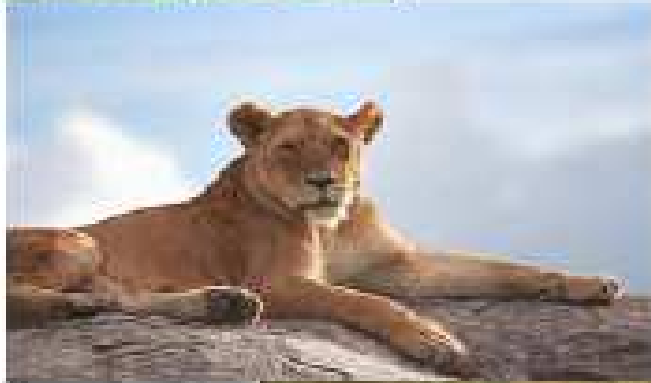


**AN
IMAL
R
OR
H
I
R
Z
A
ON
A**



Volume 10 Number 3

December 2013

**An International Peer Reviewed
Multidisciplinary Open Access Journal
Publishing Original Research Involving the
Use of Animals and Animal Products**

ISSN: 5197-3115

Website: www.zoo-unn.org

Animal Research International®

Animal Research International is an online Journal inaugurated in University of Nigeria to meet the growing need for an indigenous and authoritative organ for the dissemination of the results of scientific research into the fauna of Africa and the world at large. Concise contributions on investigations on faunistics, zoogeography, wildlife management, genetics, animal breeding, entomology, parasitology, pest control, ecology, malacology, phytonematology, physiology, histopathology, biochemistry, bioinformatics, microbiology, pharmacy, veterinary medicine, aquaculture, hydrobiology, fisheries biology, nutrition, immunology, pathology, anatomy, morphometrics, biometrics and any other research involving the use of animals are invited for publication. While the main objective is to provide a forum for papers describing the results of original research, review articles are also welcomed. Articles submitted to the journal is peer reviewed to ensure a high standard.

Editors:

Professor FC Okafor
Professor JE Eyo

Editorial Advisory Committee

Prof. M. C. Eluwa	Prof. A. O. Anya
Prof. N. M. Inyang	Prof. E. I. Braide
Prof. B. O. Mgbenka	Dr. G. T. Ndifon
Prof. Bato Okolo	Prof. P O. Ubachukwu
Prof. I B Igbinosa	Prof. N. Umechue
Prof. A. A. Olatunde	Prof. B. E. B. Nwoke
Prof. O. A. Fabenro	Prof. F. J. Udeh
Prof. R. P. king	Prof. A. A. Adebisi
Prof. E. Obiekezie	Prof. W. S. Richards
Prof. J. A. Adegoke	Prof. W. A. Muse
Prof. D. N. Onah	Prof. O. U. Njoku

Animal Research International®

Notice to Contributors

Original research papers, short communications and review articles are published. Original papers should not normally exceed 15 double spaced typewritten pages including tables and figures. Short communications should not normally exceed six double spaced typewritten pages including tables and figures. Manuscript in English

including all illustrations should be submitted online at joseph.eyo@unn.edu.ng or animalresearchinternational@gmail.com to The Editor, Animal Research International, Department of Zoology and Environmental Biology, P. O. Box 3146, University of Nigeria, Nsukka. Submission of research manuscript to Animal Research International is understood to imply that it is not considered for publication elsewhere. Animal Research International as a policy will immediately acknowledge receipt and process the manuscript for peer review. The act of submitting a manuscript to Animal Research International carries with it the right to publish the paper. A handling charge of US \$ 10.00 or ₦1000.00 per manuscript may be sent along with the manuscript to the Editor, Animal Research International. Publication will be facilitated if the following suggestions are carefully observed:

1. **Manuscript** should be typewritten in double spacing on A4 paper using Microsoft Word. An electronic copy [CD] should be enclosed, or submit online at joseph.eyo@unn.edu.ng or animalresearchinternational@gmail.com
2. The **title page** should include title of the paper, the name(s) of the author(s) and correspondence address (es).
3. **Keywords** of not more than 8 words should be supplied.
4. An **abstract** of not more than 5% of the length of the article should be provided.
5. **Tables and figures** should be kept to a minimum. Tables should be comprehensible without reference to the text and numbered serially in Arabic numerals.
6. **Figures** (graphs in Microsoft excel format, map in corel draw 10 format and pictures in photo shop format) should be comprehensible without reference to the text and numbered serially in Arabic numerals. Electronic version of figures should be submitted either in Microsoft excel format, map

in corel draw 10 format and pictures in photo shop format online.

