.

ABUNDANCE. Throughout this study, 26 specimens were found. This species can be considered as rare.

LOCATION AND DEPTH. *Aegires leuckartii* was encountered in all the examined areas from 4.5 to 23.8 m of depth.

SUBSTRATES AND HABITATS. This dorid was observed on the following algal substrates: *Peyssonnelia* sp.; *Griffithsia* sp.; turfs of filamentous red algae; turfs of *Jania* sp.; entanglements of filamentous red and brown algae with detritus; *Lobophora variegata* (J. V. Lamouroux) Womersley ex E. C. Oliveira; *Z. tournefortii*; *H. filicina* and among *H. scoparia*. Moreover, it was found on the tunicate *Pycnoclavella communis* Pérez-Portela, Duran & Turon, 2007.

SEASONALITY. *Aegires leuckartii* was documented from March to August and in October and November.

Aegires sublaevis Odhner, 1932 (Fig. 21)

MORPHOLOGY. This species presents a white coloured body. The surface of the latter is characterized by the presence of circular depressions scattered neatly over the back, flanks and tail. These depressions are edged with opalescent white and, within them, there are brown coloured dots. The rhinophores are smooth and wand-shaped. Moreover, they present a brown band near the tips. Each rhinophore is encircled by tubercles, which together form a sheath. Along the lateral margins of the notum there are small inconspicuous tubercles.

ABUNDANCE. Throughout this study, only a specimen was found. This species is rare.

LOCATION AND DEPTH. Catania, 5.7 m of depth.

SUBSTRATES AND HABITATS. The individual was observed inside a crevice in which there were a thallus of *Peyssonnelia* sp., sponges, colonial tunicates and a *P. quadrilineata* specimen.

SEASONALITY. March.

Familia CHROMODORIDIDAE Bergh, 1891
Genus *Felimare* Ev. Marcus et Er. Marcus, 1967

Felimare fontandraui (Pruvot-Fol, 1951) (Figs. 22–29)

MORPHOLOGY. This species has a dark blue body. The notum is edged by an orange line. On the dorsal surface is present a thick white line (that in the larger individuals can possess slight yellow nuances) which is developed in longitudinal way, encircling the gill tuft at the back and overcoming the rhinophores in front, forming an anchor-shaped pattern on the head. The thick line also tends to develop laterally, creating linear (almost sickle-like) white shapes that may or may not be in continuity with the previous one. Usually these "sickles" are accompanied on their external side by a more or less evident blue shade. The rhinophores and the gills are dark blue coloured. On each side of the body there is a white line that develops in a longitudinal way. Also the tail possesses dorsally a white line.

ABUNDANCE. Throughout this study a total of 95 specimens were found. This species can be considered as uncommon.

LOCATION AND DEPTH. *Felimare fontandraui* was observed in all the examined areas from 9 to 39.1 m of depth.



Figures 22–29. *Felimare fontandraui*. Fig. 22: two breeding specimens. Fig. 23: very juvenile chromatic pattern. Fig. 24: juvenile chromatic pattern. Fig. 25: intermediate colouration between juvenile and pre-adult form. Fig. 26: pre-adult colouration. Fig. 27: the first specimen found with a chromatic pattern different from the typical one. Fig. 28: the second one. Fig. 29: the third one (photos by A. Lombardo).

Substrates and habitats: this dorid was found on different algal and animal substrates: *Peyssonnelia* sp. covered by organisms or not; calcareous red algae; *Sebdenia monardiana* (Montagne) Berthold; *C. squamariae*; *Sphaerococcus coronopifolius* Stackhouse; *Eupogodon planus* (C.Agardh) Kützing; filamentous red algae with detritus; *Bonnemaisonia* sp.; *Halimeda tuna* (J. Ellis & Solander) J. V. Lamouroux, *D. implexa*, *D. dichotoma* and *C. cylindracea* covered by detritus; *P. crassum*; *Z. tournefortii*; *H. filicina* and *H. scoparia* covered by detritus; *M. truncata*; *C. crambe* and *Dysidea fragilis* (Montagu, 1814). *F. fontandraui* is characteristic of sciaphilous environments with detritus.

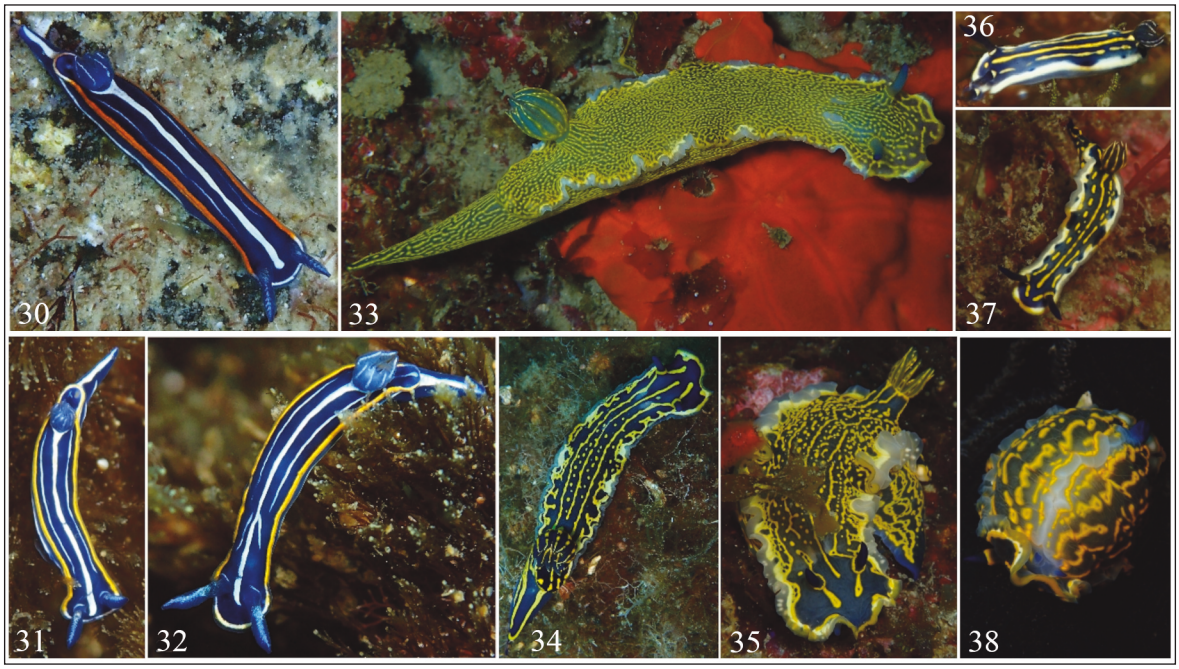
Seasonality. This nudibranch can be found from January to August. The higher number of individuals was observed from April to July, instead the breeding activities were documented from June to August.

Remarks. Throughout this study some specimens with a different development of the chromatic pattern were found. Through the examination of the photographs, it was possible to hypothesise the change of the chromatic pattern from juveniles to adults. (Figs. 23-26). Moreover, three individuals (Figs. 27–29), with a completely different chromatic pattern than that showed usually by the adults of the investigated area, were observed.

Felimare gasconi (Ortea, 1996) (Figs. 30–32)

Morphology. This dorid presents a dark blue body colouration. The notum is edged by an orange or yellow line which became white in front of the rhinophores and behind the gill tuft. The rhinophores and the gills are blue coloured and possess white lines. Dorsally a thick white longitudinal line develops from the space between rhinophores to the gills, surrounding the latter. On each side of the thick line, there is a thin white line, longitudinally disposed. Rarely, other thin lines may bifurcate from the main line, or these may be present between the central and lateral bands. These thin lines are very faint. On each side of the body, there is a white line which develops in longitudinal direction. Another white coloured line is located on the dorsal surface of the tail.

Abundance. A total of 7 specimens were found during this study. This species can be considered as rare.



