Research Digest

Issue no. 16

(July - September 2025)

VIMS | William & Mary

Virginia Institute of Marine Science

(Intentionally left blank)

Cover photo caption: Seagrasses in Chesapeake Bay provide foundational structure impacting biodiversity, food webs and ecosystem processes.

Photo credit: Frederick Corey Holbert

Message from the Associate Dean of Research and Advisory Services

This Digest is intended to provide stakeholders, colleagues, and interested persons a sense of the depth and breadth of the research happening at VIMS. While we attempt to be as comprehensive as possible, it likely does not contain every article published in the issue's timespan due to differences in timelines and release dates across various publishers and databases that curate peer reviewed research. If you are interested in reading the full text of any article that you do not have appropriate library/institution access for, please contact the VIMS author or corresponding author of the paper. Contact information for current VIMS scientists can be found on our website: www.vims.edu/about/directory/search/.

This quarters' issue contains twenty-five peer-reviewed publications, ten of which have a Batten School and VIMS graduate student as the first author and two others have graduate students as co-authors, reflecting the in-depth and hands-on nature of the Batten School and VIMS' training of students.

Mark W. Luckenbach, Associate Dean

Office of Research & Advisory Services
William & Mary, Batten School of Marine Science
Virginia Institute of Marine Science

Topics In This Issue

(click topic heading below to jump to desired section)

Navigating this document

Click on one of the headings listed above to jump to the desired section. Alternatively, search the document using keywords or an author's name. To search for words or names, simultaneously press the 'ctrl' and 'F' keys, type the desired word or name in the search field, then press 'enter' or 'return'. If the search term is in the document, it will be highlighted.

VIMS authors in this issue

(Listed alphabetically by last name. An asterisk (*) indicates VIMS student.)

Title	Changing foundation species in Chesapeake Bay (USA): Implications for faunal communities of two dominant seagrass species
Author(s)	**Alvaro L.E.***, **Patrick C.J.**, **Hensel M.J.S.***
Journal	Marine Ecology Progress Series, 768: pg. 17-33 (2025)
Link	https://doi.org/10.3354/meps14901
Summary	Climate-driven shifts from *Zostera marina* to *Ruppia maritima* in Chesapeake Bay alter seagrass food webs. Although *Ruppia* supports more small invertebrates, it yields lower biomass and production, reducing nekton abundance and diversity. Continued species replacement is likely to diminish ecosystem productivity and shift communities toward smaller-bodied fauna.

Title	Acidification, warming, and nutrient management are projected to cause reductions in shell and tissue weights of oysters in a coastal plain estuary
Author(s)	**Czajka C.R.***, **Friedrichs M.A.M.**, **Rivest E.B.**, **St-Laurent P.**, **Brush M.J.**, **Da F.***
Journal	Biogeosciences, 22(13): pg. 3181-3206 (2025)
Link	https://doi.org/10.5194/bg-22-3181-2025
Summary	A coupled hydrodynamic–biogeochemical and oyster growth model for the Chesapeake Bay projects that mid-century acidification, warming, and nutrient reductions will significantly decrease Chesapeake Bay oyster shell and tissue growth, mainly via lower carbonate saturation and food availability, with warming having the strongest overall negative effect and impacts varying spatially.

Back to topic list

Title	Associations between fishes (Actinopterygii: Teleostei) and anthozoans (Anthozoa: Hexacorallia) in epipelagic waters based on in situ records
Author(s)	**Afonso G.V.F.***, Johnson G.D., Collins R., Pastana M.N.L.
Journal	Journal of Fish Biology, 107(6): 2166-2172 (2025)
Link	https://doi.org/10.1111/jfb.70214
Summary	We describe the association of fishes and anthozoans in epipelagic waters, extending this relationship to beyond the benthos. In situ observations of filefishes, driftfishes, jacks, and pomfrets swimming alongside larval tube anemones and larval zoanthids were made during blackwater SCUBA dives off Florida, USA, and off Tahiti, French Polynesia.

Title	Measuring juvenile habitat quality for fishes and invertebrates
Author(s)	Ciotti B.J., Brown E.J., Colloca F., Eggleston D.B., **Hyman A.C.***, Le Pape O., **Lipcius R.N.**, Maathuis M.A.M., Poiesz S.S.H., K.A. Rose, **Seitz R.D.**, Ventura D., van de Wolfshaar K.E.
Journal	Biological Reviews, 100(6): pg. 2346-2395 (2025)
Link	https://doi.org/10.1111/brv.70050
Summary	Through a systematic review of approaches to measure juvenile habitat quality, we evaluate ability to identify key habitats and provide recommendations. Studies are dominated by measurements of abundance (85%) and growth (51%), with limitations in spatiotemporal resolution and extent. Few approaches are available to measure survival and juvenile–adult contribution.