7. **Symbols and common abbreviations** should be used freely and should conform to the Style Manual for Biological Journals; others should be kept to a minimum and be limited to the tables where they can be explained in footnotes. The inventing of abbreviations is not encouraged- if they are thought essential, their meaning should be spelt out at first use.

8. **References:** Text references should give the author's name with the year of publication in parentheses. If there are two authors, within the text use 'and'. Do not use the ampersand '&'. When references are made to a work by three or more authors, the first name followed by *et al.* should always be used. If several papers by the same author and from the same year are cited, a, b, c, etc., should be inserted after the year publication. Within parentheses, groups of references should be cited in chronological order. Name/Title of all Journal and Proceeding should be written in full. Reference should be listed in alphabetical order at the end of the paper in the following form:

EYO, J. E. (1997). Effects of *in vivo* Crude Human Chorionic Gonadotropin (cHCG) on Ovulation and Spawning of the African Catfish, *Clarias gariepinus* Burchell, 1822. *Journal of Applied Ichthyology*, 13: 45-46.

EYO, J. E. and MGBENKA, B. O. (1997). Methods of Fish Preservation in Rural Communities and Beyond. *Pages 16-62. In: Ezenwaji, H.M.G., Inyang, N.M. and Mgbenka B. O. (Eds.). Women in Fish Handling, Processing, Preservation, Storage and Marketing.* Inoma from January 13 - 17, 1997.

WILLIAM, W. D. (1983) *Life inland waters.* Blackwell Science, Melbourne

9. **Cover letter** stating that the manuscript is original and as long as it is being considered for publication in ARI, has not been sent any where for publication. Suggestion of three reviewer and their

emails will hasten peer review and shorten time of publication. Peer reviewed manuscripts are copy edited for clarity, conciseness, and for conformity to journal style.

Proof

A marked copy of the proof will be sent to the author who must return the corrected proof to the Editor with minimum delay. Major alterations to the text may not be accepted.

Page charges

A subvention of US \$135.00 (₦15, 000.00) is requested per published article. The corresponding author will receive five off-prints and a copy of the journal upon payment of the page charges.

Copy right

Manuscript(s) sent to ARI is believed to have not been send elsewhere for publication. The author upon acceptance of his/her manuscript give ARI the full mandate to electronically distribute the article globally through African Journal Online (AJOL) and any other abstracting body as approved by the editorial board.

Address

Animal Research International, Department of Zoology and Environmental Biology, P. O. Box 3146, University of Nigeria, Nsukka

Phone: 08026212686, 08054563188

Website: www.zoo-unn.org

Email: joseph.eyo@unn.edu.ng or animalresearchinternational@gmail.com

Subscription Information

Animal Research International is published in April, August and December. One volume is issued each year. Subscription cost is US \$200.00 a year (₦1, 400.00) including postage, packing and handling. Each issue of the journal is sent by surface delivery to all countries. Airmail rates are available upon request. Subscription orders are entered by calendar year only (January - December) and should be sent to The Editor, Animal Research International, Department of Zoology and Environmental Biology, P. O. Box 3146, University of Nigeria, Nsukka. All questions

especially those relating to proofs, publication and reprints should be directed to The Editor, Animal Research International, Department of Zoology and Environmental Biology, P. O. Box 3146, University of Nigeria, Nsukka

Change of address

Subscribers should notify The Editor of any change in address, 90 days in advance.

Advertisements

Apply to Animal Research International, Department of Zoology and Environmental Biology, P. O. Box 3146, University of Nigeria, Nsukka.

