Journal of the
Ocean Science Foundation

2020, Volume 35

Prionotus murielae Mowbray, 1928 is the juvenile of the Bandtail Searobin *Prionotus ophryas* (Teleostei: Scorpaeniformes: Triglidae)

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Abstract

For almost a century, a single small holotype specimen of the searobin *Prionotus murielae* Mowbray, 1928 from Bahamas has been considered a valid species. The diagnostic character for the species is two long filamentous uppermost pectoral-fin rays, otherwise every author agreed it was essentially the same as the Bandtail Searobin, *Prionotus ophryas* Jordan & Swain, 1885. Recent underwater photographs show juvenile *P. ophryas* have a filamentous uppermost pectoral-fin ray and a juvenile specimen from trawls in the Gulf of Mexico has the two long filamentous rays. The specimen was sequenced for the mtDNA-barcode COI marker and it matched all other *P. ophryas* sequences available. The early stages of *P. ophryas* are documented here, with a spectacularly colorful, newly settled stage with bright-blue fin spots. The pelagic larvae also show the blue spots, and a transforming individual, showing all the features of a juvenile, was photographed while still pelagic in deep waters off South Florida. The larval stage closely resembles the larvae of the invasive lionfish, *Pterois volitans*, but has a different color pattern, number, and arrangement of pectoral-fin rays.

Key words: ichthyology, taxonomy, coral-reef fishes, larvae, lionfish, *Pterois*, DNA barcoding, blackwater, Florida, Bahamas, Greater Caribbean

Citation: Victor, B.C. & Ianniello, L. (2020) *Prionotus murielae* Mowbray, 1928 is the juvenile of the Bandtail Searobin *Prionotus ophryas* (Teleostei: Scorpaeniformes: Triglidae). *Journal of the Ocean Science Foundation*, 35, 76–85.

doi: https://doi.org/10.5281/zenodo.3962673

Introduction

The searobin *Prionotus murielae* Mowbray, 1928 is known from a single small holotype specimen (56 mm SL) collected at 8 fathoms depth in Cay Sal, Bahamas by William K. Vanderbilt, II, scion of the Vanderbilt family, the wealthiest family in America at the time. The collection took place on the 1925 expedition of his luxury yacht *Ara*. The fish was named after his daughter Muriel (as *murieli*, later *murielae* to conform to feminine gender). The species has been accepted by reviewers of the genus since then, but always listed as a unique holotype (Briggs 1956, Miller & Richards 1991, Russell et al. 1992, Richards & Miller 2002), except for Böhlke & Chaplin (1968), who apparently considered it to be *P. ophryas* in their book on the fishes of Bahamas, since they wrote one *P. ophryas* had been collected "years ago" from 8 fathoms. MacEachren & Fechhelm (2005) included *P. murielae*, without an illustration, in their book on Gulf of Mexico fishes, but noted it was a unique holotype and had not been found in the Gulf (they describe the maximum size as 200 mm SL, maybe adapted from *P. ophryas* which is also listed as 200 mm SL).

Teague (1951) redescribed the *P. murielae* holotype and noted it was "very closely related" to his new *Prionotus grisescens* Teague, 1951 (=*P. ophryas*) except for the two uppermost pectoral-fin rays ending in long filaments. He also limited the name *P. ophryas* to the holotype which was obtained from the stomach of a red snapper off Pensacola, Florida and assigned the remaining 5 *ophryas*-like specimens he examined to his new species *P. grisescens*. His key to the 7 specimens with digitate supraorbital cirri included the two holotypes and *P. grisescens*, all three "species" distinguished by minor features. The key features for the single specimen of *P. ophryas*, salvaged from stomach contents, were a non-serrated first dorsal-fin spine, "less ctenoid" and "not

Figure 1. *Prionotus ophryas*, newly settled juvenile, Palm Beach County, Florida (Linda Ianniello).

Figure 2. *Prionotus ophryas*, new juveniles, Palm Beach County, Florida (upper Linda Ianniello; lower Kevin Bryant).

Figure 3. *Prionotus ophryas*, new juveniles, Palm Beach County, Florida (upper Sandra Edwards; lower Suzan Meldonian).

