Biology of the East African Stomatopod

A research proposal

from

Mr. Michael Thomas Harbuck

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Michael Thomas Harbuck
130 Anderson Road
Roxboro, North Carolina
27573 USA

Dear Colleague,

I am a young man who, for the last six years, has studied the fields of biology, zoology, and the marine sciences. My goal to become an independant researcher has driven me to visit many universities, people and places on three continents. In 2004 I had the pleasure of visiting Kenya, and the institutes there. The preparations for my research project there are now complete, and I require an affiliation from an American organisation in order to be granted a research permit. Would you please affiliate my general biology research on the littoral stomatopod. I have included my resume, as well as the pertinent research information. The small project with a two year time frame will be funded by myself, and other private sponsors. For your afilliation you will receive a copy of each publication, reports from the field, data in the form of your choice, and of course, mention in any third party publication such as National Geographic or other scientific periodicals.

It is often said there is a lack general biology researchers, so I decided upon this profession. The project heirarchy will consist of myself, and the researchers from the University of Nairobi, Kenya. I will write quarterly progress report to all of the associated organisations, sponsors and interested persons. The team of researchers and organisations should be a formidable scientific force. The first week or two will be spent at the university for purposes of organisation, then all active researchers will travel to the coastal areas of Kenya. The collected data will be available to any and all organisations to use at no cost (I will however accept donations to further other projects) as long as name is given to all project researchers. I hope you find this acceptable, as it is a good practice. All samples are property of Kenya, and will be kept by the according institute or department. Permission to have samples tested outside of Kenya will be requested in writing for each laboratory or marine institute in question. The project will be independant research with association with American, European, and Kenyan affiliation. It is intended solely to further general information on the stomatopod species, and can be adapted to other species as well, in case you have other students interested in similar projects, and would like to perform a conjuctive study. **Please make this project information available to your students**.

The next step for me is the research permit, which I have to apply for as soon as possible in order to start in 2007, and keep the project schedule.

Therefore, would you please complete the portion of the form where the affiliation is requested, with a short letter, and return this to me. I will in turn then send the completed forms to the Ministry of Science and Education of the Kenya government. Any interested persons should contact me personally per post or email.

Sincerely,

Mr. Michael Thomas Harbuck

michaelharbuck@compuserve.de

Michael Thomas Harbuck
130 Anderson Road
Roxboro, North Carolina 27573 USA
E-mail: michaelharbuck@compuserve.de
Telephone. +49(0)175 /6580770

Education

1990 Lake Howell High School, Winter Park, Florida - Diploma
1994 Valencia Community College, Orlando, Florida
1997 Albert-Ludwigs University: Theology, German
1998 Ruprecht-Karls University, Heidelberg:, German, Philosophie

Professional Experience

1998 Practical Experience - Zoo Heidelberg under Dr. Wunnemann.
1999 Lab Worker - Pathologie Institute at the Ruprecht-Karls University, Heildelberg
Pharamacogical Test Subject - Internal Medicine on the University of Heidelberg
2000 Veterinary Assistant with Dr. Ulf Hellinger - Garmisch-Partenkirchen, Germany
2001 Stable Hand at Schmalensee Stables - Mittenwald, Germany - one year contract
2002 Stable Hand at a private residence in Grainau, Germany
2003 February - Stable Hand at Schmölz Stables- Experience with studs Grainau, Germany
March - Biannual meeting of the dGaaE (German Society for Genernal and Applied Entomology)
2004 March - Guest of 'The East African Wildlife Society' in Nairobi, Kenya. Guest of the Zoological Anatomy Department at Jomo Kenyatta University
April-September - Guest by Dr.Fazil and Mwangi, Mombasa, Kenya
Guest at the Kenya Marine and Fisheries Research Institute Library
October - Stable Hand in North Carolina, USA
November- May 2005 - construction work in Orlando, Florida
2005 May - Stable Hand in North Carolina, USA
July - present: Work at Tree Service Kurschatke, Garmisch-Partenkirchen, Germany

Other Skills

Excellent UNIX/Windows-Knowledge, Motor Repair and Mechanics. Student Pilot with 13 Hours. International Drivers Licence. Class III Amateur Radio Licence

Hobby and Free-time

I like to ride my bicycle and swim, and I enjoy learning very much.