**ANNUAL SUBSCRIPTION RATE
THREE NUMBERS PER VOLUME**

CATEGORY	DEVELOPING COUNTRY	DEVELOPED COUNTRY	NIGERIA
STUDENT	\$ 200.00	\$ 300.00	N 1,400.00
INDIVIDUALS	\$ 300.00	\$ 350.00	N 2,000.00
INSTITUTION/LIBRARY	\$ 500.00	\$ 600.00	N 5,000.00
COMPANIES	\$ 600.00	\$ 750.00	N 10,000.00

Pay with bank draft from any of the following banks **only**. **(a)** Afribank **(b)** Eco Bank **(c)** Access Bank **(d)** Standard Trust Bank **(e)** United Bank for Africa **(f)** Union Bank **(g)** Zenith Bank **(h)** First Bank Nig. PLC **(i)** Western Union Money Transfer.

Addressed to **The Editor**, Animal Research International, Department of Zoology and Environmental Biology, P. O. Box 3146, University of Nigeria, Nsukka.

Alternatively, you may wish to send the bank draft or pay cash directly to **Prof. JE Eyo** Animal Research International Editorial Suite, 326 Jimbaz Building, University of Nigeria, Nsukka.

For more details contact, The Secretary, Animal Research International, Department of Zoology and Environmental Biology, Editorial Suite Room 326, Faculty of Biological Sciences Building (Jimbaz), University of Nigeria, Nsukka. Enugu State, Nigeria.



ANIMAL RESEARCH INTERNATIONAL®

Global Impact Factor: 0.562

<http://globalimpactfactor.com/journals-list/?snap=A>

Guide for Authors

Dear Sir/Madam,

Re: Manuscript Number.....Title:.....

Your above named article has been reviewed by our referee(s). If you carry out all the corrections as directed by the reviewer(s) and implement all the instructions in this guide for authors, then your article may be accepted for publication in Animal Research International.

You are free to disagree with the referee(s). In such a case, give convincing explanations for your disagreement. But, note that unnecessary disagreement may cause undue delays for your paper.

The referee(s) must have made some comments, remarks, questions, etc either directly on your manuscript or on an attached paper. On a separate sheet of paper, state clearly and sequentially (= one after the other) how you have addressed the concerns of the reviewer(s). In doing this, number your responses to correspond with the numbers of the referee's questions or remarks. Additionally, make appropriate references to page, paragraph, line, etc to the comments on the old manuscript and point out how and where page, paragraph, line, etc in the revised manuscript you have addressed the issues raised. As an illustration, you must arrange your responses in this manner.

Referee Comment No.1: On page 2, paragraph 1, line 7 the referee wanted me/us to state the advantages and disadvantages of xyz process.

Reply: I/We have given 6 advantages and 4 disadvantages of xyz method (see revised manuscript page 2 paragraph 2, line 3 to 15).

Referee Comment No.2: The referee suggested how I/We should re-write properly the sentence on page 3 line 7 to 9.

Reply: This sentence has been re-written as suggested (see new manuscript page 4, paragraph 2 line 8 to 9. The same must be done to the comments from the second referee if any.

Re-type your article with computer using a recent version of Microsoft Word (Office 2003 - 2010 or Office XP). Use the spell check option in the computer to ensure that your work is free from spelling errors, etc.

Please, note the following while re-typing your article. Use Tahoma for all pages including tables, figures and references. The Text must be justified. Use single line spacing throughout. Do not leave gaps or blank spaces inside text or between sections. Do not underline any word or sentence throughout your article. Write all Latinized words (such as et al), zoological and botanical names in italics. The top margin should be = 1, bottom margin = 1, right margin = 1, left margin = 1 inch.

The First Page: In formatting the first page of your article, follow the style/design in the model/sample article by (EYO and EZECHIE) attached. Insert all the 5 horizontal lines - exact thickness and position. Note that each line starts on the left margin and ends on the right margin. The topmost line is thicker (6 pt) than the other 4 lines (1 pt). The two lower most lines are about two line spaces apart. Nothing is written in the space between these two lower most lines. You must format/design your first page to be exactly similar to the model/sample article

Title of your article: Use capital (upper case, bold, single line spacing). Use font size =14. Type from left to right margin (select and click centre).

