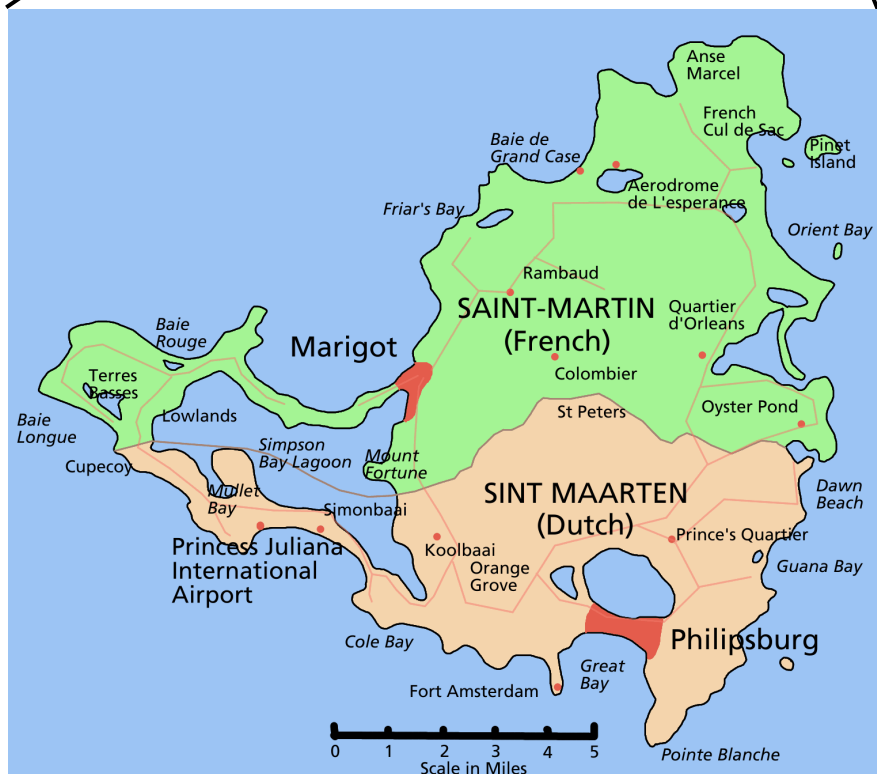


Shelling on Sint-Maarten/Saint Martin, the 'Friendly Island': Part I: Introduction and land mollusca

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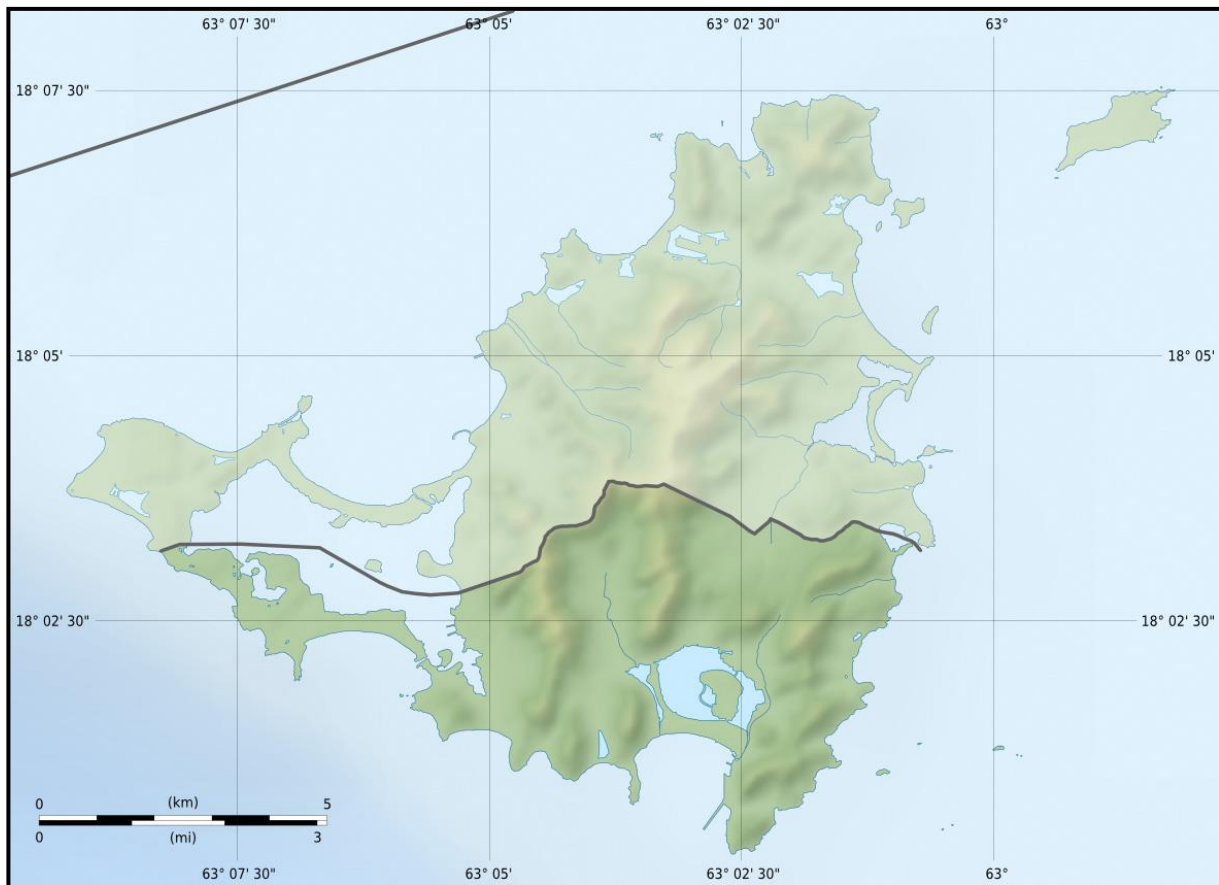


Introduction

Geography

Sint-Maarten/Saint Martin (SXM) is situated at 18°04' N, 63°04' W and belongs to what is called the '*Windward Islands*', together with Puerto Rico, Saba, the Virgin Islands and some other islands, in contrast to the '*Leeward Islands*' Aruba, Curaçao and Bonaire north of Venezuela. Saint Martin is confined by the Atlantic Ocean in the north and by the Caribbean Sea in the south. Saint Martin belongs to the northernmost islands of the Lesser Antilles in the external volcanic arc. It consists of two parts: the French Saint-Martin in the north and the Dutch Saint Maarten in the south. The total area is 86 km², of which about 34 km² is inhabited by approximately 35,000 of people in the Dutch Saint Martin.

The '*Collectivité de Saint Martin*', is an overseas collectivity of France and has an area of about 53 km², inhabited by more than 32,000 inhabitants. The capital of the Dutch part is Philipsburg while Marigot is the French capital.



The island is very hilly and is dominated by several '*Hills*' or '*Monts*' such as the Mt. France, Mt. Boeuf, Mt. Caretta, Sentry Hill and above all the highest hill, the Pic Paradis (424 m). Ridges of the hills run into the sea and with a certain regularity around the coastline which is interrupted by numerous bays and white beaches, where hundreds of hotels and resorts shoot up like mushrooms. Some large lagoons characterise the landscape (Simpson Bay Lagoon, Great Salt Pond, Etang aux Poissons, Etang Guichard). The beautiful wide beaches are strongly sloping and the rocky coast is sometimes difficult to access.



