



REVISTA DE  
**Biología Tropical**

---

INTERNATIONAL JOURNAL OF  
TROPICAL BIOLOGY AND CONSERVATION

Volume 69(4) • October-December, 2021 • Volumen 69(4) • octubre-diciembre, 2021

<https://revistas.ucr.ac.cr/index.php/rbt/index>

San José, Costa Rica



**EB** Escuela de  
Biología



Facebook  
[@revista.biologia.tropical](https://www.facebook.com/revista.biologia.tropical)

## TECHNICAL STAFF / EQUIPO TÉCNICO

### Graphic Editor / Editor Gráfico:

Sergio Aguilar Mora

### Development Editor / Editor de Desarrollo:

Alonso Prendas Vega

### COVER / PORTADA:

Photographs courtesy of / Fotografías cortesía de:

Vitor Gabriel de Oliveira Leite, Raquel Braga Aquino Florenciano,

Edihanne Gamarra Arguelho & Tatiane do Nascimento Lima

Trap rebuilding by *Myrmeleon brasiliensis* larvae (Neuroptera: Myrmeleontidae)

in response to flooding: the effect of body size.

Reconstrucción de trampas por larvas de *Myrmeleon brasiliensis* (Neuroptera: Myrmeleontidae)

tras las inundaciones: efecto del tamaño corporal.

See pages / Ver páginas: 1224-1232.

574.05

R Revista de Biología Tropical / Universidad de Costa Rica. —Vol. 1  
(1953)— . — San José, C. R. : Editorial Universidad de  
Costa Rica, 1953—  
v.

ISSN-0034-7744

1. Biología – Publicaciones periódicas, 2. Publicaciones  
periódicas costarricenses.

BUCR

---

## CONTACT

Phones / Teléfonos: (506) 2511-8982 • (506) 2511-8981 • (506) 2511-8983

biologia.tropical@ucr.ac.cr • <https://revistas.ucr.ac.cr/index.php/rbt/index><https://www.anc.cr/revista-biologia-tropical> • <https://tropicalstudies.org/rbt/pages/es/inicio.html> Revista de Biología Tropical • Universidad  
de Costa Rica • 11501-2060 San José, Costa Rica

All content in this journal is:



OPEN ACCESS

Attribution (CC BY 4.0) Anyone may copy, distribute or reuse these articles, as long  
as the author and original source are properly cited.

Reconocimiento (CC BY 4.0) Cualquiera puede copiar, redistribuir o reusar estos artí-  
culos, siempre y cuando cite adecuadamente al autor y a la revista.

Edición aprobada por la Comisión Editorial de la Universidad de Costa Rica.

© Editorial de la Universidad de Costa Rica, Ciudad Universitaria Rodrigo Facio, Costa Rica.

Apdo. 11501-2060 • Tel.: 2511-5310 • Fax: 2511-5257

Correo electrónico: [distribucionyventas.siedin@ucr.ac.cr](mailto:distribucionyventas.siedin@ucr.ac.cr) • Página web: [www.editorial.ucr.ac.cr](http://www.editorial.ucr.ac.cr)

Todos los derechos reservados. Prohibida la reproducción total o parcial **SALVO NORMAS OPEN ACCESS**.

Hecho el depósito de ley.

**Director:** Jeffrey A. Sibaja Cordero<sup>1</sup>

**Editor-in-Chief / Editor Jefe:** Julián Monge-Nájera<sup>1,2</sup>

**Editorial Board / Comité Editorial:**

Juan B. Chavarría<sup>1</sup>, Jorge Cortés<sup>1</sup>, Francisco Hernández<sup>1</sup>, Federico Villalobos Brenes<sup>3</sup>,  
Roberto Cordero Solórzano<sup>3</sup>, Alfredo Cascante Marín<sup>1</sup>, Miguel Rojas Chaves<sup>4</sup>