Names and addresses of author(s): Use Tahoma font size 10. Arrange your names in this format EYO, Joseph Effiong. Note that only the surname is in capital letters. Centre the names. The Institution's address should be typed under the name (s) and centered. In a multi author paper, separate each author's name from the other with and for two authors and with a comma with the last author beginning with and (EYO, Joseph Effiong, INYANG, Nicholas Matthias and OLUAH, Ndubuisi Stanly). In writing your name(s) and address (es), by, &, should not be used. You must include your phone number, fax number, Email address, etc as part of your address for easy correspondence.

Major Headings: Use Tahoma font size 10. All major headings must be in capital letters and bold. Note that words like **ABSTRACT, INTRODUCTION, MATERIALS AND METHODS, RESULTS, DISCUSSION, ACKNOWLEDGEMENT** and **REFERENCES** are headings. Start each heading at the left margin. Leave one line space after each heading and start the sentence on the next line. Do not indent sentences following major heading. Major headings must not be indented.

Sub headings: Use Tahoma font size 10. All sub headings must be in title case and bold. For example (**Acceptability Index of Heterotis niloticus Fed Rice Bran**). The first letter of the first word where applicable must be capitalized, anyway, the first letter in

connecting words such as and, of, from, with, to an, etc should not be capitalized). After each sub heading, begin the following sentence on the same line. Please, note: Summary, Conclusion and Recommendation are subheadings under DISCUSSION. All subheadings must not be indented.

Abstract: Use Tahoma font size 10. The text of the abstract must be bold, *italicized* and not in more than one column. Abstract text must be one paragraph.

Keywords: This is a sub heading. The word keywords must be written as one word. About 10 words are okay.

References: Use Tahoma font size 10. The word REFERENCES is a major heading. In listing your references do not underline or bold any word or sentence. Use Surname followed by initials in writing names of authors and editors in reference. Use the hanging paragraph style and indent the second line to the 5th letter under the surname of the senior author. For uniformity, all authors must follow the Animal Research International® style of referencing. Ensure that all references cited in text are listed under the REFERENCE and vice versa. After writing one reference, skip a line before writing the next reference. Use one line spacing throughout. Ensure that the references are justified on both margins. Surnames of authors and editors should not be in capital case.

Tables: Use Tahoma font size 10. Single line spacing and must be inserted within the text preferably one page should carry one table, but smaller tables may be inserted two to three on a page. Tables must be numbered consecutively using Arabic numerals e.g. Table 1, Table 2, etc. Each table must be referred to in text. Table captions must be in lower case and bold. Notes (if any) given just below tables must be in italics. In the table format on Microsoft Word, Table Classic 1 format with the heading row checked should be used. This will produced a table with two top horizontal lines and one bottom line.

Figures: Please, note that graphs, diagrams, maps, photographs, etc. are figures. Use Tahoma font size 10. All figures must be numbered consecutively using Arabic numerals e.g. Figure 1, Figure 2, etc. Insert all figures in text. Each figure must be referred to in text. Captions to figures must be in lower case and bold. Do not use the term plate to refer to your photographs. Your figures must be camera ready. Do not produce figures in color but in black and white.

Paragraphs: Please, indent the first word of a new paragraph except for those following the major heading. Do not indent subheadings. Do not skip or leave any line space just above a sub heading or above the first line of a paragraph.

Indentation: All indentations should be about 5 letters. Note that apart from the title with font size = 14, all other texts in the article have font size = 10.

Length of Article: If you follow these instructions carefully, your new manuscript will be roughly half the length of the original article. Your article (Title + Abstract + main text + Fig + Tables, + References, etc) should not exceed 10 pages. If it exceeds 10 pages, you may pay extra for the extra pages.

Send articles only by e-mail: editorari@zoo-unn.org and copy animalresearchinternational@gmail.com or joseph.eyo@unn.edu.ng Write the reference number of your article on the lower left corner of the manuscript.

It is hereby reiterated that your manuscript will be returned to you if you fail to comply with any instructions. Each sole author or senior author or corresponding author will be given one free copy of the journal that contains his/her article.

Publication fee

1. Please, return the corrected manuscript along with the prescribed publication fee of US \$135.00 (₦ 15,000.00) only for acceptance and publication of your manuscript in Animal Research International.

Online payment in Naira: **Account Name:** Prof Joseph Eyo, **Account Number:** 3067798772, **Bank:** First Bank Nigeria PLC.