Simpson Beach



Friar's Bay

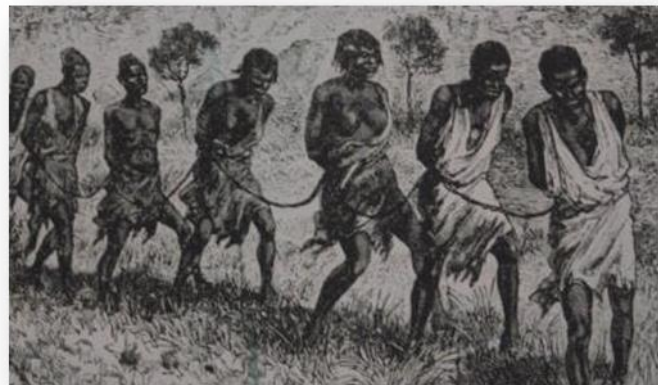
History

In the past, the island was scarcely inhabited, presumably due to a lack of drinkable water. We suspect that the island has already been inhabited since 4000 BC and that Arawak Indians were living there since ca. 800 BC. The Arawaks were relatively civilised. They were proficient in agriculture, they made pottery and their social organisation was headed by hereditary chieftains who derived their power from personal deities called 'zemis'. It was a peaceful nation that practiced salt extraction from the seawater in the lagoons. The island was then called '*Soualiga*' or 'Island of the Salt'. In the 14th century the Arawaks were subjected by the war-like Carib Indians who came from South America. We presume the latter were cannibals who massacred the male members of the Arawak tribes and used their women as slaves. The island was then called '*Oualichi*' or 'Island of Women'.





Most likely the island was first observed by Columbus on 11 November 1493, the feast day of the Holy Martin, a bishop and missionary who lived from 330 to 397 (Tours, France). It is possible that Columbus did not observe the current Saint Martin but the nearby Island of Nevis. So, it was only later on added to the Spanish possessions. As the Spaniards conquered the Caribbean Islands they rounded up the local Indian people and put them to work. Many Carib Indians emigrated or did not survive the successive Spanish, Dutch and French dominations. The Spaniards introduced the first African slaves into the Caribbean, but the vast majority of the slaves were only introduced in the middle of the 18th century. The increasing development of the sugar plantations required the supply of still more slaves from American, African, European and Asian countries. This resulted in a West Indian culture, which cannot be matched in any other part of the world for richness and diversity.



The Caribbean Sea was the venue of privateers, pirates and smugglers from different countries such as Spain, Portugal, England, the Netherlands and France with the sole purpose of getting ever more grip on the Islands. English privateers were even knighted for their fight in the service of Queen and country. Between 1630 and 1648 the Dutch seized the islands of Saint Martin, Curacao, Saba and St. Eustatius, all valuable trading and smuggling depots.



In 1631 the Dutch started salt extractions and the cultivation of tobacco, but two years later they were driven out by the Spaniards. In the meantime the French had obtained a joint rule of the island through the '*Compagnie des Isles d'Amérique*', founded in 1635. In 1642 the Friesian Peter Stuyvesant was appointed Governor of Curaçao and in 1644 the Spaniards renounced their rights to the island.

On 23 March 1648 France and the Dutch Republic signed the Treaty of Concordia, and the distribution of the territory between the two countries was decided. Between 1631 and 1816 Saint Martin was under the rule of the Dutch for seven times, three times under English authority and four times under the French Government. At the end of the Eighty Years' War, Saint Martin was again partially under Dutch supervision. Finally in 1816, at the Treaty of London, the agreement was totally accomplished. Since 2010, the Dutch part of Saint Martin has been a separate country within the Kingdom of the Netherlands.



Population

At present, the original Saint Martin natives are by far the minority compared to the legal and illegal migrants who overran the island since the 1960s. The large inflow of immigrants from the other islands on Saint Martin resulted in a Creole-Caribbean folk culture which is also present on many other Caribbean islands. The rapid development of tourism seriously influenced the population figure of Saint Martin. At the end of the 1960s, there were approximately 3,000 inhabitants. At present, this number has increased to more than 60,000 people, equally divided between the Dutch and the French sides of the island. Only 20% of them can really be called autochthonous. The others come from France, India (especially in the jewelry stores), the Netherlands, the Netherlands Antilles, other immigrants from islands such as Haiti, Dominica, St. Kitts, Anguilla, but also from China (especially working in hotels and the catering sector), Germany, North America and the United Kingdom. In addition, there are also thousands of illegal immigrants on the island, especially from the surrounding Caribbean Islands. Certain estimates believe that there are almost as many illegal immigrants as legal Saint Martin inhabitants. Probably more than 120 different nationalities are represented on Saint Martin. Due to the important British influence in the past and present, English has become the main language on the Windward Islands. The official language in Saint Martin is still Dutch, but the actual knowledge and practice has become very small. The language used by the immigrants on Saint Martin is the '*patois*', or '*Papiamentu*' of the French territories in the Caribbean region (Martinique, Guadeloupe).

Economy and traffic

Originally, the extracted salt from the seawater on Saint Martin was an interesting export product to many countries, including France and The Netherlands. Salt was used to preserve meat during the long trips across the ocean. Nowadays there are no more salt extraction activities on the island.

In the second half of the 17th century and in the 18th century the inhabitants of Saint Martin were fairly prosperous. Agriculture yielded sufficient benefits for their own use while cotton and tobacco were exported. During the 18th century sugar cane supplanted the cultivation of other crops. To increase labour intensiveness, a growing number of black slaves were introduced. At the end of the century the island counted 31 plantations, and about half of them were controlled by the English. So, Saint Martin gradually began to Anglicise not only in a demographic way but also as to language use. This phenomenon is now a general reality and there is still little that reminds of the Dutch presence except for some older names of streets and buildings.

In the 19th century there was an economic turnabout due to the many wars in which The Netherlands had been involved at the end of the 18th century and the beginning of the 19th century. The cultivation of sugar cane gradually disappeared as a result of devastating hurricanes, but also by the abolition of slavery. Nowadays, there are only a few plantation houses on the island.

The second half of the 19th century and the first half of the 20th century was a period of poverty for Saint Martin. Since 1939 Saint Martin has become a free trade area without tax provision.

Since the late 1950s and the 1960s tourism has gradually developed and begun to flourish. Now Saint Martin depends on this sector for 80%. Proportionally, the construction sector still provides more employment to the local population. Fortunately, the Government is also one of the larger employers on Saint Martin. More than a quarter of the working population has a job as a civil servant or is employed in the 'security'-sector. Surprisingly practically no fishing activities can be observed on the island. Moreover, there are no industrial activities.

Tourism and infrastructure

Saint Martin is an important tourist destination. Countless tourists - especially Americans - supplied by gorgeous cruise ships, visit the tax free town of Philipsburg every year. Aircrafts of the type Boeing 747 are able to land on the '*Princess Juliana International Airport*' in the Dutch part of the island, in contrast with the smaller airport, the '*Aérogare de l'Espérance*' in the French part.

The island has many tourist attractions, such as heavenly beaches, resorts, clubs, restaurants and swimming areas, as well as various museums, churches, concert venues and casinos. On the other hand

the economy is very vulnerable and the tourist activities are mainly in foreign hands. Businesslike services are a second source of income, but some of those activities are at least controversial such as the laundering of drugs money, gambling, Mafia activities and the growing sex industry.