Title	Predation impacts of invasive blue catfish on blue crabs in estuarine environments
Author(s)	**Fabrizio M.C.**, **Tuckey T.D.**, **Buchanan J.R.**, **Fisher R.A.**
Journal	Marine and Coastal Fisheries, 17(4): art. no. vtaf025
Link	https://doi.org/10.1093/mcfafs/vtaf025
Summary	Year-round predation of invasive blue catfish on native blue crabs was characterized and quantified from estuarine habitats (0–18 psu) in the James River, a tributary of Chesapeake Bay. The overall predation impact of blue catfish reflected the relative abundance of blue catfish size-classes. We hypothesized that the down-estuary region may facilitate predation by aggregating prey in structured areas that are readily exploited by novel predators.

Back to topic list

Fish & Fisheries (*cont.*)

Title	Ontogenetic vertical migration, seasonality, and long-term increase in mesopelagic fish larvae in the subtropical North Atlantic Ocean
Author(s)	**Mowatt-Larssen T.***, **Steinberg D.K.**, **Latour R.J., Muffelman S.C.**, **Montalvo M.***, **Nolan M.A.***, **Hilton E.J.**
Journal	Marine Ecology Progress Series, 769: pg. 107-124 (2025)
Link	https://doi.org/10.3354/meps14929
Summary	Using a 27-year Bermuda Atlantic Time-series, this study indicates that deep-sea fish larvae begin their lives in surface waters before descending in the water column as they develop, peak in abundance during spring and summer, and have increased (~3–4x) over nearly three decades. This increase is likely linked to rising zooplankton (prey) biomass. This study highlights deep-sea fish larvae sensitivity to ocean change and role in carbon cycling.

Title	Evaluation of a spatiotemporal index standardization method for coastal shark species; implications for future stock assessments
Author(s)	**O'Brien K.A.***, Carlson J.K., Cortés E., Driggers, III W.B., Frazier B.S., **Latour R.J.**
Journal	Frontiers in Marine Science, 12: art. no.1621720
Link	https://doi.org/10.3389/fmars.2025.1621720
Summary	This study compared reconciliation index standardization to spatiotemporal methods for data-limited coastal sharks in the U.S. Southeast Atlantic. Results revealed potential distribution shifts, suggesting climate-driven spatial changes could impact survey catchability and ultimately indices. Findings highlight the importance of considering spatiotemporal models in future stock assessments.

Title	Salinity tolerance, hyposaline stress recovery, and survival of the nemertean worm, *Carcinonemertes carcinophila* (Nemertea) in relation to its host, the Atlantic blue crab, *Callinectes sapidus*
Author(s)	**Pomroy A.K.***, **Schneider A.K.***, **Shields J.D.**
Journal	PLOS ONE, 20(7): e0326493
Link	https://doi.org/10.1371/journal.pone.0326493
Summary	This study assessed the infestation intensity of symbiotic nemerteans on blue crabs in relation to salinity regimes to investigate the use of these worms as biological indicators of female crab reproductive ecology. The worm's salinity tolerance indicates that rapid salinity changes in the blue crab's natural environment does not limit the reliability of *C. carcinophila* as a biomarker for the spawning history of blue crabs.

Back to topic list

See Pomroy A.K. et al. 2025, pg. 5

Photo caption: *Carcinonemertes carcinophila* on an egg-bearing female blue crab. These worms can eat several eggs a day, but they don't severely impact fecundity of their host because a single clutch of eggs can have 2-6 million eggs!

Photo credit: Samantha Dowiarz

Fish & Fisheries (*cont.*)

Title	Morphological differentiation between introduced and native populations of three species of cichlid (Perciformes)
Author(s)	**Russell K.T.***, **Hilton E.J.**
Journal	Ichthyology and Herpetology, 113(1): pg. 117-130
Link	https://doi.org/10.1643/i2024011
Summary	Specimens of three species of fishes in the family Cichlidae from non-native populations in Florida were found to display morphological variation beyond ranges exhibited by native populations. These morphological differences may result from natural selection, morphological plasticity, or a combination, suggesting rapid morphological change (<25 years) in these introduced populations.

