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## A New Species of the Ceratioid Anglerfish Genus *Lasiognathus* Regan (Lophiiformes: Oneirodidae) from the Northern Gulf of Mexico

Theodore W. Pietsch<sup>1</sup> and Tracey T. Sutton<sup>2</sup>

**A new species of the deep-sea ceratioid anglerfish genus *Lasiognathus* Regan (family Oneirodidae) is described on the basis of three female specimens collected in the northern Gulf of Mexico. Not especially similar to any of the five previously described members of the genus, the new species is unique in having a cylindrical, internally pigmented, anterior escal appendage and a pair of elongate distal escal appendages. The new species is diagnosed and described, and a revised key to the species of the genus is provided.**

**A**S recognized by Pietsch (2009), the deep-sea ceratioid anglerfish genus *Lasiognathus* Regan, 1925, contains five species, all based solely on females: the type species *Lasiognathus saccostoma* Regan, 1925, and *Lasiognathus beebei* Regan and Trewavas, 1932, known from eight (30–77 mm standard length [SL]) and five specimens (27.5–112 mm SL), respectively, and having nearly the same geographic distribution, known from both sides of the North Atlantic and from the central North Pacific Ocean off the Hawaiian Islands; *Lasiognathus waltoni* Nolan and Rosenblatt, 1975, known only from the holotype (94 mm SL) from the central North Pacific; *Lasiognathus intermedius* Bertelsen and Pietsch, 1996, eight specimens (26.5–129 mm SL), from the North and South Atlantic and from the eastern South Pacific; and *Lasiognathus amphirhamphus* Pietsch, 2005, known only from the holotype (157 mm SL) from the eastern Central Atlantic off Madeira (Pietsch, 2009:212, fig. 217). The genus differs in many ways, characterized by having an extremely long, narrow head (greater than 60% SL); a huge mouth, the premaxillae separated anteriorly, connected only by membrane (able to flip dorsally and ventrally, enclosing the much shorter lower jaw in the latter position), and bearing numerous long, slender, hooked teeth; a long illicium supported by an unusually long pterygiophore (85% SL), the latter capable of sliding back and forth within a deep trough that extends the full length of the cranium and behind between the epaxial musculature of the anterior half of the body; and two or three, usually darkly pigmented, bony, hook-like denticles embedded in the esca. While the genus (usually placed in the family Thaumichthyidae, but reallocated here to the Oneirodidae based on recent molecular evidence: Miya et al., 2010; R. J. Arnold, unpubl.) differs drastically from all other ceratioids, the included species differ little from each other, diagnosed solely on details of escal morphology.

Among recently sorted deep-pelagic (0–1500 m) collections made in the northern Gulf of Mexico (Gulf hereafter) during the National Oceanic and Atmospheric Administration (NOAA), Natural Resource Damage Assessment (NRDA), Offshore Nekton Sampling and Analysis Program (T. Sutton, Principal Investigator), were three female specimens of *Lasiognathus* that differ from all known material in having an internally pigmented anterior escal appendage and an elongate pair of distal filamentous prolongations. In addition to reporting the first record of the genus in the

Gulf, the new species is diagnosed and described, and a revised key to the species of the genus is provided.

### MATERIALS AND METHODS

Standard length (SL) is used throughout. Osteological terminology follows Bertelsen and Struhsaker (1977). Methods for taking counts and measurements, and terminology used in describing escal morphology, follow Pietsch (1974) and Bertelsen and Pietsch (1996). The illicium is the first dorsal-fin spine, which bears a terminal bait or esca. The esca (or escal bulb, with escal appendages and filaments excluded) is the distal swelling of the illicium that contains the bacteria-mediated light organ (photophore). Escal hooks are the prominent, curved, dermal denticles attached superficially to the tissue of the esca, borne on an appendage arising from the distal surface of the escal bulb. As in all other ceratioids, the escal pore and the appendage that arises just below are assumed to denote the posterior aspect of the escal bulb. Accordingly, all escal hooks are assumed to curve posteriorly. The length of the illicium is measured to the distal surface of the escal bulb (i.e., to the base of the distal escal appendage). Symbolic codes for institutions follow Sabaj Pérez (2014).