Figure 4. *Prionotus ophryas*, juvenile, depth 20 m, Mexico Beach, northern Gulf of Mexico, Florida (Carol D. Cox).

compact" scales, a pectoral fin not quite reaching the anal base, and underdeveloped cirri, but then he noted the specimen was not in good condition and had deteriorated. The key features diagnosing the *P. murielae* holotype were the two filamentous rays and "not strongly ctenoid" scales (vs. strongly ctenoid), but it was a very small specimen. Four of the 5 new species Teague described in 1951 have since been recognized as junior synonyms. His *P. grisescens* has been consigned to its senior synonym *P. ophryas* (Miller & Richards 1991), and it fits the current diagnostic features of *P. ophryas*.

Subsequent discussions of *P. murielae* repeated the point that the two long filamentous rays was the only diagnostic feature distinguishing it from *P. ophryas*, often with a qualifier which suggested the author's reticence, such as "this species remarkably agrees with *ophryas* in its general appearance... the two species differ only in structure of the pectoral. The upper two rays are filamentous by which *murielae* differs not only from *ophryas* but from all other western Atlantic species of *Prionotus* as well" (Ginsburg quoted in Miller & Richards 1991). The only image of the species created since the description is an imaginative drawing in Russell et al. (1992), repeated in Richards & Miller (2002), that copies their drawing of a large adult *P. ophryas* only with the pectoral fin made slightly shorter and the two uppermost rays extended as filaments, to about the end of the soft dorsal fin.

Given the repeated mention of the exceptional filamentous pectoral-fin rays, it is surprising that it has gone unnoticed that apparently all small *P. ophryas* specimens have filamentous uppermost rays to some degree. Numerous underwater photographs of juvenile *P. ophryas* show the uppermost ray filamentous and elongated (Figs. 1–3), and more developed *P. ophryas* still have short filamentous extensions of the two uppermost pectoral-fin rays (Fig. 4). The uppermost ray has prominent narrow brown bands, similar to the bands on the finger-like lowest three rays that are used to "walk" along the substrate. The second uppermost ray is also a little elongated.

The issue is raised of underwater photographs showing a single elongated uppermost ray, while the description of *P. murielae* describes two. This disrepancy is resolved by a 45-mm SL specimen of juvenile *P. ophryas* collected in the Gulf of Mexico off Mississippi, by Brandi Noble, from recent NOAA surveys (UF 245655) (Fig. 5). The specimen has the top two pectoral-fin rays separate and filamentous and extending back to the mid-soft dorsal fin. Clearly, two filamentous rays are found on some confirmed juvenile *P. ophryas*, perhaps a different stage than in the photographs. That specimen was sequenced for the mtDNA COI marker (the "barcode" gene) and the sequence (GenBank accession number MT762418) matched to the BOLD BIN lineage of all other *P. ophryas* in the database (BIN BOLD:AAF5959), including specimens from Florida, Texas, and off Yucatan, Mexico. There is no closely related lineage, the mtDNA lineage is isolated by more than 14.2% from the nearest-neighbor sequences, of the eastern Pacific species *Prionotus albirostris* Jordan & Bollman, 1890 (BIN BOLD:ACU9875). Significantly, to rule out the likelihood of an unknown additional species, there are no extra unassigned *Prionotus* barcode mtDNA lineages available in the Greater Caribbean region.

The photographic documentation of *P. ophryas* recently has been greatly expanded by a cadre of excellent underwater photographers intensively surveying the well-known dive site at Blue Heron Bridge (Phil Foster State Park) in Palm Beach County, Florida and also photographing fish larvae while "blackwater diving" at night, about 8 km offshore in about 200 m deep waters off South Florida. Hundreds of photographs of searobins from under Blue Heron Bridge are available, and a few show a spectacularly colored, newly settled stage that quickly develops into the less-remarkable brownish juvenile and adults, which are frequently encountered in the region.

The pectoral fins on these young fish show, in addition to the filamentous uppermost ray, an array of large, bright blue, oval to irregular spots at the outer margin of the fan-like pectoral fins. The blue spots merge into a bluish band near the margin. The blue is absent on the lower pectoral-fin rays, replaced by the typical ocellated, brown, and irregularly rounded shapes that are also found on the two or more arrays of inner bands of spots on the fin. As the fish get larger, the blue rapidly becomes purplish and then brownish (Figs. 1–3) and the rows of ocellated brown spots multiply to form the typical *P. ophryas* appearance (Fig. 4).

A pelagic searobin larva photographed by the junior author while "blackwater diving" off South Florida shows corresponding peripheral, oval, bluish spots similarly arranged on the pectoral fin (Fig. 6). The lower rays do not have the bluish spots, but have brown markings, corresponding to the pattern on juvenile *P. ophryas*. After reviewing the myriad photographs of juvenile searobins from Florida, it appears that no other species' juvenile shares the large blue spots along the margin of the pectoral fins, indicating that the larva is *P. ophryas*.