**Administrative Editor / Editora administrativa:** Vanessa Nielsen Muñoz<sup>1</sup>

1. Universidad de Costa Rica, Costa Rica. 2. Universidad Estatal a Distancia, Costa Rica  
3. Universidad Nacional, Costa Rica. 4. Instituto Tecnológico de Costa Rica, Costa Rica

**INTERNATIONAL SCIENTIFIC BOARD  
COMITÉ CIENTÍFICO INTERNACIONAL**

**USA / EEUU**

**Harlan Dean**

Harvard University, Cambridge, Massachusetts, *United States of America*

**Juliette Denslow**

Louisiana State University, Louisiana, *United States of America*

**Rodolfo Dirzo**

Stanford University, California, *United States of America*

**Ana Dittel**

University of Delaware, Delaware, *United States of America*

**William Eberhard**

Smithsonian Tropical Research Institute, Washington, *United States of America*

**Paul Ehrlich**

Stanford University, California, *United States of America*

**Peter W. Glynn**

University of Miami, Florida, *United States of America*

**Harry W. Greene**

Cornell University, New York, *United States of America*

**Daniel H. Janzen**

University of Pennsylvania, Pennsylvania, *United States of America*

**Gordon H. Orians**

University of Washington, Washington, *United States of America*

**Jay M. Savage**

Rana Dorada Enterprises, California, *United States of America*

**David Wake**

University of California, California, *United States of America*

**Edward O. Wilson**

Harvard University, Massachusetts, *United States of America*

**EUROPE / EUROPA**

**Peter Döbbeler**

Institut für Systematische Botanik, München, *Germany*

**Klaus Gocke**

Institut für Meereskunde, Kiel, *Germany*

**Maarten Kapelle**

University of Amsterdam / The Nature Conservancy, Amsterdam, *Holland*

**Wilson Lourenço**

Muséum National d'Histoire Naturelle, Paris, *France*

**Lawrence Mound**

The Natural History Museum, London, *England*

**Matthias Wolff**

Zentrum für marine Tropenökologie, Bremen, *Germany*

**LATIN AMERICA / AMÉRICA LATINA**

**Michel E. Hendrickx**

Universidad Nacional Autónoma de México (UNAM), Sinaloa, *México*

**E. Rappoport**

Universidad del Comahue, Bariloche, *Argentina*

**Sergio Salazar-Vallejo**

El colegio de la Frontera Sur (ECOSUR), Chetumal, *México*

**Enrique Freer (Jubilado)**

Universidad de Costa Rica, San José, *Costa Rica*

**Bernal Morera**

Universidad Nacional, Heredia, *Costa Rica*

**Elvia Melendez-Ackerman**

Universidad de Puerto Rico, *Puerto Rico*

**Eloisa Lasso**

Universidad de Los Andes, *Colombia*

**Anayansi Valderrama**

Instituto Conmemorativo Gorgas de Estudios de la Salud, *Panamá*

**AFRICA / ÁFRICA**

**Pius Araoye**

Benue State University, Makurdi, *Nigeria*

The **Revista de Biología Tropical** has been published without interruption since 1953, has worldwide distribution and a high *Science Citation Index* rating. The journal published four regular issues per year: issue 1 (January – March), issue 2 (April – June), issue 3 (July – September), and issue 4 (October – December), and several supplements are also published each year.

---

## Scope

Our journal publishes scientific articles that increase our understanding of biology, conservation, and bio-medical life sciences in the tropics. Selection criteria are the quantity and quality of new information and its potential interest to the general audience as well as to specialists. The studied ecosystems, or at least the organisms, must be tropical. We give preference to feature articles that include testable study questions—for example, studies with an experimental design evaluating factors that influence biological variables, or studies that explain the mechanisms underlying biological or biomedical phenomena such as, for example, behavior or physiology. Field studies should present temporal or spatial patterns. We also welcome systematic or phylogenetic studies above the species level, meta-analyses and literature reviews that critically examine what is known and what remains to be done in any field of tropical biology.