Biology of the East African Stomatopod

Description:
1. Species Determination
2. Varieties
3. Familial Relatives
4. DNA Sequence

Environment:
1. Habitat
2. Physical Properties - Quantitative Assessment
3. Environmental Adaptations

Socioology:
1. Range
2. Migratory Trends
3. Peculiarities

Reproduction :
1. Life Cycle
2. Mating
3. Growth Coefficients
4. Life Expectancy
5. Breeding Possibilities
6. Problems in Captivity under Observation
7. Special Considerations

Ecology:
1. Prey and Predatory Impact
2. Symbionts
3. Ecological Peculiarities and Importance
3. The Human Impact Factor
4. Other Factors

Pathology :
1. Diseases
    a. Parasites
    c. Bacteria
    d. Viri
2. Deformities and Mutations

Further Studies:
1. Biochemistry of the East African Stomatopod
2. Toxicology of the East African Stomatopod
3. Embryology of the East African Stomatopod
4. Histology of the East African Stomatopod
5. Anatomy of the East African Stomatopod

Biology of the East African Stomatopod

Description:

1. Species Determination

The first research question regarding the East African Stomatopod is whether or not there are different species within certain types of underwater terrain in the tidal and near littoral zone.

2. Varieties

The characteristics which determine a variety within the single species include colour, size, and habitat.

3. Familial Relatives

In order to study the evolution and further development of the stomatopod, it is necessary to compare all relatives of the East African Stomatopod.

4. DNA Sequence

The DNA of the East African Stomatopod will be a beneficial tool in determining relationships to other stomatopods and crustaceans around the world.

Environment :

1. Habitat

The habitat defines the general surroundings within which the stomatopod lives; medium, climate, weather, terrain, and type of nest.

2. Physical Properties - Quantitative Assessment

The environment of the stomatopod habitat will be quantitatively assessed so that all information regarding the conditions in which the animal lives can be collected The ocean is an extremely dynamic place and provides all of the living beings within it the nutrients necessary for life.

3. Environmental Adaptations

Life in the oceans has demanded that the animals there adapt to all types of changes in their surroundings. Changes which affected a species millions of years ago are often visible in the ancestors of this being today. Are their signs of recent adaptations?

Sociology:

1. Range

The amount of space in nature which an animal needs to live and reproduce is termed range. How much territory does an East African Stomatopod require?

2. Migratory Trends

Seasonal migrations are found in many species of animal both on land and in the sea. Often there are migrations for the purpose of reproducing. Are these characteristics of the littoral stomatopod?

4. Peculiarities

What about the stomatopod make it extraordinarily a stomatopod? Are they social? Are there colonies? Are they always found individually?

Reproduction :

1. Life Cycle

Crustaceans are wonders of nature and undergo several metamorphous phases before they reach the adult stage and reproduce. In what respect is the stomatopod similar to other animals, and in what way is it divergent? From ovum to adultus.

2. Mating

This section will describe the physical aspects of the mating process.

3. Growth Coefficients

For each peculiarity in any number of various environmental variables the is a noted and marked growth rate. How and under what conditions does the stomatopod develop best?

4. Life Expectancy

How long will a captive stomatopod live? How long can an animal in the wild under optimal conditions live?

5. Breeding Possibilities

For the possibility that humans can obtain usable sustenance from the stomatopod, and for the purpose of study in a laboratory type situation, will it be possible to hatch ovum in an aquarium environment?

6. Problems in Captivity under Observation / Special Considerations

The laboratory observations will provide an excellent opportunity to examine the stomatopod. What will be found?

Pathology :

This sub study is best undertaken in conjunction with the laboratory observations of the general biological study with the material and minimal samples taken.

