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Additions to the marine fish fauna of the US Virgin Islands (2024)

D. ROSS ROBERTSON
Smithsonian Tropical Research Institute, Balboa, Panama
https://orcid.org/0000-0003-3972-149X Email: robertsondr@si.edu

ALASDAIR G. DUNLAP-SMITH
50 Tug Mountain Road, Orange, New Hampshire 03741, USA
E-mail: xiphocaris@gmail.com

ANDRE MICHAEL GOOLISHIAN HERNANDEZ
5000 Estate Enighed, PMB 337, St. John, USVI 00830, USA
Email: A.goolash@gmail.com

LEE RICHTER
National Park Service, 1300 Cruz Bay Creek, St. John USVI 00830, USA
https://orcid.org/0009-0002-1611-0063 Email: lee_richter@nps.gov

SARA RICHTER
2602 Fish Bay #1, St. John, USVI 00830, USA
Email: sara.richter747@gmail.com

SERENITY MITCHELL
5000 Estate Enighed, PMB 337, St. John, USVI 00830, USA
Email: serenity1mitchell@gmail.com

CARLOS J. ESTAPE
197 Gulfview Drive, Islamorada, FL 33036, USA
https://orcid.org/0000-0001-8540-9101 Email: carlos.allison@me.com

ALLISON MORGAN ESTAPE
197 Gulfview Drive, Islamorada, FL 33036, USA
https://orcid.org/0000-0002-2279-8987 Email: allison.carlos@me.com

BENJAMIN C. VICTOR
Ocean Science Foundation, 4051 Glenwood, Irvine, CA 92604, USA
Guy Harvey Research Institute, Nova Southeastern University, 8000 North Ocean Drive, Dania Beach, FL 33004, USA
https://orcid.org/0000-0002-8728-9585 E-mail: ben@coralreeffish.com

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Abstract

In 2022, a comprehensive, curated, updated list of the marine fish fauna of the US Virgin Islands drew on existing published sources of information, museum records available from online databases of various museums, mtDNA-barcode sequences available from GenBank and BOLD, new collections of specimens, and an extensive set of underwater photographs of fishes from St. Croix, St. John, and St. Thomas. Robertson et al. (2022a) documented 561 species from St. John and St. Thomas, which are only 3.5 km apart on the eastward extension of the shallow Puerto Rican shelf, and 585 species from St. Croix, which is isolated from the other two islands by 45 km of deep water. Since the 2022 inventory, some of the authors have continued to collect data on reef fishes in the area and here we report on the addition of 18 species of reef-associated fishes and one non-reef species (and also one subtraction) to the marine fauna of St. John and St. Thomas and three reef-associated species to the fauna of St. Croix, raising the totals to 579 and 588 species respectively.

Key words: Caribbean, West Atlantic, coral reef fishes, species list, inventory, ichthyofauna, ichthyology, taxonomy, DNA barcoding, photo-documentation

Introduction

The US Virgin Islands (USVI) comprise a US territory of three major islands, St. Croix, St. John, and St. Thomas. These islands lie close together at the northeast corner of the Antillean chain of islands, which form the eastern boundary of the Caribbean Sea. The USVI, and the nearby US territory of Puerto Rico, which shares the same patch of shallow shelf as St. John and St. Thomas (hereafter St. John/Thomas), have a long history of research documenting their marine fish faunas. Robertson et al. (2022a) published an updated curated checklist of the marine fishes of the US Virgin Islands, expanding on two historical reviews by Dennis (2000) and Smith-Vaniz & Jelks (2014). The 2022 checklist incorporated data from online databases of museum records, together with with recent collections of fishes for DNA-barcoding studies and photographic documentation of fishes underwater by teams of divers. At that time, the photo-documentation covered 372 species from St. John/Thomas plus 11 not previously recorded from St. Croix. That publication increased the number of marine fishes known from those islands by 39.9% to 491 species for St. John and immediately adjacent St. Thomas and 7.5% to 585 species for St. Croix. An addendum later in 2022 (Robertson et al. 2022b) removed one species and added another for the St. John/Thomas fauna.

Reef-associated bony fishes represent 84% and 91% of the species listed in the St. John/Thomas and St. Croix faunas, respectively, in the 2022 paper. Since the publication of that study, the authors responsible for the compilation of photographic vouchers have continued to photograph additional species and collected some of those for taxonomic examination and DNA-sequencing. Here we compile and evaluate the new records and provide photo-documentation for each species.

Methods

Various coauthors photographed fishes during work and recreational dives in the vicinity of St. John, St. Thomas, and St. Croix in 2023 and 2024. Fishes in those photographs were identified and compared to the 2022 checklist of species to determine which represent new records. Prior to submission of this paper, records for each of the added species available in GBIF (https://www.gbif.org) were checked to confirm those listed here are indeed new records. Specimens of some species collected were DNA-barcoded (sequenced for the mitochondrial COI gene) to assist in identification (a process that consumed the entire specimen in each case). The sequences were compiled and analyzed on the Barcode of Life database (BOLD; www.boldsystems.org), where sequences are algorithmically assigned to BINs (lineages). If the sequence matched to a lineage with a reviewed voucher specimen (including the collected specimens from this project) and to the exclusion of other related species on the database, the sequence was considered to confirm the identification.

New records for the St. John/Thomas fauna (in alphabetic order)

Acanthemblemaria chaplini Bohlke, 1957: Papillose Blenny (Chaenopsidae)

Distribution: southeast Florida and Bahamas to Puerto Rican plateau, and separately in central Panama. **Distinguishing characteristics:** short knobby spines on low ridges between eyes with a row of papillae; supraorbital cirri branched in one plane with multiple short finger-like tips; color variable, including yellow with an orange eye.

Fig. 1. *Acanthemblemaria chaplini,* Hawksnest Beach, St. John, 18.347°, -64.781°, limestone substratum <1 m depth (left: A. Hernandez; right: C.J. Estape).

Acyrtus lanthanum Conway, Baldwin & White, 2014: Orange-spotted Clingfish (Gobiesocidae)

Distribution: Bahamas and scattered Caribbean locations, including St. Croix and near Puerto Rico. **Distinguishing characteristics:** of 4 Greater Caribbean species of *Acyrtus*, only *A. lanthanum* has three dark vertical bars on body with intervening scattered dark dashes and fins with dark dots (see caudal fin here); red coloration may be a nocturnal pattern.

