

An analysis of the sculptural pattern of the shell in Caribbean members of *Chicoreus* (*Siratus*) Jousseaume, 1880 (Gastropoda, Muricidae), with description of a new species

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ABSTRACT

The sculptural pattern of seven Caribbean species of *Chicoreus* (*Siratus*) [*C. (S.) formosus* (Sowerby, 1841), *C. (S.) cailletti* (Petit de la Saussaye, 1856), *C. (S.) ciboney* (Clench & Pérez Farfante, 1945), *C. (S.) articulatus* (Reeve, 1845), *C. (S.) consueta* (Verrill, 1950), *C. (S.) perelegans* Vokes, 1965 and *C. (S.) guionneti* n. sp.] is analysed, with special reference to the spiral characters and their topological correspondence. The primary cords IP, P1-P6, adp and mp, consistent in their place and their frequency, constitute the main architecture of the spiral sculpture, which is crossed by protovarices (continuous growth), then by varices and intervarical ribs (episodic growth). The intersection points between the axial and spiral sculptures (spines and nodules) show a canalized variability, the P1, P3, P5 and mp spines regularly being more developed than P2, P4, and adp spines, and the P1 and P2 nodules being broader than the other ones. The relief of cords (primary and secondary) and the nodules, the development of the spines and the number of the intervarical ribs may vary following different ontogenetic trajectories generating peculiar character associations, useful for the specific identifications. The character association distinguishing the new described species *C. (S.) guionneti* n. sp., from french West Indies, is: fine and narrow primary and secondary cords, ABP and EABP absent, low and well-individualized nodules, broader on P1, irregular browner zones between P1-P2, P4-P5, and P6-s6, low intervarical ribs, varices without basal foliation and lecithotrophic protoconch.

KEY WORDS

Mollusca,
Gastropoda,
Muricidae,
Chicoreus (*Siratus*),
Caribbean,
architectural pattern,
spiral sculpture,
homology,
new species.

RÉSUMÉ

Une analyse du plan architectural de la sculpture des Chicoreus (Siratus) Jousseaume, 1880 (Gastropoda, Muricidae) des Caraïbes, avec description d'une espèce nouvelle.

Le plan architectural de la sculpture de sept espèces de *Chicoreus (Siratus)* des Caraïbes [*C. (S.) formosus* (Sowerby, 1841), *C. (S.) cailleti* (Petit de la Saussaye, 1856), *C. (S.) ciboney* (Clench & Pérez Farfante, 1945), *C. (S.) articulatus* (Reeve, 1845), *C. (S.) consuela* (Verrill, 1950), *C. (S.) perelegans* Vokes, 1965 et *C. (S.) guionneti* n. sp.] est analysé en portant attention aux caractères spiraux, dont la correspondance topologique est donnée. Les cordons primaires IP, P1-P6, adp et mp, stables dans leur disposition et leur fréquence, forment l'architecture principale d'une sculpture spirale croisée par des protovarices (croissance continue), puis par des côtes majeures et mineures (croissance épisodique). Les points de croisement entre les constructions axiale et spirale (épines et nodosités) présentent une variabilité contrôlée, les épines prolongeant P1, P3, P5 et MP dominant régulièrement celles prolongeant P2, P4, P6 et adp, et les nodosités occupant les positions P1 et P2 étant les plus saillantes. Le relief des cordons (primaires et secondaires) et des nodosités, le développement des épines et le nombre de côtes mineures peuvent varier en fonction de trajectoires ontogénétiques indépendantes formant des associations particulières de caractères, utiles à la détermination des espèces. *C. (S.) guionneti* n. sp., qui provient des Antilles françaises, associe les caractères différentiels suivants : cordons primaires et secondaires fins, étroits, ABP et EABP absents, nodosités basses, bien individualisées, plus saillantes sur P1, coloration brune irrégulière entre P1-P2, P4-P5, P6-s6, côtes mineures basses, côtes majeures sans foliation basale et protoconque lécithotrophe.

MOTS CLÉS

Mollusca,
Gastropoda,
Muricidae,
Chicoreus (Siratus),
Caraïbes,
plan architectural,
sculpture spirale,
homologie,
nouvelle espèce.

INTRODUCTION

The descriptive method of the spiral characters of shells is based on the ontogenetic (order of appearance) and the topological correspondences (Rieppel 1988). It allows postulation of primary homologies (*sensu* Pinna 1991) codified in a nomenclature according to Merle (1999), Houart (2000) and Merle & Pacaud (in press). It gives a precise presentation of the characters, useful for comparisons. Regarding the topological place and the construction of the spiral characters in the *Siratus* species, it is obvious that the spines and the nodules are only the varical expression of their respective cords. Consequently, the same nomenclature is used for spiral cords, spines and nodules.

In 1996, three specimens (two adults and one

juvenile) of an unknown species of *Chicoreus (Siratus)* were collected by Pierre Guionnet, 20 kilometers off Trinité, Martinique Island, at a depth of 250 meters with special traps. One of these specimens was previously illustrated as *C. (Siratus)* sp. (Garrigues & Pointier 1997). In 1998, other specimens identical to the Martinique material were collected by Yves Lévy off southern Marie Galante Island in the Guadeloupe Archipelago. This paper presents the description of *C. (Siratus) guionneti* n. sp., which is compared to seven Caribbean species (Table 1): *C. (S.) formosus* (Sowerby, 1841), *C. (S.) cailleti* (Petit de la Saussaye, 1856), *C. (S.) ciboney* (Clench & Pérez Farfante, 1945), *C. (S.) articulatus* (Reeve, 1845), *C. (S.) consuela* (Verrill, 1950), *C. (S.) perelegans* Vokes, 1965 and *C. (S.) hennequini* (Houart, 2000).

TABLE 1. — Material of *Chicoreus (Siratus)* examined, localities and bibliographical basis of the study.

Species	Number of specimens	Localities	References
<i>C. (S.) guionneti</i>	Holotype (MNHN) Paratype (MNHN) 3 (Garrigues & Lamy coll.) 3 (Garrigues & Lamy coll.)	Marie Galante, 200 m. Martinique, 250 m. Marie Galante, 200 m. Martinique, 250 m.	Garrigues & Pointier (1997).
<i>C. (S.) formosus</i>	2 (Garrigues coll.)	Haiti.	Fair (1976), Radwin & Attilio (1976), Rios (1985), Vokes (1990).
<i>C. (S.) articulatus</i>	2 (Garrigues coll.)	Puerto Cortes (Honduras), 100 m; Porto Rico, 120 m.	Fair (1976), Radwin & Attilio (1976), Vokes (1990), Houart (1999).
<i>C. (S.) ciboney</i>	4 (Lamy coll.)	Guadeloupe, 150 m & 250 m; Saba Bank.	Fair (1976), Radwin & Attilio (1976), Fair (1976), Radwin & Attilio (1976).
<i>C. (S.) cailleti</i>	8 (Lamy coll.)	Guadeloupe, 150 m; Saba Bank, 150 m; Saintes.	Fair (1976), Radwin & Attilio (1976), Houart (1999).
<i>C. (S.) consueta</i>	2 (Lamy coll.)	Guadeloupe, 200 m.	Fair (1976), Radwin & Attilio (1976), Rios (1985), Vokes (1990), Houart (1991).
<i>C. (S.) perelegans</i>	4 (Lamy coll.)	Guadeloupe, 100 m.	Fair (1976), Radwin & Attilio (1976).
<i>C. (S.) hennequini</i>	1 (Houart coll.)	Roatan (Honduras), 200 m.	Houart (2000).

