

BAT RESEARCH NEWS



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Front Cover

Lonchorhina aurita (Tome's Sword-nosed Bat) captured in Carboneras, Sabanagrande, Francisco Morazán—see page 1 of this issue. Note the large nasal leaf in comparison with the pointed ears. Photo taken by Hefer Ávila. Copyright 2020. All rights reserved.

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The Tomes's Sword-nosed Bat (*Lonchorhina aurita*) in Honduras, with new records in Sabanagrande, Francisco Morazán

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Introduction

Lonchorhina is one of the most representative genera of the Phyllostomidae and is distributed from northern Mexico to northern Brazil. Currently, the genus contains six species: *L. aurita*, *L. orinocensis*, *L. marinkellei*, *L. fernandezi*, *L. inusitata*, and *L. mankomara* (Mantilla-Meluk and Montenegro, 2016; Morales-Martínez and López-Arévalo, 2018). However, the insectivorous *L. aurita* is the only member of its genus reported for Honduras (Mora et al., 2018), and this species is among the least common of the 111 types of bats known for the country (Ávila-Palma et al., 2019).

The earliest records of *L. aurita* with specific capture localities were two individuals documented by McCarthy et al. (1993): a male captured in Balfate, Cónon (northeastern Honduras), in 1930, and a female in Quimistán, Santa Bárbara (western Honduras), in 1974. Three females and two males were collected 30 years later, in July 2004, from unspecified locations in Capiro and Calentura National Park, in Trujillo, Cónon (northern Honduras). These specimens were deposited in the collection of the Museum of Texas Tech University (TTU 104255–104256, 104098–104099, and 104167—Global Biodiversity Information

Facility, 2019) and later referenced in the works of Azevedo (2013), Leal et al. (2018), and Mantilla-Meluk and Montenegro (2016). Although Slater and Long (2010) indicated the capture of *L. aurita* in Cusuco National Park, Cortés (northwestern Honduras), they supplied no data on the number or sex of individuals that were captured. Miller (2014) recently described *L. aurita* as a host of the bat fly *Trichobius dugesii* from a bat captured in a cave in Utila, Islas de la Bahía (northern Honduras) but she supplied no additional data. Finally, Mora et al. (2018) published a photo of an individual captured in 2012, in Santa Bárbara (western Honduras), and they too provided no further information. Herein, we report a seventh locality of the species, in Sabanagrande, Francisco Morazán, in southern Honduras, and we provide some ecological, morphometric, and reproductive context.

Methods

We studied bats at one site, over four nights, during 2018, in a subtropical moist forest (Holdridge, 1987), located in central Honduras, in the Department of Francisco Morazán, municipality of Sabanagrande (13°47'36''N, 87°14'54''W; Fig. 1), at an altitude of 985 m. The vegetation included an abundance of pines (*Pinus oocarpa* and *P.*