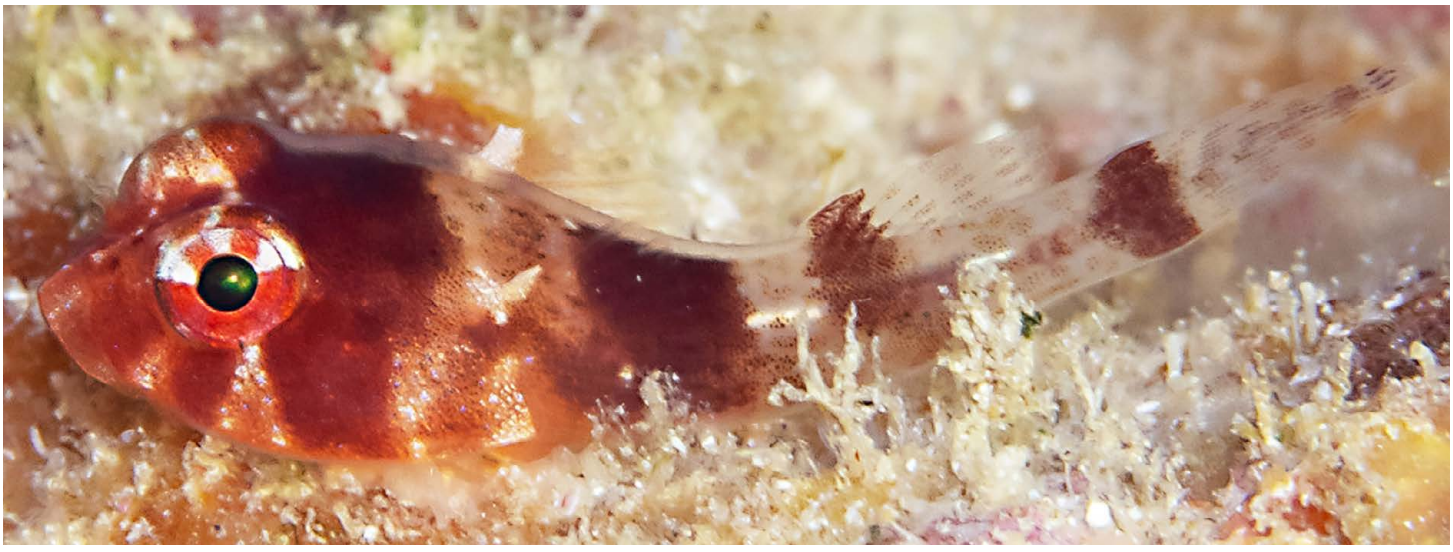


Fig. 2. *Acyrtus lanthanum,* The Stragglers off Great St. James Island, 18.3029°, -64.8365°, night dive, 10 m depth (A. Hernandez).

Cosmocampus albirostris (Kaup, 1856): Whitenose Pipefish (Syngnathidae)

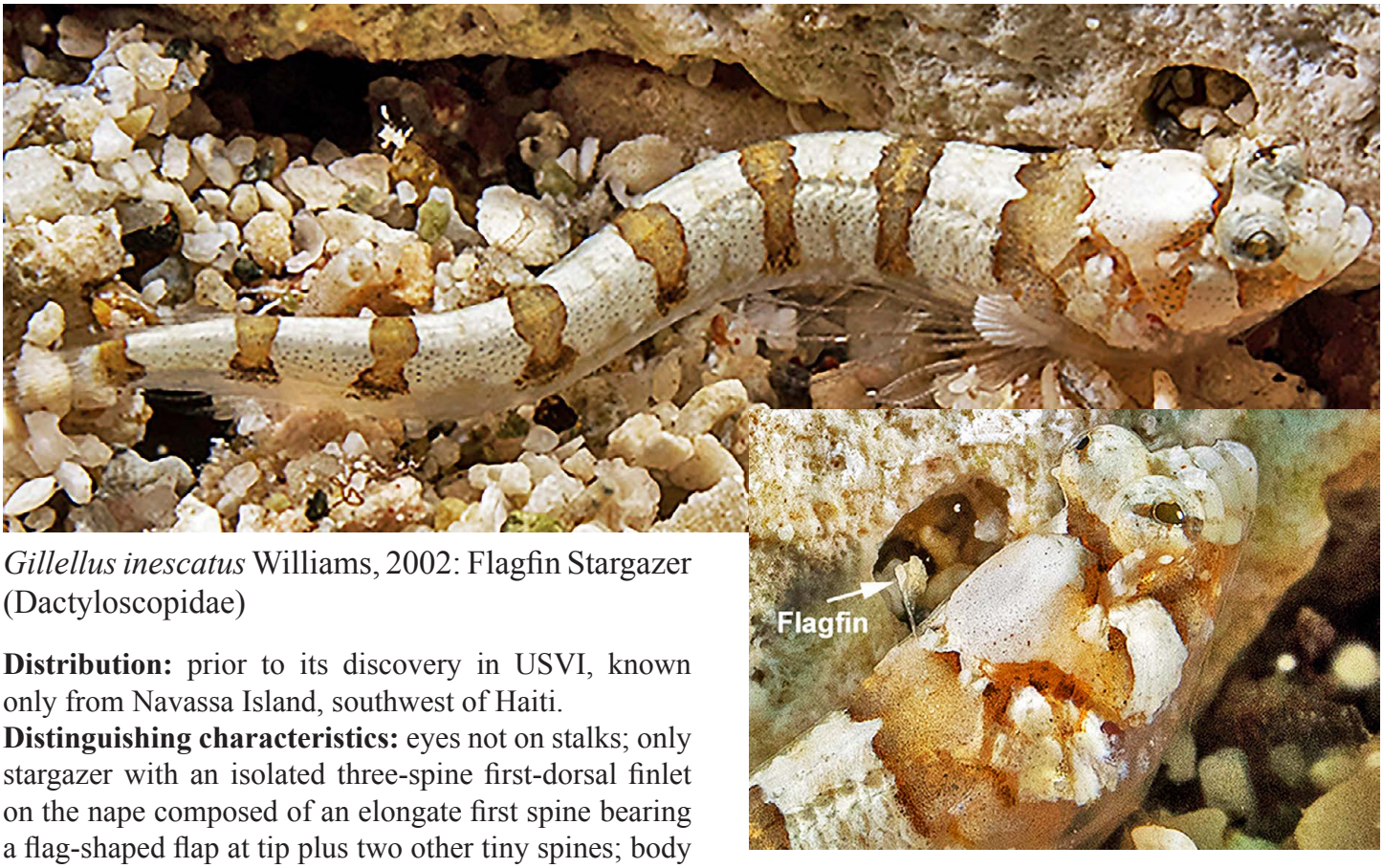
Distribution: southeast USA, Bahamas, Bermuda, Gulf of Mexico and scattered Caribbean locations, including St. Croix and Puerto Rico.
Distinguishing characteristics: only pipefish in Greater Caribbean with a short, white-to-translucent snout.

Fig. 3. *Cosmocampus albirostris*, off Annaberg, St. John, 18.3653°, -64.7324°, about 6 m depth (L. Richter).

Enneanectes quadra Victor, 2017: Squaretail Triplefin (Tripterygiidae)

Distribution: Bahamas, western and northeast Caribbean including St. Croix.
Distinguishing characteristics: body bars vertical (not slanted rearwards), last bar on body much darker and wider and with square corners (DNA-barcode identification confirmed).