### *Lasiognathus dinema*, new species

Figures 1–3

**Holotype.**—UW 152603, female, 95 mm, NOAA FRV *Pisces*, Station B249, DD2, northern Gulf of Mexico, 27.5°N, 88.5°W, Irish Herring Trawl, depth of collection 0–1271 m, bottom depth 2104 m, 26 June 2011 (Fig. 2A).

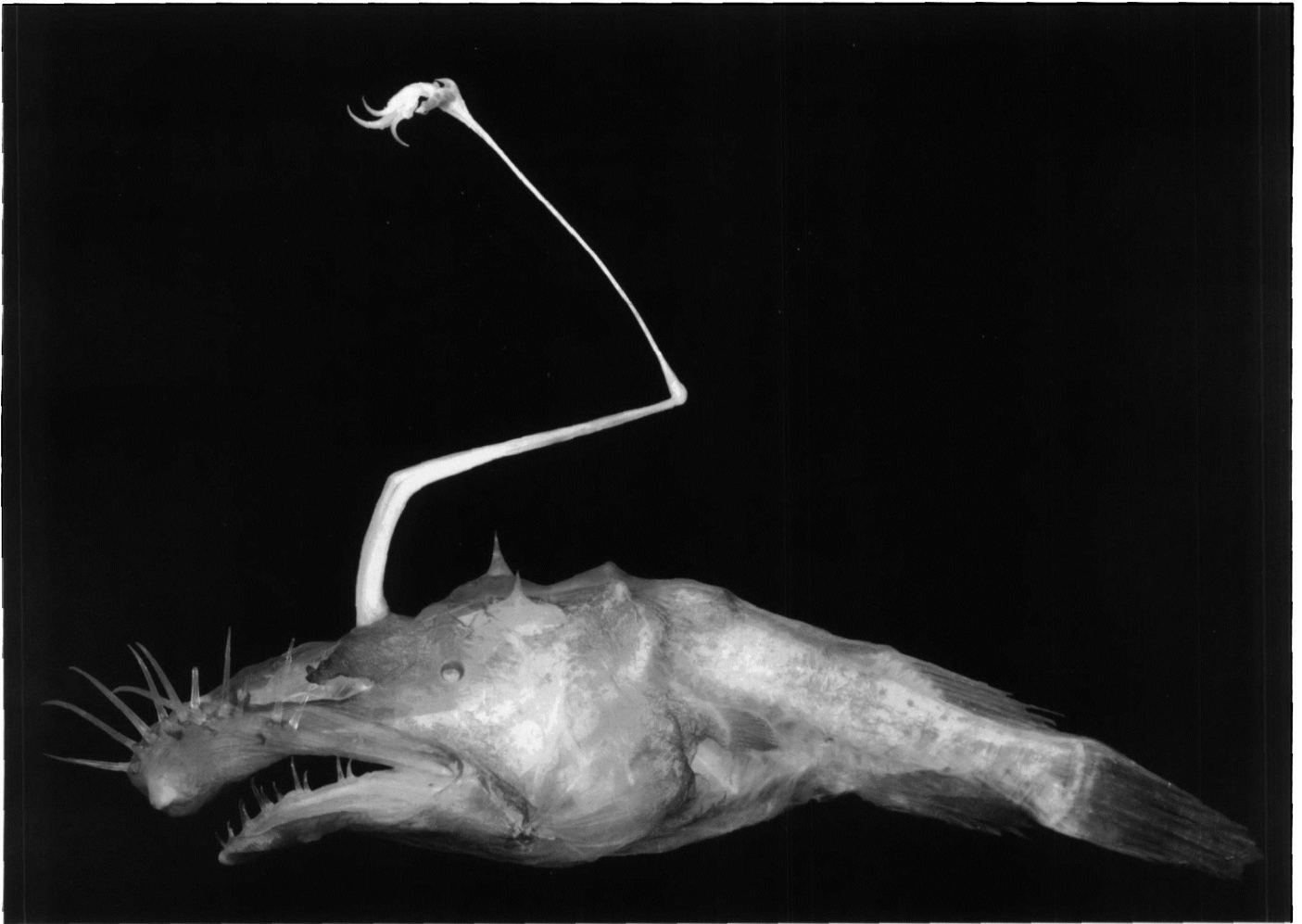
**Paratypes.**—UW 152604, female, 30 mm, R/V *Meg Skansi*, Station SW6D-net 2, northern Gulf of Mexico, 27.0°N, 90.1°W, 10 m<sup>2</sup> MOCNESS midwater trawl, depth of collection 999–1200 m, bottom depth 2559 m, 23 June 2011 (Figs. 1, 2B); UW 154626, female, 36 mm, R/V *Meg Skansi*, Station SE3D-net 1, northern Gulf of Mexico, 26.6°N, 86.8°W, 10 m<sup>2</sup> MOCNESS midwater trawl, depth of collection 800–999 m, bottom depth 2967 m, 11 September 2011 (Fig. 3).

