

Two new species of Creole Wrasse (Labridae: *Clepticus*) from opposite sides of the Atlantic

J. B. Heiser¹, R. L. Moura², and D. R. Robertson³

1) Department of Ecology and Evolutionary Biology, Stimson Hall, Cornell University, Ithaca, NY, 14853, USA. E-mail: jbh7@cornell.edu

2) Seção de Peixes, Museu de Zoologia, Universidade de São Paulo, C.P. 42694, São Paulo, SP 04299-970, Brazil. E-mail: rlmoura@usp.br

3) Smithsonian Tropical Research Institute, Panama. Mailing address: STRI, Unit 0948, APO AA 34002, USA. E-mail: ross.robertson@stri.org

Accepted: 4.11.2000

Keywords

Clepticus, Labridae, wrasse, reef fish, amphiatlantic, Gulf of Guinea, Brazil

Abstract

Two new species of labrid are described, one each from the eastern and western sides of the equatorial Atlantic. *Clepticus africanus*, n. sp., is described from fourteen specimens collected from São Tomé Island in the Gulf of Guinea off the equatorial African coast. *Clepticus brasiliensis*, n. sp., is described from nineteen specimens (plus additional material) collected from the coast and offshore islands of Brazil south of the Amazon. Neither species is significantly different in morphometric or meristic characters from the heretofore sole member of the genus, the tropical western North Atlantic *Clepticus parrae*. Both new species are distinguished from *C. parrae* by coloration and by the development in adults of greatly extended fin rays (two-thirds the standard length) from the tips of the upper and lower lobes of the forked caudal fin: the mostly black African Creole Wrasse with one filament on each lobe of the caudal, and the mostly mauve to purple Brazilian Creole Wrasse with two or more such filaments. The two new species represent a pair of amphiatlantic sister taxa.

Zusammenfassung

Zwei neue Lippfisch Spezies werden beschrieben, jeweils eine von beiden Seiten des Äquatorialen Atlantiks. *Clepticus africanus*, n. sp., wird anhand von vierzehn Exemplaren beschrieben. Sie stammen von der São Tomé Insel im Golf von Guinea, vor der äquatorialen afrikanischen Küste. *Clepticus brasiliensis*, n. sp., wird aufgrund von neunzehn Exemplaren (plus zusätzliches Material) beschrieben. Diese Exemplare wurden an der Küste und bei den vorgelagerten brasilianischen Inseln südlich des Amazonas gefunden. Keine der beiden neuen Spezies unterscheidet sich meristisch oder morphometrisch gesehen, bedeutend vom bisherigen einzigen Exemplar der Gattung, dem

tropischen westlichen Nordatlantischen *Clepticus parrae*. Beide neuen Spezies unterscheiden sich vom *C. parrae* durch ihre Färbung. Desweiteren durch die verlängerten Flossenstrahlen bei erwachsenen Tieren (2/3 der Standardlänge) von den Spitzen der oberen und unteren Lappen der gegabelten Schwanzflosse: der meist schwarze Afrikanische Kreolen-Lippfisch mit einem Filament an jedem Lappen der Schwanzflosse, der meist mauvefarbene bis violette Brasilianische Kreolen-Lippfisch hat zwei oder mehr solcher Filamente. Die zwei neuen Arten repräsentieren ein Paar amphiatlantik-Schwester Taxa.

Résumé

Deux nouvelles espèces de *Clepticus*, labrides habitant de part et d'autre de l'Atlantique équatorial, sont décrites. *Clepticus africanus* n. sp. est décrit d'après 14 spécimens récoltés près de l'île de São Tomé dans le golfe de Guinée au large de la côte de l'Afrique équatoriale. *Clepticus brasiliensis* n. sp. est décrit d'après 19 spécimens (plus du matériel additionnel) récoltés le long de la côte et autour d'îles côtières du Brésil) au sud de l'embouchure de l'Amazonie. Ces espèces diffèrent du seul membre du genre jusqu'alors connu, *Clepticus parrae*, un habitant de la région tropicale occidentale de l'Atlantique nord, par leur coloration et par le développement, chez l'adulte, de l'extrémité des lobes caudaux en filaments qui atteignent les deux-tiers de la longueur standard. En revanche, il n'y a aucune différence significative en ce qui concerne les caractères morphométriques et méristiques. L'espèce africaine, surtout noire, a un seul filament à chaque lobe caudal ; l'espèce brésilienne, surtout mauve ou violette, à deux filaments ou plus. Ces caractères uniques et la distribution géographique font de ces nouvelles espèces des taxa frères "amphi-atlantiques".

Sommario

Vengono descritte due nuove specie di labridi, provenienti una dalla costa est e l'altra dalla costa ovest dell'Atlantico equatoriale. Il *Clepticus africanus*, n. sp.,

viene descritto sulla base di quattordici esemplari raccolti sull'isola di São Tomé nel Golfo di Guinea al largo della costa africana equatoriale. Il *Clepticus brasiliensis*, n. sp., viene descritto sulla base di diciannove esemplari (oltre ad altro materiale) raccolti sulla costa e nelle isole al largo del Brasile a sud dell'Amazzonia. Nessuna nuova specie (statisticamente) risulta significativamente diversa per le caratteristiche morfometriche o meristiche di quello che risultava l'unico membro fino ad ora del genere, il *Clepticus parrae* dell'area occidentale del tropicale Atlantico del Nord. Entrambe le nuove specie si distinguono dal *C. parrae* per la loro differente colorazione e perché da adulti presentano pinne radiali molto sviluppate (due terzi della lunghezza standard) dalla cima dei lobi superiori e inferiori della pinna caudale biforcuta: il labro creolo africano per lo più nero con un filamento su ciascun lobo della caudale, il labro creolo brasiliano per lo più di color violaceo o malva con due o più di questi filamenti. Queste due nuove specie rappresentano una coppia di pesci di tassonomia simile originari di due coste dell'Atlantico.