ABBREVIATIONS

Text conventions used to describe the spiral sculpture and the internal denticles of the outer lip:

- P primary cord (cord appearing in first order);
 IP infrasutural primary cord;
 P1 shoulder cord;
 P2 to P6 primary cords of the convex part of the teleoconch whorl;
 ADP adapical siphonal primary cord;
 MP median siphonal primary cord;
 ABP abapical siphonal primary cord;
 EABP extreme abapical siphonal primary cord;
 s secondary cord (cord appearing in second order);
 adis adapical infrasutural secondary cord;
 abis abapical infrasutural secondary cord;
 s1 to s6 secondary cords of the convex part of the teleoconch whorl;
 ads adapical siphonal secondary cord;
 ms median siphonal secondary cord;
 abs abapical siphonal secondary cord;
 t tertiary cord (cord appearing in third order);
 ID infrasutural denticle;
 D1 to D6 abapical denticles.

Shell measurements:

- D diameter (excluding spines);
 LP1 length of p1;
 LD transformed data (LP1/D)*10;
 TNV total number of varices (including intervarical ribs);
 NIR number of intervarical ribs;
 MNHN Muséum national d'Histoire naturelle, Paris.

SCULPTURAL PATTERN
OF THE STUDIED SPECIES

The species studied exhibit some shell variability, which is largely the result of the variation in the expression of varices, intervarical ribs, cords, spines and intervarical nodules. The two latter characters are the result of the intersection between the axial and the spiral sculpture. Before the description of *S. guionneti* n. sp., the limits of this variation will be given in order to better understand the "Bauplan" of the *Siratus* sculpture. The axial sculpture is organised in two ontogenetic steps, the first corresponding to the presence of similar varices (or protovarices), and the second corresponding to the appearance of major varices (or megastriae *sensu* Bucher 1997), distinct from the minor varices, commonly known as intervarical ribs (or intervarical nodes). The second step occurs between the 2.5 or the third teleoconch whorl, and indicates the beginning of episodic growth (Spight & Lyons 1974; Lindsley & Javidpour 1980). The major varices in *Siratus* may be ornamented by spines and appear invariably three times per whorl on the last whorls. The average spacing of the varices is 100-110°.

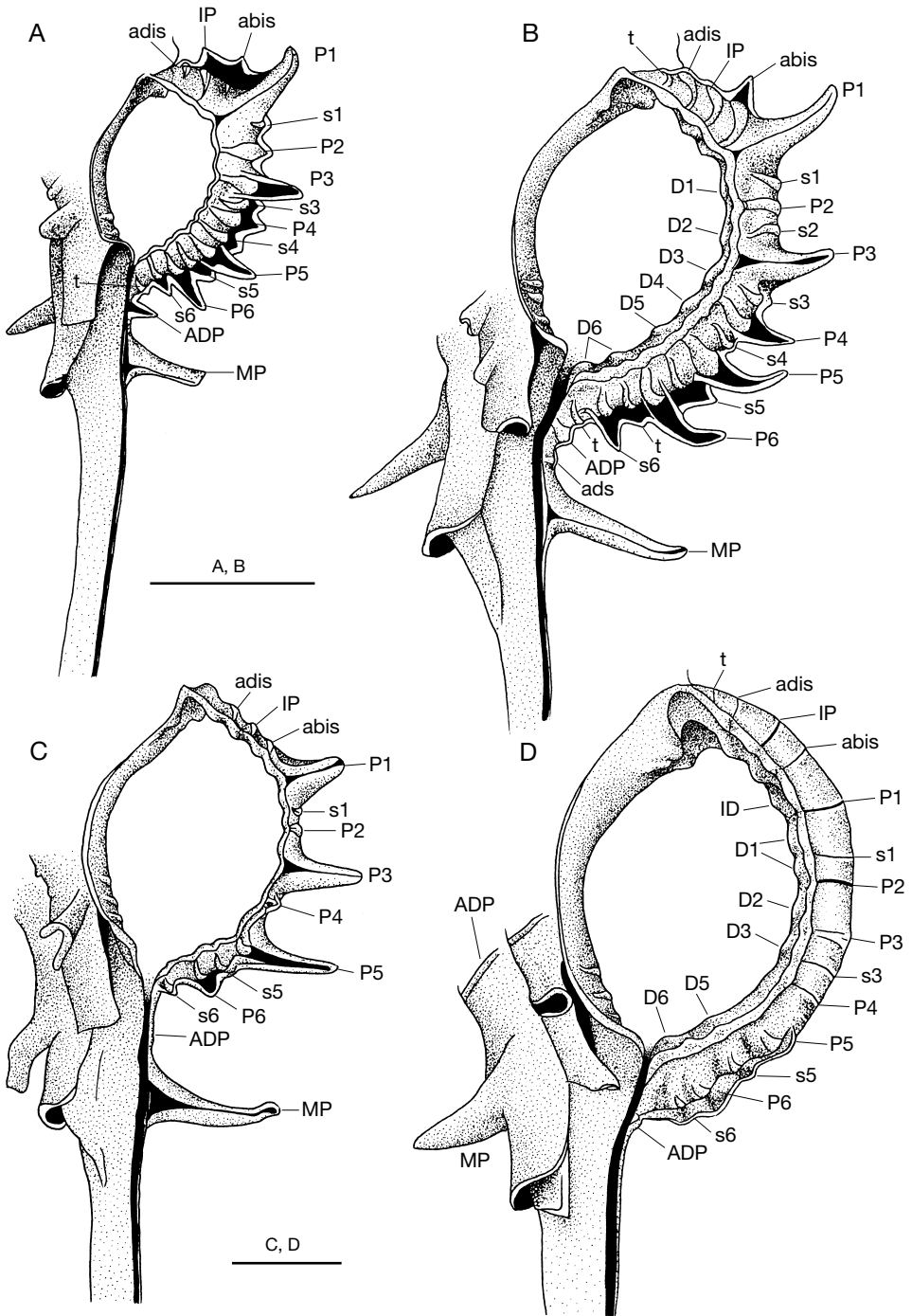


FIG. 1. — Spiral sculpture (apertural view), *Chicoreus (Siratus) caillieti* (Petit de la Saussaye, 1856); **A**, Port-Louis (coll. Lamy), four whorls; **B**, Saba bank (coll. Lamy), five whorls; **C**, Saintes (coll. Lamy), six whorls; **D**, Saintes (coll. Lamy), seven whorls. The siphonal canal is not completely drawn. Abbreviations: see text. Scale bars: 5 mm.

