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The Marine Gastropods of the Agalega Islands, Republic of Mauritius

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Abstract

The Agalega Islands, located in the Western Indian Ocean, are characterized by unique habitats such as enclosed lagoons, sandy shores, and coral reef systems, which offer ideal conditions for rich marine biodiversity. Prior to this study, the gastropod fauna of these islands had remained largely undocumented. The survey was conducted between December 2017 and March 2019 at five survey sites. A total of 705 specimens, representing 119 gastropod species across 25 families, were recorded from the survey sites. Both living and dead specimens were collected to ensure a thorough assessment of species richness, including those residing in less accessible environments, such as reef zones. The Conidae, Cypraeidae, and Muricidae families were found to be the most diverse, collectively representing nearly half of the total species identified. The highest number of species was found at La Fourche station, which represented 29% of the total species, and the lowest percentage of species was recorded at Bato Cassee station (6%). This research established the first inventory of marine gastropods in Agalega, significantly enhancing the understanding of the marine gastropod community and providing a critical baseline for future ecological research.

Keywords

Agalega, Republic of Mauritius, Western Indian Ocean, Gastropod, Mollusc

1. Introduction

Marine biodiversity plays a vital role in maintaining the health and resilience of ecosystems, particularly in tropical regions where coral reefs, lagoons, and other complex habitats serve as hotspots for various marine species. Gastropods, as one of the most diverse and ecologically significant groups of marine organisms, contribute significantly to the structure and function of these ecosystems [1]. Despite their importance, the marine gastropod fauna of many remote and isolated islands, including Agalega, remains largely undocumented.

The Agalega Islands are an integral part of the Republic of Mauritius, situated at coordinates 10˚25'S, 56˚38'E. Agalega comprises two islands, namely North Island and South Island. The dimensions of North Island are 12.5 km by 1.5 km, while South Island measures 7 km by 4.5 km [2] [3]. The islands have a total land area of 2600 hectares [4] and are surrounded by a 500 m wide lagoon [3]. The lagoon is very shallow, with a maximum depth of up to 2 meters. Agalega is inhabited by a small community with no significant human disturbance to the marine environment [2] [3]. A fringing reef encircles the islands, with the exception of the port landing area, where the reef lies in close proximity to the shore [2]. The Agalega Islands are characterized by unique ecological features, including enclosed lagoons, sandy shores, and coral reef systems [3]. These habitats offer a variety of niches that can support a rich diversity of marine gastropods. Given the isolated nature and unique environmental conditions of the Agalega Islands, understanding the diversity of gastropods is crucial for both conservation and management efforts. This study aimed to establish the first inventory of marine gastropods inhabiting the Agalega Islands.

2. Materials and Methods

Gastropod specimens were collected from five stations located in the coastal and lagoon areas around Agalega between December 2017 and March 2019. A total of 50 days of fieldwork was conducted in Agalega, with each station investigated over a 10-day period. The surveys were designed to cover a wide range of marine habitats, such as coral reefs and seagrass beds. These ecosystems support diverse gastropod species from various ecological zones. The shoreline at each site was explored for dead shells and hermit crabs.

The coastal areas at each station were visually surveyed by walking for one hour along the beach zone. At each site, lagoon surveys were conducted using a systematic grid-based sampling approach [5], with a 10-man-day effort allocated to each site. The subtidal survey involved one hour of skin diving, during which gastropod specimens were hand-picked.

The gastropod shells were washed, cleaned, and air-dried for several days. The dried samples were then stored in zip-lock bags. Shells measuring ≥ 10 mm in size were retained for this study and classified into Operational Taxonomic Units (OTUs). Photographs of each species were taken, along with their identification codes, for further analysis.

The marine gastropod species were identified to the lowest possible taxonomic level using a combination of scientific literature, field reports, and reference materials, including Marine Molluscs of Mauritius [6] and Compendium of Seashells [7]. Taxonomic nomenclature was standardized in accordance with the principles outlined in the World Register of Marine Species [8] and adhered to International Commission on Zoological Nomenclature guidelines for nomenclatural consistency.

Data analysis was conducted using Microsoft Excel and PRIMER 7.0 software [9] [10].

Site Locations and Descriptions

Agalega consists of two main islands, North Island and South Island, which are of volcanic origin and form part of the Mascarene Plateau [11]. Agalega is situated in the Indian Ocean, approximately 1000 kilometers north of Mauritius [4]. The islands cover around 2600 hectares [4] and are characterized by an almost flat topography [2].