## Why submit?

**Fully indexed:** Web of Science, Science Citation Index, Current Contents, Google Scholar, Scopus, Biological Abstracts, Zoological Record and 41 more. **Open Access** (more likely to be cited). For authors: ten first pdf pages free. **Rapid** publication; widely read in countries with the highest biodiversity, where your article can have the greatest real **impact**. A dedicated staff gives you **personalized treatment**.

---

## INDEXING:

The *Revista de Biología Tropical / International Journal of Tropical Biology and Conservation* is a mainstream scientific journal covered by the following **international indexation systems**:

- **Web of Science**
- **Science Citation Index**
- **Current Contents**
- **Google Scholar**
- **Scopus**
- **SciELO**
- **Biological Abstracts**
- **DOAJ** (Directory of Open Access Journals)
- **Latindex**
- **Zoological Record**
- INIS Atomindex (International Nuclear Information System)
- LILACS (Literatura Latino-Americana e do Caribe em Ciências da Saúde)
- Medline
- MEDES – MEDicina en Español (Fundación Lilly)
- Human and Experimental
- Nutrition Abstracts and Reviews Series A: Human and Experimental Biology
- Nutrition Abstracts and Reviews Series B: Livestock and Feeding
- Pascal
- Periódica (Índice de Revistas Latinoamericanas en Ciencias)
- Poultry Abstracts
- Protozoological Abstracts
- REDIB
- Research Alert
- Review of Agricultural Entomology
- Review of Medical and Veterinary Entomology
- Review of Medical and Veterinary Mycology
- Review of Plant Pathology
- Scirus
- Seed Abstracts
- Veterinary Bulletin
- Water Resources Abstracts
- Weed Abstracts
- Plataforma Open Access de Revistas Científicas Electrónicas Latinoamericanas (e-revist@s) [www.erevistas.csic.es](http://www.erevistas.csic.es)
- Free Journal Network

**CONTENTS • CONTENIDO**

- Time partitioning among neotropical frugivorous bats: effects of phylogeny, body size, and abundance** 1149-1163  
Manuel Francisco Cano & Oscar E. Murillo-García
- Genetic connectivity of the metapopulation of the coral *Pocillopora verrucosa* (Scleractinia: Pocilloporidae) in multi-use marine protected areas of the Gulf of California, and management implications** 1164-1178  
Fernando Aranceta-Garza, Pedro Cruz-Hernández, Héctor Reyes-Bonilla & Eduardo F Balart
- Anti-leishmanial activity of 29 daily sessions of intralesional-pentavalent antimony administration on *Leishmania (Viannia)*-infected BALB/c mice** 1179-1188  
Angélica María Vera, Julio Cesar Mantilla & Patricia Escobar
- Tree structure and diversity of a Humid Mountain Forest in the protected natural area La Martinica, Veracruz, Mexico** 1189-1203  
Rosa Lina López-Álvarez, Mario Luna-Cavazos, Juan Ignacio Valdez-Hernández & Edmundo García-Moya
- Avances de la bioinformática en Costa Rica: vista retrospectiva y perspectivas** 1204-1223  
**Bioinformatics advances in Costa Rica: retrospective view and perspectives. [In Spanish with English abstract]**  
Rebeca Campos-Sánchez, Andrés Flores-Cruz, José Arturo Molina-Mora, Rodrigo Mora, César Rodríguez, Andrés Gatica-Arias & Caterina Guzmán-Verri
- Trap rebuilding by *Myrmeleon brasiliensis* larvae (Neuroptera: Myrmeleontidae) in response to flooding: the effect of body size** 1224-1232  
Vitor Gabriel de Oliveira Leite, Raquel Braga Aquino Florenciano, Edihanne Gamarra Arguelho & Tatiane do Nascimento Lima
- Efecto de la reubicación de nidos en el éxito reproductivo de la tortuga marina *Lepidochelys olivacea* (Testudinata: Cheloniidae)** 1233-1241  
**Effect of nest relocation on the reproductive success of the marine turtle *Lepidochelys olivacea* (Testudinata: Cheloniidae). [In Spanish with English abstract]**  
José Luis Sandoval Ramírez, Elena Solana Arellano, Rafael Flores Garza, Pedro Flores Rodríguez, Sergio García Ibáñez & Himmer Castro Mondragón
- Efecto de la temperatura y concentración de microplásticos en la tasa de filtración del mejillón *Semimytilus algosus* (Mytiloidea: Mytilidae)** 1242-1251  
**Effect of temperature and microplastic concentration on the filtration rate of the mussel *Semimytilus algosus* (Mytiloidea: Mytilidae). [In Spanish with English abstract]**  
Angelo Gomez, Sergio Gonzales & Juan C. Francia-Quiroz