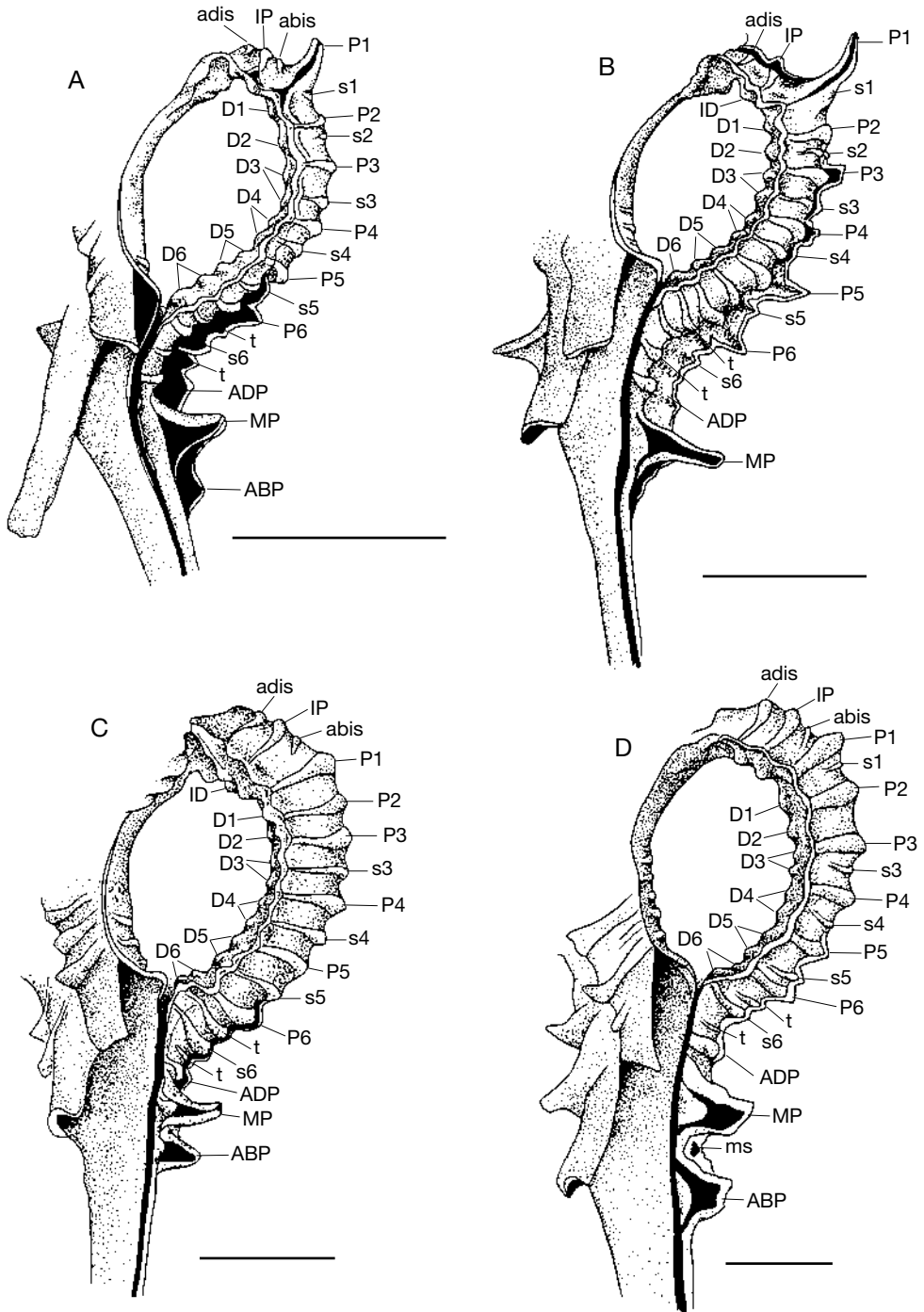


FIG. 2. — Spiral sculpture (apertural view); **A-C**, *Chicoreus (Siratus) perelegans* Vokes, 1965; **A**, Port-Louis (coll. Lamy), four whorls; **B**, Port-Louis (coll. Lamy), five whorls; **C**, Port-Louis (coll. Lamy), six whorls; **D**, *S. consuela* (Verrill, 1950), Port-Louis (coll. Lamy), six whorls. The siphonal canal is not completely drawn. Abbreviations: see text. Scale bars: 5 mm.

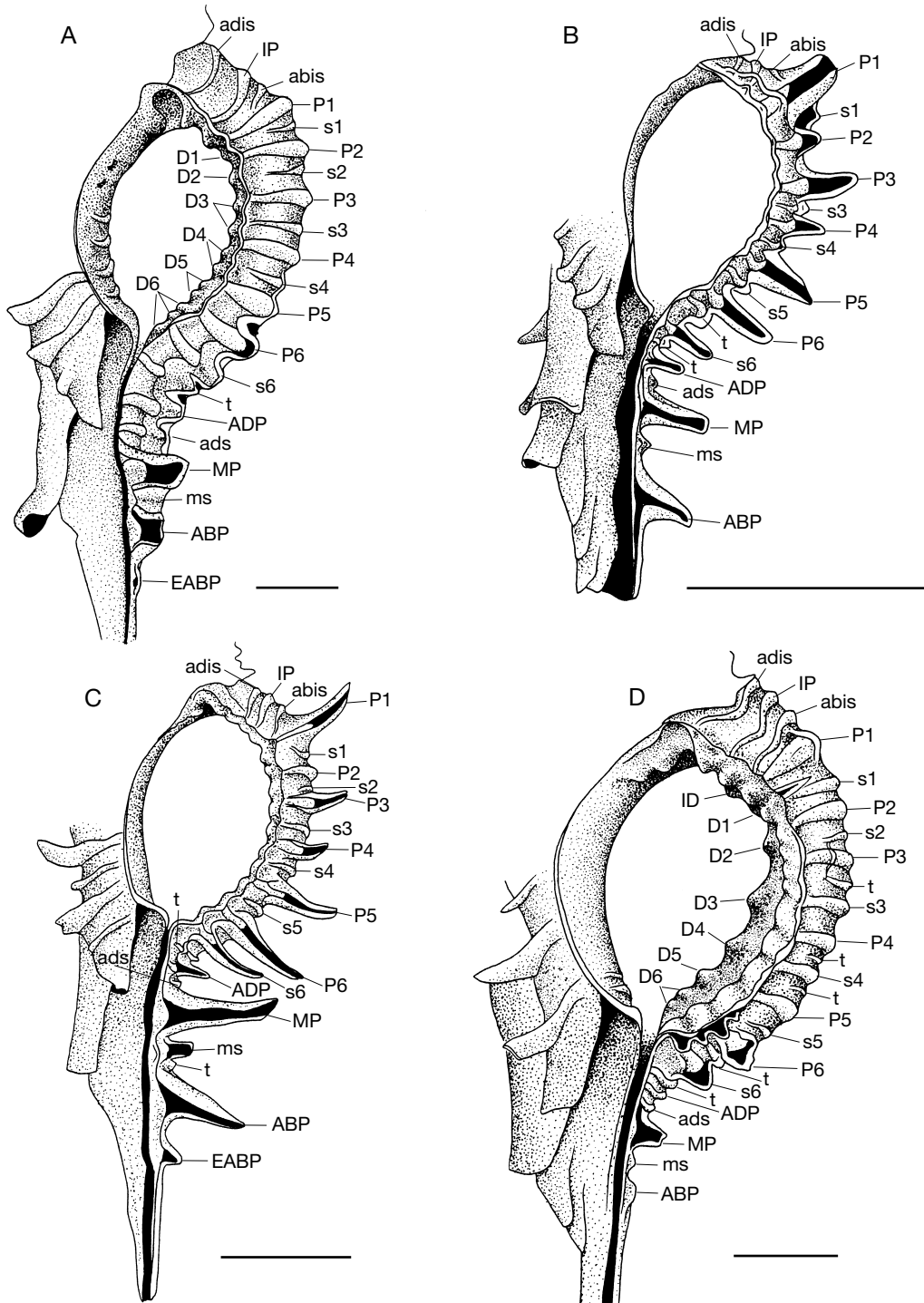


FIG. 3. — Spiral sculpture (apertural view); **A**, *Chicoreus (Siratus) consueta* (Verrill, 1950), Port-Louis (coll. Lamy), seven whorls; **B-D**, *S. (S.) ciboney* (Clench & Pérez Farfante, 1945); **B**, Port-Louis (coll. Lamy), four whorls; **C**, Port-Louis (coll. Lamy), five whorls; **D**, Port-Louis (coll. Lamy), seven whorls. For **A** and **D**, the siphonal canal is not completely drawn. Abbreviations: see text. Scale bars: 5 mm.