Figures 30–38. Chromodorididae. Fig. 30: a *Felimare gasconi* specimen with the lateral notum border orange coloured. Fig. 31: a *F. gasconi* individual with the lateral border yellow coloured. Fig. 32: a specimen with additional lines on the notum. Fig. 33: a *F. picta* specimen with the green chromatic variant. Fig. 34: a blue *F. picta*. Fig. 35: an individual with intermediate colouration. Fig. 36: a small blue *F. picta* juvenile. Fig. 37: another blue juvenile, but larger specimen. Fig. 38: a *F. picta* specimen contracted in the typical ball-shape (photos by A. Lombardo).

LOCATION AND DEPTH. *Felimare gasconi* was documented in Santa Maria La Scala and Catania, from 5.5 to 10 m of depth.

SUBSTRATES AND HABITATS. This species was observed on the following substrates: turfs of filamentous red algae; *Jania* sp.; calcareous red algae; *D. dichotoma*; *D. implexa*; *H. scoparia* and under a pebble. Principally, *F. gasconi* is present in lit environments, but, sometimes also in sciaphilous ones.

SEASONALITY. March, May and June.

Felimare picta (Philippi, 1836) (Figs. 33–38)

MORPHOLOGY. This nudibranch possesses a strongly elongated body and a general aspect that facilitates its identification. In the course of this study, it was noted that two different chromatic variants of this characteristic chromodorid may be present at the sites examined. In the first chromatic variant the body is green coloured and along its entire surface there is a conspicuous pattern of yellow lines and dots. In the second one, the body is blue coloured and along its entire dorsal surface there are four yellow lines, arranged more or less neatly. Between them, there can be present several yellow dots. Moreover, individuals with intermediate colourations, between these two colour patterns, were observed. Anyway, in all specimens, the edge of the notum is transparent and it is accompanied inwards by a white band. Behind the rhinophores, in correspondence of two small areas where the tegument is transparent, there are the eyes.

ABUNDANCE. Throughout this study a total of 66 specimens were found. *F. picta* can be considered an uncommon species.

LOCATION AND DEPTH. This dorid was documented in all the examined areas from 4 to 36.6 m of depth.

SUBSTRATES AND HABITATS. *Felimare picta* was observed on the following substrates: *Peyssonnelia* sp.; *S. monardiana*; turfs of *Jania* sp. with filamentous red algae; *Ellisolandia elongata* (J. Ellis & Solander) K.R. Hind & G.W. Saunders; *Bonnemaisonia* sp.; *Rhodymenia* sp.; calcareous red algae; *D. dichotoma*; *D. implexa*; *H. scoparia*; *Z. tournefortii*; *C. cylindra-*

cea; *Cladophora* sp. with filamentous algae; on the sponges *C. crambe* and *Dysidea* sp.; on the bryozoans *M. truncata* and *R. violacea*; and on the tunicate *P. communis*. Generally, the largest individuals were found both in well-lit and sciaphilous environments in shallow waters. The smallest ones were observed almost always in sciaphilous habitats, especially in crevices. Rarely, *F. picta* can be found in deep waters.

Seasonality. This nudibranch was encountered all year round. Individuals with the typical juvenile chromatic pattern (Figs. 36, 37) were observed in February, March, June, July, August, September and November.

Remarks. Several specimens were seen with the head inside narrow slits and the rest of the body outside them, with the gill tuft completely open. It is hypothesised that in these cases, the animals were feeding on something inside the cracks. Throughout this study it was observed that this species possesses a very high capacity to modify the shape and length of the body according to requirements. For example, when the authors handled the animals, these latter contracted and formed a ball-shape with the body (Fig. 38). These individuals returned in their normal shape when left alone.

Felimare tricolor (Cantraine, 1835) (Figs. 39–46)

Morphology. This species presents a light blue body colouration, and the notum is edged by a yellow line. Dorsally, in the space between rhinophores and gills, there is an evident central yellow line. On each side of this line, there are several bright azure small lines/dots. The trend of these latter can vary in each individual. Also the central dorsal line can present considerable variations in thickness, shape and colour. In some specimens, from this line, some yellow dots arise, which tend to merge with the lateral azure lines/dots to form a particular individual pattern. In the largest specimens the central yellow line becomes very thick and discontinuous, tending to discolour. On each side of the body there is a yellow line (continuous or not), that sometimes is accompanied by yellow-coloured dots. The rhinophores are lamellated and dark blue coloured. The gills possess the same colouration of the previous ones, but they are marked by yellow lines. The dorsal part of the tail presents a yellow line.

Abundance. Throughout this study, it was observed a remarkable difference in the number of individuals found in each site. In the areas of Catania (103) and Santa Maria La Scala (109) almost the same number of specimens was found, instead in Santa Tecla (57) at least half of them was found. Generally, *F. tricolor* can be considered as an uncommon species.

Location and depth. This dorid was found in all the examined areas from 8 to 37.2 m of depth.

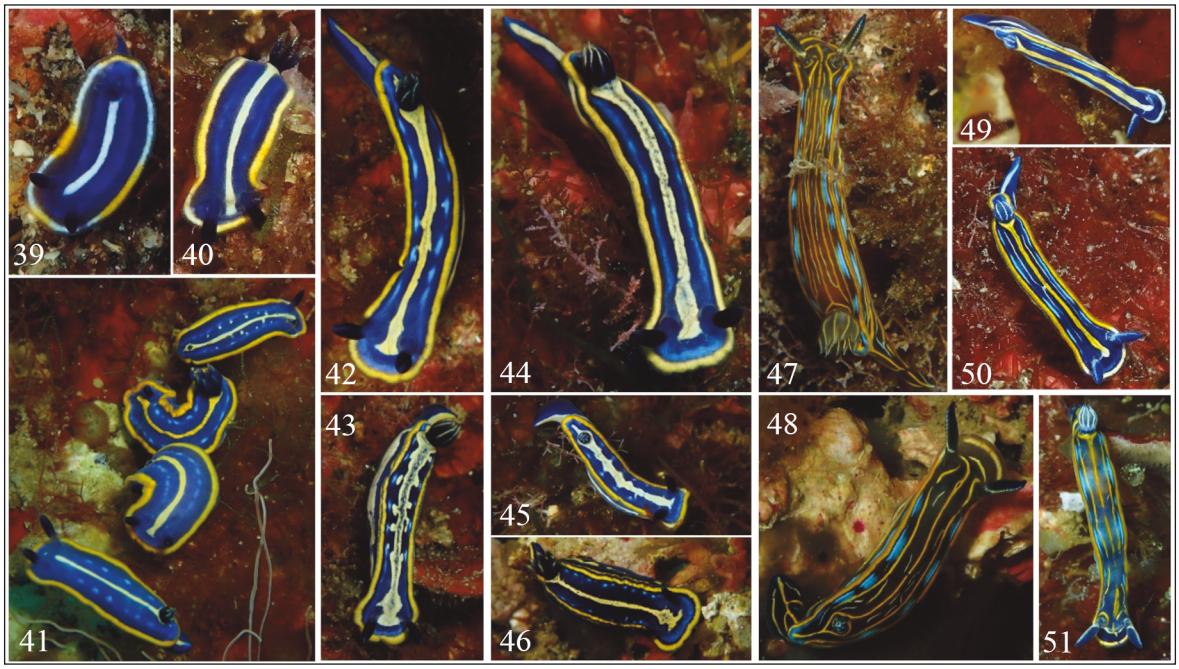
Substrates and habitats. This species was observed on the following substrates: calcareous red algae; *Peyssonnelia* spp; *S. monardiana*; *C. squamariae*; *E. planus*; *Lomentaria* sp.; *F. rayssiae*; *Rhodymenia* sp.; turfs of filamentous red algae; *Jania* sp.; *C. cylindracea*; *Codium bursa* (Olivi) C. Agardh; *D. dichotoma*; *D. implexa*; *H. filicina*; *Sphacelaria* sp.; *Z. tournefortii*; the bryozoan *M. truncata* and the sponge *C. crambe*; sand mixed with gravel; calcareous hulls; naked rocks and detritus. Generally, *F. tricolor* is found in pre-coralligenous and coralligenous environments.