The road infrastructure is seriously overloaded as a result of the increasing tourist expansion and immigration. Unfortunately, it has not been able to evolve in time. The bays and beaches are rather easily accessible thanks to the excellent roads along the coast, but you need to drive a sturdy vehicle to use the shortcuts. The cities of Philipsburg and Marigot are difficult to reach. From early in the morning till late at night the roads are congested as practically everyone is moving by car. The new '*Simpson Bay-Cole/ Bay Bridge*' turned out to be a financial fiasco and offers practically no relief for traffic to reach Philipsburg. Cyclists are not really welcome. Especially because of the hilly character of the island it is preferable to use a mountain bike. Moreover, sidewalks are rarely available for pedestrians even in the cities.

Maintenance of public utilities (water, electricity and sewage) is problematic as a result of the increasing demand. The continuing development of resorts needed massive logging on the hills preventing the retaining of rainwater by tree roots after heavy precipitations. The result is that houses risk tearing and being washed away. Streets are regularly flooded after a heavy shower. Nevertheless, it is possible to gain a first impression of the entire island with a powerful vehicle in a few hours.

Philipsburg

The capital of Saint Martin is situated on a sandbar of one and a half km long that separates Great Bay from the Great Salt Pond. The place is named after its founder, John Philips, a Scottish adventurer working for the Dutch government. The settlement on that sandbar was a very logic choice as everything in bygone days revolved around the export of salt from the salt pans at Great Bay. The Bay itself was a sheltered harbour where ships could easily anchor. In 1763 Philipsburg became the official capital of Saint-Maarten. Over the years, Philipsburg increasingly extended to the east and the west. In 1968, the reclamation of an area of about 200 m wide in Salt Pond was completed, so that Philipsburg could further extend to the north. Twenty years ago, a large car park was constructed. The government originally had great expectations about the new Simpson Bay/ Cole Bay bridge to solve the never ending problems resulting from the increasing traffic in and out of the capital, but at this moment it seems to be useless.





Great Bay, Philipsburg



The Boardwalk, Philipsburg





Typical old house decorated with 'shingles', Philipsburg

The Court House, Philipsburg



Over the years, Philipsburg has become a chaotic mishmash of all sorts of buildings and architectural styles. In addition to functional and brightly coloured rectangular new offices and hotels there is often a number of old houses, some of which are decorated with 'shingles' (vertical decorative slats) or older homes with 'gingerbread' ornamentation along the porches. These are Victorian decorations of carved wood with all kinds of motives such as leaves, half moons or suns retrieved from other Caribbean Islands. The late 18th century Court House and the Methodist community have survived the numerous tropical hurricanes since 1851. The Court House is the national symbol of the island and in fact it is just about the only real important monument. In 1793 it was constructed as City Hall and Courthouse. Later on it was ravaged by a hurricane but restored several times. It also often functioned as a prison and a fire station.

Parallel to the Bay run a number of large pedestrian streets such as Front Street, Back Street, C.A. Cannegieter Street, connected with small sidestreets and alleys with many Dutch names (Schrijnwerkersteeg, Gevangenisstraat, Loodgietersteeg) and many simple 'shingle'-houses. Front Street is the main street of Philipsburg. Many houses are now unoccupied since the increasing tourist activities have changed the street scene. Nearly the whole street is now the domain of duty free shops (especially jewellery stores managed by Indians), restaurants, bars, casinos, numerous shops and some hotels. Behind the buildings the beach of Great Bay offers an oasis of tranquility in sharp contrast with the busy shopping street.

Also interesting is the Saint Martin Museum that shows the history and culture of the island and also videos of the hurricanes that have plagued the island in recent years. House Vineyard is a colonial building that shows how the wealthy people built their homes. The Methodist church built in 1851 was demolished in 1978 and again restored with 'shingles'.

Further on there is Fort Amsterdam dominates Little Bay, west of Philipsburg. It was built by the Dutch on the fortresses of an old Spanish bastion. Some government buildings and the 'University' of Saint Martin were built on the reclamation site in Salt Pond. The latter is not a real academic institution but an educational establishment where marketing and hotel management courses can be taken. Behind this building, there is a large resort, where most festivities during Carnival take place. The rest of that area is occupied by ragged wooden houses of less prosperous immigrants similar to the neighbourhood of Marigot.

The environment of Salt Pond

In northern direction Mount William Hill is a viewpoint that offers a beautiful panorama of Salt Pond and Philipsburg with Great Bay.

West of Salt Pond, Fresh Pond is the place to be for a lot of pelicans. Further northwards different residential areas can be found bathing in a typical creole character. They are mainly occupied by immigrants of different Caribbean origins.



The East coast of Saint Martin

The East Coast consists of a chain of small bays: Pointe Blanche Bay, Back Bay, Geneva Bay, Guana Bay, Oyster Bay, Gibb's Bay and Red Pound with Dawn Beach. When the sky is cloudless, the island of Saint-Barthélemy can be observed.

The first part of a national park is situated in the area between Oyster Pond and Upper Prince's Quarter. It houses the ruins of an old sugar factory, some slave graves, the foundations of a unique windmill and a cistern.

The South coast of Saint Martin

Cay Hill is one of the wealthier districts of Saint Martin. A hospital and the water and electricity company are located at Lay Bay. On the slope of Colebay Hill there is a unique viewpoint on Cay Bay, Cole Bay, Lay Bay, Simpson Bay and Simpson Bay Lagoon.



Maho Bay and Maho Beach are situated at the end of the airport's runway. This is the place to be for aircraft spotting from the popular Sunset Bar. On the beach and in the bar you can almost touch the landing planes, but there is a real chance that you will be blown away and especially Air France has a tendency to fully open its engines before departure. In the past two cars and one American tourist were blown into the sea. Once the fence of the airport was destroyed. Since that accident the French airline has been renamed 'Air Fence'.



Mullet Beach is one of the most beautiful beaches of Saint Martin. Next to the French border we can find the last beach of the lower part of Saint Martin, the nice Cupecoy Beach. It has quite a different character than Mullet Beach because of the high rock faces along the beach. It is more sheltered and some inlets in the rocks are even suitable for nude recreation, although this activity is officially not allowed by the government.

Further to north the road is highlighted by a border monument, an obelisk placed on an elevation. It mentions the years 1648 and 1948. On 23 March 1648, the Lieutenant Governors of both sides signed the Partition Treaty. They agreed that the two parts of the island would remain neutral in the future if a war between the mother countries in Europe started.



Saint Martin

Mullet Beach

In the western part across the border with Saint Martin are the lowlands ('*Terres Basses*') with numerous hotels and resorts, but especially some beautiful beaches such as Baie Longue, Baie aux Prunes, Baie Rouge, Baie Nettle and a small bird sanctuary. This is the area of transition between the Atlantic Ocean and the Caribbean Sea.

The French capital offers an unmistakably French and French-Caribbean character. Similar to the other French possessions in the Caribbean, Saint Martin has the status of overseas territory. It is a subprefecture of the 'Département de la Guadeloupe'. The main language is French, but the black part of the more than 35,000 inhabitants speaks '*patois*', the '*Papiamentu*' of the former French colonies.

Marigot is smaller than Philipsburg but offers some nice sights: the colourful Caribbean market on the square in front of the port, a permanent souvenir market, a small museum, an open-air theatre and many local restaurants with the typical French or Caribbean dishes.