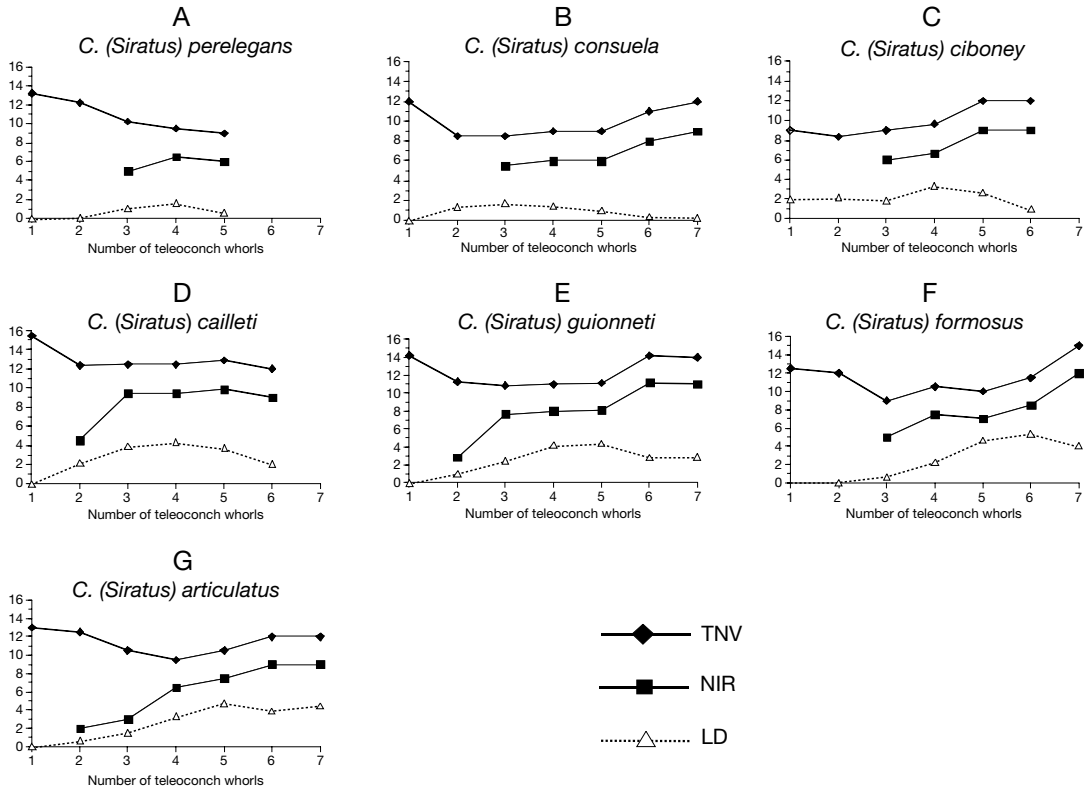


FIG. 4. — Evolution of the tnv (total number of varices including protovarices and intervarical ribs), the NIR (number of intervarical ribs) and the LD [(LP1/D)*10], during the ontogenesis of the seven *Chicoreus (Siratus)* species. For each species, the mean is used.

Intervarical ribs vary from two to nine between each major varix. They are never ornamented by spines, but have more or less developed intervarical nodules.

The spiral sculpture is characterized by the regular and consistent position of the following primary cords: on the sutural ramp (IP), on the convex part of the teleoconch whorl (P1, P2, P3, P4, P5, P6), and on the siphonal canal (ADP, MP). In this sculptural “Bauplan”, three types of variation have been observed: 1) the relief of the primary cords, which can change during the ontogeny, such as in *C. (S.) cailleti* (Fig. 1) i.e. progressive loss of the relief; 2) the appearance of extreme abapical primary cords ABP, and EABP, which are present for example in adults of *C. (S.) consueta* (Figs 2D; 3A), but absent in adults of *C. (S.) cailleti*; and 3) the relief of the secondary cords, which is more pronounced in *C. (S.) perel-*

egans (Fig. 2A-C) and in *C. (S.) ciboney* (Fig. 3B-D) than in the other species.

A large variation in the length of the cord spines has already been reported [see *C. (S.) articulatus* in Vokes 1990, pl. 8, figs 9; 10 and Houart 1999: figs 8-10]. The length of the P1 spine (LP1) may be observed during the whole ontogeny and was studied for each species in order to understand how this spine changes with growth. Two main growth processes have been detected (Fig. 4). The first one may be illustrated by *C. (S.) perelegans* (Fig. 4A). The growth of the P1 spine is more rapid than the growth of the shell diameter (excluding spines) until the fourth whorl, but after this step the growth of the P1 spine decreases and the end of the ontogenesis is marked by the loss of this spine. Similar growth patterns have been observed in *C. (S.) ciboney*, *C. (S.) consueta* and *C. (S.) cailleti* (Fig. 4B-D). In