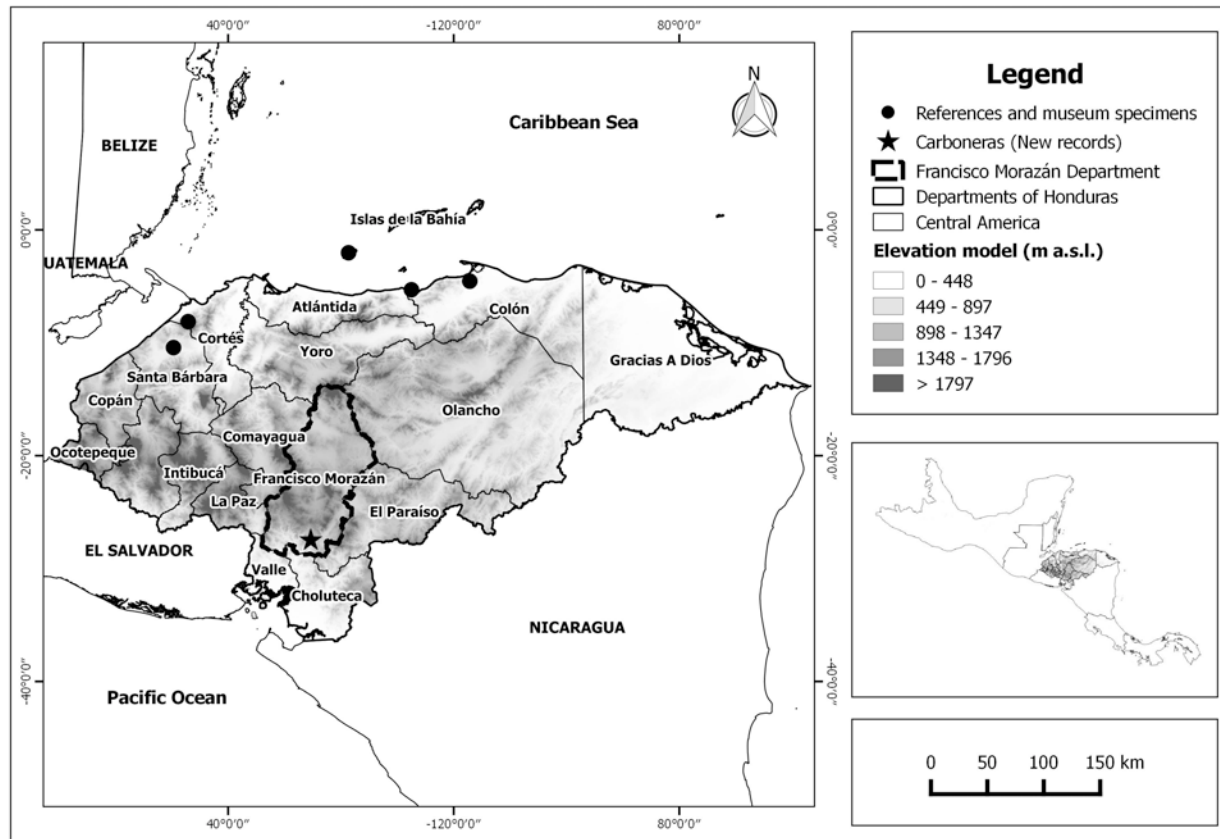


Figure 1. Five previous capture localities (solid circles) and one new site (star) for *L. aurita* in Honduras. A photographic record (Mora et al., 2018) from an unspecified location in the department of Santa Barbara is not shown.

maximinoides) and oaks (*Quercus oleoides*), along with *Miconia* (Melastomataceae), *Curatella* (Dilleniaceae), *Psidium* (Myrtaceae), *Calliandra* (Fabaceae), and *Ficus* (Moraceae). Extensive livestock and agriculture operations, especially corn (*Zea mays*) fields, also occurred near our study area.

During the four nights, we used two mist nets (12.5 x 2.5 m; mesh, 35 mm) that were positioned over a dry stream bed (Kunz and Kurta, 1988) and quantified sampling effort by multiplying the area of the two nets by the number of hours that the nets remained opened over the four nights (Straube and Bianconi, 2002). For each captured bat, we determined sex, age, and reproductive condition, based on Brunet-Rossinni and

Wilkinson (2009). Linear measurements of individuals were determined with digital calipers, and body mass was measured with a 100-g spring scale. We followed Timm et al. (1999), Medina-Fitoria (2014), and Mora et al. (2018) for identification of individuals and followed York et al. (2019) for taxonomy of the species.

Results

We performed surveys on 14 July (sampling period: 1750–2200 h, time of sunset: 1820 h); 21 July (1730–2320 h, 1819 h); 4 August (1712–0205 h, 1815 h); and 11 August (1700–2330 h, 1811 h). During the four nights, we captured 91 bats, representing 16 species and three families. Total sampling

Table 1. Relative abundance of each species that were captured in the same night with *L. aurita*, during four surveys, from 14 July to 11 August 2018 in Carboneras, Sabanagrande, Honduras.

Family/subfamily	Species	Total number captured	Percent of total captures (%)
Mormoopidae	<i>Pteronotus mesoamericanus</i>	2	2.2
	<i>Pteronotus fulvus</i>	2	2.2
Phyllostomidae			
Micronycterinae	<i>Micronycteris microtis</i>	1	1.1
Desmodontinae	<i>Desmodus rotundus</i>	6	6.6
	<i>Diphylla ecaudata</i>	2	2.2
Lonchorhinae	<i>Lonchorhina aurita</i>	5	5.5
Glossophaginae	<i>Glossophaga soricina</i>	16	17.6
Carollinae	<i>Carollia perspicillata</i>	26	28.6
	<i>Carollia subrufa</i>	3	3.3
	<i>Carollia castanea</i>	1	1.1
Stenodermatinae	<i>Artibeus jamaicensis</i>	4	4.4
	<i>Artibeus inopinatus</i>	15	16.5
	<i>Artibeus lituratus</i>	4	4.4
	<i>Dermanura tolteca</i>	2	2.2
	<i>Chiroderma villosum</i>	1	1.1
Vespertilionidae	<i>Eptesicus fuscus</i>	1	1.1
Total		91	100

effort was 1,161 m²-h, which yielded 0.08 individuals/m²-h and 0.01 species/m²-h.

Most (95%) captured bats were members of the Phyllostomidae, with 4% from the Mormoopidae and 1% from the Vespertilionidae (Table 1). The most common species were *Carollia perspicillata* (29%), *Glossophaga soricina* (18%), and *Artibeus inopinatus* (16%). *L. aurita* was the fifth most common species (5%), with two individuals caught on 4 August and one on each of the other nights. The five *L. aurita* included three males (two adults and one young) and two females (one adult and one young).

For the five *L. aurita*, forearm length was 49.5–54.3 mm; tail length, 47.7–52.2 mm;

body length, 44.4–54.4 mm; hind-foot length, 10.0–10.2 mm; ear height, 27.6–28.3 mm; and body mass, 15.0–18.0 g. The fur in the dorsal and ventral area was light brown but darker in the shoulders, with indistinct banding on individual hairs (see cover photo). Although Lassieur and Wilson (1989) indicated that reproduction occurred between February and July, none of the *L. aurita* that we captured was in reproductive condition. All *L. aurita* were netted about 10 cm above the stream bed, between 1935 and 2340 h, at an air temperature of 22–23°C and relative humidity of 68%.

We sacrificed two *L. aurita*—an adult male (UVS-V-02067) and adult female (UVS-V-02075), according to the guidelines

for the use of mammals in wildlife research (Sikes et al., 2019) and with the authorization of the Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre (ICF). These specimens were deposited in the Museum Biodiversidad y Ciencia of the Universidad Nacional Autónoma de Honduras in the Sula Valley (UNAH-VS).

