

CROCODILE SPECIALIST GROUP NEWSLETTER

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VOLUME 44 Number 3
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IUCN Species Survival Commission

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Cover: West African crocodiles (*Crocodylus suchus*) in a guelta (mountain rock pool) in the northern Afollé Mountains of Mauritania. This site marks one of the northernmost and arid locations within the *C. suchus* range, and despite the harsh conditions this pool contains one of the largest known desert populations of the species. Information/Photograph: Cristian Pizzigalli.

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CSG Newsletter

The CSG Newsletter is produced and distributed by the Crocodile Specialist Group of the Species Survival Commission (SSC) of the IUCN (International Union for Conservation of Nature). The CSG Newsletter provides information on the conservation, status, news and current events concerning crocodilians, and on the activities of the CSG. It is available as a free electronic, downloadable copy from <http://www.iucnscg.org/pages/Publications.html>

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James Hennessy, The National Reptile Zoo, Ireland.
Cathy Shilton, Darwin, Australia.

Editorial

It is with sorrow that we announce the passing of Howard Hunt (84 y) and Mark Norell (68 y). Our sincerest condolences are extended to Howard and Mark's families (see Obituaries on page 4).

As reported in the previous newsletter [44(2)], in February 2025 the "[Crocodile Control and Conservation Bill 2025](#)" was introduced into the state of Queensland Parliament, Australia. The proposed Bill aimed to establish an independent authority outside of the state wildlife agency, to manage and administer the scheme, which included the culling of Saltwater crocodiles (*Crocodylus porosus*) from waterways near human populations. The inquiry into the Bill, conducted by the Health, Environment and Innovation Committee, reached its conclusions, and tabled [Report No. 9, 58th Parliament - Crocodile Control and Conservation Bill 2025](#), in July 2025. The Committee made 8 recommendations, of which the first was that the Bill not be passed.

A recent report indicated an improving status for the *C. porosus* population in the Indian Sundarbans ([The Hindu 2025](#)). This report was based on the results of daytime surveys carried out in December 2024-February 2025 ("Population Assessment & Habitat Ecology Study of Saltwater Crocodiles in Sundarbans 2025"). Although a increasing trend was observed relative to results from surveys undertaken in 2012 and 2024, the relative density of 0.18 non-hatchlings/km remains relatively low. Between 1976 and 2022, 577 head-started juvenile *C. porosus* were released into the Sundarban Biosphere Reserve, to bolster the wild population. The presence of hatchlings during the most recent survey is encouraging, indicating successful nesting is taking place. It is hoped that monitoring continues to occur on regular basis for this important population in India.

Charlie Manolis attended the 7th European Croc Network Meeting (ECNM) held on 1-2 August 2025, in Berlin, Germany. It was very gratifying to see the extent of interest in crocodilians within Europe, from a diversity of participants, including zoos, researchers, private enthusiasts, etc. Europe continues to be a significant reservoir of young researchers who undertake their postgraduate research in regions in which crocodilians occur. Given its success to date, I see the ECNM continuing to be a significant networking event in Europe.

Alejandro Larriera attended a symposium ("Management and Conservation of Crocodilians in the Face of the Challenges of the 21st Century") in Havana, Cuba, on 1-5 July 2025, held under the auspices of the "XIV International Congress of Protected Areas". The objective of the symposium was to

"promote the development of conservation and sustainable use actions for crocodile populations in Cuban ecosystems". Alejandro opened the symposium with an introduction to the history, activities and objectives of the CSG, followed by various Cuban presenters: Irina Martinez, Director of Cuban Crocodile Conservation Program, presented on her activities; Gustavo Sosa and Etían Perez Fleitas presented on *C. rhombifer* conservation activities at the farm and in the wild; Manuel Lopez and Yairén Alonso presented on work at the Las Tunas *C. acutus* farm and in the wild at Monte Cabaniguán; Gabriel Cisneros spoke about the *C. acutus* farm in Manzanillo; and, Mirza Peres Posada spoke about studies of crocodiles in the wild at Los Colorados (Pinar del Río). There was also a presentation by Alexander Leiva Silva on the Isle of Youth (breeding and field studies) and *C. acutus* at Guanahacabibes. Lauren Augustine (Philadelphia Zoo), Brian Henley (Cameron Park Zoo), Jamie Palmer and Sharon Deems (St. Louis Zoo), Kevin Torregrosa and Kelvin Alvarez (Bronx Zoo) and Lauren Gruny (St. Augustine Alligator Farm Zoological Park) presented on various research and conservation activities with which they are involved in Cuba. This reflects ongoing cooperation between Cuban and US researchers and the CSG. On the third day, a workshop was held to identify problems and possible solutions. The most serious problems identified related to poaching in all regions, lack of funding for animal feed, hybridization in captivity, and the need to improve *C. rhombifer* studies in the core area of the Zapata Swamp. We concluded with participants meeting with Commandante Guillermo García Frías (Chair, Fauna and Flora) and a final meeting at Havana Zoo. Visits were undertaken by most participants to Zapata Swamp to see newly-hatched wild *C. acutus* nests and to Jagüey to see the *C. rhombifer* hatchery.

The 2nd Siamese Crocodile Species meeting took place on 19-20 August 2025, in Bangkok, Thailand, to which Charlie Manolis and Sally Isberg were invited to attend on behalf of the CSG. Hosted by Kasetsart University, the meeting drew participation from the Thai farming industry, researchers, students, government agencies, NGOs, European zoos and other interested parties (see below). Unfortunately, due to the recent border issue, participants from Cambodia and Laos had to withdraw at the last minute. The main area of discussion related to ongoing efforts to reintroduce Siamese crocodiles (*C. siamensis*) into suitable habitats in Thailand. Progress in this regard has been slow, and we greatly appreciated the openness of government representatives, industry and other stakeholders in providing an understanding of the reasons for this. Despite the current market for *C. siamensis* skins resulting in at least 50% of the 1000+ farms in Thailand closing and/or scaling down considerably, and creating economic hardship generally, the industry remains committed to continuing reintroduction efforts. However, the ability to plan in the long-term is very much dependent on government support and commitment as well as the policy framework to enable effective reintroductions. To address this, it has been recommended that a strategy be developed to enable commitments to be made by all stakeholders. As a first step, it was suggested that a review of the current reintroduction guidelines, based on existing knowledge, be

undertaken, including the permitting process and number of animals permitted for annual release, age of released crocodiles in terms of survival and time to reach breeding status, release strategy (eg soft versus hard release, time of year), community acceptance and education, methods for ensuring genetic purity and disease-free status of released stock as well as capacity-building in crocodile management. We look forward to seeing these initiatives developed.



Figure 1. Participants at Siamese Crocodile Species Meeting.

The Regional Workshop held in San Salvador, El Salvador, on 24-26 September 2025, drew 61 participants from various countries, including Cuba, Costa Rica, Dominican Republic, Belize, Jamaica, El Salvador, Nicaragua, Panama, Guatemala, Mexico and the USA. Activities included presentation of country reports, development of conservation priorities for the region, and a roundtable session on “Women in Conservation”. We thank the El Salvador Government which hosted the workshop, and the organising committee for their tireless efforts. A detailed summary of the workshop is currently being prepared for inclusion in the October-December Newsletter.



Figure 2. Participants at CSG Regional Workshop.

We again remind CSG members that the 28th CSG Working Meeting will be held in Morocco, in May 2026. The meeting [website](#) has been launched, providing information on [registration](#), [venue and accommodation](#), [veterinary workshop](#) (11 May), and [call for abstracts](#).

Alejandro Larriera and Charlie Manolis, *CSG Co-Chairs*.

Obituaries

Howard Hunt (30 October 1940 - 8 June 2025)



Howard Hunt was curator of reptiles at Atlanta Zoo for over 30 years. Whilst working there, Howard carried out field research on American alligator (*Alligator mississippiensis*) nesting in Okefenokee Wildlife Refuge. For some 10 years after retirement, he led tours of the Okefenokee. Myrna Watanabe recalls studying alligator behaviour in the Okefenokee in the summers of 1976, 1977 and 1978, at the same time as Howard, at which time they became close friends and corresponded in later years, continuing to discuss insights into Howard’s current work and/or other aspects of crocodilian biology.

Howard is considered one of the pioneers in the conservation of Morelet’s crocodile (*Crocodylus moreletii*). His involvement with this species began in the 1960s, when Atlanta Zoo received a group of Morelet’s crocodiles from Yucatan, Mexico. Taking care of those juveniles and raising them to adulthood allowed Howard to observe and document their growth needs, behaviour and breeding, resulting in the production of 232 hatchlings over a 7-year period.

Howard participated in CSG meetings and in the Crocodile Advisory Group of the Association of Zoos and Aquariums (AZA). He oversaw the evaluation of *C. moreletii* as an endangered species and was involved in that species’ studbook. In 1995, he recommended that captive population growth should be limited, and unnecessary breeding not be carried out, and supporting *in-situ* efforts and replacing them with keystone species where possible.

In the 1980s, Howard also carried out research on wild *C. moreletii* populations in Belize, where he promoted the establishment of The Cox Lagoon Crocodile Sanctuary approximately 45 km east of Belize City. This freshwater lagoon is surrounded by swampy forests and on the western side there is a large expanse of wetlands. Howard’s study indicated that a significant population of *C. moreletii* inhabited the lagoon (in 1993, 11 surveys recorded 413 crocodile sightings in 14,600 ha), and he recommended it be promoted for ecotourism.

Compiled from information provided by Luis Sigler ([Sigler et al. 2017](#)), Myrna Watanabe and online [sources](#).

Mark A. Norell (26 July 1957 - 9 September 2025)



Mark Norell was a Minnesota native, but grew up in southern California. He completed undergraduate studies at Long Beach State University, earned an MS at San Diego State University, and in 1988 obtained his PhD at Yale University. In 1989, he became a curator at the Division of Paleontology at the American Museum of Natural History (AMNH) in New York, a position he held until he retired in 2021. For much of that time, he was Chairman of that division.

To the broader community, Mark will be remembered mostly for his work on theropod dinosaurs and the origin of birds. He helped describe some of the first non-avian theropods found with feathers. Partly because of him, we now restore animals like *Velociraptor* with plumage. He led important field excursions, especially in Mongolia, and was a gifted fossil hunter. He made critical contributions to the application of phylogenetic methods to fossils and deep time and coined the term “ghost lineage”. He was also a master of public outreach who wrote popular books, designed museum exhibits, and appeared on broadcast media. It’s no exaggeration to call him one of the most consequential vertebrate paleontologists of the modern era.

Those of us who work on crocodyliform systematics will remember Mark as one of the founders of the discipline. He published the first morphology-based phylogenetic analysis of crown-group Crocodylia in 1990 and provided additional analytical work in his PhD thesis, which focused on the relationships among alligators and caimans (the clade name Caimaninae first appears in his dissertation). This was a springboard for his immense contributions to understanding the fossil record in a phylogenetic context.

He contributed to some of the most important descriptive work on crocodylians and close crocodylian relatives, including *Brachychampsia*, *Hylaeochampsia* and *Bernissartia*. This body of work, often done in collaboration with James Clark, set the stage for all subsequent phylogenetic analyses of living and extinct crocodyliforms. Every crocodylian morphological data matrix used since the mid-1990s has drawn heavily from their foundational efforts.

But as important as his phylogenetic analyses and descriptions were, the nomenclatural system Mark helped establish, in partnership with Jim Clark, has arguably had the greatest long-term impact on our community. Mark was an early promoter of phylogenetic nomenclature. And for those of us

working with crown-group Crocodylia - a definition Jim first published and Mark quickly adopted - the distinction Mark drew between total-group Alligatoroidea and crown group Alligatoridae was revolutionary. It led to the framework now used for all crocodylian clades. The system Mark helped bring into existence has proved remarkably stable in the face of continued discoveries and changing phylogeny estimates. It was an enduring gift to the entire crocodylian specialist community.

Every aspect of his career stands as a model for how the rest of us should proceed. The clarity of his descriptions? The level of contemplation placed on his results? The care directed at building an intellectual foundation that would serve a growing community in perpetuity? His interdisciplinary approach? Those of us working on crocodylian systematics - and there are now many of us - have all worked to emulate his approach.

The interdisciplinary nature of his work is evident in the 2022 study led by Evon Hekkala on ancient DNA from *Voay robustus*, a recently extinct crocodylid from Madagascar. The analysis integrated molecular and morphological data to resolve the relationships of this bizarre horned animal. He played a central role in making it happen, and it illustrates the synthetic approach he brought to everything he did.

Mark was also known for his uncommon collegiality. Indeed, the Wall Street Journal once called him “the coolest dude alive”. He always made time for visitors to the AMNH, and his assistance went far beyond merely opening the door and pointing to the right cabinets. This was especially true for visiting students. Many of us remember stimulating conversations – sometimes in the collections, sometimes in his office in one of the AMNH’s turrets facing Central Park, sometimes over beer. We encountered a sharp wit, relaxed demeanor, and a remarkable breadth and depth of knowledge.

His mentorship of students is perhaps his greatest accomplishment. The list of his alumni is a who’s who of contemporary reptile paleontology and systematics. Several prominent crocodyliform workers passed through his lab, including Alan Turner, Eugenia Gold, Diego Pol, Aki Watanabe, Evon Hekkala, James Napoli and Pedro Godoy.

Even those of us who were not formally part of his program found an important source of insight and, more importantly, encouragement. I made several visits to the AMNH while I was in grad school at the University of Texas in the 1990s, and Mark went out of his way to help me. One of my clearest memories of the time is of Mark taking me to the cabinets holding skulls of *Voay robustus*. These specimens took my breath away, and Mark’s effort to show me meant the world.

Mark is survived by his daughter Inga, his brother Todd, and a host of colleagues who owe him a debt of gratitude we can never repay.

Christopher A. Brochu, *University of Iowa, Iowa City, IA 52242, USA* (chris-brochu@uiowa.edu).

Key Events in 2025

- IUCN World Conservation Congress (WCC), Abu Dhabi, United Arab Emirates, 9-15 October 2025.
- “Symposium on Conservation and Use of Crocodilians in Latin America: a Look at the Present, Reflections Towards the Future”, will be held under the auspices of “XVI CIMFAUNA 2025” (organized by COMFAUNA), San Cristóbal de las Casas, Chiapas, México, 10-14 November 2025.
- “20th Conference of the Parties to CITES (CoP20)”, Samarkand, Uzbekistan, 24 November to 5 December 2025.

CSG Student Research Assistance Scheme

The Student Research Assistance Scheme (SRAS) and Fritz Huchzermeyer Veterinary Science Student Research Assistance Scheme (FHVS-SRAS) provided funding to three students in the July-September 2025 quarter (see below), and one application is currently under review.

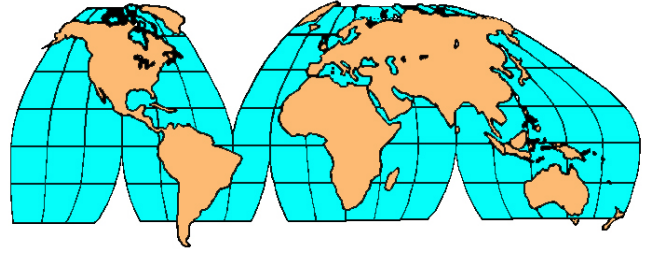
1. Gabriel Brandão de Mello Netto (Brazil; Project 25/13): Influence of urbanization on the distribution of Broad-snouted caimans (*Caiman latirostris*) in Pernambuco, Brazil.
2. José Rodolfo Mañon González (Mexico; Project 25/14): Occupancy patterns of two sympatric crocodilian species on the coast of Chiapas.
3. Andrea Torzone (USA; Project 25/15): Effects of water pollution on the immune system of sub-adult and adult *Crocodylus moreletii* in rivers in Belize.

The following reports, submitted in July-September 2025 by SRAS applicants who have completed their studies, have now been posted on the CSG website:

1. Ciarán Ó Mórdha (Ireland; Project 23/4). Assessment of the American crocodile (*Crocodylus acutus*) population in Ambergris Caye, Belize. [Download](#).
2. Yashendu Joshi (India; Project 21/17). The crocodile conundrum of Charotar: Understanding crocodile behaviours and their socioecological connections with humans. [Download](#).
3. Gervais Habarugira (Australia; Project 20/5). Understanding the mechanisms of West Nile virus (WNV) infection and induced lesions in *Crocodylus porosus*. [Download](#).

Dr. Sally Isberg, CSG Executive Officer (csg@wmi.com.au).

Regional Reports



East & Southeast Asia

Lao PDR

SIAMESE CROCODILES RELEASED AS WETLAND AND CROCODILE INFORMATION CENTER OPENS IN SAVANNAKHET PROVINCE, LAO PDR. The official opening of the Xe Champhone Wetland and Crocodile Information Center (XCWCIC) took place on 7 May 2025 in Tansoum Village (Champhone District, Savannakhet Province), in the presence of government representatives, monks, local students and personnel from Wildlife Conservation Society (WCS) and donor agencies (Fig. 1). During the ceremony, 10 Siamese crocodiles (*Crocodylus siamensis*) were released by participants into a temporary soft-release enclosure at the edge of the wetlands near the village (Fig. 2).



Figure 1. Participants on tour of the XCWCIC.



Figure 2. Participants releasing juvenile crocodiles into a soft-release enclosure at edge of Xe Champhone Wetlands.

The Governments in the three target districts (Champhone, Songkhone and Xonnabouly), the Savannakhet Provincial and District Forestry and Agriculture Offices, and the National Department of Water Resources, are the main governmental partners in the project, which aims to ensure a viable population of Siamese crocodiles remains in the Xe Champhone Wetlands (XCW). With less than 1000 Siamese crocodiles remaining in the wild, it is considered among the most threatened of world crocodilians (Platt *et al.* 2019).

The XCW (16.3836°N, 105.2147°E) are located in the floodplains of the Champhone and Xangxoy Rivers, Savannakhet Province, and represent the largest of Lao PDR's two Ramsar sites (established in 2010). The XCW hosts what is probably the largest remaining wild population of Siamese crocodiles in mainland Southeast Asia (Platt *et al.* 2022). Based on nest counts in 2022-24, we estimate the number of Siamese crocodiles inhabiting the XCW to range between 70 and 225 individuals (Platt *et al.* 2022, 2024).

Crocodiles in the XCW are afforded de facto protection stemming from the local belief that crocodiles are the living embodiment of the spirits of dead ancestors, and anyone harassing, harming, or killing a crocodile risks supernatural retribution in the form of misfortune, illness, or even death (Baird 2001; Bezuijen *et al.* 2013; Platt *et al.* 2018). The widespread existence of these beliefs almost certainly explains the continued persistence of *C. siamensis* in the XCW, given that populations elsewhere in Lao PDR have largely been extirpated (Platt *et al.* 2018).



Figure 3. Participants searching for juvenile crocodiles in the head-starting ponds, from the enclosure's observation platform.

The new XCWCIC offers an immersion in the biodiversity of the XCW, with an emphasis on the biology, ecology and conservation of the Siamese crocodile in this ecosystem. With educational panels displayed along the visitors' path as well as various wall murals, the center invites visitors to discover and learn more about the wetlands and its wildlife (Fig. 1). Part of the center showcases the crocodile head-starting activities carried out by the Tansoum community in partnership with Government and WCS. Adjacent to the center and accessed by a walkway, visitors can oversee three outside ponds from a central viewing platform (Fig. 3). This

enclosure also contains a battery of four concrete grow-out pens housing head-started crocodiles of various sizes/ages. In total, there are three such batteries, one more in Tansoum and another in Donyanong village, located in another section of the floodplain.

The dedicated, ongoing conservation program for the Siamese crocodile operated in close collaboration with the local communities and Government is in place in the Champhone, Songkhone and Xonnabouly Districts of Savannakhet Province, and it is the aim to have a multi-district protected area created along the Champhone River. Since the restart of the program in 2019, a total of 183 Siamese crocodiles have been successfully translocated into the XCW to boost the existing wild population. This includes 68 head-started crocodiles released at the start of the 2025 wet season.

Acknowledgements

This conservation program is part of the "Ecosystem Conservation through Integrated Landscape Management in Lao PDR" (ECILL) project funded by the European Union and the Agence Française de Développement and implemented by WCS. It is also funded by the Critical Ecosystem Partnership Fund, a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, Fondation Hans Wilsdorf, the Global Environment Facility, the Government of Canada, the Government of Japan and the World Bank. A fundamental goal is to ensure civil society is engaged in biodiversity conservation.

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Robert van Zalinge, Phacksouliya Phommatheth, Viengthida Phaxayyaphet, Sounantha Boutxakittilath and Steven G. Platt; Wildlife Conservation Society-Lao Program, P.O. Box 6712, Vientiane, Lao PDR (rvanzalinge@wcs.org; pphommatheth@wcs.org; vphaxayyaphet@wcs.org; sboutxakittilath@wcs.org; sgplatt@gmail.com).

Latin America & the Caribbean

Mexico

“CROCOKERMES SOLIDARIA”: AN EVENT TO PROMOTE APPRECIATION AND CONSERVATION OF CROCODILIANS. Environmental education focused on crocodilians often represents a challenge, as they do not evoke tenderness due to their rough appearance and predatory nature, and often generate little empathy to the public. As the Wildlife Rescue and Rehabilitation Center “Mundo Cocodrilo” (a project of AC COMAFFAS), specialized in crocodiles and caimans, we work to contribute “a grain of sand” to raising awareness about these species (in Chiapas, there are *Crocodylus acutus*, *C. moreletii* and *Caiman crocodilus*).

This private initiative is taking its first steps in the tourism sector for educational purposes, and recently, with the aim of increasing outreach efforts on the importance of crocodilians, we organized an event “CrocoKermés Solidaria” to involve the public to get to know the species under our care. Some of these crocodilians came from rescue situations due to human-crocodile interactions, health problems that would prevent their survival in the wild, or other risk circumstances that motivated our intervention for their care in captivity, always with the relevant permits.

“CrocoKermés Solidaria” was held on 10 August 2025 at Mundo Cocodrilo, where each activity was designed to offer visitors a unique experience in a healthy and family-friendly environment that combined learning, fun and safety. One of our goals was to raise funds for the conservation of crocodilians and, at the same time, bring people closer to these amazing reptiles in a responsible and enriching way.

Among the most outstanding activities during our event, the crocodile feeding activity stood out for its educational and interactive nature, always carried out under strict safety conditions and supervision by our specialized team, led by Jerónimo Domínguez-Laso. Thanks to this activity, visitors were able to understand firsthand the natural behavior of crocodiles, their diet, and their ecological importance,



Figure 1. Supervised feeding of crocodilians during the event. Photographs: Berenice García-Reyes.

breaking myths and promoting respect for these species.

The overall atmosphere of the event was very pleasant and enjoyable, featuring delicious regional food in a setting surrounded by marimba music “Sones de mi Tierra” performed by the youth from the Cultural House of the Municipality of Suchiapa. At the same time, there were other activities such as talks, “contact tables” with crocodilian skulls, interaction with juvenile specimens, and an exhibition of crocodilians ranging from small hatchlings to large specimens up to 4 m in length, allowing both children and adults to actively participate and learn in a hands-on way.

As a team, we were pleasantly surprised and very grateful for the public’s response, as we exceeded attendance expectations with more than 150 people, and participation in the activities, helped us raise funds that can be applied to conservation action. This leads us to consider the possibility of holding a second “CrocoKermés Solidaria”, with the aim of keeping the tradition of the event alive, including more people in the educational experience, promoting the conservation of species, and at the same time, financially contributing to the project for the preservation of crocodilians in Chiapas.

Berenice García-Reyes and Jerónimo Domínguez-Laso, COMAFFAS A.C., Chiapas, México (crocodylia@gmail.com, jeroxdl@yahoo.com.mx).



Figure 2. Family enjoying the event and taking a souvenir photograph (left); exhibit of crocodilian skulls and other material for educational purposes (right). Photographs: Berenice García-Reyes and Yazmin Reyes.



Recent Publications

Caldwell, J. (2025). World Trade in Crocodilian Skins 2021-2023. UNEP-WCMC: Cambridge.

Executive Summary: All crocodilians are listed in either Appendix I or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and many are found in international trade for the leather and fashion industry, for meat, and as live animals for breeding operations, food, the pet industry, and zoos. This report shows the changing trends in the species involved in this trade since 2014 with special emphasis on the years 2021 to 2023, the most recent three-year period for which there are reasonably complete data. The species involved in the skin trade are the ‘classics’ such as *Alligator mississippiensis*, *Crocodylus acutus*, *C. moreletii*, *C. niloticus*, *C. novaeguineae*, *C. porosus* and *C. siamensis*, and the caimans such as *Caiman crocodilus crocodilus*, *C. c. fuscus*, *C. latirostris* and *C. yacare*. More recently, black caiman *Melanosuchus niger* has entered the skin trade. Between 2014 and 2020 overall global trade appeared to decline, mainly due to a collapse of the South American caiman trade as the industry moves towards higher value skins. Some species weathered this decline, notably American alligator from the USA, Nile crocodile from southern Africa, and Siamese crocodile from Thailand and Viet Nam. Since 2014 the total number of crocodilian skins traded globally has declined but 4.3 million skins were reported in trade over the three-year period 2021-2023. There were dramatic declines in all aspects of the trade in crocodilians in 2020 because of restrictions put in place to control the global pandemic of COVID-19, however trade levels in some species, notably *C. porosus* and *C. siamensis*, showed signs of recovery in the three following years. Live animal trade involves relatively few individuals except for the Far Eastern trade in Siamese crocodile *C. siamensis*. These animals are bred in captivity in Cambodia, Thailand, and Viet Nam, and until 2019 were exported in large numbers to China where they

are consumed as food. This trade was not continued since then, probably because of COVID-19. Crocodilian meat is traded widely but is particularly favoured in the Far East, especially China and Hong Kong SAR; the top species in trade in the period 2021-2023 continued to be *C. niloticus*, *C. porosus* and *C. siamensis*.