Introduction

The labrid genus *Clepticus* currently has one described species. In 1995 J. B. Heiser observed and photographed a distinct form of what was obviously a species of *Clepticus* off the coasts of São Tomé and Príncipe in the Gulf of Guinea, tropical eastern Atlantic. In 1996 he observed and photographed another distinctive but obviously related fish in the near-shore waters of Fernando de Noronha, a tropical western Atlantic island south of the Equator (and the mouth of the Amazon). At least as early as 1977 specimens of this south-western Atlantic form were collected but not regarded as distinct from the Caribbean *Clepticus parrae* (Bloch and Schneider 1801) (see Menezes and Figueiredo 1985, Carvalho-Filho 1992). From 1991 through 1998 R. L. Moura and others collected specimens from numerous sites along the coasts of Brazil and its offshore islands. In 1997, D. R. Robertson collected specimens of the eastern Atlantic form from the coast of São Tomé Island, Gulf of Guinea. Material from these collections provided an opportunity to compare these distinct forms with the Caribbean Creole Wrasse, *Clepticus parrae*, resulting in the descriptions of two new species.

Clepticus parrae is known from the tropical western Atlantic, north of the Equator, from North Carolina, Bermuda and the northern Gulf of Mexico banks to Trinidad and Venezuela (Gomon 1997, Lieske and Myers 1994, Randall 1996). It has been recognized as a distinct species since 1787, and since 1862 the heretofore monotypic genus has remained in its own subdivision of the primitive hypsigenyin (formerly bodianine) labrids (Gomon 1997). The genus is highly specialized for a plankton-picking life in the water column above hard-bottom substrates. Gomon (1997) provided a comprehensive analysis of the genus

based on *C. parrae*. The two new species described here are morphologically very similar to *C. parrae*, but quite distinct in colour and elaboration of filaments on the caudal fin.

Type specimens of the new species are deposited in the Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil (MZUSP) and the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM). Additional material was also kindly made available by the American Museum of Natural History (AMNH); California Academy of Sciences (CAS); Cornell University Museum of Vertebrates (CU); Florida Museum of Natural History, University of Florida (UF); and the Smithsonian Institution, National Museum of Natural History (USNM).

Diagnosis of the genus *Clepticus* Cuvier

based on the methods and data of Gomon 1997 and examination of the following specimens:

Clepticus parrae: AMNH 30728SW, cleared and double stained; AMNH 56896SD, dry skeleton; AMNH 56941SD, dry skeleton; AMNH 88905SD, dry skeleton; UF 16301; UF 17294; UF 36557; USNM 9797; USNM 178482; USNM 178641; USNM 318550, two x-rayed; USNM 327600. *Clepticus africanus*, n. sp.: USNM 361243; and USNM 361243 two x-rayed; CU 81300. *Clepticus brasiliensis*, n. sp.: CAS 99821; CAS 99822; MZUSP 44590; MZUSP 44677; MZUSP 47151; MZUSP 51427; MZUSP 53161; MZUSP 53263, 53265, 53267 through 53272; USNM 350958; USNM 350959, x-rayed.)

Dorsal rays XII, 10; anal rays III, 12 (some anal spines appear to have segmentation at their tips, but three spine pterygiophores are always clearly distinct on skeletal material and x-rays); caudal rays 11-13 (dorsal unbranched rays) + 11-12 (branched rays) + 11-13 (ventral unbranched rays); pectoral rays ii, 15; vertebrae 11 + 17 = 28; last pleural rib on 11th vertebra; last epipleural rib on 10th or 11th vertebra; lateral line scales 32 + 2; scales above lateral line 5½ (occasionally as few as 4½); scales below lateral line 10½ - 13 (occasionally as few as 9); predorsal scales crowded and irregular, approximately 24-36; total gill rakers 26-32.

Body streamlined, moderately deep, depth 32-38% of standard length (SL) (except in juveniles which are distinctly more slender), compressed; caudal peduncle slender, 11-15% of SL; head and snout broadly pointed, head 28-31% of SL, moderately deep, tapering rapidly; snout short, 23-29% of head length; dorsal outline of head nearly straight in lateral aspect, with gentle curve, most pronounced at occiput.

Scales reaching onto dorsal and anal fins forming basal scaly sheaths of about 3½ - 4½ scales high, sheath mostly covering the anterior ⅓ of fins, distal outline of sheaths in broad convex curves. Predorsal scales small, reaching forward to above centre of eye on dorsal midline of head; scales lateral to midline

reaching slightly farther forward. Cheek scales overlapping, extending forward on upper side of mouth to below posterior nostril, reaching to free preopercular edge posteriorly and ventrally; scales on subopercle moderately large in about three rows, extending forward beyond anterior extent of ventral preopercular edge; scales covering all but about the anterior $\frac{1}{4}$ - $\frac{1}{3}$ of lower jaw. Lateral line scales each with simple straight sensory canal tube. Cephalic sensory canal pores few in number, confined to major canals. Posterior edge of preopercle serrate.