Title	Multidecadal assessment of blueback herring egress in mid-Atlantic subestuaries and implications for management
Author(s)	**Smith S.C.F.***, **Fabrizio M.C.**, **Tuckey T.D.**
Journal	Marine and Coastal Fisheries, 17(4): vtaf015
Link	https://doi.org/10.1093/mcfafs/vtaf015
Summary	We described the habitat associations and spatial distribution of juvenile blueback herring during egress from three large mid-Atlantic subestuaries and investigated the effects of increasing temperatures and changing hydrological regimes on the timing of egress during the past quarter century (1996-2023).

Back to topic list

Title	The first report of *Hematodinium perezi* genotype I infection of Chinese mitten crab (*Eriocheir sinensis*) from the River Thames, UK
Author(s)	Kerr R.C., **Small H.J.**, Bass D., Al Arimi W.S., Ross S., Pevsner R., Williams B., van Aerle R., Stentiford G., Bateman K.
Journal	Journal of Invertebrate Pathology, 213: art. no.108427
Link	https://doi.org/10.1016/j.jip.2025.108427
Summary	We report on the discovery of an important crustacean pathogen, *Hematodinium perezi*, found infecting invasive Chinese mitten crabs from the River Thames in the UK. This finding is of particular interest for the future aquaculture of this species in its native range since it may indicate susceptibility to infection with *Hematodinium perezi* genotype II, a parasite prevalent in other crustacean species farmed in Asia.

Title	Fishing to farming livelihood diversification: Perceptions from commercial fishers and shellfish farmers in the United States
Author(s)	Lemoine H.R., **Michaelis A.K.**, Lester S.E.
Journal	People and Nature, 7(8): pg. 2038-2050 (2025)
Link	https://doi.org/10.1002/pan3.70089
Summary	This study examined how commercial fishers and shellfish farmers in Maine, New York and Florida perceive the shift (diversification or transition) from commercial fishing to shellfish aquaculture as part of their livelihood strategy.

Title	Alternative substrate types promote eastern oyster recruitment and benthic community productivity
Author(s)	**Patel J.***, **Knick K.E.**, **Saluta G.G.**, **Lipcius R.N.**, **Seitz R.D.**
Journal	Marine Ecology Progress Series 754: 51-63 (2025)
Link	https://doi.org/10.3354/meps14788
Summary	Oyster restoration alternatives may provide novel opportunities but require performance evaluation. We compared oyster recruitment among natural (shell and granite) and concrete-mix (castle, diamond, c-dome, and x-reef) reef types and determined how reef type influences macrofaunal community productivity and found similar performance between substrate types.

Back to topic list

Shellfish & Crustaceans *(cont.)*

Title	Successful eastern oyster (*Crassostrea virginica*) recruitment on intertidal artificial substrates in Virginia, USA
Author(s)	**Seitz R.D.**, **Knick K.E.**, Suchonic E., Pysher A.
Book	Ecosphere, 16(8): e70380
Link	https://doi.org/10.1002/ecs2.70380
Summary	Concrete GROW Reef Tiles (GT) and oyster castles (OC) were used for restoration and oyster densities compared post-deployment. OC had 27% greater surface area for recruitment compared to GT. At 25 months post-deployment, mean oyster densities differed significantly by substrate, with 553.3 oysters m^{-2} on OC and 423.0 oysters m^{-2} on GT (24% higher on OC).

Title	Crustaceans as herbivores, predators, and general consumers
Author(s)	**Seitz R.D.**, **Lipcius R.N.**, **Patel J.***, **Ralph G.M.**
Book	The Natural History of the Crustacea in *Ecology and Conservation, vol. 10* (eds. L. Gutow and M. Thiel), chp. 2, pg. 34-67 (2025)
Link	https://www.doi.org/10.1093/oso/9780197768242.003.0002
Summary	This chapter reviews the ecological role of crustacean consumers. We discuss herbivores and their role in structuring phytal habitats and phytoplankton communities; consider predatory crustaceans and their effects on prey communities, including omnivory versus specialization, and cannibalism; and finally, the role of crustaceans in food webs, contrasting top-down and bottom-up effects, trophic cascades, behavioral (non-consumptive) effects, and the impact of invasive predatory crustaceans on ecosystems.