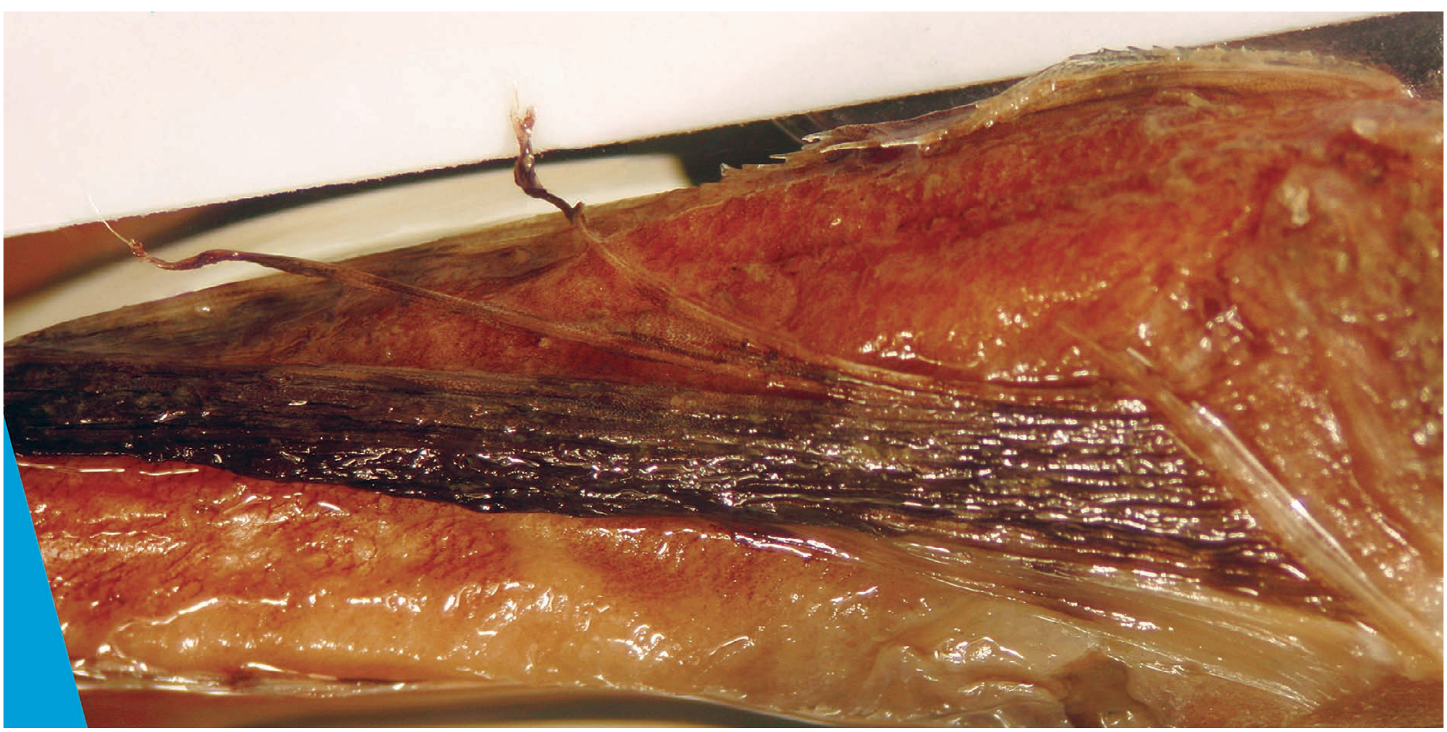

Figure 5. *Prionotus ophryas*, ethanol-preserved juvenile, 45 mm SL, UF 245655, Gulf of Mexico, off Mississippi, collected by Brandi Noble on a NOAA trawl survey (Benjamin C. Victor).