Harbour of Marigot



Looking for chitons at
Friar's Bay

The 17th century's Fort Saint-Louis is situated on the hill on the north side of the harbour. It was completed finished in 1786 and is better preserved than the forts on the Dutch side. It offers a beautiful view on the nearby British-Caribbean Anguilla.

To the north of the island the road leads us to the quiet beach of Baie de Friar's and the more touristic beach of Grand Case.

The inland part of the island with the village of Colombier is very hilly and a steep road leads to the Pic Paradis. This is the highest mountain of the island, reaching a height of 424 m. Starting from the "*Loterie Farm*'

- a former sugar plantation – there is a path that can be used after paying a small fee. The Pic Paradis can be climbed through rocks between three roots, trees and shrubs. This tropical jungle is an interesting place to observe a large variety of endemic land snails and tropical plants. The top of the Pic Paradis offers a unique view over the island. Going inland we reach the small airfield of Saint Martin. The north is barely developed for tourism and difficult to reach by car.





Pic Paradis

Baie de Grand Case



In the northeast, the French Government has established a national park on the islands of Pinel and Tintamarre, which can be reached by means of a small boat, although on payment of a charge. On Pinel itself there are no roads and there are no vehicles. Many tourists come here to snorkel and to practise underwater photography near the coral reefs. Ile Pinel is especially famous for the large iguanas that roam freely and eat out from your hand. There are two beach bars, run by French people, where they serve BBQ food, seafood and fresh grilled lobster.





Pinel Island



A cemetery for *Strombus*

Guana Bay



Baie Orientale (Orient Bay) and Le Galion are shallow bays in the east with a beautiful long sandy beach and a whole range of wooden beach cabins where you can eat and drink. From the beach you can dive and make snorkeling trips to the island of Caye Verte, but good swimmers can directly reach it.

Coralita Bay and the small Baie Lucas are close to the border with Sint-Maarten. Shell Island is in front of the pebble beach at only one hundred metres. At low tide it can be reached on foot and if not you will need to swim that small distance. It is a paradise for snorkelers and divers who want to explore the coral reefs. On the hills behind the shore there is a small nature reserve with many typical cactus species.



Shell Island at Coralita Bay

Climate

Saint Martin has a tropical monsoon climate. In contrast to the Leeward Islands, Saint Martin is rather rainy. There is a clear difference between a dryer and a wetter season. The dry season is in the first half of the year between December and May, whereas the wet season lasts from June to December. The average daytime temperature is about 27 degrees Celsius and the weather is very congenial throughout the whole year.

Saint Martin is located in an area that is vulnerable to hurricanes, but fortunately it often escapes to the most destroying ones, compared to other Caribbean Islands. Hurricane '*Louis*' caused enormous damage in 1995 and '*Friendly Island*' was last afflicted in October 2008, November 2010 and October 2014. Due to increasing global warming there is also a danger of possible floods.





Nature landscapes

Saint Martin offers a variety of different habitats which directly influence the flora and fauna on the island. Typical are the salt ponds, the lagoons, the mangroves, the marshes, the sandy shores, the sea grass beds and the coral reefs.

Originally, the salt ponds were connected to the sea and surrounded by mangroves. As a result of deeper water, environmental pollution, a higher salt content and temperature fluctuations many root trees have disappeared. Some plants and animals such as the red mangrove and a certain kind of lavender as well as some birds like the brown pelican and white egrets, have survived.



The mangroves are ecologically very important in the loose and muddy bottom of the intertidal zone in tropical waters. They help stabilise erosion of the beach and function as a kind of breeding pond for young fishes. Mangroves can be found on the southern shore of the Simpson Bay Lagoon and near some salt ponds.

Sea grass beds grow on the bottom of sandy coves and coral reefs. The grass grows and reproduces itself by means of rhizomes that lie just below the sand. It requires sunlight and does not tolerate cloudy water.



Fauna

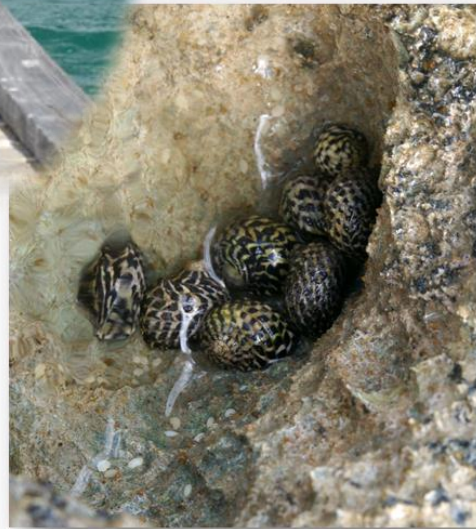
The fauna is rather limited. Most common are hummingbirds, pelicans, white herons, cormorants, hawks, hummingbirds, bats, iguanas and butterflies.

The widespread Antillean Green Iguana or *Iguana nudicollis* can grow up to one metre in length. Young animals are light green coloured but as they grow the colour changes into dark green to brown.



Iguana nudicollis at
Pinel Island





Nerita versicolor Gmelin, 1791

Nerita tessellata Gmelin, 1791



Acanthopleura granulata (Gmelin, 1791)



Sea urchins





Shells dived at Shell Island,
Coralita Bay



Shells for sale on the market of Philipsburg

Flora

In the dry areas close to the coast some types of cacti, Acacia and cotton plants are rather common. The slopes on the hills offer a wide range of habitats, ranging from the original vegetation like rubber trees, bromeliads, orchids in the highest areas to succulent plants (agaves), palm trees and hibiscus on the lower slopes.





Acknowledgements

We want to thank Steve Hubercht (Heverlee, Belgium) for the identification of the terrestrial molluscs and David Monsecour for the correction of the English text.

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Results of a shelling trip on Saint Martin

The present paper deals with the results of the search for land snails and shoreline sea molluscs during a shelling trip on Saint Martin from the 29th of October to the 6th of November 2015.

Land mollusca

We concentrated our efforts to find land shells on the Pic Paradis, as high as 424 m. Most fruitful were the habitats between bushes and trees at 200-300 m in the mesophile stratum. Most of the shells were empty as the island had suffered from an unusual very dry season from April to October.

Only eight different species were found during one three-hour trip but most of them were present in relatively large quantities. This means about 20% of the known land snail fauna of Saint Martin. However, a few of them are here for reported in literature for the first time or have little been known from Saint Martin till now.

HELICINIDAE

***Helicina fasciata* (Lamarck, 1822)**

Plate I, Figs 1-2

Although this species is generally recognised as a common species in its distribution area, we estimate *H. fasciata* is a rare species on Saint Martin. We only found two specimens and Coomans (1967) only reports a few samples in musea.

BULIMULIDAE

***Bulimulus guadelupensis* (Bruguère, 1789)**

Plate I, Figs 3-6; Plate II, Figs 7-11

A common species found in litter and on low plants, in different habitats, from dry littoral areas to the mesophile forest all over the Caribbean islands.

***Drymaeus elongatus* (Bolten, 1798)**

Plate III, Figs 12-17

This is also a rather common species living in the same habitats as *Bulimulus guadelupensis* at the same altitudes.

ACHATINIDAE

***Achatina fulica* (Bowdich, 1822)**

Plate IV, Figs 18-21

Originated from West Africa, widely distributed in all tropical and subtropical area all over the world. An invasive species, introduced at the end of the previous century and classified among the 100 most invasive species. Spread everywhere on the island, especially in disturbed areas. Commonly included in the genus or subgenus *Lissachatina*. This species is not mentioned by Coomans (1967).

