

**REEFS OF PERNAMBUCO – BRAZIL – PART I
SCLERACTINIA COMMON IN THE REGION OF TAMANDARÉ (SOUTH
COAST OF THE STATE OF PERNAMBUCO)**

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RESUMO

O trabalho consiste de um estudo *in loco* e em laboratório sobre os escleractínios mais comuns da região de Tamandaré. São feitas referências sobre a morfologia esquelética das espécies, mostrando as diferenças em relação às citações anteriores. O material foi observado, fotografado *in loco*, e coletado em mergulho livre ou com a utilização do escafandro autônomo (SCUBA) ou mesmo a pé sobre recifes emersos. O material estudado encontra-se depositado no Departamento de Zoologia – CCB / UFPE.

Palavras - Chave: “Beachrocks”, morfologia, corais, sul de Pernambuco.

SUMMARY

This work consists of a study *in loco* and in laboratory of the most common Scleractinia in the region of Tamandaré. References are made to the skeletal morphology of the species, showing the differences between previous mentions of the species. The material was observed and photographed *in loco*, and collected in free dives, or with the use of the SCUBA or even walking over the emmersed beachrocks.

Keywords: Beachrocks, morphology, corals, south of Pernambuco.

ABSTRACT

The Scleractinia studied in the region of Tamandaré, presented some characteristics which differ somewhat from notes made so far about those studied in Brazil. These small differences are due to the environmental features of the region which at some places shows strong influence of fresh water, sedimentation, pollution (close to the beaches and river outlets) and places less affected by these factors, a bit farther from the shore and on the external pente. The work was done by free diving

and scuba diving *in loco* and laboratory study of the more common characteristics of the Tamandaré region. The material was observed and photographed *in loco*, and collected in free dives, or with the use of the SCUBA or even walking over the emmerged beachrocks.

Keywords: Beachrocks, Scleractinia, morphology, south of Pernambuco.

INTRODUCTION

The Northeastern reefs were first described by Darwin (1841). According to Coutinho *et al.* (1979); Darwin (1841) described them as being made of sandstone with pieces of shells. The first research on beach rocks of the coast of Brazil was done by Branner (1904). These beachrocks are made of deposits of consolidated calcium carbonate and there are various hypothesis about the formation of sandstone reefs or beachrocks, which are made in tropical and semi-tropical weather. Branner (1904) conceived some theories of the origin of calciferous cement, he considered as being precipitated through CO₂; carbon dioxide escapes when the wave reaches the beach. This may onset CaCO₃ as well as iron oxide which come in solution in form of bicarbonate and iron carbonate respectively. Another hypothesis was carbonate of continental origin, for the running water over calciferous surfaces would be eventually full of calcium; if these currents entered in the sea with any dilution, they would then deposit their calcium immediately at the entrance of the sea. Another hypothesis would be a physicochemical deposit of CaCO₃, caused by water evaporation and impregnated sand to low tides. There are many explanation to how this happens. According to Chaves (1996), the cementation of the beach rocks presents clearly two stages. First, the cement would be around the siliciclastic sediments as a micritical envelope and secondly an acicula fringe would occur and the pores filled with calcite cryptocrystalina. Many researches studied beach rocks and their origin, among them: Ottman (1960); Mabesoone (1964, 1991); Laborel (1965); Morais (1970); Assis (1990); Chaves (1996). Brazilian Scleractinia were first mentioned by Verrill (1902, 1902^a). However a more accurate study was done by a young frenchman who arrived in the city of Recife during the early 60s, through a French-Brazilian cooperation, to study macroalgae and later he changed his thesis project to study of Brazilian reefs, mainly scleractinians and hydrocorals. During his time here, he worked at the Instituto de Oceanografia nowadays called Departamento de Oceanografia. His Thesis of Doctorat D'Etat was published in 1969 under the title **“Les peuplements de Madreporaires de Cotes Tropicales du Brésil”**, which he dedicated to the fisherman (sailors-jangadeiros) of the northeast. Laborel made a summary, specially of scleractinians of the Northeast of Brazil, focusing where there was more access and supposing in various places where there was no opportunity to observe *in loco*. The working conditions were poor at that time, and to go to some of the places, such as Tamandaré, was really difficult, he had to go by donkey or by jeep, even camping in the old Fortress with his wife and small children (personal communication). Being part of the Calypso campaign, he could get samples of the more distant reefs and of the continental platform of the Northeast, even going to Abrolhos, and Atol das Rocas Islands, which he said that