Mouth small, oblique, extremely protrusible; posterior corner of mouth situated below posterior nostril or below anterior extent of orbit; lower lip broad, extensively united with that of the opposite side along symphysis of jaw, mostly exposed when mouth closed; upper lip almost totally concealed by lateral epidermal flap on upper side of mouth when mouth closed; maxilla totally concealed when mouth closed; crease at corner of mouth curved ventrally. Anterior and posterior nostrils on each side of head in deep common groove. Gill rakers simple, usually long, and narrow, especially on the lower limb. Upper jaw with 2 (occasionally 3) short peg-like anterior canines on each side, all of nearly equal size and directed anteriorly; 1-6 rather evenly spaced slightly smaller canines present on dental ridge; prominent posterior canines absent. Lower jaw with single prominent anterior canine on each side, slightly to considerably larger than those of upper jaw, directed anteriorly; dental ridge bony, usually devoid of teeth other than anterior canine. Vomerine teeth absent.

Dorsal fin spines subequal, pungent; posterior tip of

dorsal and anal fins pointed with at least one filamentous ray in adults, posterior tips of filaments not reaching further than posterior edge of scaly base of caudal in adults; anal fin filament shorter or equal to that of dorsal fin. Caudal fin forked with smoothly concave posterior margin; uppermost caudal branched ray (the dorsalmost ray originating on fused hypurals three and four) and lowest caudal branched ray (originating on the parhypural) longest. Pectoral fin long, upper rays considerably longer than ventralmost rays, posterior edge of fin obliquely angled. Pelvic fin short, with tip reaching distinctly short of the anus.

Ethmoid frontal depression deep, well developed. Infraorbital series simple, tubular; lachrymal rectangular. Dentigerous ramus of premaxilla forming an obtuse oblique angle with ascending process. Posterior flange on ventralmost part of cleithrum nearly meeting anteriormost projection of the coracoid. Hypurapophysis well developed, needle- or thorn-like.

All species attain a similar moderate maximum size, reported to be 300 mm (Böhlke and Chaplin 1993; Randall 1996), the largest specimen examined 243 mm SL.

***Clepticus africanus*, n. sp.**

(Figs. 1, 2a, 2b, and 6)

Material

Holotype: USNM 361243, terminal phase (?) male, 205 mm SL, collected off the north coast of São Tomé Island (0°25'00"N, 6°40'00"E), Gulf of Guinea, 5-15 m with spear by D. R. Robertson, 5-10 December 1997.



Fig. 1. *Clepticus africanus*, holotype, 205.1 mm SL, north coast of São Tomé Island, Gulf of Guinea, Africa. Photo by Andrew Muss.

Paratypes (collected with the holotype): USNM 361244, 10 specimens, 64.0-175.5 mm SL; CU 81300, 2 specimens, 64.7-72.8 mm SL.

Description

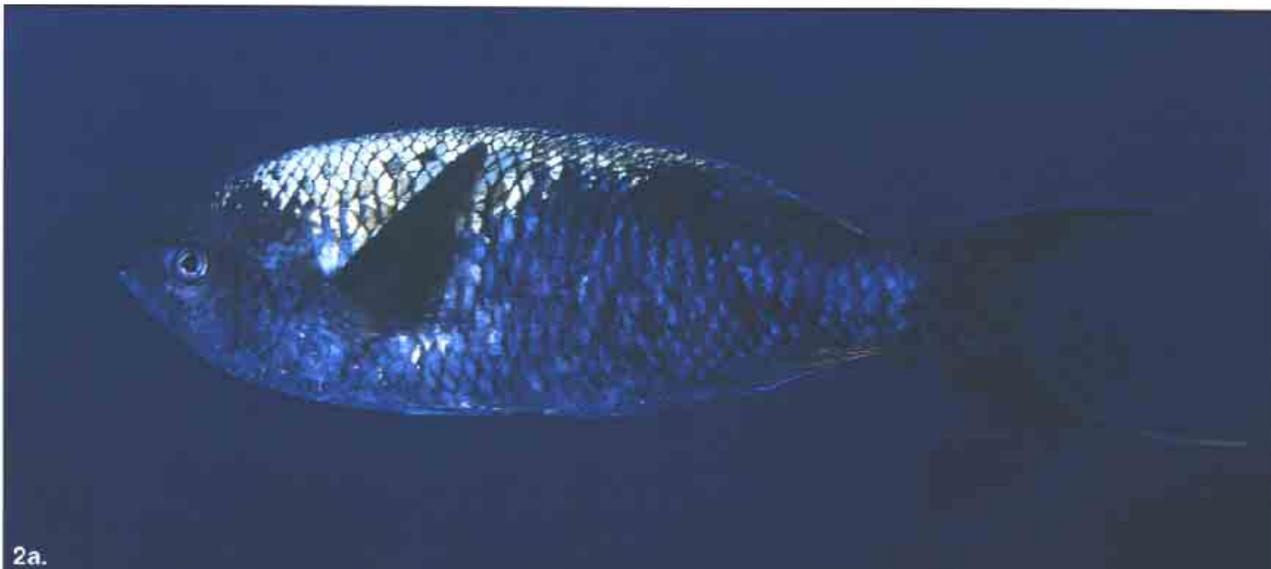
A typical species of *Clepticus* with the following combination of additional diagnostic morphological characters: posterior margin of fleshy opercular flap bluntly pointed above pectoral axil; sixth through eighth segmented rays of dorsal fin and seventh through tenth segmented rays of anal fin elongate, their tips filamentous in adults; second principal rays of dorsal and ventral margins of caudal fin (the uppermost and lowest branched caudal rays) each drawn out into single, robust, wire-like, long filament, developing from mod-