SUBULINIDAE

***Subulina octana* (Bruguère, 1789)**

Plate V, Figs 22-25

From xerophile areas (0-100 m) to the rain forest (above 400 m) in natural forest and anthropised habitats. A litter-dwelling detritivorous species. It has become a cosmopolitan species due to human activities and was introduced in the middle of the 20th century.

STREPTAXIDAE

***Streptartemon deplanchei* (Drouet, 1859)**

Plate V, Figs 26-27

A rare species probably introduced into Saint Martin from northern South America.

CAMAENIDAE

***Pleurodonte lychnuchus* (Müller, 1774)**

Plate VI, Figs 28-34

Coomans (1967) only mentions one empty shell collected by Mazé (1890) and estimates that this species does not belong to the fauna of Saint Martin. We collected at least eight specimens on the Pic Paradis.

***Zachrysia provisoría* (Pfeiffer, 1858)**

Plate VII, Figs 35-38

An uncommon species in the mesophile stratum of Pic Paradis, not listed by Coomans (1967).

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Plate I. Figs 1-6: Pic Paradis, Saint Martin. 4 November 2016.

Figs 1-2: *Helicina fasciata* (Lamarck, 1822). 9.44 mm;

Figs 3-6: *Bulimulus guadelupensis* (Bruguière, 1789); 3-4: 17.99 mm; 5-6: 17.60 mm.



Plate II. Figs 7-11: *Bulimulus guadelupensis* (Bruguière, 1789). Pic Paradis, Saint Martin. 4 November 2016; 7: 19.60 mm; 8: 20.48 mm; 9: 21.20 mm; 10: 21.71 mm; 11: 22.54 mm.

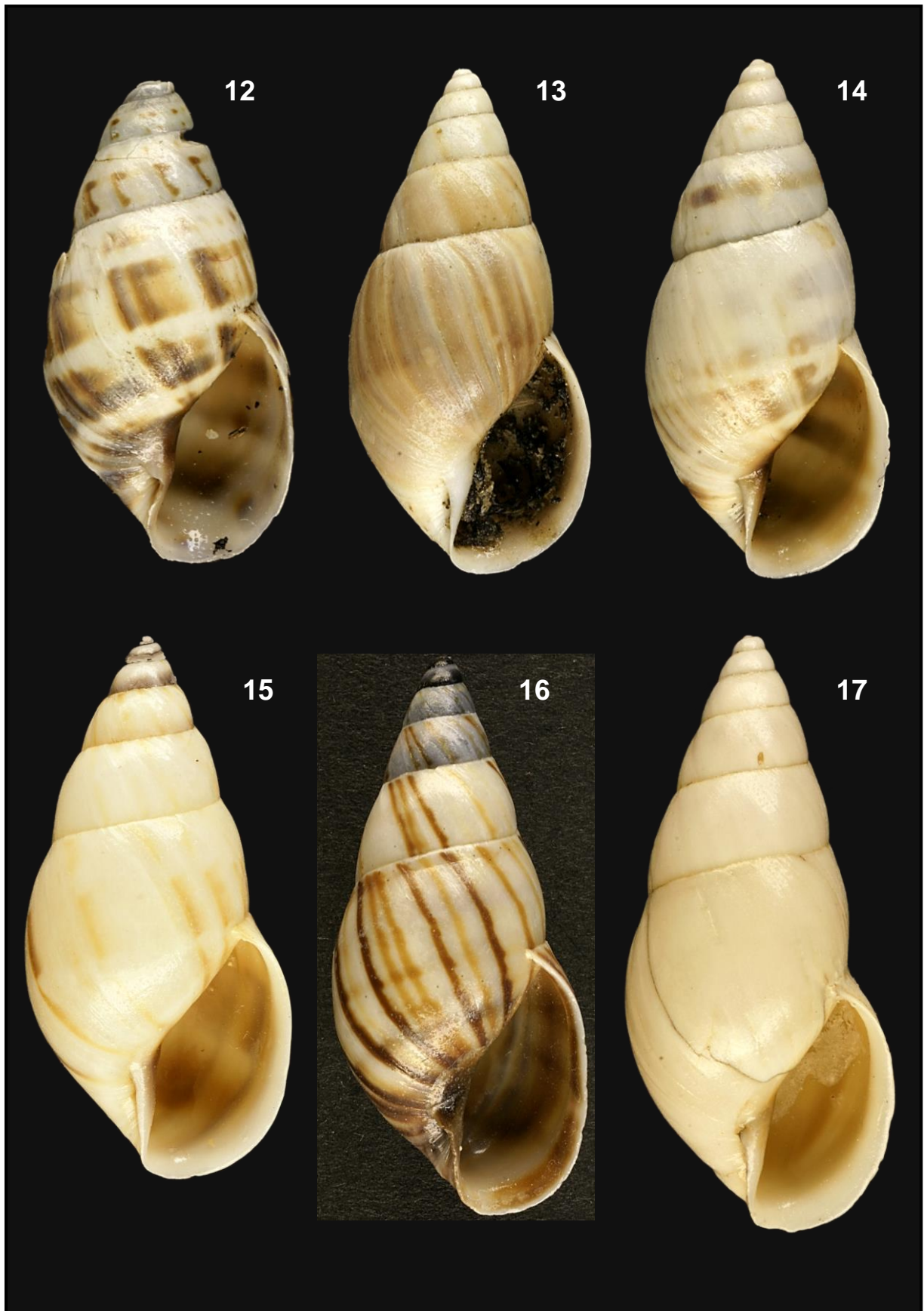


Plate III. Figs 12-17: *Drymaeus elongatus* (Bolten, 1798). Pic Paradis, Saint Martin. 4 November 2016; 12: 21.09 mm; 13: 24.43 mm; 14: 25.58 mm; 15: 26.57 mm; 16: 28.76 mm; 17: 30.23 mm.