- Potencial de reducción de emisiones y captura de carbono en bosques y sistemas agroforestales con cacao en el Pacífico colombiano** 1252-1263  
**Potential for reducing emissions and carbon sequestration in forests and cocoa agroforestry systems in the Colombian Pacific. [In Spanish with English abstract]**  
 Víctor Eleazar Mena-Mosquera & Hernán J. Andrade C.
- Estructura poblacional del árbol *Avicennia germinans* (Acanthaceae) en un manglar alterado del Golfo de México** 1264-1275  
**Population structure of *Avicennia germinans* trees (Acanthaceae) in a disturbed mangrove in the Gulf of Mexico. [In Spanish with English abstract]**  
 Agustín de J. Basáñez Muñoz, Adán G. Jordán Garza, Arturo Serrano, Ascensión Capistrán Barradas, Celina Naval Ávila & Liliana Cuervo López
- Effects of the submerged macrophyte *Ceratophyllum demersum* (Ceratophyllaceae) and the cladoceran *Moina micrura* (Cladocera: Moinidae) on microalgal interactions** 1276-1288  
 Vitor Ricardo de Souza, Cihelio Alves Amorim & Ariadne do Nascimento Moura
- Vertical stratification of arthropods in the dry ecosystems of Colombian Guyana: morphological patterns and their ecological implications** 1289-1305  
 Edgar Camero Rubio, Johanna Paola Cárdenas & Jaime Marín Ballesteros
- Bibliometrics of Latin American research on COVID-19 in the first year of the pandemic: the main trends** 1306-1321  
 Wen-Ta Chiu & Yuh-Shan Ho
- Abundancia de aves playeras (Charadriiformes: Scolopacidae) y su relación con la temperatura del agua en un humedal de Perú (2013-2019)** 1322-1332  
**Abundance of shorebirds (Charadriiformes: Scolopacidae) and its relationship with water temperature in a wetland in Peru (2013-2019). [In Spanish with English abstract]**  
 Jorge Podestá & Daniel Barona

### **Journal scope**

Our journal publishes scientific articles that increase our understanding of biology, conservation, and biomedical life sciences in the tropics. Selection criteria are the quantity and quality of new information and its potential interest to the general audience as well as to specialists. The studied ecosystems, or at least the organisms, must be tropical.

We give preference to feature articles that include testable study questions—for example, studies with an experimental design evaluating factors that influence biological variables, or studies that explain the mechanisms underlying biological or biomedical phenomena such as, for example, behavior or physiology. Field studies should present temporal or spatial patterns. We also welcome systematic or phylogenetic studies above the species level, meta-analyses and literature reviews that critically examine what is known and what remains to be done in any field of tropical biology. Notes, short communications, species lists, range extensions, new records and other preliminary, short studies, or highly specialized reports of limited interest are no longer accepted.

### **Format and page charges**

Text must be clear, brief and without repetitions according to CSE norms (council-scienceeditors.org/). Use International System (SI) units and abbreviations (m, km, kg, ml, s; details in bipm.org).