est extensions in specimens 150 mm SL to streamers equal to at least 2/3 SL in adults of 200 mm SL.

Pigmentation in alcohol:

Juveniles: pale ventrally, dark dorsally; dorsal and anal fin scaly sheaths dark. Scattered individual scales in pale areas of body distinctly more darkly pigmented at their bases. Median fins dark except for central portion of caudal fin which is pale producing highly lunate appearance of tail. Upper pectoral fin first ray and membrane dark; base of fin dusky, remainder of fin clear. Pelvic fin spine pale, remainder of fin dark.

Initial phase adults: body, fin sheaths, and median fins entirely dusky, darker dorsally and on fin sheaths. Dorsal and anal fin membranes dark on outer margins,



Figs. 2a. (top) and **2b.** Underwater photographs of *Clepticus africanus*, north coast of Principe Island, Gulf of Guinea, Africa. Photos by J. B. Heiser.

otherwise pale. Caudal fin dusky except for outermost portion of central rays and pale membranes; dorsal and ventral margins of caudal fin darkest. Pectoral fins dark except for pale distal portion, pale area broadest along last rays. Pelvic fins entirely dusky.

Terminal phase adults: body, fin sheaths, and median fins entirely dusky to dark. Scales below dorsum paler in centre than at edge; irregular patches of scales (especially in the region of the pectoral fin and at its base) pale or unpigmented. Lower pectoral rays with outer 1/4 unpigmented exaggerating the sickle shape of fin.

Colour in life:

Juveniles: apparently very similar to juvenile *Clepticus parrae* but no detailed information available.

Initial phase adults: overall charcoal black to brown with green iridescence anteriorly and blue to purple iridescence posteriorly on body; colour considerably darker on head, posterior half to two-thirds of dorsum and median and paired fins. Belly with white-centred, dark-edged scales producing checkered appearance. Dorsum from behind nape extending to about third to fifth dorsal spine base washed with dull gold to copper colour. Iris reddish gold.

Terminal phase adults: similar to initial phase except anterior dorsum behind nape iridescent bronze to greenish gold; body iridescence more obvious.

Irregular patches of scales on breast and around pectoral fin unpigmented allowing white colour of flesh beneath to show through prominently (these areas reminiscent of similar patches on certain varieties of nishikigoi - Japanese coloured carp). Elongate and filamentous rays of anal and caudal fins golden (as is the corresponding region of the dorsal fin in most individuals).

Etymology

Named *africanus* in reference to the only known distribution of the species. The common name African Creole Wrasse is proposed.

Distribution

Known only from the Democratic Republic of São Tomé and Príncipe, located 320 km west of the (Gabon) coast of Africa in the Gulf of Guinea offshore of the Bight of Biafra (=Bight of Bonny), specimens having been collected on the north coast of São Tomé and photographed off the north coast of Príncipe. The species is likely to inhabit the other islands of the Guinea Archipelago: Annobon (Pagalu), 120 miles to the southwest of São Tomé, where it has apparently been photographed, and Bioko (also spelt Bioco, formerly known as Fernando Póo), 160 miles to the northeast of Príncipe, both islands part of the Republic of Equatorial Guinea. The species was not observed in over 30 hours of underwater observations in likely habitat around Sal and São Tiago Islands, Cape Verde Archipelago.

Remarks

Clepticus africanus seems not to have been noted in surveys of the fish fauna of the region (Blache *et al.*, 1970; Seret, 1981; Schneider, 1990; Brito, 1991; Wirtz, 1994; Gonzalez Jimenez, 1995; Reiner, 1996; Debelius, 1997) until the recent work of Afonso *et al.*, 1999, who recognized the species as an undescribed *Clepticus*. The species is immediately obvious to divers around habitats of hard bottom and steep drop-off to deeper waters in São Tomé and Príncipe. It is frequently observed in aggregations with other diurnal planktivorous fishes, such as the pomacentrids *Chromis cf. multilineata* and *Abudefduf saxatilis*. The larger, terminal phase individuals are curious about divers and anything edible that divers might expose, and come close to inspect intruders; but their interest wanes quickly and they return to the open water column to resume picking plankton. Such behaviour, coupled with the eye-catching appearance of this handsome fish, make it unlikely simply to have been overlooked in the other eastern Atlantic islands. It seems likely that *C. africanus* may at present have a very limited distribution.