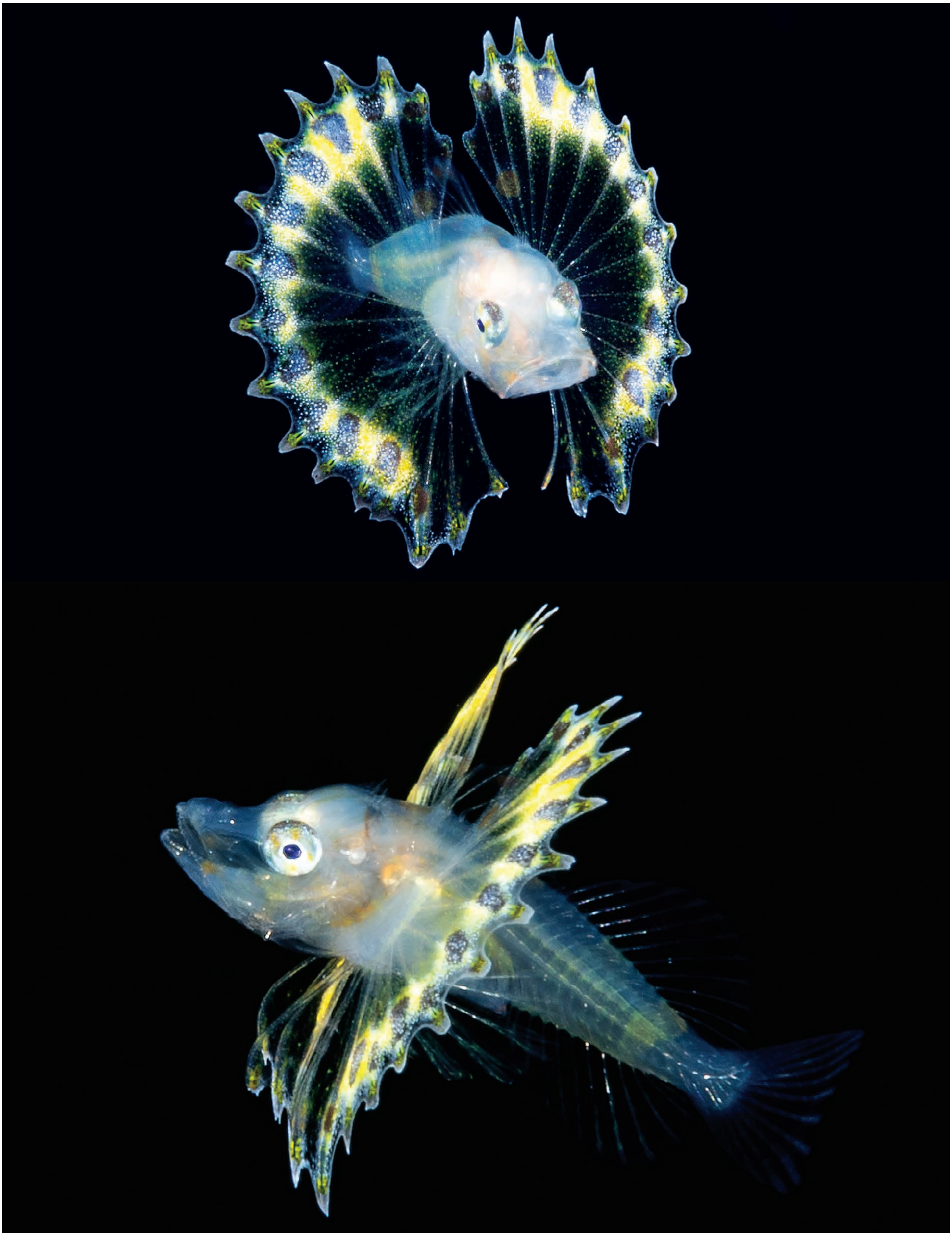

Figure 6. *Prionotus ophryas*, pelagic larva, duckbill head profile, 16 pectoral-fin rays, blackwater, Florida (Linda Ianniello).

Figure 7. *Prionotus ophryas*, pelagic transforming larva, note separated and banded lowermost pectoral-fin rays behind fin in foreground, blackwater, South Florida (Michael Patrick O'Neill/ www.mpostock.com).

A transitional larva of *P. ophryas* has been photographed by Michael Patrick O'Neill, also in blackwater dives off South Florida, that has already adopted most juvenile features, including the separated three "walking" legs of the lowermost pectoral-fin rays, visible as banded separate rays below the 13 joined pectoral-fin rays (Fig. 7). The occurrence of fully transformed and colored transitional larvae in the pelagic zone well offshore indicates that there is some deterministic point of transformation for some reef-fish larvae, but this subject remains mostly unexplored. A number of other fishes have been photographed already fully transformed and colored like settled juvenile fish in blackwater diving off South Florida.