The Agalega Islands are surrounded by a prominent reef system. The shoreline is composed of sandy beaches extending roughly 20 – 30 meters in width [2]. The islands are primarily composed of coral limestone, formed over time from the breakdown of coral and other marine life [2].

A survey map was generated using QGIS software [12]. The five survey sites were Batterie Cassee (B. Cassee), Simin Henri (S-Henri), Vingt Cinq (V-Cinq), La Pointe Sud, and La Fourche, as shown in **Figure 1**. The survey sites are predominantly sandy with seagrass beds, except for La Fourche. This station includes the Port Area, known as St. James Port. At La Fourche, the reef comes close to the shoreline and features a man-made pass that connects to the open sea [2] [4]. The survey extended to a depth of 10 meters in this area.

Figure 1. Survey sites of Agalega islands.

3. Result

3.1. Taxonomic Diversity of Species in Agalega

The five survey stations of the Agalega Islands yielded a total of 705 specimens, comprising 119 gastropod species. These species were classified into seven orders and 25 families, as illustrated in Table 1.

Table 1. List of species recorded in Agalega.

	Order	Family	Species
1	Cephalaspidea	Bullidae	*Bulla ampulla* (Linnaeus, 1758)
2	Littorinimorpha	Bursidae	*Dulcerana granularis* (Röding, 1798)
3	Littorinimorpha	Bursidae	*Bursa rosa* (Perry, 1811)
4	Littorinimorpha	Strombidae	*Canarium labiatum* (Röding, 1798)
5	Littorinimorpha	Strombidae	*Canarium mutabile* (Swainson, 1821)
6	Littorinimorpha	Strombidae	*Canarium ochroglottis* (Abbott, 1960)
7	Littorinimorpha	Cassidae	*Casmaria erinaceus* (Linnaeus, 1758)
8	Littorinimorpha	Cassidae	*Casmaria ponderosa* (Gmelin, 1791)
9	Caenogastropoda incertae sedis	Cerithiidae	*Cerithium columna* (G. B. Sowerby I, 1834)
10	Caenogastropoda incertae sedis	Cerithiidae	*Cerithium echinatum* (Lamarck, 1822)
11	Caenogastropoda incertae sedis	Cerithiidae	*Cerithium rostratum* (A. Adams in G. B. Sowerby II, 1855)
12	Littorinimorpha	Charoniidae	*Charonia tritonis* (Linnaeus, 1758)
13	Littorinimorpha	Hipponicidae	*Cheilea equestris* (Linnaeus, 1758)
14	Neogastropoda	Colubrariidae	*Colubraria nitidula* (G.B Sowerby I, 1833)
15	Neogastropoda	Colubrariidae	*Colubraria obscura* (Reeve, 1844)
16	Neogastropoda	Colubrariidae	*Colubraria tenera* (Gray, 1839)
17	Neogastropoda	Conidae	*Conus arenatus* (Hwass in Bruguière, 1792)
18	Neogastropoda	Conidae	*Conus auricomus* (Hwass in Bruguière, 1792)
19	Neogastropoda	Conidae	*Conus balteatus* (G. B. Sowerby I, 1833)
20	Neogastropoda	Conidae	*Conus capitaneus* (Linnaeus, 1758)
21	Neogastropoda	Conidae	*Conus catus* (Hwass in Bruguière, 1792)
22	Neogastropoda	Conidae	*Conus chaldaeus* (Röding, 1798)
23	Neogastropoda	Conidae	*Conus coronatus* (Gmelin, 1791)
24	Neogastropoda	Conidae	*Conus ebraeus* (Linnaeus, 1758)
25	Neogastropoda	Conidae	*Conus flavidus* (Lamarck, 1810)
26	Neogastropoda	Conidae	*Conus frigidus* (Reeve, 1848)
27	Neogastropoda	Conidae	*Conus geographus* (Linnaeus, 1758)
28	Neogastropoda	Conidae	*Conus imperialis* (Linnaeus, 1758)
29	Neogastropoda	Conidae	*Conus litteratus* (Linnaeus, 1758)
30	Neogastropoda	Conidae	*Conus lividus* (Hwass in Bruguière, 1792)