the correct name should be Rocas Reefs, for there was no real lagoon, but a tide system not very deep, as he wrote in his paper in 1969. In Atol das Rocas he did not have the chance to dive, receiving samples from the fishermen and from the ship's own collections. With the collected material in this campaign, he published in 1969 **“Resultats scientifiques des Campagnes de la Calypso.”** The studies done by this researcher, were truly qualitative, describing the beach rocks which he had access to and the reefs, identifying above all the scleractinians and hydrocorals. After his stay in Brazil, he made a research of corals in Bermuda Islands. In the concerned publication, he made comments on the fauna of Brazilian corals, comparing the divisions of the species. This work was published before his thesis, in 1966, under the title **“ Contribution à l'études Madreporaires des Bermudes (Systématique et Répartition)”**.

In his work about the hypothesis and origin of the reefs in Africa, published in 1974, he still makes comments about Brazil, including the probable migration of Brazilian species to Africa. Certainly, Laborel may be considered the pioneer of the studies of Brazilian reefs, due to the general summary that he did of all the Northeastern area, verticalizing at many points. He always took seriously his work and professional ethics. Later Leão (1982) made a study on the reefs of Itaparica and Abrolhos Islands, which was the subject of her thesis. From Laborel's work up to now (about 30 years), many things have changed, especially in Pernambuco, due to embankment (sand filling), deforestation (causing the poor nutrition of the areas), explosions to open up for vessels, hotels, fishing, harbour, protection without taking into account the hydrodynamics of the places, causing severe sedimentation over the fauna and flora of the reefs. Erosion increases in the coastal area, hindering the reef residents.

PERNAMBUCO STATE

The State of Pernambuco has an area of 98.078km², and a coastal area of 187km², expanding from Carne de Vaca Beach in the county of Goiana in the North, to the Queimada Beach in the county of Barreiros in the South. The coast included the Northeast coast, according to Silveira (*apud* Azevedo, 1964), which extends from outlet of the Parnaíba river to the de Bay of Todos os Santos. Pernambuco coastal area is characterized by the presence (outcrop) of crystal foundation rocks, sediments of argillous sand of continental origin of the Formation Barreira and of Pleistocenian age. The shallow depth of the platform of the Northeast region, allows the supposing that the whole area is being re-established which may be less active than the outside platform. The inside terrigenous sands are submitted to a constant mobilization, which stops the biogenic colonization near the coast. And in areas of less movimentation, the carbon sedimentation progress towards the coast is observed, especially encrusted algae migrating over the terrigenous sands (Kempf, 1970; Summerhayes *et al.* 1975). The continental platform of Pernambuco is about 45 km in width, being considered one of the narrowest of the Brazilian coast. This allows a continental sedimentation up to the rim of the platform, where detritus sediments are found as well as carbon materials of biogenic origin (Lira, 1992). According to Lira (1987), in the littoral of Pernambuco, the tide currents and the

oblique wave impacts, rebounds in the coast heading the North. The transport between the beach string and the zone of breaking of waves, happens in shape similar to the teeth of a saw, and the sandy reefs that run parallel to the littoral, make sandy ropes which act as hallways to the waters that pass in the coastal zone. These ropes hinder the exit of the waters to the sea. In accordance with Coutinho *et al* (1979), one of aspects that most characterizes the Northeast Coast, is the presence of the lines of reefs parallel to the coast. The study of sandstone reefs is considered important, because it helps in the interpretation of the coastal dynamics. According to Chaves (1996), the lines of beach rocks that occur in Pernambuco coast, are related to the algae banks and carbonatic sediments common in Pernambuco platform. The continental platform of the State of Pernambuco is made of configurations of quartz sand, calcareous algae, biotritus, and mud. The configuration of quartz sand is here made of sand grains of medium to thin size, with quartz grains semicircled and shining (Lira, 1975).