Christensen-Dalsgaard, J., Galeotti, P., Knapp, C.R. and Mathevon, N. (2025). Reptiles. Pp. 172-222 in *Exploring Animal Behavior Through Sound: Volume 2*, ed. by C. Erbe and J.A. Thomas. Springer: Cham.

Pizzigalli, C., Regalla, A., Palmeirim, A.F., Palma, L., Lopes-Lima, M., Razgour, O., Godinho, R., Intipe, W.A. and Brito, J.C. (2025). Diversity, distribution and conservation of crocodiles (Order: Crocodylia) in Guinea-Bissau, West Africa. *Scientific Reports* 15(1): 24703.

Abstract: Challenges in freshwater organism conservation in West Africa are worsened by significant knowledge gaps, even for charismatic species like crocodiles. This study addresses these gaps by assessing crocodile diversity, distribution, and conservation threats in Guinea-Bissau, where existing data is outdated. We used visual surveys, inquiries, molecular barcoding, camera trapping, and bibliographic reviews to investigate crocodile populations. Notably, we found evidence suggesting the Nile crocodile (*Crocodylus niloticus*), previously thought extinct in West Africa since about 200 years, may persist in Guinea-Bissau's Cacheu region. We also confirmed the presence of the West African crocodile (*Crocodylus suchus*) in major river basins and coastal lagoons, including the Bijagós Archipelago, and the West African dwarf crocodile (*Osteolaemus cf. tetraspis*) in the southern mainland and the Bijagós Archipelago. Habitat loss and deliberate killings were identified as major threats. Standardized surveys and genetic sampling are essential to assess population size, connectivity, and genetic diversity, informing evolutionary studies and conservation planning. Conservation efforts should prioritize habitat protection through community-managed reserves and restoration initiatives. Additionally, engaging local communities to raise awareness and

develop conflict mitigation strategies is crucial, particularly in areas with human-crocodile interactions.

Muslin, C., Salas-Brito, P., Coello, D., Morales-Jadán, D., Viteri-Dávila, C. and Coral-Almeida, M. (2025). *Salmonella* prevalence and serovar distribution in reptiles: a systematic review and meta-analysis. *Gut Pathogens* 17(1): 52.

Abstract: Reptiles are recognized as reservoirs of *Salmonella* bacteria, and the expansion of the global pet reptile trade has led to reptile-associated salmonellosis emerging as a significant public health concern. To characterize the risk posed by reptiles as a source of *Salmonella* transmission to humans, we conducted the first comprehensive meta-analysis to estimate the worldwide prevalence of *Salmonella* in both wild and captive reptiles and identify the primary factors influencing this prevalence. We systematically reviewed publications reporting the prevalence of *Salmonella* spp. intestinal isolation in reptiles, published between 1986 and 2023, across the PubMed, Scopus and Web of Science databases. The 179 studies included examined a total of 23,411 reptiles from 56 countries across all continents, with 49.9% being free-ranging animals and 48.4% living in captivity, mainly from zoos, pet shops, or households. The overall pooled prevalence of *Salmonella* spp. in reptiles was estimated at 30.4% (95% confidence interval, CI: 27.4-33.6%). Notably, significant variations in *Salmonella* spp. colonization rates were observed across different reptile taxa, with snakes exhibiting the highest prevalence at 63.1% (95%CI: 57.4-68.4%), followed by lizards at 33.6% (95%CI: 28.6-39.0%), and turtles and crocodiles with similar rates of 11.2% (95%CI: 8.8-14.2%) and 10.5% (95%CI: 5.7-18.6%), respectively. Furthermore, significant differences in *Salmonella* spp. prevalence were observed across different reptile families within each taxon. The data suggest that captivity is a contributing factor to *Salmonella* spp. colonization, as captive reptiles showed significantly higher prevalence rates (37.8%, 95%CI: 34.3-41.4%) compared to their wild counterparts (14.8%, 95%CI: 11.0-19.6%). Additionally, we found that the inclusion of pre-enrichment and selective enrichment steps in culture broths significantly improved the sensitivity of both culture-based and PCR-based *Salmonella* detection methods. Importantly, the study revealed that reptiles primarily carried *Salmonella enterica* subspecies *enterica*, responsible for most human salmonellosis cases. Of particular concern, several human-pathogenic *Salmonella* serovars of public health relevance, such as Enteritidis, Typhimurium and Newport, were identified among the 10 most common serovars colonizing reptiles. Collectively, these findings highlight the substantial health threat posed by reptiles as a source of human *Salmonella* infection and may inform the development of policies and strategies for prevention and public education to mitigate the risk of reptile-associated salmonellosis.

Viljoen, D., Webb, E., Myburgh, J., Truter, C., van Wyk, H. and Myburgh, A. (2025). Thermal profiles associated with nest site selection of Nile crocodiles (*Crocodylus niloticus*) on a commercial crocodile farm. *Journal of Thermal Biology* (doi: [10.1016/j.jtherbio.2025.104179](https://doi.org/10.1016/j.jtherbio.2025.104179)).

Abstract: Understanding crocodile nest site selection is important in the context of climate change and related habitat alterations. This study assessed a current nesting environment on a crocodile farm in South Africa, examining associations between various nest site selection parameters, with a particular emphasis on the role of temperature. It was hypothesized that thermal profiles of nests and factors affecting nest temperatures (orientation, shading, grassy cover) would directly impact nest site selections, nests closer to waterbodies would be preferred, dominant females would dictate nesting area use, and human presence would not impact nesting behaviours as farmed crocodiles are accustomed to this. Nile crocodiles in this study produced nests of similar depth to wild Nile crocodiles, and subsurface temperatures varied with nesting layouts (section, orientation, shading), climate factors, and grass

growth. Although a complex interaction of factors affected nest site selections, mean subsurface nest temperatures tended to fit into the narrow range of 25-26°C, highlighting a measure of stability within the nesting environment. Daily temperatures and temperature ranges did however vary significantly between crocodile-selected nesting depths. Behaviour played an important role in the nest site selections, highlighting how nesting sites must be more than just thermally viable in farmed settings. Grassy growth over nesting sites reduced the surface and subsurface temperatures of those nests. Although this did not affect nesting site occupancy, crocodiles selected against depositing eggs in these sites. Nests closer to waterbodies and tourist walkway were occupied more frequently; however, successful nesting occurred further from the walkway. The size (snout-hindlimb length) of crocodiles within nesting sites did not correlate to preferred nesting sections within the pen. Further research is needed to determine if thermally optimal nesting conditions might be complicated by climate change related nesting environment alterations on commercial farms.

Dando, T.R., Crowley, S.L., Young, R.P., Carter, S.P., Denman, H. and McDonald, R.A. (2025). Understanding farmers' perspectives and engagement with wildlife conservation practices: Insights from a European wildcat reintroduction. *People and Nature* (doi: [10.1002/pan3.70070](https://doi.org/10.1002/pan3.70070)).

Abstract: Farmers are important stakeholders in many conservation projects; however, their relationships with conservation practices and institutions are complex and can reflect competing visions and priorities for the same spaces. The reintroduction of carnivores into farmed landscapes can be especially contentious because of actual or perceived risks to livestock and livelihoods. Effective engagement between conservationists and farmers is essential for positive reintroduction outcomes. The European wildcat (*Felis silvestris*) is Critically Endangered in Scotland and is extinct in England and Wales, where reintroduction has been proposed. Using semi-structured interviews, we investigated livestock farmers' perspectives on conservation practice, focusing on wildlife reintroductions and the prospect of wildcat restoration. Farmers often perceived wildlife conservation practices as removed from the needs of rural landscapes. Discourses initiated by prominent individuals and amplified in the media were perceived as 'anti-farmer' and have fostered feelings of distrust of conservation practices and associated organisations. While we highlight farmers' senses of detachment and imposition, most farmers expressed willingness to engage with reintroduction projects if they were engaged in the 'right' way. Face-to-face interactions and investment in a long-term local presence were seen as essential in engendering positive relations between farmers and trusted individuals. Cultural salience of wildcats was low among livestock farmers in these regions, where wildcats were long extinct. Uncertainties and confusion about wildcat ecology meant that many farmers, irrespective of their support for reintroduction, overstated both negative impacts and potential benefits. The conflation of reintroductions and 'rewilding' appeared detrimental to support for reintroductions. Transparency and clarity in communicating the scope of a project and farmer involvement were important. Individual and community level engagement as well as local involvement in planning reintroductions are central to fostering positive relationships between farmers and conservation organisations. Where the cultural salience of a species is low, such approaches can reduce the risk of misinterpretation of a species impacts and project objectives. Our wider exploration of current problems and potential solutions (as perceived by farmers) between farming and wildlife conservation means our results apply to a host of conservation initiatives where there is a need to facilitate better interactions between these groups.

Adhikari, S., Luitel, H., Khanal, S. and Marasini, A. (2025). Identification and multidrug resistance profiles of *Escherichia coli*, *Salmonella*, and *Staphylococcus* from cloacal swabs of captive yearling gharials (*Gavialis gangeticus*) in Chitwan National Park,

Nepal. Veterinary and Animal Science (<https://doi.org/10.1016/j.vas.2025.100475>).

Abstract: This study focuses on the identification and antibiogram profiles of *Escherichia coli*, *Salmonella* spp., and *Staphylococcus* spp. isolated from cloacal swabs of captive yearling gharials (*Gavialis gangeticus*) at the Gharial Breeding Center, Chitwan National Park, Nepal. A total of 28 samples were collected and processed, yielding 38 isolates comprising *E. coli* (46.43%), *Staphylococcus* spp. (46.43%), and *Salmonella* spp. (42.86%). All three bacteria were isolated in 14.29% of samples. Antimicrobial susceptibility testing, performed using the Kirby-Bauer disk diffusion method, demonstrated high levels of resistance to commonly used antibiotics such as ampicillin and ciprofloxacin. Multidrug resistance was prevalent, with 84.62% of *E. coli* and 58.33% of *Salmonella* spp. isolates classified as multidrug-resistant, while all *Staphylococcus* spp. isolates showed resistance to three or more classes of antibiotics underscoring critical AMR challenges. The study also revealed a significant interplay between the reptilian gut microbiota and environmental factors, suggesting shared reservoirs for bacterial transmission. The findings underscore the urgent need for antimicrobial stewardship, improved environmental management, and regular health monitoring to mitigate the risks posed by antimicrobial resistance and pathogenic bacteria in critically endangered gharials. This research contributes valuable insights into the health challenges facing captive gharials and provides a basis for developing targeted conservation strategies.

Parrott, B.B. and Bock, S.L. (2025). An epigenomic threshold hypothesis for integrating dynamic environmental signals into functional models of developmental polyphenisms. Functional Ecology (doi: [10.1111/1365-2435.70099](https://doi.org/10.1111/1365-2435.70099)).

Abstract: Interactions between developing embryos and a multitude of environmental factors (eg climate, nutrition, social cues, stress and anthropogenic contaminants) underlie adaptive and non-adaptive developmental plasticity and carry broad implications across ecological, evolutionary and biomedical science. At its core, developmental plasticity entails an environmental signal, a biological pathway capable of sensing and transducing the signal and an epigenetic response that directs alternative developmental trajectories from a single genotype. In recent years, our collective understanding of these processes has advanced in meaningful ways - the instructive environmental factors have been identified in many systems and in some cases, even the molecular cascades connecting environmental cues to developmental outcomes have been revealed. Yet, environmental signals that induce plastic responses are often transient and co-occur with opposing cues in nature, and how molecular hierarchical pathways integrate temporal variation in environmental conditions across environmentally and biologically relevant timescales has received relatively little attention. For example, predator cues, nutritional quality, density, temperature and almost any other environmental signal dictating plastic responses are dynamic across time. This leads to a fundamental, yet unanswered question: How is the strength, stability and frequency of inductive cues integrated into genomic responses that ultimately trigger robust and stable developmental outcomes? Here we develop an epigenomic threshold hypothesis for integrating ecologically and biologically relevant timescales into a mechanistic model, highlighting temperature-dependent sex determination in reptiles as a timely case study. We further define several key questions stemming from the epigenomic threshold hypothesis and suggest experimental and methodological considerations for future investigations of these questions across diverse polyphenic systems.

Vyas, R., Upadhyay, K. and Mistry, V. (2025). Bird's paradise under threats: Blurred future of wetlands of Charotar region, Gujarat, India. Flamingo Gujarat VIII(1-2): 11-18.

Petrossian, G., Lang, J., von Ferber, J., Gondhali, U., Lieu, B.,

Bernstein, K., Barbosa, J., Chakraborty, S., Sharma, K. and Freire, J. (2025). Scaling the web: Unraveling online reptile leather trade networks with machine learning and network analysis. Available at SSRN: <https://ssrn.com/abstract=5332548> or <http://dx.doi.org/10.2139/ssrn.5332548>.

Abstract: Since COVID-19, the illegal wildlife trade (IWT) has made a massive transition from physical to online marketplaces, creating new challenges for identifying and tracking the trade of reptile leather products. Social network analysis has been used in the past to identify networks of key actors and generate strategies to dismantle these networks. However, these analyses have been limited to actors interacting in the physical space. We utilize machine learning (ML) and large language models (LLMs) to extract advertisements on potential illegal sales of small leather items on eBay as the case-study marketplace. We use social network analysis to identify key actors, products, and eBay sites where these activities occur, and use network percolation analysis to determine which network disruption strategies offer the most optimal impact of disruption on network dismantlement. We found that online reptile leather trade is highly concentrated, with a small number of species, product types, and countries dominating the market, especially for such luxury products as crocodile bags. Network percolation analyses revealed that targeted interventions focusing on high-degree product types (rather than sellers or shipping countries) are most effective at disrupting the market. These findings suggest that regulatory agencies should prioritize enforcement at key market chokepoints by requiring all online listings of reptile leather products to display valid CITES permits, include the full scientific and common species names, and show non-reusable CITES tags in product images. E-commerce platforms like eBay must enforce these requirements to ensure compliance with domestic and international wildlife trade laws.

Griffin, C., Dinh, D., Singletary, D., Tellez, M. and Sung, H. (2025). Characterizing the microbiome of *Dujardinascaris helicina* (Nematoda: Ascarididae) isolated from wild American crocodiles in Belize. Journal of Helminthology 99: e73.

Abstract: Microbiomes are communities of microorganisms that form close associations with metazoan hosts and have important roles in host biological processes. With the advent of Next Generation Sequencing, the microbiomes of myriad animals and plants have been described. However, the microbiomes of parasites have received little attention, which is surprising considering their ecological and medical importance. This study characterizes, for the first time, the microbiome of *Dujardinascaris helicina*, a gastrointestinal nematode parasite of the American crocodile. *Dujardinascaris helicina* were isolated from crocodiles residing in two geographically separated habitats across Belize. Using 16S sequencing, we compare β -diversity between sampling locations using generalized linear mixed modeling. Our results show that *D. helicina* microbiomes differ in composition depending on location. We also show that *D. helicina* microbiomes show strong shifts toward consolidation of specific taxa when proximity to human modified environments increases.

Jin, Y., Xu, J., Zhang, Y., Sun, Y., Wang, Y. and Zhang, F. (2025). How to construct a habitat network of wild Chinese alligator (*Alligator sinensis*)? A case study of the Xuancheng area, China. European Journal of Wildlife Research 71: Article 77.

Abstract: Habitat fragmentation is a major limiting factor for the population growth of the critically endangered wild Chinese alligator (*Alligator sinensis*). Based on occurrence records in the Xuancheng area, we employed the Maximum Entropy (Maxent) model to evaluate habitat suitability, incorporating both natural environmental variables and anthropogenic disturbance variables. Habitat suitability was classified into four levels to delineate potential habitat areas, within which source habitats were subsequently identified. Based on the contribution rates of environmental

variables in the Maxent model, resistance factors were selected to construct a landscape resistance surface. Subsequently, circuit theory was employed to identify ecological corridors and establish a habitat network for the wild Chinese alligator in the Xuancheng area. Our findings indicate that suitable habitats for the wild Chinese alligator are predominantly distributed in the central and northern regions of the study area, primarily at elevations ranging from 0 to 200 m. These habitats are characterized by proximity to water bodies, high vegetation cover, and limited disturbance from major roads. Notably, Langxi County and Guangde City demonstrated the highest levels of habitat suitability. We delineated 16 source habitats, encompassing a total area of 203.47 km², with Langxi County containing the largest patch area. Additionally, 26 ecological corridors were identified, and Guangde City hosts the highest number of corridors. Based on the constructed habitat network in the Xuancheng area, the following recommendations were made: (1) The areas that are now suitable habitats for the survival of the wild Chinese alligator were categorized into three categories: plain polder areas, hilly and valley areas, and reservoir-adjacent areas. (2) Ecological corridors can be strategically planned within plain areas to connect nearby water bodies and wetland habitats. Enhancing vegetation coverage along corridor edges to improve environmental concealment. By establishing a theoretical framework for habitat selection and ecological corridor design, this study aims to optimize habitat suitability and connectivity for the wild Chinese alligator, thereby supporting species recovery efforts and contributing to the long-term conservation of this critically endangered reptile.

Dutton, H.R. and Bullard, S.A. (2025). First record of a polystome (Monogeneoidea: Polystomatidae) infecting a crocodilian: *Latergater louisdupreezi* n. gen., n. sp. from the eye of an American alligator, *Alligator mississippiensis* Daudin, 1802 (Crocodilia: Alligatoridae) in a North-Central Gulf of America salt marsh (Rockefeller Wildlife Refuge). *Journal of Parasitology* 111(4): 489-495.

Abstract: From July 2021 through June 2024, we necropsied 35 American alligators from Louisiana, Alabama, and South Carolina (including the Gulf of America and Atlantic Ocean river basins). A new polystomatid, *Latergater dupreezi* n. gen., n. sp. is described based on specimens collected from the eye of 1 wild-caught American alligator measuring 1450 mm in total length and captured from a salt marsh habitat within the Rockefeller Wildlife Refuge (Grand Chenier, Louisiana) on 19 July 2021. The new species resembles species of Polystomoidinae Yamaguti, 1963 and Oculotremaninae Yamaguti, 1963. It is readily differentiated from species of Polystomoidinae by the combination of having circular haptor suckers with skeletal elements but that lack marked separation between suckers; ceca having anterior, medial, and lateral diverticula; a compact testis that occupies a small proportion of the intercecal space (vs a broad testis that spans the intercecal space); a sinistral and intercecal ovary (vs an ovary that is ventral to the sinistral cecum) having a proximal oviduct extending mediad and then posteriad (vs. proximal oviduct extending anteriad); a small uterus (occupying a minute portion of the intercecal space), medial, and located close to the cecal bifurcation; and vaginal pores that open laterally at the level of or slightly posterior to the level of the testis. It differs from species of Oculotremaninae by having vaginae and lacking hamuli. No other nominal polystome has this combination of features; therefore, the erection of a new genus for the new species is warranted. We lack a nucleotide sequence for the new species because we used the only specimen we collected as a heat-killed, formalin-fixed, stained wholemount (holotype) for a taxonomic study that prioritized morphology. Without a nucleotide sequence (and phylogenetic analysis), we herein refrain from emending an existing subfamily or proposing a new subfamily to accommodate the new genus. This is the first record of a polystome infecting a crocodilian and the first definitive record of an ectoparasitic polystome infecting a host captured in salt water.

Rodrigues Marques, A.L., Marangoni, M., Mamguê, V.E., Takazono

Lemes, M., Martínez, O., Braz, P.H. and Champion, T. (2025). Oculocardiac reflex and autonomic modulation in a Broad-snouted caiman (*Caiman latirostris*). *Acta Scientiae Veterinariae* 53 (<https://doi.org/10.22456/1679-9216.144013>).

Abstract: The oculocardiac reflex (OCR) is a neurophysiological response mediated by the vagus nerve, triggering changes in heart rate and rhythm in response to pressure applied to the ocular globe. While well-documented in humans and other mammals, the OCR remains less explored in reptiles, particularly crocodilians. Given the rising interaction between wildlife and urban settings, understanding OCR in these species has become essential due to potential implications in veterinary and wildlife medicine. This case report aimed to investigate the OCR in a broad-snouted caiman rescued from an urban environment, providing insights into its autonomic responses under ocular compression. A juvenile broad-snouted caiman, approximately 45 cm in length and weighing 0.8 kg, was rescued from an urban household in Capanema, Paraná, Brazil. The animal, found in a dehydrated and lethargic state far from its natural habitat, was transported to the Wildlife Animal Service at the veterinary hospital of the Federal University of Fronteira Sul (UFFS), Realeza campus, for evaluation and possible release. The animal underwent electrocardiogram (ECG) monitoring using an INcardio X® device (INpulse, Florianópolis, SC, BR) to assess changes in heart rate and rhythm during ocular pressure, simulating vagal stimulation. Surface cup electrodes coated with conducting gel were placed on the animal's cranial and caudal limbs for ECG readings. Application of ocular pressure induced a notable OCR response, evidenced by a 47% decrease in heart rate, dropping from 34 bpm to 16 bpm, along with changes in heart rate variability (HRV) parameters and a 2nd-degree atrioventricular block. Three min after the release of ocular pressure, the heart rate returned to 29 bpm, with HRV values returning to baseline, indicating a recovery of autonomic balance. Manual restraint in crocodilians often involves ocular pressure to facilitate temporary immobilization through vagal activation. However, the OCR poses substantial cardiovascular risks, as highlighted by this case. During OCR activation, HRV metrics such as Standard Deviation of NN intervals (SDNN) and Root Mean Square of Successive Differences (RMSSD) rose, reflecting increased heart rate variability likely due to heightened parasympathetic activity. Additionally, increases in the mean NN interval and the Cardiac Vagal Index (CVI) pointed to enhanced vagal modulation, while a drop in the Cardiac Sympathetic Index (CSI) indicated diminished sympathetic response. Changes in DFA parameters with increased α -1 and decreased α -2 values reflected short-term variability and reduced long-term complexity, respectively. These shifts underscored a significant autonomic imbalance dominated by parasympathetic tone. The atrioventricular block and multiple sinoatrial node depolarizations observed during the OCR response align with known reptilian cardiac responses to parasympathetic dominance. Similar findings have been reported in canine studies during OCR, suggesting that vagal modulation of HRV may share patterns across taxa. The results of this report underline the necessity of safety precaution for handling of crocodilians during ocular manipulation, as failure to recognize OCR could result in severe bradycardia, arrhythmias, or even cardiac arrest. Future studies should expand on the physiological implications of OCR in crocodilians, as insights from these investigations will be critical for veterinary practices involving these animals. This report provides pioneering data on HRV and OCR in a caiman, offering valuable perspectives for improving welfare and safety protocols in wildlife and veterinary care.

Qian, Y., Liu, J., Liu, L., Wang, X. and Zheng, J. (2025). Recreational fisheries encountering flagship species: Current conditions, trend forecasts and recommendations. *Fishes* 10(7): 337 (<https://doi.org/10.3390/fishes10070337>).

Abstract: Recreational fisheries increasingly intersect with the habitats of flagship species, ie species that attract public attention and drive conservation efforts, raising potential ecological conflicts.

This study investigated the spatial coupling between recreational fisheries and three flagship species in the Yangtze River Basin: the Chinese alligator (*Alligator sinensis*), the Yangtze finless porpoise (*Neophocaena phocaenoides*), and the scaly-sided merganser (*Mergus squamatus*). Drawing on over 10,000 fishing Points of Interest recorded between 2015 and 2024 and over 300 verified species occurrences, this study applied a Random Forest model with spatial integration and a Maximum Entropy model to examine estimated current distributions and forecast interactions from 2025 to 2035. Flagship species habitat suitability was modeled and projected at a spatial resolution of 1 km, while recreational fishing density was resolved on a coarser grid of $1.875^\circ \times 1.25^\circ$ in latitude-longitude dimensions. Results reveal a substantial increase in high-risk overlap zones. For example, high-density fishing areas within high-suitability habitats for the scaly-sided merganser expanded from 0 km² in 2015 to 85,359 km² in 2024. Projections indicate continued intensification of such overlaps, particularly in regions including Ma'anshan-Wuhu, the Taihu-Chaohu-Poyang lake system, and Yibin. These findings offer robust, model-driven evidence of growing spatial conflicts and offer actionable insights for ecosystem-based governance. The methodological framework is transferable and supports broader applications in other regions and species under ecological sustainability goals.

Lima, M.O., Gorza, L.L., Borges, E.J.S., Nóbrega, Y.C., Trivilin, L.O., Figueiredo, R.G. and Silva, M.A.D.A. (2025). Kidneys and adrenal glands of *Caiman yacare* (Daudin, 1802) (Crocodylia: Alligatoridae): morphology and morphometry. *Anais da Academia Brasileira de Ciências* 97(3): e20240202.