Fig. 4. *Enneanectes quadra*, juvenile, 9.1 mm SL, Fish Bay, St. John, 18.3167°, -64.7632° (L. Richter).



Gillellus inescatus Williams, 2002: Flagfin Stargazer (Dactyloscopidae)

Distribution: prior to its discovery in USVI, known only from Navassa Island, southwest of Haiti.
Distinguishing characteristics: eyes not on stalks; only stargazer with an isolated three-spine first-dorsal finlet on the nape composed of an elongate first spine bearing a flag-shaped flap at tip plus two other tiny spines; body with 8 long dark vertical bars between nape and caudal fin (DNA-barcode identification confirmed).

Fig. 5. *Gillellus inescatus*, Little St. James Island, 18.299°, -64.830° (A. Hernandez).

Gillellus jacksoni Dawson, 1972: Jackson's Stargazer (Dactyloscopidae)

Distribution: western to southern Caribbean, Lesser Antilles, including St. Croix.
Distinguishing characteristics: eyes not on stalks; isolated first-dorsal finlet of three spines on nape; body with or without 6 or more long, thin dark vertical bars from nape to caudal fin base, with intervening short bars; distinguished from similar *G. greyae* (also present in USVI) by fewer skin flaps on lower-lip, fewer anal-fin rays and fewer lateral-line scales (DNA-barcode identification confirmed).

Fig. 6. *Gillellus jacksoni*, Haulover Bay, St. John, 18.3455°, -64.8309° (A. Hernandez).

Gobulus myersi Ginsburg, 1939, Paleback Goby (Gobiidae)

Distribution: Gulf of Mexico, Bahamas, and Caribbean, including Puerto Rico.
Distinguishing characteristics: only goby in region with horizontally bicolored head and body, dorsal bright white and ventral dark brown; dark curved bar at base of caudal fin.

Fig. 7. *Gobulus myersi*, Great Lameshur Bay, St. John, 18.3127°, -64.7235°, depth 13 m, around and under small rubble fragments in sand, adjacent to the reef. (A. Dunlap-Smith).

Labrisomus conditus Sazima, Carvalho-Filho, Gasparini & Sazima, 2009: Masquerader Hairy Blenny. (Labrisomidae)

Distribution: Florida, scattered Caribbean locations to Brazil.
Distinguishing characteristics: *Labrisomus* species have thick lips and a relatively long snout; first dorsal-fin spine shorter than third; opercular ocellus absent or with an irregular or poorly defined ring, often orange smudged.

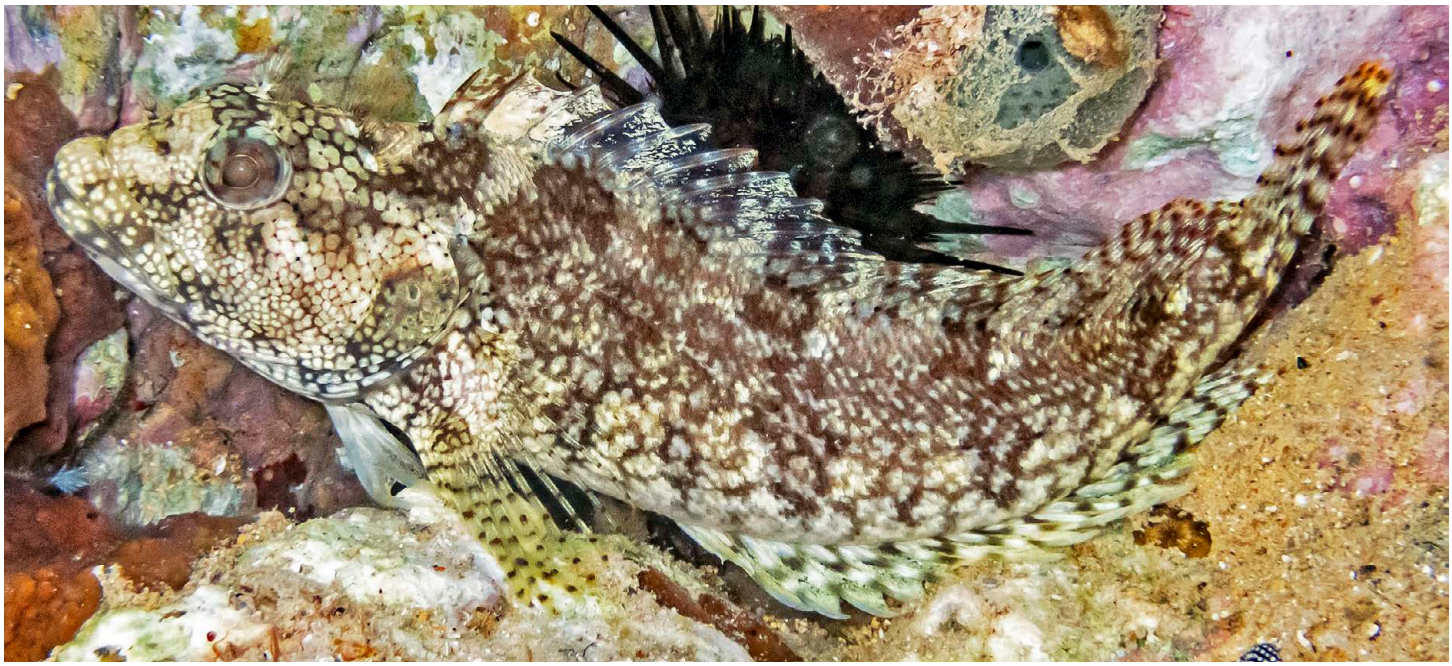


Fig. 8. *Labrisomus conditus*, White Cliffs, St. John, 18.316°, -64.736° (L. Richter).

Leurochilus acon Bohlke, 1968: Smoothlip Stargazer (Dactyloscopidae)

Distribution: Bahamas to northern Lesser Antilles, including British Virgin Islands and St. Croix.
Distinguishing characteristics: dwarf species; head conical; eyes large, not on stalks; lips and eyes without skin flaps; rear edge of operculum with a broad fleshy flap with a few short points along edge; isolated three-spine finlet in front of (sometimes) notched dorsal fin; head, nape, and belly scaleless (DNA-barcode identification confirmed).

Fig. 9. *Leurochilus acon*, West Little St. James Island, 18.2977°, -64.8304° (A. Hernandez).