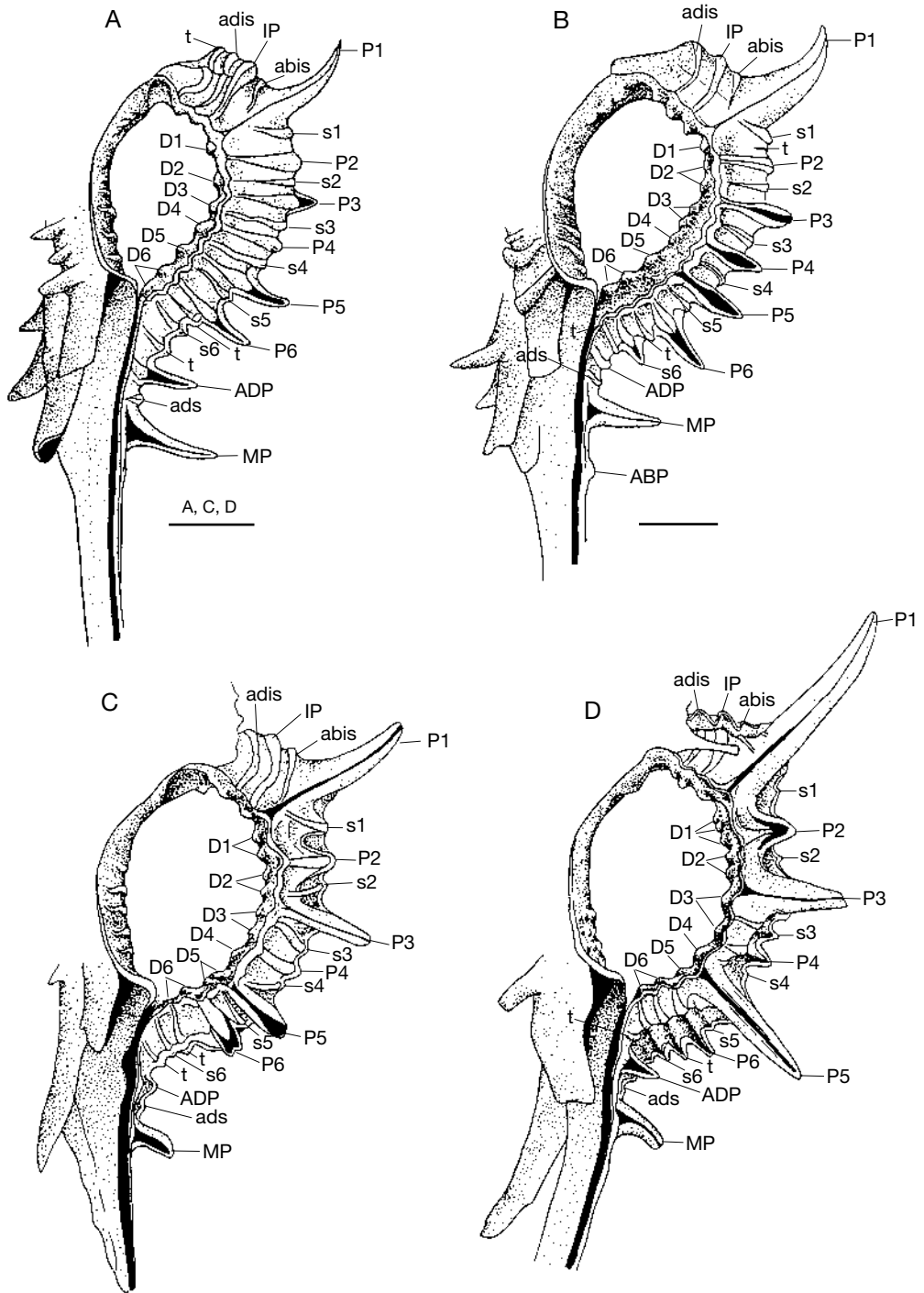


FIG. 5. — Spiral sculpture (apertural view); **A, B**, *Chicoreus (Siratus) articulatus* (Reeve, 1845); **A**, Puerto Cortes (coll. Garrigues), six whorls; **B**, Porto Rico (coll. Garrigues), seven whorls; **C, D**, *C. (S.) formosus* (Sowerby, 1841); **C**, Haiti (coll. Garrigues), 6.5 whorls; **D**, Haiti (coll. Garrigues), seven whorls. For **A, B, D**, the siphonal canal is not completely drawn. Abbreviations: see text. Scale bars: 5 mm.

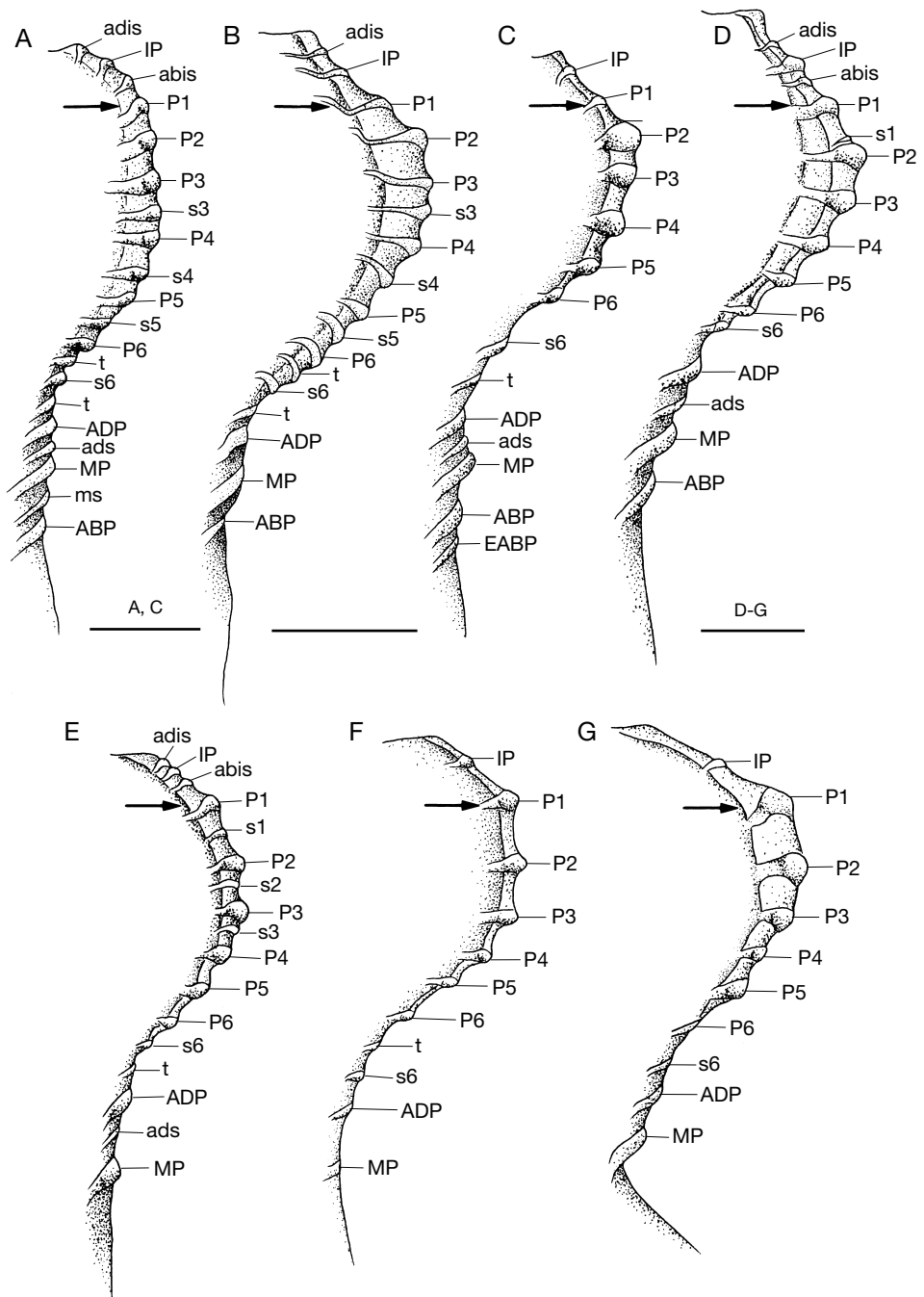


FIG. 6. — Profile views of the intervarical nodules; **A**, *Chicoreus* (*Siratus*) *ciboney* (Clench & Pérez Farfante, 1945), Port-Louis (coll. Lamy), seven whorls; **B**, *C.* (*S.*) *perelegans* Vokes, 1965, Port-Louis (coll. Lamy), six whorls; **C**, *C.* (*S.*) *consuela* (Verrill, 1950), Port-Louis (coll. Lamy), seven whorls; **D**, *C.* (*S.*) *articulatus* (Reeves, 1845), Porto Rico (coll. Garrigues), seven whorls; **E**, *C.* (*S.*) *formosus* (Sowerby, 1841), Haiti (coll. Garrigues); **F**, *C.* (*S.*) *guionneti* n. sp., Martinique (paratype, MNHN); **G**, *C.* (*S.*) *cailleti* (Petit de la Saussaye, 1856), Saintes (coll. Lamy), seven whorls. Abbreviations: see text. Scale bars: 5 mm.

