

NEW RECORDS OF GALÁPAGOS FISHES

By: John E. McCosker and Paul H. Humann

INTRODUCTION

The shorefishes of the Galápagos Islands have received considerable attention in recent years with the advent of modern scuba diving and improvements in underwater photography. Since 1977, Humann has made more than 1,400 dives throughout the archipelago and, in preparation for the publication of his Galápagos Reef Fish Identification Guide (Humann 1993), discovered that many of his subjects were previously unknown, unreported and, in several cases, new to science. McCosker has made several trips to Galápagos and has also discovered new species and new records of fishes otherwise known from elsewhere in the eastern Pacific or from the Indo-Pacific.

The most recent estimates of the Galápagos ichthyofauna indicated approximately 325 shorefish species distributed among 92 families (McCosker and Rosenblatt 1984; McCosker 1987; and subsequent new records and species descriptions). As well, the recent El Niño events that have occurred in the eastern Pacific have added additional examples of Indo-Pacific fishes to the Galápagos (Grove 1985); however it is unlikely that many of them will establish reproducing populations. We add the following 13 new records of species previously unknown from Galápagos. Species common to the eastern Pacific mainland include: *Triakis maculata* (Spotted Houndshark); *Elops affinis* (Ten Pounders); *Uraspis helvola* (Cotton Mouth Jacks); *Haemulon sexfasciatum* (Graybar Grunt); *Hemilutjanus macrophthalmus* (Ojo de Uva); and *Kathetostoma averruncus* (Smooth Stargazer). New records of species common to the Indo-Pacific include: *Gymnothorax meleagris* (Whitemouth Moray); *Forcipiger flavissimus* (Long-nosed Butterfly Fish); *Thalassoma purpureum* (Surge Wrasse); *Naso brevirostris* (Spotted Unicornfish); *N. vlamingii* (Bignose Unicornfish); and

Cylichthys spilostylus (Yellow-spotted Burrfish). *Guentherus altivela*, also a new record, is from the southeast Atlantic and the eastern Pacific.

ACCOUNTS

Family Triakidae

Triakis maculata Kner and Steindachner 1866

An adult female Spotted Houndshark, \approx 170 cm TL, was captured with hook and line above a 6-8 m bottom by McCosker on 25 July 1980 at Punta Espinosa, Isla Fernandina. It was photographed (Figure 1) and examined, then released alive. Its identification was verified by from the photograph and description (personal communication, L. J. V. Compagno). *Triakis maculata* ranges from Peru to northern Chile, includes *Mustelus nigromaculatus* Evermann and Radcliffe (1917) in its synonymy, and may reach 240 cm (Compagno 1984).

Family Muraenidae

Gymnothorax meleagris Shaw and Nodder 1795

An adult specimen of the Whitemouth Moray, *Gymnothorax meleagris*, was seen and photographed in March 1989, by Humann (1993, p. 175) off Cousins Rock, Isla Santiago, over a boulder strewn bottom at approximately 15 m depth. This species is unmistakable in appearance, and this individual represents the first example reported from the eastern Pacific Ocean. It is common in shallow tropical waters from Hawaii westward to the coast of Africa (Gosline and Brock 1960; Castle and McCosker 1986). Previously reported records of *G.*