Liopropoma carmabi Randall, 1963: Candy Basslet (Liopromatidae)

Distribution: southeast Florida, Bahamas, southwest Gulf of Mexico and Caribbean, including St. Croix and Puerto Rico.
Distinguishing characteristics: bright, full-length purple and yellow-orange stripes; caudal fin with two separated black blotches at upper and lower corners; blue-ringed black ocellus on second dorsal fin; no ocellus on anal fin (vs. similar *L. rubre* with an anal-fin ocellus). (Record has already been added to GBIF (https://www.gbif.org)

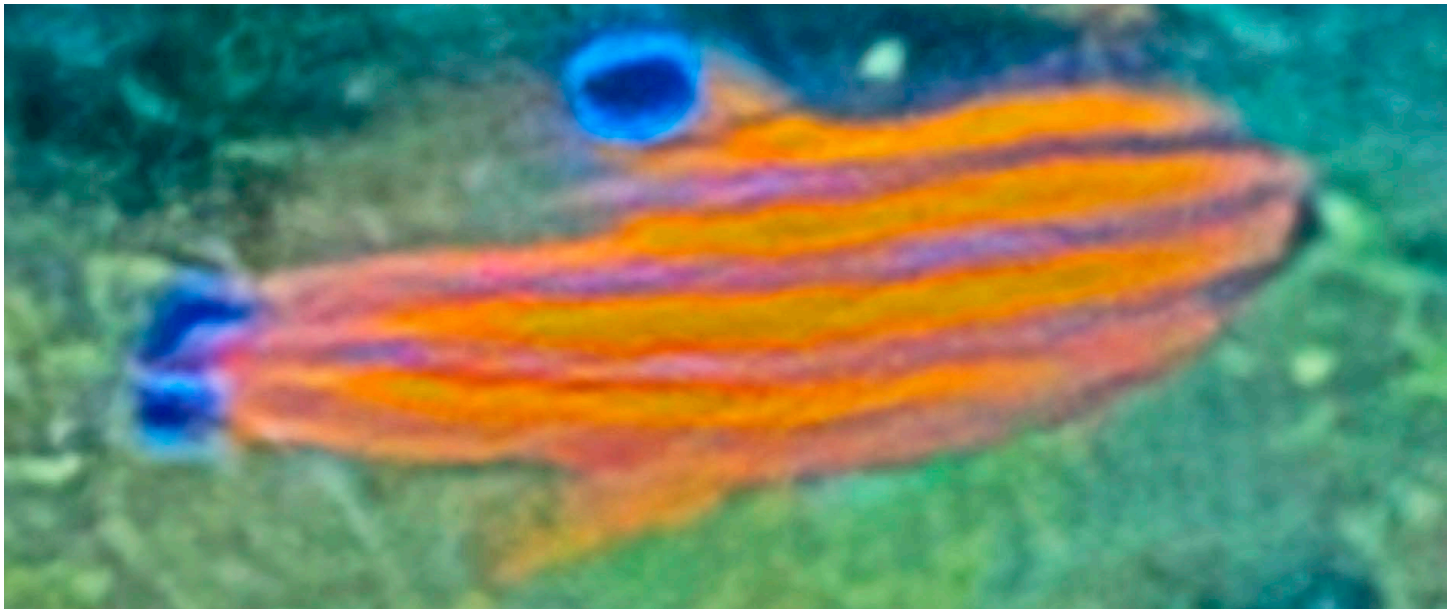


Fig. 10. *Liopropoma carmabi,* Grammanik Reef, St. Thomas, 18.1886°, -64.9578°, 42 m depth, near the outer edge of the shallow platform extending south of St. Thomas (L. Richter).

Ogilbia sabaji Moller, Schwarzhans & Nielsen, 2005: Curator Brotula (Dinematichthyidae)

Distribution: southeast Florida, Bahamas and Lesser Antilles, but not previously known from Virgin Islands or Puerto Rico.

Distinguishing characteristics: caudal fin separate from dorsal and anal fins; pelvic fins a single ray each side, under throat; lowest median fin-ray counts (D-66 A-52) for Caribbean *Ogilbia*; pelvic fins not reaching anus (DNA-barcode identification confirmed).

Fig. 11. *Ogilbia sabaji*, West Flanagan, St. John, 18.3268°, -64.6523°, 32 mm SL, under rock in seagrass, 7.5 m depth (A. Hernandez).

Fig. 12a. *Ophidion nocomis*, settling larva, 37 mm SL, Haulover Bay South, St. John, 18.3463°, -64.6801°, on shallow sand ledge (A. Hernandez).

Ophidion nocomis Robins & Bohlke, 1959: Letter-opener Cusk-eel (Ophidiidae)

Distribution: Bahamas, few scattered Caribbean locations, including Puerto Rico.
Distinguishing characteristics: very long dorsal and anal fins continuous with caudal fin; pelvic fins two long filaments each side, under jaw; snout with finger-shaped downcurved central rostral spine (not visible); highest median fin-ray counts (D-146 A-134) for Caribbean *Ophidion*; pale translucent and silver, no distinctive coloration or markings (DNA-barcode identification confirmed).

Fig. 12b. *Ophidion nocomis*, juvenile, Great Lameshur Bay, St. John, 18.3143°, -64.7222°, at 7.5 m depth, disturbed fish burrowed into sand tail-first (A. Dunlap-Smith).

Otophidium chickcharney Bohlke & Robins, 1959: Ghost Cusk-eel (Ophidiidae)

Distribution: Bahamas and Lesser Antilles, but not previously known from Virgin Islands or Puerto Rico.
Distinguishing characteristics: very large eye; very long dorsal and anal fins continuous with caudal fin; pelvic fins under jaw, two long filaments each side; snout with anvil-shaped midline rostral spine (not visible); nape with dark anchor-shaped mark on top of head (DNA-barcode identification confirmed).

Fig. 13. *Otophidium chickcharney*, 78 mm SL, Great Lameshur Bay, St. John, 18.3143°, -64.7222°, disturbed fish burrowed into sand tail-first (A. Dunlap-Smith).

Otophidium omostigma (Jordan & Gilbert, 1882): Polkadot Cusk-eel (Ophidiidae)

Distribution: North Carolina to northeast and southwest Gulf of Mexico, and Saba in Lesser Antilles.
Distinguishing characteristics: very large eye; long dorsal and anal fins continuous with caudal fin; pelvic fins under jaw, each composed of two long filaments; snout with short spiked midline rostral spine (not visible); lowest median fin-ray counts (D-<110, A-<88) for Greater Caribbean relatives; black shoulder spot, dark patches along upper body and at front of dorsal fin (DNA-barcode identification confirmed).

Fig. 14. *Otophidium omostigma*, Great Lameshur Bay, St. John, 18.3143°, -64.7222°, disturbed fish burrowed into sand tail-first (A. Dunlap-Smith).

Prionotus punctatus (Bloch, 1793): Bluewing Searobin (Triglidae)

Distribution: southern Gulf of Mexico and throughout Caribbean, including Puerto Rico and a single non-georeferenced specimen from St. Thomas (ZMUC 9978).
Distinguishing characteristics: unknown for newly settled juveniles (DNA-barcode identification confirmed).

Fig. 15. *Prionotus punctatus*, newly settled juvenile, 8.3 mm SL, Little St. James Island, 18.2989°, -64.8298°, 10m depth in a sand channel between coral ledges (A. Hernandez).