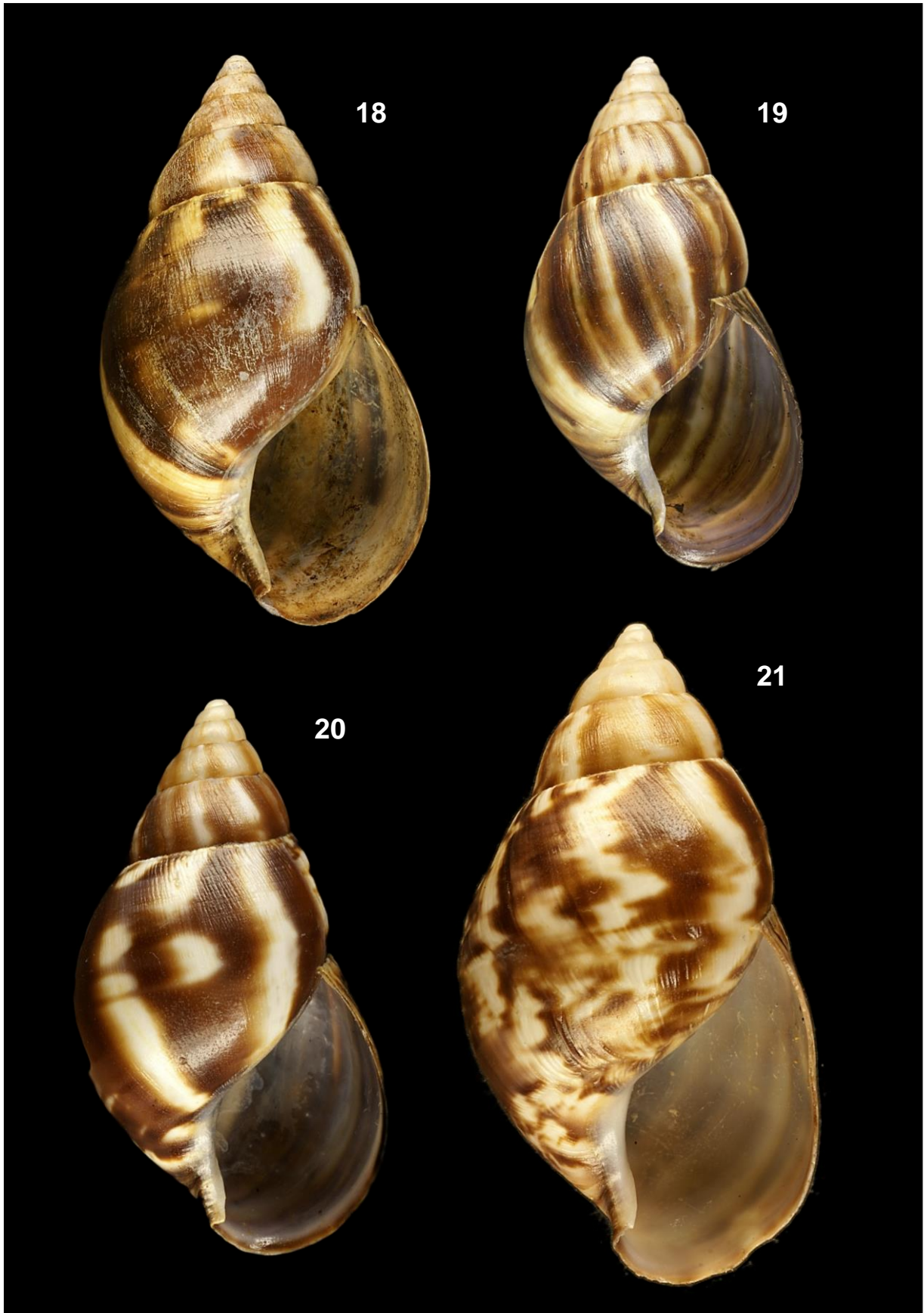


Plate IV. Figs 18-21: *Achatina fulica* (Bowdich, 1822). Pic Paradis, Saint Martin. 4 November 2016; 18: 67.07 mm; 19: 65.95 mm; 20: 60.76 mm; 21: 68.88 mm.



Plate V. Figs 22-27: Pic Paradis, Saint Martin. 4 November 2016.
Figs 22-25: *Subulina octona* (Bruguière, 1789); 22-23: 14.78 mm; 24-25: 18.04 mm;
Figs 26-27: *Streptartemon deplanchei* (Drouet, 1859); 26: 6.78 mm ; 27: 7.16 mm.



Plate VI. Figs 28-34: *Pleurodonte lychnuchus* (Müller, 1774). Pic Paradis, Saint Martin. 4 November 2016; 28-29: 14.12 mm; 30-31: 14.59 mm; 32-34: 15.04 mm.

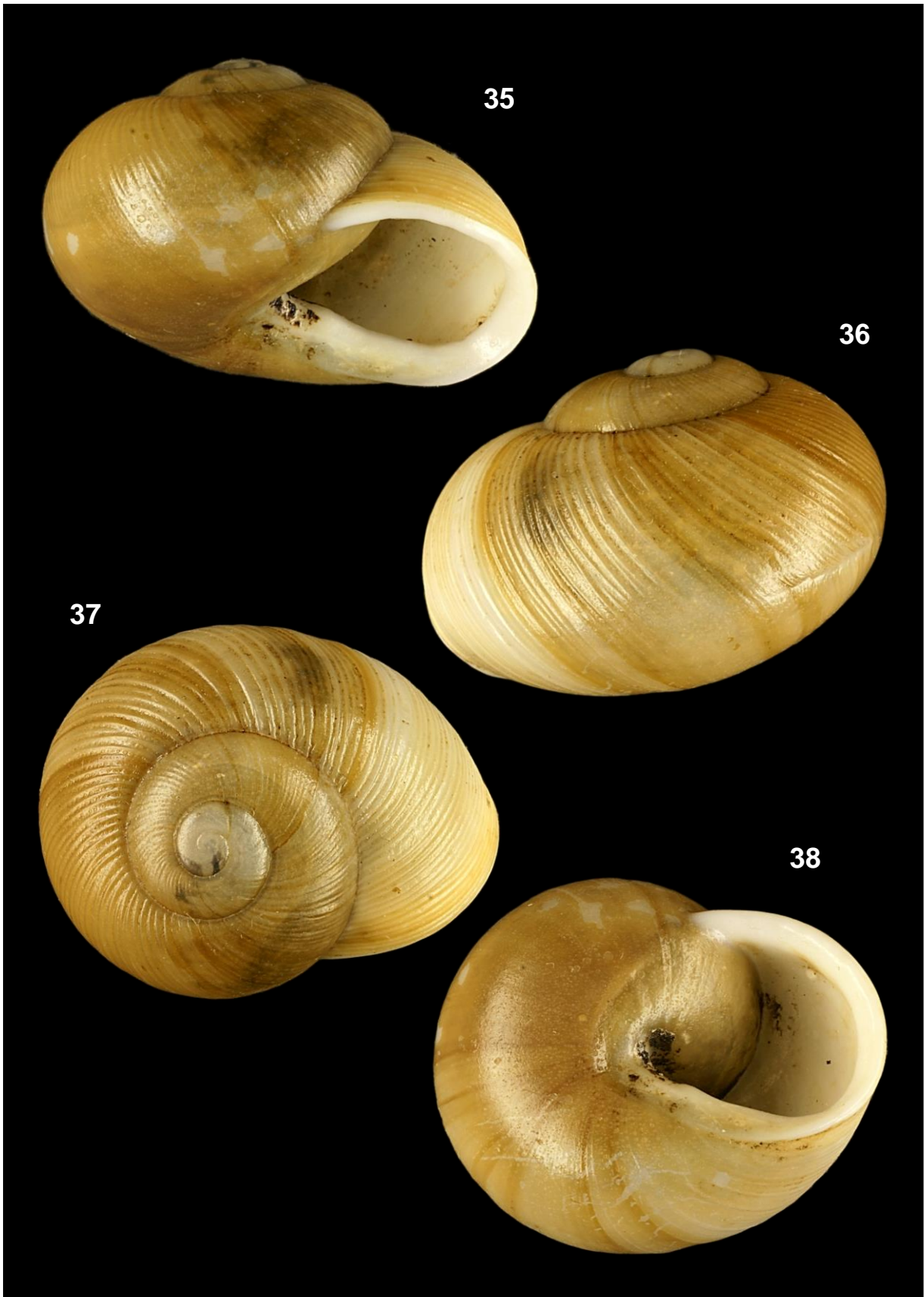


Plate VII. Figs 35-38: *Zachrysia provisoria* (Pfeiffer, 1858). Pic Paradis, Saint Martin. 4 November 2016. 28.91 mm.

Contributions to the knowledge of the Eratoidae.