Kempf (1967/1969, 1970) describes the configuration of calcareous algae, as composed mostly of Rhodophyta Corallinaceae. But were in certain areas where *Halimeda* is predominant, a variation of the bottom where calcareous algae happen. The configuration of mud is a reflex of the influence of the coastal rivers and of the morphological conditions of the bottom. The mud is transported in suspension and spread by the coastal currents. The continental platform of Pernambuco is a part of Brazilian platform, where the slope breaking is nearer the beach string. In the North of Recife, in Itamaracá Region is to the South, in Tamandaré, the carbon sediments are present at 2 to 5 meters depth, where calcareous algae fragments are predominant (Lira, 1987). The predominant winds along the Pernambuco Coast are the Southwest, with Northeast wind and East during some months of the year.

The coastal circulation is according to the wind patterns. Since the Southeast winds are more frequent and stronger, the long shore transport occurs from South to North. The factor which helps this route in a more effective way, is the angle that the Coastline of the Pernambuco littoral makes with the North direction (Lira, 1987). The sandstone reefs are not always of the same kind, for they seem to reflect the composition of the sediments of the beaches where they occur. The number of lines or ropes, vary, being usually during low tide, two or three expositions, being the first one is almost always emerged and near the beach and the others only partially emerged. Reefs which are nearer the beach are usually more friable, and some of these banks, are apparently being formed at present. In the continental platform, some underground reef lines were observed by seismic records, meanwhile, in the coastal, prairies covered by sandy deposits were found by probes (Coutinho *et al.* 1996). At the upper part of the reefs, the presence of sea erosion is very common, due to the biochemical action, called 'marmitas' (fig. 1.).

Some other characteristic features are urchins signs left on the rocks. Frequent is also the presence of fractures, whose predominant orientation is NW SE and NE SW. These fractures may be associated to neotectonic phenomena. In general, the reefs present grains of medium to coarse sizes, sometimes with elements of larger diameter at the top, and variation of the darker levels and richer levels in bioclastics. The siliclastic grains make 70 to 80% of rock material cemented by calcium carbonate. Sandstone reefs are regarded by many authors, as indicators that

sea level was higher than at present, during the Quaternary: this evidence is supported by the study of the sedimentary structure and the petrography of sandstone reefs.

The origin of the beachrocks is related to the fluctuation of the sea-level, more specifically to the last transgression (5, 100 years BP) and subsequent regression.



Photo: Valdir Manso

Fig. 1. Beachrocks with erosive structures "marmitas" and longitudinal and transversal fractures. Toco Grande beach – PE.

The lowering of the relative sea-level which followed the last transgression with the consequent lowering of the depth with the increase of the turbidity of the water were responsible for the existence of the great number of dead or underdeveloped corals found in the reefs. The surface of the reef presents several indications of the digging by echinoids, one of the natural agents of reef erosion. Incrustating coralline algae are also noted. Laborel (1965) associates the presence of two types of reefs (beachrocks and organics) to the existence of morphological facies of the coast. The present coast zone is twisted, with bays or coves with the presence of reefs. To the south of the Pernambuco's coastal plains, generally the bays are limited at their extremities by the occurrence of corals: while to the north, the coves are limited by blossoming of Barreiras Formation. The beach zone marked by the sandy ridges or restingas is sinuous and in the north it recedes, placing itself within the main string of beachrocks. While in the southern part, the beachline progrades and it even comes to cover the beach rock string almost reaching the reefs with corals, which are somewhat further. This situation is found in

several places such as at Suape, Rio Formoso and Tamandaré beach (Coutinho *et al.* 1996).

STUDIED AREA

The Tamandaré District is located at approximately 110km to the South of the city of Recife; 08° 41' 08" 47' S and 35° 05' 06" W.