Continued

31	Neogastropoda	Conidae	*Conus miliaris* (Hwass in Bruguière, 1792)
32	Neogastropoda	Conidae	*Conus nussatella* (Linnaeus, 1758)
33	Neogastropoda	Conidae	*Conus parvatus* (Walls, 1979)
34	Neogastropoda	Conidae	*Conus rattus* (Hwass in Bruguière, 1792)
35	Neogastropoda	Conidae	*Conus sanguinolentus* (Quoy & Gaimard, 1834)
36	Neogastropoda	Conidae	*Conus sponsalis* (Hwass in Bruguière, 1792)
37	Neogastropoda	Conidae	*Conus tenuistriatus* (G. B. Sowerby II, 1858)
38	Neogastropoda	Conidae	*Conus tessulatus* (Born, 1778)
39	Neogastropoda	Conidae	*Conus textile* (Linnaeus, 1758)
40	Neogastropoda	Conidae	*Conus tulipa* (Linnaeus, 1758)
41	Neogastropoda	Conidae	*Conus virgo* (Linnaeus, 1758)
42	Neogastropoda	Muricidae	*Galeropsis monodonta* (Blainville, 1832)
43	Neogastropoda	Muricidae	*Coralliophila radula* (A. Adams, 1855)
44	Neogastropoda	Muricidae	*Coralliophila violacea* (Kiener, 1836)
45	Littorinimorpha	Cypraeidae	*Cypraea tigris* (Linnaeus, 1758)
46	Littorinimorpha	Cassidae	*Cypraecassis rufa* (Linnaeus, 1758)
47	Neogastropoda	Muricidae	*Amplidrupa clathrata* (Lamarck, 1816)
48	Neogastropoda	Muricidae	*Drupa morum* (Röding, 1798)
49	Neogastropoda	Muricidae	*Drupella margariticola* (Broderip, 1833)
50	Neogastropoda	Muricidae	*Drupina lobata* (Blainville, 1832)
51	Neogastropoda	Pisaniidae	*Engina bonasia* (Martens, 1880)
52	Littorinimorpha	Strombidae	*Gibberulus gibberulus* (Linnaeus, 1758)
53	Littorinimorpha	Cymatiidae	*Gutturnium muricinum* (Röding, 1798)
54	Neogastropoda	Harpidae	*Harpa amouretta* (Röding, 1798)
55	Littorinimorpha	Strombidae	*Harpago arthriticus* (Röding, 1798)
56	Caenogastropoda incertae sedis	Modulidae	*Indomodulus tectum* (Gmelin, 1791)
57	Littorinimorpha	Strombidae	*Lambis truncata* (Lightfoot, 1786)
58	Neogastropoda	Fasciolariidae	*Latirus barclayi* (Reeve, 1847)
59	Neogastropoda	Fasciolariidae	*Latirus polygonus* (Gmelin, 1791)
60	Littorinimorpha	Strombidae	*Lentigo lentiginosus* (Linnaeus, 1758)
61	Littorinimorpha	Littorinidae	*Littoraria coccinea glabrata* (Philippi, 1846)
62	Littorinimorpha	Cypraeidae	*Luria isabella* (Linnaeus, 1758)
63	Littorinimorpha	Cypraeidae	*Lyncina carneola* (Linnaeus, 1758)
64	Littorinimorpha	Cypraeidae	*Lyncina lynx* (Linnaeus, 1758)
65	Littorinimorpha	Cypraeidae	*Lyncina propinqua* (Garrett, 1879)
66	Littorinimorpha	Tonnidae	*Malea pomum* (Linnaeus, 1758)
67	Littorinimorpha	Naticidae	*Mammilla melanostoma* (Gmelin, 1791)

