



## *Sparisoma choati*, a new species of Parrotfish (Labridae: Scarinae) from the tropical eastern Atlantic

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### Abstract

The parrotfish *Sparisoma choati* is described from the tropical eastern Atlantic Ocean. It is genetically unique and also differs from its congeners by coloration as follows: initial phase individuals and females greyish brown to greyish red, with chin and belly paler and reddish brown scales irregularly distributed along flanks resulting in a general mottled appearance; terminal phase individuals with brownish red head and upper half of anterior two-thirds of body, ventral portion of central third of body bright yellow-green, posterior third of body dark greenish gray and dark spot on upper fifth of pectoral fin base. The new species is found in rocky reefs along the coast and oceanic islands off West Africa, from Cape Verde and Senegal south to the islands of São Tomé and Príncipe and Angola.

**Key words:** taxonomy, biodiversity, Perciformes, West Africa

### Resumo

O peixe-papagaio *Sparisoma choati* é descrito do Oceano Atlântico tropical oriental. Ele é geneticamente único e também difere de seus congêneres na coloração da seguinte forma: indivíduos em fase inicial e fêmeas marrom acinzentados a vermelho acinzentados, com parte inferior da cabeça e ventre mais pálidos e escamas marrom avermelhadas irregularmente distribuídas ao longo dos flancos resultando num padrão geral de aparência de mosaico; indivíduos em fase terminal com cabeça e metade superior dos dois terços anteriores do corpo vermelho amarronzada, porção ventral do terço central do corpo verde-amarelo brilhante, terço posterior do corpo cinza esverdeado escuro e mancha escura no quinto superior da base da nadadeira peitoral. A nova espécie é encontrada em recifes rochosos ao longo da costa e ilhas oceânicas da África Ocidental, do Cabo Verde e Senegal às ilhas de São Tomé e Príncipe e Angola.

### Introduction

Recent analyses of the taxonomic status of Atlantic Parrotfishes have resulted in the revalidation and/or description of several species in the western Atlantic (Moura *et al.*, 2001; Gasparini *et al.*, 2003; Robertson *et al.*, 2006; Pinheiro *et al.*, 2010). In contrast, the fauna of the eastern Atlantic remained relatively unstudied. Randall (1981) reported four species of Parrotfishes for the eastern Atlantic: *Scarus hoefleri* (Steindachner 1881), *Sparisoma cretense* (Linnaeus 1758), *Sparisoma rubripinne* (Valenciennes 1840) and *Nicholsina collettei* Schultz 1968. Both *Scarus hoefleri* and *Sparisoma cretense* are very distinctive species and there are no significant taxonomic questions involving them. *Nicholsina collettei* was initially described as a subspecies of *Nicholsina usta* (Valenciennes 1840), but based on the genetic distinctiveness of eastern and western Atlantic forms, Robertson *et al.* (2006) raised its taxonomic rank to that of species.

The Eastern Atlantic species referred to as *S. rubripinne* historically has been problematic. The oldest record of it is probably by Capello (1872), who lists *Scarus squalidus* Poey 1860, originally described from Cuba, as

occurring in Cape Verde Islands. Osório (1890) also reports *S. squalidus* from Cape Verde. These two reports served as basis for Fowler (1936) to list this species in his Marine Fishes of West Africa. However, he considered *S. squalidus* to be a junior synonym of *Sparisoma flavescens* (Bloch & Schneider 1801), which was also described from Cuba (but for which no type specimens are known), and is now considered a synonym of the Caribbean *Sparisoma chrysopterum* (Bloch & Schneider 1801) (Parenti & Randall, 2000). More recently, the species we describe here was referred to as *Sparisoma rubripinne* (Valenciennes 1840), and has been recorded from Cape Verde and Senegal (Randall, 1981; Brito *et al.*, 1999), Guiné-Bissau (Sanches, 1991) and São Tomé (Afonso *et al.*, 1999; Wirtz *et al.*, 2007).

During a field trip to Cape Verde in 1999, LR and DRR noticed that the fish locally identified as *S. rubripinne* had a coloration very different from what is commonly seen in the Caribbean. Based on collections made by LR and DRR, Bernardi *et al.* (2000) found that the species from Cape Verde is genetically distinct from the Caribbean *S. rubripinne*. More recently, Robertson *et al.* (2006) showed that the Cape Verde fish is very similar to the Parrotfish from São Tomé and Príncipe islands in the Gulf of Guinea, but also distinct from the closely related Brazilian *Sparisoma axillare* (Steindachner 1878). We herein describe this new species based on specimens collected in São Tomé and Príncipe as well as obtained from a fish market in Dakar, Senegal.