Discussion

Morales-Martínez and López-Arévalo (2018) mentioned that the existence of *L. mankomara*, *L. marinkellei*, and *L. orinocensis* in the Amazonia is vulnerable, because of forest fragmentation, but in Central America, *L. aurita* is considered a threatened species only in El Salvador, due to its restricted range and the impact of human activity (Girón and Rodríguez, 2015). The records of *L. aurita* that we present are the only ones from the Department of Francisco Morazán, the southernmost record of the species in Honduras, and the highest altitudinal record of the species in the country. We believe that the population in Francisco Morazán represents a disjunct population, and that Carboneras is an important site for conservation of the species in Honduras, due to the frequency of captures and the potential threat from agriculture and cattle in this area.

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Ciencia of UNAH-VS, for receiving the specimens; and the ICF, for issuing the collecting and research permit.

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RECENT LITERATURE

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NEWS

As many of you already know, the United States Mint has released a new quarter featuring *Pteropus samoensis*, the Samoan fruit bat.



Reverse

Obverse

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The Mint states, “The design depicts a Samoan fruit bat mother hanging in a tree with her pup. The image evokes the remarkable care and energy this species puts into its offspring. The design is intended to promote awareness of the species’ threatened status because of habitat loss and commercial hunting.”

The quarter is the 51st release in the America the Beautiful Quarters® Program and commemorates the National Park of American Samoa, the only United States National Park that is home to the Samoan fruit bat. The reverse of the quarter was designed by Richard Masters and sculpted by Phebe Hemphill.

For more information, visit the following websites:

<https://www.usmint.gov/coins/coin-medal-programs/america-the-beautiful-quarters/national-park-of-american-samoa>

<https://www.usmint.gov/learn/kids/library/america-the-beautiful-quarters/national-park-of-american-samoa>

<https://www.nps.gov/npsa/index.htm> (National Park of American Samoa site)

ANNOUNCEMENTS

Reminder—Renewal Time!

Many of you have already renewed your subscription to *Bat Research News*, and we thank you for doing so! But some of you have not. Please consider this a friendly reminder along with your recent renewal notice. We hope you will continue to support *BRN* for the 2020 volume-year.

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Will you be moving in the near future? If so, please send your new postal and e-mail addresses to Margaret Griffiths (margaret.griffiths01@gmail.com), and include the date on which the change will become effective. Thank you in advance for helping us out!

Request for News

Please consider submitting news from your lab group, your field work, or any bat-related news. Thank you in advance for considering us as a place for bat, bat worker, and bat lab news items.

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Original research/speculative review articles, short to moderate length, on a bat-related topic would be most welcomed. Please submit manuscripts as .rtf documents to Allen Kurta, Editor for Feature Articles (akurta@emich.edu). Also please consider submitting short articles, notes, or letters on a bat-related topic. If you have questions, please contact Al. Thank you for considering *BRN*.

FUTURE MEETINGS and EVENTS

2020

The 15th European Bat Research Symposium will be held 3–7 August 2020, in Turku, Finland. Please visit: <https://www.ebrs2020.fi/> for updates and information.

The 11th European Bat Detector Workshop will be held 7–11 August 2020, in Kausala, Finland. For information please go to: <http://www.batlife.info/ebdw/>.

The **NASBR** will celebrate their **50th anniversary** where it all began, in Arizona. The annual meeting will be held 28–31 October 2020, in Tempe, Arizona, at the Tempe Mission Palms. The NASBR also plans to publish an edited volume that highlights bat biology research to coincide with their 50th annual meeting. Check the NASBR website for more information and updates — <https://www.nasbr.org/annual-meetings>.

2021

The 51st Annual NASBR will be held 19–24 October 2021 in Winnipeg, Manitoba. Check the NASBR website for updates — <https://www.nasbr.org/annual-meetings>.

2022

The 52nd Annual NASBR will be held in conjunction with the 19th International Bat Research Conference (IBRC) in Austin, Texas, in August of 2022. Check the NASBR website for updates — <https://www.nasbr.org/annual-meetings>.

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Front Cover

Hipposideros kunzi, Kunz's Bicolored Roundleaf Bat, named in honor of Thomas H. Kunz. Tom died on April 13, 2020 (please see page 17, this issue). Photo by Charles M. Francis, (C) 2020. CC BY-NC-SA 4.0.

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Bat Research News is published four times each year, consisting of one volume of four issues. *Bat Research News* publishes short feature articles and general interest notes that are reviewed by at least two scholars in that field. *Bat Research News* also includes abstracts of presentations at bat conferences around the world, letters to the editors, news submitted by our readers, notices and requests, and announcements of future bat conferences worldwide. In addition, *Bat Research News* provides a listing of recent bat-related articles that were published in English. *Bat Research News* is abstracted in several databases (e.g., BIOSIS).

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IN MEMORIAM



Tom at Sargent Camp, NH, summer 2011.
Courtesy of Kunz Family.