Continued

68	Littorinimorpha	Naticidae	*Mammilla simiae* (Deshayes, 1838)
69	Littorinimorpha	Cypraeidae	*Mauritia arabica* (Linnaeus, 1758)
70	Littorinimorpha	Cypraeidae	*Mauritia depressa* (J.E. Gray, 1824)
71	Littorinimorpha	Cypraeidae	*Mauritia histrio* (Gmelin, 1791)
72	Ellobiida	Ellobiidae	*Melampus luteus* (Quoy & Gaimard, 1832)
73	Ellobiida	Ellobiidae	*Melampus pfeifferianus* (Morelet, 1860)
74	Neogastropoda	Muricidae	*Menathais tuberosa* (Röding, 1798)
75	Neogastropoda	Mitridae	*Mitra stictica* (Link, 1807)
76	Littorinimorpha	Cypraeidae	*Monetaria annulus* (Linnaeus, 1758)
77	Littorinimorpha	Cypraeidae	*Monetaria caputserpentis* (Linnaeus, 1758)
78	Littorinimorpha	Cypraeidae	*Monetaria moneta* (Linnaeus, 1758)
79	Littorinimorpha	Cymatiidae	*Monoplex mundus* (Gould, 1849)
80	Littorinimorpha	Cymatiidae	*Monoplex nicobaricus* (Röding, 1798)
81	Neogastropoda	Muricidae	*Morula uva* (Röding, 1798)
82	Neogastropoda	Terebridae	*Myurella affinis* (Gray, 1834)
83	Littorinimorpha	Cypraeidae	*Naria helvola* (Linnaeus, 1758)
84	Neogastropoda	Muricidae	*Nassa serta* (Bruguière, 1789)
85	Neogastropoda	Nassariidae	*Nassarius gemmuliferus* (A. Adams, 1852)
86	Neogastropoda	Nassariidae	*Nassarius horridus* (Dunker, 1847)
87	Neogastropoda	Nassariidae	*Nassarius papillosus* (Linnaeus, 1758)
88	Neogastropoda	Nassariidae	*Nassarius quadrasi* (Hidalgo, 1904)
89	Neogastropoda	Mitridae	*Nebularia acuminata* (Swainson, 1824)
90	Cycloneritida	Neritidae	*Nerita albicilla* (Linnaeus, 1758)
91	Cycloneritida	Neritidae	*Nerita plicata* (Linnaeus, 1758)
92	Cycloneritida	Neritidae	*Nerita polita* (Linnaeus, 1758)
93	Cycloneritida	Neritopsidae	*Neritopsis radula* (Linnaeus, 1758)
94	Littorinimorpha	Naticidae	*Notocochlis cernica* (Jousseaume, 1874)
95	Littorinimorpha	Naticidae	*Notocochlis gualtieriana* (Récluz, 1844)
96	Littorinimorpha	Cypraeidae	*Nucleolaria nucleus* (Linnaeus, 1758)
97	Neogastropoda	Terebridae	*Oxymeris crenulata* (Linnaeus, 1758)
98	Neogastropoda	Terebridae	*Oxymeris dimidiata* (Linnaeus, 1758)
99	Neogastropoda	Terebridae	*Oxymeris felina* (Dillwyn, 1817)
100	Neogastropoda	Terebridae	*Oxymeris maculata* (Linnaeus, 1758)
101	Neogastropoda	Pisaniidae	*Ecmanis ignea* (Gmelin, 1791)
102	Littorinimorpha	Naticidae	*Polinices flemingianus* (Récluz, 1844)
103	Littorinimorpha	Naticidae	*Polinices mammilla* (Linnaeus, 1758)
104	Neogastropoda	Pisaniidae	*Pollia undosa* (Linnaeus, 1758)

Continued

105	Littorinimorpha	Cypraeidae	*Pustularia cicercula* (Linnaeus, 1758)
106	Littorinimorpha	Cypraeidae	*Pustularia margarita* (Dillwyn, 1817)
107	Caenogastropoda incertae sedis	Cerithiidae	*Rhinoclavis sinensis* (Gmelin, 1791)
108	Neogastropoda	Muricidae	*Ricinella rubusidaeus* (Röding, 1798)
109	Neogastropoda	Muricidae	*Sistrum ricinus* (Linnaeus, 1758)
110	Littorinimorpha	Cypraeidae	*Staphylaea staphylaea* (Linnaeus, 1758)
111	Littorinimorpha	Cypraeidae	*Talparia talpa* (Linnaeus, 1758)
112	Trochida	Tegulidae	*Tectus mauritianus* (Gmelin, 1791)
113	Trochida	Tegulidae	*Rochia virgata* (Gmelin, 1791)
114	Neogastropoda	Muricidae	*Arakawania granulata* (Duclos, 1832)
115	Trochida	Turbinidae	*Turbo argyrostomus* (Linnaeus, 1758)
116	Trochida	Turbinidae	*Turbo setosus* (Gmelin, 1791)
117	Neogastropoda	Fasciolariidae	*Turrilatirus craticulatus* (Linnaeus, 1758)
118	Neogastropoda	Costellariidae	*Vexillum amabile* (Reeve, 1845)
119	Neogastropoda	Costellariidae	*Vexillum pardale* (Küster, 1840)