In this region sandstone ridges occur with horizontal stratification very evident, over which corals and other corallineous organisms are developing. There is the occurrence of algalic banks related to the sandstone banks. The reefs found here as those in the rest of the Pernambuco coast. The beach line is marked by wavy sand lines and there are no spaces left uncovered as it occurs in the northern coast, it even covers the line of reefs with sand (Coutinho *et al.* 1996). The reef bodies closer to the coast present a distorted top which frequently exposed during the low tides, resulting the erosion of the higher parts of the reefs when they were exposed subaerially during the regression which succeeded the Last Transgression (Leão *et al.* 1985). The coastal region of Tamandaré is characterized by sandy beaches which evidence, mainly during the winter, a pronounced *Crista de Berma*, (Lira, 1987). The limit of this zone is determined for the appearance of crystalline rocks (granite). The humid beach is characterized by sediments of quartz with grain size varying from medium to coarse, indicating an accentuated gradient of underwater beaches, this being most evident at the Tamandaré bay, only in that district. This bay is located between the latitudes 08° 44' 23" and 08° 47' 41" S and the longitudes 35° 07' 29" and 35° 02' 28" W; it suffers great influence of the Rivers Mamocabinhas and Ilhetas, having a average depth of 07 to 08 meters. The sediment cover of the internal platform consists of quartz sands and carbonatic materials from reefs and calcareous algae. The climate is of the litoraneous type: hot and humid (Lira, 1987).

MATERIAL AND METHODS

The material was observed and photographed *in loco*, and collected in free dives, or with the use of the SCUBA or even walking over the emmersed beachrocks. The associated fauna and flora were noted and, when needed, collected. The measurements of the corallites were done with caliper rule and in stereo microscope with the aid of ocular micrometrics.

RESULTS

The scleractinian analyzed in the Tamandaré region, are subject to great turbidity for the greater part of the year, mainly those that are found nearer to the beach. The scleractinia analyzed belong to the suborders Fungiida Duncan, 1884 and Faviida Vaughan and Wells, 1948; three super families, Agariciidae Vaughan and Wells, 1894; Poritoidae Vaughan and Wells, 1894, and to six families: Agariciidae Gray, 1847, Siderastreidae Vaughan and Wells, 1943; Poritidae Gray, 1942; Faviida Gregory, 1900; Astrangiidae Verrill, 1869; Mussidae Ortmann, 1800 (Vaughan and Wells, 1948). Ten genera and twelve species.

***Madracis decactis* (Lyman) 1859**

This species was found in a globose and incrusting form. The corallites had up to 1.3mm in diameter, and septa varied between 8 to 10 in number, coming all the way to the columella.

***Agaricia agaricites* (Linnaeus) 1758**

The specimens used for the description showed reticulated colonies developing in crusts, and the corallites were arranged in parallel groups, (bifacials), such as those found in the caribbean Region, and separated by wide and tall mounds. The serrulate septa numbered from 30 to 33, and were green and brown.

***Siderastrea stellata* Verrill, 1868**

This species is considered a Brazilian endemic. The corallites reach up to 4mm in diameter, and sometimes up to 5 to 7mm, they are rounded and deep. In lower depths, the corallites have a greater diameter and the fifth cycle of septa is united to the four cycle, as already observed by Mayal *et al.* (1990). Coloration was orange, red and yellow.

***Porites astreoides* Lamarck, 1816**

The corallites have diameters between 10 and 14mm and septa in number of 12. The columella is porous, being in some specimens well developed. Specimens have been found with solid colonies (thick), less dense, irregulars, hemisphericals, incrustating, frequently presenting protuberances and almost always having a dense endofauna.

***Porites branneri* Rathbun, 1887**

The corallites present a diameter up to 1.5mm, the septa are porous, with the internal edge fused forming a central ring. This specie does not show any columella. Colonies were found incrusting and rounded massive, frequently with mamelonated polyps.

***Favia gravida* Verrill, 1868**

This species presents globose forms and rarely flattened. The variations in the greater or smaller meandrization of the corallites are common in this region. The number of septa per coralite varies both with size and meandrization. Over all the extension of the septum there are teeth. The columella is little visible and the mounds are high and separated. The wall is compact and in some specimens they are elevated allowing a total vision of them.

***Montastrea cavernosa* Linnaeus, 1886**

The coralite is tall, above the floor of the skeleton, reaching up to 8mm in diameter. They show three complete cycles of septa and one incomplete cycle of septum. The complete cycles of septa are completely adhered to a long porous and deep columella, which stretches in the space between the corallites, are serrulated

and numbered as many as 36. The teeth are small and triangular. The mounds are well defined with lateral walls which are thick and high.