Abstract: Crocodilians are semi-aquatic reptiles with highly sophisticated anatomy and physiology that are well adapted to dwell in freshwater environments or be exposed to brackish and saltwater, indicating the complex nature of the organization and function of the urinary system in these animals. The objective of this work is to describe the morphology of the kidneys and adrenal glands of *Caiman yacare*, providing morphometric comparisons between male and female animals. It is concluded that macroscopically, the kidneys had an elongated oval shape, reddish-brown color, and greater width in the middle region. The kidneys are associated with the wall of the coelomic cavity, together with the adrenal glands and gonads. Histologically, the renal structure consisted, from the outer periphery to the inner core, of the collecting tubules, the cortical region, the proximal and distal convoluted tubules, the renal corpuscles and the medullary region. The adrenal glands are composed of two types of tissue: adrenocortical tissue and chromaffin tissue. Morphometric analyzes revealed that male kidneys exceeds female kidneys in most macroscopic biometric dimensions. The diameter of the renal corpuscles for both sexes was greater in the caudal portion of the right kidney, and in the middle portion of the left kidney, for males.

Zarazua, M. and Casas, A. (2025). Continuous gradient in human-fauna interactions in Mesoamerica and neighboring Northern Mexico and Central America. Pp. 1-38 in *Biodiversity Management and Domestication in the Neotropics*, ed. by A. Casas, N. Peroni, F. Parra-Rondinel, V. Lema, X. Aguirre-Dugua, E. Arévalo-Marín, H. Alvarado-Sizzo and J. Blancas. Springer: Cham.

Abstract: Human-fauna interactions are complex expressions of worldviews. They involve emotions, beliefs, thoughts, and the satisfaction of basic survival needs. They also, involve local in situ or ex situ management strategies that take different forms in different human cultures. Some of their ecological and evolutionary consequences are intentional, while others are incidental. This chapter reviews the zooarchaeological and ethnozoological literature in the region between Mexico and Panama to analyze the management and domestication of native and introduced fauna (dogs, turkeys, silkworms, and grana cochineal, as well as the management of native snails, insects, iguanas, turtles, crocodiles, birds, and mammals). As a result, the following examples of management

categories that occur between the following extremes are illustrated: (1) wild versus domesticated; (2) human actions toward individual animals versus human actions toward the ecosystems and processes of which they are a part, such as agroecosystems or protected areas; and (3) human management focused on controlling animals and/or ecosystems versus human-fauna relationships mediated by recognizing the agency of animals or other non-human entities. The model of a continuous gradient in human-fauna interactions is a borrowing from zooarchaeology to ethnozoology, which can be approached through transdisciplinary qualitative research methods and also by evaluating the biological outcomes of management practices. Such analyses allow to visualize a wide array of human-fauna interactions, as part of a process, motivated by intrinsic, instrumental, or relational values, influenced by several conditions across ecological, social, and time scales.

Srinivas, A., Bright, J.A., Cunningham, J.A., Tavares, S.A.S., Branco, F.R., de Souza Carvalho, I., Iori, F.V. and Rayfield, E.J. (2025). Constraints and adaptations in crocodyliform skull evolution. *bioRxiv* (<https://doi.org/10.1101/2025.07.09.663933>).

Abstract: Crocodyliformes display a diverse range of skull morphologies through their evolutionary history. Extant crocodilians possess platyrostral (broad and flat) snouts, thought to be sub-optimal for resisting feeding loads due to the conflicting demands of feeding and hydrodynamic constraints. In contrast, numerous Mesozoic crocodyliformes possessed oreinirostral (dome-shaped) skulls, were terrestrial and hence free from hydrodynamic constraint. This study aims to examine the role of function in determining skull shape in crocodyliformes, and assesses the difference in stress resistance between oreinirostral and platyrostral taxa. We hypothesize that in the absence of hydrodynamic constraints, oreinirostral taxa have skulls that are better suited for resisting feeding induced loads. Using finite element analysis (FEA), we evaluated biomechanical performance in oreinirostral notosuchian taxa *Baurusuchus salgadoensis*, *Montealtosuchus arrudacamposi* and *Caipirasuchus paulistanus*; compared to the extant platyrostral *Alligator mississippiensis*, *Crocodylus niloticus*, and *Paleosuchus palpebrosus*. Results show that oreinirostral morphologies are comparatively better suited for resisting forces generated during feeding, with increased muscular efficiency, supporting the hypothesis that hydrodynamic constraints influence crocodyliform skull evolution.

Nie, H., You, F., Wang, S., Xu, Y., Li, S., Zhan, J., Zhang, Y., Liu, P., Wen, Y., Zhou, Y., Zhang, S. and Wu, X. (2025). The effect of hibernation on reproduction is not limited to maintenance of mature follicle, but also involves the fundamental resource of germ cells. Available at SSRN: <https://ssrn.com/abstract=5351365> or <http://dx.doi.org/10.2139/ssrn.5351365>.

Abstract: Hibernation, as a survival strategy for low temperatures, is believed to significantly affect reproductive performance. However, many mysteries remain regarding the intrinsic mechanisms of this interaction. Ultrasound scanning for dynamic changes in follicle numbers and plasma neurotransmitters and steroid hormones determination were conducted to describe the dynamic association between follicle development and endocrine fluctuations throughout the onset of hibernation (OH), deep hibernation (DH), and the end of hibernation (EH). The results indicated that a cycle of follicular development occurs before the initiation of hibernation, accompanied by an additional yolk deposition cycle following hibernation. Additionally, a significant correlation was found between the number of follicles greater than 20 mm (PF, the closest to mature size) and plasma levels of GABA/glutamine, strongly suggesting that the maintenance of follicles nearing maturity may be related to fluctuations in neurotransmitters during hibernation. During hibernation, the follicles undergo selective determination regarding health and atresia. RNA-seq results suggest that the downregulation of GABA receptors in PF might be an adaptation to hormonal changes, preventing excessive cell proliferation and

apoptosis, thereby maintaining their continuous existence during hibernation. The results of MeRIP-seq confirm that the inhibition of oocyte recruitment to vitellogenic growth during hibernation is related to the M6A methylation modification of synthesis-related genes. Furthermore, corresponding results suggest that, in addition to the initiation and recruitment of primordial follicles, ovarian reserve is also likely affected by the depth of hibernation through key biological events such as double-strand breaks (DSBs) and the synapsis of homologous chromosomes during oogenesis.

Takahashi, K., Lee, Y., Nishizawa, T. and Tame, J.R.H. (2025). Conformational analysis of liganded human hemoglobin by cryo electron microscopy. bioRxiv (doi: <https://doi.org/10.1101/2025.07.07.661630>).

Abstract: The long-standing debate on the preferred conformation of liganded hemoglobin (Hb) in solution has yet to be completely resolved. While some studies have used lyophilized human hemoglobin for structural studies by cryo-EM, we recently presented the first cryo-EM analysis of freshly prepared human and crocodilian Hbs. Further three-dimensional (3D) classification analysis of these datasets reveals distinct structural characteristics. CO-bound adult human Hb (CO-HbA) shows a mixture of conformations, with the R2 conformation most populated, R strongly represented, and other intermediate states present in sufficient quantity to produce maps. CO-bound crocodile Hb showed the R conformation and, unexpectedly, a smaller population of molecules in a T-like conformation. The amino acid substitution Glu β 39 - Arg, unique to crocodilian Hbs, appears to favour the R conformation over R2.

Langley, R.L. and Kearney, G.D. (2025). Animal-related fatalities in the United States (2018-2023). Environmental Health Insights 19: 1-12.

Abstract: Animal encounters are often positive but can result in serious injury, illness, or death, posing a global public health concern. Over 60% of human infectious diseases are zoonotic, contributing to millions of illnesses and deaths annually. Non-infectious injuries, including bites and stings, are also common, with snakebites alone causing over 100,000 deaths each year. The primary goal of this study was to describe fatal, animal-related encounters and assess trends from 2018 to 2023 in the United States. This was a secondary data analysis, using aggregate, population-level data obtained from the Centers for Disease Control and Prevention, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER). Data was analyzed on 1604 total animal-related deaths, averaging 267 annually (crude death rate: 0.808 per 1 million population). Fatalities were stratified by cause, animal type (venomous vs nonvenomous), age, sex, race, ethnicity, and region. Overall, the major causes of death were from hornets, wasps, and bees (31.0%), "other mammals" (28.6%) and dogs (26.2%). Most decedents were male (67.6%), white (87.2%) and between 55 and 64 years old (22.8%). The Southern U.S. had the highest number (46.8%) and rate (0.984 per 1 million) of deaths. We observed an upward trend in animal-related fatalities, including a notable increase in human deaths caused by dogs during and following the COVID-19 pandemic. This rise is likely associated with the surge in pet adoptions and increased time spent at home during this period. Public health strategies that promote safe animal interactions, increased awareness, and responsible pet ownership may help mitigate these fatalities. Future research should aim to capture contextual factors, such as household dynamics, animal behavior, and environmental conditions to better inform targeted prevention efforts.

Davhana, F., Humphries, M., Hunter, G., Seoraj-Pillai, N. and Combrink, X. (2025). Exposure of sub-adult Nile crocodiles (*Crocodylus niloticus*) to extreme lead concentrations: a 48-week experimental study with implications for wild populations. Research Square (doi: <https://doi.org/10.21203/rs.3.rs-6966105/v1>).

Abstract: Lead (Pb) poisoning poses a significant threat to wildlife. A primary cause of Pb poisoning is the unintentional ingestion of Pb ammunition fishing weights, which are still used for hunting and fishing in numerous regions globally. While the effects of Pb poisoning on birds and mammals are well-established, impacts on reptiles are less well documented and difficult to assess under field conditions. In this study, we investigated the effects of extreme Pb exposure on captive sub-adult Nile crocodiles (*Crocodylus niloticus*; n= 18). We administered Pb dosages in the form of fishing weights (54-215 g) and monitored changes in blood lead levels (BPb), packed cell volumes (PCVs), growth, and body condition over a 48-week period. Crocodiles exhibited a remarkable tolerance to exceptionally high Pb exposure over the duration of the study. Despite the lack of obvious clinical signs of Pb toxicity, elevated BPb concentrations were linked to lower PCVs, indicating anaemia across all treatment groups by week eight. However, crocodiles showed a sustained erythropoietic response which may be contributing to their resilience to acute Pb toxicity. While Pb exposure did not significantly affect body condition, it was associated with a discernible reduction in weight gain over the duration of the study. Our estimation of a 5.8 to 7.3-year timeframe for complete dissolution of the Pb fishing weights in the experimental crocodiles' stomachs carries significant implications for wild populations, which are likely to be exposed to Pb for far longer than 48-week duration of this study.

Rotov, A.Y. (2025). From rod to cone: Functional transformations in the evolution of vertebrate photoreceptors. Sensornye sistemy 39(2): 45-74.

Abstract: The vertebrate retina contains two types of photoreceptors: rods and cones, the receptors of nocturnal and diurnal vision, respectively. They have a number of morphological and biochemical differences that determine their functional role. The discovery of intermediate photoreceptor types in a number of vertebrates became the basis for the transmutation theory, which postulates that both rods and cones are capable of changing their functional roles and transforming into their opposite type during adaptation of the visual system to different habitat conditions. Changes in the photoreceptor physiology during functional transition can occur at different levels: morphological (general cell structure), molecular and biochemical (expression of specific protein isoforms of the photosensitive signaling cascade) and electrophysiological (sensitivity and kinetics of the light response). Photoreceptors with a confirmed transitional type are found in basal vertebrates and in groups that have undergone a shift in the habitat conditions towards extremely low or high light levels. In the last two decades, the understanding of the molecular mechanisms leading to the functional transformation from typical rods to cones, and vice versa, has advanced significantly. However, a number of aspects remain poorly understood, primarily because many animals possessing transformed receptors are far from the standard biological model objects. This review discusses the examples of transitional photoreceptors in various taxa, describing the history of their study and current research that sheds light on the molecular features underlying their non-standard physiology.

Wu, Y., Ye, S., Liu, S., Yu, J., Gao, H., Feng, W., Chen, X., Zhao, X., Zhao, J., Zeng, J., Zhang, X., Wang, X., Yang, N., Fan, L., Guo, G., Jiping, Z. and Li, X. (2025). Characterization and biocontrol potential of two novel lytic phages Vb_Etas_2 and Vb_Etas_6 against *Edwardsiella tarda* in aquaculture. Available at SSRN: <https://ssrn.com/abstract=5355048> or <http://dx.doi.org/10.2139/ssrn.5355048>.

Abstract: *Edwardsiella tarda* poses a significant challenge to aquaculture industry owing to its pathogenicity and emerging antibiotic resistance. These factors have led to substantial economic losses and growing concerns about food safety. Given the urgent need for sustainable alternatives to antibiotics, bacteriophage therapy has emerged as a promising strategy for targeted pathogen control. This study isolated two bacteriophages exhibiting high lytic

activity against *E. tarda* from wastewater samples collected at a crocodile farm in Hainan, China. These phages, designated as vB_EtaS_2 and vB_EtaS_6, were taxonomically classified within the genus *Tlsvirus* of the family *Drexlerviridae*, based on morphological characterization and genomic sequence analysis. *In vitro* antibacterial assays showed that a multiplicity of infection value of 0.1 exhibited optimal antibacterial efficacy and phage propagation efficiency. Both phages maintained substantial stability under thermal stress (-20-50°C), across a broad pH range (5-10), and in the presence of low-concentration chloroform. Whole-genome analysis confirmed the absence of antibiotic resistance genes and virulence factors in both phages, ensuring their biosafety profile. Furthermore, *in vitro* assays demonstrated potent bactericidal activity. In *Danio rerio* (zebrafish) infection models, a phage cocktail of vB_EtaS_2 and vB_EtaS_6 significantly reduced mortality rates by 40% ($p < 0.05$). Collectively, these findings suggest that vB_EtaS_2 and vB_EtaS_6 are promising biocontrol agents against *E. tarda*. They offer a sustainable, targeted alternative to antibiotics, with translational value in improving pathogen management in crocodile aquaculture.

Pye, M.E. (2025). Bayou Denizens Secrets Unveiled: Exploring Extracellular Traps in *Amphiuma tridactylum*, *Alligator mississippiensis*, and *Procambarus clarkii*. MSc thesis, Southeastern Louisiana University, Hammond, Louisiana, USA.

Abstract: Extracellular Traps (ETs) are an innate immune defense mechanism conserved across various species. A well-characterized example is the Neutrophil Extracellular Trap (NET), which forms through a process called NETosis. During NETosis, activated neutrophils may undergo cell death, releasing cellular chromatin along with antimicrobial proteins and enzymes such as histones, myeloperoxidase, and elastase. These components form a web-like structure that traps and kills microbes while also aiding in the recruitment and activation of macrophages. While NETs and ETs have been extensively studied in many organisms, their presence in species such as salamanders, alligators, and crayfish remains unexplored. This study outlines a protocol to isolate neutrophils from salamander blood, lymphocytes from alligator blood, and hemolymph cells from crayfish, followed by *in vitro* stimulation to observe ET formation. This study provides the first visualization of ETs of salamanders and alligators. Future directions include investigating interspecies differences in ET formation in relation to genome size, antimicrobial peptide/enzyme profiles, and induction by environmental pathogens. Studies of ETs in these organisms enhance our understanding of immunity across species, with potential implications for responses to ecological pathogens that threaten their habitats.

Maudens, Y., Debruyne, G., Loccufier, E., Daelemans, L., Savino, E., Tonetti, C., Vineis, C., Varesano, A., Shawkey, M.D., D'Alba, L. and De Clerck, K. (2025). Modular design of biomimetic electrospun keratin composites for tunable gaseous sorption inspired by reptile eggshells. *Materials Today Bio* 33 (doi: [10.1016/j.mtbio.2025.102032](https://doi.org/10.1016/j.mtbio.2025.102032)).

Abstract: Biomimicry, the replication of natural structures, is an emerging strategy in materials engineering for developing advanced functional materials. Reptile eggshells serve as compelling models for tunable bioinspired material design due to their diversity in forms and functions. This study presents a modular approach to designing keratin-based composites with customizable vapor sorption behavior. Inspired by reptile eggshells, four key biomimetic components were reconstructed: (1) electrospun keratin membranes resembling the fibrous shell membrane, (2) an egg protein matrix replicating the proteinaceous eggshell matrix, (3) calcium carbonate (CaCO_3) particles introducing mineralization, and (4) a paraffin coating representing the lipid-rich cuticle layer. The modular accuracy of these biomimetic models was validated by comparison with representative reptile eggshells through Scanning Electron Microscopy analysis and Fourier-Transform Infrared Spectroscopy.

Dynamic Vapor Sorption (DVS) analysis confirmed that varying the CaCO_3 content allows precise control over the absorption profiles, ranging from low to high sorption values. Additionally, integrating the organic matrix and lipid coating enabled fine-tuning of the sorption properties. The resulting biomimetic composites exhibited sorption characteristics comparable to those of natural eggshells, including *Caiman crocodilus* (low absorption) and *Pantherophis guttatus* (high absorption), demonstrating the effectiveness of the modular design strategy. These findings establish a foundation for engineering advanced biocompatible materials with adaptable sorption behavior, offering potential applications in moisture-regulating wound dressings, tissue engineering scaffolds, sustainable packaging, and filtration systems.

Murhula, G.B., Shadrack, M., Rehema, M.M., Muhamba, F., Mrema, E.M. and Mghase, A.E. (2025). Crocodile bite scalp avulsion and hand extensor tendons injury: A rare case reconstructed in a tertiary hospital, in Tanzania. *International Journal of Surgery Case Reports* 134 (2025): (2025) 111721.

Abstract: Introduction and importance: Crocodile bites on humans are rare but can lead to life-threatening injuries that most commonly affect the extremities and are often characterized by fractures and severe soft tissue avulsion. This case highlights 20 years-old fisherman, victim of crocodile bite, managed in a plastic surgery unit of a tertiary hospital in Tanzania. Presentation of the case: A 20 years old male was attacked by a crocodile during night fishing activity and was rescued by fellow fishermen. Conducted to a peripheral hospital, resuscitation, antibiotics therapy, tetanus prophylaxis and debridement were initiated. He was then referred to a tertiary hospital where the assessment shown a 15 × 8 cm open debrided wound on the left fronto-parietal area and injuries on 4th and 5th extensor digitorum tendon and on the extensor digit minimi tendons repaired by the modified Kessler technique. Scalp defect was reconstructed by a right fronto-parietal transposition flap later. Functional and cosmetic outcomes were acceptable. Clinical discussion: Crocodile bite is dangerous and requires quicker reference to a health facility that should initiate resuscitation, antibiotics and tetanus toxoid. Optimal definitive management is done in a tertiary care center. Biomechanically, Modified Kessler is the most superior tendon repairs technique. The large size of scalp defect motivated its reconstruction by a transposition flap. Functional and cosmetic results were similar to other studies. Conclusion: Crocodile attack survivors suffer from large wounds with significant tissue destruction. To improve outcomes, early initiation of resuscitation, antibiotic therapy, and tetanus prophylaxis is essential. Definitive management, including soft tissue reconstruction, should be carried out at a tertiary hospital.

Martin, J.E. and Jattiot, R. (2025). First report of neosuchian remains in Aptian-Albian marine deposits of southeastern France. *Proceedings of the Geologists' Association* (<https://doi.org/10.1016/j.pgeola.2025.101132>).

Abstract: The European fossil record of crocodylomorphs during the Cretaceous is indubitably skewed towards the lowermost and uppermost strata. Neosuchian remains from the Aptian–Albian interval are exceptionally rare in marine deposits globally. Yet, they potentially hold important information for understanding the phylogenetic interrelationships of several neosuchian lineages. Here, we assign a single squamosal to cf. *Pholidosauridae* and some postcranial elements to *Neosuchia* indet. from Aptian and Albian marine deposits in southeastern France. Although it is presently impossible to ascertain the continental versus marine origin of the specimens, their rare occurrence calls for future investigations of the diversity and interrelationships of neosuchians during the mid-Cretaceous.

Link, A., Moreno-Bernal, J.W., Degrange, F.J., Cooke, S.B., Ortiz-

Pabon, L.G., Perdomo-Rojas, C.A. and Salas-Gismondi, R. (2025). Direct evidence of trophic interaction between a crocodyliform and a large terror bird in the Middle Miocene of La Venta, Colombia. *Biology Letters* 21(7) (<https://doi.org/10.1098/rsbl.2025.0113>).

Abstract: Direct evidence of predation and other trophic relationships provide valuable information about trophic interactions between species in palaeo-communities. Data on ecological interactions amongst extant apex predators open a unique opportunity to better understand how sympatric apex predators coexisted or interacted with each other in the past. Here, we describe direct evidence of a predation or scavenging event in which we hypothesize that a medium-sized caiman (possibly *Purussaurus neivensis*) consumed (either through scavenging or through direct predation) a large terror bird. The distal part of a left tibiotarsus from a phorusrhacids had four pits inflicted on the cortical bone, and no signs of healing, suggesting it did not survive this trophic event. This record contributes to our current understanding of prey consumed by *P. neivensis* in the wetlands of the Pebas System of South America and indicates that large phorusrhacids might have had higher predation risk than previously expected. This study provides evidence of a trophic relation between apex predators and the complexity of trophic interactions in the diverse vertebrate palaeo-community of La Venta in the Middle Miocene of northern South America.

Buehler, J. (2025). Giant caiman bit ancient 'terror bird'. *New Scientist* 267(3554): 19.

Sellers, K.C., Wilken, A.T., Cranor, C.R., Middleton, K.M. and Holliday, C.M. (2025). Quadrate orientation and joint reaction force underwent correlated evolution during suchian evolution. *Journal of Anatomy* ([doi: 10.1111/joa.70020](https://doi.org/10.1111/joa.70020)).

Abstract: As part of the jaw joint, the quadrate is a key skeletal element of the feeding system in nonmammalian vertebrates, which plays a critical role in resisting joint reaction forces (JRF). Some authors have suggested that the quadrate orientation reflects overall muscle anatomy and, by implication, JRF. Here, we quantitatively test the longstanding hypothesis that quadrate orientation is correlated with JRF orientation using the suchian lineage leading to extant crocodylia. The evolution of the characteristic crocodylian skull is a major transformation in vertebrate evolution in which the quadrate played a crucial role. We use detailed, three-dimensional biomechanical modeling to estimate JRF in a sample of eleven fossil and extant suchians and compare these to the orientation of quadrates. We use the cross-product of orientation vectors to quantify similarity in orientation and show that the angle of the quadrate in the sagittal plane is tightly coupled with JRF in the same. These results demonstrate a coordinated evolution between JRF and quadrate anatomy during suchian evolution and provide a framework with which to analyze evolutionary changes in joint anatomy and biomechanics.

Simpson, E.L., Hunt, A.P. and Lucas, S.G. (2025). A note on the microscale analysis of crocodylian coprolite (*Eucopruss cylindricus*) from the Eocene of the Zaysan Basin, Kazakhstan: Diagenesis and preservation of spherical bacteriomorphs. *New Mexico Museum of Natural History and Science Bulletin* 100: 293-297.

Abstract: Microbial communities are commonly preserved in coprolites, and, until recently, microscale analysis of coprolites is a relatively new investigative field. Field emission scanning electron microscope (FESEM) and energy dispersive spectroscopy system (EDS) examination of a well-preserved calcium phosphate crocodylian coprolite (*Eucopruss cylindricus*) from the Eocene of the Zaysan Basin of Kazakhstan indicates the presence of preserved external molds of coccoid bacteriomorphs. Coccoid bacteriomorphs consist of submicron diameter spherical structures, composed of nanometer-scale calcium phosphatic spheres. These bacteriomorphs

probably induced the early precipitation of calcium phosphate, enhancing the coprolite's preservation

McGreal, M.A. (2025). The Influence of Hydrology on the Seasonal Movement of American Crocodiles (*Crocodylus acutus*) in Costa Rica. MSc thesis, Southeastern Louisiana University, Hammond, Louisiana, USA.

Abstract: Animal movement strategies arise in response to environmental changes and reflect the behavioral mechanisms that help animals cope with seasonal conditions. However, the cryptic behaviors and prolonged inactivity of large reptiles generate unique movement patterns, making traditional methods of space-use estimation inadequate for fully capturing their movement ecology. Here, I hypothesize that seasonal hydrological variability shapes the movement strategies of American crocodiles (*Crocodylus acutus*) in the Tempisque River Basin, Costa Rica, where management efforts are intended. To address this, I applied dynamic Brownian Bridge Movement Models (dBBMMs) to GPS data from ten individual crocodiles to model movement paths, estimate movement parameters, and infer behavioral states. Findings reveal multiple distinct seasonal strategies, including migration and aestivation. Movement intensity varied by sex, size, and habitat, with larger crocodiles and males displaying greater movement, particularly in riverine environments. Increased rainfall triggered higher activity, while dry conditions corresponded with less movement. These insights deepen our understanding of crocodile movement ecology and highlight the importance of accounting for behavioral flexibility in conservation strategies for populations facing environmental variability and human-wildlife conflict.