Seasonality. *Felimare tricolor* was documented all year round. The most numerous assemblages were observed from May to October. The breeding activities were seen from May to August and in October.

Remarks. During this study several individuals, with a different development of the chromatic pattern, were found. Through the examination of the photographs, it was possible to hypothesise the change of the chromatic pattern from juveniles to adults (Figs. 39-43). Moreover, specimens, with an adult chromatic pattern different from that typical one, were encountered (Figs. 44-46). On one occasion, four large specimens were encountered on top of each other with the front part of the body sunken into sand mixed with gravel, detritus and calcareous shells.

Felimare villafranca (Risso, 1818) (Figs. 47–51)

Morphology. This dorid has a blackish colouration for most of its body and a characteristic chromatic pattern that makes it easy to identify. The dorsal surface of the notum is characterised by the presence of numerous longitudinally elongated parallel orange lines. These tend to pass anteriorly over the rhinophores, surrounding them. Posteriorly, instead, there is only one line (the central one) that surrounds the gill tuft, continuing up to the posterior



Figures 39–51. Chromodorididae. Fig. 39: a *F. tricolor* juvenile. Fig. 40: intermediate colouration between juvenile and adult form. Fig. 41: a group of *F. tricolor* specimens with the adult chromatic pattern. Fig. 42: an adult with a slightly different colour pattern from the previous one. Fig. 43: an individual with a more developed chromatic pattern. Fig. 44: a specimen with continuous azure dorsal lateral lines Fig. 45: an individual with an intermediate colour pattern between the previous ones. Fig. 46: a darker *F. tricolor* specimen. Fig. 47: *Felimare villafranca.* Fig. 48: a *F. villafranca* specimen with the lines pattern less developed than the previous one. Fig. 49: very juvenile colouration. Fig. 50: juvenile colouration. Fig. 51: intermediate colour pattern between juvenile and adult (photos by A. Lombardo).

limit of the notum. Overall, these dorsal orange lines may be ordered or chaotic, and between them, there may be thin yellowish lines isolated from each other. The notum is bordered by a thin orange line. In the space between the latter and the orange dorsal lines, there are discontinuous bright blue lines running in a longitudinal direction. The rhinophores are lamellated and dark blue; on their surface there is an evident white line. The gill tuft is blue-grey and has numerous yellow or white lines.

ABUNDANCE. Throughout this study, a total of 15 specimens was found. This species can be considered as rare.

LOCATION AND DEPTH. *Felimare villafranca* was documented in all the examined areas from 7.8 to 30 of depth.

SUBSTRATES AND HABITATS. This species was observed above the following substrates: *Peyssonnelia* sp.; calcareous red algae; *Asparagopsis* sp. and detritus; turfs of *F. rayssiae*; on entanglements of filamentous red algae, *Cladophora* sp., *D. implexa* and *H. scoparia*; *L. variegata*; *H. filicina*; on an unidentified smooth black encrusting sponge and under a rock with bryozoans and serpulids.

SEASONALITY. December, February, March, April, May, June and October.

REMARKS. During this study several individuals, with a different development of the chromatic pattern, were found. Through the examination of the photographs, it was possible to hypothesise the change of the chromatic pattern from juveniles to adults (Figs. 49–51).

NOTE ON *Felimare orsinii* (Vérany, 1846). Despite this species is present (through a single report for the site of Santa Maria La Scala) in the list elaborated by Lombardo and Marletta (2020a), it is not considered as a valid finding for this area. Indeed, the authors could not retrieve and view the original photographic material, in which the single *F. orsinii* individual was present. Consequently, *F. orsinii* is considered to be a species whose presence is doubtful along the areas examined.

Genus *Felimida* Ev. Marcus, 1971

Felimida binza (Ev. Marcus et Er. Marcus, 1963) (Figs. 52–58)

Morphology. This nudibranch presents a violet body colouration. The surface of the notum is characterized by the presence of a peculiar pattern of yellow-coloured lines. These are three in number, parallel to one another and developing in longitudinal direction. The central line goes from the anterior area of the rhinophores to the gill tuft, encircling it. Usually, this line tends to enlarge in the anterior and posterior parts of the notum, becoming white. On each side of this line, there is another yellow one which, generally, presents posterior or medial connections with the previous one. These lateral lines can be more or less continuous and regular. Rarely from them, other orange lines, accompanied by red spots almost touching the lateral edges of the notum, can develop. The notum is bordered by a striking yellow line and an additional white one towards the inside. The rhinophores are lamellated and dark violet coloured. Also the gill tuft has this colouration with the addition of white nuances. Some individuals had the edge of the notum with small parts of the yellow line missed.

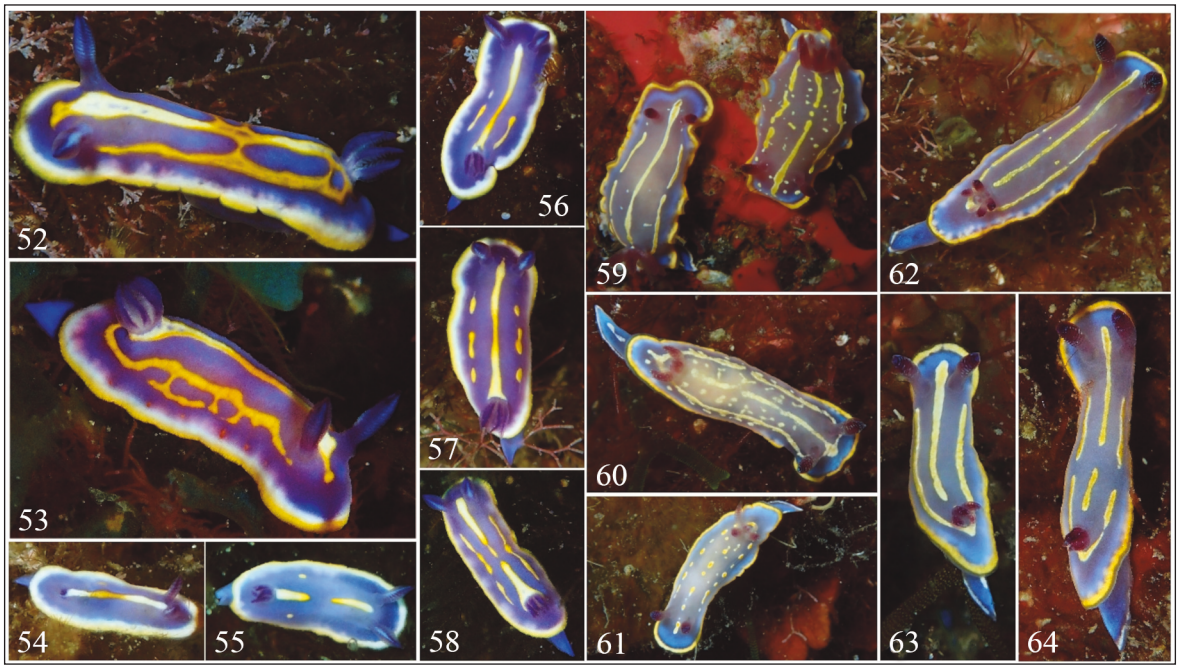
Abundance. Throughout this study 57 specimens were found. This species can be considered as uncommon.

Location and depth. *F. binza* was documented in all the examined areas from 5 to 34 m of depth.

Substrates and habitats. This dorid was observed above the following substrates: filamentous red algae with detritus; calcareous red algae mixed with detritus; *Jania* sp.; *Peyssonnelia* sp.; *Bonnemaisonia* sp.; *D. dichotoma*; *D. implexa*; *C. cylindracea*; *H. scoparia*; *H. filicina* and *Z. tournefortii*. Generally, this nudibranch was found in sciaphilous environments, but it can be seen also in lit habitats.

Seasonality. *Felimida binza* was encountered all year round, except in September and November.

Remarks. Through the photographic examination, it was possible to hypothesise the development of the chromatic pattern from juveniles to adults (Figs. 54–58).