***Clepticus brasiliensis*, n. sp.**

(Figs. 3, 4a, 4b, 5, and 6)

Material

Holotype: MZUSP 53269, terminal phase male, 243 mm SL, collected off Ilha Escalvada, Guarapari (20°42'00"S, 40°24'30"W), off the coast of the state of Espírito Santo, Brazil, at unrecorded depth with spear by J. L. Gasparini, at an unspecified time during the period November/December 1997.

Paratypes (collected with the holotype unless otherwise indicated): MZUSP 53265, 229.5 mm SL; MZUSP 53267, 223.5 mm SL; MZUSP 53268, 242.5 mm SL; MZUSP 53272, 215 mm SL, Ilha da Vitória (23°44'S, 45°01'W), state of São Paulo, Brazil by R/V Orion (date unknown); MZUSP 47151, 221.5 mm SL, Laje de Santos (24°19'S, 46°11'W), state of São Paulo, Brazil by R. L. Moura, 13 January 1991; MZUSP 51427, 220.9 mm SL, Ilha Escalvada (20°42'S, 40°24'W), state of Espírito Santo, Brazil by J. L. Gasparini, 14 July 1986; MZUSP 53161, 183.5 mm SL, Recife Manuel Luís (0°52'S, 44°15'W), Brazil by R. L. Moura *et al.*, 1 July 1998; CAS 99821, 220 mm SL, Laje de Santos (24°19'S, 46°11'W), state of São Paulo, Brazil by R. L. Moura, 21 February 1992; CAS 99822, 231.1 mm SL, Laje de Santos (24°19'S, 46°11'W), state of São Paulo, Brazil by R. L. Moura, 23 February 1992; USNM 350958, 117.2 mm SL, Arquipélago dos Alcatrazes (24°06'S, 45°42'W), state of São Paulo, Brazil by R. L. Moura, 8 m depth, 26 April 1992; USNM 350959, 185.7 mm SL, Arquipélago dos Alcatrazes (24°06'S, 45°42'W), state of São Paulo, Brazil by R. L. Moura, 8 m depth, 2 November 1992.



Fig. 3. *Clepticus brasiliensis*, holotype, 243 mm SL, from off the coast of the state of Espírito Santo (20°S, 40°W), Brazil. Photo by J. L. Gasparini.

Additional material examined: MZUSP 44590, 32.9 mm SL, Laje de Santos (24°19'S, 46°11'W), state of São Paulo, Brazil by R. L. Moura, 13 January 1991; MZUSP 44677, 239.5 mm SL, Ilhas Rasas (20°40'S, 40° 22'W), state of Espírito Santo, Brazil by J. L. Gasparini, 13 March 1986; MZUSP 53263, 248 MM SL, collected with holotype; MZUSP 53270, 7 specimens 110 -131.5 mm SL, collected with holotype; MZUSP 53271, 219 mm SL, Laje de Santos (24°19'S, 46°11'W), state of São Paulo, Brazil by A. Carvalho-Filho, October 1977.

Description

A typical species of *Clepticus* with the following combination of additional diagnostic morphological characters: posterior margin of fleshy opercular flap extends as a rounded "ear" above pectoral axil; sixth through ninth segmented rays of dorsal fin (especially sixth) and seventh through eleventh segmented rays of anal fin (especially eighth) elongate, their tips filamentous in adults; first principal rays of dorsal and ventral margins of caudal fin elongated, supporting second principal rays of dorsal and ventral margins of caudal fin (the uppermost and lowest branched caudal rays), each drawn out into two or more wire-like filaments; these filaments developing from single modest filaments in specimens of 120 mm SL to four or more subequal streamers, some at least 2/3 standard length, in adults of 200 mm SL, dorsal filaments often longer than ventral.

Pigmentation in alcohol:

Juveniles: overall pale, honey-coloured; six darker bands on dorsum, adjacent to dorsal fin base, first band below third and fourth spines of dorsal, last band below last three or four soft rays of dorsal fin. Caudal fin

margins distinctly darker than body, middle rays unpigmented; anal, pectoral and pelvic fins entirely pale.

Initial phase adults: Overall pale, honey-coloured, darker dorsally; dorsal and anal fin scaly sheaths darkest. Base of opercular "ear" and scales at base of caudal fin also darker. Fins entirely pale.

Terminal phase adults: Body and fins pale, centre of each scale irregularly somewhat darker, especially on scaly sheath of dorsal fin and to lesser degree on anal fin sheath.

Colour in life:

Juveniles: at about 40 mm SL individuals are rose to yellow dorsally and white ventrally, with body traversed by nine highly irregular slightly oblique bands of dark red- to rose-centred scales, each band two to three scales wide. Anteriormost band located on nape behind eye and extending to level of eye; bands two through six originating on dorsal fin; third through sixth bands marked by bold red blotches on scaly sheath of dorsal fin; bands four through six end on anal fin with similar although less strongly pigmented red blotches on scaly sheath of anal fin. Seventh and eighth bands on caudal peduncle, seventh ending in strongly pigmented red spot on posterior base of anal fin. Ninth band on base of caudal and most strongly pigmented on upper and lower margins of body at caudal flexure. Breast, ventral part of head, and lower jaw white crossed by about seven red bands, anteriormost on chin, last (and most prominent) extending ventrally from pectoral axil to base of pelvic fin. Iris alternately red and white with red pigmented areas continued as irregular red markings radiating from eye, the most prominent such marking extending posteriorly on operculum behind eye. Dorsal fin rosy, anterior ray tips red; dark blotch on outer portion of

membranes of first three spines. Anal fin pale except for ends of oblique bands extending onto it from body. Caudal fin clear except for reddish coloration on upper and lower margins and extending to tips of fin. Pectoral fins clear except for strongly pigmented narrow red band at base; pelvic fins white with red band across middle of fin.