Maharjan, A., Karki, B., Ram, A.K. and Tumbahangphe, A. (2025). Managing the unseen threat: A case of recurrent rectal prolapse in a captive Gharial (*Gavialis gangeticus*). *Research Square* (<https://doi.org/10.21203/rs.3.rs-7129366/v1>).

Abstract: Rectal prolapse is a rare yet significant issue in reptiles, with little documentation in crocodylians, especially in the critically endangered Gharial (*Gavialis gangeticus*). This case study outlines the diagnosis, clinical management, and implications of rectal prolapse in a captive male Gharial at the Crocodile Conservation Center (CCC) in Bardia National Park. A male Gharial displayed recurrent prolapse of rectal tissue through the cloacal opening and exhibited signs of discomfort. A combination of conservative and surgical methods was employed, including manual reduction and supportive care. This case highlights the necessity of immediate veterinary intervention to prevent recurrence and protect reproductive capabilities, particularly in species with limited breeding populations. Additionally, this report adds to the sparse literature on gastrointestinal issues in Gharials and highlights the importance of proactive veterinary care in *ex-situ* conservation initiatives.

Li, W., Liu, J., Cui, L., Sun, K., Gao, Y., Wang, Q., Zhou, Y., Mei, L., Yi, P., Wu, X., Yu, Z.P. and Pan, T. (2025). Size-dependent effects of the intestinal microbiota in juvenile Chinese alligators: Implications for species protection. *Frontiers in Zoology* 22(1): 15.

Abstract: Increasing the quality of offspring to optimize population reproductive efficiency represents a viable approach for increasing population size. The population of Chinese alligators has a growing age structure, but the high mortality rate of juveniles is a serious problem that needs to be solved. We investigated the relationship between the weight of juvenile Chinese alligators and the microbiota to improve the survival rate and provide better protection for Chinese alligators. The results revealed significant differences in body weight among the selected individuals. Among the 35 most abundant microbial genera in the different weight groups, four genera (*Stenoxymbacter*, *Gracilibacteria*, *Absconditabacteriales*—

(SR1) and *Saccharimonadales*) were significantly positively correlated with weight. These genera can help the host shape the anaerobic environment of the intestine, degrade organic acids and proteins, and promote the production of growth-promoting factors. This study provided valuable insights into the relationship between the microbiota and weight, along with theoretical guidance for improving the survival rate of juvenile Chinese alligators.

González-Desales, G.A., Mañón-González, J.R., Zarco-González, Z., Perera-Trejo, E.E., Charruau, P., Mandujano-Camacho, H.O. and Monroy-Vilchis, O. (2025). Is *Caiman crocodilus chiapasius* at risk?: Distribution, habitat degradation, and population trends. Available at SSRN: <https://ssrn.com/abstract=5367698> or <http://dx.doi.org/10.2139/ssrn.5367698>.

Abstract: This study addresses the current conservation status of the spectacled caiman (*Caiman crocodilus chiapasius*), a subspecies endemic to the southern coast of Mexico, Guatemala and El Salvador. Its potential distribution was investigated and a multi-temporal analysis of habitat modification between 1980 and 2020 with projections for 2040 and 2060 was carried out. Local and national population status was determined through a retrospective analysis of scientific literature, unpublished data and technical reports. Using species distribution models, priority areas for the conservation of *C. c. chiapasius* were identified. The main factors that influence the probability of presence are the distance to mangroves, the average temperature in the wettest quarter, and the precipitation in the driest month and in the coldest quarter. The analysis of land use change reveals a significant loss of native vegetation, especially mangroves, grasslands, and tropical forests, due to the advance of agriculture and human settlements. Projections indicate that this trend will continue towards 2040 and 2060, with an increase of 12.38% in agricultural areas and 5.84% in urban settlements. Through the Relative Abundance Index (RAI), a decline in caiman populations was observed in Chiapas. The average RAI has decreased significantly from 1996 to the present, with negative values projected for 2040 and 2060. During the surveys, individuals of all size categories (neonates, juveniles, subadults, and adults) were observed. Although it is located within natural protected areas, these are also under constant anthropic pressure, including expansion of oil palm cultivation and recurrent forest burning.

Salih, K., Müller, J., Eisawi, A. and Bibi, F. (2025). A new late Pleistocene fossil crocodile from Sudan reveals hidden diversity of *Crocodylus* in Africa. *Scientific Reports* 15: 27433.

Abstract: While *Crocodylus* fossils are common in late Cenozoic deposits of Africa, there is a lack of knowledge about species diversity within the genus, especially after the Early Pleistocene. Here we report on a complete skull of a new fossil *Crocodylus* from the Late Pleistocene of the Middle Atbara River, eastern Sudan. Cranial morphology resembles Plio-Pleistocene species of *Crocodylus* from Africa in having upturned squamosals, though not as prominently developed as in these species, whereas the skull differs from fossil and extant *Crocodylus* in having a vaulted sagittal boss on the dorsal surface of the rostrum, and in the absence of a supraoccipital exposure on the dorsal skull table. Phylogenetic analyses indicate the Atbara *Crocodylus* represents a separate species and is more closely related to the fossil African crocodiles than the extant forms. The new species represents the first fossil *Crocodylus* to be described from the Late Pleistocene of Africa, providing new information on the occurrences and diversification of the genus *Crocodylus* during the Late Pleistocene.

Zuniga-Lopez, Z., Erdle, L.M., Fulfer, V.M., Flores, L., Brady, G. and Vermaire, J.C. (2025). Marine litter in mangrove soils of Roatán, Western Caribbean: Abundance, sources, and ingestion by an American crocodile (*Crocodylus acutus*). *Marine Pollution Bulletin* 221 (<https://doi.org/10.1016/j.marpolbul.2025.118508>).

Abstract: Mangrove forests in insular regions are increasingly exposed to marine litter, even within designated protected areas. These ecosystems provide key ecological services but remain vulnerable to pollution via solid waste accumulation. Caribbean mangroves, in particular, are underrepresented in global assessments. This study provides the first baseline of macrolitter accumulation in mangroves on Roatán Island, within the Bay Islands National Marine Park, Honduras. We assessed: (1) the abundance and composition of macrolitter (≥ 5 cm) across four mangrove sites; (2) potential sources of macroplastics through brand and country-of-origin analysis of labeled items; and (3) the composition of litter ingested by an American crocodile (*Crocodylus acutus*) found near one site. A total of 3417 litter items were collected across 20 quadrats, with an average concentration of 6.83 items m^{-2} . Plastics dominated the litter, making up 98.7% of all items. Only 2.4% items had legible labels, most originating from Honduras and Guatemala. Among the subset of bottles with visible dates, the average age was 7 years, suggesting long-term retention within the mangrove environment. The deceased *C. acutus* found near one of the sites had ingested 62 litter items. A Principal Component Analysis revealed that the composition of ingested materials closely matched the litter profile of the nearby sampling site, indicating likely local exposure. These findings confirm that mangroves act as long-term sinks for plastic and highlight risks to mangrove fauna. The presence of banned and foreign-sourced litter underscores poor enforcement and transboundary pollution. Coordinated regional policies, improved waste management, and targeted cleanup in protected ecosystems are urgently needed.

Kirkik, D., Hacimustafaoğlu, F., Özkanca, C., Taş, S.K. and Elmastaş, M. (2025). Assessment of the in vitro antimicrobial activity and fatty acid composition of crocodile oil from *Crocodylus siamensis*. *Scientific Reports* 15(1): 28673.

Abstract: Crocodile oil has been traditionally used for its medicinal properties, including wound healing and antimicrobial effects. However, scientific validation of its antimicrobial activity remains limited. Although its potential to induce microbial resistance and its safety profile have been proposed in previous literature, these aspects were not addressed experimentally in the current study. This study aimed solely to evaluate the *in vitro* antimicrobial activity of crocodile oil using dip solution and standard microbiological approaches. Standard bacterial and fungal strains, including *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Candida albicans*, were tested using disk diffusion and minimum inhibitory concentration (MIC) methods. Fatty acid composition was analyzed using GC-FID. The results demonstrated significant antimicrobial activity against *Staphylococcus aureus* ATCC 29213, *Staphylococcus aureus* ATCC 43300 (methicillin-resistant), *Enterococcus faecalis*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Candida albicans*. No inhibition was observed against *Staphylococcus epidermidis* ATCC 12228 and *Klebsiella pneumoniae* ATCC 4352, as confirmed by both disk diffusion and MIC methods. MIC values ranged from 187.5 to 500 $\mu L/Ml$. The lowest MIC was observed for *Escherichia coli* (187.5 $\mu L/mL$), while MICs of 375 $\mu L/mL$ were recorded for *Staphylococcus aureus* ATCC 43300, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, and *Candida albicans*. The highest MIC (500 $\mu L/mL$) was observed for *Staphylococcus aureus* ATCC 29213. While the results are promising, further studies are necessary to evaluate safety, resistance development potential, and *in vivo* efficacy.

Habarugira, G., Yuen, N.K.Y., Suen, W.W., Moran, J., Hobson-Peters, J., Hall, R.A., Isberg, S.R. and Bielefeldt-Ohmann, H. (2025). Tissue tropism, pathology, and pathogenesis of West Nile virus infection in saltwater crocodile (*Crocodylus porosus*). *PLoS Neglected Tropical Diseases* 19(8): e0013385.

Abstract: West Nile virus (WNV) is one of the leading causes of economic losses to the saltwater crocodile farming industry due to

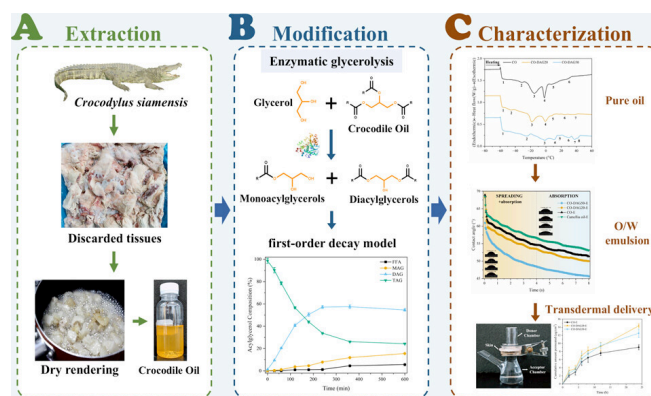
skin lesions, known as “pix”, induced by the infection. Our previous study suggested a possible immunopathological pathway causing these lesions. We therefore resolved to investigate the kinetics of WNV-infection and the elicited immune responses in experimentally challenged saltwater crocodile hatchlings. Employing virus isolation, quantitation of viral genome loads in tissues by RT-qPCR and immunohistochemistry, we demonstrated that upon infection, the virus replicates in the spleen, liver and later in the pancreas. Transcriptomic analysis, based on RNA sequencing and RT-qPCR of kidney and liver tissues, revealed that the early host response is primarily via alteration of cellular structure and metabolism. As the infection progresses, the response becomes predominantly inflammatory and antiviral. The results suggest that the kidney and gastrointestinal tract are primary nidi of viral replication leading to cloacal shedding, but a link to skin lesion development remains to be fully clarified.

Pierini, S.E., Simoncini, M.S., Larriera, A., Frutos, A.E. and Piña, C.I. (2025). Are caiman nests microhabitats? Assessing their ecological role across different levels of anthropogenic disturbance. *Proceedings of the Royal Society B. Biological Sciences* 292(2052): 20250108.

Abstract: Wild vertebrates face increasing threats from human activities, particularly land-use changes, which disrupt ecological interactions and ecosystem structure. Animal-built structures, such as nests, can provide resources for diverse species, especially under conditions of environmental stress. Here, we evaluate whether broad-snouted caiman nests function as microhabitats for other vertebrates across varying levels of anthropogenic disturbance in Santa Fe, Argentina. Over four nesting seasons we monitored 64 nests in forests, savannahs and floating vegetation using camera traps, examining vertebrate species richness, interactions and visitation frequency. A total of 100 species were recorded, including 74 birds, 23 mammals and 3 reptiles. Amphibians and some reptiles could not be identified, as most photographs were nocturnal or because of their small size. Species richness was highest in the driest nesting season and in forest nests, but unrelated to anthropization. Of the species observed, 62% interacted with the nests through commensalism, predation or indirectly. The Interaction Strength Index (ISI) proved to be a reliable indicator of use of caiman nests. Caiman nests are structurally and ecologically relevant elements, as they provide resources for a wide variety of species. Including such structures in conservation strategies could contribute to more comprehensive approaches that go beyond a species-level focus.

Zou, S., Yang, D., Xie, P., Lee, Y.Y., Huang, Y., Lou, Z., Wang, Y., Cheng, J. and Zhang, Z. (2025). Sustainable utilization of crocodile byproducts: Extraction and enzymatic modification of *Crocodylus siamensis* oil. *ACS Omega* 10(32): 35975-35987.

Abstract: The rapid growth of the crocodile industry has led to significant waste from discarded tissues. This study successfully extracted crocodile oil from waste tissues, achieving a yield of 73.20%. The oil was rich in polyunsaturated fatty acids (24.4%) and contained 332.80 mg/100 g of cholesterol and 1.80 mg/100 g of vitamin A, highlighting its potential as a base oil for cosmeceutical products. Enzymatic glycerolysis was performed on the crocodile oil and showed that the reaction followed a first-order decay model. The potential of modified crocodile oil emulsions as cosmeceutical emulsions was evaluated using dynamic light scattering, transmission electron microscopy, contact angle measurements, and Franz diffusion cell analysis. The results demonstrated that O/W emulsions formulated with modified crocodile oil exhibited smaller particle size, enhanced stability, improved spreadability, and enhanced transdermal delivery capabilities, with transdermal behavior more closely following the Korsmeyer-Peppas model. These results not only provided new insights into the effective use of crocodile waste but also highlighted the importance of glycerolysis in the development of high-performance cosmeceutical base oils.



Sellers, K.C., Wilken, A.T., Cranor, C.R., Middleton, K.M. and Holliday, C.M. (2025). Quadrate orientation and joint reaction force underwent correlated evolution during suchian evolution. *Journal of Anatomy* (<https://doi.org/10.1111/joa.70020>).

Abstract: As part of the jaw joint, the quadrate is a key skeletal element of the feeding system in nonmammalian vertebrates, which plays a critical role in resisting joint reaction forces (JRF). Some authors have suggested that the quadrate orientation reflects overall muscle anatomy and, by implication, JRF. Here, we quantitatively test the longstanding hypothesis that quadrate orientation is correlated with JRF orientation using the suchian lineage leading to extant crocodylia. The evolution of the characteristic crocodylian skull is a major transformation in vertebrate evolution in which the quadrate played a crucial role. We use detailed, three-dimensional biomechanical modeling to estimate JRF in a sample of eleven fossil and extant suchians and compare these to the orientation of quadrates. We use the cross-product of orientation vectors to quantify similarity in orientation and show that the angle of the quadrate in the sagittal plane is tightly coupled with JRF in the same. These results demonstrate a coordinated evolution between JRF and quadrate anatomy during suchian evolution and provide a framework with which to analyze evolutionary changes in joint anatomy and biomechanics.

Kummrow, M.S., Roig-Genovés, J.V., Giménez, I., Tzika, A.C., Clauss, M., Neuhauss, S.C.F., Hatt, J-M. and Gesemann, M. (2025). Non-avian reptile reproduction functions with a reduced gonadotropin system. *Endocrinology* 166(9) (<https://doi.org/10.1210/endo/bqaf128>).

Abstract: Vertebrate reproduction is controlled by two pituitary gonadotropin hormones (GtHs), FSH and LH, binding to gonadotropin receptors (GtHRs) in gonadal tissues. All gnathostome vertebrates have been confirmed to possess at least one receptor for each GtH (LHR and FSHR), except for species of the reptilian (non-avian sauropsidan) orders, such as lepidosauria, testudines, and crocodylia, which showed inexplicable reactions to heterologous amphibian, avian, and mammalian GtHs in early endocrinological studies. This study investigated the number and function of reptilian GtHRs. Genomic and transcriptomic analyses of selected tetrapod species now strongly suggest the inactivation of the LH receptor in all non-avian sauropsidans. This gene inactivation likely occurred independently in three branches of the sauropdisan clade, sparing only the avian class. Bioassays served to investigate the binding specificity of squamate, chelonian, crocodylian, avian, and mammalian GtHRs with their homologous and heterologous GtHs. The FSHR of a squamate lizard proved completely promiscuous to both its homologous GtHs, while the chelonian FSHR responded slightly stronger to the homologous LH than FSH, and the crocodylian FSHR was only stimulated by the homologous LH but not FSH. We therefore propose a modified paradigm with a neuroendocrine control of non-avian reptilian reproduction by a

single GtHR and either one GtH in crocodylians or two GtHs in chelonians and squamate reptiles. Finally, we discuss hypotheses of tightly regulated temporal and spatial expression of the remaining FSHR in different gonadal somatic cells and temperature-dependent functions of the single non-avian reptilian GtHR.

Li, J., Sun, W., Hou, Y. and Li, Y. (2025). A geographical perspective on the Xia culture: Evidence from ancient phenology and paleoclimate simulation. *Journal of Geographical Science* 35: 1683-1694.

Abstract: In research on the legendary Xia Dynasty of ancient China, the famous archaeological site of Erlitou and its culture are the most debated topics. A key question is whether this ancient culture is truly related to the Xia Dynasty. This study combines traditional literature (Xia Xiao Zheng), archaeological evidence (on alligators), and climate simulation (of autumn rains) to demonstrate that the ancient Chinese phenological calendar, Xia Xiao Zheng, likely originated in the same region as the Erlitou culture. A logical explanation of these findings is that both Xia Xiao Zheng and the Erlitou culture are indeed closely related to the Xia Dynasty.

Schwarz, E.R. (2025). West Nile Virus in birds, mammals, and other vertebrate species. In: *Veterinary Virology of Domestic and Pet Animals*, ed. by L. Wang. Springer: Cham.

Abstract: West Nile virus (WNV) is an enveloped, positive sense, single-stranded RNA virus in the Flaviviridae family. First identified in Africa in the 1930s, WNV has since gained endemicity on all continents except for Antarctica. Maintained in nature in bird-mosquito-bird transmission cycles, WNV can infect dead-end vertebrate hosts including horses and humans to produce severe, debilitating neuroinvasive disease. Although equine infections are preventable due to the availability of effective commercial vaccines, clinical disease in domestic horses is common worldwide. Occasional epizootics are also seen in atypical vertebrate species, such as farmed alligators. WNV presents diagnostic challenges, due to significant serological cross-reactivity with other flaviviruses and inconsistent availability of viral particles and viral genetic material in clinical samples for antigenic detection. With increasing viral genetic diversity, changing anthropogenic environmental factors favoring viral spread, a lack of preventive options in avian reservoir species, and no commercially available treatments, drugs, or therapeutics, WNV remains one of the most important differentials for viral neurologic disease in the domestic equine and other vertebrate animals.

Zamora-Vega, C., Romero, P.E., Urbina, M., Carré, M., Ochoa, D. and Salas-Gismondi, R. (2025). Exceptional fossils from Peru and an integrative phylogeny reconcile the evolutionary timing and mode of *Gavialis* and its kin. *Biology Letters* 21(8): 20250238.

Abstract: The acquisition of a long and slender snout (longirostry) resulted in extremely similar morphology across crocodylians and, therefore, raised a conflict between morphological and molecular phylogenetic hypotheses involving the longirostre living gharials, *Gavialis gangeticus* and *Tomistoma schlegelii*. This discrepancy is not only topological but also concerns divergence time estimates for the crown clade Gavialidae, especially due to the inclusion of other longirostre forms, ancient 'thoracosaur'-which introduces significant chronostratigraphic inconsistencies. To contribute to reconciling these contrasting lines of evidence, exceptionally preserved fossils of a new Miocene gavialid from Peru were included in a total-evidence Bayesian analysis. Our analysis integrates morphological, molecular and chronostratigraphic data and incorporates most taxa of the largest adaptive radiation of gavialids, which occurred in the Cenozoic of South America and the Caribbean (SAC). Our results demonstrate that including SAC taxa substantially increase divergence estimates for Gavialidae,

surpassing those inferred from molecular data alone. The exceptional preservation of the new Peruvian fossils enabled character re-evaluation for gavialids and 'thoracosaur', the latter recovered even outside Crocodylia and suggesting that longirostry resulted from independent evolution. These findings underscore the crucial role of SAC gavialids in understanding the morphological trajectory and phylogenetics of longirostre crocodylians.

Pierini, S.E., Adjad, F., Bauso, J., Imhof, A., Piña, C.I. and Simoncini, M.S. (2025). Dietary patterns of Yacare in the wetlands of Corrientes, Argentina. *Journal of Zoology* (<https://doi.org/10.1111/jzo.70049>).

Abstract: We investigated the feeding habits and dietary patterns of Yacare (*Caiman yacare*) in freshwater wetlands located in the province of Corrientes, Argentina, with a focus on how these habits relate to the size of the caiman. A total of 39 caimans were classified into different groups based on their total length, including hatchlings (Class I), juveniles (Class II), and adults (Class III and IV). Stomach contents were obtained through gastric lavage. Insects (Coleoptera, Orthoptera, Odonata, and Hemiptera), mollusks (*Pomacea* sp.), and freshwater crustaceans (*Pseudopalaemon* sp. and *Trichodactylus* sp.) were the most common prey, while reptiles, fish, and birds were less frequently consumed. Remains of aquatic plants such as *Pistia* sp., *Azolla* sp., and *Elodea* sp. were also found. Prey diversity and diet composition were similar across the size classes of caimans. As the size of *C. yacare* increased, smaller prey were not excluded in order to consume larger prey. Larger caimans had larger *Pomacea* sp. opercula in their stomachs, potentially linked to morphological constraints, such as the limitation in jaw opening. Our findings suggest that *C. yacare* incorporates a variety of prey into its feeding behavior, and there is no abrupt change in dietary pattern as the caimans grow in size.

Campbell, M.O. (2025). Predators of cattle in Asia. Pp. 191-223 in *Cattle, Their Predators and Geomatics Research*. Springer: Cham.

Abstract: The Asian continent has the largest number of predatory species capable of killing domestic cattle, including tigers, leopards, snow leopards, brown and black bears, wolves and dholes, and occasionally crocodiles. Northwestern Asia is similar to Europe in carnivore species, namely brown bears and wolves, but eastern Asia includes the tiger, leopard, and snow leopard, and tropical Asia includes dholes and black bears. There are also semi-domesticated cattle, such as the gayal, and domesticated water buffalo and yak, as well as more domesticated breeds, such as the zebu. This chapter examines the factors for large predator interactions with semi-domesticated and domesticated cattle. Current evidence indicates that very significant conflicts exist between large predators and cattle managers, especially at the local and individuals. Other conflicts have emerged between political elites and the local cattle herders, over the contradictions between the conservation of large predators and the ownership of cattle, in farms, free-ranging areas, and protected areas. Such conflicts vary regionally, especially between northern Asia, south and southeast Asia, and southwestern Asia. Political, legal, economic, sociocultural, and ecological issues have reshaped the dialogue and applications around large predators and cattle/human relations. The charismatic tiger and its ecology stand as possibly the most important dynamic in this complex scenario, especially in South Asia. It is concluded that despite significant, unresolved matters, predator-cattle issues are increasingly, effectively managed.

Dias, M.J.M. (2024). Efeitos antrópicos sobre a distribuição e abundância de crocodilianos em córregos urbanos no município de Palmas. BSc thesis, Universidade Federal do Tocantins, Porto Nacional, Brazil.

Resumo: Desmatamento, queimada, caça ilegal, poluição, crescimento urbanístico e disposição inadequada de resíduos

sólidos constituem como pressões antrópicas constantes em corpos hídricos em zona urbana, tendo implicações para a biodiversidade aquática local, como os jacarés. Como são animais de topo da cadeia trófica, efeitos negativos em suas populações podem causar um desequilíbrio ecossistêmico devido à suas funções de controle biológico, abundância de peixes e não proliferação de doenças. No presente estudo avaliou-se a relação da presença humana e suas ações antrópicas sobre o uso do espaço dos crocodilianos, ampliando os conhecimentos relacionados à ecologia populacional destes répteis em áreas urbanas, a partir do levantamento populacional das espécies, caracterização do ambiente, identificação e seleção dos microhabitats pelos animais, complementando com análises da qualidade da água dos córregos Brejo Comprido e Sussuapara, localizados no município de Palmas, Tocantins, Brasil. Os resultados apresentaram classificação mais antropizada para o Brejo Comprido em relação ao Sussuapara, com os fatores “uso por humanos” e “presença de resíduos sólidos” como piores problemas ambientais, da mesma forma, mostrou-se densamente mais povoado em relação ao outro. Os microhabitats com maior porcentagem nas áreas de estudo na sazonalidade de chuva foram: estrutura antrópica, alagado, pedregulho e terra, já para a seca foram: estrutura antrópica, galhada e pedregulho. Os microhabitats que tiveram mais abundâncias de animais foram: galhada, poças, vegetação gramínea e estrutura antrópica, com o maior índice de encontros na estação seca. Os animais não mostraram preferência para os microhabitats, exceto em 2 pontos (ponto 3 e Cesamar) do Brejo Comprido, sendo um na chuva e o outro na seca, respectivamente. A qualidade da água foi classificada como boa para ambos, através do Índice de Qualidade da Água (IQA).