Thomas Henry Kunz, 1938–2020

Gary F. McCracken

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Tom Kunz ranks among the great bat biologists of all time. This is not only because of his tremendous contributions to our knowledge of bat biology—including over 260 peer-reviewed publications and 6 edited volumes on bat research. And, not only because of his outstanding record of training graduate students (as major professor to 31 Ph.D. students and 15 M.S. students), his mentoring of 17 Post-doctoral associates,

and his providing research opportunities to scores of undergraduate students. But also because of his humanity. Those of us who knew Tom well and had the good fortune and privilege to work with him have lost a great friend, mentor, and motivator. Those of you who may not have known him well, or missed the opportunity to know him personally, have undoubtedly heard many stories of his charisma and his joyful presence. His

openness and friendliness and the generosity in which he gave attention and time to generations of young scientists are legendary in the NASBR community. We'll miss the infectious, "boyish" smile that he maintained well into his 70's, his dancing (sort of) the Macarena at the annual NASBR banquets, and his deely bopper batman costume. Although he was temperate in his use of alcohol, he was invariably among those who stayed out into the wee hours during the pub crawl after the banquet.

In an autobiographical sketch (https://www.bu.edu/cecb/files/2009/08/kunz_becoming-mamm04.pdf) written in 2005, Tom gave his thoughts on the "traits needed to be a successful biologist." In no "particular order" these traits included: "passion for organismal biology, passion for reading, passion for writing, field and laboratory skills, common sense, patience, perseverance, enthusiasm, and a commitment to do your best." Tom's career accomplishments demonstrate that he possessed each of these traits. But in eulogizing Tom and his career, I respectfully think that he out left a few traits, and that more detail on how they translated into his accomplishments are important if we are to truly appreciate what Tom has done for all of us during his long and successful career.

Tom Kunz was "fearless" in his approach to science. He was not afraid to pursue any problem or any question that grabbed his interest. He knew no fear. If he lacked the skills that were needed to pursue a project— isotope chemistry, genetics, epidemiology, mathematical modeling, radar technology..., whatever—he would identify someone who had those skills and cajole them to collaborate with him. But in Tom's case, being "cajoled" did not just mean succumbing to intense coaxing or flattery. If you collaborated with Tom, you could count on being rewarded—you would be a Co-PI on grants, invited to write book chapters and a coauthor on papers. Tom had an uncanny genius for identifying

projects and for "smelling out" possible sources of funding for those projects. He also had the energy to carry more than his load of the work, to make sure that he and you met deadlines, and to do whatever was necessary to be successful.

His fearlessness and his natural ability to forge collaborations put Tom at the forefront of interdisciplinary research in bats. Interdisciplinary research now is seen, and supported by funding agencies, as the best way to engage in science. Although this was not so overtly recognized when Tom was in the early stages of his career, Tom appears to have seen it clearly. Later in his career when National Science Foundation (NSF) and other funding agencies developed interdisciplinary granting initiatives, Tom was at the forefront of tapping into those programs.

Another central theme in Tom's research was his interest in the development and application of techniques. As an example, his early work on reproduction, postnatal growth and resource allocation in bats required information on activity patterns, diets, daily and seasonal energy budgets, the energetics of lactation, the mineral and energy contents of milk, and techniques for aging bats. Tom with the help of his students and numerous collaborators pioneered new techniques to obtain quantitative data in all of these areas. In other instances, such as the effectiveness of bat capture methods or assessing diets from insect fragments in feces, Tom engaged in experiments to ascertain the limits and precision of existing techniques. As his career advanced, his research program embraced more and more advanced and complex technologies. These included the application of doubly-labelled water to assess energy budgets, genetic analyses of parentage and relatedness in bat social groups, the use of advanced thermal imaging to count millions of bats, the application of various radar systems to document flights of bats aloft, and multiple applications of modern DNA

technology to examine diets and pathogens from rabies to the fungus that causes white nose-syndrome (WNS). All these

technologies were part of Tom's research program, and all were done with collaborators.



Tom at work in Uvalde, Texas, 2006.



Tom and Pat Morton at Bamburger Ranch, 2004.

Photos courtesy of Nickolay Hristov.

Passions for reading and writing also were listed by Tom as traits contributing to his success. But, add to these passions two other traits that he also listed—patience and perseverance—and we have Tom the Editor. Between 1982 and 2009, Tom edited or co-edited six books on the biology of bats (*Ecology of Bats*, Plenum Press, 1982; *Ecological and Behavioral Methods for the Study of Bats*, Smithsonian Institution Press, 1988; *Bat Biology and Conservation*, Smithsonian Institution Press, 1998; *Bat Ecology*, University of Chicago Press, 2003; *Functional and Evolutionary Ecology of Bats*, Oxford University Press, 2006; and the 2nd Edition of *Ecological and Behavioral Methods for the Study of Bats*, Johns Hopkins University Press, 2009). The two *Ecological and Behavioral Methods* books have served as handbooks for bat researchers around the world. The four other volumes summarize the then current state of knowledge and give directions for future research in ecology, evolution, behavior, and the conservation of bats. These volumes not only inspired and served as resources for bat researchers, they

also gave authors and co-authors outlets for ideas and synthesis papers that might otherwise not be published. As the beneficiary of these volumes as a “consumer”, but also as co-author to several chapters and co-editor of one volume, I’ve always been grateful to Tom for his “passions” and his patience and perseverance. These edited volumes should be credited among Tom’s greatest contributions to bat research, and they are even more amazing given Tom’s contribution of over 260 papers of primary research. Tom’s son, David, remembers his Dad falling asleep in front of his home computer—no wonder.