By about 80 mm SL *C. brasiliensis* is quite differently coloured but elements of the earlier pattern can be distinguished. Body purple dorsally, golden on sides and ventrally; purple colour extension of red of younger individuals, golden pigment extending dorsally into dorsal fin as lines where inter-band pale pigment found in younger individuals. (These narrow

vertical lines are paler on the anterior third of the body appearing almost white.) Few darkly pigmented scales blotching purple areas of posterior dorsal scaly sheath. Prominent blotch behind snout and between eyes is bright carmine red as are the iris, the posterior edge of the upper lip, outer margin of dorsal fin (especially posteriorly), outer margin of anal fin, pectoral axilla, and much of pelvic fins. This same colour variably evident on random scales on caudal peduncle and sometimes on outer margins of caudal fin although sometimes same purple colour as body. Longest anterior pectoral ray purple to its tip.

Initial phase adults: Body and fins mauve to purple shading to golden or pale ventrally, gold sometimes as



Figs. 4a. (top) and **4b.** Underwater photographs of *Clepticus brasiliensis*, Fernando de Noronha, off northeastern Brazil. Photos by R. L. Moura (top) and J. B. Heiser (above).

extensive as from middle of dorsal fin to entire belly or as restricted as small patch on sides above anal fin. Dorsal fin scaly sheath darker than rest of body. Chin and breast pale or purple like that of rest of body. Iris red or golden. Dorsal fin colour same as adjacent part of body, often with iridescent blue green lines extending along each ray and parallel to rays on membranes, tips of dorsal spines pale purple to pink, posterior (soft) dorsal rays and membranes crimson. Anal fin colour same as adjacent body, except crimson on posterior (soft) rays and their membranes. Caudal clear centrally, crimson to purple on upper and lower lobes, beginning to extend as similarly-coloured filaments by this stage. Pectoral fins mostly red, especially anteriorly. Pelvic fins mostly red although plain white in some specimens.

Terminal phase adults: Body, median and paired fins mauve or purple to crimson, palest on breast, most deeply pigmented on posterior portions of dorsal and anal fins and on pectoral, pelvic, and caudal fins (including the numerous extended filaments). Sides, belly, and caudal peduncle suffused with gold, base of each golden scale crimson or purple like rest of body. Iris crimson, occasionally gold.

Etymology

Named *brasiliensis* in reference to the only known distribution of the species. The common name Brazilian Creole Wrasse is proposed.

Distribution

Clepticus brasiliensis is known from Recife Manuel Luís (0°52'S, 44°15'W) among the northernmost reefs within the Brazilian Province (*sensu* Briggs 1974) to the coastal islands off São Paulo State, southeastern

Brazil. It is also known from the oceanic archipelago of Fernando de Noronha, 345 km off the northeastern Brazilian coast. It has not however been collected from Saint Paul's Rocks, 960 km off the northeastern Brazilian coast (Lubbock and Edwards, 1981).

Remarks

Clepticus brasiliensis appears to be a Brazilian endemic, heretofore misidentified as its Caribbean counterpart (back cover photo), *C. parrae* (Menezes and Figueiredo, 1985; Carvalho-Filho, 1992), in spite of the fact that there is little colour pattern similarity and the posterior portions of the median fins in adult specimens of the two species are distinctive.

Clepticus brasiliensis occurs in a wide range of hard-bottom habitats from coral-rich areas in northern and northeastern Brazil, where there is a strong influence of the tropical Equatorial and Brazil Currents, to rocky-bottom habitats in southeastern Brazil, which are strongly influenced by the cold Falklands Current. Water temperature in collection sites ranged from 27°C (Recife Manuel Luís, northeastern Brazil) to 14°C (Laje de Santos, southeastern Brazil). Groups of the Brazilian Creole Wrasse, composed of dozens to hundreds of individuals, can be very common adjacent to open water above or just seaward of hard bottoms. They are frequently observed in aggregations with other diurnal planktivorous fishes, such as the serranid *Paranthias furcifer* and the pomacentrids *Chromis cf. multilineata* and *Abudefduf saxatilis*. The largest individuals range furthest seaward from the reef and *C. brasiliensis* is the planktivorous species in the community which feeds furthest out in the incoming currents. At night it is found close to the hard bottom, taking refuge in crevices. During the day it



Fig. 5. Underwater photograph of juvenile *Clepticus brasiliensis*, 38 mm SL, Ilha Escalvada, Guarapari, Espírito Santo, Brazil. Photo by J. L. Gasparini.