## Material and methods

Counts and measurements follow Westneat *et al.* (2007). Type specimens are deposited at the California Academy of Sciences (CAS), and the University of Florida Museum of Natural History (UF). Specimen lengths are given as mm standard length (SL). Even though the specimens from Senegal matched the ones from Cape Verde and São Tomé in color and morphology, we sequenced the cytochrome b and 16s genes of these specimens to test whether the coastal populations were the same as the insular ones. Methods for sequencing and genetic analysis followed Bernardi *et al.* (2000).

### *Sparisoma choati* sp. n.

West-African Parrotfish  
(Figures 1–2AB, Table 1)

*Scarus squalidus* (non Poey) Capello, 1872; Osório, 1890.

*Sparisoma flavescens* (non Bloch & Schneider) Fowler, 1936.

*Sparisoma rubripinne* (non Valenciennes) Randall, 1981; Sanches, 1991; Afonso *et al.* 1999; Brito *et al.*, 1999; Bernardi *et al.*, 2000; Robertson *et al.*, 2006; Wirtz *et al.*, 2007.

**Holotype.** CAS 224080, female, 128.8 mm total length, Atlantic Ocean, São Tomé and Príncipe, northeastern coast of São Tomé Island, dock near airport, 0°22'27" N, 6°43'03" E, 1 m depth, hook and line, 01 May 2006, Tomio Iwamoto.

**Paratypes.** CAS 214635, female, 114.8 mm, Atlantic Ocean, São Tomé and Príncipe, off Marlin Beach Hotel, 0°21'54" N, 6°42'48" E, 2–4 m depth, large beach seine by local fishermen, 12 April 2001, Tomio Iwamoto. CAS 230969, female, 100.6 mm, Atlantic Ocean, São Tomé and Príncipe, fish market at Gamboa and Mercado Municipal in São Tomé town, beach seine, 10 Jan 2009, David Catania and John McCosker. UF 179646, 245.2–366.4 mm (2 terminal phase males, 2 females), Atlantic Ocean, Senegal, Dakar fish market, 10 m depth, trawling, 15 Sep 2005, Alberto Brito.

**Diagnosis.** *Sparisoma choati* can be distinguished from all of its congeners by the following combination of characters: Dorsal rays IX, 10; anal rays III, 9; pectoral rays 12 or 13 (rarely 13); pelvic rays I, 5; lateral line scales 23 to 26; gill rakers on first arch 11 to 14. Initial phase individuals and females greyish brown to greyish red, with chin and belly paler and reddish brown scales irregularly distributed singly or in clusters along flanks; pectoral fin translucent red with a dark red to black spot on upper fourth of its base. Terminal phase individuals with brownish red head and upper half of anterior two-thirds of body; ventral portion of central third of body yellowish green; posterior third of body dark greenish gray; black spot on upper fifth of pectoral fin base.

**Description.** Dorsal rays IX, 10; anal rays III, 9; all dorsal and anal soft rays branched, the last to base; pectoral rays 12 (13 in 1 specimen); pelvic rays I, 5; lateral line scales 23 to 26, including 2 or 3 on caudal-fin base; scales between lateral-line scales and origin of anal-fin 5 or 6; 2 rows of scales between lateral-line scales and dorsal fin, scales in upper row about half the size of those in lower row; 5 scales on cheek in single row; median predorsal scales 4, those scales progressively smaller and more ridged posteriorly, the last three progressively more notched posteriorly; median prepelvic scales 3; gill rakers on first arch 11 to 14.

Body moderately deep, the depth 34.5 to 42% of SL, and compressed, the width 13.7 to 19.4% SL; head moderately large, the length 29.7 to 32.3% SL; snout length 9.3 to 15.2% SL; orbit diameter 5.3 to 7.9% SL; interorbital width 6.2 to 8.1% SL; caudal peduncle depth 12.3 to 14.3 % SL; caudal peduncle length 12 to 15.2% SL. Mouth oblique and terminal, the lower dental plate overlapping the upper; lips covering at least half of dental plates.

**TABLE 1.** Total length, standard length (mm) and proportional measurements (%SL) of the type series of *Sparisoma choati*.