3.2. Taxonomic Species Diversity in Agalega

The bar chart illustrated the distribution of species across various gastropod families (Figure 2). The number of species per family varied greatly, ranging from 1 to 25. The highest number of species was found in the Conidae family, which comprised 25 species. This was followed by the Cypraeidae family, with 17 species. The Muricidae family was also notably diverse, comprising 13 species. The Strombidae family included 7 species, while the Terebridae and Naticidae families comprised 5 and 6 species, respectively. Four species were recorded in families such as Nassariidae, Cerithiidae, and Cassidae. Several families, including Pisaniidae, Fasciolariidae, Cymatiidae, Costellariidae, and Colubrariidae, each had 3 species. On the lower end, families such as Ellobiidae, Eulimidae, Modulidae, Mitridae, Littorinidae, Hipponicidae, Harpidae, Bullidae, and Bursidae were represented by only 1 or 2 species each. The most abundant families were Conidae, Cypraeidae, and Muricidae, which together represented 46.2% of the total species diversity.

3.3. Distribution of Species at Selected Sites in Agalega

A total of 119 species were recorded across the different stations around Agalega. The proportion of species at each station ranged from 6% to 29% (Figure 3). The highest number of species was recorded at La Fourche station, accounting for 29% of the total species, while the lowest percentage was observed at Bato Cassee station, representing 6%.

3.4. Distribution of specimens at selected sites in Agalega

A total of 705 specimens were recorded across the different stations around Agalega.

The proportion of specimens at each station ranged from 4% to 38% (**Figure 4**). The highest number of specimens was recorded at La Fourche station (38%), followed by Simin Henri (24%) and La Pointe Sud (23%). In contrast, the lowest number of specimens was observed at Bato Cassee station (4%).

3.5. Multivariate Analysis of Gastropod Distribution in Agalega

Figure 5 illustrated the nMDS plot of the stations in Agalega. The position of Bato Cassee was relatively distant from the other points, indicating that it was the most dissimilar from the other samples. La Fourche and La Pointe Sud were positioned closer to each other, reflecting a higher level of similarity between these two stations. Simin Henri was located near La Pointe Sud but slightly farther away, suggesting moderate similarity. Finally, Vingt Cinq was relatively isolated but still closer to the cluster formed by La Pointe Sud, Simin Henri, and La Fourche, indicating some level of similarity while retaining distinct differences.