I know from discussions with Tom, that these volumes were not solely in service to the bat research community. They also served Tom in providing him an overview of the state-of-the-art in bat research, roadmaps to potentially productive directions of inquiry, and sources of ideas and potential collaborators for his own research.

Thomas Henry Kunz was born on June 11, 1938 in Independence, Missouri, the second son of William H. Kunz and Edna F.

(Dornfeld) Kunz. His mother was a homemaker and his father worked for over 35 years for the Kansas City Power and Light Company. By his own accounting, Tom had a classic American childhood. He was close to his parents, athletic, competitive with his older brother Jim, and an Eagle Scout. Tom credits a 5th grade teacher, Alma Read, as stimulating his early interest in biology, an interest that was enhanced by his 10th grade biology teacher at East High School, Eleanore Canny. Tom was a multi-sport athlete and helped the East High School varsity football team achieve a 10–0 record and win the Kansas City Championship. After graduating from high school in June 1956, Tom enlisted for a 6-month tour of active duty in the U.S. Army and was stationed at Fort Leonard Wood, Missouri. After his military service, Tom worked six months doing road survey work for the Missouri Highway Department.

Tom enrolled at Central Missouri State

University in Warrensburg, Missouri in 1957 where he majored in biology and physical education. He played on the varsity football team and was a co-captain of the football team his senior year. Central Missouri State University offered small class sizes and frequent field trips and three professors in the Biology Department, Richard F. Myers, Oscar Hawksley, and Laura Nahm, greatly influenced Tom's interests in field biology and conservation. After graduating with a B.S. in Biology in 1961, Tom was invited to coach the freshman football team and was able to simultaneously pursue a Master's degree in Education that he received in 1962. A big event in his personal life occurred in the fall semester 1961, when he met Margaret Louise Brown who was on faculty at Central Missouri State as an Instructor in the Department of Business. Tom and Margaret were married on December 27, 1962.



Wedding of Tom and Margaret Kunz
December 27, 1962



Margaret and Tom Kunz
Christmas 2019

Photos Courtesy of Kunz Family.

For the next four years Tom taught biology and coached football and track at Shawnee Mission West High School in Overland Park, Kansas. During this time, Tom applied to participate in the NSF Summer Institute in Biology for high school teachers which, following the Soviet Union's launching of Sputnik, had been established to enhance science education in the United States. As an NSF scholar Tom was supported for one summer at the University of Nebraska, Lincoln. During that summer he developed an avid interest in collecting bats and began a correspondence with E. Raymond Hall at the University of Kansas, resulting in his earliest publications. He then applied for and received a second NSF scholar award and spent the next three summers at Drake University, Des Moines, Iowa. He was awarded a Master's degree in Biology from Drake University in 1968.

In Fall 1967, Tom enrolled in the doctoral program in the Department of Systematics and Ecology at the University of Kansas where J. Knox Jones, a former doctoral student of E. Raymond Hall, was Tom's

major professor. Tom completed his Ph.D. in 1971 with a dissertation based on field research in Kansas and Oklahoma focused on the population biology and reproduction, growth and development of the cave bat, *Myotis velifer*. While a graduate student Tom presented a paper ("Reproductive patterns and development of *Myotis velifer* in Kansas") at the very first meeting of the North American Symposium on Bat Research (NASBR) — then called Symposium on Bat Research in the Southwest—in 1970. Subsequently, until 2011, he participated in all but one of the annual NASBR meetings.

Tom accepted a faculty position in the Department of Biology at Boston University in 1971 and remained at Boston University for his entire career. In addition to his research, teaching, and mentorship of students and post-docs, Tom's long and successful career was marked by significant service to the University, including Chair of the Biology Department (1985–1990), Co-Founder and long-time Director of the Tiputini Biodiversity Station in Ecuador, and Founder and Director of Boston University's Center



Tom photographing bat exodus in Texas, 2007.
(Photo courtesy of Nickolay Hristov)



Tom conducting outreach at Frio Cave (undated).
(Photo provided by Gary McCracken)

for Ecology and Conservation Biology. He was an elected Fellow of the American Association for the Advancement of Science, served as President of the American Society of Mammalogists, and was named a life-time honorary member of the American Society of Mammalogists. He received a Life-time Achievement Award from the Karst Waters Institute and won the Gerrit S. Miller Award for outstanding service and research to bat biology, and the C. Hart Merriam Award for outstanding contributions to mammalogy. In 2011 he was named William Warren Fairfield Distinguished Professor, Boston University's highest faculty honor.

Tom was always productive, but his productivity and the diversity and geographic reach of his research portfolio increased dramatically during the latter part of his career. Until the early-to-mid-1990's most of his work was focused on activity patterns, reproduction and growth, and the physiological ecology of bats in and around northeastern North America. In the 1980's he was beginning to venture into the tropics and the southwestern United States, but only about 1/4 of his peer-reviewed work dates from what was chronologically the first half of his career. His publication rate then jumped, and Tom entered a period of sustained momentum in which he continuously juggled multiple projects in many parts of the world, including India, Malaysia, several Neotropical countries and, of course, North America. The extent and breadth of this work is astounding. His interests in reproduction and physiological ecology remained, but he became more focused on behavior and issues related to bat conservation. Examples of these studies, all done with collaborators and many excellent students, include roosting behavior and sociality in foliage-roosting bats, flight behavior, conservation of tropical bat community assemblages, disease ecology, and the ecosystem services of bats. Tom's

network of collaborators and the arsenal of technologies that he was able to bring to projects continued to expand.