contrast, in *C. (S.) articulatus* (spiny morphotype), *C. (S.) guionneti* n. sp. and in *C. (S.) formosus*, the growth of the P1 spine is more rapid than the growth of the shell diameter until the fifth or sixth whorl (Fig. 4E-G) and consequently generates a developed P1 spine. If spines are variable in their absolute size, their relative size along a varix follows the same pattern in all species. Spines P1, P3 and P5 are the major spines on the convex part of the whorl, while P2, P4 and P6 are the minor ones. Moreover, spines P2 and P4 are clearly reduced in comparison of the others (Figs 1-5). The spine MP on the siphonal canal is always longer than the adapical spine ADP or the abapical spine ABP. Spines of secondary cords are generally poorly developed, except in s5 and s6. Intervarical nodules, formed by the swelling of spiral cord across the nodes (= axial ribs), occur mainly on primary cords of the sutural ramp (IP) and the convex part of the teleoconch whorl (P1-P6). They are rarer on secondary cords and are absent on all cords of the siphonal canal. The relief of nodules is more pronounced on P1, P2 and P3, than on the other primary cords (IP, P4, P5, P6), and a variation occurs on these three cords (Fig. 6). This variation can be illustrated by the comparison between *C. (S.) cailleti* (Fig. 6G) and *C. (S.) consueta* (Fig. 6C). In *C. (S.) cailleti*, the highest nodule is on P1, while in *C. (S.) consueta* the highest nodule is on P2. It is also important to note that for the same topological place the relief of nodules and spines is not strictly correlated. It is demonstrated in *C. (S.) articulatus*, by the nodule of P2 (Fig. 6D), which has a high relief while the P2 spine is clearly reduced (Fig. 5A, B), and by the nodule of P1 which has a low relief while the P1 spine is well-developed.

SYSTEMATICS

Family MURICIDAE Rafinesque, 1815
Subfamily MURICINAE Rafinesque, 1815

Genus *Chicoreus* Montfort, 1810

TYPE SPECIES. — *Murex ramosus* Linnaeus, 1758 by original designation.

Subgenus *Siratus* Jousseaume, 1880

TYPE SPECIES. — *Purpura sirat* "Adanson, 1757" Jousseaume, 1880 by original designation (= *Murex senegalensis* Gmelin, 1791).

Chicoreus (Siratus) guionneti n. sp. (Figs 4E; 6F; 7A, B; 8B; 9A, B)

Chicoreus (Siratus) sp. — Garrigues & Pointier 1997: 18, figs 11; 12.

TYPE MATERIAL. — Holotype, Marie Galante Island, Guadeloupe Archipelago, length 56.7 mm (MNHN) Fig. 9A. Paratype, Martinique Island, length 37.8 mm (MNHN) Fig. 9B.

TYPE LOCALITY. — Off southern Marie Galante Island, 200 m.

ETYMOLOGY. — Named in honour to Pierre Guionnet.

OTHER MATERIAL EXAMINED. — Marie Galante Island. Three spm, coll. Garrigues & Lamy.

Martique Island. Three spm, coll. Garrigues & Lamy.

OTHER LOCALITY. — 20 kilometers off Trinité, Martinique Island, 250 m.

DESCRIPTION

Paucispiral protoconch, diameter of 1.35 mm. Teleoconch globose, up to 56.7 mm in length, up to 25 mm in width excluding cord spines, and up to 30 mm in width including cord spines. Spire moderately high up to 6.5 subcarinate whorls. Last whorl (sixth whorl) up to 83% of total length of the teleoconch. Apical angle of 65°. Spiral sculpture with narrow primary cords. First and second whorl: presence of primary cords ip, P1, P2 and P3. Third whorl: appearance of the secondary cords adis on the sutural ramp and s1. Fourth whorl: appearance of the secondary cord s1. Fifth whorl: appearance of the secondary cords s2 and abis. Sixth and last whorl showing the primary cords IP (sutural ramp), P1 to P6 (convex part of the whorl), and ADP and MP (siphonal canal); fine secondary cords (s1-s6); s1-s4, finer than s5 and s6; tertiary cords present between P5 and s5, s5 and P6, P6 and s6, s6 and ADP. Axial sculpture with 13 protovarices on first whorl. On second whorl, appearance of three major varices and eight intervarical ribs (two or three between each major varix). On third whorl, seven intervar-

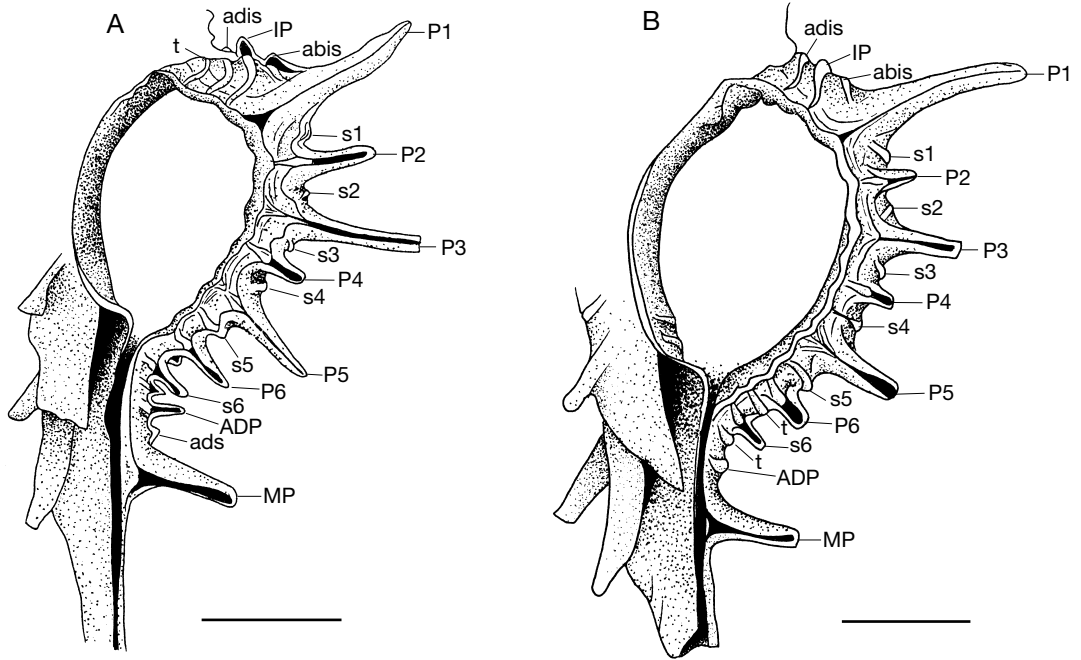


FIG. 7. — Spiral sculpture (apertural view), *Chicoreus (Siratus) guionneti* n. sp.; **A**, Martinique (coll. Garrigues), five whorls; **B**, Guadeloupe (coll. Lamy), six whorls. For **A**, the siphonal canal is not completely drawn. Abbreviations: see text. Scale bars: 5 mm.

ical ribs (two or three between each major varix). On the fourth, six intervarical ribs (two between each major varix). On the fifth whorls, seven intervarical ribs (two or three between each major varix). On sixth whorls nine intervarical ribs (three between each major varix). Major varices with moderately long and narrow spines. Spines P1, P3 and P5 longer than spines P2, P4 (both reduced) and P6. MP spine longer than adp spine. Spines of secondary cords not developed except s5 and s6. Intervarical nodules with low relief, but slightly higher on P1 than in other topological places. Aperture rounded, large and up to 40% of the diameter and up to 85% (including the siphonal canal) of length of the body whorl. Columellar lip with six weak, low knobs abapically. Rim partially erect, adherent adapically. Anal notch narrow, moderately deep. Parietal callus poorly developed. Inner denticles of the outer lip weak. ID more pronounced than the other inner denticles (D1-D6). Denticles at the edge of the outer lip (= crenulations) weak on convex part of

the whorl and more marked on the shoulder particularly between the notch and adis, abis and IP, and IP and P1. Siphonal canal up to 64% of the aperture length and slightly recurved. Shell creamy to rosy-brown with brown lines on primary cords and interrupted by the intervarical nodules. Irregular browner zones between P1 and P2, P4 and P5, and P6 and s6. Animal, radula and operculum unknown.