The pectoral-fin pattern on larvae of *P. ophryas* superficially resembles that of the larvae of the invasive lionfish, *Pterois volitans*, and pre-transitional *P. ophryas* larvae were first identified as lionfish larvae. The searobin larvae can be distinguished by a duckbill-shaped head profile, but otherwise can look quite similar, sharing many of the basic scorpaeniform characters, including body shape, head spines, and fin arrangement. Pertinent differences distinguishing the two are 16 pectoral-fin rays in *P. ophryas* with notably shorter uppermost and lowermost rays (and some separation beginning for the lower three "walking" legs) vs. usually 14 (or 15) rays in larval *P. volitans*,

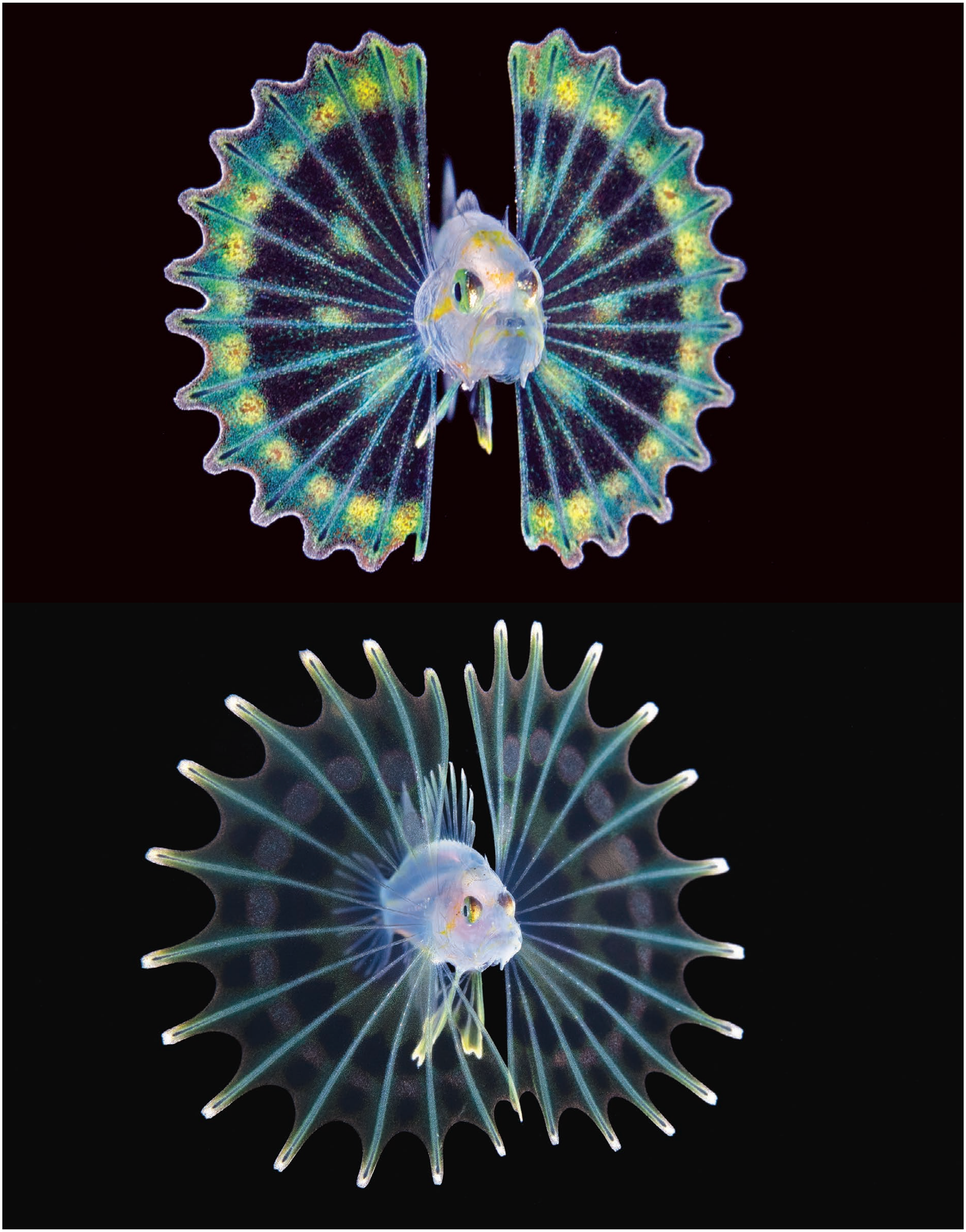

Figure 8. *Pterois volitans*, pelagic larvae, 14 pectoral-fin rays, the lower photograph shows a later, more-developed, stage, blackwater off South Florida (Steven Kovacs).

with the uppermost and lowermost rays only slightly shorter (Fig. 8). Other searobins and scorpionfishes in the region have more than 15 pectoral-fin rays (note that the three lowermost rays of searobins are often not included in fin counts in various books and guides).