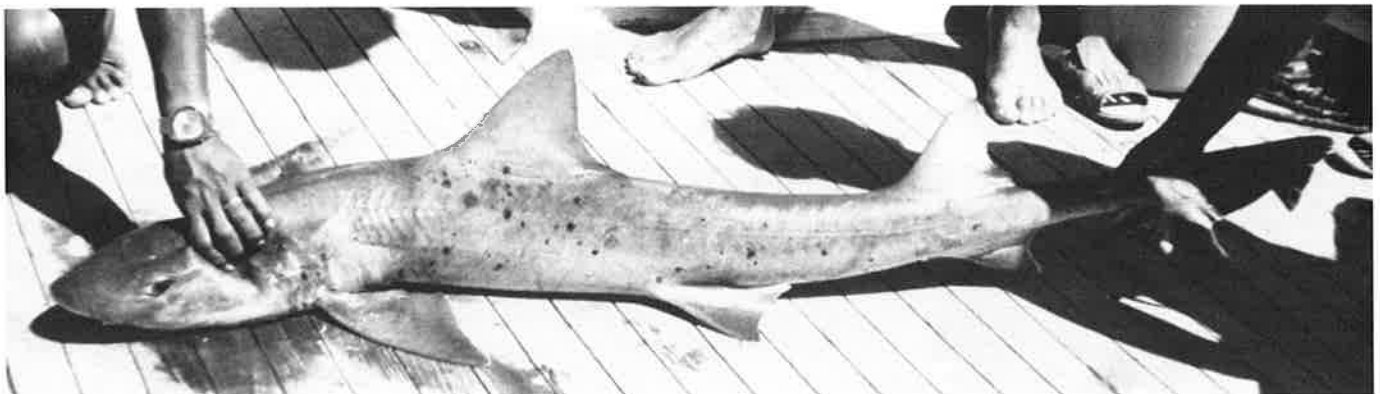


Figure 1. Adult female *Triakis maculata* (Spotted Houndshark), \approx 170 cm total length, captured above a 6-8 m bottom at Punta Espinosa, Isla Fernandina, 25 July 1980.

meleagris from the Red Sea are based on mis-identified specimens of *G. buroensis* (Randall and Golani 1995).

McCosker and Rosenblatt (1975) reviewed the morays of the Galápagos and reported upon 16 species, four of which are also widely distributed in the Indo-Pacific. McCosker et al. (1984) subsequently recognized the eastern Pacific *Uropterygius necturus* (Jordan and Gilbert) to be a junior synonym of *U. macrocephalus* (Bleeker). Bussing (1991) described McCosker and Rosenblatt's "*Uropterygius sp.*" as *U. versutus*. The presence of *G. meleagris* in Galápagos brings the number of muraenids common to the eastern Pacific and Indo-Pacific to 11 (see Rosenblatt et al. 1972; McCosker and Rosenblatt 1975), including: *Echidna nebulosa*, *Enchelycore lichenosa*, *Enchelynassa canina*, *Gymnothorax buroensis*, *G. flavimarginatus*, *G. meleagris*, *G. undulatus*, *Gymnomuraena zebra*, *Scuticaria tigrina*, *Siderea picta*, and *Uropterygius macrocephalus*.

Family Elopidae

Elops affinis Regan 1909

Also known as Ten Pounders, Lady Fish, or *Chiro*, *Machete* are found in shallow inshore areas between Peru and southern California. We report them from Galápagos on the basis of our sightings and photographs (Humann 1993, p. 51) off Roca Redonda at 3-5 m beneath the surface, above a boulder bottom at 15 m depth. We presume them to be *E. affinis*, the only species known to inhabit the eastern tropical Pacific (Whitehead 1962).

Family Carangidae

Uraspis helvola Forster, 1801

We occasionally observed, and photographed (Humann 1993, p. 39), large schools of Cottonmouth Jacks off Darwin, Wolf, and Roca Redonda. We now cautiously identify this species as *U. helvola*, rather than *U. secunda* (Poey, 1860), until a generic revision is completed (pers. comm. W. F. Smith-Vaniz). In the eastern Pacific, it is also found from southern California to Costa Rica, typically near offshore islands.

Family Haemulidae.

Haemulon sexfasciatum Gill 1862

We observed and photographed (Humann 1993, p. 57) schools of adult Graybar Grunt at several Galápagos locations between 7-15 m depth, including the channel between Baltra and North Seymour, the north shore of Española off Isla Gardner, Corona del Diablo off Isla Floreana, and Cabo Marshall, Isla Isabela. It is unmistakable in coloration and is one of the commoner nearshore grunts living between the Gulf of California and Panama.