Figures 52–64. Chromodorididae. Fig. 52: a typical *Felimida binza* specimen. Fig. 53: a specimen with red dots. Fig. 54: a very juvenile individual. Fig. 55: a juvenile. Fig. 56: a specimen with the lateral lines poorly developed. Fig. 57: an individual with an intermediate colour pattern between the previous and the following one. Fig. 58: a specimen with an almost fully developed colour pattern. Fig. 59: two *F. krohni* specimens. Fig. 60: an individual with a very developed pattern of lines and dots. Fig. 61: a specimen with a very discontinuous lines pattern. Fig. 62: the typical *F. krohni* specimen. Fig. 63: an individual with a neat lines pattern. Fig. 64: a specimen with a slightly discontinuous lines pattern (photos by A. Lombardo).

Felimida krohni (Vérany, 1846) (Figs. 59–64)

MORPHOLOGY. The body is coloured with several nuances of pink-violet. Dorsally, the notum presents three yellow lines parallel to each other. The central line goes from the space between rhinophores to just before the gill tuft. The two lateral ones begin behind the rhinophores and develop longitudinally until they join each other behind the gill tuft. Generally, these lines can be continuous or discontinuous (to the point of resembling spots). The largest specimens have from few to many yellow dots or spots scattered over the notum, either between the three lines or outside them. The notum is edged by a yellow line which is bordered inwards by an azure nuanced band/line. The dorsal part of the tail presents this last colouration. The rhinophores and the gill tuft possess a violet-crimson colouration and on their surface, there are small bright white dots.

ABUNDANCE. Throughout this study, a total of 135 specimens were found. *F. krohni* can be considered as uncommon.

LOCATION AND DEPTH. This species was documented in all the examined areas from 4.2 to 38.8 m of depth.

SUBSTRATES AND HABITATS. *Felimida krohni* was observed on different substrates: calcareous red algae with detritus; *Peyssonnelia* spp; *S. monardiana*; *C. squamariae*; *E. planus*; *F. rayssiae*; *Jania* sp.; filamentous red algae; *P. crassum*; *Cladophora* sp.; *D. dichotoma*; *D. implexa*; *H. scoparia*; *H. filicina*; *Z. tournefortii*; *Dictyopteris lucida* M. A. Ribera Siguán, A. Gómez Garreta, Pérez Ruzafa, Barceló Martí & Rull Lluch; The sponges *Dysidea* sp., *C. crambe* and *P. ficiformis;* on encrusting bryozoans; *M. truncata* and *R. violacea*. Generally, this nudibranch can be found in sciaphilous environments. Rarely, it can be found in lit habitats.

SEASONALITY. This species can be present all year round. Nevertheless, the presence peaks were documented from March-April to July-August.

REMARKS. The juveniles and the intermediate individuals seem to possess a rather neat pattern of lines (continuous or discontinuous) and the full absence of dots. The adults would tend to have, in addition to the classic three lines, scattered dots (few or many).

Felimida luteorosea (Rapp, 1827) (Figs. 65–70)

MORPHOLOGY. This species possesses a violet body colouration (in various nuances). The dorsal surface of the notum is covered by a variable number of circular, more or less regular yellow blotches. Normally, these are edged with crimson and white. Rarely, these can present a faded aspect. The notum is bordered by a yellow line which is edged, inwards and outwards, with white. The notum edge can also present azure nuances inwards. Generally, the largest individuals have, in the centre of the notum, pink nuances. The rhinophores are lamellated and, as the gill tuft, have a violet-crimson colouration with numerous bright white dots on their surface. Rarely, the gill tuft can be grey coloured.

ABUNDANCE. Throughout this study a total of 18 specimens were found. This species can be considered as rare.

LOCATION AND DEPTH. This dorid was documented in all the examined areas from 10 to 37.8 m of depth.

SUBSTRATES AND HABITATS. The individuals were observed above the following substrates: calcareous red algae; *Peyssonnelia* spp. with detritus; *S. monardiana*; *C. squamariae*; turfs of filamentous red algae with *D. dichotoma* and *D. implexa*; *H. filicina*; *Z. tournefortii*; *Taonia* sp. and on detritus.

SEASONALITY. January, April, May, June, July, August, September and November.

REMARKS. The photographic examination of the various specimens of *F. luteorosea* encountered in this study showed that the only difference between the colour pattern of adults and juveniles is an evident darkening of the general body colour. The number of circular spots does not seem to be really variable between juveniles and adults. In fact, both adults with numerous blotches and with few blotches were encountered (compare for example Fig. 65 with Fig. 68). The same situation was noted for juveniles (compare Fig. 69 with Fig. 70). Consequently, these latter, which possess a general light violet (almost pink) body colouration, would tend to acquire the characteristic violet colour as they grow into adults.

Felimida purpurea (Risso, 1831) (Figs. 71, 72)

MORPHOLOGY. This species presents a pinkish body colouration. The central area of the notum can possess several crimson and light pink nuances.

The notum is bordered by a yellow line and its edges are azure faded. The rhinophores are lamellated and crimson coloured, the tips are white. Also the gill tuft has this same colouration. The tail tends to be azure in colour and is edged with white.

Abundance. Throughout this study, a total of 24 individuals was found. *F. purpurea* can be considered as a rare species.

Location and depth. This dorid was encountered in all the examined areas from 6.4 to 38.1 m of depth.

Substrates and habitats. *Felimida purpurea* was observed on the following substrates: calcareous red algae and detritus; filamentous red algae; *Peyssonnelia* spp. with detritus; *S. monardiana*; *C. squamariae*; *F. rayssiae*; *Asparagopsis armata* Harvey; *D. dichotoma*; *C. cylindracea*; *H. filicina*; *H. scoparia*; *Z. tournefortii*; *L. variegata*; *Dysidea* sp.; *M. truncata* and *Crisularia plumosa* (Pallas, 1766).

Seasonality. December, January, February, March, May, June, July, September and November.

Remarks. During this study an individual, with a peculiar funnel shaped malformation, in front of the left rhinophore was found (Lombardo & Marletta, 2021c).

Familia DISCODORIDIDAE Bergh, 1891

Genus *Aporodoris* Ihering, 1886

Aporodoris millegrana (Alder et Hancock, 1854) (Fig. 73)

Morphology. This species presents a reddish colouration of the body with scattered darker patches and several bright lines and dots radially disposed. The notum surface is fully covered by small tubercles, which give to the animal a knurled appearance. On each side of the visceral mass there is a group of tubercles brown-cream coloured which are more evident than normal scattered tubercles. The rhinophores, lamellated and with mucronate tips, are cream-beige coloured and possess brown pigmentation on their surface. The gill tuft has this same colouration. The rhinophores' and gills' sheaths present several prominent white tubercles. The animal had a strong flattened appearance.

Abundance. A single specimen was found during May 2020 (Lombardo & Marletta, 2020c).

Location and depth. The individual was documented in Santa Maria La Scala at 6.4 m of depth. (Lombardo & Marletta, 2020c).

Substrates and habitats. *Aporodoris millegrana* was observed beneath a rock with sponges and bryozoans (Lombardo & Marletta, 2020c).

Remarks. See Lombardo & Marletta (2020c).

Genus *Baptodoris* Bergh, 1884

Baptodoris cf. ***cinnabarina*** Bergh, 1884 (Fig. 74)

Morphology. The individual presented a grey coloured body with the area of the visceral mass brownish-cream. All the notum surface was covered by evident small tubercles and spotted with small brownish dots. Along all the edge of the notum there were bright white dots. The rhinophores, lamellated and mucronate at the tips, were cream coloured and presented on their anterior surface a brownish pigmentation. The gill tuft was transparent grey cream coloured and possessed some darker spots. The rhinophores' and gills' sheaths had several white sharp tubercles on their margins.

Abundance. Throughout this study only a specimen was found.

Location and depth. The individual was observed in Catania at 5.7 m of depth.

Substrates and habitats. Beneath a rock with serpulids and a sedentary anellids.