I was fortunate to engage with Tom for over three decades on many projects. Our collaborations began in the 1980's when we combined skills to investigate the behavioral context and energetic costs of non-parental nursing in Brazilian free-tailed bats, *Tadarida brasiliensis*. This was followed by field work together on tent making bats in Trinidad, and then a series of field studies and workshops on disease ecology, the continental expansion of WNS, high-altitude foraging, and the ecosystem services of Brazilian free-tailed bats in Texas. When we were last in the field together in Texas in June 2011, I asked Tom if he ever thought of retirement. "What would I do?," he asked. He then said, "Maybe when I'm 80?"

On the evening of October 26, 2011, Tom's career was cut short when he was struck by a car and suffered a head injury while walking to the opening ceremony of the 41st Annual NASBR meeting in Toronto, Canada. At that time Tom was directing 7 Ph.D. students and had grants from 6 different funding agencies. He was, as always, integrating a host of collaborators and technologies and was at the height of his efforts to define and establish the emerging field of Aeroecology.

Tom resided in recent years at Newbridge on the Charles nursing facility in Dedham, Massachusetts where he enjoyed daily visits with his wife Margaret, and other visits with family and friends. Throughout that time Margaret kept Tom's many friends informed of his progress. I'm grateful to have had a phone conversation with Tom on March 30, 2020, in which we updated each other on our families, reminisced about old friends and relived many adventures. Tom died on April 13, 2020 from complications from COVID-19. He was preceded in death by his parents and brother Jim. He is survived by his wife

Margaret, daughter Pamela, son David, and 5 grandchildren. Tom was a highly successful academician and an attentive and devoted

husband, father, and grandfather. He was great friend and colleague to many.



Tom at Chiroptorium, 2010.

Gary McCracken and Tom Kunz, 2006.

Photos provided by Gary McCracken

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RECENT LITERATURE

Authors are requested to send reprints (PDF files) of their published papers to the Editor for Recent Literature, **Dr. Thomas A. Griffiths**, (e-mail: thomas.alan.griffiths@gmail.com) for inclusion in this section. Receipt of reprints is preferred, as it will facilitate complete and correct citation. However, if reprints and/or PDF files are unavailable, please send a complete citation (including complete name of journal and corresponding author e-mailing address) by e-mail. The Recent Literature section is based on several bibliographic sources and for obvious reasons can never be up-to-date. Any error or omission is inadvertent. Voluntary contributions for this section, especially from researchers outside the United States, are most welcome and appreciated.

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ANNOUNCEMENTS

Change of Address Requested

Will you be moving in the near future? If so, please **send your new postal and e-mail addresses** to Margaret Griffiths (margaret.griffiths01@gmail.com), and include the date on which the change will become effective. Thank you in advance for helping us out!

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Please consider submitting news from your lab group, your field work, or any bat-related news. Thank you in advance for considering us as a place for bat, bat worker, and bat lab news items.

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Original research/speculative review articles, short to moderate length, on a bat-related topic would be most welcomed. Please submit manuscripts as .rtf documents to Allen Kurta, Editor for Feature Articles (akurta@emich.edu). Also please consider submitting short articles, notes, or letters on a bat-related topic. If you have questions, please contact Al. Thank you for considering *BRN*.

FUTURE MEETINGS and EVENTS

2020

Postponed: The 15th European Bat Research Symposium and the 11th European Bat Detector Workshop have been postponed until 2021 (see below).

Please note: The NASBR has decided not to hold an in-person meeting in 2020, but will celebrate their 50th anniversary in 2021 (see below). For updated information, see <https://www.nasbr.org/>.

2021

The 11th European Bat Detector Workshop will be held 6–10 August 2021, in Kausala, Finland. For information please go to: <http://www.batlife.info/ebdw/>.

The **NASBR** will celebrate their **50th anniversary** in Tempe, Arizona. Please check the NASBR website for information and updates: <https://www.nasbr.org/>.

The 15th European Bat Research Symposium will be held 2–6 August 2021, in Turku, Finland. Please visit: <https://ebrs2021.fi/> for updates and information.

2022

The Annual NASBR meeting will be held in conjunction with the 19th International Bat Research Conference (IBRC) in Austin, Texas, in August of 2022. Check the NASBR website for updates — <https://www.nasbr.org/>.

2023

The Annual NASBR meeting will be held in Winnipeg, Manitoba, Canada in 2023. Check the NASBR website for updates — <https://www.nasbr.org/>.

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Short-tailed Fruit Bats (*Carollia* sp.) roosting in the corner of a small sea cave, located south of Dominical, Costa Rica. Photo taken by Keith Christenson. Copyright 2020. All rights reserved.

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ANNOUNCEMENTS

Change of Address Requested

Will you be moving in the near future? If so, please **send your new postal and e-mail addresses** to Margaret Griffiths (margaret.griffiths01@gmail.com), and include the date on which the change will become effective. Thank you in advance for helping us out!