Family In Question

Hemilutjanus macrophthalmus Tschudi 1845

Humann regularly observed and photographed (Humann 1993, p. 65) groups of *Ojo de Uva* below 30 m at Punta Vicente Roca. McCosker observed three individuals at 35 m along the north entrance to Tagus Cove, Isla Isabela. They were \approx 25 cm in length and hovered about 1 m above the rocky bottom. *Ojo de Uva* have previously been reported from the coasts of Perú and Chile where it is captured by fishermen using handlines over rocky bottoms (Hildebrand 1946). The familial relationships of *Hemilutjanus* are poorly understood, however recent studies (Johnson 1984) have determined that although it looks much like a snapper, it does not belong within the Lutjanidae.

Family Chaetodontidae

Forcipiger flavissimus Jordan and McGregor 1898

Humann photographed (Humann 1993, p. 29) adults of the Long-nosed Butterfly fish on numerous occasions at Isla Darwin (May 1991, November 1992, April and May 1993) and once at Wolf (May 1993). In each case they were swimming over rocky, boulder strewn bottoms between 8-10 m. *Forcipiger flavissimus* is widely reported from throughout the Pacific and Indian oceans (Burgess 1978). In the eastern Pacific, it is also known from Easter Island, the Revillagigedo Islands, Clipperton Island, and Cabo San Lucas.

Family Labridae

Thalassoma purpurum (Forrsk=E51 1775)

Humann observed numerous individuals of the Surge Wrasse (Figure 2) at Isla Darwin during May and November 1994. They were appropriately swimming within the surge zone at about 3-4 m depth. This species is widespread in the Indo-Pacific and known from the Red Sea to the Hawaiian, Marquesan, and Easter islands, north to southern Japan and throughout Micronesia (Myers 1989). Randall (1995, p. 675) reported its occurrence at Clipperton Island.

Family Ateleopodidae

Guentherus altivela Osorio 1917

A postlarval specimen of *Guentherus altivela* was collected by Andre De Roy on 12 June 1978 using a benthic shell dredge in 200 m, south of Isla Santa Cruz. The damaged and poorly preserved specimen (Figure 3, CAS 47468) has the following counts and measurements (mm): standard length 109; head length 27; snout length 6.5; upper

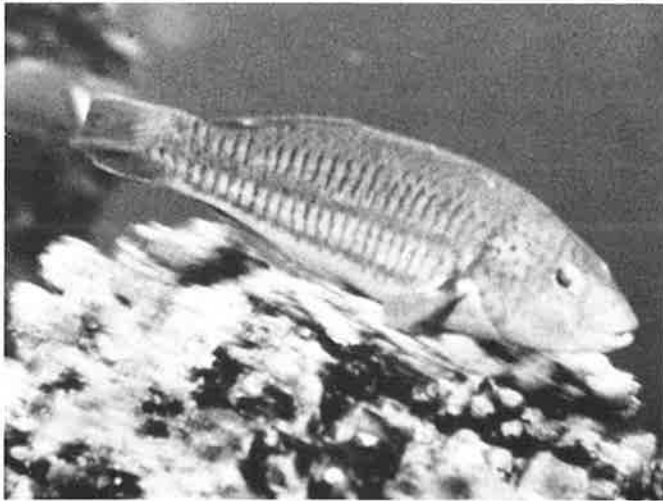


Figure 2. Adult *Thalassoma purpuraceum* (Surge Wrasse) photographed by Humann at 1-4 m depth in the surge zone off Isla Darwin in 1994.

jaw length 13.5; eye diameter 5.3; preanal length 44; tail length 65; dorsal fin rays 12; anal fin rays 75; caudal fin rays 11; pectoral fin rays 14; pelvic fin rays 11, the last two joined at their base; upper gill rakers 5; lower gill rakers 18. The specimen is too poorly ossified to allow a vertebral count to be made and fins were too damaged to allow accurate length measurements. The coloration of this nearly gelatinous specimen is similar to that of the 104.5 mm postlarva illustrated in Bussing and Lopez (1977), and possesses ten black smudged bands over a cream colored body, black fin edging, and spots (about equal to the eye in size) on the head.