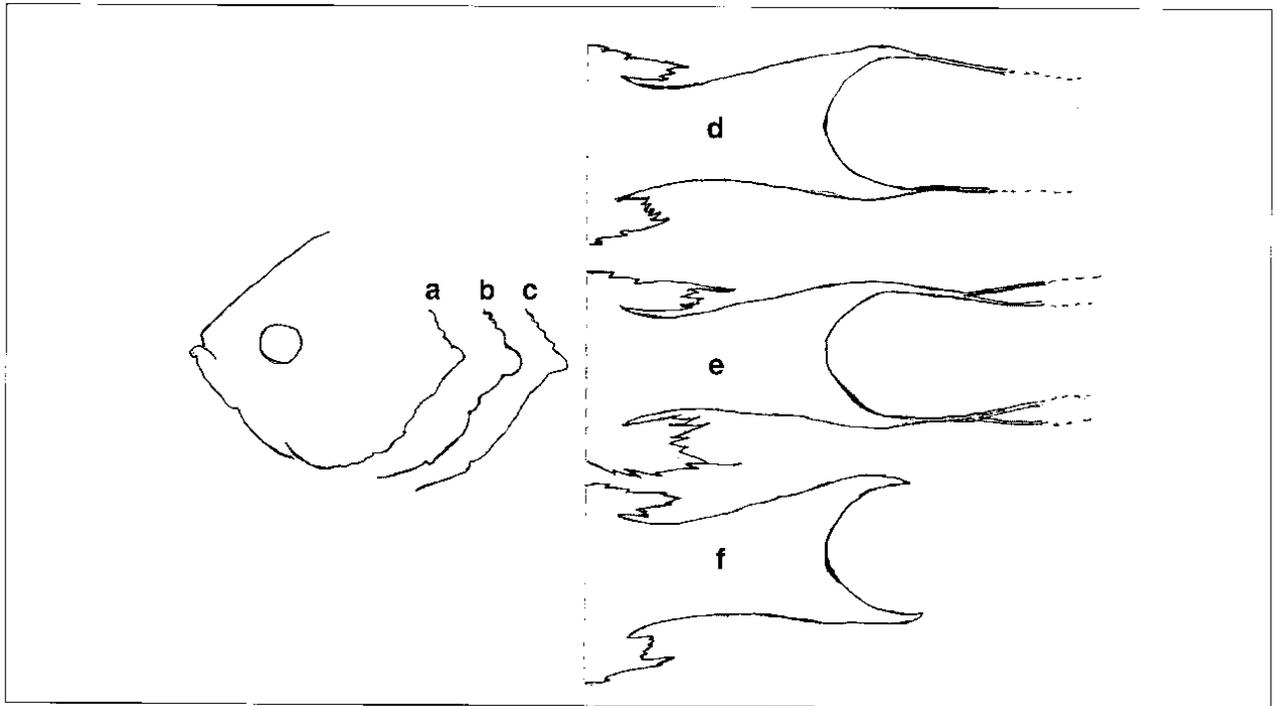


Fig. 6. Shape of opercular margin (a, b, and c) and posterior portions of median fins (d, e, and f) of *Clepticus africanus*, 175 mm standard length (a and d), *C. brasiliensis*, 186 mm SL (b and e), and *C. parrae*, 187 mm SL (c and f).

approaches the bottom only infrequently, usually when seeking to be cleaned by gobies of the genus *Elacatinus*.

Unlike *C. africanus*, and to a lesser extent *C. parrae*, *C. brasiliensis* is wary of divers and does not usually permit a close approach. Because of this and the peculiar nature of their pigmentation, adults appear pale blue at a distance from the observer of more than two metres, even when they are near the water's surface. Absorption in the water column alters the particular hue of their purple and red coloration and they are perceived as being entirely pale blue.

Discussion of affinities

The three species of *Clepticus* are unusually homogeneous in their morphometric and meristic characteristics. Regressions of common morphometric measurements against the standard length of the individual are linear from juvenile to largest sizes and are not statistically different for any species. These characters include: head length, body depth, pectoral fin length, pelvic fin length, caudal peduncle depth, length of dorsal fin base, length of anal fin base, and length of shortest caudal fin ray. The consistency of morphometric dimensions relative to standard length between species supports the hypothesis that the three species are closely related to one another.

Clepticus parrae populations are currently separated from *Clepticus brasiliensis* populations by about 2500 km of coastal South America consisting of "vast

stretches of mud bottom, and ... the mouths of great rivers ... [which] have greatly reduced salinities" and are thus devoid of coral reefs and exposed hard bottom environments (Briggs 1974). *Clepticus brasiliensis* and *C. africanus* are separated by at least 4500 km of open ocean without shallow water habitat. The one exception being Saint Paul's Rocks, a group of volcanic rocks exposed at 0°56'N, 29°22'W (about 560 km and 960 km roughly NE of Fernando de Noronha and Cape São Roque, Brazil, respectively). No *Clepticus* has been reported from these isolated rocks although the shorefish fauna consists primarily of species widespread in the tropical western Atlantic. The South Equatorial Current carries surface water from the Gulf of Guinea and the Cape Verde Islands across these exposed mountain tops before proceeding to the Brazilian coast, and the lack of West African affinities in the Saint Paul's fauna is puzzling (Debelius 1997).

In the few possible morphological synapomorphies that might be used to understand the inter-relationships of the three species of *Clepticus*, the similar extensions of the median fins into filaments shared by *C. africanus* and *C. brasiliensis* seem to us to be more informative than the shared colour hues (but not patterns) of *C. brasiliensis* and *C. parrae*. On morphological grounds it seems most likely that *C. africanus* and *C. brasiliensis* represent sister species. Molecular comparisons (in prep.) may be more revealing of the relationships and evolution of creole wrasses.