Online payment in US Dollar: **Account Name:** Prof Joseph Eyo, **Account Number:** 2023220793, **Bank:** First Bank Nigeria PLC.

Swift code: FBINGLAXXX **Sort code:** 011150000 **Beneficiary Address:** Department of Zoology and Environmental Biology, University of Nigeria, Nsukka, Enugu State, Nigeria. **Beneficiary Bank:** First Bank Nigeria PLC, University of Nigeria, Nsukka Branch.

2. Write your manuscript number on your covering letter [or enclose a scanned of this letter] along with your payment voucher and Email to The Accountant, accountari@zoo-unn.org Animal Research International Account Section, Department of Zoology and Environmental Biology, POBox 3146, University of Nigeria, Nsukka as a proof of payment..

ARI publication ethics and copy right policy

Read the publication ethics and fully comply with the issues raised regarding authorship of manuscripts. Fill and return electronically the attached ARI copy right policy. Manuscripts will not be published without the declaration of the corresponding author. Mail the ARI copy right policy form to ari@zoo-unn.org and copy joseph.eyo@unn.edu.ng or animalresearchinternational@gmail.com

Surface mail to: The Editor, Animal Research International, Department of Zoology and Environmental Biology, P. O. Box 3146, University of Nigeria, Nsukka, Enugu State, Nigeria.

The deadline for the receipt of your revised manuscript is... ..

Animal Research International is associated and indexed in EBSCO USA, African Journal Online (AJOL), Thompson Reuters, Zoological Record, CABI, Google Scholar, Global Impact Factor Canada, Research Bible, Contemporary Research Index, OPEN J-GATE, Academic Papers Database, Scientific Publications Index, Digital Journals Database, Scientific Resources Database, Current Index to Scholarly Journals, Recent Science Index, Elite Scientific Journals Archive, Scholarly Journals Index, Directory of Academic Resources, ProQuest Agriculture Journals, ProQuest Biological Science Journals, ProQuest Illustrata: Natural Science, ProQuest Natural Sciences Journals, ProQuest SciTech Journals

Animal Research International

ISSN: 1597-3115

Global Impact Factor: 0.562

<http://globalimpactfactor.com/journals-list/?snap=A>

Publication Ethics

Animal Research International is bound to upholding the highest standards and best practice of publication ethics and takes all necessary measures against publication malpractice. **Animal Research International** publication ethics is based, in large part, on the guidelines and standards developed by the [Committee on Publication Ethics \(COPE\)](#).

Authors who submit papers to Animal Research International must attest in writing that their article is original and unpublished, and is not under consideration for publication elsewhere. In addition, the corresponding author must attest that the article is a product of their own research; that it has not been plagiarized or copied, in whole or in part, from any other published works; and that they have disclosed actual or potential conflicts of interest with their work or partial benefits associated with it.

Animal Research International is also bound to upholding objective, fair and fast double-blind peer review of submitted manuscripts. **Animal Research International** is also committed to preventing any (actual or potential) conflicts of interest between authors, editors and reviewers. Problems that arise in relation to any of the above are addressed by the Editor, who is committed to providing quick and unbiased resolutions to disputes.

DUTIES OF EDITORS

- **Decision on the Publication of Articles:** The Editor of Animal Research International (Anim. Res. Inter.) is responsible for deciding which of the revised articles should be published. The Editor must at all time be guided by the policies of the journal's editorial board and subjected to such legal requirements regarding libel, copyright infringement and plagiarism. The Editor must at all times seek the opinion of other editors or reviewers in making this decision.
- **Review of Manuscripts:** The Editor must ensure that each manuscript is initially evaluated by the editor, who may make use of appropriate software to examine the originality of the contents of the manuscript (plagiarism check) and after passing this test, manuscript is forwarded without the details of the author(s) to two referees for blind peer review, and each of whom will make a recommendation to publish the manuscript in its present form or to modify or to reject the same. The review period will be from two weeks to one month (maximum two months in extra ordinary circumstances). Before forwarding the manuscript to the reviewer the Editor must have requested the reviewer willingness to review the manuscript through an email with the abstract attached.
- **Disclosure and conflicts of interest:** Unpublished materials in a submitted manuscript must not be disclosed, used, plagiarized or copied by anyone who has a

view of the manuscript in his or her own research without the express written permission of the author.