Specimen	CAS 224080 Holotype	CAS 214635	CAS 230969	UF 179646-1	UF 179646-2	UF 179646-3	UF 179646-4
Total length	128.8	114.8	100.6	366	395	362	245
Standard length	108.5	97.5	82.4	288	314	290	191
Body depth	38.5	34.5	37.5	42.0	39.5	37.9	39.3
Body width	14.8	14.6	13.7	19.1	19.4	18.6	19.4
Head length	32.3	29.7	30.2	31.9	32.2	31.0	31.4
Snout length	12.3	9.3	10.3	14.1	15.2	13.5	12.3
Orbit diameter	7.9	6.8	6.4	5.3	5.3	5.5	6.5
Interorbital width	8.1	6.9	7.9	6.6	6.6	6.2	7.0
Caudal ped depth	13.5	12.3	12.4	13.2	12.3	12.5	14.3
Caudal ped length	14.4	15.2	13.0	13.1	13.7	12.0	12.7
Predorsal length	34.1	29.3	34.0	34.7	34.7	33.4	33.4
Prepelvic length	32.3	28.2	28.6	32.5	33.3	31.5	32.2
Dorsal fin base	58.4	52.9	54.5	61.5	52.5	57.2	59.8
Anal fin base	31.0	32.5	28.3	21.4	27.6	25.2	27.0
First dorsal spine	10.9	10.6	8.3	9.9	12.5	11.9	11.7
9th dorsal spine	10.1	9.4	6.8	11.5	11.1	10.4	10.7
3rd anal spine	8.1	8.2	7.3	9.0	9.1	9.3	9.4
Longest anal ray	10.7	11.3	8.7	12.2	14.3	12.7	13.9

Origin of dorsal fin slightly posterior to upper end of gill opening, the predorsal length 29.3 to 34.7% of SL; dorsal and anal spines flexible, the tips curving posteriorly; first dorsal spine 8.2 to 12.5% SL; origin of anal fin below base of last dorsal spine; pectoral fins slightly pointed, the second ray the longest; pelvic fins pointed, the second ray the longest, the prepelvic length 28.2 to 33.3% SL; caudal fin truncate in juveniles and females, slightly lunate in terminal males, the concavity 1.6 to 3.8% SL.

Color of holotype in alcohol as in Figure 1. Preserved initial phase specimens uniformly light to dark brown, darker dorsally, with fins the same color as body. Terminal phase specimens also brown, with a darker posterior third of body and dark spot on pectoral upper fifth of pectoral fin usually visible. Color in life as shown in Figure 2A and 2B. Initial phase individuals grayish brown to greyish red, with chin and belly paler and some reddish brown scales irregularly distributed along flanks, giving the fish an overall mottled pattern; edges of scales dark; fins greyish to whitish red, except for pectoral fin, which is translucent red with a dark red to black spot on upper fourth of its base; iris orange. Terminal phase individuals with brownish red head and upper half of anterior two-thirds of body, ventral portion of head and body paler; cheek with a gray cast; ventral portion of central third of body bright yellowish green; posterior third of body dark greenish gray; sometimes scales with thin bright green margin; posterior third of dorsal fin and caudal fin dark gray, anal fin greenish blue, anterior two-thirds of dorsal fin

red brown, pectoral fin brownish red with yellowish green base and a black spot on upper fifth of that fin base, ventral fin brownish red anteriorly and greenish blue posteriorly.