INTRASPECIFIC COMPARISONS

The protoconch diameter varies from 1.29 mm (paratype) to 1.35 mm (holotype). On the teleoconch, the spiral sculpture of the other examined specimens shows a consistent pattern consisting in narrow primary cords (IP, P1-P6, ADP, MP), and in fine secondary cords, more developed between P4 and P5, P5 and P6 and between P6 and ADP. The intervarical nodules also are always small, well-individualized and higher on p1 than on the other topological places; they are not present on the intersection points of the secondary cords. In all

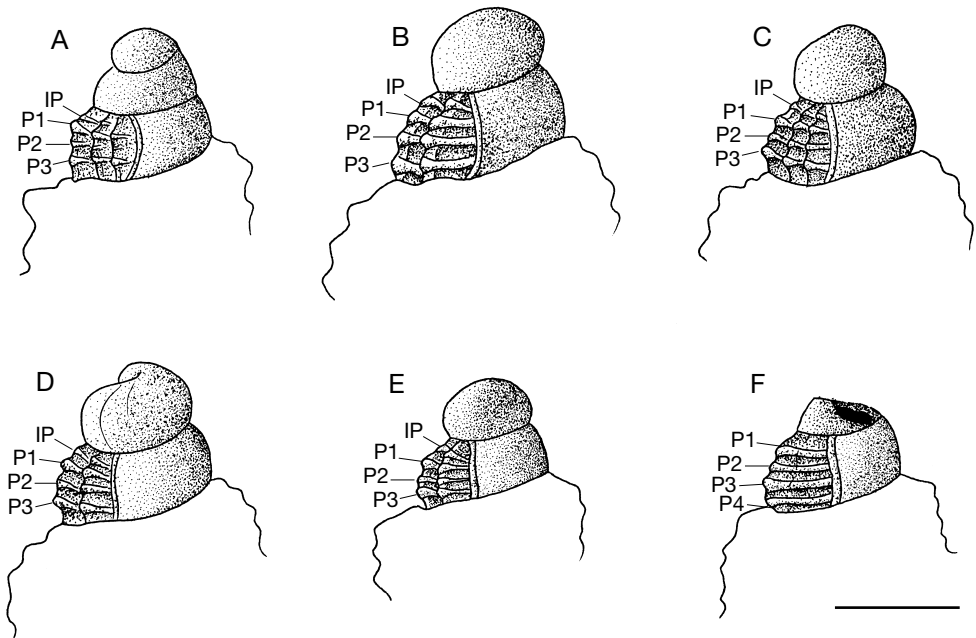


FIG. 8. — Protoconchs and first teleoconch whorl; **A**, *Chicoreus (Siratus) ciboney* (Clench & Pérez Farfante, 1945), Port-Louis; **B**, *C. (S.) guionneti* n. sp., Martinique; **C**, *C. (S.) cailletti* (Petit de la Saussaye, 1856), Saba bank; **D**, *C. (S.) perelegans* Vokes, 1965, Port-Louis; **E**, *C. (S.) articulatus* (Reeves, 1845), Puerto Cortes; **F**, *C. (S.) consuela* (Verrill, 1950), Port-Louis. Abbreviations: see text. Scale bar: 1 mm.

studied specimens, the P1, P3, P5 and MP spines are more developed than the P2, P4, P6 and ADP spines. The variation of the number of protovarices is: 13 to 16 on first whorl, and 10 to 13 on second whorl. The appearance of major varices and intervarical ribs is observed between the second and third whorl. The variation of the number of intervarical ribs is: six to nine on the third whorl, six to 12 on the fourth and fifth whorls, and 12 to 19 on the sixth whorl. In the aperture, the columellar lip can possess from two to six weak knobs.

COMPARISONS WITH OTHER SPECIES

Chicoreus (Siratus) consuela (Verrill, 1950) (Figs 2D; 3A; 4B; 6C; 8F; 9G)

DESCRIPTION

The teleoconch of *C. (S.) consuela* (Figs 2D; 3A; 9G) differs from that of *C. (S.) guionneti* in the thicker primary cords, in the presence of ABP and EABP, the well-developed intervarical nodules,

particularly on P2 and P3, the shorter or absent spines and only two or three intervarical ribs. Inner denticles of the outer lip are also more developed in *C. (S.) consuela* than in *C. (S.) guionneti* n. sp. *C. (S.) consuela* occurs from the Gulf of Mexico to the Lesser Antilles in 20 to 200 meters deep.

Chicoreus (Siratus) ciboney (Clench & Pérez Farfante, 1945) (Figs 3B-D; 4C; 6A; 8A; 9E)

DESCRIPTION

C. (S.) ciboney differs from *C. (S.) guionneti* n. sp. and the other studied species in having a multispiral protoconch of three whorls (Fig. 8A), suggesting a planktotrophic larval development. *C. (S.) ciboney* has thicker primary and secondary cords (Fig. 3B-D), developed but low intervarical nodules (Fig. 6A) which are present on the strongest secondary cords (s3, s4), shorter or absent spines in the adult morphology (Fig. 6D), and denticles within the outer lip. This species occurs from Cuba to Lesser Antilles in 200 to 300 meters deep.

Chicoreus (Siratus) perelegans Vokes, 1965
(Figs 2A-C; 4A; 6B; 8D; 9H)

DESCRIPTION

C. (S.) perelegans is characterized by the association of thick primary and secondary cords s3, s4 (Fig. 2A-C), the absence of intervarical nodules (Fig. 6B), short or absent spines, only two intervarical ribs, and stronger inner denticles of the outer lip than in *C. (S.) guionneti* n. sp. This character association is not found in *C. (S.) guionneti* n. sp. *C. (S.) perelegans* is reported from Haiti to Barbados between 80 and 120 meters deep.

Chicoreus (Siratus) cailletii
(Petit de la Saussaye, 1856)
(Figs 1; 4D; 6G; 8C; 9F)

DESCRIPTION

C. (S.) cailletii is present in the French Antilles where it lives between 120 and 150 meters deep. It also occurs from Florida to Honduras and Colombia (Houart 1999). *C. (S.) cailletii* is distinguishable from *C. (S.) guionneti* n. sp. by the association of a shorter spire, a lower relief of the spiral cords, a progressive loss of spines (Fig. 1), and three higher intervarical ribs. In *C. (S.) cailletii*, the highest intervarical nodules are on P1 and P2 (Fig. 6G), and are higher than in *C. (S.) guionneti*.