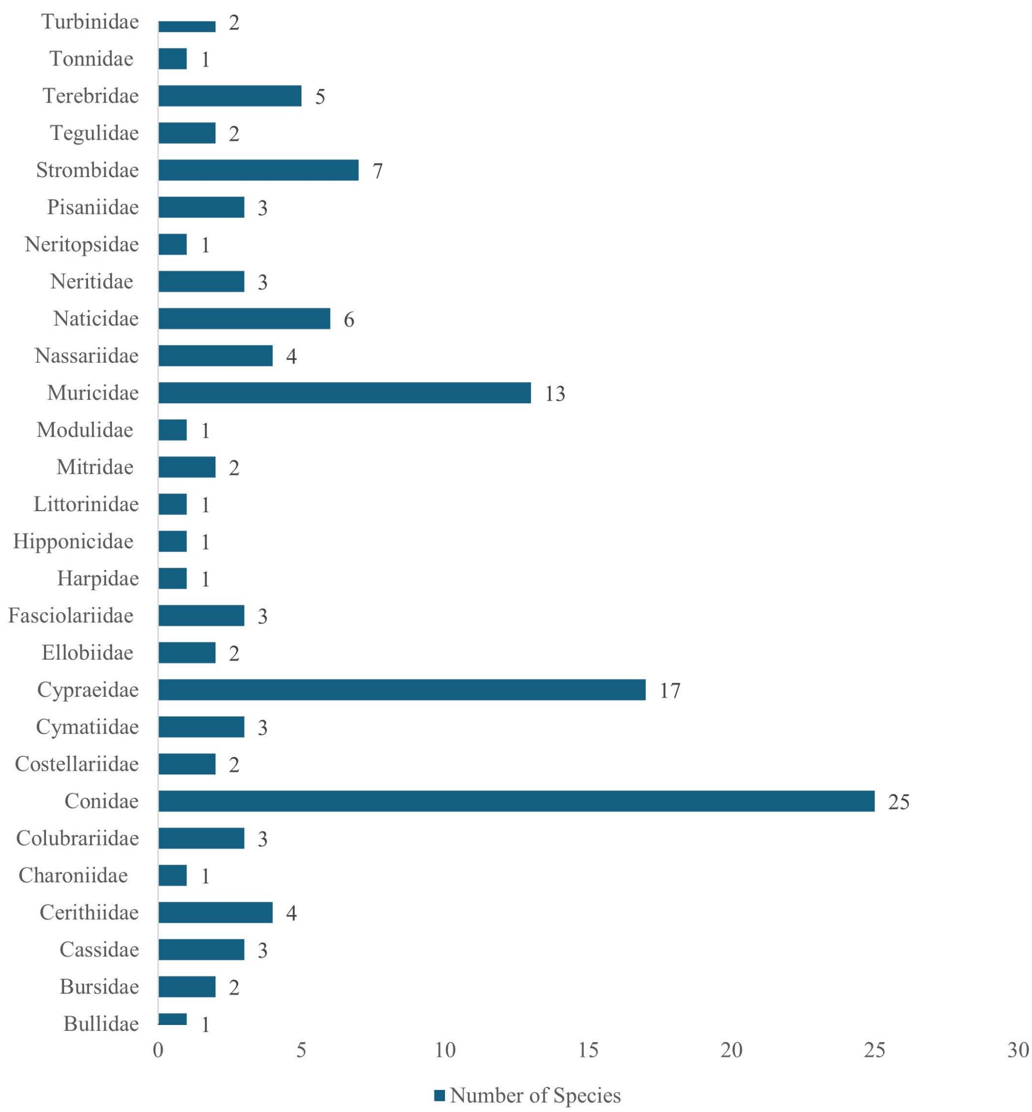

Figure 2. List of families of gastropods in Agalega.

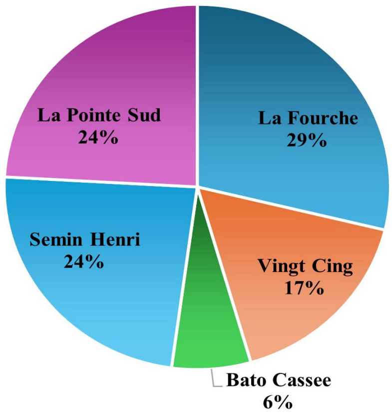

Figure 3. Percentage distribution of species at each site.

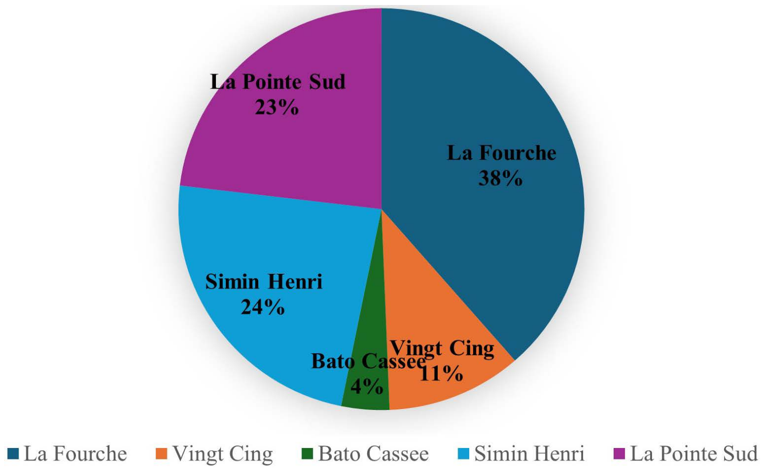

Figure 4. Percentage distribution of specimens.