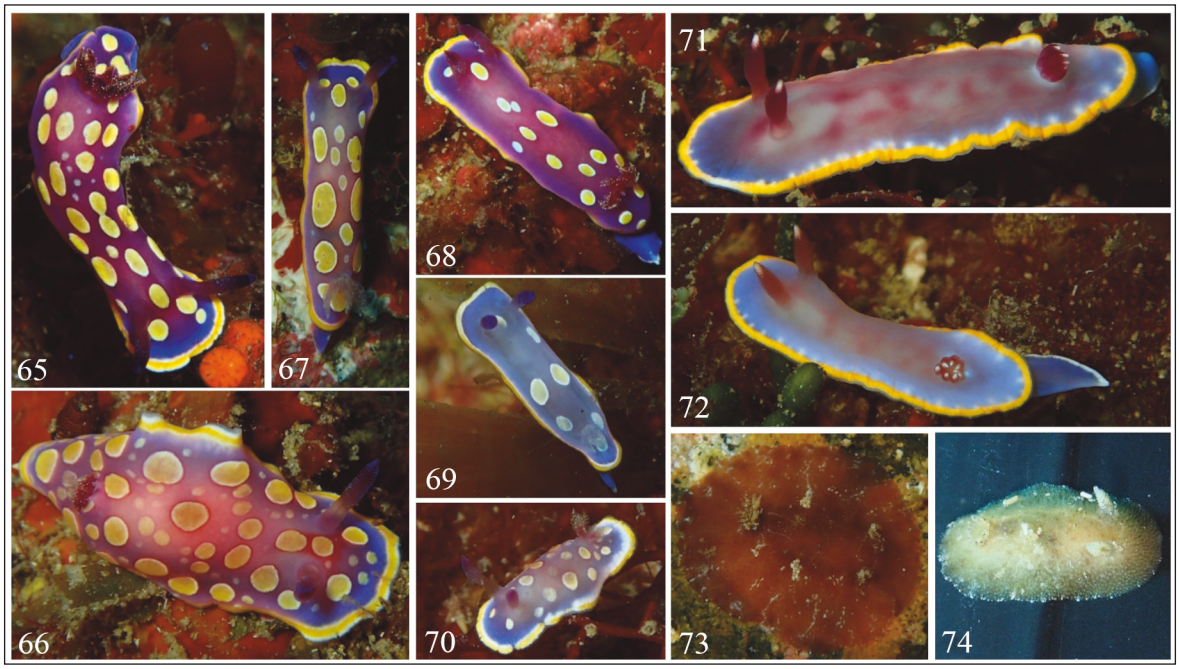
Seasonality. August 2018.

Remarks. The specimen is the same illustrated in Lombardo & Marletta (2020a, Fig. 9).

Genus *Geitodoris* Bergh, 1891

Geitodoris portmanni (Schmekel, 1972) (Figs. 75–77)

Morphology. The animal had an orange body colouration. The visceral mass was darker than the rest of the notum, and the marginal areas of the latter were almost transparent. The notum, at a closer look, had a reticulate appearance. Moreover, in some areas of the notum, there were dendritic-stellate formations at the centre of which a small white tubercle originated. The rhinophores, lamellated and mucronate at the tip, were beige-cream coloured and pigmented with brown. The gill tuft



Figures 65–74. Chromodorididae and Discodorididae. Fig. 65: *Felimida luteorosea*. Fig. 66: a specimen with pinkish colouration and many spots. Fig. 67: another example of different spot's pattern. Fig. 68: an adult with few spots. Fig. 69: a juvenile with few spots. Fig. 70: a juvenile with many spots. Fig. 71: *F. purpurea*. Fig. 72: a *F. purpurea* specimen light in colour. Fig. 73: *Aporodoris millegrana*. Fig. 74: *Baptodoris* cf. *cinnabarina* (photos by A. Lombardo).

was very evident and presented the same rhinophores' colouration. The gills' and the rhinophores' sheaths possessed several sharp tubercles.

ABUNDANCE. A single individual was found during this study. This species can be considered as rare.

LOCATION AND DEPTH. The specimen was documented in Santa Tecla at 5.1 m of depth.

SUBSTRATES AND HABITATS. The dorid was under a rock with encrusting bryozoans, remnants of shells, sand, filamentous red algae, *Peyssonnelia* spp. and genicles of the red algae *E. elongata*.

SEASONALITY. August 2021.

REMARKS. The animal had an external morphology corresponding to that exposed by Perrone (1984) for his *G. portmanni* specimens.

Genus *Jorunna* Bergh, 1876

Jorunna tomentosa (Cuvier, 1804) (Figs. 78–80)

MORPHOLOGY. This species has a variable body colouration. The two specimens observed during this study possessed two different colourations. One individual was whitish with several bright dots and evident darker blotches scattered on the notum. The other animal was yellowish-brownish coloured with small white dots scattered on the notum and evident brown blotches on the surface of the visceral mass and on each side of it. Both specimens had the gill tuft retracted. The rhinophores, lamellated and mucronate at the tips, were beige-cream coloured with a brown pigmentation. The individuals, if touched or moved on another substrates, tended to erect the tubercles assuming a knurled general appearance.

ABUNDANCE. Throughout this study, only two specimens were documented. This species can be considered as rare.

LOCATION AND DEPTH. The white individual was found in Catania at 6.5 m of depth. Instead, the yellow one was encountered in Santa Tecla at 9.4 m of depth.

SUBSTRATES AND HABITATS. Both animals were observed beneath rocks.

SEASONALITY. The white specimen was found in April, while the yellow one in June.

Genus *Peltodoris* Bergh, 1880

Peltodoris atromaculata Bergh, 1880 (Figs. 81–83)

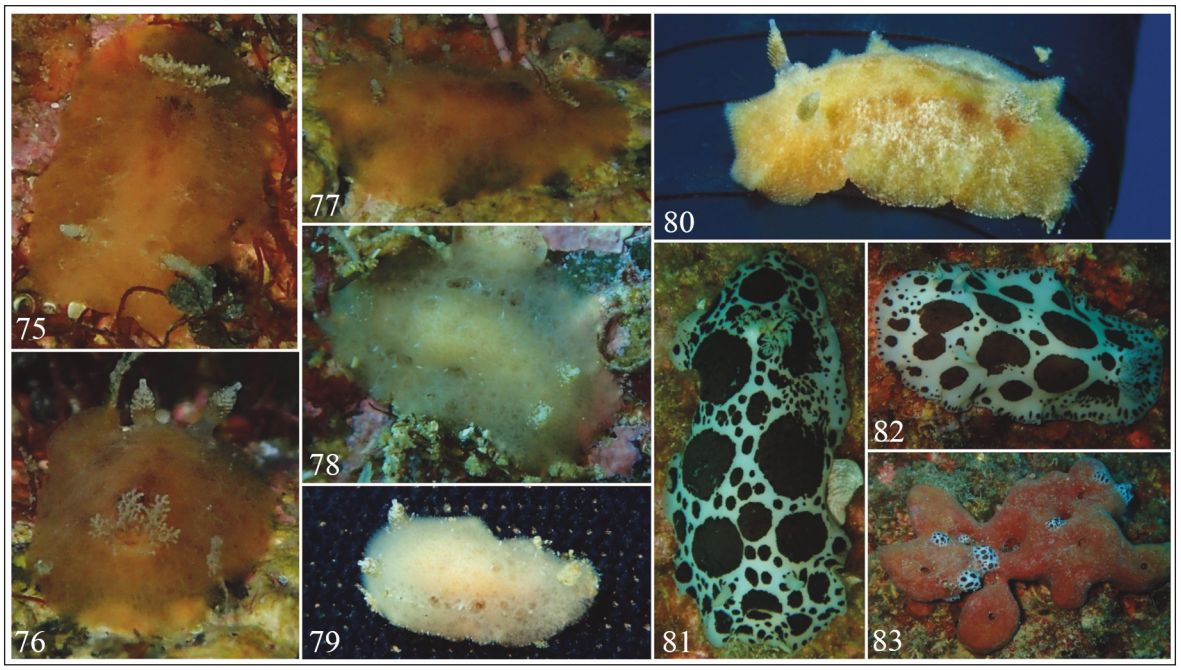
Morphology. The body is white coloured and along its entire surface there are scattered black circular blotches (also tending to brown). Generally, the central part of the notum presents larger blotches with a certain degree of order between them. The blotches became smaller and more chaotic towards the notum's edge. The latter presents several black dots. The entire notum's surface is rough to the touch due to the high presence of small tubercles. The rhinophores are lamellated and white coloured. The gill tuft is white with black longitudinal stripes.