Astrangia braziliensis Vaughan, 1906

The corallites measure up to 4.5mm in diameter and are elevated. They present three cycles of complete septa and one incomplete cycle with papiliform teeth. The columella is porous and the corallites are united by the base. The specimens were found attached to calcareous algae and to the sandstone.

Phyllangia americana Milne Edwards *et* Haine, 1857

This species shows deep corallites, which are from 6mm to 1cm in diameter. The three cycles of septa are longer than the walls of the corallites. The columella is residual. Some authors consider which one columella rudimentary.

Mussismilia harttii Verrill, 1868

This species shows large corallites which reach 6cm (or more) and are separated at the upper portion. They are generally dicotomized, having the corallites rounded or elongated. There are also colonies where the corallites are less separated, but these are never compact.

Mussismilia hispida (Verrill) 1902

In this species the corallites are wide. In some specimens the diameter of the corallites comes to 2,2cm. This species is extremely plastic.

Scolymia wellsii Laborel, 1967

A ciafilous species and solitary, having only one rounded coralite, sometimes elongated, reaching up to 12cm in diameter and 3cm in high (sometimes a little more).

It is common to find 'deformed' corallites. The columella is formed by teeth from the inner part of the septa, which come up in six cycles; three of which go all the way to the columella, in some specimens only two septa reach the columella. This species is frequently found in small holes, under parts of the reefs, always in shaded places, in the vertical walls it is common to find the green color. Laborel (1969/1970) describes with details the species, which differs in some samples in relation to the manner of interlacing of the septa.

DISCUSSION

The species *A. agaricites*, has the columella visible. There were also found some colonies where a coating was observed. This species is very plastic, (Maýal *et al.* 1990) and it showed characteristics of specimens of *A. agaricites* described from Guadalupe (Chassaing *et al.*, 1978), including *ssp crassa* Verrill and *purpurea* Lesson, mentioned by the authors. In reality, these forms are nothing more than ecomorphs of the species in question. Laborel (1969/1970) describes in details this species in various situations of lighting and mode, showing the variations in form and structure. There were found specimens aggregated, similar to what occurs to this species in Jamaica, (Goreau, 1979).

According to Leão (1986), in *S. stellata*, specimens orange colored would be of little depths and those of a yellow color would be from a greater depth. In Tamandaré even though there is a dominance of yellow and red specimens in less depths, including in small pools in the high-tide zone and sometimes even exposed, there was specimen found in a yellow color in the same depth, next to red and orange specimens. According to Leão (*op.cit*) the red color is typical of specimens from turbid waters; this was confirmed because colonies with this color were found in pools closer to the beach and in the reefs nearer to the mouth of rivers, where the quantity of materials in suspension is great.

Another characteristic would be the flattened forms that look like a disk, which is not common in the region under study, where very frequently one can find very rounded forms in turbid waters. The characteristics of *S. stellata* are similar to those of *S. radians* from the Caribbean region.

Laborel (1969) when studying the specie *P. astreoides*, divided it into two populations: **‘nous avons pu constater au Brésil l'existence de deux populations distinctes présentant des caractéristiques calicinales voisines, mais différant pour leurs formes de croissance. Le premier correspond à peu près à la description de *P. verrilli* et la seconde par une partie de ses caractères, à celle de *P. astreoides* var. *braziliensis* de Verrill (1901). Nous le noterons simplement populations A et B.’** The population A, where the samples would be in mass and strongly yellowed, was found in the Fernando de Noronha archipelago and Abrolhos archipelago as well as in some other places in the State of Pernambuco (Porto de Galinhas and Suape); and a population B, in which the samples would be less massive, was found in Tambaú, Paraíba State, Recife Air Force Base and Tamandaré, Pernambuco State, and also in Maceió, Alagoas State, where the waters are calm and turbid (Laborel, 1969). However, upon analysis, the material from Tamandaré yielded samples of the so called populations A and B, as described by Laborel (*op. cit.*). There were even detected the peculiarities of the corallites and their walls. Thus, what occurs is nothing more than the result of the plasticity of the species: upon a change of mode, turbidity, or depth morphological variations occur. Looking up the Table 1, it is possible to verify that the so called populations A and B as defined by Laborel also occur in Tamandaré.