Sphoeroides nephelus (Goode & Bean, 1882): Southern Puffer (Tetraodontidae)

Distribution: Greater Caribbean from North Carolina to Brazil, including Puerto Rico.
Distinguishing characteristics: long snout; concave between eyes; dense network of rosettes or yellow-brown blotches and a row of dark blotches along lower body profile; no skin flaps.

Fig. 16. *Sphoeroides nephelus*; upper: Francis Bay, St. John, 18.3664°, -64.7442° (L. Richter); lower: West Maho Bay, St. John, 18.3580°, -64.7452° (A. Hernandez).

Symphurus plagusia (Bloch & Schneider, 1851): Duskycheek Tonguefish (Cynoglossidae)

Distribution: Caribbean from Cuba to Brazil, including Puerto Rico.
Distinguishing characteristics: eyes small, round, without pupillary operculum (pupil cover); lower jaw on eye-side with a fleshy ridge; eye-side operculum usually without a dark blotch; unpigmented peritoneum (abdomen not dark); body uniform pale to occasionally with 8–14 narrow broken crossbars; median fins uniform dusky or with alternating groups of dark and lighter rays; basal of caudal fin dark (DNA-barcode identification pending).

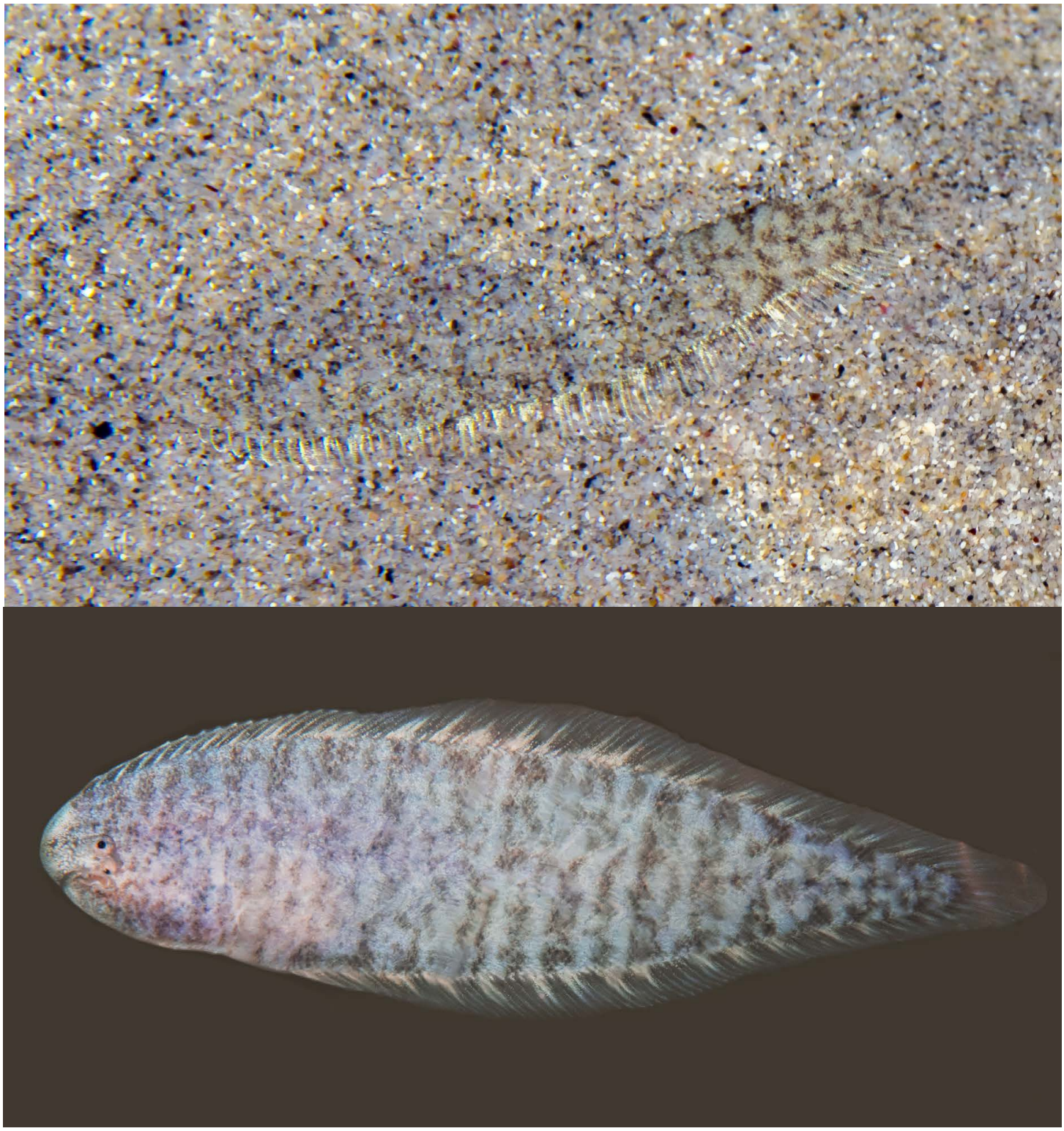


Fig. 17. *Symphurus plagusia*, juvenile, 24.4 mm, Francis Bay, St. John, 18.3619°, -64.7444° (A. Hernandez).

Tigrigobius gemmatus (Ginsburg, 1939): Frecklefin Goby (Gobiidae)

Distribution: southeast Florida, Bahamas, throughout Caribbean, including British Virgin Islands, St. Croix and Puerto Rico.
Distinguishing characteristics: rounded head; very short blunt snout; rounded caudal fin; color varies from uniformly dark to dusky bars, small white spots and broken white lines on head and pectoral-fin base; a row of short white lines along dorsal midline between dark bars.

Fig. 18. *Tigrigobius gemmatus,* Haulover Bay South, St. John, 18.346°, -64.680° (A. Hernandez).

Zu cristatus (Bonelli, 1819): Scalloped Ribbonfish (Trachypteridae)

Distribution: circumglobal in tropical and temperate waters, scattered records throughout Greater Caribbean.
Distinguishing characteristics: juveniles with compressed, rapidly tapering, silvery body with black bars and spots; first few dorsal-fin rays and pelvic-fin rays greatly extended into long filaments with prominent, colored, fleshy tabs; caudal fin with two lobes, the upper lobe sharply upturned.

Fig. 19. *Zu cristatus*, juvenile, Lovango, St. John, 18.3593°, -64.8081° (Nancy Coxe Batten, with permission).

New records for the St. Croix fauna (in alphabetic order)

Lipogramma trilineata Randall, 1963: Threeline Basslet (Grammatidae)

Distribution: Gulf of Mexico, Bahamas and throughout Caribbean, species described from Puerto Rico.
Distinguishing characteristics: large eye, single long dorsal fin, elongated pelvic-fin tips, lemon-yellow body and head with prominent thin, black-edged, iridescent blue stripes, one each side from upper eye to just behind operculum and one along dorsal midline to origin of dorsal fin (juveniles of some damselfish species are similarly colored, but have two blue stripes per side, none along midline and stripes not outlined in black).