A Broad Spectrum Study can also be achieved with a five to eight year study which would include the “Further Studies”; Biochemistry of the East African Stomatopod, Toxicology of the East African Stomatopod, Embryology of the East African Stomatopod, Histology of the East African Stomatopod, and Anatomy of the East African Stomatopod. Quite a bit of work would be involved.

1. Diseases

a. Parasites

A majority of animals in the sea are the home for other animals which live in and near their host. Are stomatopods to be categorised into this group? If so, which parasites are present, and how do they affect the lives of their hosts?

b. Deformities and Mutations

Visible mutations and deformities are a good indicator of poor water quality and or disease to which attention should be paid. Are there regularly seen cysts or tumours?

c. Bacteria

Which bacteria are present in and on the stomatopod. How do these vary with environmental variables?

d. Viri

Some viri live within host organisms without complicating the metabolism of the host. On the other hand others are deadly. Will here be a strain of virus which is particular to the stomatopod? Will this virus be local or wide spread?

Ecology:

1. Symbionts

In the world's oceans, there are many organisms which benefit and profit from the proximity to one another. There are also amimals which share certain relationships. Does the stomatopod take part in this type of behaviour? Which organisms share thier ecological area with the stomatopod, and what are the interactions between these?

2. Prey and Predatory Impact

What does the diet of the stomatopod consits of? Are there seasonal changes in the diet of the Stomatopod? Are thier diffferent species which rely on one single prey?

3. Ecological Peculiarities and Importance

Each organism reacts with it's environment in different ways. An ecological overview provides the necessary information to observe all interactoins with the species. What role is significant to the East African Stomatopod?

4. The Human Impact Factor

It can not be forgotten, that man is also a part of the oceans' ecology. How has man affected the life of the stomatopod? What threats from humans linger above the waters of the stomatopod? How can possible damage be averted?

5. Other Factors

Climate change and weather pattern variations pose a possible threat to entire regions all over the world. What would be expected of the stomatopod? What impact would these ard other unforseen changes bring to the region of the East African Stomatopod? What impact did the Tsunami of 2004 have on the littoral stomatopod?

Further Studies:

Pleae let me reiterate, that these are additional studies and not part of the initial biological survey.

1. Biochemistry of the East African Stomatopod

An entire spectrum of biochemic explanations. From osmoregulation to repeoductive hormons.

2. Toxicology of the East African Stomatopod

Toxicological findings from taken specimens, as well as individual experiments with regionally known and potential chemical dangers.

3. Embryology of the East African Stomatopod

Crustacean embryology specific to the stomatopod families.

4. Histology of the East African Stomatopod

Fully illustrated histology of the stomatopod families. Best in conjunction with the biochemical study.

5. Anatomy of the East African Stomatopod

General crusteacean anatomy with the stomatopod families as central focus point.

Methodology for Biology of the East African Stomatopod

Description:

The main component of the description process is capture, and release of littoral stomatopod of several different chosen areas. Four area will be designated collection sites, with periodical search in non determined areas for control purposes. Using general methoed of identificaton lists of features of each sample will be entered into a computer data bank. Data maps of the study area will serve as the main visual component. A continually updated chart will serve as identification process. For each collection day a protocol and survey card will be issued. All pertinent information will be entered here in. Samples will be identified and returned to the collection area within 24 hours. At certain time intervals a number of chosen samples with be held for longer periods for obervation.
Differences in varietal flavour will be noted and illustrated. The ara of varietal occurance will be shown on one of the many data maps of the study areas. The differentiaton follows the rules of species desription. The presence of closely related crustaceans will also be visuallz projected through a data map. The DNA maps of the found species will be generated by an undetermined laboratory. The DNA will serve as a base for determining subspecies and evolutinary change for time to come. The visualisations will be accompanied by written conclusions.

Environment :

For each of the collecton sites an environmental survey will be conductued. This will consist of an initial survey, and monitoring of specific variables of interest. The variable may include tides, weather, water temperature, salinity, suspended organic matter, light penetratoin and other factors important to the individual site. This data will be entered into an data bank and visualised. The data will then be interpreted and conclusoins obtained.