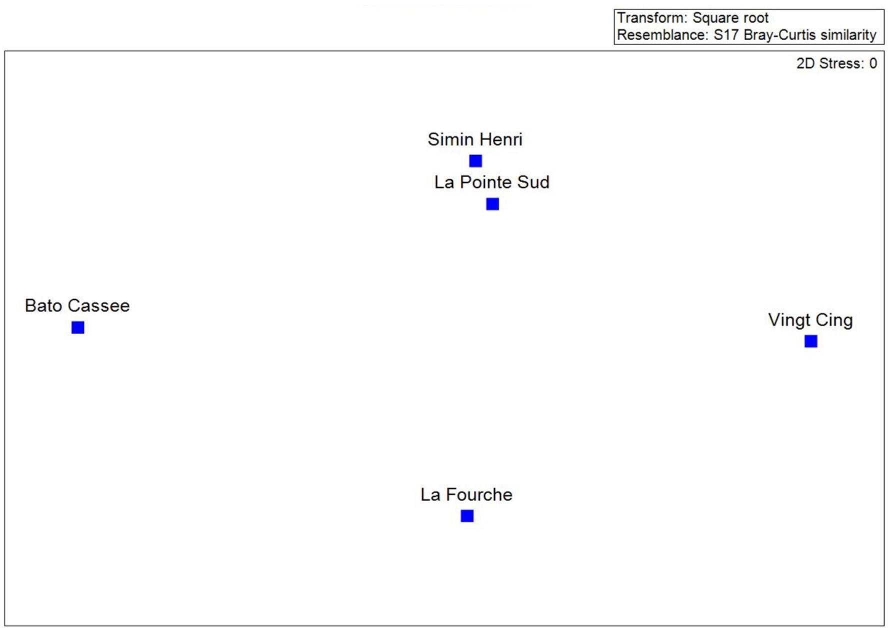

Figure 5. nMDS plot of the stations in Agalega.

4. Discussion

The gastropod fauna of Agalega had not been thoroughly documented, and a comprehensive list of gastropods for this region had yet to be published. The only existing literature is attributed to Poisson [13], who conducted a study in Agalega focusing on a broader spectrum of molluscs, including bivalves, cephalopods, and gastropods. Poisson's [13] study reported the presence of approximately 24 species of gastropods. Several key gastropod families, including Cypraeidae and Conidae, were recorded in Poisson's [13] work. These gastropod species are typical inhabitants of coral reef environments. However, due to taxonomic uncertainties, these records were excluded from our comparative analysis.

This study marked a pioneering effort to document the molluscan fauna across selected sites within the Agalega Islands, having uncovered a total of 119 marine gastropod species. The gastropod community was dominated by three primary families: Cowries (*Cypraeidae*), Cone Snails (*Conus*), and Muricidae, which together accounted for 46.2% of the observed diversity. This pattern aligned with general trends reported in tropical marine environments [14] [15], where these families thrived due to their broad ecological adaptability and diverse life history strategies. The dominance of *Cypraeidae* could be attributed to their widespread distribution in tropical and subtropical regions, as well as their ability to inhabit temperate waters. Their reproductive strategy, involving planktonic veliger larvae with extended developmental periods, enhances their dispersal potential across vast oceanic distances, enabling the colonization of varied habitats, particularly coral reefs in the Indo-Pacific [16]. Ecologically, cowries play a critical role as herbivores, grazing on algae to regulate algal growth and maintain the structural integrity of coral reef ecosystems [17]. This balance is vital for supporting other reef-associated organisms, further emphasizing their ecological importance. *Conus* species, another key component of Agalega's gastropod community, are globally diverse, with over 700 species occupying approximately 25% of the world's marine environments [18]. The Indo-West Pacific region serves as a biodiversity hotspot for Conus, hosting 60% of the global species [19] [20]. Their predatory nature and adaptive diversification across various marine ecosystems contribute to their ecological significance. As predators, *Conus* species feed on fish, polychaete worms, and molluscs, regulating prey populations and maintaining the stability of marine food webs. This regulation underscores their role in sustaining ecosystem health and highlights their importance in conservation planning [21]. Similarly, the Muricidae family demonstrates significant adaptability, with species distributed from intertidal zones to deeper marine environments. The family includes genera such as *Coralliophila*, which act as parasites on anthozoan cnidarians [22], showcasing a specialised ecological niche. The carnivorous feeding habits of muricids and their influence on prey populations underline their role as key predators, driving benthic community dynamics through top-down control. Other gastropod families, such as Strombidae, Terebridae, and Naticidae, exhibited moderate representation at the surveyed sites, with each family comprising 5 - 7 species. These families displayed diverse feeding strategies and habitat preferences, reflecting the varied ecological niches within the Agalega marine ecosystem. In contrast, families like Ellobiidae, Modulidae, and Hipponicidae, each represented by one or two species, highlighted the ecological specialisation and rarity of certain taxa in this region. The observed species composition was consistent with records from other parts of the Indo-Pacific, including Mauritius and Réunion, with no endemic species identified during the study. The limited number of survey sites and the brief duration of the study restricted the ability to conduct a comprehensive comparison of gastropod diversity with other tropical islands in the Western Indian Ocean.

The World Register of Marine Species (WoRMS) [8] database, as of 2024, did not contain specific records of gastropod species for the Agalega Islands. However, 247 gastropod species had been documented within the broader Mauritian Exclusive Economic Zone (EEZ). These findings suggested that Agalega might harbour a substantial diversity of marine gastropod species, highlighting the need for further research to better understand its unique marine biodiversity.