Chicoreus (Siratus) articulatus (Reeve, 1845)
(Figs 4G; 5A, B; 6D; 8E; 9D)

DESCRIPTION

C. (S.) articulatus is reported from the southeast and central Caribbean from 160 and 300 meters deep. This species is distinct from *C. (S.) guionneti* n. sp. by the association of narrower teleoconch whorls, thicker spiral cords and developed denticles within the outer lip (Fig. 5A, B). The intervarical ribs are generally less numerous (three ribs between each pair of varix) and higher in *C. (S.) articulatus*, but both species may have three ribs between each pair of varix. However, in *C. (S.) articulatus*, the two abapertural ribs are stronger and closer than the third, while in *C. (S.) guionneti* n. sp., the ribs are smaller and more

equally spaced. The relief of the intervarical nodule P2 is also more pronounced than that of P1 in *C. (S.) articulatus* (Fig. 6D) while the reliefs of P1 and P2 are both less pronounced in *C. (S.) guionneti* n. sp. (Fig. 6F). Regarding the spiral cords, *C. (S.) guionneti* n. sp. is characterized by the absence of ABP.

Chicoreus (Siratus) formosus (Sowerby, 1841)
(Figs 4F; 5C, D; 6E; 9C)

DESCRIPTION

C. (S.) formosus occurs in Jamaica, Cuba, Haiti and Dominican Republic between 20 and 380 meters deep but is unknown in the Lesser Antilles. It differs from *C. (S.) guionneti* n. sp. in the association of narrower teleoconch whorls, thicker spiral cords and marked internal denticles of the outer lip (Fig. 5C, D). This species may have three to four intervarical ribs, but the two abapertural ones are more marked and less spaced than in *C. (S.) guionneti* n. sp. The secondary cords s1, s2, s3, and s4 are also heavier in *C. (S.) formosus* than in *C. (S.) guionneti* n. sp. The interrupted brown lines of the primary cords are absent in *C. (S.) formosus* which is often monochromatic (see also Vokes 1980).

Chicoreus (Siratus) hennequini
Houart, 2000

DESCRIPTION

C. (S.) hennequini from Roatan Island (Honduras) superficially seems to *C. (S.) guionneti* in its short and well-individualized intervarical nodules. However, it presents nodules on s1, s3, s4 and s5 (Merle in Houart 2000, fig. 16C), which are absent in *C. (S.) guionneti* n. sp. The most developed spines are on P1, P5 and MP, but the P3 spine is reduced (Merle in Houart 2000, fig. 16A). P3 spine is always present in *C. (S.) guionneti* n. sp. Moreover, *C. (S.) hennequini* shows a small foliation between ads and P5 (Merle in Houart 2000, fig. 16A), which is not observed in *C. (S.) guionneti* n. sp. The aperture of *C. (S.) hennequini* also differs in numerous and well-marked crenulations.

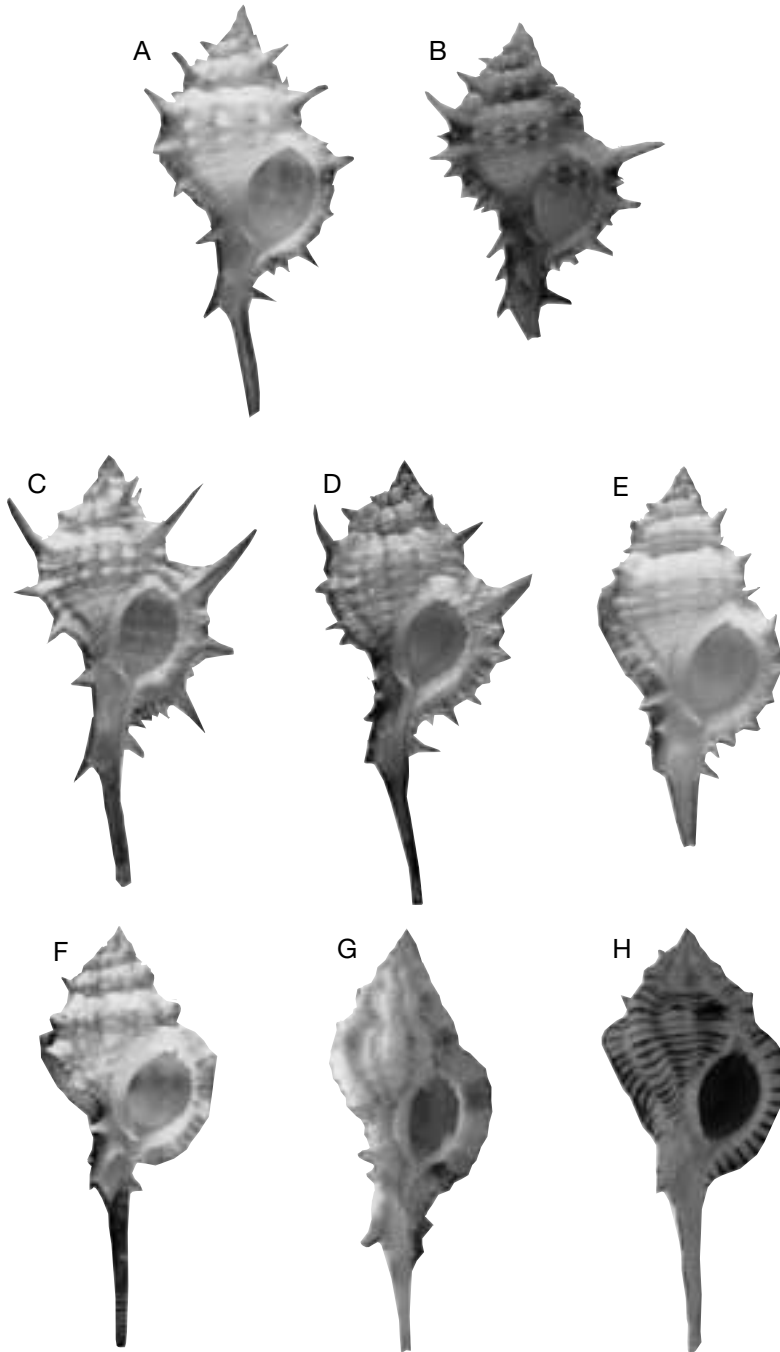


FIG. 9. — **A**, *Chicoreus (Siratus) guionneti* n. sp., holotype, MNHN (length 56.7 mm), Marie Galante; **B**, *C. (S.) guionneti* n. sp., paratype, MNHN (length 37.8 mm), Martinique; **C**, *C. (S.) formosus* (Sowerby, 1841), coll. Garrigues (length 63.9 mm), Haiti; **D**, *C. (S.) articulatus* (Reeves, 1845), coll. Garrigues (length : 62 mm), Porto Rico; **E**, *C. (S.) ciboney* (Clench & Pérez Farfante, 1945), coll. Lamy (length 53.8 mm), Saba Bank; **F**, *C. (S.) cailleti* (Petit de la Saussaye, 1856), coll. Lamy (length 60.1 mm), Guadeloupe; **G**, *C. (S.) consuela* (Verrill, 1950), coll. Lamy (length 57 mm), Guadeloupe; **H**, *C. (S.) perelegans*, coll. Lamy (length 58 mm), Guadeloupe.

CONCLUSION

The present paper attempts to delineate the *Siratus* sculptural “Bauplan” using primary homologies to describe the major spiral elements. Inside this “Bauplan”, the species studied seem characterized by different assemblages of their characters or their states characters. Although the relief of the cords and the nodules is difficult to measure, comparisons between the length of the P1 spine and the number of varices during growth strongly suggest two independent ontogenetic trajectories. Independent ontogenetic trajectories potentially generate mosaics of heterochronies (David 1989), which may explain the observed assemblages. Further studies supported by more fossil and Recent material will be necessary to confirm these preliminary results, and will need to be completed by analyses of constructional and microarchitectural characters (Miller 1999) in order to give a complete overview on *Siratus* sculptural patterns.

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