Sociology:

The territorial maps of the collection areas will show the movments and ranges of both individual stomatopods, as well as general population numbers and density. Any areas of sociological importance will be included here. In case of migratory activity there will be a specific illustration for this event. Along with these illustrations, a written conclusoin will be included.

Reproduction :

Along with observation on the wild, the main tool of the life cycle study will be captive observation. With the help of the Kenya Marine and Fischeries Research Institute there will be a true to nature aquarium erected, which will provide the necessary environment for observed repeoduction. Illustrations of each life cycle and the mating process will be accompanied by written conclusions regarding the captive observaton and it's success or failure. Either from wild population survey or from captive specimen, or both, the growth rates, growth rates, and growth factiors will be assessed. A visualisation of the life expectancy will be included in the findings. There will be a nesessary mix of information from the environmental data for these conclusions. The complications of the methodology and changes made to accomodate unforseen variables will be discussed in the reproductive findings.

Pathology :

Visual inspection will serve as the main method for determining the presence of parasites and non parasitic smybionts on the body of the stomatopod. Where there are parasites found, these, along wth the host, will be preserved in a formadehyde solution for further study. During collection any deformed sample will also be preserved for further study.

Each specimen will be catagorized and labeld, and then entered into a data bank on a computer. A small bacteriological station will be erected in a centrally located area, or in conjunction with KMFRI in oder to prepare bacterial cultures for microscopy and description. If the laboratorial capacty will be available to prepare viri from the stomatopod is still a question to be answered. At concludion of the initinial biological study a written synopsis will accompany the visual data. The specimen as well as catalogged inventory will be handed over to KMFRI. In the case of external laboratory work to be sent out of Kenya, this will be requested in written form from the Ministry of Science.

Ecology:

Once again observation of wild populations will be the main tool for determining the symbiontal relationships within the territory of the East African Stomatopod.
A list of possible symbionts and their interactoin will be created, and verified and or rejected within the study period. Prey and possible prey will be listed and then tested under controlled conditions. In the case of a filter feeding organism, samples of the organic matter from the collection site will be taken periodically with the environmental sampling. Plankton and zooplankton, when a part of the stomatopod diet, will be seasonally examined, and procentually visualised. Findings on ecological importance will be published at the end of the study, and included with the visual data representations. The impact of human behaviour on the stomatopod will be included here also.

UNIVERSITY OF NAIROBI

SCHOOL OF BIOLOGICAL SCIENCES

Telephone, 4442316 - Director's Office
Telegrams VARSITY NAIROBI
Telex 22095 KE
TeleFax: 254-2-4445763
email zoology@uonbi.ac.ke <mailto:zoology@uonbi.ac.ke>

P.O. Box 30197
NAIROBI, KENYA

5th June 2006

Michael Thomas Harbuck
130 Anderson Road
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1. The research is very relevant since very little study on stomatopods has to be undertaken in East Africa. The broad nature of the intended research has the capacity to generate information required for resource conservation.

2. However, we need to get into proper collaborative arrangements for long term relationship of our two institituions. This will spell out clearly how we deal with issues of sharing data and information. However in the short-term we can affiliate you to our School for purposes of your research. The arrangements shall involve attaching Masters students from the School participating in the proposed research. This would allow us to participate in joint research activities which would hopefully lead to joint publications and hence therefore ensuing data ownership.

Prof. M.J. Ntiba
Director
School of Biological Sciences

KWS/5001.1

7th June, 2006

KENYA WILDLIFE SERVICE
P.O. BOX 40241, NAIROBI, KENYA.
TELEPHONE: (254 20) 600800, 602345, 604310
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Michael Thomas Harbuck
130 Anderson Road
Roxboro, North Carolina
27573
USA

Email: michaelharbuck@compuserve.de

Dear Michael,

RE: PROPOSED RESEARCH ON THE BIOLOGY OF THE EAST AFRICAN STOMATOPOD

This is to acknowledge receipt of your research proposal on the above subject. The proposed research will offer an opportunity to generate data and information on he East African Stomatopod and KWS will be willing to collaborate with you.