**Diagnosis.**—Escal bulb with an elongate, cylindrical, internally pigmented anterior appendage; distal escal appendage a short cylindrical stalk, with an expanded distal end and a pair of tapering, filamentous prolongations emerging anteriorly from

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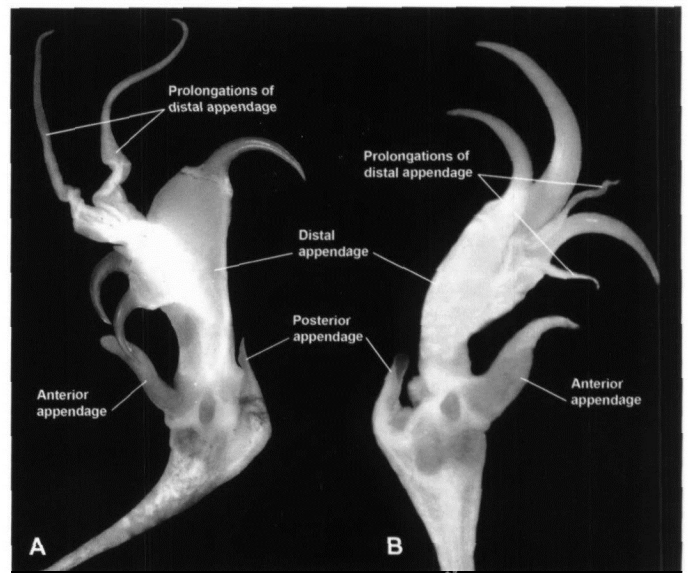


**Fig. 1.** *Lasiognathus dinema* Pietsch and Sutton, new species, paratype, UW 152604, female, 30 mm SL.

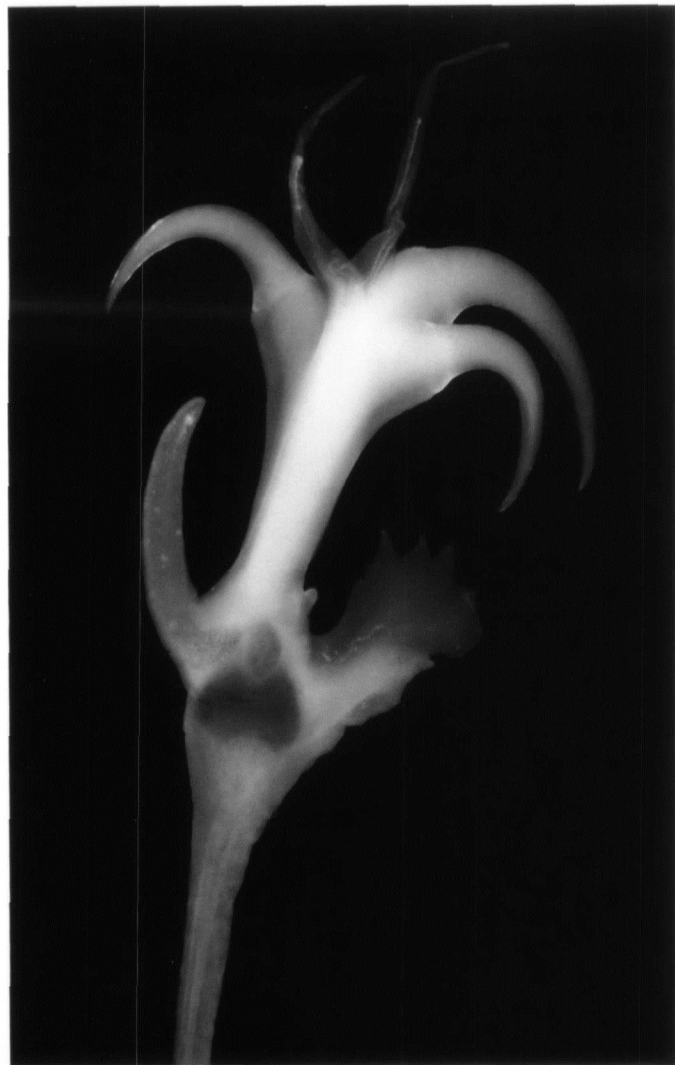
bases of esca hooks; distal esca appendage bearing three, lightly pigmented, bony, hook-like denticles; posterior esca appendage membranous, antero-posteriorly compressed, with a scalloped or rounded distal margin (Figs. 2, 3).