Page charges: There is no compulsory page fee for the first ten pdf pages. Additional pages will be charged \$50 each. A document that corresponds to the maximum length published free of charge typically has about 5 000 words, two figures and two small tables.

### **Tables**

Avoid very small or very large tables (half a page is usually a good size). Table headings must be brief. Do not use bold font, words

completely spelled in upper case or separation lines. All symbols and abbreviations must appear as footnotes.

### **Figures**

Attach sharp photographs at 300 DPI and illustrations at 600 DPI (we accept JPG TIFF, PNG and Photoshop). Very important: all figures must have labels using Helvetica 10 points as their only font type and size (Check our Figures Guide).

### **References**

Present the list of references and citations within the text in APA 7<sup>th</sup> Edition format. We recommend freeware: zotero.org and mendeley.com

### **Stages in manuscript processing**

Manuscripts that follow our scope and format indications are sent to three external reviewers who make recommendations to improve them or qualify them as unacceptable. The second draft is corrected by our staff and returned with instructions to prepare the final version for the printer. The Editorial Board has the final word on acceptance.

### **Legal and ethical requirements**

Follow all format details from a recent issue <https://revistas.ucr.ac.cr/index.php/rbt/index>. Include the ethical and legal requirements form signed by all coauthors (download from journal website). Include the names and e-mail addresses of three possible objective reviewers.

**Submit via <https://revistas.ucr.ac.cr/index.php/rbt/about/submissions>** Contact us if you do not receive the automatic submission reception message.

## ETHICS

When authors submit a manuscript they legally imply that they followed all pertinent legislation and ethical principles (including informed consent and proper treatment of nature according to UNESCO Recommendation on Science and Scientific Researchers; Committee on Publication Ethics and Helsinki Ethical Norms, [onlineethics.org](http://onlineethics.org)); that all coauthors participated in the main aspects of research and agree to publication; and that the study is original; scientifically valid; has not been published before, and was not sent simultaneously to another journal. You share non-exclusive printed and electronic publication rights with the Journal and that you accept to comply with all Journal norms regarding procedure, format, decision, and other pertinent aspects; that you understand that only ten pdf pages are published for free (additional pages cost \$50 each).

Board and staff members can publish in the journal but are excluded from all decisions regarding their manuscripts. Authors, reviewers, board members and staff must report conflicts of interest as soon as they arise. Any cases of error, citation manipulation, piracy, plagiarism, duplicate submission, republication, fabrication or falsification of data, and financial conflict must be informed to the Editorial Board, which will investigate them even if the report is from anonymous sources. Articles found in fault can be rejected, retracted or be added errata.

## MANUSCRIPT PROCESSING AND TRANSPARENCY

Manuscripts are sent to three external anonymous reviewers who act as referees and include an ethics assessment in their opinion (we apply plagiarism software to all manuscripts). Neither authors, nor reviewers, know each other identities (i.e. doble blind). The evaluation forms are public ([https://revistas.ucr.ac.cr/docs/RBT/RBT\\_evaluation.pdf](https://revistas.ucr.ac.cr/docs/RBT/RBT_evaluation.pdf)).

The decision of acceptance or rejection rests with the Editor, who is based on the opinions of referees and is backed by the support of an Editorial Board and an International Scientific Board. Authors can appeal Editor's decisions once to the Editorial Board and that decision is final. Board meeting proceedings are stored in the University Archive as public documents.

The journal publishes about 130 articles per year, not including the occasional supplements. The rejection rate is 28 % *ad portas* and 38 % after peer review (2018 data).

Considering both boards, 82 % of members are external to the publishing institution and foreign authors and institutions represent 78 % of articles in normal issues and 12 % of supplements (2018 data). All processing is documented in OJS.