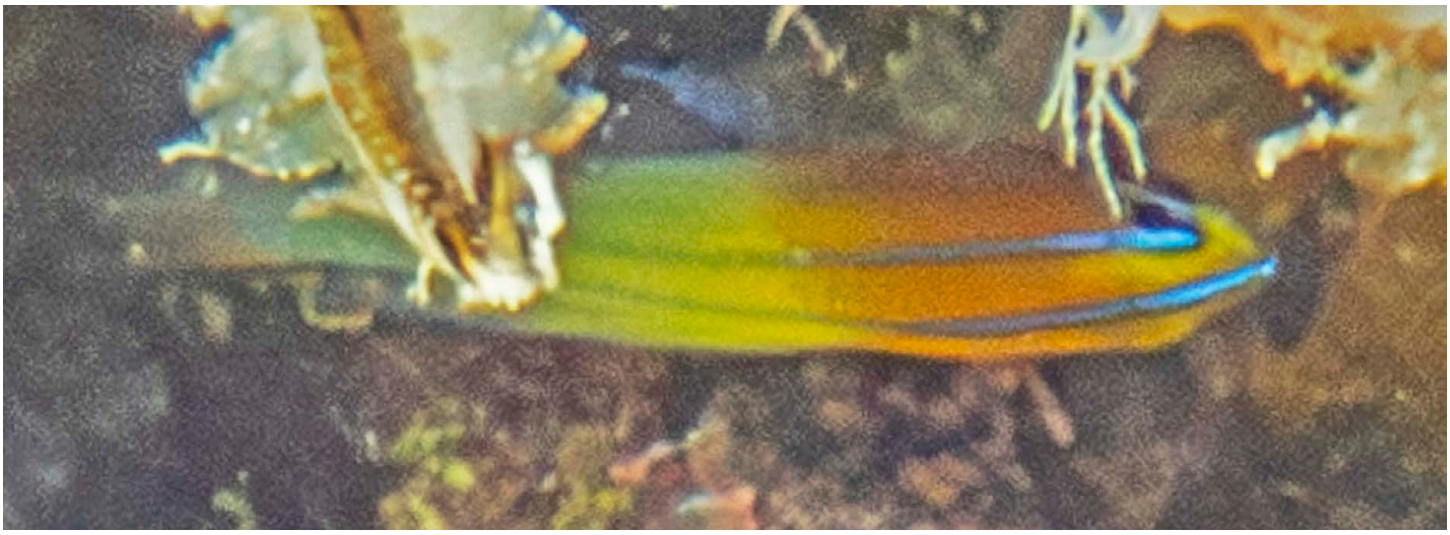


Fig. 20. *Lipogramma trilineata*, North Star, St. Croix, 17.7694°, -64.5216° (L. Richter).

Pempheris poeyi Bean, 1885: Curved Sweeper (Pempheridae)

Distribution: Bahamas and scattered locations throughout Caribbean.
Distinguishing characteristics: deep, oval, silvery body with long anal fin; body relatively shallow and without dark stripe along anal-fin base (vs. only other Atlantic species, *P. schomburgkii*, with deeper body, usually coppery color and prominent dark band along anal-fin base).

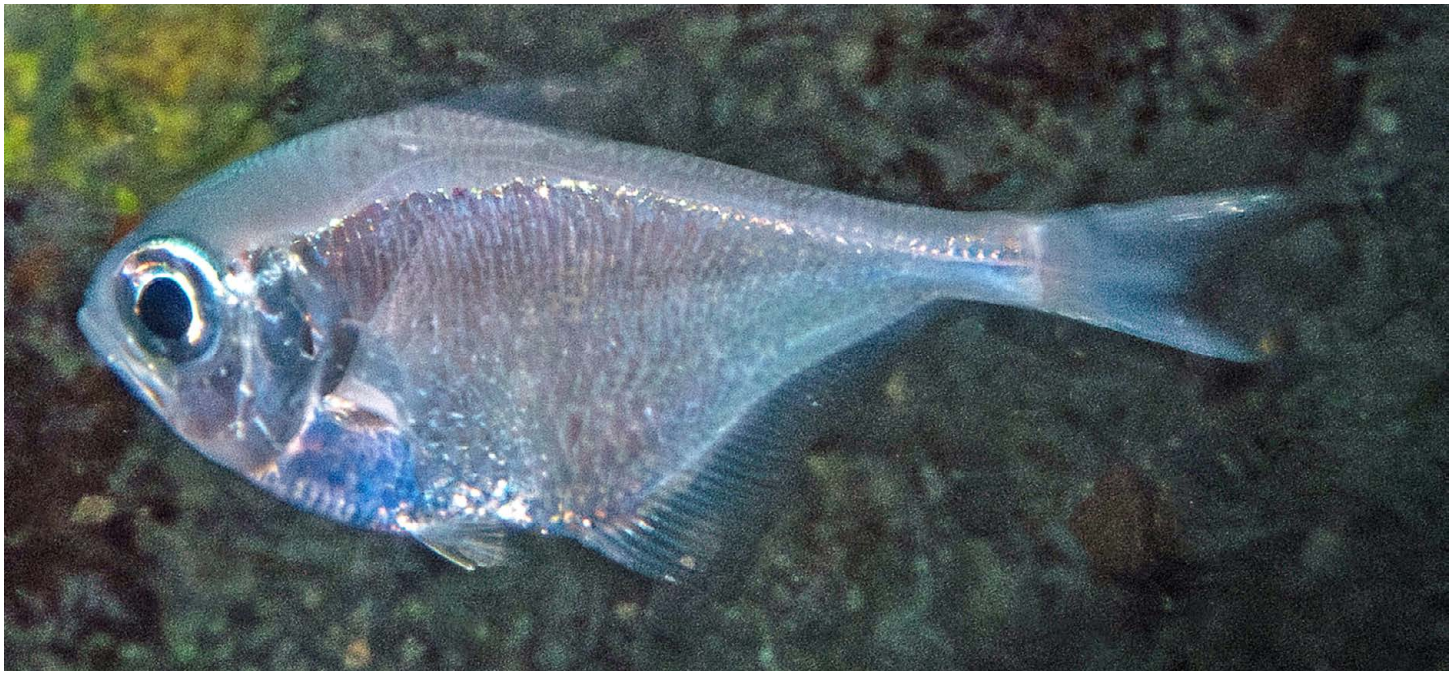


Fig. 21. *Pempheris poeyi*, St. Croix pier, 17.614°, -64.885° (S. Richter).

Starksia hassi Klausewitz, 1958: Ringed Blenny (Labrisomidae)

Distribution: Bahamas and scattered locations throughout Caribbean, including St. John and Puerto Rico.
Distinguishing characteristics: body with broad dark bars separated by narrow pale bars with thin white midlines, usually extending halfway or full-body height; nuchal and orbital cirri white; distinctive line of alternating brown (or red) and white spots between eye and jaw.