- **Fair play:** Manuscripts shall be evaluated solely on their relevant contributions to knowledge and intellectual merit without prejudice to authors' age, race, gender, sexual orientation, religion, ethnicity, citizenship, previous publication/association with the journal, or political philosophy.
- **Confidentiality:** The Editor and members of the Editorial crew must not disclose any information about submitted manuscript to anyone other than the corresponding author, reviewers (potential and actual reviewers), members of editorial advisory committee and the publisher.

DUTIES OF REVIEWERS

- **Promptness:** In case, any reviewer can not complete review of manuscript within stipulated time frame due to earlier commitment, then the same must be communicated to the editor, so that the article could be sent to any other reviewer.
- **Confidentiality:** Information regarding submitted manuscript should be kept confidential and be treated as privileged information.
- **Standards of Objectivity:** Reviews should be conducted promptly and objectively. There should be no personal criticism of the author. Reviewers should express their views politely and clearly with supporting arguments and documents were possible. The use of offensive language should be avoided.
- **Acknowledgement of Sources:** It is very important that Reviewers identify relevant published work(s) that has not been cited by the authors. Any statement that had been previously reported elsewhere should be accompanied by the relevant citation. Reviewer should inform the Editor of any substantial similarity or overlap between the manuscript under consideration and any other published paper of which they have personal knowledge.
- **Disclosure and Conflict of Interest:** Privileged information or ideas obtained through peer review must be kept confidential and not used for personal advantage in his or her own research without the express written permission of the author. Reviewers should not consider manuscripts in which they have interest in as a resulting of their association with the author(s) through mentoring, collaborations or other relationships or connections with any of the authors, or with companies or institutions connected to the author(s).

DUTIES OF AUTHORS

- **Reporting standards:** Authors of original research should present an accurate account of the work performed as well as an objective discussion of its significance. Underlying data should be represented accurately in the manuscript. A manuscript should contain sufficient and detailed information and all cited references to permit others researchers to replicate the study. Plagiarism, fraudulent listing of cited works, inaccurate statements and misrepresentation of known facts constitute unethical behavior and are unacceptable.

- **Data Access and Retention:** Authors may be asked to provide the raw data in connection with the manuscript for editorial review, and should be prepared to provide public access to such, if practicable, and should in any event be prepared to retain such data for a reasonable time after publication.
- **Originality and Plagiarism:** Authors should ensure that the article is entirely their original works, and if the authors have used the work and/or words of other researchers this must be appropriately cited or quoted.
- **Multiple Publications:** An author should not publish manuscripts describing essentially the same research in more than one journal or primary publication. Submitting the same manuscript or part of a manuscript to more than one journal concurrently constitutes unethical publishing behavior and is unacceptable.
- **Acknowledgement of Sources:** Proper acknowledgment of the work of other researchers must always be given. Authors should cite publications that have been influential in determining the scope and nature of the reported study. Where the research was funded, such grant holder (institutional/non institutional) must acknowledge the source of funding.
- **Authorship of the Manuscript:** Authorship should be limited to those who have made significant contribution to the conception, design, execution, data analysis, data interpretation and write-up of the reported study. All those who have made significant contributions should be listed as co-authors. In this regards Animal Research International requires submission of author's contributions stating each author's involvement in the study. Where there are others who have participated in certain substantive aspects of the research project, they should be acknowledged or listed as contributors.
- **Disclosure and Conflicts of Interest:** All authors should disclose in the manuscript any financial or other substantive conflicts of interest that may militate against publication of their manuscript or influence the results or interpretation of their manuscript. All sources of financial support for the project should be disclosed and acknowledge.
- **Fundamental Errors in Published Works:** When an author discovers a significant error or inaccuracy in his/her own published article, it is the author's obligation to promptly notify the journal editor or publisher and cooperate with the editor to retract or correct the manuscript. To stop the occurrence of errors in published work, authors are expected to carefully and painstaking read, correct and approve the galley proof for publication.



Prof. JE Eyo

Editor

Animal Research International