Request for News

Please consider submitting news from your lab group, your field work, or any bat-related news. Thank you in advance for considering us as a place for bat, bat worker, and bat lab news items.

Request for Manuscripts — *Bat Research News*

Original research/speculative review articles, short to moderate length, on a bat-related topic would be most welcomed. Please submit manuscripts as .rtf documents to Allen Kurta, Editor for Feature Articles (akurta@emich.edu). Also please consider submitting short articles, notes, or letters on a bat-related topic. If you have questions, please contact Al. Thank you for considering *BRN*.

FUTURE MEETINGS and EVENTS

2020

Postponed: The 15th European Bat Research Symposium and the 11th European Bat Detector Workshop have been postponed until 2021 (see below).

Postponed: The NASBR has postponed its annual meeting in 2020, and will celebrate their 50th anniversary in 2021 (see below). For updated information, see <https://www.nasbr.org/>.

2021

The 15th European Bat Research Symposium will be held 2–6 August 2021, in Turku, Finland. Please visit: <https://ebrs2021.fi/> for updates and information.

The 11th European Bat Detector Workshop will be held 6–10 August 2021, in Kausala, Finland. For information please go to: <http://www.batlife.info/ebdw/>.

The **NASBR** will celebrate their **50th anniversary, 20–23 October 2021**, in **Tempe, Arizona**. Please check the NASBR website for information and updates: <https://www.nasbr.org/>.

2022

The Annual NASBR meeting will be held in conjunction with the International Bat Research Conference (IBRC), 7–12 August 2022, in Austin, Texas. Check the NASBR website for updates — <https://www.nasbr.org/>.

2023

The Annual NASBR meeting will be held in Winnipeg, Manitoba, Canada in 2023 (dates TBD). Check the NASBR website for updates — <https://www.nasbr.org/>.

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Front Cover

This Lesser Dog-like Bat (*Peropteryx macrotis*) was found roosting in a shallow cave-like underground room near the Poas Volcano, Aguas Zarcas, in Costa Rica (2019). Photo taken by Keith Christenson. Copyright 2020. All rights reserved.

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Bat Research News is published four times each year, consisting of one volume of four issues. *Bat Research News* publishes short feature articles and general interest notes that are reviewed by at least two scholars in that field. *Bat Research News* also includes abstracts of presentations at bat conferences around the world, letters to the editors, news submitted by our readers, notices and requests, and announcements of future bat conferences worldwide. In addition, *Bat Research News* provides a listing of recent bat-related articles that were published in English. *Bat Research News* is abstracted in several databases (e.g., BIOSIS).

Communications concerning feature articles and "Letters to the Editor" should be addressed to Dr. Al Kurta (akurta@emich.edu), recent literature items to Dr. Tom Griffiths (thomas.alan.griffiths@gmail.com), and all other correspondence (e.g., news, conservation, or education items; subscription information; cover art; back issues) to Dr. Margaret Griffiths (margaret.griffiths01@gmail.com).

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Back issues of *Bat Research News*, Volumes 40 (1999) through 56 (2015), are available for download from the *BRN* website at <http://batresearchnews.org/>. Other back issues may be available by contacting Dr. Margaret Griffiths (margaret.griffiths01@gmail.com). Thank you!

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To *BRN* Subscribers: Greetings and Happy 2021!

I hope this finds you safe and well. 2020 has been a challenging year for all of us as well as for the world's bat populations, so it is good to see a new year arrive. Some of the challenges caused by 2020 are affecting *Bat Research News* as well.

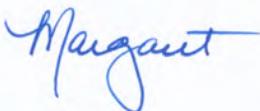
Illinois Wesleyan University, where *BRN* has been printed and mailed since 2004, is now outsourcing all printing and mailing services making it more expensive and more difficult to get *BRN* printed and mailed. Additionally postal costs themselves continue to increase. A number of countries shut down international mail services during the pandemic, which made mailings even more challenging.

Therefore, I must increase the cost of individual subscriptions by \$5.00 USD, beginning with the 2021 Spring issue (Volume 62). Other changes may need to be made in future years as well. I am working to revise the information pages of our website and PayPal payment forms. Once those are completed, I will send out more information and renewals for 2021. Please be patient as the website is updated.

PayPal has made changes as well. According to PayPal, credit/debit card fraud has become an increasing problem and therefore they are limiting who can make credit/debit card payments. This means you may need to set up a PayPal account if you want to renew your *BRN* subscription with a credit/debit card, especially if you reside outside the United States. There are no fees to set up a PayPal account or to use PayPal to make a payment (unless perhaps you live in a country outside the U.S.), but it is one more step that you will need to do to continue to use PayPal.

I am making other changes to the *BRN* website as well which will provide additional value to your *BRN* subscription. In recent years, many of you have requested easier access to back issues of *BRN*. Therefore, I am changing the website to make back issues more easily accessible, and not just to current subscribers. Currently, Volumes 40–56 (1999–2015, respectively) are available on the site, and I plan to make more available in the future. To access them, go to the *BRN* homepage (<http://batresearchnews.org/>), click on the “Past Volumes” link, and then click on the desired link to download the specific volume. Tables of Contents for Volumes 1–60 are also available via a link on the homepage entitled “Table of Contents.” The five most recent volumes (Volumes 57–61) remain accessible online to current electronic subscribers. As always, please contact me (margaret.griffiths01@gmail.com) if you need back issues that are not available on the site.