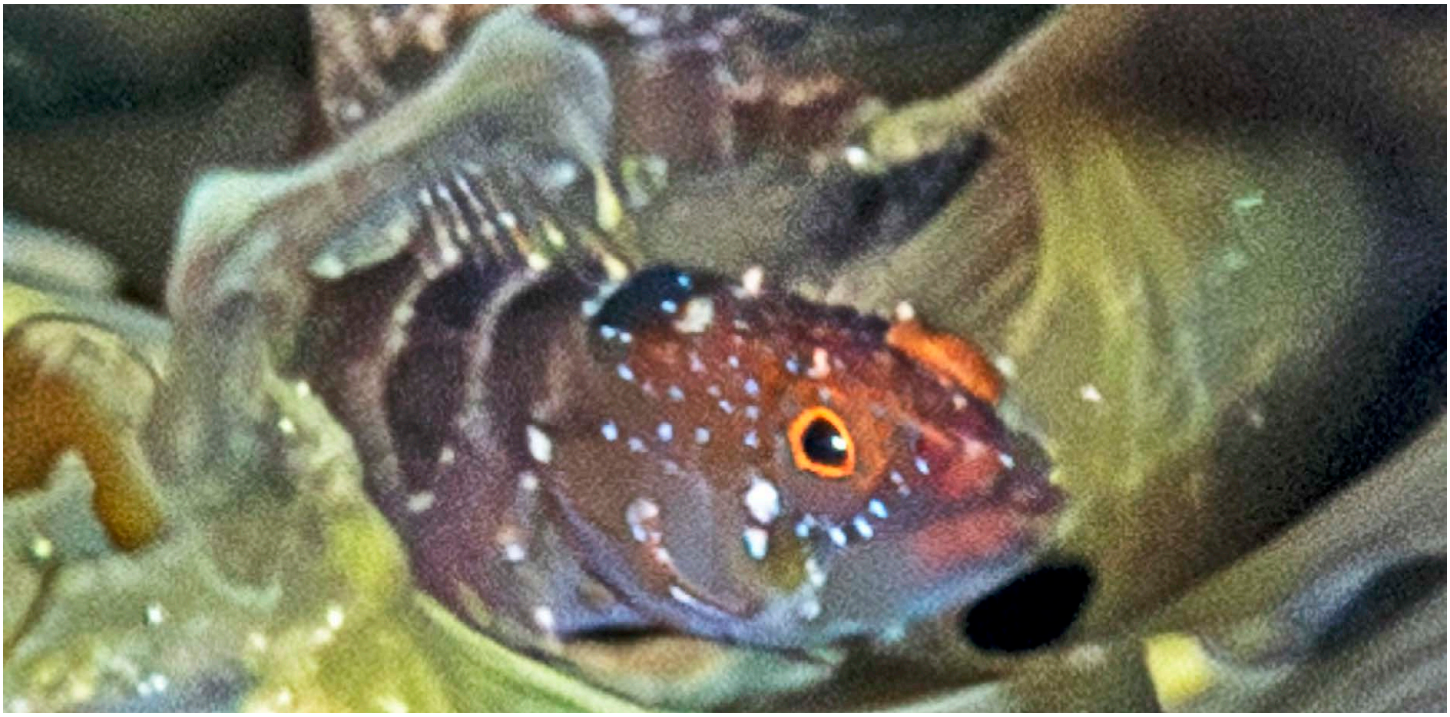


Fig. 22. *Starksia hassi*, Salt River Canyon, St. Croix, 17.7871°, -64.7577°, depth about 30 m (L. Richter).

New voucher images for species on the 2022 checklist lacking such images

Robertson et al. (2022a) provided images that vouch for the occurrence of 372 species of fishes at different islands in the USVI, most of which had occurrences confirmed by other sources. Images of an additional 15 species with confirmed occurrences that lacked such images in the that paper are presented here: the species include *Ahlia egmontis* (Ophichthidae) (Fig 23), *Bathygobius lacertus* (Fig. 24) and *B. soporator* (Fig. 25) (both Gobiidae), *Chromis scotti* (Pomacentridae) (Fig. 26), *Cosmocampus brachycephalus* (Syngnathidae) (Fig. 27), *Dactyloscopus crossotus* (Fig. 28) and *D. poeyi* (Fig. 29) (both Dactyloscopidae), *Haemulon striatum* (Haemulidae) (Fig. 30), *Jenkinsia lamprotaenia* (Spratelloididae) (Fig. 31), *Ogcocephalus nasutus* (Ogcocephalidae) (Fig. 32), *Opisthonema oglinum* (Dorosomatidae) (Fig. 33), *Paraclinus barbatus* (Labrisomidae) (Fig. 34), *Scorpaena bergii* (Scorpaenidae) (Fig. 35), *Stathmonotus stahli* (Labrisomidae) (Fig. 36), and *Trachinocephalus myops* (Synodontidae) (Fig. 37). All of these photographs were taken at St. John or St. Thomas, except that of *Chromis scotti*, which was taken at St. Croix.

Fig. 23. *Ahlia egmontis*, Great Lameshur Bay, St. John, 18.3143°, -64.7222° (A. Dunlap-Smith).

Fig. 24. *Bathygobius lacertus*, off Annaberg, St. John, 18.3649°, -64.7331°, depth 1 m (L. Richter).

Fig. 25. *Bathygobius soporator*, Francis Bay, St. John, 18.3642°, -64.7437°, depth 1 m (L. Richter).

Fig. 26. *Chromis scotti*, Salt River Canyon, St. Croix, 17.7871°, -64.7577°, depth 50 m (L. Richter).

Fig. 27. *Cosmocampus brachycephalus,* Klein Bay, St. John, 18.319°, -64.768° (C.J. Estape).

Fig. 28. *Dactyloscopus crossotus*, West Francis Bay, St. John, 18.3618°, -64.7444°, sand at 1 m depth, DNA-confirmed ID (A. Hernandez).

Fig. 29. *Dactyloscopus poeyi*, West Francis Bay, St. John, 18.3618°, -64.7444, DNA-confirmed ID (A. Hernandez).

Fig. 30. *Haemulon striatum*, South Side, St. Thomas, 18.2588°, -64.9205°, depth 35 m (L. Richter).

Fig. 31. *Jenkinsia lamprotaenia*, Haulover Bay South, St. John, 18.3456°, -64.6809°, depth 10 m (L. Richter).

Fig. 32. *Ogcocephalus nasutus*, Cruz Bay, St. John, 18.3305°, -64.7966°, depth 2 m (L. Richter).