Guentherus altivela is known from 360-700 m depth off southwest Africa to the Cape of Good Hope, and from Panama and Costa Rica in the eastern Pacific, between 220-302 m depth (Bussing and Lopez 1977). Their eastern

Pacific specimens did not differ significantly from the Galápagos specimen in either counts or measurements.

Family Acanthuridae

Naso brevirostris Valenciennes 1835

McCosker was advised by Tui De Roy in 1984 that she had seen a "unicorn-snouted" surgeonfish off Islas Darwin and Wolf. Subsequent observations and photographs confirmed the presence of the Spotted Unicornfish by Humann along the northern edge of Isla Darwin in 10 m in November 1993, suggesting to us that De Roy had also seen *N. brevirostris*. The Spotted Unicornfish is easily recognized on the basis of its head profile (Figure 4) and coloration, and is well-known from the Red Sea to the Hawaiian, Marquesan, and Ducie islands, north to southern Japan, south to Lord Howe Island, and throughout Micronesia (Myers 1989). This represents the first record of its existence within the eastern Pacific.

Naso vlamingii Valenciennes 1835

We observed and photographed Bignose Unicornfish on separate occasions at the south side of Isla Darwin above 12 m depth in November 1993, and at 18 m off the north end of Isla Wolf in May 1994. The absence of a nasal horn, the elongate caudal filaments, and the blue bar beneath the eye identify this species (Figure 5). This represents the first eastern Pacific record for this species; in the Indo-Pacific it is known from East Africa to the Line, Marquesan, and Tuamotu islands, north to southern Japan, south to the southern Great Barrier Reef and New Caledonia, and throughout Micronesia (Myers 1989).

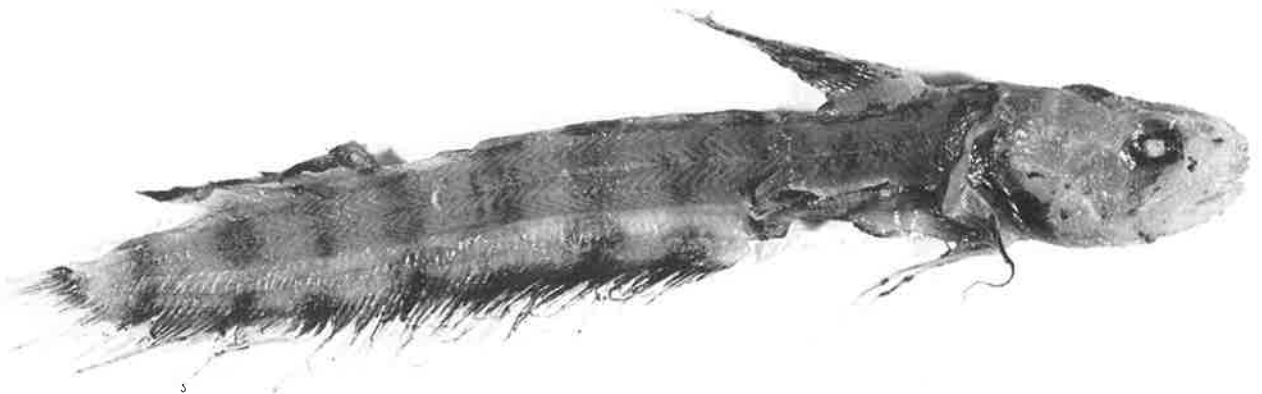


Figure 3. Postlarval specimen of *Guentherus altivela* (CAS 47468) collected by Andre De Roy in 200 m, south of Isla Santa Cruz.