## OPEN ACCESS, COPYRIGHT AND DATA TRANSPARENCY

Copyright is shared by the authors and the journal; contents can be reproduced if the source and copyright are acknowledged, according to the Open Access license. Self-storage in preprint servers and repositories is allowed for all versions. We encourage authors to publish raw data and data logs in public repositories and to include the links since the first draft so that reviewers and readers can consult them at any time. Blogs with comments and a Forum section that allows reply articles are available to readers in our website.

The journal is financed by public funds via the Universidad de Costa Rica and editorial independence and ethical compliance are guaranteed by SIEDIN norms (<https://bit.ly/2Dwyg36>); we do not publish paid adds or receive funds from companies.

<https://revistas.ucr.ac.cr/index.php/rbt/about>

# IMPORTANT

**We have improved our abstracts to help readers rapidly understand why a paper is important, and what the authors wanted to achieve, how they did it, and what they found.  
Please conform your abstract to this example\***

**ABSTRACT. Introducción:** Interspecific interactions among tropical mesocarnivorous species and other mammalian trophic guilds have been poorly studied, despite their important implications in the survival, structure, demography, and distribution of these species. **Objective:** To analyze if sympatric mesocarnivores coexist or compete in the axis of the temporal and spatial niche. **Methods:** From January 2015 to December 2016 we recorded mammals with 26 stations of camera traps (in pairs, facing each other) along roads and animal trails, at Reserva de la Biosfera El Cielo, Tamaulipas, Mexico. We calculated temporal and spatial overlaps with the Czezanowski and Pianka indices. **Results:** We obtained 239 margay, 118 ocelot and 22 yaguarundi records. Margay and ocelot were nocturnal (75 % of their records) and had a high temporal overlap (0.85); whereas yaguarundi was fully diurnal, suggesting it may be able to coexist with the other two species. The three species used similar habitats: yaguarundi had 0.81 spatial overlap with margay and 0.72 with ocelot; spatial overlap between margay and ocelot was intermediate (0.53). **Conclusions:** There is no interspecific competition among these tropical mesocarnivores, probably due to antagonistic interactions leading to use of different parts of the temporal and spatial axes.

- \* Sample based on *Interacciones temporales y espaciales de mesocarnívoros simpátricos en una Reserva de la Biosfera: ¿coexistencia o competencia?* By R. Carrera-Treviño, et al. (*Revista de Biología Tropical* 66, 3 (2018): DOI 10.15517/rbt.v66i3.30418

---

# IMPORTANTE

**Hemos mejorado nuestros resúmenes para ayudar a los lectores a entender rápidamente por qué un artículo es importante, y lo que los autores querían lograr, cómo lo hicieron, y qué encontraron.  
Por favor escriba su resumen según este ejemplo\***

**RESUMEN. Introducción:** Las interacciones entre especies de mesocarnívoros tropicales y otros gremios tróficos de mamíferos han sido muy poco estudiadas, a pesar de sus importantes aplicaciones en la supervivencia, estructura, demografía, y distribución de estas especies. **Objetivo:** Analizar si los mesocarnívoros simpátricos coexisten o compiten en el eje del nicho temporal y espacial. **Métodos:** De enero 2015 a diciembre 2016, registramos mamíferos con 26 estaciones de cámaras trampa (en pares, una frente a la otra) a lo largo de caminos y veredas, en la Reserva de la Biosfera El Cielo, Tamaulipas, México. Calculamos el traslape temporal y espacial con los índices de Czezanowski y Pianka. **Resultados:** Obtuvimos 239 registros de margay, 118 de ocelote y 22 de yaguarundi. El caucel y el ocelote son nocturnos (75 % de sus registros) y mostraron un alto traslape temporal (0.85); mientras que el yaguarundi fue totalmente diurno, sugiriendo que puede coexistir con las otras dos especies. Las tres especies usaron hábitats similares: el yaguarundi tuvo un traslape espacial de 0.81 con el caucel y de 0.72 con el ocelote; el traslape espacial entre el caucel y el ocelote fue intermedio (0.53). **Conclusiones:** No hay competencia interespecifica entre estas especies de mesocarnívoros tropicales, probablemente debido a interacciones agresivas que conducen al uso de partes diferentes de los ejes temporal y espacial.