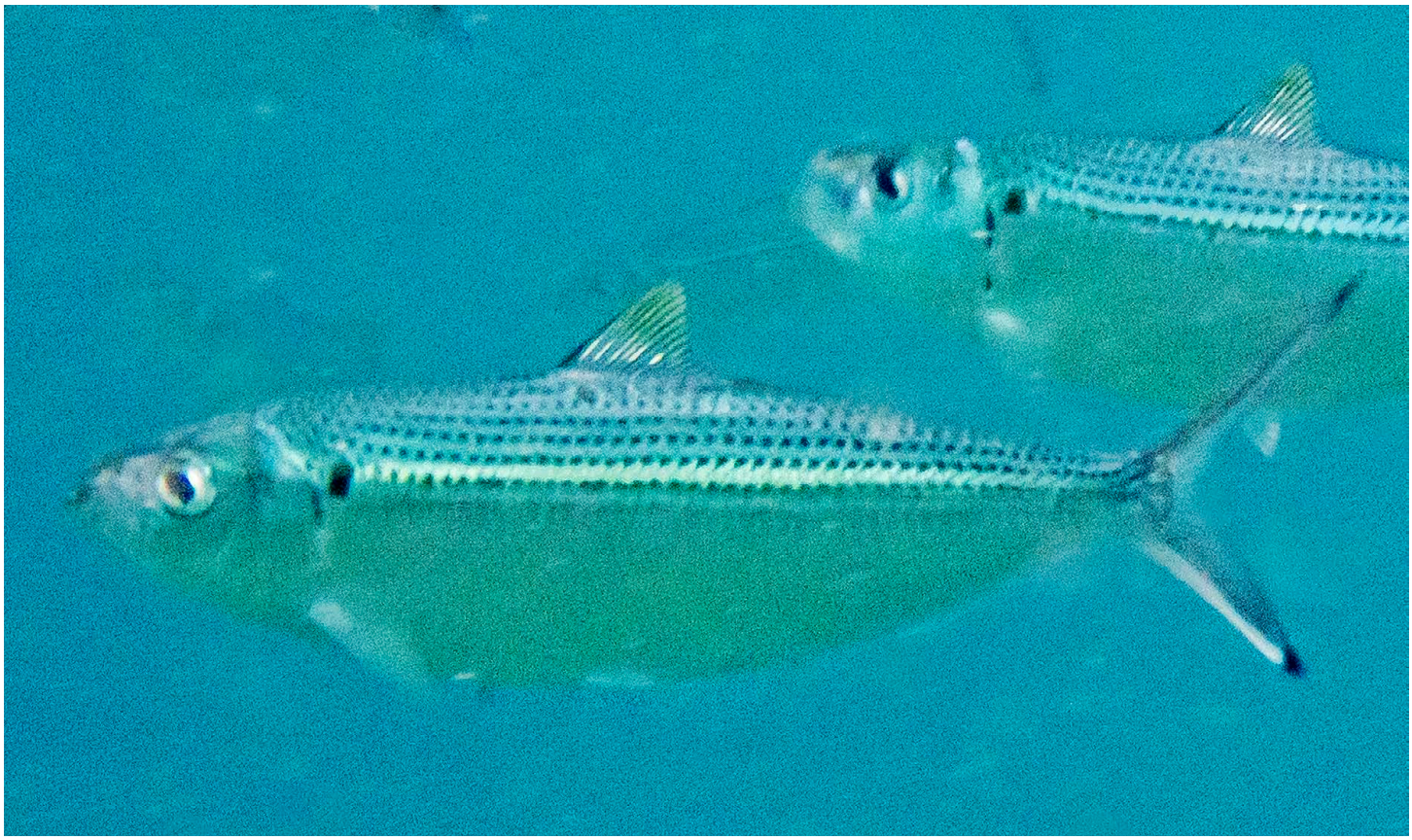


Fig. 33. *Opisthonema oglinum*, Brewers Bay, St. Thomas, 18.3427, -64.9784°, depth 6 m (L. Richter).

Fig. 34. *Paraclinus barbatus,* St. Thomas (courtesy Bill Rath).

Fig. 35. *Scorpaena bergii,* Reef Bay, St. John, 18.3161°, -64.7439°, depth 10 m (L. Richter).

Fig. 36. *Stathmonotus stahli*, Borck Creek, St. John, 18.3514°, -64.7035°, depth 2 m (L. Richter).

Fig. 37. *Trachinocephalus myop*s, Kiddel Bay, St. John, 18.3082°, -64.7136° (A. Hernandez).

Correction of errors in the checklist in Robertson et al. (2022a)

In Table 2, the number "1" in the Ichthyocide column was erroneously preceded by a negative sign in some cases. All cases should lack such a sign.

Platygillellus rubrocinctus (Longley, 1934) was erroneously included as a member of the St. John/Thomas fauna in Table 2 of Robertson et al. (2022a) with no evidence included for the source of that species record. This common and widespread species is found in southeast Florida, Bahamas, and throughout the Antilles and continental Caribbean, and is known from numerous records around Puerto Rico, in the British Virgin Islands and, especially, St. Croix. There are no additional records available at St. John/Thomas EEZ in GBIF (https://www.gbif.org), although it almost certainly occurs there.

Discussion

The photo-documentation and collection activity described here added 18 species of reef-associated fishes plus one non-reef species to the fauna of St. John/Thomas (and subtracted one erroneously included species), raising the total to 509 species, an increase of 3.7%. In addition, three species are added to the better-known fauna of St. Croix, for a total of 588 species, an increase of 0.5%. Sampling effort may well have contributed to this difference in the number of new records, as most diving activity leading to these additions was conducted at St. John/Thomas rather than St. Croix. However, since St. John/Thomas lies on a large shallow platform with a much larger area and diversity of habitats, particularly of deeper shelf habitats, vs. St. Croix, its fauna should eventually be expected to exceed that of the latter.

Only one of the reported species added both a new genus and family to the US Virgin Islands fauna: *Zu cristatus*, for which there are very few existing records anywhere in the Greater Caribbean. We also added one new genus to the St. Croix fauna (*Lipogramma*), as well as 5 new genera (*Leurochilus*, *Gobulus*, *Ogilbia*, *Otophidium*,

and *Prionotus*) and one new family (Dinematichthyidae) to the St. John/Thomas fauna. *Zu cristatus* was the only new record of a pelagic species; the remainder were benthic species, which constitute more than half the known USVI fauna (Robertson et al. 2022a) and 15 of those are small cryptobenthic fishes, which alone represent about one third of the total fauna. The number of new records of small cryptobenthic species reflects the diligent and persistent searching in a range of different reefal habitats by the citizen-scientist coauthors.

All but one (*Lipogramma trilineata*) of the 21 new reef-associated species are shallow-living fishes. The current list of the USVI fauna has a deficit of both shallow and deep cryptobenthic species when compared to other locations at which deep species have been more comprehensively sampled, such as Curacao (see Robertson et al. 2022a). With additional surveying, especially of deep habitats not explored by the present authors, the eventual number of species likely will be comparable.

Collecting Permit

Collections from St. John in 2023 & 2024 were made under National Park Service Collecting Permit VIIS-2023-SCI-0025 and DPNR/DFW 22082U.

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