Abundance. *Peltodoris atromaculata* is a species whose abundance varies widely between the examined areas. In Catania it can be considered from common to very common, in Santa Maria La Scala uncommon, while in Santa Tecla is even rare (Lombardo & Marletta, 2021d; present study).

Location and depth. This species was observed in all the examined areas from 11.7 to 38.8 m of depth (Lombardo & Marletta, 2021d; present study).

Substrates and habitats. The characteristic substrate, on which the largest assemblages of *P. atromaculata* individuals (especially juveniles) were found, was the sponge *P. ficiformis*. However, this species was encountered also on other substrates as the algae *Lithophyllum* sp.; *Peyssonnelia* sp.; mix of red and brown seaweeds; *H. scoparia*; *Dictyota* sp.; *P. crassum*; *C. bursa*; the sponges *C. crambe*; *Haliclona* sp. and *Chondrilla nucula* Schmidt, 1862; the bryozoan *Bugula* sp.; sand; bare rock and detritus (Lombardo & Marletta, 2021d). Other substrates on which *P. atromaculata* was found were: *D. dichotoma*; *D. implexa*; *C. cylindracea*; filamentous red algae; *C. squamariae*; *Laurencia* sp.; *L. stictaeforme*; *P. pavonica* and the hydrozoan *E. racemosum* (present study). It is a species characteristic of sciaphilous environments especially in coralligenous.

Seasonality. *Peltodoris atromaculata* is present all year round. Generally, this nudibranch is characterized by two presence peaks in the periods of May-September and September-February. In these two periods the number of specimens rise and, probably, they coincide with the recruitment of new in-



Figures 75–83. Discodorididae. Fig. 75: dorsal view of *Geitodoris portmanni*. Fig. 76: posterior view of the same one. Fig. 77: left lateral view. Fig. 78: the white *Jorunna tomentosa* specimen. Fig. 79: the same with a knurled aspect. Fig. 80: the yellow *J. tomentosa* specimen. Fig. 81: dorsal view of an adult *Peltodoris atromaculata* specimen. Fig. 82: another adult individual. Fig. 83: a typical grouping of juvenile specimens on the sponge *Petrosia ficiformis* (photos by A. Lombardo).

dividuals into the population. The breeding period seems to start at the end of February and end in August (Lombardo & Marletta, 2021d). Recently the breeding activities were observed also in March, consequently it is probable that breeding period of this species is from March to August.

REMARKS. In Catania it was noted a remarkable increase in the number of *P. atromaculata* individuals between December 2020 and August 2021. In this period, during dives, the authors observed numerous small specimens of this dorid, which over the course of the months, took possession of the various sponges of the species *P. ficiformis* present at the site. Generally, on the hand-sized sponges were present, on average, a dozen of small specimens. These latter, according to their size, were located in specific areas of the sponge. The smaller ones were always inside the oscula of the sponge, with the entire body or a most part of it within the sponge. On closer examination of the oscula and the small dorids inside them, it was noted that these latter tend to "dig" the inside of the oscula, creating larger and deeper internal spaces. In fact, within a single osculum it was not uncommon to see more than one small individual. They could be found either with the back of the body towards the osculum (perhaps to facilitate breathing) or the head towards it. It was not uncommon to see young specimens "plugging" the osculum with their bodies.

The latter position probably represents the first phase of digging and enlarging the osculum, which once properly scratched was subsequently enlarged and dug deep. Specimens whose size did not allow them to enter the oscula, tended to be on the outer surface of the sponge, usually on the upper surface, close to each other. It was noted that these individuals had the habit to try entering in the oscula. In fact, many of these specimens had the body dorso-ventrally flattened on the sponge's surface, and a small area of the notum inside the oscula (usually the areas of the anterior part of the body close to the head), as if the animal, now too large to enter the osculum, still needed to squeeze into it. Probably, in the animal life cycle, the sponge has a very high importance not only as hypothetic trigger for the metamorphosis and principal food, but plays an important role both as a protective structure for the juveniles, whose instinct to enter it for protection, remains as they grow, and as a substrate that facilitates encounters between specimens. Nevertheless, it is curious that several small specimens have been found, very often, far from the sponges of this species in various substrata. Rarely near sponges inhabited by numerous specimens, other isolated individuals, could be seen.

Genus *Platydoris* Bergh, 1877

Platydoris argo (Linnaeus, 1767) (Figs. 84–86)

MORPHOLOGY. This dorid presents a brick red body colouration and the notum surface has the appearance and the roughness of sandpaper. Along the entire dorsal area, there are several white dots which varied in number from individual to individual. In some specimens these dots are so many numerous and scattered that almost hide the principal colouration. Instead, in other individuals, these points tend to join together forming small shapeless patches. Usually there are many white dots along the edge of the notum. The ventral surface of the body is characterized by an orange colouration with numerous darker dots. The rhinophores are lamellated and possess the same general body colour. The gill tuft is large and grey-black coloured.

ABUNDANCE. Throughout this study a total of 22 specimens was found. This species can be considered as rare (see below).

LOCATION AND DEPTH. This nudibranch was observed in all the examined areas from 1 to 34 m of depth.

SUBSTRATES AND HABITATS. *Platydoris argo* was found on the following substrates: *Peyssonellia* sp.; calcareous red algae; turfs of filamentous red and brown algae; *H. scoparia*; in crevices surrounded by *H. scoparia* e *E. elongata*; *D. dichotoma*; on rocky walls covered by sponges, hydrozoans and by *Astroides calycularis* (Pallas, 1766); *C. crambe*; in crevices and bare rocks. The egg masses, wavy ribbon in shape (generally orange coloured but rarely also salmon-pink or dark grey), were observed among thalli of *H. scoparia* e *Z. tournefortii*; on *E. elongata*; on turfs of filamentous algae; on walls rich in sponge, bryozoans and tunicates; and on bare rock. This species is characteristic of cracks, crevices and shaded walls in shallow waters (within the 10 m of depth), rarely it can be found in open well-lit environments.

Seasonality. This dorid was encountered in January, February, May, June, July, August, October and November. The egg masses were observed from May to October. The breeding activities were documented in May, July and August. Overall, *P. argo* seems to be an annual species (or biennal?) (sensu Todd, 1981).

Remarks. The majority of the individuals encountered during this study presented clearly visible wounds, cuts and scars over the whole surface of the body. The most common wounds seemed to be the loss of marginal notum's parts and the presence of longitudinal cuts/scars on the surface of the notum, especially on the visceral mass. In all cases these wounds were easily visible due to the fact that they exposed the orange tegument of the notum, normally hidden by the brick-red colouration. The first type of wound could be due to attacks by other animals, like fishes and crustaceans. The second type was probably due to the rubbing of the notum on sharp and abrasive surfaces, which are common in the (often very narrow) cracks and crevices, where this species normally lives and is found. The majority of specimens encountered in these environments had a shape that mimicked the contour of the substrate, adhering perfectly to it. When disturbed (by contact or removal from the substrate), these specimens (which very often had the gill tuft already retracted) had a very slow reaction time, in some cases the animals seemed to be unresponsive, so much so that they look dead. These specimens, even if repositioned on the substrate on which they stood, tended to have very slow reaction times and to retain their previous body shape. The few encountered individuals which did not present this aspect, had instead normal reaction times. It was noted that the groups of encountered specimens never exceed three individuals in number. In one occasion an individual was observed while expelling threadlike orange material from the anus. The "rarity" attributed to *P. argo* is due to its preferred environments, which makes this dorid very difficult to find. Consequently, it is probable that this species can be considered as uncommon.