**Description.**—Length of illicium 15–47 mm (49.5–50.0% SL); illicium of three known specimens fully extended anteriorly, cutaneous sheath surrounding posterior extension of illicial pterygiophore fully internalized (Pietsch, 2009:84, fig. 85). A cylindrical, internally pigmented, anterior esca appendage (a light-guiding structure, without a homolog in any other known species of *Lasiognathus*; Pietsch, 2009:237, figs. 245, 248), rounded distally in holotype, more elongate and tapering to a point in paratypes, length 1.3–2.8 mm (4.3–2.9% SL). A thin, translucent, broad-based, antero-posteriorly compressed, posterior esca appendage, length 0.9–2.2 mm (3.0–2.3% SL), with a scalloped or rounded distal margin, emerging from below esca pore. Distal esca appendage cylindrical, with narrow base and distal swelling, length 1.9–4.8 mm (6.3–5.0% SL), bearing three lightly pigmented, strongly curved, bony hooks: one somewhat larger, length 2.0–2.2 mm (6.7–2.2% SL), emerging from distal tip, directed posteriorly; and a pair of near equal size, length 1.4/1.6–1.4/1.9 mm (5.0/5.3–1.9/2.0% SL), situated somewhat below, directed anteriorly. A pair of elongate, filamentous, tapering prolongations of distal appendage emerging slightly above bases of anteriorly directed esca hooks, considerably smaller in paratypes, length 1.6/2.2 mm

(6.7/7.3% SL); more highly developed in holotype, length 6.3/6.4 mm (6.6/6.7% SL).



**Fig. 2.** Escae of *Lasiognathus dinema* Pietsch and Sutton, new species, in preservation: (A) Holotype, UW 152603, female, 95 mm SL, left lateral view; (B) Paratype, UW 152604, female, 30 mm SL, right lateral view (prolongation of distal esca appendage rotated to show anterior face).



**Fig. 3.** Esca of *Lasiognathus dinema* Pietsch and Sutton, new species, paratype, UW 154626, female, 36 mm SL, left lateral view, in preservation. Image courtesy of L. Malarky (NSUOC).

The esca of all three type specimens is well preserved (Figs. 2, 3). The head and body of the holotype, however, is in extremely poor condition, so badly damaged upon capture that only a few of the standard ceratioid measurements can be made (the following are given in percent of standard length, values for the smaller paratype are followed by those of the holotype when available): tip of upper jaw to posteriormost margin of preopercle 41.7–?; tip of upper jaw to anteriormost margin of opercular opening 53.3–?; distance between tips of sphenotic spines 25.0–?; tip of sphenotic spine to posttemporal 13.7–?; tip of sphenotic spine to tip of quadrate spine 60.0–?; length of sphenotic spine 6.0–2.2; length of quadrate spine 5.8–2.3; length of premaxilla 36.7–35.8; length of lower jaw 34.7–28.4; longest tooth in upper jaw 11.7–6.3; longest tooth in lower jaw 4.7–2.6. Total number of teeth on premaxillae 24–86, on dentaries 23–98; vomerine teeth absent; dorsal-fin rays 5–6; anal-fin rays 5–5; pectoral-fin rays 18/19–19/19; pelvic fins absent; caudal-fin rays 9–9. Remaining description as for the genus (Bertelsen and Pietsch, 1996; Pietsch, 2009).

**Geographic distribution.**—*Lasiognathus dinema* is known from three female specimens collected in the northern Gulf of Mexico, over the Mississippi Fan bathyal accumulation

(27–28°N, 87–90°W; bottom depths 2000–3000 m). Specimens were collected in closing trawls fished between 800–1000 and 1000–1200 m, and in a non-closing trawl fished between 0–1271 m.