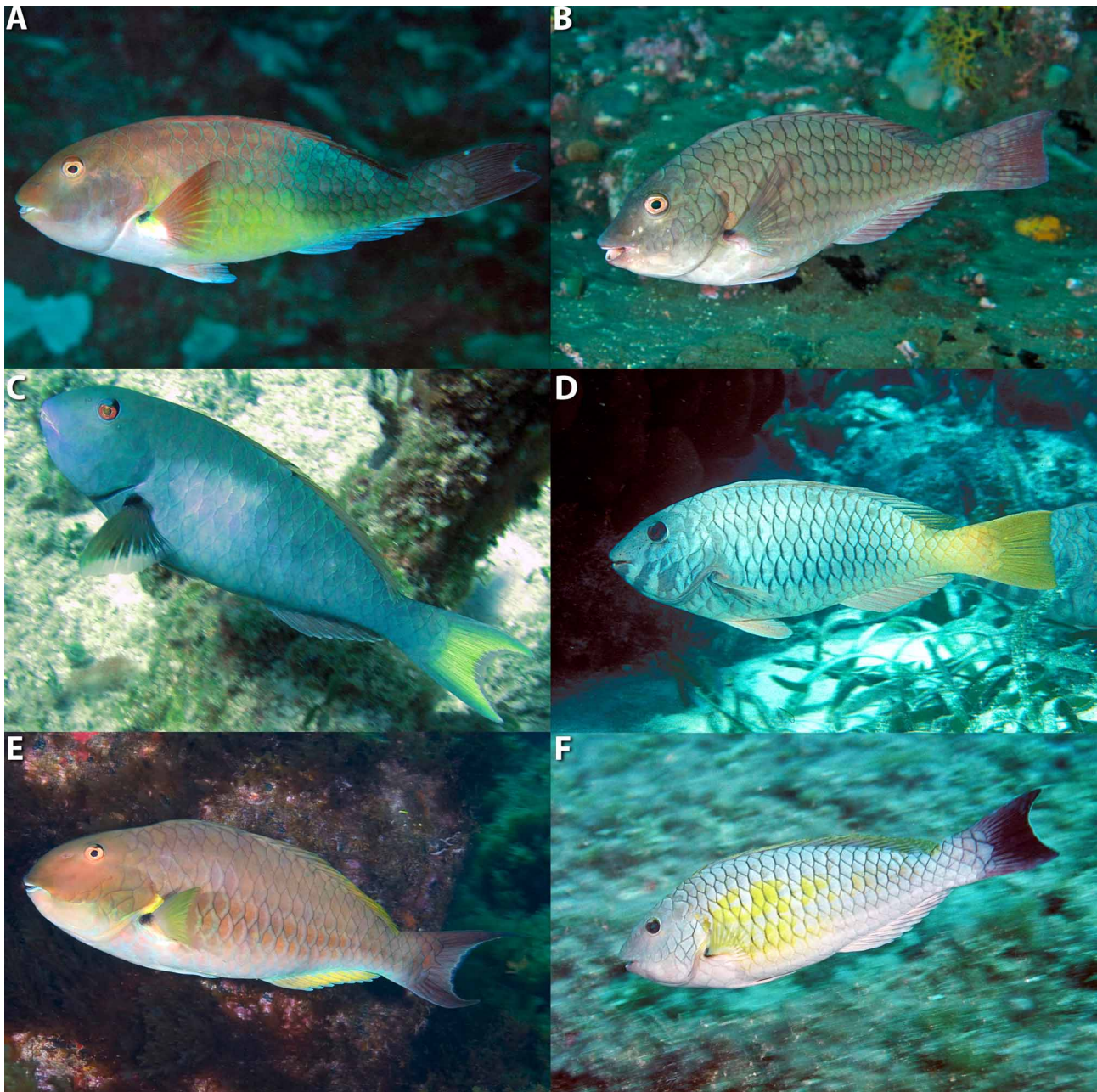
**FIGURE 1.** Lateral, dorsal and ventral views of the holotype of *Sparisoma choati*, CAS 224080. Photos by J. Fong.

**Habitat and distribution.** *Sparisoma choati* is distributed from the Cape Verde islands and Senegal south to the offshore islands of the Gulf of Guinea and northern Angola (Figure 3). It has been observed in rocky reefs from depths of 2 to 30 m where it grazes on algae growing over rocky or calcareous substrate. Males are usually solitary, but females are often seen in pairs or small groups and juveniles in loose aggregations of up to 10 individuals.

**Remarks.** *Sparisoma choati* is part of a monophyletic clade that also includes the Caribbean *Sparisoma rubripinne* and the Brazilian *Sparisoma axillare*. The three species in this clade are indistinguishable morphologically, but are easily separated by color pattern, genetics and areas of distribution. Terminal male *S. rubripinne* have a dull green or blue-green body, and TP *S. axillare* have a brown to greenish-brown body. In contrast TP *S. choati* have a distinguishing tri-colored body. Initial phase male and female *S. rubripinne* have a bright yellow tail and two vertical pale bars crossing the chin, and IP *S. axillare* have bright yellow scales irregularly distributed over a pale brown body. IP *S. choati*, however, have a greenish-gray body with irregular reddish-brown scales along the sides and red fins (Figure 2). Phylogenetic analyses indicate that *S. choati* (labeled as *S. "rubripinne"*) is sister to a