XI. New species in the genus *Hespererato* F.A. Schilder, 1925

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Abstract: The holotype of *Erato callosa* A. Adams & Reeve, 1850 is rediscovered. *Erato callosa* is a junior synonym of *Hespererato scabriuscula* (J.E. Gray in G.B. Sowerby I, 1832). Former incorrectly identified specimens from the central Indo-Pacific are described as *Hespererato rubra*. The new species is briefly discussed and compared with similar species.

Abbreviations:

DFB: collection Dirk Fehse, Berlin, Germany
ZSM: Zoological State Collection, Munich, Germany
L: length of shell
W: width of shell
H: height of shell
LT: number of labral teeth
CT: number of columellar teeth

Introduction: My research on the type specimens of the Eratoidae has resulted in the discovery of the holotype of '*Erato*' *callosa* A. Adams & Reeve, 1850. C.N. Cate (1977: 347) designated a lectotype for this species. The lectotype does not correspond with the original description and is completely different from the holotype. There is even no similar shell known from the Indo-Pacific that resembles the holotype of '*E.*' *callosa*.

Small, red coloured specimens from the Philippines are often offered as '*E.*' *callosa*. These specimens are different from both Adams & Reeve's holotype and Cate's lectotype. It is questionable how these specimens are identified. They do not resemble any known species and are hereby described as *Hespererato rubra* n. sp.

All of the species mentioned below could be studied by means of type specimens and by hundreds of specimens from various localities in the author's collection. All type specimens of the new species were dead collected.

SUPERFAMILY: TRIVIOIDEA Troschel, 1863

FAMILY: ERATOIDAE Gill, 1871

SUBFAMILY: ERATOINAE Gill, 1871

GENUS: *Hespererato* F.A. Schilder, 1932

Type species: *Erato vitellina* Hinds, 1844, by monotypy

***Hespererato scabriuscula* (J.E. Gray in G.B. Sowerby I, 1832)**

(Pl. I, Figs 1, 2)

- 1832 *Erato scabriuscula* Gray in Sowerby, The Conchological Illustrations ...: 15, fig. 45.
1850 *Erato callosa* A. Adams & Reeve, The zoology of the voyage ...: 25, pl. 10, figs 32 a, 32b.
1977 '*Hespererato scabriuscula* (Sowerby 2nd, 1832) – Cate, A Review ...: 364, figs 50, 50a to 50c.

Non 1977 *Proterato* (*Sulcerato*) *callosa* (A. Adams & Reeve, 1850) – Cate, A Review ...: 347, figs 12, 12a [= *Sulcerato pellucida* (Reeve, 1865); *Lachryma pura* Kuroda & Habe, 1971 is a junior synonym].

Locus typicus: “Santa Elena, Colombia”. No such locality could be identified along the western coast of Colombia. There is a small town called Santa Elena (80°52' W – 02°12' S) on the coastline of Guayas, Ecuador and it is hereby designated as type locality.

Locus typicus of 'Erato' callosa: “China Seas, Samarang expedition. Presented by Mrs J. Lombe-Taylor.”

Type material:

Lectotype of *Hespererato scabriuscula*: NHMUK, No. 1966363/1; Hugh Cuming collection; designation by C.N. Cate (1977: 364).

Holotype of *'Erato' callosa*: NHMUK, No. 1874.12.11.184



Fig. 1: '*Erato*' *callosa* (A. Adams & Reeve, 1850). Holotype, NHMUK, No. 1874.12.11.184. “China Seas, Samarang expedition. Presented by Mrs J. Lombe-Taylor.” Photo: Harry Taylor, © NHMUK, 2014.

Original description of *Erato callosa* (A. Adams & Reeve, 1850: 25): “ *Erato callosa* ... Erat. testâ pyriformi, crassâ, tumidâ, callosâ, spirâ breviusculâ, subobtusâ, columellâ excavatâ, labro conspicuè denticulato; carneâ, subtus albicante.

[“... Shell pyriform, thick, swollen, calloused, spir e short, blunt, columella excavated, labrum conspicuously denticulated; flesh colored, somewhat white.”].

An interesting species of rather large size, distinguished by its callous, thickly-enamelled growth.”

Measurements:

Lectotype:	L = 10.3 mm,	W = 6.2 mm,	H = 5.1 mm,	LT 16	CT 14
Holotype:	L = 6.7 mm,	W = 4.5 mm,	H = 3.7 mm,	LT 12	CT 11



Fig. 2: *Hespererato scabriuscula* (Hinds, 1844). Lectotype, NMHUK, No. 1966363/1. Santa Elena (80°52' W – 02°12' S), Guayas, Ecuador. Photo: Harry Taylor, © NHMUK, 2014.

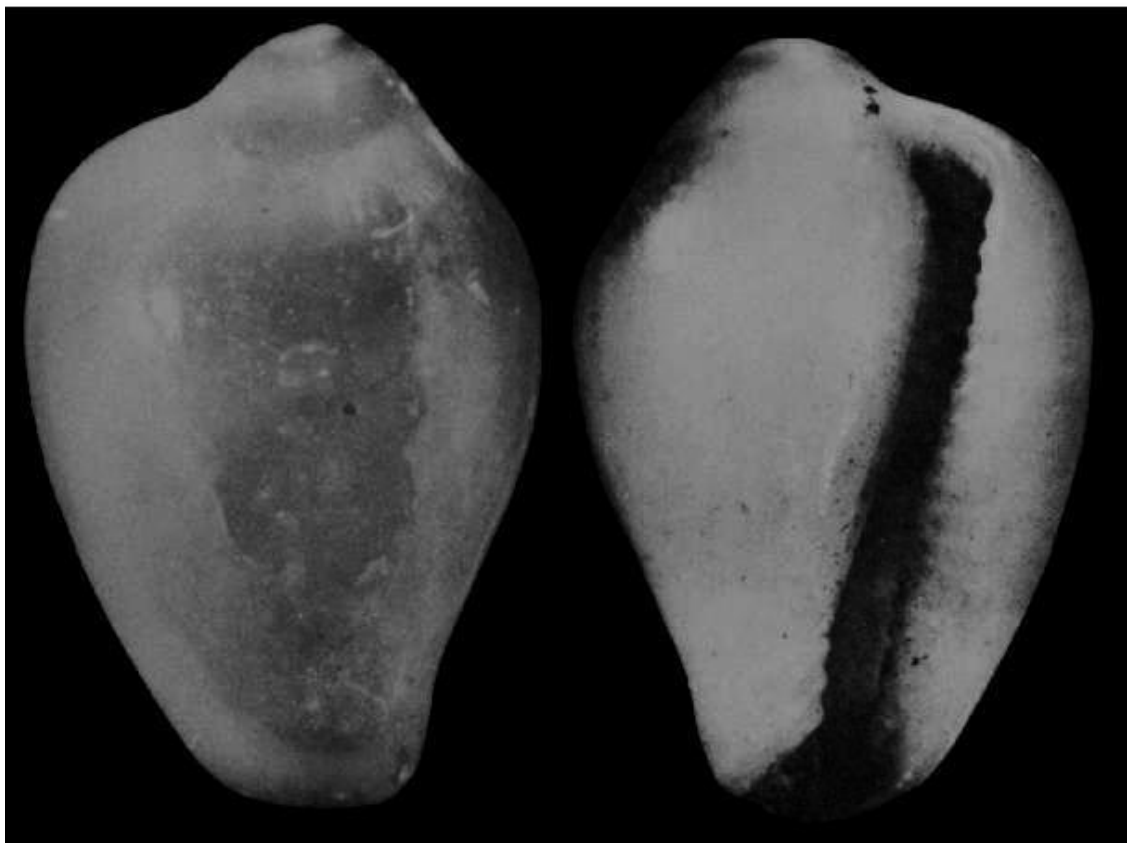


Fig. 3: *Sulcerato pellucida* (Reeve, 1865). NMHUK, No. 197411/1. "Drushi, Japan" (Cate, 1977: 347). Cate's lectotype of "*Sulcerato*" *callosa* (after Cate, 1977: text fig. 12).