The lagoon and reef ecosystems of the Agalega Islands function as ecological microcosms, characterized by a rich diversity of habitats. These systems exhibit a complex mosaic of microenvironments, distinguished by variations in current patterns and substrate types, which are particularly conducive to supporting diverse gastropod assemblages. These gastropods have evolved to exploit the varied ecological niches available within these environments. This study investigated gastropod diversity across five survey stations, revealing that these differences were closely linked to habitat complexity and environmental conditions. La Fourche station demonstrated the highest biodiversity, contributing 29% of the total species and 38% of the specimens recorded. The high diversity at this station could be attributed to a mosaic of habitats, including coral reefs and sandy substrates, which provided ecological niches supporting a broad array of gastropod families, such as Conidae and Cypraeidae. In comparison, the Bato Cassee station, characterized by its predominantly sandy bottom, exhibited the lowest diversity, with only 6% of species and 4% of specimens. This site was primarily dominated by burrowing taxa like Naticidae and Terebridae. Similarly, the Simin Henri and La Pointe Sud stations, characterized by seagrass meadows and soft sediment substrates, supported gastropod communities such as Naticidae and Cerithiidae. These stations accounted for 24% and 23% of the total specimens recorded, respectively. In contrast, the Vingt Cinq station exhibited a distinct ecological profile shaped by tidal fluctuations, with water depths ranging from near exposure at low tide to levels up to 1.5 meters at high tide. This dynamic interplay of tidal activity, bedrock substrates, and strong water currents created a challenging yet diverse environment that supported a unique community composition. Furthermore, the intricate structures of coral colonies and seaweed beds at this station provided a diverse array of microhabitats and refuges for gastropods, significantly shaping the observed gastropod assemblages.

Both living specimens and dead shells were included in the inventory of marine gastropods for the Agalega Islands. This approach was essential due to the specialized lifestyles and habitats of marine gastropods. Many species inhabit environments that are difficult to access, such as surf reef areas or small, hidden crevices. Previous studies had highlighted the challenges associated with collecting species from these unique habitats due to their inaccessibility [23] [24]. Incorporating dead shells in the inventory provided a more comprehensive understanding of the gastropod diversity of the islands [1]. For example, an inventory of the molluscan community in Kuwait conducted by Glayzer *et al.* [25] revealed that 55% of the community was represented by dead shells. Additionally, gastropod species are often more accessible during specific periods of the year or at nighttime, further complicating sampling and studies conducted within the limited duration of surveys.

Coral reef ecosystems are known to harbour highly diverse molluscan assemblages, including many undescribed species [26]. However, these vital ecosystems are increasingly threatened by global warming. Although no specific information is available on the impact of bleaching events on the Agalega Islands, studies by Ateweberhan and McClanahan [27], Gudka *et al.* [28], McClanahan *et al.* [29], Obura [30], and Sheppard *et al.* [31], and have shown that countries in the Western Indian Ocean (WIO) region frequently experience bleaching events of varying severity. Numerous studies have demonstrated that such events could significantly impact marine diversity [32]-[37]. A major bleaching event in 2016 resulted in a 20% decrease in coral cover across six WIO countries [28]. This event significantly altered habitat structures and reduced food availability, potentially affecting the composition and abundance of gastropod species. Since this study was conducted post-bleaching, these factors might have influenced the observed gastropod communities.

Several additional factors likely influenced the species richness observed in this study. The spatial coverage of lagoon areas might have been insufficient to capture the full heterogeneity of gastropod fauna across Agalega. Offshore waters and off-reef areas were also excluded from the study. Furthermore, the experience level of collectors might have limited species detection [38]-[40].

5. Conclusion

This study represented a critical step in enhancing our understanding of gastropod diversity within the Agalega Islands, providing foundational baseline data essential for informed conservation strategies. The relatively low levels of human impact on Agalega's marine ecosystems present a unique opportunity to protect and preserve its biodiversity. A key finding of this study was the identification of a diverse assemblage of Conus species. The ecological significance of these species, coupled with conservation concerns for several members of the genus, highlighted the necessity of integrating them into biodiversity management plans. Future research should build upon these findings by investigating unexplored habitats, such as deeper reef slopes. Additionally, prioritising the study of micro-molluscs would be vital to achieving a more comprehensive understanding of the region's biodiversity. Such efforts would support the development of targeted conservation initiatives, ensuring the long-term sustainability of Agalega's unique marine ecosystems.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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