You are hereby advised to submit to us the detailed proposal which should clearly state the role of our local scientists from both KWS and other collaborating institutions. Your proposal must clearly identify the sampling/survey and control sites where the research will be conduced as well as a clear statement of your affiliation arrangements and timeframe for implementation of the study.

In compliance with our procedures you are required to submit the following documents prior to your being accepted to undertake the proposed research:

- Letter of recommendation from a Research Institution or University in USA
- Research permit from the Kenyan Ministry of Education, Science and Technology

Looking forward to working with you.

Sincerely yours.

DR. RICHARD BAGINE
DEPUTY DIRECTOR BIODIVERSITY
RESEARCH & MONITORING

For:

Dr. Richard Bagine
Deputy Director of Biodiversity
Research and Monitoring

Kenya Wildlife Service
P.O. Box 40241
Nairobi, Kenya

Stomatopod Proposal Details of Kenya for KWS

Sites:

The survey and collection ares would optimally encompass the entire tropical coastline of Eastern Africa, from 20 degrees N. to 20 degrees S. extending seawards 1.0 Nautical Mile from chart datum. For the purposes of the primary survey, I would like to begin with the coastline from Lamu extending southwards to the border with Tanzania. I would also like to include the Marine Reserve Area around Shimoni. Accessabilty and topography of the coastline will be noted and reported upon.

Affiliation Arrangments:

As the University of Nairobi has announced interest in producing students who would like to participate, and earn valuable experience, I expect that a group of not more than three students would make the best team. I must however pronounce, that as I am funding this endeavour with personal funds, I can make no promises of being a benefactor for the students who wish to participate. I may come that another private sponsor will jump in and provide support for the additional team members, but I can not promise this. I will do my best.

I hope that it will be possible to have a KWS contact in each of the zones along the coast, as well as yourself as the main contact there at Headquarters.

The official Kenyan affiliation will therefore include:

KWS
KMFRI
The University of Nairobi

with support from

The East African Wildlife Society
The Wildlife Conservaton Society

Timeframe:

Two rainy season to dry season cycles would be best for assurance of complete observation. In case of longer cycles pertinent to the Stomatopod, these will be assesed and purported upon if deemed necessary. The start of the rainy season 2007 is the goal for the start of the project.

Compliance Measures:

1. The letter of affiliation from a research institute and or university will be included with the final proposal to the KWS.

2. The national research permit will be obtained from the Kenyan government and submitted with the final proposal.

List of Contacted Institutions

The Hawai'i Institute of Marine Biology
P.O. Box 1346
Kane'ohe, Hawaii 96744

The Rosenstiel school of Marine and Atmospheric Sciences
4600 Rickenbacker Causway
Miami, Florida 33149-1098

Oregon Istitute of Marine Bology
University of Oregon
P.O. Box 5389
Charleston, Oregon 97420

The Belle W. Baruch Institute for Marine & Coastal Sciences
607 EWS Building
Columbia, South Carolina 29208

Department of Marine Sciences
12-7 Venable Hall CB#3300
UNC-CH Chapel Hill, North Carolina 27599

Virginia Institute of Marine Science
Route 1208, Greate Road
P.O.Box 1346
Glouchester Point, Virginia 23062

European Institute of Marine Sciences
University of Western Brittany
Brest, France

Marine Science Center of Northeastern University
430 Nahant Road
Nahant, Massachussets 01908

Department of Earth, Atmospheric and Marine Sciences
2800 Faucette Drive, R, 1125 Jordan Hall
North Carolina State University
Raleigh, North Carolina 27695-8208

Institute of Marine Sciences
University of California
1156 High Street
Santz Cruz, California 95064

Department of Marine Biology
Texas A&M University at Galveston
P.O. Box 1675
Galveston, Texas 77553

Department of Marine Science
The University of Texas at Austin, Marine Science Institute
750 Channel View Drive
Port Aransas, Texas 78373-6777