Abstract: Deforestation, burning, illegal hunting, pollution, urban growth and inadequate disposal of solid waste constitute constant anthropogenic pressures on water bodies in urban areas, with implications for local the aquatic biodiversity, such as alligators. As they are animals at the top of the trophic chain, negative effects on their populations can cause an ecosystem imbalance due to their biological control functions, abundance of fish and non-proliferation of diseases. In the present study, the relationship between human presence and its anthropic actions on the use of crocodilian space was evaluated, expanding the knowledge related to the population ecology of these reptiles in urban areas, from the population survey of the species, characterization of the environment, identification and selection of microhabitats by the animals, complementing with water quality analyses of the Brejo Comprido and Sussuapara streams, located in the municipality of Palmas, Tocantins, Brazil. The results showed a more anthropized classification for Brejo Comprido in relation to Sussuapara, with the factors “use by humans” and “presence of solid waste” as worse environmental problems, in the same way, it was more densely populated in relation to the other. The microhabitats with the highest percentage in the study areas in the rainfall seasonality were: anthropic structure, flooded, gravel and land, while for dry season they were: anthropic structure, antlers and gravel. The microhabitats that had the most occurrences of animals were: antlers, puddles, grassy vegetation and anthropic structure, with the highest rate of encounters in the dry season. The animals did not show a preference for the microhabitats, except in 2 points (point 3 and Cesamar) of Brejo Comprido, one in the rain season and the other in the dry season, respectively. Water quality was classified as good for both by the Water Quality Index (WQI).

Soto, D.X., Radloff, F.G.T., Bond, A.L., Hobson, K.A. and Leslie, A.J. (2025). In the quest of isotope equilibrium for trophic discrimination estimation: Diet-tissue dynamics in Nile crocodiles (*Crocodylus niloticus*). *Isotopes in Environmental and Health Studies* (doi: 10.1080/10256016.2025.2535762).

Abstract: Stable isotopes of carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) are increasingly employed to study the foraging ecology of ectothermic predators like crocodilians. However, accurate and precise estimations of trophic discrimination factors between diet and crocodile tissues ($\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$) from captive experiments

under controlled conditions are necessary to reliably quantify the contribution of different prey items make to their diet. The issue of an isotopically constant diet which leads to isotope equilibrium is an important factor influencing accurate estimations of diet-tissue discrimination factors. We raised Nile crocodiles (*Crocodylus niloticus*) under controlled experimental conditions feeding them with two isotopically distinct (but constant) diets until tissues reached isotopic equilibrium. We sampled blood (plasma and red blood cells, RBC), scute keratin and collagen, and nail tissues throughout the experiment to estimate diet-tissue discrimination factors. Overall, our estimations of average diet-tissue discrimination factors for $\delta^{13}\text{C}$ were +0.2‰ for plasma, +0.1‰ for RBC, +0.2‰ for keratin, +1.9‰ for collagen, and +1.2‰ for nail tissue, while for $\delta^{15}\text{N}$ values were -0.6‰ for plasma, +1.5‰ for RBC, +1.5‰ for keratin, +2.3‰ for collagen, and +1.8‰ for nail tissue. Body size did not have a significant effect on these tissue estimates, but plasma $\Delta^{15}\text{N}$ was influenced slightly. Understanding these differences in ectotherm isotope ecology is crucial for interpreting trophic relationships within food webs that include animals such as reptiles.

Keating, M.P., Rainwater, T.R., Singh, R., Priore, M.R., Platt, S.G., Wilkinson, P.M., Levi, T., Jachowski, C.M.B. and Jachowski, D.S. (2025). Bobcat predation on American alligators in coastal South Carolina. *Southeastern Naturalist* 24(3): N28-N37.

Abstract: We describe 6 observations of *Lynx rufus* (Bobcat) preying on *Alligator mississippiensis* (American Alligator) in South Carolina. Two of our accounts are field observations, 3 are based on trail camera imagery, and 1 is via scat analysis. Bobcat diet items most often include small- to large-bodied mammals and birds, whereas our observations provide evidence of predation on American Alligators by Bobcats. Further, 3 of our observations involve juvenile alligators and 2 involve alligator hatchlings and eggs, for which knowledge gaps exist with regards to predation risk.

Rainwater, T.R., McFee, W.E. and Platt, S.G. (2024). *Alligator mississippiensis* (American alligator). Diet. *Herpetological Review* 55(3): 433-434.

Platt, S.G., Boutxakittilah, S., Van Zalinge, R.N., Jeratthitikul, E. and Rainwater, T.R. (2024). *Crocodylus siamensis* (Siamese crocodile). Parasitism. *Herpetological Review* 55(3): 434-435.

Sues, H.D., Ma, W. and Ezcurra, M.D. (2025). Braincase and digital endocast of a loricatan pseudosuchian (Reptilia: Archosauria) from the Upper Triassic of Nova Scotia (Canada). *PalZ* (<https://doi.org/10.1007/s12542-025-00743-y>).

Abstract: We present a detailed description of an incomplete but excellently preserved braincase and a digitally generated endocast of a pseudosuchian archosaur from the Upper Triassic (Carnian) Evangeline Member of the Wolfville Formation of Nova Scotia (Canada). The general morphology of the braincase particularly resembles that of the raiusuchid *Postosuchus kirkpatricki* from the Upper Triassic (Norian) of Texas. Indeed, the quantitative phylogenetic analyses found the Wolfville specimen within Raiusuchidae (*Postosuchus* spp., *Polonosuchus silesiacus*, and *Raiusuchus tiradentes*) among loricatan pseudosuchians based on the presence of a deep and dorsoventrally elongate basisphenoid recess. Although the specimen described here shows differences from *Postosuchus kirkpatricki* and *Postosuchus alisonae*, its fragmentary condition and the absence of overlapping elements with other raiusuchids (*Polonosuchus silesiacus* and *Raiusuchus tiradentes*) led us to be cautious and identify it as aff. *Postosuchus* sp. The Wolfville raiusuchid braincase provides evidence for the presence of this clade in low paleolatitudes during the Carnian, bridging the higher paleolatitude occurrences of Raiusuchidae in southern Brazil and in Poland, respectively.

Kummrow, M.S., Roig-Genovés, J.V., Giménez, I., Tzika, A.C., Clauss, M., Neuhauss, S.C.F., Hatt, J.-M. and Gesemann, M. (2025). Nonavian reptile reproduction functions with a reduced gonadotropin system. *Endocrinology* 166(9):bqaf128.

Abstract: Vertebrate reproduction is controlled by 2 pituitary gonadotropin hormones (GtHs), FSH and LH, binding to gonadotropin hormone receptors (GtHRs) in gonadal tissues. All gnathostome vertebrates have been confirmed to possess at least 1 receptor for each GtH [LH receptor (LHR) and FSH receptor (FSHR)], except for species of the reptilian (nonavian sauropsidan) orders, such as lepidosauria, testudines, and crocodylia, which showed inexplicable reactions to heterologous amphibian, avian, and mammalian GtHs in early endocrinological studies. This study investigated the number and function of reptilian GtHRs. Genomic and transcriptomic analyses of selected tetrapod species now strongly suggest the inactivation of the LHR in all nonavian sauropsidans. This gene inactivation likely occurred independently in 3 branches of the sauropsidan clade, sparing only the avian class. Bioassays served to investigate the binding specificity of squamate, chelonian, crocodilian, avian, and mammalian GtHRs with their homologous and heterologous GtHs. The FSHR of a squamate lizard proved completely promiscuous to both its homologous GtHs, while the chelonian FSHR responded slightly stronger to the homologous LH than FSH, and the crocodylian FSHR was only stimulated by the homologous LH but not FSH. We therefore propose a modified paradigm with a neuroendocrine control of nonavian reptilian reproduction by a single GtHR and either 1 GtH in crocodylians or 2 GtHs in chelonians and squamate reptiles. Finally, we discuss hypotheses of tightly regulated temporal and spatial expression of the remaining FSHR in different gonadal somatic cells and temperature-dependent functions of the single nonavian reptilian GtHR.

Avenant, C. and Gee, J. (2025). Observations on predation of the flatback turtle *Natator depressus* by the saltwater crocodile *Crocodylus porosus* at a major rookery in northern Australia. *Pacific Conservation Biology*.

Abstract: This study examines predation by the saltwater crocodile (*Crocodylus porosus*) on the flatback turtle (*Natator depressus*), an Australian endemic, at Cape Domett, a significant nesting site in Cambridge Gulf, northern Australia, where crocodile populations have recovered since legislative protection in the 1970s. The investigation aimed to document crocodile predation on flatback turtles across hatchling and adult life stages, assess predation strategies, and evaluate ecological impacts on this genetically distinct turtle stock. Conducted over three Austral winters (2021–2023), the study utilised infrared videography, unmanned aerial vehicles, and beach patrols to observe predation events in a population of approximately 3250 nesting female flatback turtles. Five predation events were recorded, involving juvenile (<2 m) and large (>5 m) crocodiles. Large crocodiles employed ambushing strategies at the waterline or on land, with tracks, remains, and carcasses indicating an estimated predation rate of one adult turtle per week. Juvenile crocodiles targeted hatchlings during emergence, and scavenging of turtle carcasses was documented. The recovery of *C. porosus* has likely intensified predation pressure on *N. depressus*. Infrared cameras and drones proved effective in capturing unbiased diurnal and nocturnal predation interactions, contributing to the limited global literature on crocodilian predation of sea turtles. Implications: These findings position *C. porosus* as a significant ecological threat to flatback turtles. Comprehensive assessments, including nest inventories and thermal drone surveys, are recommended to refine predation estimates and enhance population viability models, informing conservation strategies for *N. depressus* amid increasing crocodile populations.

Hebert, J. (2025). Fossil crocodilians grew larger and longer, and lived longer than extant crocodilians. *Creation Research Society Quarterly* 61(3): 172–188.

Abstract: Whatever factor or factors enabled extreme human longevity in the pre- and immediate post-Flood worlds likely also affected the animal kingdom. Thus, direct or indirect evidence for greater past animal longevity is also de facto evidence for greater past human longevity. The field of skeletochronology is making it possible to deduce information about the ontogenetic growth trajectories of giant fossil crocodilians such as *Deinosuchus riograndensis* (alternately, *D. hatcheri*) and *Sarcosuchus imperator*. Their growth curves indicate that these crocodilians grew for at least 50–60 years, a duration significantly greater than even the total typical 30-year lifespan of extant crocodilians. Moreover, a smoothed *Deinosuchus* growth curve published in the mainstream evolutionary literature suggests this age of 50 years likely significantly underestimates the true age at maturity. Given the evidence from longevity studies linking both larger adult body sizes and greater ages at maturation to greater longevity, the large adult body sizes of *Deinosuchus* and *Sarcosuchus* and their prolonged maturation intervals are indirect evidence of lifespans greater than extant crocodilians. Other giant fossil crocodilians, some of which may be direct ancestors of extant crocodilians, were also likely experiencing greater longevity. Moreover, the similarity of giant crocodilian body sizes in Cretaceous, Miocene, and Pliocene strata suggest that these crocodilians obtained their giant sizes under similar environmental conditions. This could suggest they all lived in the pre-Flood world and would be another argument for a ‘high’ Cenozoic Flood/post-Flood boundary.

Vuong, Q.H., Jones, T.E. and Nguyen, M.H. (2025). Exploring the impacts of biodiversity loss perceptions on preferences and behaviours related to animal fur and skin product consumption. *Environmental Conservation* (doi: <https://doi.org/10.1017/S037689292500013X>).

Abstract: The drivers of the unsustainable consumption of animal products have been researched, but, to date, no studies have specifically examined the interplay between perceptions of biodiversity loss consequences, beliefs in its existence and significance and the consumption of animal skin and fur products. We explore how people’s perceived consequences of biodiversity loss are associated with their consumption preferences and behaviours related to animal fur/skin products in varying scenarios of biodiversity loss beliefs. Applying Bayesian mindspage framework analytics to a dataset of 535 Vietnamese urban residents (with 85.05% holding an undergraduate or higher degree), we found that, for people viewing biodiversity loss as real and significant, perceived consequences of biodiversity loss were negatively associated with the preference for animal skin/fur products. Conversely, when they viewed biodiversity loss as unreal or real but insignificant, the association was the reverse. Regarding the ownership of skin/fur products, among those who considered biodiversity loss insignificant, perceived consequences of biodiversity loss were correlated with owning more such products. However, for individuals who saw biodiversity loss as a major issue or denied its existence, ownership remained unaffected by perceptions of its consequences. These findings underscore the need for interdisciplinary research in sociocultural and environmental psychology to improve our understanding of the human–nature relationship and inform evidence-based policies integrating science and humanistic values.

Thapa, G.J., Thapa, K., Poudel, S., Pun, D.B.P., Shrestha, S., Poudel, P., Acharya, H.B., Lamsal, B.K., Sada, R. and Wich, S.A. (2025) Eyes in the sky: Drone monitoring of the largest gharial and mugger populations in the East Rapti River, Chitwan National Park. *PLoS One* 20(8): e0330350.

Abstract: Drone-based aerial monitoring can play a pivotal role in scaling up efforts to monitor species at risk. In this study, we assessed the population size, occupancy, and spatial interactions of Gharials and Muggers in the Eastern Rapti River and its tributaries within Chitwan National Park, complying with national regulations.

Using a Wingtra Tail-Sitter Vertical Take-Off and Landing fixed-wing drone, we surveyed a 73-km river stretch during the species' basking period. The drone captured 24,129 photographs across 27 flight missions, covering 702.66 km and 44.68 km², of which 153 contained dorsal images of Gharials (77) and Muggers (76). An experienced image analyst identified and counted 323 crocodiles (205 Gharials and 118 Muggers) from the images. The encounter rates were 14.33 Gharials and 9.95 Muggers detections per 1 hour of drone flight time. To measure habitat-use through an occupancy framework, we divided the 73-km river stretch into 809 grid cells of 0.04 km² each. The site-level probabilities of habitat-use were 0.47 for Gharials and 0.24 for Muggers. As anticipated, both species co-occurred spatially along the Eastern Rapti River during the winter season, with a spatial interaction factor (SIF) of 1.94. This study demonstrates the effectiveness of drones in collecting high-resolution ecological data - both spatial and temporal - for assessing population parameters and monitoring threatened crocodile species at scale. Drones offer a cost-effective and less labor-intensive (~\$US0.61 per km) alternative to traditional ground-based surveys (~\$US21 per km). Integrating machine learning with drone surveys for automated image analyses has significant potential to further reduce costs and increase efficiency and could strengthen conservation efforts across South Asian River system.

Li, C., Zhang, Y., Wen, Y., Wang, C., Li, P., Xu, Y., Zhang, Y., Zhou, Y., Wu, X. and Nie, H. (2025). MicroRNA expression profiling and functional analysis of CDH3 during oogenesis in the Chinese alligator (*Alligator sinensis*). Current Zoology (<https://doi.org/10.1093/cz/zoaf058>).

Abstract: MicroRNAs (miRNAs), noncoding RNAs that regulate the expression of target mRNAs, have gained attention. Nevertheless, the biological mechanism underlying oogenesis in crocodiles remains unclear. In this study, RNA sequencing was utilized to analyses miRNA expression at 1-, 15-, and 90-days post hatching (dph) in *Alligator sinensis*. We identified 92 differentially expressed known miRNAs. Among these genes, 17, 1, and 5 had specific expression patterns at 1, 15, and 90-dph, respectively. GO and KEGG analyses of the predicted miRNA targets revealed enrichment in cell adhesion molecule pathways. The expression of CDH3 was significantly higher than that of other family members and was high during the embryonic stage, which coincided with the commencement of mammalian oogenesis. Our prediction indicated the presence of three Ca²⁺ binding sites, two cadherin domains, and a cadherin cytoplasmic region in the CDH3 amino acid sequence. This finding suggests a similar cell adhesion function to that of mammalian CAM family genes. IHC analysis revealed minimal CDH3 expression in the germ cell nests at 1-dph. Elevated CDH3 expression was observed in primordial follicles formed via Nest breakdown at 15-dph. Notably, CDH3 expression decreased significantly at 90-dph, but positive signals remained in thecal epithelia of the medullary cavities. The results of lentivirus experiments revealed that CDH3 downregulation suppressed the expression of oogenesis genes (FSHR, CYP19A1, BMP15, and BCL2). Our research highlights the function of miRNAs in crocodilian oogenesis, and CDH3 is proposed to be crucial for reproductive developmental mechanisms.

Safi, A. and Karl, H. (2024). A review of the updated checklists of the amphibians and reptiles of Pakistan: Present and prehistoric. Journal of Biodiversity and Biotechnology 4(1): 22-37.

Abstract: This paper presents annotated and updated checklists of recent and updated information on the herpetofauna of Pakistan, encompassing both extant and extinct taxa. The presenting checklists mentioned all species (243 species, 104 genera, and 27 families of extant herpetofauna, including 24 anuran amphibian species, belonging to 4 families) that have been recorded, so far, from Pakistan in major works of herpetology. In comparison, the reptilian fauna consists of 219 species/subspecies, including 2 species of crocodiles, 15 species of turtles and tortoises, 119 species

of Sauria, and 83 species of snakes belonging to 23 families. Four species of amphibians and 33 species of reptiles are endemic to Pakistan. Recent herpetological collections have added several new taxa to the previously compiled herpetofauna of Pakistan. Separate checklists of prehistoric reptiles (50 taxa) for both dinosaurs (26 taxa) and non-dinosaurian taxa (24 taxa) are also presented here. Pakistan is the home of all three living reptile orders: Crocodylia, Testudines, and Squamata. Apart from living herpetofauna, the exposures of the Vitakri Formation in the Vitakri dome proved to be a graveyard that yielded a large number of bone assemblages and also hosted numerous skeletal fragments and their assemblages.

Natale Castillo, M.I. and Leone Gold, M.E. (2025). On the paranasal and paratympenic sinuses of perinatal *Gavialis gangeticus*, with notes on the endocast, ossification observations in the braincase, and cervical vertebrae. Anatomical Record (Hoboken) ([doi: 10.1002/ar.70024](https://doi.org/10.1002/ar.70024)).

Abstract: *Gavialis gangeticus* is a critically endangered, enigmatic, long-snouted crocodylian with uncertain phylogenetic affinities. Molecular and morphological data return disparate results for its placement within the larger diversity of Crocodylia. Because of its conservational status, specimens of *Gavialis* are rarer in museum collections, especially ones of younger ontogenetic age. Here, we use computed tomography (CT) to image a perinatal specimen to investigate cranial morphology, paranasal, and paratympenic pneumaticity. We provide digital reconstructions of the cranial morphology as an open access digital atlas. We also compare this unique specimen to adult morphology based on taxonomically comparative published literature and found some similar, but not identical morphologies across ontogeny (eg maxillary sinus, antorbital sinus, recessus epitubarius, laterosphenoid recess, and otoccipital recess). Other structures, like the basioccipital recess and pterygoid recesses, are morphologically disparate in this hatchling, matching more closely with other published hatchling specimens of different species rather than with adult *Gavialis*. We include a description of the endocast and associated nervous structures. The scan included the first three cervical vertebrae, so we make observations on vertebral ossification. We intend this descriptive work to be a novel point of comparison for future ontogenetic work in Crocodylia.

Resume: El *Gavialis gangeticus* es un cocodrilo enigmático, con hocico largo y afinidades filogenéticas inciertas. Datos morfológicos y moleculares resultan en respuestas distintas en cuanto a su posición en relación con la gran diversidad de Crocodylia. Por su estatus como especie en peligro crítico de extinción, especímenes de *Gavialis* son más raros en colecciones de museo, especialmente especímenes de edades ontogenéticamente más jóvenes. En este estudio, utilizamos tomografía computarizada (TC) para escanear un espécimen perinatal y analizar tanto su morfología craneal como la neumatización de las regiones paranasales y paratimpánicas. Proveemos la morfología craneal en un atlas digital con acceso abierto. Asimismo, comparamos este ejemplar único con las descripciones de la morfología adulta disponibles en la literatura publicada, la cual ofrece comparaciones desde una perspectiva taxonómica. Encontramos que algunas de las estructuras son similares, pero no idénticas a las del adulto (eg el seno maxilar, el seno antorbital, el recessus epitubarius, el recesso lateroesfenoideo, y el recesso otoccipital). Otras estructuras, como el recesso basioccipital y el recesso pterigoideo, son morfológicamente distintos del adulto, pero más cercanos a lo que se encuentra en otros especímenes perinatales de distintas especies. También describimos el endocráneo y las estructuras nerviosas asociadas con el endocráneo. El escaneo incluye las tres primeras vértebras cervicales; por lo tanto, hacemos observaciones sobre la osificación vertebral. Aspiramos a que este trabajo descriptivo sea un punto de comparación novedoso para trabajo ontogenético de los cocodrilos en el futuro.

Marin Acosta, D.A. (2025). Uso Tradicional y Percepcion de los

Cocodrilos en la Reserva de la Biosfera la Encrucijada, Chiapas, Mexico. BSc thesis, Universidad Nacional Autonoma de Mexico, Mexico.

Resumen: Los cocodrilos (orden Crocodylia), reptiles depredadores semiacuáticos, son esenciales para mantener la estructura y función de los ecosistemas. En México se distribuyen en las costas del Pacífico y del Golfo, siendo aprovechados en varios estados como fuente de alimento o vestimenta. Sin embargo, enfrentan amenazas como el comercio ilegal y la pérdida de hábitat, que han impactado negativamente en sus poblaciones y en el conocimiento tradicional asociado a ellos. El objetivo de este trabajo fue conocer y analizar el uso tradicional y la percepción que tienen los pobladores de las comunidades Salto de Agua y Ceniceros, ubicados en la Reserva de la Biosfera “La Encrucijada”, en el estado de Chiapas, México, respecto a las especies *Crocodylus acutus* y *Caiman crocodilus chiapasius*. Se realizaron 100 entrevistas semiestructuradas por un muestreo aleatorio, durante el mes de julio del 2023. Se obtuvo que el 98% de los entrevistados reconoce dos especies diferentes de cocodrilos: el “lagarto” (*C. acutus*) y el “pululo” (*C. c. chiapasius*). En ambas comunidades se aprovechan como alimento (frito, asado), medicina tradicional (para aliviar problemas respiratorios), como animales de ornato y compañía, para confeccionar prendas para la vestimenta y la captura para su comercio. En ambas comunidades, los cocodrilos son vistos como peligrosos, en particular *C. acutus* debido a su tamaño y comportamiento. Un 51% de la población entrevistada cree que es necesario controlar el tamaño de su población, ya que su aumento está invadiendo áreas frecuentadas por humanos. Sin embargo, otro 34% no considera necesario tomar medidas contra ellos, ya que rara vez atacan sin provocación. En conclusión, en ambas comunidades existe un conocimiento del uso de estas especies. Aunque los pobladores de las comunidades de estudio tienen preocupación por el aumento de las poblaciones de cocodrilos, no les representa un problema la convivencia con estas especies y no se han generado acciones en contra.

Abstract: Crocodiles, semi-aquatic predatory reptiles belonging to the order Crocodylia, are essential for maintaining the structure and function of ecosystems. In Mexico, they are distributed along the Pacific and Gulf coasts and are used in several states as a source of food and clothing. However, they face threats such as illegal trade and habitat loss, which have negatively impacted their populations, and the traditional knowledge associated with them. The goal of this study was to learn about and analyze the traditional use and perception of two crocodile species, *Crocodylus acutus* and *Caiman crocodilus chiapasius*, by the inhabitants of the communities of Salto de Agua and Ceniceros, located in the biosphere reserve “La Encrucijada”, Chiapas, Mexico. A total of 100 semi-structured interviews were conducted by random sampling in July 2023. Results: 98% of those interviewed recognized two different species of crocodiles: the “lizard” (*C. acutus*) and the “pululo” (*C. c. chiapasius*). In both communities they are used as food (fried, roasted), traditional medicine (to alleviate respiratory problems), as ornamental and companion animals, to make clothing, and to capture for trade. In both communities, crocodiles are considered dangerous, particularly *C. acutus* due to their size and behavior. Fifty-one percent of the people interviewed believe that it is necessary to control crocodiles’ population size, as they are invading areas frequented by humans. However, another 34% do not consider it necessary to take measures against them, as they rarely attack without provocation. In conclusion, in both communities, there is knowledge of the use of these species. Although there is concern about the increase in crocodile populations, they do not see the coexistence with these species as a problem and no actions have been taken against them.

Zamora-Vega, C., Romero, P.E., Urbina, M., Carré, M., Ochoa, D. and Salas-Gismondi, R. (2025). Exceptional fossils from Peru and an integrative phylogeny reconcile the evolutionary timing and mode of *Gavialis* and its kin. *Biology Letters* (<https://doi.org/10.1098/rsbl.2025.0238>).