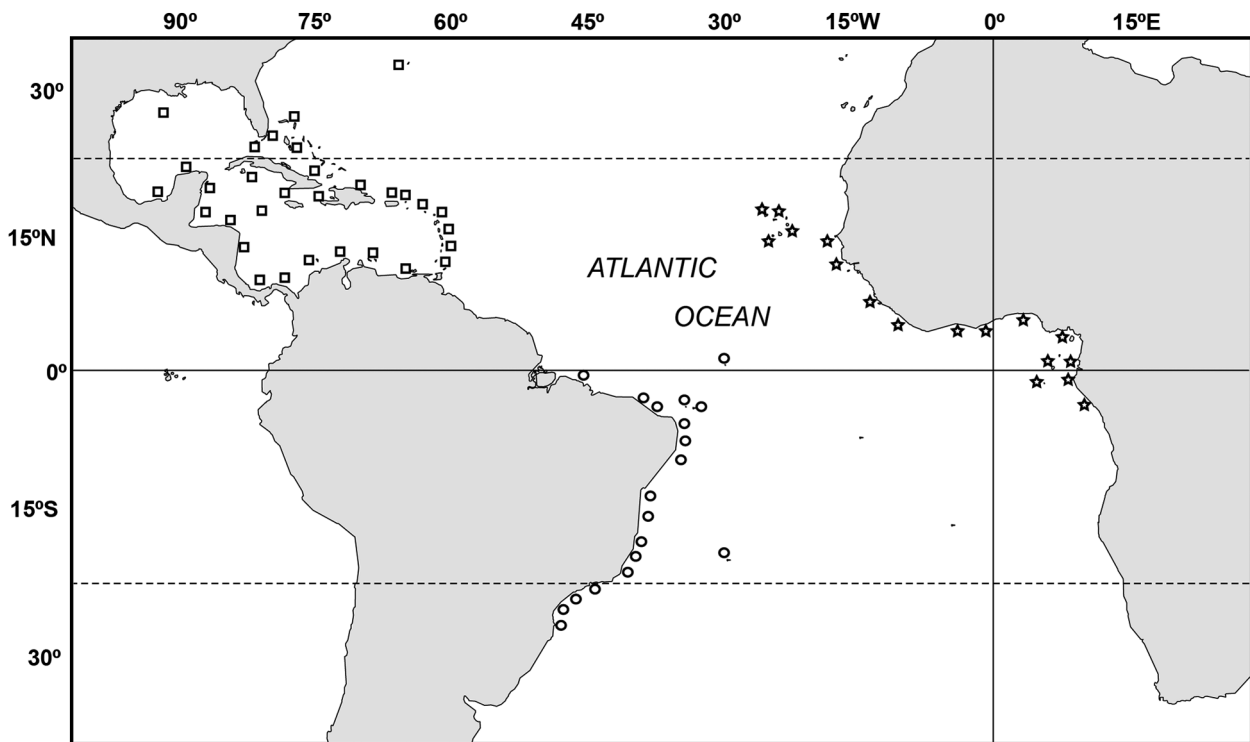
monophyletic clade containing *S. rubripinne* and *S. axillare* (Robertson *et al.*, 2006). DNA sequences obtained for the type series of *S. choati* also confirm their genetic identity as belonging to the clade labeled as *S. "rubripinne"* by Robertson *et al.* (2006).



**FIGURE 2.** Underwater photographs of a terminal phase male *Sparisoma choati* (A, São Tomé), initial phase *S. choati* (B, São Tomé), TP *S. rubripinne* (C, Bahamas), IP *S. rubripinne* (D, Belize), TP *S. axillare* (E, Brazil), and IP *S. axillare* (F, Brazil). Photo credits: L. Rocha (A, B); F. Charpin (C); J. Randall (D); J. P. Krajewski (E); O. Luiz (F).

Within its area of occurrence, initial phase individuals of *Sparisoma choati* are somewhat similar in color to initial phase *Nicholsina collettei*, but these two species are easily distinguishable in the field upon close inspection. Moreover, *N. collettei* is rarely seen in rocky reefs since its preferred habitat is sandy areas with sea grass. Female and initial phase *Sparisoma choati* also can resemble juvenile and initial phase *Sparisoma cretense*: both are greyish brown with reddish fins. However, terminal phase male *S. cretense* have a distinguishing large black blotch just above and behind the pectoral fin base, and a more pointed head, and juveniles have a brownish red body (greyish in *S. choati*) and pale bars crossing the chin.

**Etymology.** We name this species in honor of J. Howard Choat, in recognition of his extensive scientific work on parrotfishes. During his lengthy and productive career, Howard has made many significant contributions to our knowledge of parrotfish taxonomy, ecology, reproductive biology, demography, evolution and historical biogeography.



**FIGURE 3.** Geographic distributions of *Sparisoma choati* (☆), *S. rubripinne* (□) and *S. axillare* (○).

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