Table 1. Comparison of the characteristics of population A and B, with those from the population from Tamandaré

POPULATION A	POPULATION B	TAMANDARÉ POPULATION
Abrolhos (BA), F. de Noronha, Suape, Porto de Galinhas (PE) (Laborel, 1969)	Tambaú (PB), Base Aérea do Recife, Tamandaré (PE)Maceió(AL) (Laborel, 1969)	This work
Massive colony with a bright yellow coloring.	Less massive colony(less density);color strong brown and sometimes yellow.	Denser colonies more or less dense; color brown, yellow or greenish.
Incrustating form over a vertical wall.	Massive forms with protuberancy, cilindrical, in its extremities cirripeds.	Massive forms with protuberance, having sometimes at its extremes cirripeds.Sometimes in the periphery a free leafy margin, incrustating forms over a vertical wall.
Large corallites, its diameter increases in calmer waters.	Large corallites, not of great depth, columella well developed.	Large corallites, having in moving waters a smaller diameters and in calm waters greater diameters. Columella well developed.
Little elevated walls	Septa and elements of the wall are finer and weaker.	Fine septa or otherwise. Walls with little elevation and at times with weak elements.

In the species *P. branneri*, Laborel (1969/1970), mentions colonies with mamelonated polyps; in Tamandaré this also happens. Leão (1986) mentions that this specie is characterized “ by the presence of five minuscule columns, making up a central ring which substitutes the columella.” These columns, in reality, are septa which together form this ring; this characteristic described both by Chassaing *et al.* (1978) and by Laborel (1969/1970). This is one of the characteristics which distinguishes this species from *P. astreoides*.

The specie *F. graviora* from Tamandaré does not follow the standards of 1,2 and 3 (Laborel, 1969), but the morphological variations observed are mixed in the various forms (A, B, C) mentioned by Laborel (1969), in what it refers to the meandrinization and to the development of the exoteca. It was observed in one colony, elongated, oval, and deformed corallites and in some colonies were found corallites extremely elevated, almost pedunculate, leaving the wall totally exposed, what is not common in this specie. For more details see Maýal *et al.* (1995).

Some of the colonies studied approximate the medium type which Laborel (1969) called B2' and of weak depth; however they present themselves with greater meandrinization than in the scheme presented by that author. Also, he mentioned elevated corallites, from the same colony. However, what was found in one and the same colony from Tamandaré, found in places where sedimentation occurs frequently, sometimes intensively, was a mixture of the different types given by that author. This specie shows affinities with Caribbean species.

The specie *M. cavernosa*, which occurs from the closer reefs to the most far off ones where they make good representative zones, present the coralite high, above the floor of the skeleton, which is a characteristic connected to the efficiency of the rejection of the sediments; which has a lot to do with the geometry of the corallites and the capacity of distention of the polyps.

According to Loya (1976), this characteristic is essential for the corals which live in waters with a constant aport of sediments. Colonies were found with irregular forms, sperical, laminar and incrustating. Laminar forms are very much characteristic also of the specie *M. cavernosa* of the Bermudas in shaded places (Laborel, 1966). Various specimens presented more than 1m of diameter and length. There were observed smaller rounded specimens, but, in general they are incrustating and well developed; not only at Tamandaré, but, all along the Coast of the State of Pernambuco, what does not occur with this species in Abrolhos, according to Leão, 1986. They show a coloration which is dark brown and is found starting at ½m depth or even less, at the low tide. This specie presents a grate plasticity, already studied by Maýal *et al.* (1986, 1990) and Amaral (1994). According to Laborel (1969) -“ **Il semble done que *M. cavernosa* soit plus tolérant aux eaux turbides que *M. annularis*, espèce adaptee aux eaux claires et à la luminosité plus faible de la pente externe d'oú elle élimine *M. cavernosa*.**” In fact, the specie *M. cavernosa* is found in places with much turbidity, in pools in the reefs, subject to the slime, due to the flocculation at the local river estuaries. At the sand reefs further out to sea, and at the banks of algae, this species presents itself more frequently in a spherical form, similar to the forms found at Abrolhos as described by Leão (1986); and sometimes form aggregates or are irregular, as much on the top of the reefs as in the internal and external combs, always having an exuberant growth.