Abstract: The acquisition of a long and slender snout (longirostry) resulted in extremely similar morphology across crocodylians and, therefore, raised a conflict between morphological and molecular phylogenetic hypotheses involving the longirostrine living gharials, *Gavialis gangeticus* and *Tomistoma schlegelii*. This discrepancy is not only topological but also concerns divergence time estimates for the crown clade Gavialidae, especially due to the inclusion of other longirostrine forms, ancient ‘thoracosaur’ - which introduces significant chronostratigraphic inconsistencies. To contribute to reconciling these contrasting lines of evidence, exceptionally preserved fossils of a new Miocene gavialid from Peru were included in a total-evidence Bayesian analysis. Our analysis integrates morphological, molecular and chronostratigraphic data and incorporates most taxa of the largest adaptive radiation of gavialids, which occurred in the Cenozoic of South America and the Caribbean (SAC). Our results demonstrate that including SAC taxa substantially increase divergence estimates for Gavialidae, surpassing those inferred from molecular data alone. The exceptional preservation of the new Peruvian fossils enabled character re-evaluation for gavialids and ‘thoracosaur’, the latter recovered even outside Crocodylia and suggesting that longirostry resulted from independent evolution. These findings underscore the crucial role of SAC gavialids in understanding the morphological trajectory and phylogenetics of longirostrine crocodylians.

Pellarin, R., de Araújo Sena, M.V., Clarac, F. and Cubo, J. (2025). Elucidating the thermometabolism of *Thalattosuchus superciliosus* (de Blainville) Young, Brignon, Sachs, Hornung, Foffa, Kitson, Johnson & Steel, 2021 (Archosauria: Metriorhynchidae): a paleohistological study. *Comptes Rendus Palevol* 24(17): 333-344

Abstract: Metriorhynchidae Fitzinger, 1843 is an emblematic group of crocodylomorphs whose marine and pelagic lifestyle has long aroused the interest of palaeontologists. Indeed, both their ecology and thermometabolic strategy (ie endotherm or ectotherm) remained debated. In order to shed light on this matter, we inferred the thermometabolism of *Thalattosuchus superciliosus* de Blainville, 1852 focusing on the femoral histology and CT-scan anatomy. Using “phylogenetic logistic regression” methods, we calculated the probability of endothermy on the basis of minimum vascular cavity diameter. Using the “phylogenetic eigenvector maps” approach, we inferred resting (based on osteocyte density) and maximum (based on minimum diameter of femoral nutrient foramina) metabolic rates. We found that *T. superciliosus* had a low probability of being endotherm and possessed a low resting metabolic rate. The study of the maximal metabolic rate allows us to suggest that *T. superciliosus* was not a pursuit hunter, but perhaps rather had a sit-and-wait/opportunistic and scavenging feeding strategy, as extant crocodylians. Our study allows us to discuss the ecology of this species, but further studies relying on a wider sample of metriorhynchids are needed in order to have a better understanding of both the thermometabolism and the foraging behavior of this group.

Résumé: L’élucidation du thermométabolisme de *Thalattosuchus superciliosus* (de Blainville) Young, Brignon, Sachs, Hornung, Foffa, Kitson, Johnson & Steel, 2021 (Archosauria : Metriorhynchidae): une étude paléohistologique.

Metriorhynchidae Fitzinger, 1843 constitue un groupe emblématique de crocodylomorphes dont le mode de vie marin et pélagique a longtemps suscité l’intérêt des paléontologues. En effet, tant leur écologie que leur thermométabolisme (ie endotherme ou ectotherme) sont restés débattus. Afin de faire la lumière sur cette question, nous avons inféré le thermométabolisme de *Thalattosuchus superciliosus* de Blainville, 1852 en nous concentrant sur l’histologie fémorale et l’anatomie par tomographie à rayon X. En utilisant les méthodes de “régressions logistiques phylogénétiques” nous avons calculé la probabilité d’endothermie sur la base du diamètre minimal des cavités vasculaires. En utilisant l’approche des “cartes de vecteurs propres phylogénétiques” nous avons inféré les taux métaboliques au repos (sur la base de la densité ostéocytaire) et maximaux (sur

la base du diamètre minimal du foramen nourricier fémoral). Nous avons constaté que *T. superciliosus* avait une faible probabilité d'être endotherme et possédait un faible taux métabolique au repos. L'étude du taux métabolique maximal nous permet de suggérer que *T. superciliosus* n'était pas un chasseur de poursuite, mais qu'il avait peut-être plutôt une stratégie de capture de proies en embuscade, opportuniste et charognarde, comme les crocodiliens actuels. Notre étude nous permet de discuter de l'écologie de cette espèce, mais d'autres études reposant sur un échantillon plus grand de métriorhynchidés sont nécessaires pour mieux comprendre le thermométabolisme et le comportement alimentaire de ce groupe.

Novas, F.E., Pol, D., Agnolín, F.L., de Souza Carvalho, I., Manabe, M., Tsuihiji, T., Rozadilla, S., Lio, G.L. and Isasi, M.P. (2025). A new large hypercarnivorous crocodyliform from the Maastrichtian of Southern Patagonia, Argentina. *PLoS One* 20(8): e0328561

Abstract: The first crocodyliform specimen from the Maastrichtian Chorrillo Formation (Austral Basin, Patagonia) is here described. The discovery was made about 30 km to the SW of the town of El Calafate (Province of Santa Cruz, Argentina) and consists of a beautifully preserved and articulated skull and jaws, and part of the postcranial skeleton that were preserved encased in a large concretion. This new taxon belongs to the notosuchian clade Peirosauridae, representing the latest and southernmost record for this group of crocodyliforms. The new taxon is recovered as closely related to other robust and broad-snouted peirosaurids that lived by the end of the Cretaceous Period, such as *Colhuehuapisuchus* from the Maastrichtian of Central Patagonia and *Miadanasuchus oblita* from the Maastrichtian of Madagascar. The completeness of the new specimen reveals, for the first time, the anatomy and body plan of a large and broad snouted peirosaurid. The new taxon bears large ziphodont teeth, a broad oreinirostral snout that is only slightly longer than 50% the skull length, and a deep adductor chamber in the temporal region and posterior mandibular ramus. The anterior region of its postcranial skeleton is preserved and shows broad scapula and a robust humerus features previously known in large predatorial notosuchians. The new crocodyliform adds to the predatorial component of terrestrial ecosystems at high paleolatitudes by the end of the Cretaceous Period.

Nawipa, M., Makaba, S., Tingginehe, R.M., Togodly, A., Irab, S.P. and Medyati, N. (2025). The experience of the Burmeso tribe in using crocodile oil to treat scabies in Burmeso Village, Mamberamo Raya Regency. *Formosa Journal of Science and Technology* 4(8): 2291-2300.

Abstract: Scabies is a contagious skin disease caused by the *Sarcoptes scabiei* mite and is a significant public health problem, especially in remote areas with limited access to modern health services. This qualitative phenomenological study aims to explore the experiences of the Burmeso people in using crocodile oil as a traditional treatment for scabies in school-age children in Burmeso Village, Mamberamo Raya Regency, Papua. Through in-depth interviews with 10 informants consisting of medical personnel, traditional leaders, parents, and the general public, this study reveals the practice of traditional crocodile oil processing, how to use it, the effectiveness of the treatment, and the reasons why people choose traditional medicine. The results show that crocodile oil is processed from crocodile fat through a traditional heating process without additional chemicals, is used topically by being applied 2-3 times daily after heating, and shows high effectiveness with healing within 3-5 days. People choose traditional medicine due to cultural beliefs, limited access to health facilities, proven effectiveness, and the availability of local ingredients. This study contributes to the understanding of the integration of local wisdom in the public health system and the importance of preserving traditional knowledge as a sustainable alternative treatment.

Canna, C. (2025). Nuovi dati sui resti delle teste di coccodrillo acquisiti nei tesori ecclesiastici e laici europei dal Medioevo all'Età Moderna. *Archaeofauna: International Journal of Archaeozoology* 34: 353-358. (New data on crocodile head remains acquired in European ecclesiastical and secular treasures from the Middle Ages to the Modern Era).

Abstract: Taxidermically preserved crocodiles, or parts of these reptiles, are among the most sought-after naturalistic finds in European ecclesiastical and secular treasures from the Middle Ages to the Modern Era. The presence of these exotic animals is still documented today by the faunal remains acquired within this time interval in European places of worship and secular contexts. The purpose of this paper is to provide new data on crocodile head remains by relating the study of historical sources with the analysis of faunal remains (whether osteological or preserved via taxidermy), with respect to the general characteristics (identification of the species, place of acquisition, and state of preservation) and possible origins (geographical area of origin and modes of acquisition) of these naturalistic finds.

Lescord, G.L., Lajoie, C.M.E. and Lange, T.R. (2025). Mercury in biota from Florida's freshwater lakes and rivers: a review of current research and emerging challenges. *Environmental Reviews* (<https://doi.org/10.1139/er-2025-0127>).

Abstract: A notable amount of aquatic mercury (Hg) research has been done in northern ecosystems but less is known about Hg dynamics in the sub-tropics. Our collective understanding of Hg bioaccumulation is particularly lacking in freshwater lakes and rivers across Florida, USA, which is dominated by uniquely shallow and polymictic solution lakes, as well as black-water rivers. To understand the state of information and direct future research and management efforts, we conducted a literature review of the primary research available on Hg dynamics in biota from inland freshwater ecosystems across Florida. We notably excluded research from the greater Everglades National Park (which includes the upgradient water conservation areas), a unique wetland system that has been well researched. In total, 42 peer-reviewed papers, conference proceedings, and student theses were found with data on methyl or total Hg in biota from Floridian lakes, rivers, or wetlands. These sources were notably dated, and much of the data used, even in more recent research, was >20 years old. Nevertheless, the collective research report elevated Hg concentrations across biotic groups, when compared to other regions in the United States, but lower than in the greater Everglades region. There was also significant spatial and/or temporal variability in the concentrations of both total Hg (THg) and methyl Hg (MeHg). Communal drivers of this variability included measures of biological productivity, precipitation, and the abundance of wetlands influencing a given waterbody. Notably, sulfate and dissolved organic matter (DOM), well studied drivers of Hg methylation and bioaccumulation in northern systems and the greater Everglades region, were absent from much of this past modeling; the limited research available suggest complex effects that warrant further study. Broader knowledge gaps and future challenges (eg the impact of urbanization, lake management practices, and invasive species) are also discussed herein, specifically focusing on how they may impact Hg cycling and direct future monitoring, research, or mitigation efforts. Such challenges are impacting freshwater ecosystem globally. This, coupled with the potential for other lakes to resemble Florida's warm and productive systems due to climate change, make the findings of our review broadly applicable.

Parida, S.N., Tripathy, P.S., Kumar, N., Rout, A.K., Panda, A.P., Dobriyal, M., Parida, P.K. and Behera, B.K. (2025). The evaluation of prospects for human and saltwater crocodile (*Crocodylus porosus*) conflict: The case of coastal Bhitarkanika National Park, India. *Frontiers in Amphibian and Reptile Science* 3 ([doi: 10.3389/famrs.2025.1639071](https://doi.org/10.3389/famrs.2025.1639071)).

Abstract: The preservation of biodiversity and managing human-wildlife conflicts are significant problems associated with conservation worldwide. The evaluation of the human-saltwater crocodile (*Crocodylus porosus*) conflict around the Bhitarkanika National Park revealed an overview of attacks on humans. In this study, it was found that between 2019 and 2025, a total of 28 fatal attacks were reported in the area adjacent to the National Park. It is also highlighted that the past 25 years of government investment policies in *C. porosus* conservation have led to a significant increase in the number of *C. porosus* individuals by approximately 36.4 individuals per year over this period of 25 years, which follows a moderately complex to highly nonlinear trend, the adult *C. porosus* follows moderately nonlinear trend and sub-adult follows a highly complex trend. The population increases by 12.6 individuals per year, revealing significant growth. A key aspect of this study is the difficulty of recovering and conserving large predator populations due to the inherent risk they pose to people and their livelihoods. The findings of the study will aid in creating strategies to reduce the risk of HWC.

Modelling ecosystem disruption along the Odisha coast of the Bay of Bengal using biophysical parameters. Pp. 139-170 in *Revealing Ecosystem Services Through Geospatial Technologies*, ed. by M. Mishra, G.K. Panda and S. Panda. Springer: Cham.

Abstract: Disruption of ecosystems along the Bay of Bengal coast in Odisha is a pressing environmental challenge, impacting various species and their habitats. Human activities, combined with climate change, rising sea temperatures, and increasing tropical cyclones, exacerbate this crisis. The 480 km coastline of Odisha features diverse ecosystems, including tidal flats, marshes, mangroves, sandy beaches, and estuarine river mouths, which support species like Olive Ridley turtles, saltwater crocodiles, blackbucks, and migratory birds. Critical areas like Chilka Lake and the Little Sundarbans mangroves are particularly vulnerable. This study uses the Coastal Hazard Wheel (CHW) model, developed by UNEP with Danish institutions, to assess the vulnerability and risks of ecosystem disruption. The CHW model evaluates coastal hazards such as erosion, inundation, saltwater intrusion, and flooding, using biophysical parameters include geological features, wave exposure, tidal range, flora and fauna, sediment balance, and storm climate. Multi-date satellite images and geospatial tools were used to map areas at risk. Results indicate that 22% of Odisha's coastline is at very high risk, 74% at moderate risk, and 4% at low risk of ecosystem disruption. The study identifies vulnerable areas and recommends management strategies, including coastal zoning, ecosystem-based management, fluvial sediment management, dune construction, rehabilitation, and coastal setbacks. These strategies, supported by the CHW model, aim to mitigate risks and promote sustainable coastal zone management. Additionally, the study highlights the importance of open-source satellite data and geoinformatics in managing ecosystem disruption in coastal regions.

Raposo, A.C., Grijaldo-Alvarez, S.J.B., Xu, G., Alvarez, M.R.S., Lebrilla, C.B., Portela, R.W. and Oriá, A. (2025). Comparative glycomic analysis of hawk (*Rupornis magnirostris*), caiman (*Caiman latirostris*) and sea turtle (*Caretta caretta*) tear films. *Molecular Omics* (doi: 10.1039/d4mo00255e).

Abstract: Glycans are recognized as biomarkers and therapeutic targets. However, these molecules remain a critical blind spot in understanding post-translational modifications, particularly in vertebrate species inhabiting diverse habitats. The glycans present in tears play a crucial role in eye protection and may be one of the key factors in adapting to direct environmental contact. This study aimed to describe and compare the glycomic profiles of roadside hawk (*Rupornis magnirostris*), broad-snouted caiman (*Caiman latirostris*), and loggerhead sea turtle (*Caretta caretta*) tears, thereby one avian and two reptilian species. Samples were collected from 10 healthy roadside hawks, 70 broad-snouted caimans, and 10

loggerhead sea turtles to determine N- and O-glycan compounds. The compounds were released from tear glycoproteins and enriched by solid-phase extraction (SPE). Then, the glycans were eluted based on size and polarity. SPE fractions were analyzed using high-resolution mass spectrometry. 155 N-glycans (56% sialylated) and 259 O-glycans (37% sialylated) were detected in roadside hawk tears; 127 N-glycans (55% sialylated) and 263 O-glycans (35% sialofucosylated) in broad-snouted caiman tears; and 85 N-glycans (36% fucosylated) and 84 O-glycans (89% fucosylated) in loggerhead sea turtle tears. The marine habitat has a significant impact on the tear's glycans. The high presence of fucosylated glycans can represent a shield mechanism potentially related to its adhesion to glycocalyx, and interaction with the immune system, also serving as an environmental biomarker. Tears are composed of various biologically active substances, and this description can help in further studies on the identification of novel ocular surface biomarkers and in the differentiation of glycan profiles in healthy and non-healthy animals.

Ezat, M.A., Molenaar, E., Naguib, M. and van Langevelde, F. (2025). Nile crocodiles in Lake Nasser, Egypt, are found close to fishermen's camps, indicating potential conflicts. *Ecology and Evolution* 15: e71970.

Abstract: Conflict between wildlife and humans is one of the main causes of wildlife decline. Numerous studies have investigated environmental and anthropogenic variables determining the distribution of large carnivores to predict and mitigate the risks of such conflicts. However, for aquatic carnivores, such as crocodiles, little is known about which variables explain their distribution. Yet, human-crocodile conflicts are on the rise. A better understanding of such variables will potentially prevent conflicts or even promote coexistence between crocodiles and humans. Here, we analyze which environmental and anthropogenic variables determine the distribution of Nile crocodiles (*Crocodylus niloticus*) in Lake Nasser, Egypt. As apex predators, Nile crocodiles are often perceived to be responsible for the declining fish populations, and proximity to fishermen could lead to conflicts and killing of crocodiles. Since both crocodiles and fishermen hunt fish, we expected to find Nile crocodiles close to fishermen's camps. To analyze the crocodile distribution, we surveyed 1880 km of Lake Nasser's shoreline and collected 192 sightings of Nile crocodiles. We used readily available spatial data for 23 environmental and anthropogenic variables, including ambient temperature, the slope of the shoreline, and the distance to fishermen's camps. We used MaxEnt species distribution modeling to quantify which variables were correlated with Nile crocodile locations. Our analyses revealed a higher probability to find Nile crocodiles closer to fishermen's camps. Additionally, crocodile presence was positively associated with flat shorelines. The findings that crocodiles are not driven away by fishing activities reflect a conflict between fishermen and crocodiles. This study contributes to an understanding of which environmental and anthropogenic variables determine the distribution of Nile crocodiles, a key conservation point to promote human-crocodile coexistence.

Leeds, A., Daneault, A., Riley, A., Stalter, L., Wolfe, K., Leonard, I., Alba, A.C. and Soltis, J. (2025). Pilot investigation: Testing opaque water as an agonism mitigating visual barrier for Nile crocodiles (*Crocodylus niloticus*). *Zoo Biology* (doi: 10.1002/zoo.70022).

Abstract: This pilot investigation sought to evaluate the effectiveness of water opacity as an agonism-mitigation strategy in an all-male group of Nile crocodiles (*Crocodylus niloticus*). Crocodile behavior was monitored over 95 observation hours, split approximately equally between transparent water and opaque water conditions. In addition to agonism rates, the crocodiles' use of water was evaluated to ensure the change in their habitat did not disrupt utilization of the water, which is an important component of their thermoregulatory processes. Agonism rates were approximately equal between the transparent and opaque water conditions. The proportion of

the group in water was lower in the opaque condition though the mean difference between conditions suggests that approximately two more crocodiles (out of a group size that ranged from 21 to 18 individuals) were in water in the transparent condition than opaque condition. Overall, these findings suggest the opaque water had little to no effect on the crocodiles' behavior as measured here. However, the opaque water may have increased environmental complexity. In nature, crocodiles navigate opaque water utilizing chemosensory and integumentary sensory modalities that are likely underutilized in transparent water commonly provided to crocodilians living in human care. Further research is needed to understand how opaque water may be enriching for crocodilians.

Wu, X.C., Kang, Z., Shi, J., You, H.L. and Dong, L. (2025). *Taihangosuchus wuxiangensis*, a new gracilisuchid (Archosauria: Pseudosuchia) from the Middle Triassic of Shanxi Province, China. *Historical Biology* (<https://doi.org/10.1080/08912963.2025.2537848>).

Abstract: Recently, two partial skeletons of an archosaur have been collected from the upper part of the Triassic Ermaying Formation in Shanxi Province, China, which represent a new pseudosuchian, *Taihangosuchus wuxiangensis* gen. et sp. nov. The new species can be diagnosed based on a set of cranial and postcranial characteristic states and assigned to Gracilisuchidae. Our phylogenetic study finds that *T. wuxiangensis* gen. et sp. nov. is the second most basally branching gracilisuchid and that Gracilisuchidae and Erpetosuchidae are nested together as the most basally branching clade of Pseudosuchia, implying that Gracilisuchidae diverged within a sub-clade rather than directly from the mainline of Pseudosuchia. Furthermore, Aetosauria and Ornithosuchidae form a clade at the base of Suchia. Phylogenetic patterns recovered in this study for the four basally branching clades of Pseudosuchia and the members of Gracilisuchidae are congruent with their chronostratigraphies better than those obtained in previous studies.

Platt, N.C. (2025). A Phylogenetic Reconstruction of North American Goniopholidid Crocodyliforms. PhD thesis, The University of Iowa, Iowa, USA.

Abstract: Goniopholididae includes some of the most common and distinctive crocodyliforms from continental freshwater and estuarine deposits of Jurassic and Cretaceous Laurasia. They are characterized by platyrostral (= flattened) snouts with prominent maxillary depressions on the posterolateral surfaces of the maxillae that may have housed composite sensory organs to aid in prey detection and capture. This clade was among the first crocodyliforms with a body plan and, presumably, ecological role superficially resembling those of modern crocodylians. The flat, triangular skull and conical teeth typical of goniopholidids resemble those of most extant crocodylians and are thought to typify the configuration of a “generalized” semiaquatic ambush predator with a broad prey base. This generalized morphology has caused them to receive little scientific attention historically. Unfortunately, Goniopholididae has been treated as a wastebasket taxon, with any non-eusuchian neosuchian with generalized morphology liable to be referred to the clade. Although European goniopholidid systematics have drawn substantial attention in the past two decades, considerably less effort has been directed toward the North American record of the group. This project revises the species-level taxonomy of North American goniopholidids, including a review of existing species and the description of new species. Also, phylogenetic analyses were conducted to help resolve the evolutionary relationships of goniopholidids and their closest relatives. The results of this study reveal novel tree topologies that challenge long-held assumptions about the status and distribution of Goniopholididae, which had a more restrictive Jurassic and expansive Cretaceous distribution in North America than previously believed. Moreover, these results highlight the presence of a faunal exchange across North America

and Europe within the group during the late Jurassic and early Cretaceous.

Public Abstract: Goniopholidids are distant relatives of crocodiles and alligators from the Jurassic and Cretaceous (201-66 mya) of North America and Europe. They are the first in this lineage with a body plan and, presumably, ecological role superficially resembling those of modern crocodylians. The flat, triangular skull and conical teeth typical of goniopholidids resemble those of most living crocodylians and are thought to typify the configuration of a “generalized” semiaquatic ambush predator with a broad prey base. This generalized morphology has caused them to receive little scientific attention historically. Unfortunately, this caused Goniopholididae to be treated as a wastebasket taxon, with any crocodylian relative during the age of the dinosaurs with generalized morphology liable to be referred to the group. Although European goniopholidid systematics have drawn substantial attention in the past two decades, considerably less effort has been directed toward the North American record of the group. This project revises the species-level taxonomy of North American goniopholidids, including a review of existing species and the description of new species. Also, phylogenetic analyses were conducted to help resolve the evolutionary relationships of goniopholidids and their closest relatives. The results of this study reveal novel evolutionary relationships that challenge long-held assumptions about the status and distribution of Goniopholididae, which had a more restrictive Jurassic and expansive Cretaceous distribution in North America than previously believed. Moreover, these results highlight the presence of a faunal exchange across North America and Europe within the group during the late Jurassic and early Cretaceous.

Laut, S., Poapolathep, S., Klangkaew, N., Phaochoosak, N., Wongwaipairoj, T., Badillo, E., Marin, P., Escudero, E., Giorgi, M. and Poapolathep, A. (2025). Pharmacokinetics of carprofen in Siamese crocodiles (*Crocodylus siamensis*). *Research in Veterinary Science* 196 (<https://doi.org/10.1016/j.rvsc.2025.105886>).

Abstract: Carprofen (CAR) is an NSAID commonly used in veterinary medicine that preferentially inhibits cyclooxygenase-2 (COX-2), thereby mitigating inflammation and pain while minimizing adverse effects linked to cyclooxygenase-1 (COX-1) inhibition. This study characterizes the pharmacokinetics of CAR in Siamese crocodiles (*Crocodylus siamensis*) and was conducted at an ambient temperature range of 27-30°C following single intravenous (IV) or intramuscular (IM) administration at 2 mg/kg, and IM administration at 4 mg/kg. Plasma concentrations were determined using a validated high-performance liquid chromatography method with ultraviolet detection (HPLC-UV). Pharmacokinetic parameters were derived using non-compartmental analysis (NCA). After IM administration, CAR exhibited dose-dependent increases in peak plasma concentrations (C_{max} : 4.15 µg/mL at 2 mg/kg; 6.64 µg/mL at 4 mg/kg). The elimination half-life ($t_{1/2\lambda_z}$) was prolonged following IM injection (37.00-40.22 h) compared to IV administration (25.69 h), suggesting flip-flop kinetics. The volume of distribution (Vd) ranged from 0.43 to 0.68 L/kg. The IM bioavailability (F) was calculated as 123.75% at 2 mg/kg and 94.96% at 4 mg/kg, potentially reflecting overestimation due to between-group variability in clearance, absence of a cross-over design, or factors such as analytical variation, vehicle effects, or lymphatic absorption. Plasma protein binding ranged from 73% to 82%. These findings indicate sustained systemic exposure and high bioavailability of CAR in *C. siamensis*, supporting its potential as a long-acting analgesic. Future studies should assess pharmacodynamic responses and therapeutic efficacy in clinical settings to optimize dosing regimens.

Srieng, K., Khun-Chan, S., Mork, T., Chhoen, C., Kong, S.O. and Srun, S. (2025). Implementation of STEM education to enhance wildlife awareness: A study of promoting Siamese crocodile. *Journal of Innovation, Advancement, and Methodology in STEM Education* 2(4): 247-254.