Thank you for continuing to support *Bat Research News*, and for your patience and understanding as I make changes. Best wishes to you for a happy, healthy, and safe 2021, from all of us at *Bat Research News*.



RECENT LITERATURE

Authors are requested to send reprints (PDF files) of their published papers to the Editor for Recent Literature, **Dr. Thomas A. Griffiths**, (e-mail: thomas.alan.griffiths@gmail.com) for inclusion in this section. Receipt of reprints is preferred, as it will facilitate complete and correct citation. However, if reprints and/or PDF files are unavailable, please send a complete citation (including complete name of journal and corresponding author e-mailing address) by e-mail. The Recent Literature section is based on several bibliographic sources and for obvious reasons can never be up-to-date. Any error or omission is inadvertent. Voluntary contributions for this section, especially from researchers outside the United States, are most welcome and appreciated.

ANATOMY/HISTOLOGY

Abiaezute, C. N., I. C. Nwaogu, and U. M. Igwebuikwe. 2020. Histology, ultrastructure, and seasonal variations in the bulbourethral gland of the African straw-colored fruit bat *Eidolon helvum*. *Journal of Morphology*, 281: 1446–1455. [nwabugwu.abiaezute@unn.edu.ng]

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DISEASE

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IN MEMORIAM**John Roland Winkelmann, 1931–2020**

As many of you know, our dear friend and colleague, John Winkelmann, died on October 13, 2020. John was a well-known bat biologist and a professor at Gettysburg College, Gettysburg, Pennsylvania, for over 50 years. He was a lifetime supporter of students, other educators and researchers, *Bat Research News*, the NASBR, and of course bats. His research included bats and other animals in North, Central, and South Americas and also Australasia and Africa. John always had a twinkle in his eye, a willingness to help, and a word of encouragement when needed. He will be missed by all of us who knew him. His obituary can found at:

https://www.gettysburgtimes.com/obituaries/article_d9b6ca7d-76ff-54a5-9f6e-75f53e09e602.html.

ANNOUNCEMENTS**Changes Coming to *Bat Research News* for 2021**

As mentioned in the Message from the Editor, *Bat Research News* will be making some changes in 2021. The cost for individual subscriptions will increase by \$5.00 USD. For more information, please contact the Managing Editor, Margaret Griffiths (margaret.griffiths01@gmail.com). Also we are in the process of updating the *BRN* website, including the payment site. Please be patient while these changes are made.

Volumes 40–56 (1999–2015), which had been available only to subscribers, are now available to all. The five most recent issues remain available to current subscribers only. If you or someone you know need back issues not available, please contact the Managing Editor, Margaret Griffiths (margaret.griffiths01@gmail.com).

Reminder—Renewal Time!

Just a reminder that this is the last issue of the 2020 series of *Bat Research News*. That means many of you will be receiving renewal information in your e-mail inbox fairly soon. We hope you will continue to support *BRN* for the 2021 volume-year. All of us at *Bat Research News* wish you a safe and happy 2021!

Change of Address Requested

Will you be moving in the near future? If so, please **send your new postal and e-mail addresses** to Margaret Griffiths (margaret.griffiths01@gmail.com), and include the date on which the change will become effective. Thank you in advance for helping us out!

2020 Annual NASBR Meeting Canceled and No Meeting Abstracts

The Annual NASBR meeting was canceled in 2020 due to the pandemic, so no meeting abstracts were available for this issue of *BRN*. The Society plans to hold their annual meeting and celebrate their 50th anniversary in October 2021 (see **Future Meetings and Events**) and hopefully they will share the 2021 meeting abstracts with *BRN*.

Request for News

Please consider submitting news from your lab group, your field work, or any bat-related news. Thank you in advance for considering us as a place for bat, bat worker, and bat lab news items.

Request for Manuscripts — *Bat Research News*

Original research/speculative review articles, short to moderate length, on a bat-related topic would be most welcomed. Please submit manuscripts as .rtf documents to Allen Kurta, Editor for Feature Articles (akurta@emich.edu). Also please consider submitting short articles, notes, or letters on a bat-related topic. If you have questions, please contact Al. Thank you for considering *BRN*.

FUTURE MEETINGS and EVENTS

2021

The 15th European Bat Research Symposium will be held 2–6 August 2021, in Turku, Finland. Please visit: <https://ebrs2021.fi/> for updates and information.

The 11th European Bat Detector Workshop will be held 6–10 August 2021, in Kausala, Finland. For information please go to: <http://www.batlife.info/ebdw/>.

The **NASBR** will celebrate their **50th anniversary, 20–23 October 2021**, at the Tempe Mission Palms, **Tempe, Arizona**. Please check the NASBR website for information and updates: <https://www.nasbr.org/>.

2022

The Annual NASBR meeting will be held in conjunction with the International Bat Research Conference (IBRC), 7–12 August 2022, at the Hilton Austin, in Austin, Texas. Check the NASBR website for updates — <https://www.nasbr.org/>.

2023

The Annual NASBR meeting will be held 11–14 October 2023, at the Fort Garry Hotel, in Winnipeg, Manitoba, Canada. Check the NASBR website for updates — <https://www.nasbr.org/>.