Back to topic list

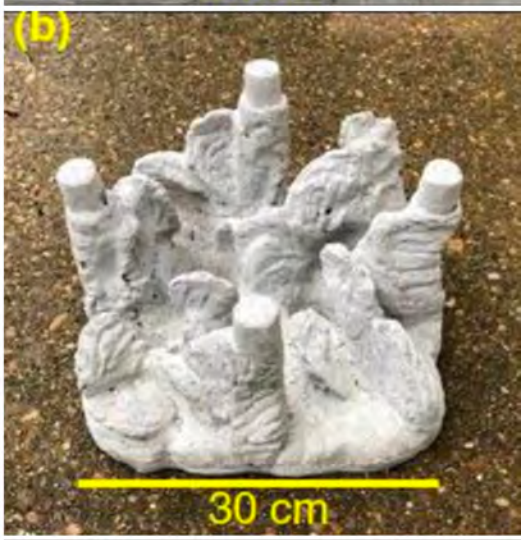
See Seitz et al. 2025 , pg. 9

Photo caption: (a) An oyster castle and (b) GROW Tile before deployment with 30-cm scale bars, and (c) an oyster castle and (d) GROW Tile 25 months after deployment, with visible settlement of oysters.

Photo credits: Kathleen Knick and Rochelle Seitz

Photo caption: GROW reef tiles & oyster castles deployed on the seaside of the eastern shore.

Photo credit: Gabrielle Saluta



Additional Topics

(VIMS authors in bold, asterisk indicates VIMS student)

Topic	**Science Policy, Education**
Title	Learning outcomes and evaluation metrics for training researchers to engage in science policy
Author(s)	Akerlof K.L., Schenk T., Mitchell K., Bankston A., Syl A., **Eddy L.**, Hall S.L., Lad N., Lake S.J., Ostrom R.B.J., Rosenberg J.L., **Sisti A.R.***, Smith C.T., Solomon L., Velez A.-L.K.
Journal	Humanities and Social Sciences Communications, 12(1): art. no. 1137 (2025)
Link	https://doi.org/10.1057/s41599-025-05434-2
Summary	This article reviews literature on training researchers for science policy engagement, identifying key learning outcomes, especially communication skills and policy knowledge, and associated evaluation metrics. It compares academic frameworks with Virginia programs, highlighting inconsistencies in theoretical foundations and emphasizing the need for a unified framework to strengthen assessment and practice.

Topic	**Wetlands**
Title	Examining the relationship between nearshore seagrass and living shorelines in a subtropical estuary
Author(s)	**Benson G.W.***, Donnelly M.J., Morris L.J., **Isdell R.E.**, Walters L.J.
Journal	Estuaries and Coasts, 48(6): 165 (2025)
Link	https://doi.org/10.1007/s12237-025-01595-0
Summary	In Mosquito Lagoon, persistent nearshore seagrass was linked to gently sloped, shallow, slowly eroding shorelines. Natural uneroded shorelines supported higher seagrass density than nearby living shorelines, with differences driven more by shoreline slope than stabilization design, supporting broader ecotone-focused restoration monitoring.

Topic	**Phycology**
Title	A predictive framework for identifying source populations of non-native marine macroalgae: *Chondria tumulosa* in the Pacific Ocean
Author(s)	Fumo J.T., Nichols P.K., Ely T., Marko P.B., Moran A.L., Powell B.S., Williams T.M., Kosaki R.K., Smith C.M., Lopes Jr. K.H., Smith J.E., Spalding H.L., **Krueger-Hadfield S.A.**, McDermid K.J., Hauk B.B., Morioka J., O'Brien K., Kennedy B., Leliaert F., Fujii M.T., Nelson W.A., Draisma S.G.A., Sherwood A.R.
Journal	PeerJ, 13: art. no. e19610, pg. 1-34 (2025)
Link	https://doi.org/10.7717/peerj.19610
Summary	We predict the occurrence of the cryptogenic red alga *Chondria tumulosa*.

Back to topic list

Additional Topics *(cont.)*

Topic	**Management & Policy**
Title	Recovery of benthic macroinfauna six years after dredging
Author(s)	**Johnson D.S.**, **Pant M.**, **Nemeth A.**, Foster E., Gartelman A., Calhoun-Grosch S., Xu K., Roberts B.J., Nelson J.
Journal	PLOS ONE, 20(9): e0332089 (2025)
Link	https://doi.org/10.1371/journal.pone.0332089
Summary	Six years after dredging sand off Louisiana's coast, the seafloor community hasn't returned to normal. Muddy sediments and low oxygen favor small, opportunistic species (worms), instead of sand-dwelling animals (amphipods, lancelets). To support faster recovery, future dredging to reduce long-term mud accumulation and improve oxygen conditions may be helpful.