Larval lionfish also develop increasingly deep scalloping of the pectoral-fin membranes as they approach maturity (Fig. 8), and subsequently develop the long trailing pectoral-fin spine filaments characteristic of lionfishes as they approach settlement. The color pattern of the pectoral fins is somewhat different from the searobin, with a band of yellow peripherally, forming amorphous rounded spots on each membrane, and then 4 large, rounded, yellowish spots about halfway out on each fin, centered on membranes 1/2, 4/5, 7, and 10.

Acknowledgments

We are especially grateful to the Florida group of underwater photographers that provide amazing photographs of fishes, especially at the Blue Heron Bridge, now by far the most photo-documented underwater location on earth, as well as on blackwater dives at night off South Florida, where they are pioneering a new world of larval-fish biology that captures perfect living images of heretofore ugly preserved larvae in collections. Without those photographs, these projects would be impossible. Thanks are especially due to Kevin Bryant, Carol D. Cox, Sandra Edwards, Linda Ianniello, Steven Kovacs, Suzan Meldonian, and Michael Patrick O'Neill for their wonderful photographs. Killian Taylor at the Vanderbilt Museum graciously provided scans of the original description of *P. murielae* and Rob Robins at FMNH assisted with museum accession. We are indebted to Brandi Noble who has shipped samples of trawled fish to the senior author. DNA barcoding was performed at the Centre for Biodiversity Genomics and supported by the International Barcode of Life Project (iBOL.org) with funding from the Government of Canada via the Canadian Centre for DNA Barcoding as well as from the Ontario Genomics Institute (2008-OGI-ICI-03), Genome Canada, the Ontario Ministry of Economic Development and Innovation, and the Natural Sciences and Engineering Research Council of Canada. The manuscript was reviewed by David Greenfield and William F. Smith-Vaniz.

References

Böhlke, J.E. & Chaplin, C.C.G. (1968) *Fishes of the Bahamas and Adjacent Tropical Waters*. Academy of Natural Sciences of Philadelphia, Philadelphia, PA, USA, 771 pp.

Briggs, J.C. (1956) Notes on the triglid fishes of the genus *Prionotus*. *Quarterly Journal of the Florida Academy of Sciences*, 19, 99–103.

Ginsburg, I. (1950) Review of the western Atlantic Triglidae (fishes). *Texas Journal of Science*, 2 (4), 489–527.

Jordan, D.S. & Swain, J. (1885) Description of three new species of fishes (*Prionotus stearnsi, Prionotus ophryas,* and *Anthias vivanus*) collected at Pensacola, Florida, by Mr. Silas Stearns. *Proceedings of the United States National Museum*, 7 (465), 541–545.

McEachran, J.D. & Fechhelm, J.D. (2005) *Fishes of the Gulf of Mexico. Volume 2: Scorpaeniformes to Tetraodontiformes.* University of Texas Press, Austin, TX, USA, 1004 pp.

Miller, G.C. & Richards, W.J. (1991) Nomenclatural changes in the genus *Prionotus* (Pisces: Triglidae). *Bulletin of Marine Science*, 48 (3), 757–762.

Mowbray, W.H. in Borodin, N.A. (1928) Scientific results of the yacht "*Ara*" expedition during the years 1926 to 1928 while in the command of William K. Vanderbilt: Fishes. *Bulletin of the Vanderbilt Oceanographic Museum*, 1, 1–37.

Richards, W.J. & Miller, G.C. (2002) Triglidae *In*: Carpenter, K.E. [Ed.] *The Living Marine Resources of the Western Central Atlantic. Volume 2: Bony fishes part 1 (Acipenseridae to Grammatidae)*. Food and Agriculture Organization of the United Nations, Rome, Italy, pp. 1266–1277.

Russell, M., Grace, M. & Gutherz, E.J. (1992) Field Guide to the searobins (*Prionotus* and *Bellator*) in the western North Atlantic. *NOAA Technical Reports, NMFS*, 107, 1–26.

Teague, G.W. (1951) The sea-robins of America. A revision of the triglid fishes of the genus *Prionotus. Comunicaciones Zoologicas del Museo de Historia Natural de Montevideo*, 3 (61), 1–59.