**Etymology.**—The name *dinema*, is derived from the Greek, *di*, a prefix meaning “two,” and *nema*, “thread,” in allusion to the two elongate, thread-like prolongations emerging anteriorly from the bases of the esca hooks of this species (Figs. 1–3).

## DISCUSSION

The specimens for this study were collected as part of an ongoing Natural Resource Damage Assessment Process conducted by the National Oceanic and Atmospheric Administration (for more information, see <http://www.darrp.noaa.gov/about/nrda.html>) pursuant to the *Deepwater Horizon* Oil Spill (DWHOS). The stations at which the type specimens were collected were within a 250 km radius of the Macondo wellhead, at depths between 800–1300 m. The depths coincided with the depths of massive horizontal intrusions of hydrocarbons during and after DWHOS (~800–1200 m; Camilli et al., 2010; Valentine et al., 2010; Kessler et al., 2011), though the specimens described herein were not necessarily exposed. The finding of a new species in this region adds to our knowledge of the deep-pelagic Gulf in particular, and to the bathypelagic zone in general, which post-Census of Marine Life surveys have identified as the most chronically under-sampled environment on earth (Webb et al., 2010). In addition to describing a new species, this report is the first record of the genus *Lasiognathus* in the Gulf.

Like the majority of ceratioid anglerfishes, examination of all available material of *Lasiognathus* has revealed no characters that allow separation of the species other than those of the esca and its appendages (Bertelsen and Pietsch, 1996; Pietsch, 2005, 2009). The differences in esca morphology, however, now strongly indicate the existence of six species. *Lasiognathus dinema* differs from all previously recognized species of the genus in having an anterior esca appendage and a pair of elongate, filamentous prolongations of the distal esca appendage, the former having no apparent homolog in any of its congeners; the latter represented by a single prolongation in *L. saccostoma*, *L. intermedius*, and *L. amphirhamphus*, but absent altogether in *L. beebei* and *L. waltoni*. The new species differs further from *L. beebei* in having the esca hooks emerging from a cylindrical distal appendage, rather than from a transverse, fan-shaped distal appendage (Bertelsen and Pietsch, 1996:404, fig. 2); from *L. intermedius* in having a broad-based, antero-posteriorly compressed posterior esca appendage instead of a cylindrical appendage (Bertelsen and Pietsch, 1996:406, fig. 4); from *L. saccostoma* in having simple distal prolongations of the distal esca appendage instead of bearing numerous lateral serrations or filaments (Bertelsen and Pietsch, 1996:407, fig. 5); and from *L. amphirhamphus* in having three esca hooks instead of only two (Pietsch, 2005:78, fig. 2).

## KEY TO FEMALES OF THE SPECIES OF LASIOGNATHUS

- 1a. Esca hooks borne on a short, transverse, fan-shaped, distal appendage (Bertelsen and Pietsch,

- 1996:404, fig. 2) ..... *Lasiognathus beebei*  
Regan and Trewavas, 1932
- 1b. Escal hooks borne on an elongate, cylindrical, distal appendage ..... 2
- 2a. Escal bulb with a membranous anterior crest; prolongation of distal appendage absent (Bertelsen and Pietsch, 1996:404, fig. 3) ..... *Lasiognathus waltoni* Nolan and Rosenblatt, 1975
- 2b. Escal bulb without a membranous anterior crest; prolongation of distal appendage present ..... 3
- 3a. A cylindrical, internally pigmented, anterior escal appendage arising from base of escal bulb; distal escal appendage with a pair of slender, filamentous prolongations (Figs. 2, 3) ..... *Lasiognathus dinema* Pietsch and Sutton, new species
- 3b. Cylindrical, internally pigmented, anterior escal appendage absent; distal escal appendage with a single cylindrical or compressed prolongation ..... 4
- 4a. Distal escal appendage with a short, cylindrical prolongation (length 5.2–8.6% SL) emerging anteriorly from bases of escal hooks, without lateral serrations or filaments; posterior escal appendage cylindrical (Bertelsen and Pietsch, 1996:405, fig. 4) ..... *Lasiognathus intermedius* Bertelsen and Pietsch, 1996
- 4b. Distal escal appendage with an elongate, compressed prolongation (length 2.9–20.8% SL) emerging anteriorly from bases of escal hooks, bearing lateral serrations and/or tiny filaments on distal tip; posterior escal appendage broad, laterally compressed ..... 5
- 5a. Three darkly pigmented escal hooks; length of distal escal appendage 8.0–12.5% SL (in specimens ranging from 30–77 mm); length of prolongation of distal escal appendage increasing with standard length from 7.7% SL (in 30 mm specimen), to 10.8% SL (55.5 mm), to 20.8% SL (77 mm); prolongation of distal escal appendage bearing numerous lateral serrations and distal filaments (Bertelsen and Pietsch, 1996:407, fig. 5) ..... *Lasiognathus saccostoma* Regan, 1925
- 5b. Two lightly pigmented escal hooks; length of distal escal appendage 3.8% SL (in a 157 mm specimen); length of prolongation of distal escal appendage 2.9% SL (in 157 mm holotype); prolongation of distal escal appendage without lateral serrations, but bearing a series of six tiny distal filaments (Pietsch, 2005:78, figs. 1, 2) ..... *Lasiognathus amphirhamphus* Pietsch, 2005