Acknowledgements

The authors would like to thank: Ivan Sazima (Universidade Estadual de Campinas) and Naércio A. Menezes (MZUSP) for helpful discussions; José L. Figueiredo and Osvaldo T. Oyakawa (MZUSP), Richard P. Vari and Susan Jewett (USNM), Carl Ferraris and David Catania (CAS) and George H. Burgess (UF) for allowing us to borrow and examine material in their care; João L. Gasparini for collecting specimens and allowing us to use his photographs; Andrew Muss for allowing us to use his photograph; Ronaldo B. Francini-Filho (MZUSP) for help in the lab and field; Guilherme E. L. Moura, Emilia Engelberg, and Marcelo C. M. Rodrigues for help in the field; Mauricio Villela, Fábio Pereira and Eleonora "Lolla" Fritsche for assistance in the field at Fernando de Noronha; Hennie F. Marias, Antonio Emidio da Cruz Esteves, Natalie Bolling, and Aaron Jones for assistance in the field in São Tomé and Príncipe; IBAMA, Instituto Forestal/SP, and SEMA/MA for allowing fish collection in the marine protected areas under their administration. Partial funding for this study came from grants to R. L. Moura from FAPESP (#98/03491-3) and a Short Term Fellowship provided by the Smithsonian Institution; to Ivan Sazima (FAPESP #96/5238-8); and to Naércio A. Menezes from FINEP/PRONEX-97 (#53/97).

References

- Afonso, P., Porteiro, F. M., Santos, R. S., Barreiros, J. P., Worms, J. & P. Wirtz.** 1999. Coastal marine fishes of São Tomé Island (Gulf of Guinea). *Arquipélago. Life and Marine Sciences*, **17 A**: 65-92. Ponta Delgada, Azores.
- Blache, J., Cadenat, J. & A. Stauch,** eds. 1970. Clés de Détermination des Poissons de Mer Signalés dans l'Atlantique Oriental. (*Faune Tropicale*, Vol. XVIII.) ORSTOM, Paris: 479 pp.
- Böhlke, J. E. & C. G. Chaplin.** 1993. *Fishes of the Bahamas and Adjacent Tropical Waters* (second edition). University of Texas Press, Austin: xxix +771 pp.
- Briggs, J. C.** 1974. *Marine Biogeography*. McGraw-Hill Book Company, New York: 475 pp.
- Brito, A.** 1991. *Catálogo de los Peces de Las Islas Canarias*. Francisco Lemus, La Laguna, Tenerife, Canary Islands: 230 pp.
- Carvalho-Filho, A.** 1992. *Peixes: costa brasileira* (second edition). Marca d'Água, São Paulo: 304 pp.
- Debelius, H.** 1997. *Mediterranean and Atlantic Fish Guide*. IKAN-Unterwasserarchiv Frankfurt, Germany.
- Gomon, M. F.** 1997. Relationships of fishes of the labrid Tribe Hypsigenyini. *Bulletin of Marine Science*, **60**(3): 789-871.
- Gonzalez Jimenez, J. F.** 1995. *Peces do Canarias: Guia Submarina* (second edition). Francisco Lemus, Santa Cruz de Tenerife, Canary Islands: 223 pp.
- Lieske, E. & R. Myers.** 1994. *Coral Reef Fishes: Caribbean, Indian Ocean and Pacific Ocean including the Red Sea*. Harper Collins Publishers, New York: 400 pp.
- Lubbock, R. & A. Edwards.** 1981. The fishes of Saint Paul's Rocks. *Journal of Fish Biology*, **18**: 135-157.
- Menezes, N. A. & J. L. Figueiredo.** 1985. *Manual de Peixes Marinhos do Sudeste do Brasil. V. Teleostei* (4). Museu do Zoologia, Universidade de São Paulo: 105 pp.
- Randall, J. E.** 1996. *Caribbean Reef Fish* (third edition). TFH Publications, Neptune City, New Jersey, USA: 368 pp.
- Reiner, F.** 1996. *Catálogo dos peixes do Arquipélago de Cabo Verde*. IPIMAR, Lisboa: 339 pp.
- Schneider, W.** 1990. *Field Guide to the Commercial Marine Resources of the Gulf of Guinea*. FAO, Rome: 268 pp. + XVI plates.
- Seret, B.** 1981. *Poissons de Mer l'Ouest Africain Tropical*. ORSTOM, Paris: 416 pp.
- Wirtz, P.** 1994. *Unterwasserführer Madeira - Kanaren - Azoren Fische*. S. Nagelschmid, Stuttgart: 159 pp.

ERRATA

aqua 4 (1): Pygmy Angelfish *Centropyge woodheadi* Kuitert, 1998, a Synonym of *C. heraldi* Woods and Schultz, 1953 - cover photo and **Fig. 1** (P. 2) captions should read: Juvenile of *woodheadi* form of *Centropyge heraldi*, BPBM 11315, 27 mm SL, Tutuila, American Samoa. Photo by J. E. Randall - and captions of **Fig. 2** (P. 3) should read: Underwater photograph of adult of *Centropyge heraldi*, Enewetak Atoll, Marshall Islands. Photo by J. E. Randall.