- \* Ejemplo basado en *Interacciones temporales y espaciales de mesocarnívoros simpátricos en una Reserva de la Biosfera: ¿coexistencia o competencia?* Por R. Carrera-Treviño, et al. (*Revista de Biología Tropical* 66, 3 (2018): DOI 10.15517/rbt.v66i3.30418

**WEB OF SCIENCE**

The *Revista de Biología Tropical*  
International Journal of Tropical Biology and Conservation  
is included in the Web of Science platform:

**Science Citation Index • Biological Abstracts  
Zoological Records • Journal Citation Reports  
Current Contents**

Web of Science: world-class research literature linked to a rigorously selected core of journals, regional citation indexes, patent data, specialized subject indexes, and an index of research data sets.

Clarivate Analytics  
1500 Spring Garden Street, 4th Floor  
Philadelphia, PA 19130 | USA  
Phone: 1(215) 823-6693  
clarivate.com



The Revista de **BIOLOGÍA TROPICAL**  
International Journal of **TROPICAL BIOLOGY** and Conservation  
is included in



REVISTA DE BIOLOGÍA TROPICAL

Articles  include patents  Case law



The *Revista de Biología Tropical*  
International Journal of Tropical Biology and Conservation  
is included in the microform publishing and digitization program of  
National Archive Publishing Company  
NAPUBCO

[www.napubco.com](http://www.napubco.com)

Tel.: 1-734-302-6500 ext. 2479. Fax: 734-302-6581  
National Archive Publishing Company, 300 N. Zeeb Road,  
P.O. Box 998, Ann Arbor, MI 48106-0998 USA.



The *Revista de Biología Tropical*  
International Journal of Tropical Biology and Conservation  
is available from the

**Natural History Book Service**

[www.nhbs.com](http://www.nhbs.com)

Tel.: +44(0)1803-865913  
Natural History Book Service, 2-3 Wills Road,  
Totnes, Devon TQ9 5XN, United Kingdom.

You can order journal supplements, as well as a variety of books on tropical nature, published by University of Costa Rica Press and other respected Costa Rican publishers

Sistema Regional de Información  
en Línea para Revistas Científicas  
de América Latina, el Caribe, España y Portugal



Latindex has the widest coverage of the scientific literature published in Latin America, Spain and Portugal

The *Revista de Biología Tropical*  
International Journal of Tropical Biology and Conservation  
is included in **Latindex**

<http://www.latindex.unam.mx/>

Phone (52-55) 5622 1632 or (52-55) 5616 0664  
Latindex, Dirección General de Bibliotecas de la UNAM, Ciudad Universitaria,  
Universidad Nacional Autónoma de México, 04510 México, D.F.

The *Revista de Biología Tropical*  
International Journal of Tropical Biology and Conservation  
is included in Scielo, the Scientific Electronic Library Online and other BIREME services



Scientific Electronic Library Online  
[www.scielo.org](http://www.scielo.org) • [www.bireme.org](http://www.bireme.org)

Tel.: (55 11) 5576-9800 • Fax: (55 11) 5575-8868 • Centro Latinoamericano e  
do Caribe de Informação em Ciências da Saúde Rua Botucatu, 862 • cep: 04023-901.  
São Paulo/SP • Brasil



[redalyc.uaemex.mx](http://redalyc.uaemex.mx)

La Red de Revistas Científicas de América Latina y el Caribe, España y Portugal es un proyecto impulsado por la Universidad Autónoma de Estado de México.

**CONSULTA ESPECIALIZADA  
POR ÁREA Y POR PAÍS**



**REDIB** | Red Iberoamericana  
de Innovación y Conocimiento Científico