Genus *Taringa* Er. Marcus, 1955

Taringa cf. ***telopia*** Er. Marcus, 1955 (Fig. 87)

Morphology. The individual presented a general yellowish body colouration with several scattered dark spots and numerous bright white dots on its surface. The latter tended to form radially arranged lines along the entire notum's surface. This was characterized, on its entire surface, by numerous tubercles. The rhinophores were lamellated and had a beige-cream colouration with brown pigmentation. The gill tuft had this same colouration. The rhinophores' and gills' sheaths presented small white tubercles. The strongly tuberculate aspect of the animal was visible only when it was removed by the substrates.

Abundance. Only one specimen was documented (Lombardo & Marletta, 2021a).

Location and depth. Santa Tecla, 4 m of depth (Lombardo & Marletta, 2021a).

Substrates and habitats. This dorid was observed beneath a rock (Lombardo & Marletta, 2021a).

Seasonality. June 2020 (Lombardo & Marletta, 2021a).

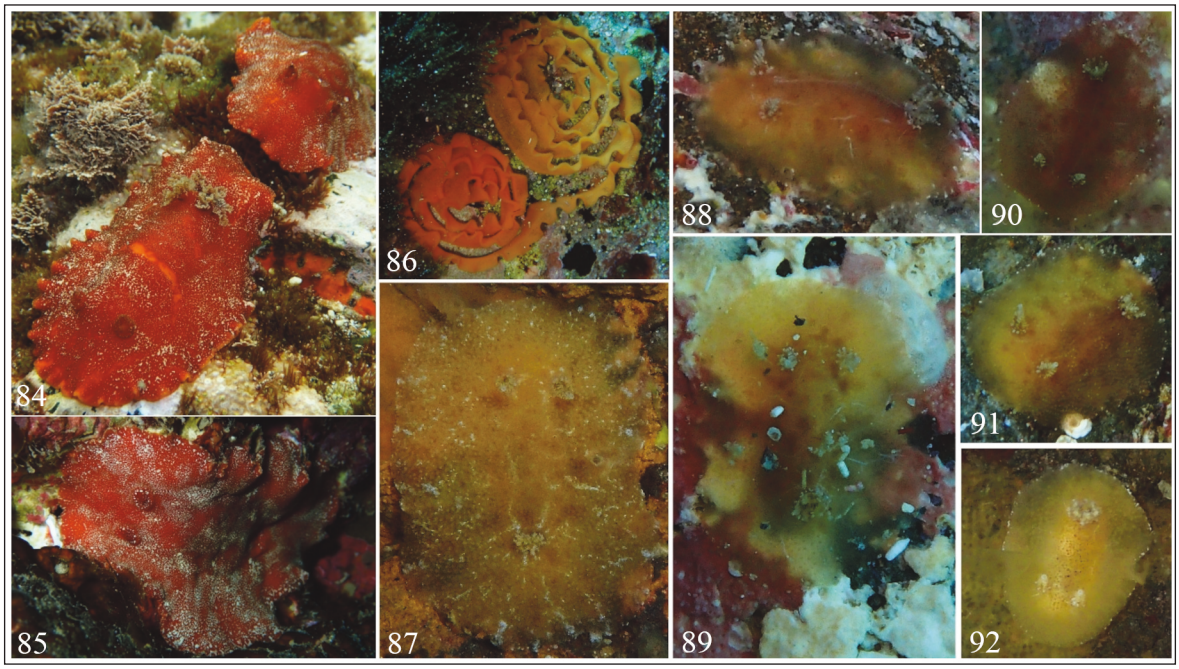
Remarks. See Lombardo & Marletta (2021a).

Taringa tritorquis Ortea, Perez et Llera, 1982 (Figs. 88–92)

Morphology. This species presents a variable general body colouration from yellowish to reddish. Usually, the tegument of the mantle areas, which encircled the visceral mass, is transparent. The entire notum's surface is scattered with dark patches, which are more numerous and evident on the visceral area, that is darker than the rest of the mantle. Sparse along the notum surface, there are varies whitish-greyish lines which resemble scars. These can be disposed in longitudinal or transversal direction. The edge of the notum is characterized by the presence of white bright dots. The rhinophores are lamellated and mucronate at the tips. They are beige-cream in colour and possess brown pigmentation. The gill tuft can be of this last colouration or greyish, but always characterized by bright white dots on gills' tips. The rhinophores' and gills' sheaths have evident white crown-shaped tubercles.

Abundance. Throughout this study 5 *T. tritorquis* specimens were found. It can be considered as rare.

Location and depth. This nudibranch was doc-



Figures 84–92. Discodorididae. Fig. 84: two *Platydoris argo* specimens in a well-lit environment. Fig. 85: typical body appearance of *Platydoris argo* in crevices. Fig. 86: *Platydoris argo*'s egg masses. Fig. 87: *Taringa* cf. *telopia*. Fig. 88: orange *Taringa tritorquis* specimen. Fig. 89: dorsal view of the individual found in Catania. Fig. 90: a pinkish specimen. Fig. 91: the orange individual found in Santa Tecla. Fig. 92: the yellow specimen found in Santa Tecla (photos by A. Lombardo).

umented in all the examined areas from 3.2 to 9.5 m of depth (Gerovasilieu et al., 2020; Lombardo & Marletta, 2020d; 2021a; present study).

SUBSTRATES AND HABITATS. *T. tritorquis* was observed always beneath rocks (Gerovasilieu et al., 2020; Lombardo & Marletta, 2020d; 2021a; present study).

SEASONALITY. February, June, July, August and December (Gerovasilieu et al., 2020; Lombardo & Marletta, 2020d; 2021a; present study).

REMARKS. See Gerovasilieu et al. (2020) and Lombardo & Marletta (2020d; 2021a).

Familia DENDRODORIDIDAE O'Donoghue, 1924 (1864)

Genus *Dendrodoris* Ehrenberg, 1831

Dendrodoris limbata (Cuvier, 1804) (Figs. 93–96)

MORPHOLOGY. This species presents a slightly elongated and convex body shape. This dorid can possess two different colourations. In one of them (the most common), the body is black coloured with brownish-greyish nuances; in the other one (the rarest), it is brown in colour with scattered cream and black mottles. The latter colouration resembles the camouflage of a soldier. In both chromatic variants, the notum is bordered of yellow and its edges present a wavy appearance with cracks. The rhinophores have most of their proximal surface smooth, the rest is lamellated. The smooth area is grey brown in colour, instead the lamellated one tends from brown to blue.

The rhinophores' tips are white. The gill tuft is greyish coloured with bright white dots, and also to the naked eye, the anal papilla is very evident. Overall, the rhinophores and the gill tuft are very characteristic. The juvenile specimens encountered during this study, presented a general colouration similar to the first described or were entirely black with the notal edge yellow coloured. Moreover, in all these animals, the gill tuft was red with white dots in the tips.

ABUNDANCE. A total of 12 individuals were encountered during this study. This species can be considered as rare.

LOCATION AND DEPTH. *Dendrodoris limbata* was found in all the examined areas from 3.4 to 12.3 m of depth.

SUBSTRATES AND HABITATS. This dorid was observed almost exclusively beneath rocks. A single large individual was found in an open well-lit environment characterized by the red alga *Jania* sp. and turfs of filamentous algae. Generally, *D. limbata* is a strongly sciaphilous species which can be found beneath rocks.

SEASONALITY. From July to September and in December.

REMARKS. The encountered individuals, once removed from the substrate and exposed to light, they had a very strong tendency to escape from the light by crawling very quickly in search of the shaded areas of the artificial substrates on which they were placed by the authors. On the contrary of many dorids encountered in the examined area, *D. limbata* is soft to the touch.