Discussion: Cate (1977: 347) designated a lectotype (“BM(NH), Register No. 197411/1 [one of 3 syntypes, designated herein, ...]”) for ‘*Erato*’ *callosa*. A detailed research showed that Cate’s ‘syntypes’ are not part of the type lot of Adams & Reeve (pers. comm.. Andreia Salvador, NHMUK, October 2014). The holotype (NHMUK, No. 1874.12.11.184) of ‘*E.*’ *callosa* is indeed available. Therefore, Cate’s designation of the lectotype is invalid. Adams & Reeve (1850: 25) mentioned a blunt spire (“spire ... subobtusá”) but Cate’s lectotype has a pointed spire. Adams & Reeve also noted that the labrum is ‘conspicuously denticulated’ (“la bro conspicuè denticulate”) but Cate’s lectotype possesses a labrum with a fine dentition that is not at all striking. Cate’s lectotype does not correspond with the original description and was not meaningfully chosen.

The holotype of ‘*E.*’ *callosa* is a beach-collected, subfossil, eroded and bleached shell whose protoconch is absent. The absent protoconch gives the impression of a blunt spire. The shell outline, the shape of the labrum and especially the columellar and labral dentition remarkably resemble the lectotype of *Hespererato scabriuscula*. The resemblance is so astonishing that it became obvious that ‘*E.*’ *callosa* is identical to *H. scabriuscula*. It is mysterious how the western American species ended up in the Samarang collection but there is no known Eratoid from the Indo-Pacific with a similar columellar dentition.

***Hespererato rubra* n. sp.**
(Pl. II, Figs 1 to 3)

2008 *Sulcerato* cf. *olivaria* (Melvill, 1899) – Fehse in Poppe, *Eratoidae* ...: pl. 278, figs. 2a, 2b.

Locus typicus: Off Mactan Island, Cebu, Philippines; trawled at 200 m.

Type material:

Holotype: ZSM, coll. No. 20150468.

Paratype 1: Coll. of DFB, No. 11015.

Paratype 2: Coll. of DFB, No. 11376-1.

Etymology: From the Latin adjective, *rubrus*, meaning red.

Description: Shell minute, elongated pyriform, smooth, with a rounded, conical spire. Protoconch and subsequent whorls completely covered with thin callus. Suture indistinct. Junction with teleoconch fluent. Body whorl almost 90% of total height, rounded adapically, with the maximum diameter one third from the adapical suture, evenly tapered below and slightly constricted at the ventral margin. Dorsal elevation highest at posterior third. Dorsal sulcus absent. Whole shell surface covered with quite thin, sub-glossy callus. Aperture comprises about 80% of total height, almost straight and narrow. Labrum inflected, smooth, rounded, anteriorly declivous, posteriorly roundly edged, outer margin rounded, edged at inner and outer margin, with somewhat coarse, somewhat irregular denticles – 13 in number. Denticles extended as short, coarse, slightly indistinct folds onto labrum. Siphonal canal short, rounded and indented. Anal canal funnel-like widened. Columella almost straight, narrow without an inner carinal ridge. Parietal lip indistinct. Columellar denticles fine, somewhat indistinct, irregular – 14 in number. Ventral folds absent. Fossula absent, inner fossular margin indistinct. Terminal ridge fine.

Shell colour uniformly translucent reddish brown with white callosities.

Living animal and radula: No information is available on external morphology and radula.

Variations: Dead-collected specimens are opaque and often appear uniformly reddish brown. The anterior terminal is more or less elongated. The position of the dorsal summit varies from posterior third to almost mid-dorsum in shells with short anterior terminals.

Geographic range: The species is only known from the Philippines: off Mactan Island, Cebu at depths of 60 to 250 m.

Measurements:

Holotype: L = 4.2 mm, W = 2.7 mm, H = 2.1 mm, LT 13, CT 14 (ZSM, No. 20150468).

Paratype 1: L = 4.4 mm, W = 2.7 mm, H = 2.2 mm, LT 13, CT 14 (DFB, No. 11015).

Paratype 2: L = 4.4 mm, W = 2.8 mm, H = 2.2 mm, LT 14, CT 15 (DFB, No. 11376-1).

Paratype 3: L = 3.9 mm, W = 2.6 mm, H = 2.1 mm, LT 15, CT 13 (DFB, No. 11376-2).

Paratype 4: L = 4.2 mm, W = 2.8 mm, H = 2.2 mm, LT 13, CT 13 (DFB, No. 11376-3).

Paratype 5: L = 3.6 mm, W = 2.4 mm, H = 1.9 mm, LT 12, CT 14 (DFB, No. 5620-1).

Paratype 6: L = 4.5 mm, W = 2.8 mm, H = 2.2 mm, LT –, CT – (DFB, No. 5620-2), subadult. Paratype

7: L = 3.7 mm, W = 2.5 mm, H = 2.0 mm, LT 11, CT 13 (DFB, No. 5620-3).

Further paratypes in coll. DFB, No. 11376; 11559.

Discussion: The assignment to the genus *Hespererato* is especially based on the smooth anterior ventral portion with only a terminal ridge and without ventral folds, the irregular apertural dentition and the red-coloured shell.

The genus *Sulcerato* Finlay, 1930 (type species: *Erato illota* Tate, 1890) characterised by a smooth, non-pustulated shell, a multi-folded anterior ventral portion and the regular apertural dentition. The following species occur together with *Hespererato rubra* n. sp.: *Sulcerato pellucida* (Reeve, 1865), *Sulcerato stalagmia* C.N. Cate, 1977 and *Sulcerato tomlini* (F.A. Schilder, 1933). These species are immediately distinguishable by their white or light green shells besides the aforementioned features like the multi-folded anterior ventral portion.

Hespererato rubra differs from *H. scabriuscula* by the smaller and smooth shell without a dorsal sulcus, the less developed columellar denticles and the rounded spire. Both species are also separated by a great geographical distance.

This species is not related to *Eratopsis olivaria* (Melvill, 1899) as first supposed (Fehse *in* Poppe, 2008: pl. 278, figs. 2a, 2b). *Eratopsis olivaria* is a relic of the Miocene. Species belonging to this genus possess a ribbed ventrum. A larger number of specimens collected at Oman confirmed the existence of those folds and they are restricted to the NW Indian Ocean (from Oman to Pakistan).



Fig. 4: *Hespererato rubra* n. sp. Holotype, ZSM, No. 20150468. Off Mactan Island, Cebu, Philippines; trawled at 200 m.

Fig. 5: *Hespererato rubra* n. sp. Paratype 7, DFB, No. 5620-3. Off Hilton, Mactan Island, Cebu, Philippines; dredged at 130 m.



Fig. 6: *Hespererato rubra* n. sp. Paratype 6, DFB, No. 5620-3. Off Hilton, Mactan Island, Cebu, Philippines; dredged at 130 m.

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