Topic	**Physical Oceanography**
Title	Spatio-temporal variability of San Francisco Bay plume from space
Author(s)	**Mazzini P.L.F.**, **Pianca C.**, Pareja-Roman L.F., Cole K.L., Walter R.K., Castelao R.M., Hunter E.J., Chant R.J.
Journal	Frontiers in Marine Science, 12: art. no. 1588441 (2025)
Link	https://doi.org/10.3389/fmars.2025.1588441
Summary	This paper provides the first observationally based investigation of the spatio-temporal variability of the San Francisco Bay plume (SFBP), using a plume tracking algorithm applied to more than two decades (2002-2023) of ocean color data from MODIS.

Back to topic list

Additional Topics *(cont.)*

Topic	**Benthic Ecology**
Title	First record of the euryhaline polychaete *Laonome xeprovala* (Sabellidae) from the U.S. Midwest
Author(s)	**Pant M., Dreyer J.C.**, Lamer J.
Journal	Biological Invasions, 27(7): art. no. 169 (2025)
Link	https://doi.org/10.1007/s10530-025-03629-x
Summary	We report a non-native sabellid polychaete found in 2023 in the La Grange Pool of the Illinois River, Illinois. Morphological and genetic analyses identify it as *Laonome xeprovala*, a freshwater and brackish water tube-dwelling suspension feeder first described in Europe. This is the first confirmed U.S. record despite extensive Midwest benthic sampling.

Topic	**Modeling**
Title	Evaluation of a 3D unstructured grid model for the New York-New Jersey Harbor under different forcing sources
Author(s)	Park K., **Zhang Y.J.**, Lorenzo E.D., Seroka G., Fujisaki-Manome A., Pe'eri S., Moghimi S., Kelley J.G.W.
Journal	Ocean Modelling, 197: art. no. 102598 (2025)
Link	https://doi.org/10.1016/j.ocemod.2025.102598
Summary	This paper presents an in-depth evaluation of a 3D unstructured grid model under various forcing sources (tides, wind, river flows etc.), with a focus on the New York-New Jersey harbor. The findings emphasize the necessity of selecting optimal forcing sources to minimize uncertainties and enhance predictive capabilities.

Topic	**Marine Geology**
Title	Local versus regional controls on the morphology and texture of preserved beach and foredune ridges
Author(s)	**Shawler J.L.***, **Hein C.J.**, Georgiou I.Y., Messina F., Sakib M.M.
Journal	Journal of Geophysical Research: Earth Surface, 130(9): e2025JF008429 (2025)
Link	https://doi.org/10.1029/2025JF008429
Summary	This paper focuses on the records contained within beach ridges along Virginia's coast (Wallops, Chincoteague, and Assateague islands). Using sediment cores, ground-penetrating radar, and numerical modeling, this work reveals that ridge shape and sediment type mainly depend on local factors like shoreline orientation and nearby inlets, and these patterns stayed consistent for over 1,000 years despite environmental changes.