The species *A. braziliensis* was found in waters much turbid and is similar to the species *A. solitaria* (Lesueur) found in this Antiles by Chassaing *et al.* (1978), and inclusive they have the characteristics of this species. By the descriptions from the above mentioned author, the specie *A. braziliensis* described by Vaughan and previously mentioned by Leão (1986), may be a synonymy of the specie *A. solitaria* of the Caribe. The specie *A. braziliensis* presents all the characteristics of the specie *A. solitaria*; the only difference being that according to the description of Lesueur (in: Chassaing *et al.* 1978), it is that the specie *A. solitaria* has a 6mm height above the coralite, and to the present time, the samples collected had up to 5mm height from the coralite. What does not seem sufficient to separate as a new specie. Laborel (1969) also affirms that this species is very close to the *A. solitaria*. **“L' espèce est très proche de *A. solitaria* de la région Caribe.”** It is possible that it be a synonymy of the Caribbean species, and it would be worth having a more

detailed work done with this specie and others which leave doubts. At the present time the specie *A. braziliensis* is considered brazilian endemic.

The species *P. americana* was found in both turbid and clear waters. It is mentioned as endemic for Brazil by Leão (1986), but, it has already been described from Guadalupe (French Antilles) by Chassaing *et al.* 1978).

The specie *M. harttii* is considered endemic for Brazil, but, Pratt (*n*: Laborel, 1969) indicates this species to the Bermudas. Laborel (1969), refers to that he made a mistake when he mentioned it and re-affirms that it is an endemic species for Brazil. However, he goes into no details neither does he point out Pratt is error. This species presents a notable plasticity, modifying its faciloide form due to the waves action and direction, with corallites more or less separated in accordance with the conditions of the environment.

The species *M. hispida*, is extremely plastic and there are doubts related to its so called types. Presently time, we leave the bulk of the discussion for the time this species would be better studied, what seems and it is expected that the doubts will be cleared. soon. According to Laborel (1969) this species presents a great number of ecomorphs.

The species *S. wellsi* is considered a Brazilian endemic. However, its characteristics remind us both *S. cubensis* and *S. lacera*, as Laborel (1969/1970) himself quotes: **“...une série complémentaire de *Scolymia* Caraïbes (récoltés à la Jamaïque par Goreau) montrant le passage entre *S. cubensis* et *S. lacera*, qui est la forme adulte. Les formes brésiliennes présentent des caractères proches de ceux des formes jeunes de l'espèce Caraïbe, sans toute fois jamais présenter ceux de la forme adulte.”** The species *S. lacera* and *S. cubensis* are cited for Guadalupe by Chassaing *et al.* (1978). The specimens here examined, show characteristics close to *S. lacera*, mainly in the strong septa and strong and thick teeths. However, the varieties of forms of the corallites, do not allow us to consider oval as a constant form. *S. wellsi* appears to be a species which presents a certain amount of phenotypical plasticity. However, this species still is considered a Brazilian endemic, whose type described by Laborel (1967) was first collected in Tamandaré, and later on at Porto de Galinhas and Abrolhos in the State of Bahia. Laborel (1969/1970) also remarks that *S. wellsi*, appears next to the species *Lithophyllia michelotti* (Michelin) of the Mediterranean miocen (Chevalier, 1961 *in*: Laborel 69/70). However, although *S. wellsi* seems to be a synonymous of the Caribbean species *S. lacera*, more detailed comparative studies of the both species should clear up if it they represent ecomorphs or not.

CONCLUSIONS

It is necessary to study in detail the species which are said to be endemic, which show characteristics little expressive to be separated into an species.

To be certain that some species are not ecomorphs of Caribbean species, it would be necessary to utilize not only the comparison of the cnida, but, enzymatic comparisons and DNA.

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