Abstract: The processing of creation Siamese crocodile feature displays the practical knowledge and skills of sculpture concept of science, integration of technology to promote wildlife awareness and sustainability solutions. This study aims to highlight the concept of recreation Siamese crocodile from clay sculpture to promote wildlife awareness based on STEM Teaching and Learning strategies in school setting. The study has developed teaching approach consists of the 7 stages of the Sutaphan and Yuenyong (2019) context-based STEM education approach such as (1) Identification of social issues, (2) Identification of potential solutions, (3) Need for knowledge, (4) Decision-making, (5) Development of prototype or product, (6) Test and evaluation of the solution, and (7) Socialization and completion decision stage. This study showed that the overall of the average student learning activities, critical thinking skill, creativity skill, and ecological sustainable conservation and protection were very high. The findings also provided that the students' performances on conducted activities revealed their problem-solving capacity with significant of incorporation STEM education into real-world projects for scientific way, advanced technology, and environmentally sustainable. Therefore, the STEM Teaching and Learning strategies in school setting should be widely integrate in classrooms.

Harrington, L.A., Elwin, A. and D'Cruze, N. (2025). Viewer perceptions (and misperceptions) of animal-visitor interactions with big cats and crocodilians on YouTube. *Discover Animals 2*: Article number 65.

Abstract: Animal-visitor interactions (AVIs) that involve "touching" captive wild animals are hugely popular, increasingly in-demand, and widely shared on social media. Social media may help raise awareness of conservation, and educate viewers, but the quality of information provided via AVIs varies, as does the treatment of the animals involved. Global standards for AVIs are lacking but various recent national-level codes and regulations call for increasing consideration of animal welfare (particularly for large, potentially dangerous animals). For accredited facilities, World Association of Zoos and Aquariums guidelines demand "respect" for the animals involved, and that AVIs are accompanied by animal welfare and conservation messaging. We described, and analysed the response to, 78 YouTube videos showing AVIs with captive "big cats" or crocodilians. Videos comprised predominantly promotional material, coupled with messaging that touched on conservation and animal welfare issues but lacked detail, and, in some cases, was potentially misleading. Both the videos themselves and viewer response to videos (assessed on the basis of video comments) revealed superficial "respect" for the animals, but there was little apparent appreciation of the "wildness" of the animals or of their place in the natural world. The sentiment of viewer comments was variable, but positive on average. We conclude that social media has considerable potential to perpetuate a potentially damaging perception of wild animals being "safe" and "protected" in captivity, where people seem to desire an unnatural relationship with wild animals and appear to be largely unaware of the welfare implications for the animals involved.

Byrne, P.J., Legendre, L.J., Echols, S., Farmer, C.G., Wu, Y-H. and Huttenlocker, A.K. (2025). Diverging trends in erythrocyte size elucidate cardiovascular evolution in stem dinosaurs and crocodilians. *Proceedings of the Royal Society B. Biological Sciences* 292(2054) (doi: 10.1098/rspb.2025.1286).

Abstract: Red blood cell (RBC) size constrains the rate of diffusion of gases between (i) the environment and the capillary beds of the gas exchanger and (ii) the blood and organs. In birds, small RBCs with a high surface area to volume ratio permit a high O₂ diffusion capacity and facilitate sustained, vigorous exercise. Unfortunately, our knowledge of archosaur cardiovascular evolution is incomplete without fossilized RBCs and blood vessels. However, muscle capillary diameters closely match RBC width and, importantly, these microvessels leave a signature in bone in the fossil record.

Here, we ask: do fossilized, histological indicators of RBC size, combined with phylogenetic information, support divergent patterns of cardiovascular evolution in Mesozoic crocodile-line and bird-line archosaurs? Building on a published dataset, we used vasculolacunar histometrics and phylogeny to retrodict RBC sizes in 20 extinct and 20 extant tetrapods. Our results indicate decreases in RBC size within the archosauromorph *Prolacerta* and in bird-line archosaurs (Aves). Conversely, crocodile-line archosaurs (Pseudosuchia) that transitioned to an aquatic environment demonstrated increases in RBC size. These patterns offer an opportunity to probe physiological hypotheses regarding archosaur cardiovascular evolution and can explain, in part, the contrasting aerobic capacities of extant species in these two major archosaur lineages.

Sanchez, R.S., Manzano, A., De Los Angeles Lazarte, M. and Abdala, V. (2025). Knee tissue diversity and evolution in different reptile taxa. *Journal of Anatomy* (doi: 10.1111/joa.70039).

Abstract: The knee joint plays a critical role in tetrapod locomotion, yet its developmental trajectories and anatomical diversity remain underexplored outside of model taxa. Here, we examine knee joint development in three representative reptilian lineages, *Phrynosoma hilarii* (Testudines), *Caiman latirostris* (Crocodylia), and *Columba livia* (Aves), and compare them with adult knee morphology in two squamate species, *Cercosaura parkerii* and *Hemidactylus mabouia*. Using histological series spanning key developmental stages, we document patterns of ossification, meniscus formation, cartilage composition, and sesamoid presence. All taxa share delayed epiphyseal ossification and early ligament and meniscus differentiation. However, they differ in meniscal shape, tissue composition, tibial plateau morphology, and sesamoid expression. Notably, *P. hilarii* lacks a patella but seems to present both a fabella and a cyamella; *C. latirostris* and *C. livia* exhibit distinct patellar configurations, with *C. livia* displaying a multi-element patellar complex. Cartilage thickness and composition also vary, with thinner cartilage and a narrower interarticular zone observed in *C. livia*. Ancestral state reconstruction supports a single origin of the patella within Reptilia and highlights multiple instances of anatomical convergence. These findings underscore the functional diversity of the reptilian knee and provide a developmental framework for interpreting the evolution of limb joint morphology across tetrapods.

Pritz, M.B. (2025). Development of the dorsal thalamus in a reptile: identification of subdivisions and their associated nuclei. *International Journal of Developmental Biology* (doi: 10.1387/ijdb.250018mp).

Abstract: How the dorsal thalamus of amniotes (reptiles, birds, and mammals) is organized remains an important but incompletely answered question. Identification of meaningful subdivisions would greatly aid in its understanding. Because the dorsal thalamus is more simply organized during development, studies have examined this structure during embryogenesis. Most reports using this approach have examined the developing dorsal thalamus in mammals and birds. Only rarely has the development of the dorsal thalamus been investigated in reptiles. Regardless, any approach to identify subdivisions, the presumed building blocks of the dorsal thalamus, should include representatives of all three classes of vertebrates. To fill this gap in knowledge, the development of the dorsal thalamus was investigated in *Alligator mississippiensis*, a member of the reptilian group most closely related to birds. As the first detailed study of its kind, cytoarchitecture and calretinin expression were used to examine dorsal thalamus development. Three subdivisions, termed tiers, and the individual nuclei originating from each tier, were identified. These three tiers were similar to the subdivisions found in birds and, to a limited extent, in mammals. Taken together, these early subdivisions may represent the common building blocks of the dorsal thalamus and provide clues to understand how evolution has sculpted this structure in amniotes.

Tsai, S.H.-Y., Froelich, B. and van Hoek, M. (2025). The synthetic peptide GATR-3 shows significant antibacterial activity against shell-fish and oyster bacteria *Vibrio vulnificus* and *Vibrio parahaemolyticus*. Available at SSRN: <https://ssrn.com/abstract=5448128> or <http://dx.doi.org/10.2139/ssrn.5448128>.

Abstract: Among Gram-negative pathogens, *Vibrio vulnificus* and *Vibrio parahaemolyticus* are of particular concern because of severe human disease, rising antimicrobial resistance, and biofilm formation. Antimicrobial peptides (AMPs) are promising alternatives owing to rapid bactericidal, membrane-disruptive activity and a low propensity for resistance. GATR-3 is a rationally designed α -helical AMP derived from a cryptic alligator peptide; it eradicates *Acinetobacter baumannii* biofilms and shows a favorable therapeutic index. We evaluated GATR-3 against *Vibrio* isolates under two conditions: (i) MIC testing in Mueller-Hinton broth and (ii) 3-hour bactericidal EC50 assays in 10 mM phosphate buffer, 1% NaCl. GATR-3 exhibited low MICs for *V. vulnificus* MO6 (8 $\mu\text{g/mL}$) and *V. parahaemolyticus* SAK11 (8 $\mu\text{g/mL}$), intermediate activity for *V. vulnificus* JY1701 (16 $\mu\text{g/mL}$), and a higher MIC for *V. parahaemolyticus* NY477 (32 $\mu\text{g/mL}$). By MIC, activity often exceeded Mastoparan-AF and far exceeded LL-37, which was markedly salt/cation sensitive. In EC50 assays, GATR-3 was highly potent against *V. vulnificus* (3.46×10^{-3} – 1.17×10^{-3} μM) and active against both *V. parahaemolyticus* strains; LL-37 and Mastoparan-AF were relatively more active against *V. parahaemolyticus*. Some *Vibrio* (*V. mimicus*, *V. cholerae*) were less susceptible by MIC. Overall, GATR-3 retained activity in cation-containing media, indicating cation tolerance. These results collectively demonstrate that GATR-3 displays robust bactericidal activity against clinically relevant *Vibrio* species under both MIC and EC50 conditions and generally outperforms LL-37 and Mastoparan-AF in broth. Its potency in broth, tolerance to physiological cations, and prior safety profile support advancement of GATR-3 as a candidate - potentially as a topical adjunct - for treatment of *Vibrio* wound infections in humans.

Gonzalez, S.C., Tigertail, A., Backhouse, P.N. and van der Heiden, C. (2025). Account of inland dispersal of an American crocodile (*Crocodylus acutus*) and first record in Hendry County, Florida. Southeastern Naturalist 24(3): N38-N42.

Abstract: *Crocodylus acutus* (American crocodile) in the United States primarily occupies coastal environments in southern peninsular Florida. While the species is capable of long-distance dispersal and shorter seasonal movements, penetration of interior freshwater systems has rarely been documented. This account describes a record distance dispersal event inland by an American crocodile in Florida and documents the first occurrence in Hendry County and the Big Cypress Seminole Indian Reservation, FL. The dispersal distance was corroborated by discerning a scute-clip pattern matching mark-recapture records at the University of Florida Croc Docs Lab and identifying the individual's hatching location. The individual was observed in an agricultural canal system for several weeks until staff were unable to locate it.

Palazuelos, A., Narváez Padilla, I., Hernández, J.M. and Murelaga, X. (2025). Crocodylian remains from the Early Miocene site of Monte la Pila, Ebro Basin, Spain. Spanish Journal of Palaeontology 40(2) (<https://doi.org/10.7203/sjp.30395>).

Abstract: Abundant crocodylian fossil remains from the Early Miocene locality of Monte la Pila, which have not been studied previously, are described here. This fossil site is located in the municipality of Lardero, a few kilometers from Logroño (La Rioja, Spain), in the Ebro Basin (late Aquitanian-early Burdigalian). The recovered material includes 121 disarticulated and isolated specimens. Despite the incompleteness of the remains, certain diagnostic features within the genus *Diplocynodon* are unambiguously recognized in the studied material. Based on

the identification of some of these characters, the material has been assigned to *Diplocynodon* sp. This assignment confirms the presence of this taxon in the late Aquitanian-early Burdigalian of the Iberian Peninsula. It also provides valuable data on the anatomical characteristics and distribution of the crocodile fauna on the Iberian Peninsula during the Lower Miocene.

Resumen: Se describen abundantes restos fósiles de cocodrilos procedentes del yacimiento de Monte la Pila, del Mioceno inferior, que no han sido estudiados previamente. Este yacimiento está situado en el término municipal de Lardero, a pocos kilómetros de Logroño (La Rioja, España), en la Cuenca del Ebro (Aquitaniense superior-Burdigaliense inferior). El material recuperado incluye 121 ejemplares desarticulados y aislados, pero a pesar de su naturaleza fragmentaria, existen ciertos rasgos diagnósticos dentro del género *Diplocynodon* que pueden ser evaluados inequívocamente en el material estudiado. En base a la identificación de alguno de estos caracteres, se refiere el material a *Diplocynodon* sp. Esta asignación confirma la presencia de este taxón en el Aquitaniense superior-Burdigaliense inferior de la península ibérica, y ofrece valiosos datos sobre las características anatómicas y la distribución de la fauna de cocodrilos en la península ibérica durante el Mioceno Inferior.

Mestre, A.P., Leiva, P.M.L., Iungman, J.L., Viotto, E.V., Amavet, P.S., Lábaque, M.C., Piña, C.I., González, M.A. and Simoncini, M.S. (2025). Flaxseeds and thymol feed as dietary supplementation for *Caiman latirostris*: effects on immune status, meat quality and intestinal morphology. Tropical Animal Health and Production 57: 378.

Abstract: Adequate nutrition is crucial for development, growth, and optimal immune function. Consuming long-chain n-3 polyunsaturated fatty acids (PUFAs) in breeding animals reduces inflammation and enhances growth and immune health. We selected 15 juvenile caimans and, for 35 days were fed with experimental diets: Control Diet (C), Control + Flaxseed (CF), and Control + Flaxseed + Thymol (CFT). Then, aliquots of blood were collected for total leukocyte count, leukocyte profile, heterophils/lymphocytes ratio, and natural antibodies determination. Also, we obtained meat and tissue samples from each individual. Caiman meat obtained with the addition of flaxseed (CF) achieved an increase in C18: 3 n-3 concerning all dietary treatments, and both the CFT treatment and CS showed increases in C22: 6 and total n-3 levels, as well as a decreased n-6/n-3 ratio regarding C. Total leukocytes and lymphocytes, monocytes, eosinophils, and basophils populations were lower for animals fed with enrichment diets than C. Seemingly, the favorable serum fatty acid pattern, reflected by the substantially lower ratio of n-6 to n-3 fatty acids, would beneficially affect animal health. Higher values of natural antibody titers were found in animals fed with enriched diets related to controls, which could suggest an improvement in the immune system of these animals. Dietary supplementation with both CF and CFT revealed high levels of plasma antioxidant capacity. Our study shows improvements in meat quality and caiman health, through enhanced antioxidant capacity and immune function. The dietary supplements adapted well without disrupting digestion, making long-chain n-3 PUFA-enriched diets a viable option for optimal caiman health.

Barboza, R.S.L., Negromonte da Silva, M.G., Rodrigues de Souza Neto, C.F., Mascarenhas-Junior, P.B., Monteiro Caminha, M., dos Santos, E.M. and de Sousa Correia, J.M. (2025). First record of twin hatchlings in *Caiman latirostris* (Daudin, 1802) in the Atlantic Forest, Brazil. Journal of Environmental Analysis and Progress 10(3): 176-180.

Abstract: Embryo twinning is quite common in reptiles, possibly due to atypical incubation conditions, although few specimens hatch and reach adulthood, especially in the wild. In crocodilians, eggs with double yolk or monozygotic twins are usually produced by young females and laid at the beginning or end of oviposition. This

scientific note aimed to report the first record of twinning caimans in the Brazilian Atlantic rainforest from a *Caiman latirostris* clutch, found during the 2021 nesting season in Tapacurá Ecological Station. Both twins were healthy and without deformities, just slightly lighter and smaller than the average of the nest. However, this may compromise their survival until sexual maturity, as larger hatchlings tend to have a higher survival rate than smaller ones. This is despite nesting females reacting more to the vocalization of smaller specimens, which promotes more maternal care. This study advances the understanding of crocodilian reproductive biology by documenting the first record of wild *C. latirostris* twins, highlighting the crucial role of field research in uncovering ecological, genetic, physiological, and evolutionary insights.

Pritz, M.B. (2025). Later development of a vertebrate telencephalon: Time of origin of identified subdivisions, derived nuclei, and associated tracts. *Brain Mechanisms* (<https://doi.org/10.1016/j.bramec.2025.202520>).

Abstract: Most studies examining the development of the telencephalon have focused on mammals. Similar reports on reptiles and birds are few and most are incomplete. Without comparable analyses among amniotes, features that are shared and those that are new cannot be determined. To fill this gap in knowledge, the later development of the telencephalon was investigated in *Alligator mississippiensis*, a member of the group of reptiles most closely related to birds. The timing, identification, and transformation of the major brain compartments that occurred during this time in embryogenesis were investigated. These divisions were: septum, cortex, dorsal ventricular ridge, basal nuclei, and the accumbens area. Although the pallial thickening was identified and its development documented, its origin remained incompletely defined. The lack of comparable studies and disagreement in telencephalic homologies make comparisons between the present results and those in other amniotes problematic. Nevertheless, the findings of this analysis provide a blueprint for future studies. Among these are investigations of neural circuitry and additional features of individual brain areas. Together with the present results, these future data will provide a firm basis for understanding the development and evolution of the telencephalon in amniotes.

Davhana, F., Humphries, M., Hunter, G., Seoraj-Pillai, N. and Combrink, X. (2025). Exposure of sub-adult Nile crocodiles (*Crocodylus niloticus*) to extreme lead concentrations: A 48-week experimental study with implications for wild populations. *Archives of Environmental Contamination and Toxicology* (doi: 10.1007/s00244-025-01159-0).

Abstract: Lead (Pb) poisoning poses a significant threat to wildlife. A primary cause of Pb poisoning is the unintentional ingestion of Pb ammunition and fishing weights, which are still used for hunting and fishing in numerous regions globally. While the effects of Pb poisoning on birds and mammals are well established, impacts on reptiles are less well documented and difficult to assess under field conditions. In this study, we investigated the effects of extreme Pb exposure on captive sub-adult Nile crocodiles (*Crocodylus niloticus*; n= 18). We administered Pb dosages in the form of fishing weights (54-215 g) and monitored changes in blood lead concentrations, packed cell volumes, urine Pb concentrations, growth, and body condition over a 48-week period. Crocodiles exhibited a remarkable tolerance to exceptionally high Pb exposure over the duration of the study. Despite the lack of obvious clinical signs of Pb toxicity, elevated BPb concentrations were linked to lower PCVs, indicating anaemia across all treatment groups by week eight. However, crocodiles showed a sustained erythropoietic response which may be contributing to their resilience to acute Pb toxicity. While Pb exposure did not significantly affect body condition, it was associated with a discernible reduction in weight gain over the duration of the study. Our estimation of a 5.8-7.3-year timeframe for complete dissolution of the Pb fishing weights in the experimental

crocodiles' stomachs carries significant implications for wild populations, which are likely to be exposed to Pb for far longer than 48-week duration of this study.

Hernandez-Gonzalez, C.F. (2025). Evaluación genética de las poblaciones naturales del Caimán Aguja (*Crocodylus acutus*) del Caribe y Alto Magdalena y una población *ex situ*. MSc thesis, Universidad Nacional de Colombia, Bogotá, Colombia.

Resumen: El Caimán Aguja (*Crocodylus acutus*) en Colombia ha experimentado importantes disminuciones en su población debido a la sobreexplotación histórica y la pérdida de hábitat, lo que ha generado la necesidad de estrategias de conservación específicas. Esta tesis presenta un análisis genético integral de las poblaciones silvestres y un programa de reproducción en cautiverio de *C. acutus* en Colombia para evaluar la diversidad genética, la estructura poblacional y la conectividad, con implicaciones para los esfuerzos de cría en cautiverio y reintroducción. Se analizaron datos genéticos de poblaciones silvestres de diversas regiones clave y de un grupo de individuos parentales del zoológico Nelly Sierra & CIA utilizando 14 marcadores microsatélites. Los resultados revelaron que existen al menos ocho grupos genéticamente distintos dentro de Colombia, con un flujo génico mínimo y baja diversidad genética entre las poblaciones. Los tamaños efectivos de la población fueron alarmantemente pequeños ($N_e = 2-34$), lo que indica un alto riesgo de sufrir los efectos de la deriva génica. El estudio también examinó la composición genética de la población cautiva, la cual mostró una mezcla de dos poblaciones silvestres distintas, lo que resalta preocupaciones sobre la endogamia y la pérdida de diversidad genética. Se desarrolló una herramienta de apoyo a la toma de decisiones para optimizar las estrategias de cría seleccionando cruces óptimos, asegurando que los individuos cautivos mantengan su integridad genética y sean aptos para la reintroducción en sus respectivas poblaciones silvestres. Esta investigación proporciona una base para refinar las unidades de conservación y mejorar la gestión de la cría en cautiverio para potenciar la recuperación de *C. acutus* en Colombia, garantizando la sostenibilidad genética a largo plazo tanto en el medio natural como en cautiverio.

François, C., Campos, Z. and Marquis, O. (2025). West African crocodiles are active thermoregulators. hal-05267285.

Abstract: Our earlier investigation of body temperature in the dwarf caiman (*Paleosuchus palpebrosus*) has shown that this species is a thermoconformer and that this behaviour is associated with habitat niche-specific body-size reduction. In contrast larger, habitat-generalist caiman species are thermoregulators. This led us to investigate the West African crocodile (*Crocodylus suchus*) which is a rather small-sized species that has recently been identified as distinct from the Nile crocodile (*Crocodylus niloticus*), and at least in north-west Africa is a niche specialist inhabiting permanent mountain rock pools (gueltas) and flood plains (tâmoûrts). We compared daily body temperature variations of captive *C. suchus* and *C. niloticus* in Morocco and found that despite a smaller size and habitat specialism, *C. suchus* is not a thermoconformer but like *C. niloticus* is an active thermoregulator with marked daily body temperature oscillations. In this regard, we suggest that smaller size *per se* is not related to a switch from active thermoregulation to thermoconformity in crocodiles.

Smaga, C.R. (2025). Eco-Evolutionary Dynamics of Developmental Plasticity in the American Alligator, a Species with Temperature-Dependent Sex Determination. PhD thesis, The University of Georgia, Athens, Georgia, USA.

Abstract: Developmental plasticity, the irreversible modification of phenotypes in response to the developmental environment, carries critical implications for ecology, evolution, and conservation. In some cases, responses to the developmental environment can

be beneficial, increasing organismal fitness. However, when developmental environments are altered by human activities, normal developmental trajectories can become disrupted, resulting in negative fitness outcomes. Despite their significance, however, the ecological and evolutionary dynamics of adaptive and disruptive plasticity in natural systems are not well understood. In this dissertation, I utilize unique attributes of the American alligator (*Alligator mississippiensis*) to integrate developmental plasticity into eco-evolutionary contexts, seeking to connect proximate mechanisms to ultimate outcomes in nature. In Chapter 2, I focus on the disruptive effects of environmental contaminants, testing how maternally deposited hormones and contaminants contribute to gonadal gene expression. I provide novel insight into how reproductive development is altered in contaminated populations and support a non-trivial role of maternally deposited hormones in driving offspring sexual development. Chapters 3-6 center on plasticity in response to incubation temperature and temperature-dependent sex determination (TSD). In Chapter 3, I assess the evolutionary potential for developmental plasticity to drive morphological differences across populations, revealing variable responses to incubation temperature across northern and southern population pairs that are associated with phenotypic divergence. Building off these findings, I then investigate divergence in the molecular pathways associated with TSD across those populations in Chapter 4. My results support unique evolutionary processes acting on TSD genes and highlight several candidate genes for its adaptive evolution. In Chapter 5, I identify time-dependent relationships between incubation temperature, hatchling phenotypes, and post-release traits that contribute to temperature-dependent survival outcomes supported to drive the adaptive evolution of TSD. Finally, in Chapter 6, I evaluate the use of blood gene expression patterns to non-lethally sex hatchling alligators. I demonstrate promising potential for using gene expression to predict natural sex ratios in TSD species, which will aide in incorporating TSD into ecological frameworks and assessing population responses to environmental change. When viewed altogether, my dissertation contributes novel mechanistic, ecological, and evolutionary insights into developmental plasticity as it occurs in nature.

Londoño, N., Sedano-Cruz, R.E. and Giraldo, A. (2025). Genetic characterization of *Caiman crocodilus* (Crocodylia: Alligatoridae) on Gorgona Island, Colombia. *Biology* 14(9): 1227.

Abstract: This study examines the genetic variation and structure of the spectacled caiman (*Caiman crocodilus*) on Gorgona Island, Colombia, compared to continental populations. We analyzed 178 partial Cytochrome b gene sequences, most of which were obtained from GenBank, and identified 23 haplogroups, with five of these specifically found on the Island. Phylogenetic analysis using maximum likelihood placed *C. crocodilus*, including the Gorgona Island population, in a distinct monophyletic group. Genetic structure analysis identified two main clusters, with Gorgona Island caimans primarily assigned to the Trans-Andean cluster. The haplogroup network illustrates the two major groups, with a maximum of 12 mutational steps between them. Additionally, Tajima's D statistic suggests an excess of rare alleles in the spectacled caiman. Genetic differentiation across regions suggests historical isolation, likely shaped by geographical barriers and limited gene flow. The distinct genetic patterns of island populations highlight their disparity in terms of evolutionary dynamics and conservation importance. Further genomic analysis is recommended to explore demographic history. Conservation strategies should prioritize the maintenance of genetic diversity to mitigate the effects of isolation, while also incorporating insights from the species' biogeographic history. Our findings highlight the unique contribution of the small population in Gorgona Island to the species' spatial genetic structure.

Castillo-Contreras, A., González-Jáuregui, M., Lázaro-Bello, D. and Paredes-Trujillo, A. (2025). Parasites of *Crocodylus moreletii* (Reptilia: Crocodylidae) across habitats with different levels of

anthropogenic disturbance in southeastern Mexico. *Ecohealth* (doi: 10.1007/s10393-025-01759-1).