Back to topic list

See Pant et al. 2025, pg. 13

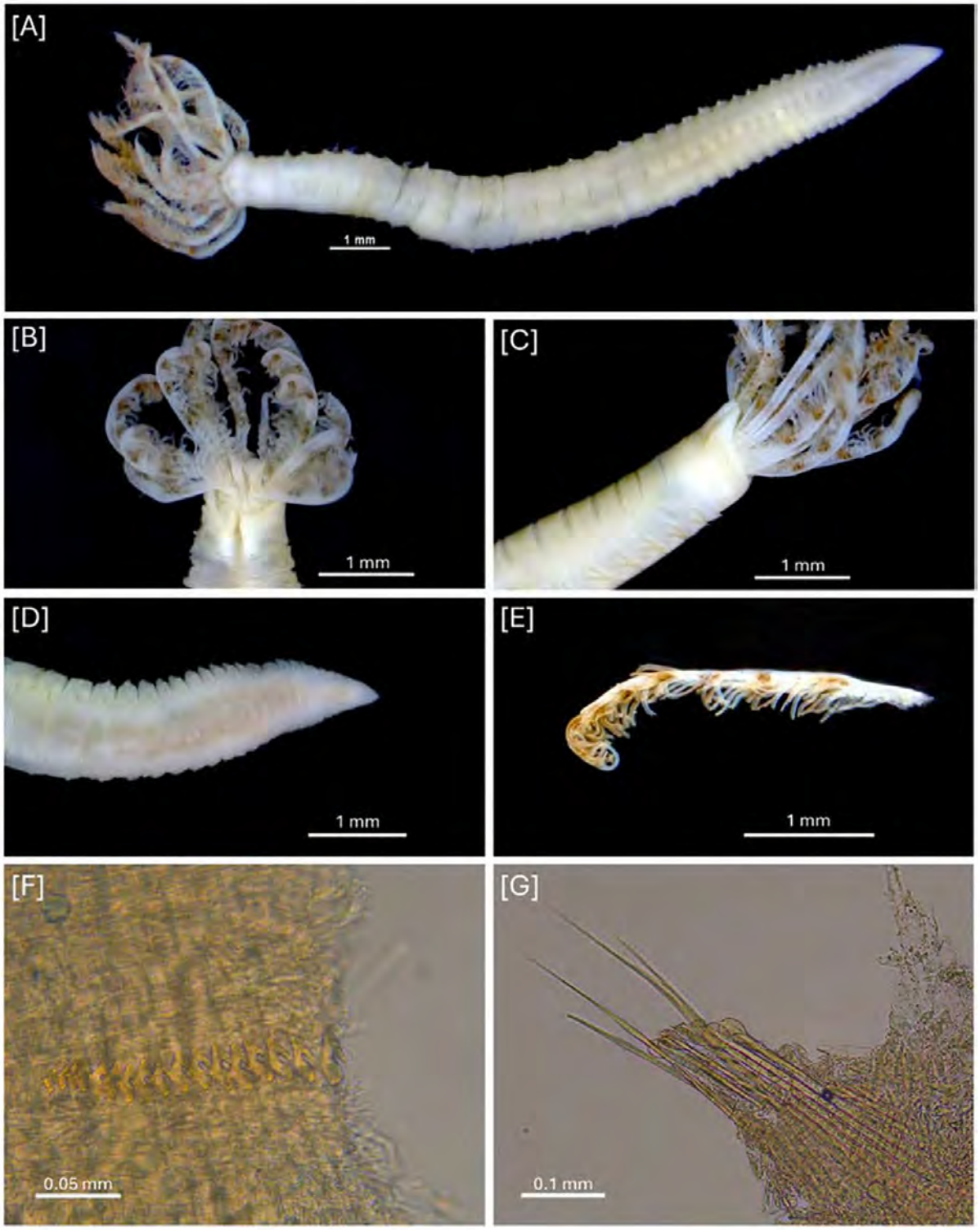


Photo caption: *Laonome xeprova/a* collected from the La Grange Reach of the Illinois River, USA in 2023 [A] complete specimen [B] anterior end with branchial crown [C] front part, ventral view [D] posterior end, pygidium [El branchial radiole with characteristic brown transverse bands [F] a row of thoracic uncini [G] fringed and spatulated setae of the thoracic segment.

Photo credit: Manisha Pant

Additional Topics *(cont.)*

Topic	**Toxicology**
Title	Exposure and hormone associations of pesticides and flame retardants among primates in Uganda
Author(s)	Steiniche T., **Green W.**, Mutegeki R., Chapman C.A., Wrangham R.W., Rothman J.M., Venier M., Wasserman M.D.
Journal	Environmental Toxicology and Chemistry, 44(8): pg. 2244-2257 (2025)
Link	https://doi.org/10.1093/etojnl/vgaf130
Summary	This study investigated concentrations of brominated flame retardants and organochlorine pesticides in air, diet, and feces of four primate species in Kibale, Uganda, and assessed their relation to juvenile hormone levels. Pollutant exposure and endocrine associations varied by species, suggesting dietary ecology influences contaminant uptake, metabolism, and physiological effects.

Topic	**Phycology**
Title	Assessment of red macroalgal (Rhodophyta) diversity in Michigan, USA
Author(s)	Vis M.L., Lindsey G.A., Shainker-Connelly S.J., Crowell R.M., Oetterer A.P., Thornton B.M., **Krueger-Hadfield S.A.**
Journal	Journal of the Torrey Botanical Society, 152(1): pg. 38-56 (2025)
Link	https://doi.org/10.3159/TORREY-D-24-00022.1
Summary	We document freshwater red algae in Michigan.

Back to topic list