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#### LITERATURE CITED

- Bertelsen, E., and T. W. Pietsch. 1996. A revision of the deep-sea anglerfish genus *Lasiognathus* (Lophiiformes: Thaumatchthyidae), with the description of a new species. *Copeia* 1996:401–409.
- Bertelsen, E., and P. J. Struhsaker. 1977. The ceratioid fishes of the genus *Thaumatchthys*: osteology, relationships, distribution, and biology. *Galathea Report* 14:7–40.
- Camilli, R., C. M. Reddy, D. R. Yoerger, B. A. S. Van Mooy, M. V. Jakuba, J. C. Kinsey, C. P. McIntyre, S. P. Sylva, and J. V. Maloney. 2010. Tracking hydrocarbon plume transport and biodegradation at Deepwater Horizon. *Science* 330:201–204.
- Kessler, J. D., D. L. Valentine, M. C. Redmond, M. R. Du, E. W. Chan, S. D. Mendes, E. W. Quiroz, C. J. Villanueva, S. S. Shusta, L. M. Werra, S. A. Yvon-Lewis, and T. C. Weber. 2011. A persistent oxygen anomaly reveals the fate of spilled methane in the deep Gulf of Mexico. *Science* 331:312–315.
- Miya, M., T. W. Pietsch, J. W. Orr, R. J. Arnold, T. P. Satoh, A. M. Shedlock, H.-C. Ho, M. Shimazaki, M. Yabe, and M. Nishida. 2010. Evolutionary history of anglerfishes (Teleostei: Lophiiformes): a mitogenomic perspective. *BMC Evolutionary Biology* 10:58.
- Pietsch, T. W. 1974. Osteology and relationships of ceratioid anglerfishes of the family Oneirodidae, with a review of the genus *Oneirodes* Lütken. *Natural History Museum of Los Angeles County, Science Bulletin* 18:1–74.
- Pietsch, T. W. 2005. A new species of the ceratioid anglerfish genus *Lasiognathus* Regan (Lophiiformes: Thaumatchthyidae) from the Eastern North Atlantic off Madeira. *Copeia* 2005:77–81.
- Pietsch, T. W. 2009. *Oceanic Anglerfishes: Extraordinary Diversity in the Deep-sea*. University of California Press, Berkeley and Los Angeles.
- Sabaj Pérez, M. H. (Ed.). 2014. Standard symbolic codes for institutional resource collections in herpetology and ichthyology: an online reference. Version 5.0 (22 September 2014). Electronically accessible at <http://www.asih.org/resources>, American Society of Ichthyologists and Herpetologists, Washington, D.C.
- Valentine, D. L., J. D. Kessler, M. C. Redmond, S. D. Mendes, M. B. Heintz, C. Farwell, L. Hu, F. S. Kinnaman, S. Yvon-Lewis, M. Du, E. W. Chan, F. Garcia Tigreros, and C. J. Villanueva. 2010. Propane respiration jump-starts microbial response to a deep oil spill. *Science* 330:208–211.
- Webb, T. J., E. V. Berghe, and R. O'Dor. 2010. Biodiversity's big wet secret: the global distribution of marine biological records reveals chronic under-exploration of the deep pelagic ocean. *PLOS ONE* 5(8):e10223.