Abstract: Between July 2021 and July 2022, a cross-sectional parasitological survey was conducted on 97 free-ranging *Crocodylus moreletii* individuals across four Mexican states: Campeche, Quintana Roo, Yucatán, and Tabasco. Sampling was conducted out at 12 sites representing varying degrees of anthropogenic disturbance, categorized as conserved, moderately disturbed, and highly disturbed habitats. Parasitological analysis identified seven nematode taxa: *Contracaecum* sp. type 1, *Contracaecum* sp. type 2, *Terranova crocodili*, *Micropleura* sp., *Dujardinascaris helicina*, *Eustrongylides* sp., and *Goezia nonipapillata*, belonging to four families: Ascarididae, Anisakidae, Micropleuridae, and Dioctophymidae. The most prevalent species were *Contracaecum* sp. type 1 (51%), followed by *Contracaecum* sp. type 2 (41%) and *D. helicina* (28%), while *Eustrongylides* sp. showed the lowest prevalence (4.1%). Parasite composition differed significantly among sites with varying levels of anthropogenic disturbance (PERMANOVA, $p < 0.05$). *Contracaecum* sp. type 1 reached a prevalence of 100% in moderately disturbed habitats. Additionally, *Contracaecum* sp. type 2, *D. helicina*, and *T. crocodili* exhibited moderate to high prevalence across all surveyed localities, irrespective of habitat disturbance levels. *Eustrongylides* sp. and *G. nonipapillata* were found exclusively in urban environments. These findings highlight the importance of monitoring host-parasite dynamics across environmental gradients of anthropogenic impact to better assess zoonotic risks and promote both public and wildlife health.

Bekale Obame, A.L.L., Mbehang Nguema, P.P., Lendamba, R.W., Makanga, B.K., Obague Mbeang, J.C., Ndong Atome, G.R. and ZINGA KOUMBA Christophe Roland (2025). Presence of *Salmonella enterica* subsp. *arizonae* in bushmeat from the Mulundu department of the Ogooué-Lolo province, Gabon. *International Journal of Current Science Research and Review* 8(9): 4825-4834.

Abstract: In Africa, most investigations on *Salmonella* spp. have focused on isolates from humans, poultry, and domestic animals, whereas studies on wild terrestrial mammals remain limited. Consequently, the occurrence of *Salmonella* spp., particularly *Salmonella enterica* subsp. *arizonae*, in African wildlife is underreported. In Gabon, there is little to no information on the presence of antimicrobial-resistant *S. enterica* subsp. *arizonae* in bushmeat. This study aimed to isolate and characterise antibiotic resistance in *S. enterica* subsp. *arizonae* recovered from wildlife in Mulundu department, Lastoursville, Gabon. A total of 147 bushmeat samples representing 20 animal species were collected. After bacterial culture and identification, 23 samples (15.65%) from eight species were positive for *S. enterica* subsp. *arizonae*. The distribution of isolates was as follows: Peters' duiker (34.78%), blue duiker (26.09%), African wood owl (13.04%), moustached monkey (8.69%), pangolin (4.35%), genet (4.35%), crocodile (4.35%), and African brush-tailed porcupine (4.35%). Resistance profiles revealed the presence of multidrug-resistant strains. One isolate from a moustached monkey showed resistance to three antibiotic families, namely sulfonamides (sulfonamide), fluoroquinolones (ofloxacin), and β -lactams (cefoxitin, ampicillin). Another isolate from a Peters' duiker exhibited resistance to six antibiotics: cefotaxime, cefepime, sulfonamide, ertapenem, cefoxitin, and ampicillin. Additionally, isolates from Peters' duiker ($n = 3$), blue duiker ($n = 2$), wood owl ($n = 1$), genet ($n = 1$), and pangolin ($n = 1$) were resistant to ertapenem, cefoxitin, and ampicillin. These findings demonstrate the circulation of *S. enterica* subsp. *arizonae* in wildlife consumed as bushmeat in Gabon. This represents a potential source of antimicrobial-resistant pathogens for human populations relying on game meat.

Sung, H.W. (2025). Salt-Crossed Lovers: A Genomic Investigation of Adaptive Potential in Hybridizing Saltwater and Freshwater Mesoamerican Crocodiles (*Crocodylus acutus* and *Crocodylus*

moreletii). PhD thesis, University of Hawai'i at Manoa, Honolulu, Hawaii, USA.

Abstract: Hybridization presents both a conservation challenge and an evolutionary opportunity - particularly where natural hybrid zones intersect with human-modified landscapes. Recent advances in genomics have reshaped our understanding of hybridization, revealing its role in facilitating adaptation and diversification, especially in dynamic environments. In this dissertation, I investigate the evolutionary and conservation implications of naturally occurring hybridization between two Mesoamerican crocodile species in Belize: *Crocodylus acutus* (American crocodile) and *Crocodylus moreletii* (Morelet's crocodile). Using reduced-representation genomic data, I first characterized population structure, admixture dynamics, and demographic history. These analyses revealed widespread admixture, the presence of two genetically distinct *C. acutus* lineages in Belize, and evidence of both ancient and ongoing hybridization. Building upon this foundation, I examined the genetic architecture of salinity tolerance - a key ecological trait delineating species boundaries. Through genome-wide association scans (GWAS), I identified two candidate loci associated with environmental salinity gradients, including a previously uncharacterized sodium channel gene (SCN5A-like) in archosaurs. These findings suggest that introgressed variants may contribute to physiological adaptation in hybrid populations. Finally, I assessed the role of adaptive introgression in shaping hybrid genomes. By integrating genome-wide scans for recent positive selection with tests of interspecific gene flow and window-based introgression analyses, I identified introgressed genomic regions under selection enriched in genes linked to environmental stress response, osmoregulation, and metabolism. Notably, introgression patterns were asymmetric, with directional gene flow shaping distinct genomic regions through historical versus recent admixture. Together, these findings suggest that hybridization in crocodylians is not merely a consequence of anthropogenic disturbance but may serve as a mechanism of evolutionary innovation. This work deepens our understanding of hybridization in long-lived vertebrates and underscores the importance of recognizing hybrids as valuable contributors to biodiversity. By integrating genomic and ecological perspectives, this dissertation aims to inform conservation strategies for species affected by hybridization, particularly those subject to uneven legal protections and complex evolutionary trajectories.

Chatterjee, A.K. (2025). The 19th Century Colonial Archetype of the Indian Crocodile: The aquapelagic roots of Rudyard Kipling's 'Muggers'. *Shima* 19(2): 234-256.

Abstract: This article studies the archetype of the Indian crocodile (also called by the British as 'mugger,' derived from the Hindi word *magarmachh*, meaning aquatic monster) in late-19th century colonial anthropological and zoological accounts. These constitute a vital archive of imperial views of environmental others, especially within Indian lacustrine contexts. I attempt to explore the historicity of the crocodile-archetype - that Rudyard Kipling, for instance, used in his famous story 'The Undertakers' (1894) as a scapegoat for overcoming the traumas of the 'sepoy Mutiny' or India's First War of Independence, of 1857 (which saw fierce battles between the British and Indian rebels and revolutionaries on the plains). In taking Kipling's story as the point of departure, this article tries to trace the evolution of the crocodile archetype through its appearances in popular accounts in Victorian periodicals, sporting, adventure, and anthropological literature, in their representations of Indian lacustrine contact zones. What makes the colonial archetype of the crocodile Kiplingesque is the author's historical coupling of it with the gory events of 1857 (as they were represented in British popular imagination) and India's lacustrine settings, as if to relocate the site of Anglo-Indian conflict from the plains to aquatic zones, on the one hand, and the internecine conflict to an inter-species conflict (that is, from British versus Indian to Anglo-Indian versus crocodiles), on the other hand. This ideology of representation of Indian crocodiles in colonial hunting narratives ended up obscuring

an emerging geological narrative of the Indian subcontinent's deep past and traces of the hypothetical supercontinent, Gondwana, that British geologists had found in India. Since a holistic understanding of crocodilian origins was key to understanding India's geological deep pasts - that could have created an aquapelagic understanding of the crocodile as opposed to its diabolical image in Victorian popular imagination - demonising the crocodile hurt India's intellectual interests, too.

Konzing, L., Davou, J.A., Tekki, I.S., Hambolu, S.E., Zhakom, P.N., Haruna, R.S., Livinus, C.J., Lombin, P., Duwong, R.K., Odita, C.I., Maurice, N.A., Meseko, C.A. and Ngulukun, S.S. (2025). Laboratory-based surveillance of rabies in animals in the middle belt of Nigeria: A 5-year retrospective study. *Nigerian Veterinary Journal* 46(2):10-18.

Abstract: Laboratory-based surveillance has proven to be effective for rabies prevention and control since, any claim of rabies absence is dependent on confirmatory laboratory data reports. This study aims to determine the cases of rabies in animals within the states in the middle belt region of Nigeria based on available 5 years laboratory records (2019 to 2023) obtained from the National Veterinary Research Institute (NVRI) Vom, Plateau State. Data obtained from brain samples of animals processed for rabies confirmatory diagnosis were retrieved from the archived records of the Rabies Laboratory and analysed using descriptive statistics and results were presented in tables and charts. A total of 725 animal brain samples were submitted to the Laboratory for diagnosis. The Majority (93.9%) of the samples were from the canine species, also feline (2.2%), porcine (0.7%), monkey (0.1%), equine (0.1%), ovine (0.6%), bat (0.6%), caprine (0.8%), crocodile (0.3%), lion (0.1%) and bovine (0.6%) species. The result showed that of the 725 samples submitted, 430 (59.3%) tested positive for rabies and there were dog bite cases involving 497 people from some states of the middle belt of Nigeria. It is recommended that there should be additional Laboratory for testing rabies samples in all the states in the middle belt of Nigeria, to encourage the submission of animal brain samples for rabies diagnosis which will provide information to enhance further control, prevention and possible eradication of rabies by the year 2030.

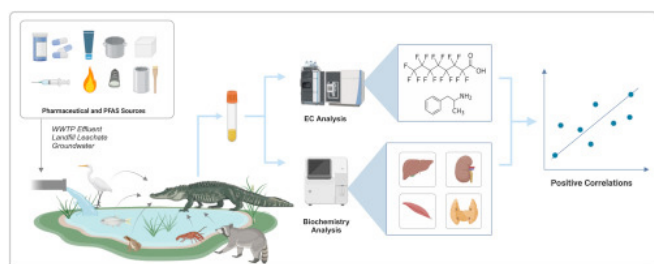
Pyron, R., Moura, M., Bowie, R., Brito, S., Ceron, K., Colston, T., Esselstyn, J., Guedes, J., Guralnick, R., Lima, H., Mooers, A., Moroti, M., Paiva, M., Pennell, M., Pirani, R., Souza, J., Tonini, J., Upham, N., Xavier, J.P. and Jetz, W. (2025). Anthropocene imperilment of ancient diversity and evolutionary potential in terrestrial vertebrates. *Research Square* (<https://doi.org/10.21203/rs.3.rs-7556378/v1>).

Abstract: The ecological and evolutionary consequences of ongoing extinction episodes remain poorly understood, despite mounting evidence of global biodiversity loss. To assess how human activities are reshaping tetrapod evolution, we estimate species-level extinction probabilities ('pEX') over the next ~50-500 years using time-calibrated phylogenies, 35 ecological and environmental attributes⁹, and current-day, expert-assessed threats for 33,281 terrestrial vertebrates. We find a critical, divergent association between extinction risk and macroevolutionary patterns: in birds, lizards, and snakes, both evolutionary distinct and rapidly diversifying lineages are most imperiled; while in amphibians and mammals, threat is concentrated in less distinct and slowly radiating groups. Overall, species with high fecundity, intermediate body sizes, and broad geographic ranges are more likely to persist through the ongoing extinction crisis. Without intervention, current-day threats alone suggest a 15% decline (~5000 extinctions) in species richness and a 16% loss in median speciation rate from 0.11 to 0.094 lineages per million years within the next 500 years. Notably, mammals are projected to experience the largest declines in future speciation potential, despite lower overall imperilment than turtles, crocodilians, or amphibians. Across tetrapods, projected evolutionary distinct extinctions are concentrated in tropical regions,

whereas faster-radiating lineages face widespread risk across deserts, tropical islands, and temperate zones. These results uncover ecological and evolutionary drivers of the ongoing reorganization of Earth's biodiversity, underscoring the urgent need for coordinated conservation efforts to preserve both deep evolutionary history and future potential for evolutionary responses.

Umeki, Y., Nolen, R., Hala, D. and Petersen, L.H. (2025). Evaluation of emerging contaminants and biochemical parameters in the blood plasma of wild American alligators (*Alligator mississippiensis*). Environmental Research (<https://doi.org/10.1016/j.envres.2025.123004>).

Abstract: Pollution by pharmaceuticals and industrial chemicals has received increased attention due to their environmental persistence and ecotoxicity as emerging contaminants (ECs). American alligators (*Alligator mississippiensis*) are top predators in the coastal aquatic ecosystems of the Gulf of Mexico and are a sentinel species for ecosystem health due to their longevity and high trophic position. However, knowledge on the extent of ECs exposures and likely health impacts on alligators is scarce. This study measured select ECs and blood biochemistry parameters in alligator plasma opportunistically sampled at the Rockefeller Wildlife Refuge in southwest Louisiana. The analysis showed the prominent occurrence of 6 ECs in the plasma: amphetamine (AMP), atenolol (ATN), ketoprofen (KTP), naproxen (NPR), nicotine (NCT), and perfluorooctane sulfonate (PFOS). AMP and PFOS were most prevalently detected in the plasma samples (95% and 100% detection frequency, respectively), and exhibited the highest concentrations (mean $\pm$ SEM; AMP: 7.05 ± 3.02 ng/mL, PFOS: 5.95 ± 0.57 ng/mL). The detection of the other ECs ranged from 46-69% and with mean concentrations approximately an order of magnitude lower than that of PFOS or AMP. While the biochemistry parameters were all within physiologically acceptable ranges, partial redundancy and correlation analyses suggested positive correlations between the total number of detected pharmaceuticals, ATN, and PFOS, with biochemical parameters associated with liver, kidney, and muscle injury; and endocrine disruption. This study reports on the exposure of alligators to ECs and identifies likely biomarkers of exposure and adverse effects.



Ditchkoff, S.S. and Belsare, A.V. (2025). Much ado about modeling: Why fieldwork should remain the soul of wildlife ecology and management. Wildlife Society Bulletin 49: e1608.

Abstract: Models have become an integral component of wildlife conservation and management, and lie at the foundation of decision-making in our field today. Yet, like too much of anything, there are risks with their overuse. Herein, we argue that despite their value, our increasing reliance on, and incorporation of, models into our data analysis, education of future wildlife professionals, and development of management decisions has inherent risks. We believe that increased reliance on models has resulted in a detachment from the species and systems that we model, which threatens the quality of our science and, ultimately, decision-making. The impact of models, both pros and cons, on the wildlife field should be an often-discussed topic at wildlife conventions and within research agencies and academic institutions.

Singh, T.K.A., Khoo, G., Maulud, K.N.A., Mohamed, K.A. and Ong, A.H.K. (2025). Genetic diversity of *Tomistoma schlegelii* in Malaysia using microsatellite and mitochondrial DNA markers. Scientific Reports 15: 34427.

Abstract: The rising incidence of human–crocodile conflict involving the endangered Sunda gharial, *Tomistoma schlegelii*, has led to a growing number of wild-caught individuals being placed in conservation centres and zoos. But the genetic diversity and coancestry of the captive individuals is unknown which could result in an increased inbreeding or outbreeding, defeating the purpose of ex situ conservation efforts. Therefore, this study analysed the genetic diversity, population structure and identification of important clusters for future breeding programs. Blood samples from 38 individuals were analysed using 14 species-specific microsatellite loci and the partial mitochondrial DNA sequences of ND6-tRNA^{Glu}-cyt b region and control region. The STRUCTURE results revealed six clusters displaying low nuclear gene diversity, with mtDNA diversity noted in only one cluster. Two important clusters were identified to facilitate future breeding programs of this species.

Kavhu, B., Mutema, C., Mpakairi, K.S., Gandiwa, E. and Muvengwi, J. (2025). Mapping human fatalities from megafauna to inform coexistence strategies. Scientific Reports 15(1): 33856.

Abstract: Human fatalities from human-wildlife conflict (HWC) represent a critical dimension of conservation, often triggering retaliatory actions and post-traumatic stress in affected communities. However, most studies focus on the economic implications of HWC, neglecting human fatalities which may have far-reaching long-term implications. This study investigates the spatial and temporal patterns of human fatalities caused by megafaunal species in Zimbabwe, using data collected from 2016 to 2022. Through spatial and statistical analyses based on the Getis-Ord Gi* hotspot analysis and Mann-Kendall trend test, we assess fatalities caused by six megafaunal species: Nile crocodile (*Crocodylus niloticus*), African elephant (*Loxodonta africana*), hippopotamus (*Hippopotamus amphibius*), African buffalo (*Syncerus caffer*), African lion (*Panthera leo*) and spotted hyena (*Crocuta crocuta*). The results of the study showed that crocodiles and elephants account for over 80% of human fatalities in Zimbabwe. These fatalities also significantly increased over the study period ($p < 0.03$). In contrast, fatalities involving lions, hyenas, hippos, and buffaloes showed no significant increase, indicating more stable but still concerning risks. Fatality hotspots were concentrated in Kariba, Binga and Hwange districts in northern and western Zimbabwe, highlighting areas needing urgent interventions. These insights have broader implications for HWC management across Africa, where megafaunal species frequently interact with human populations. By adopting data-driven, species-specific strategies, other countries facing similar conflicts can foster human-wildlife coexistence and improve conservation outcomes.

Domínguez-Rodrigo, M., Cifuentes-Alcobendas, G., Vegara-Riquelme, M., Camarós, E. and Baquedano, E. (2025). Meta-learning provides a robust framework to discern taxonomic carnivore agency from the analysis of tooth marks on bone: reassessing the role of felids as predators of *Homo habilis*. Royal Society Open Science 12(10): 250548.

Abstract: Determining carnivore agency in taphonomic research is crucial for identifying site formation processes and carnivore-hominin interactions that influenced human evolution. Previous deep learning (DL) models classified the four principal carnivore agents affecting African hominins, but exhibited uneven performance due to unbalanced sample sizes. This study introduces a dual method based on few-shot supervised learning (FSSL) and model-agnostic meta-learning (MAML) as an alternative, achieving more consistent accuracy (FSSL: 81.54-83.56%; MAML: 82.56-85.13%), and significantly improving macro-average F1 scores.

The best performing MAML model, Xception, reached 85.13% accuracy and an 84% F1 score, with taxon-specific F1 scores of 82% (crocodiles), 83% (hyenas), 88% (leopards) and 83% (lions), making the most precise classification of carnivore-made tooth marks to date. Applying FSSL-MAML ensemble models to *Homo habilis* specimens OH7 and OH65 from Olduvai Gorge confirms that leopards were preying on these hominins, as they had been earlier on australopithecines. Contrary to our expectations, these findings demonstrate that early *Homo* was still part of the prey spectrum, reinforcing the idea that the transition to dominant predator status occurred later in human evolution or penecontemporaneously to *H. habilis* through a different hominin taxon.

De, K. and Dwivedi, A.K. (2025). Conserving the Indian Mugger crocodile: Policy, practice and future pathways. *Aquatic Conservation: Marine and Freshwater Ecosystems* 35(10): e70230.

Desai, B., Bhowmik, T., Wadekar, A., Bhatt, U. and Ghosal, R. (2025). Investigating reproductive biology of female mugger crocodiles (*Crocodylus palustris*) by using behaviour and endocrine measures. *Applied Animal Behaviour Science* 292 (<https://doi.org/10.1016/j.applanim.2025.106832>).

Abstract: Reptiles are one of the most speciose groups of tetrapods, however, they are often neglected in conservation research. In this manuscript, we studied a focal population (20 females and 2 males) of captive Mugger crocodiles to investigate their reproductive behavioural patterns and underlying endocrine correlates, a basic knowledge that was lacking in understanding the biology of the Mugger crocodiles. Our study population exhibited three distinct phases of behavioural activities: a) mating phase, with only mating events; b) mixed phase with a few mating events and high occurrences of parental care; c) non-breeding phase, where reproductive activities were absent. Ethogram analysis demonstrated a fixed behavioural repertoire during mating (n=165), including 13 behaviours exhibited by both males and females. Due to low sample size (n=2), we excluded males from further statistics. Female-female aggression was prevalent in all three phases and did not vary significantly ($P>0.05$). To investigate endocrine correlates, scats (n=138) were collected to measure (averaged across phases, Mean $\pm$ SE, ng/g dry faeces) fecal progesterone (fPm= 2421.4 ± 316.5), oestrogen (fEm= 406.9 ± 34.8), and testosterone (fTm= 2386.6 ± 245.4) metabolite levels in females. Hormone-behaviour associations in females showed that fEm and fTm levels did not vary significantly ($P>0.05$) across phases, but fPm levels were significantly higher ($P<0.05$) during mixed phase when compared to mating and non-breeding phases. Though our research had a few limitations (low sample size of males and included a single reproductive season only), it is the first to investigate reproductive behaviour and physiology of the female Muggers. This work also successfully validated fecal measurements of three reproductive hormone metabolites, progesterone, testosterone and oestrogen for the Mugger crocodile species. Overall, the current study presents fundamental work on the reproductive biology, including both behaviour and endocrine correlates, of vulnerable Muggers, which will contribute towards improving *ex-situ* as well as *in-situ* conservation and management strategies for the species.

You, L.-X., Tang, B., Tan, Q.-W., Chen, X., Wei, J.-B., Wang, Y.-Z. and Song, F. (2025). Non-wetting-confined construction of triboelectric surface with crocodile skin-inspired cap-like mechanoreceptors for ultrasensitive tactile sensation. *Chemical Engineering Journal* (<https://doi.org/10.1016/j.cej.2025.169233>).

Abstract: With the advancement of Internet of Things (IoT), triboelectric nanogenerators (TEGs) have emerged as a promising technology for energy harvesting and self-powered sensing, owing to their flexible design and strong capability for converting mechanical energy into electrical energy output. Recent advances have focused on synergistically optimizing surface morphology and charge transfer efficiency; however, some critical challenges persist, including reliance on expensive fabrication equipment, diminished deformability and sensing sensitivity, and stress concentrations arising from the continuous distribution of incorporated rigid electropositive and electronegative phases. Here, inspired by the microdome-structured mechanoreceptors of crocodiles, we present a micro-convex-confined surface-patterning strategy to develop a high-performance TENG featuring biomimetic cap-like arrays. Through precise regulation of array density and region-specific growth of an electropositive phase, the resulting TENG achieves a high power density of 443 mW/m², exceptional sensitivity (up to 20.4 V/kPa), and nearly 100% antibacterial efficacy. Furthermore, when integrated with machine learning algorithms, the TENG enables an intelligent conveyor belt system capable of accurately identifying object dimensions and weight. This innovative surface-patterning strategy facilitates the development of high-precision, self-powered sensors through mimicking biological mechanoreceptors, highlighting their potential as integrated energy-harvesting and sensing platforms for smart IoT nodes.

Denton, M.J., Cherkiss, M.S., Mazzotti, F.J., Brandt, L.A., Godfrey, S.T., Johnson, D. and Hart, K.M. (2025). Stable carbon (C13) and nitrogen (N15) isotopic values of American alligators within the Florida Everglades (2013-2020). U.S. Geological Survey data release, <https://doi.org/10.5066/P9L1N0IE>.

Abstract: This dataset contains morphometric and isotopic data for American alligators (*Alligator mississippiensis*) that were sampled from within four freshwater (FW) wetlands and one estuarine (EST) wetland within the Greater Everglades ecosystem. Due to their compartmentalization and varied habitat and water regimes, there were multiple sampling sites within two of the FW wetlands. The five wetlands were the Arthur R. Marshall Loxahatchee National Wildlife Refuge (LOX), Big Cypress National Preserve (BICY), Water Conservation Area 3 (WCA3; includes WCA3A-Tower (TW), WCA3A-Holiday Park (HD), WCA3A-North HWY 41 (N41) and WCA3B-3B sites), Everglades National Park (ENP-FW; includes ENP-FC, ENP-SS, and ENP-NESSE sites), and an estuary system within ENP (ENP-EST). The subtropical climate of south Florida has hot humid summers, mild winters, and surface hydrology that is managed for flood protection, water supply, and ecological needs. Alligators were sampled between South Florida Water Management District Water Years (WY; May 1 of the previous year to April 30 of the reporting year) 2013-2020 during the spring dry seasons (February-May) and fall wet seasons (September-November) within the five wetlands. Immediately following capture, we collected ~1.5-2.0 mL of whole blood via the post-occipital venous sinus or the ventral coccygeal vein with a sterile, 20-gauge 5.0 mL capacity syringe. During WY 2013-2016 we also collected plasma fractions by immediately centrifuging blood in the field using a portable centrifuge. In spring of WY 2016 both plasma and whole blood were collected. From fall of WY 2016 through spring of WY 2020 logistical constraints prevented us from collecting plasma fractions, thus we were only able to collect whole blood samples. After collection, we placed both plasma fractions and whole blood samples into individually labeled, sterile Corning Cryovials. We stored the vials on ice in the field until they were transferred into a -20°C freezer in the laboratory later that same night.

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