Genus *Doriopsilla* Bergh, 1880

Doriopsilla areolata Bergh, 1880 (Figs. 97–99)

MORPHOLOGY. This species presents a body coloured from yellow to orange. The notum is characterized by the presence of numerous ramifications, which tend to form a network. They are easily detectable for most of the mantle. On the notum' surface, there are scattered and isolated white bright tubercles which form small eyelets. The visceral mass is very evident and can possess a slightly darker colouration compared to the mantle, or it can be from brown to black in colour. The rhinophores are lamellated for most of their length. They are transparent at their bases and have the same colour of the body in the lamellated areas. The gill tuft has the same colouration of the body.

ABUNDANCE. Only 3 individuals were found during this study. This species can be considered as rare.

LOCATION AND DEPTH. The specimens were documented in Santa Maria La Scala and Santa Tecla from 5 to 8.7 m of depth.

SUBSTRATES AND HABITATS. The larger *D. areolata* individual was observed in an open and well-lit environments above a thallus of *H. scoparia*. The two smaller specimens were both found beneath rocks with detritus, calcareous red algae, sponges and encrusting bryozoans.

SEASONALITY. February, March and June.

REMARKS. Both Santa Tecla's specimens had some areas of the mantle missing. The yellow individual presented evident signs of bites caused by some hypothetical predator, instead, the orange one had inconspicuous lacerations in some marginal areas of the notum.

Familia PHYLLIDIIDAE Rafinesque, 1814
Genus *Phyllidia* Cuvier, 1797

Phyllidia flava Aradas, 1847 (Figs. 100, 101)

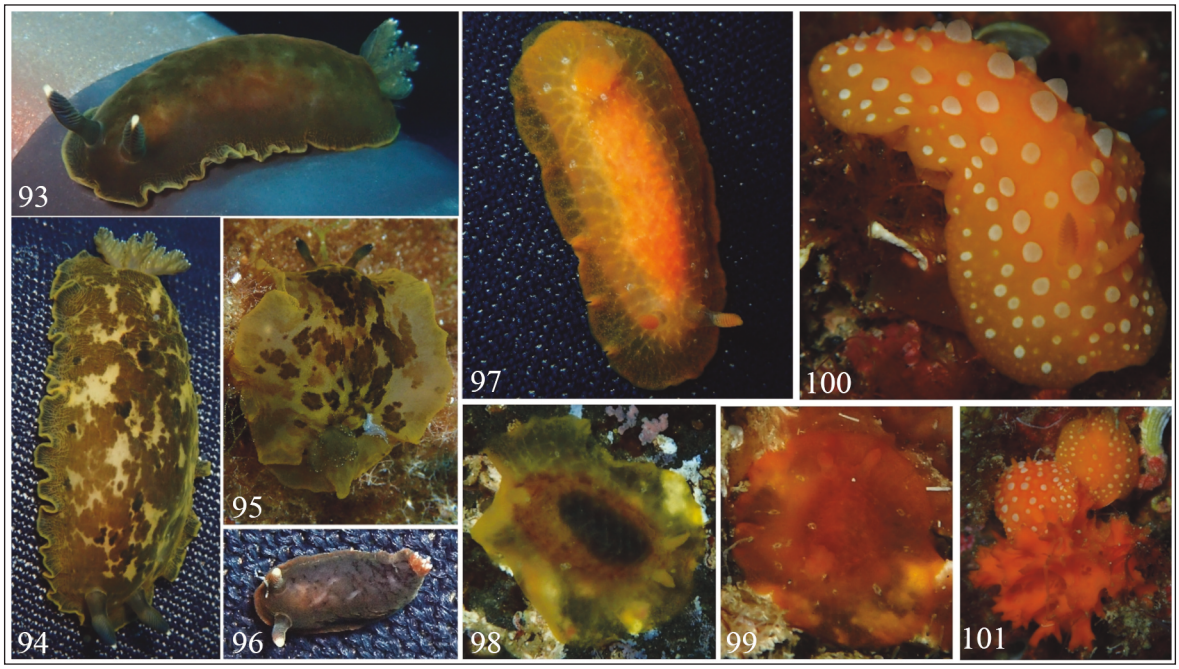
MORPHOLOGY. This species presents an orange-coloured body. Along its entire surface, there are numerous and evident white coloured tubercles, conical or hemispherical in shape. Sometimes, the tubercles' contour can be reddish or dark orange in colouration. The rhinophores are lamellated and of the same body's colouration. Ventrally, in the space between the mantle and the foot, on each side of the body, there are several respiratory lamellae.

ABUNDANCE. Throughout this study a total of 32 individuals were found. *P. flava* can be considered as a rare species.

LOCATION AND DEPTH. This peculiar dorid was documented in all the examined areas (even if, only a specimen was found in Santa Tecla) from 12 to 37 m of depth.

SUBSTRATES AND HABITATS. The individuals were observed on various substrates: the sponge *Acanthella acuta* Schmidt, 1862 with or without detritus; *Peyssonellia* sp. with detritus; *S. monardiana*; *C. squamariae* with detritus; turfs of *Jania* sp.; rock with calcareous red algae; turfs of filamentous red and brown algae with detritus; *D. dichotoma*; *C. cylindracea* and *P. crassum*. Generally, *P. flava* is found in sciaphilous environments with detritus, like walls and crevices.

SEASONALITY. This nudibranch was observed from March to August and in November and December. The breeding activities were documented in March, May and July.



Figures 93–101. Dendrodorididae and Phyllidiidae. Fig. 93: a darker *D. limbata* specimen. Fig. 94: a mottled *D. limbata* individual. Fig. 95: a mottled specimen with light coloured margins. Fig. 96: a juvenile. Fig. 97: *Doriopsilla areolata.* Fig. 98: the yellow specimen with several signs of bites. Fig. 99: the orange specimen found under a rock. Fig. 100: *Phyllidia flava*. Fig. 101: two individuals near the sponge *Acanthella acuta* (photos by A. Lombardo).

DISCUSSION AND CONCLUSIONS

Through the present study new data on the biology and ecology of dorids along the central-eastern coast of Sicily, whose knowledge was previously scant and fragmentary, have been here provided. It was observed that the number of species belonging to this suborder, present in this zone, increased to 32, compared to the 27 species found by Lombardo and Marletta (2020a) for the same area. Consequently, along the central-eastern coast of Sicily there is almost the 28% of the total Mediterranean dorid fauna, represented by 113 valid species reported by Trainito & Doneddu (2014). In this study, six species, not found by Lombardo & Marletta (2020a), are here listed. Of these last species, four (*A. millegrana*, *T.* cf. *telopia*, *O. picoensis*, *O. longiductis*) were already deepen also in Lombardo & Marletta (2020c; 2021a, b) and Crocetta et al. (2021). Instead, *C. papillata* and *G. portmanni* are here reported for the first time for the central-eastern coast of Sicily. Moreover, through this study, it was highlighted that the presence of *F. orsini*, reported in the list of Lombardo & Marletta (2020a), may be considered doubtful, because, as already mentioned above, the original photographic material was lost, and thus, it is not possible to confirm its presence in the investigated area.

Throughout the period of study, several specimens of chromodorid species at different life stages, were encountered. Consequently, for almost all the species of this family present along the central-eastern coast of Sicily, the high amount of collected photographic material allowed to hypothesize the development of the chromatic pattern from the juvenile stage to the adult one. Moreover, in this way, it was also possible to define for each species the typical and the most widespread chromatic pattern showed for the investigated area. Given the different chromatic variants owned also within a single species of the genera *Felimare* and *Felimida*, knowing the characteristic chromatic pattern of a species in a certain area could be useful to make comparisons between various chromodorid populations in geographically close and distant areas, to obtain new information on the life and distribution dynamics of this group.

This study, as also those on sacoglossans (Lombardo & Marletta, 2021e) and on cladobranchs (Lombardo, 2021), demonstrated that to achieve an

extensive knowledge on the marine Heterobranchia fauna, it is necessary to carry out, through periodical scuba dives, a continuous monitoring in a given area. In this way, these works, may represent the starting point for subsequent studies on this peculiar group of gastropods along the central-eastern coast of Sicily.

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