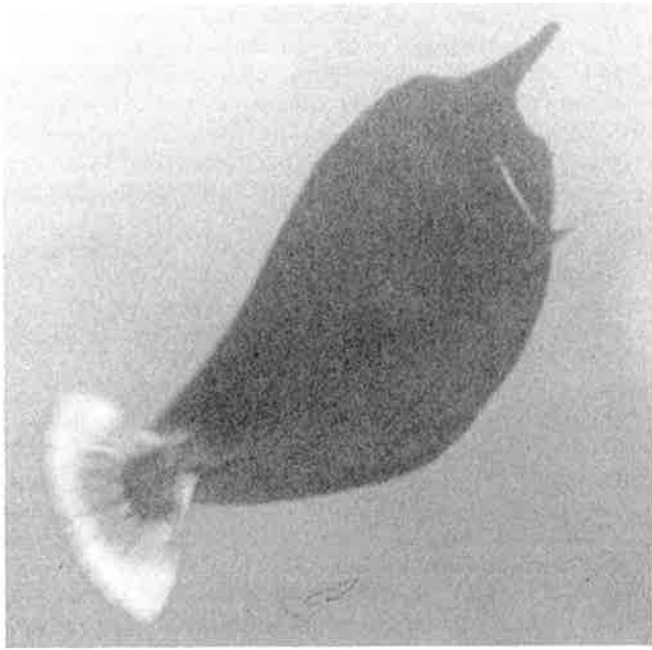


Figure 4. Adult *Naso brevirostris* (Spotted Unicornfish), photographed by Humann at 10 m at Isla Darwin, November 1993.

Family Uranoscopidae

Kathetostoma averruncus Jordan and Bollman 1890

A 117 mm (standard length) Smooth Stargazer (CAS 47470) was captured using a "coffee can dredge" by Andre De Roy in the Galápagos, location unidentified. *Kathetostoma averruncus* was described from specimens collected off Colombia and includes *K. ornatus* Wade (1946) from the San Benito Islands, Baja California, in its synonymy. The Smooth Stargazer inhabits sand bottoms over a wide range of depth (13-384 m) and is recorded from central California to Peru (Eschmeyer and Herald 1983).

Family Diodontidae

Cylichthys spilostylus Leis and Randall 1982

An adult Yellow-spotted Burrfish was first seen and photographed in March, 1978 (Humann 1993, page 151), hiding beneath a ledge at 15 m at Tagus Cove, Isla Isabela. Humann observed a second specimen in November, 1994, at 20 m depth off Punta Vicente Roca, Isla Isabela. Described as *Chilomycterus spilostylus*, this burrfish has been subsequently referred to *Cylichthys* and is known from the Red Sea, South Africa to the South China Sea, the Philippines, Japan, and Australia (Leis 1986, Matsuura et al. 1993).



Figure 5. Adult *Naso vlamingii* (Bignose Unicornfish), photographed by Humann at 18 m at the north end of Isla Wolf, May 1994.

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MOLECULAR GENETICS AND CONSERVATION IN THE GALAPAGOS

By: Kornelia Rassmann

INTRODUCTION

For more than a century Galápagos has served evolutionary biologists as a natural laboratory for their studies. A major goal has been to describe the unique morphological and behavioral adaptations evolved by the diverse life forms of Galápagos organisms in response to their forbidding environment and to understand how these specializations have come about. Because the basic material of evolutionary changes are genes, understanding the genetic mechanisms of these processes has been an important step. Models derived from theories of population genetics can illustrate the processes influencing the genetic composition of populations or species, and therefore constitute an important part of current evolutionary research. These models attempt to describe the current genetic status of evolutionary systems, e.g. the amount of genetic variation within or among populations, and estimate the future prospects of populations with regard to their genetic composition. At the same time, the genes

and the gene composition of a species or population serve as a record of the evolutionary events that occurred in its past and thus provide information on its historical - or phylogenetic - background.

In a rather sad way, population genetic and phylogenetic theory may become increasingly important for the practical aspects of research in the Galápagos. Over the past few centuries the populations of several endemic or native species declined, bringing some of them close to extinction and extirpating a few. The major reasons for these declines include predation by feral animals, habitat destruction and competition for resources by non-indigenous plants and animals introduced to the islands by humans, and human exploitation of indigenous species and their natural habitat (Trillmich 1992). Of course, there are also non-human-induced causes threatening Galápagos' fauna and flora. Sudden catastrophic events such as volcanic eruptions or epidemic diseases may endanger specific populations. Of more global nature are environmental changes such as the recurrent El Niño events -