

ORIGINAL

**SMITHSONIAN INSTITUTION
NATIONAL MUSEUM OF NATURAL HISTORY
Department of Invertebrate Zoology
Museum Support Center, MRC 534; 4210 Silver Hill Road; Suitland, MD 20746**

Date: June 19, 2009**SHIPPING INVOICE****Transaction #:** 2051107**Please reference transaction number when tracking the material itemized below.**

TO: ATTN: Dr. Christine Ortiz
 Massachusetts Institute of Technology
 Department of Materials Science and Engineering, RM
 12-009
 77 Massachusetts Avenue
 Cambridge MA 02139

Due Date: 19 JUN 2010**Initiated By:** Paul Greenhall**Approved By:** Miroslaw G. Harasewych**This material is sent as a loan for scientific study by Dr. Jeremy Brittan at your request.****Description:** MOLLUSCA:NON-TYPE:Pteropoda and Gastropoda:4 lot:8 spm

8 Specimen(s) 4 Lot(s)

INSTRUCTIONS/REMARKS: Permission granted to extract DNA from shells, all shell pieces to be returned as vouchers.

ITEM	CATALOG #	TAXON/GROUP	# SPEC.	# LOT	TYPE STATUS	PRESERVATIVE	COUNTRY OF ORIGIN
1.	USNM 897465	Torellia mirabilis - Gastropods	1	1		Alcohol	
		Phylum thru Family: Mollusca Gastropoda Trichotropidae					
		Description: Shell only					
		Instructions: Shells exceptionally fragile kept in ethanol to prevent drying out and cracking.					
2.	USNM 1121915	Torellia mirabilis - Gastropods	1	1		Alcohol	
		Phylum thru Family: Mollusca Gastropoda Trichotropidae					
		Description: Shell only					
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3.	USNM 216359	Limacina atlantica - Gastropods	3	1		Dry	
		Phylum thru Family: Mollusca Gastropoda Limaciidae					
4.	USNM 286797	Clio? sp. - Gastropods	3	1		Dry	
		Phylum thru Family: Mollusca Gastropoda Limaciidae					

The original invoice must be signed & dated upon receipt of the loan and promptly mailed to the Initiated By Staff.

When returning specimens, please include Transaction Number and Initiator's Name with the package(s).

SEE REVERSE FOR CONDITIONS OF THE LOAN

**** HAZMAT DETAILS **:** Small Quantities ETOH 1170 Class 3

Please pack and ship all shipments to NMNH in accordance with all applicable government and carrier regulations.

Shipment #: 1171622
 Method: Registered
 Payment: Prepaid

Shipping Office: NHB
 Carrier: USPS
 # of Packages: 1

RECEIVED IN GOOD ORDER AND ALL CONDITIONS ACCEPTED.
Christine Ortiz
 (Name)
 06/29/09
 (Date)

Package Types:

PLEASE SIGN, DATE AND RETURN THIS COPY TO THE OFFICE AT THE ABOVE ADDRESS.

LOAN POLICY & CONDITIONS
DEPARTMENT OF INVERTEBRATE ZOOLOGY,
UNITED STATES NATIONAL MUSEUM, SMITHSONIAN INSTITUTION

1. The "Sign & Return" copy of the invoice must be signed and dated upon receipt of the loaned material and promptly mailed to the Collection Manager.
2. Loans are made to qualified institutions or organizations, not the individual. The head of the borrowing institution or department shall undertake full responsibility for the proper care and return of the material sent on loan. Returns of DRY type material must be made via Registered Air Mail or its equivalent. Returns of ALL FLUID preserved material must be made via FedEx following ALL US DOT, IATA and FedEx hazardous materials packing and labeling protocols. Parcels must be labeled "Preserved Scientific Material, No Commercial Value". Specimens sent out in preservative must be maintained in the same medium.
3. All loaned material must be returned to The Department of Invertebrate Zoology by the specified due date, unless otherwise agreed upon, in writing, between the loan recipient and the responsible curator or Collection Manager.
4. Type material is lent for a period of two (2) months, other material is lent for a period of six (6) months unless agreed upon by the Collection Manager. An extension is possible ONLY if requested in writing by the loan recipient.
5. We reserve the right to determine whether or not a specimen is able to travel. Delicate specimens will be sent only in exceptional circumstances. Rare and unique specimens may also be governed by this rule.
6. No more than half of the holdings of a given taxa will be dispatched at any one time. If required, the remainder will be sent upon safe return of the first loan.

Dissection, clearing and staining, or preparing for SEM examination is permitted only by prior arrangement, writing, between the loan recipient and the responsible Curator. Any such preparations made must be turned with the parent specimen.

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PACKAGE COPY

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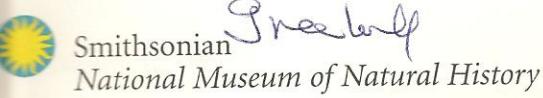
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Smithsonian *Great Wolf*
National Museum of Natural History

Washington DC 20560-0163

Official Business

Penalty for Private Use \$300

ATTN: Dr. Jeremy Brittan
Massachusetts Institute of Technology
Dept of Materials Science and Engineering, RM 12-009
77 Massachusetts Avenue
Cambridge MA 02139

LOAN REQUEST FORM
National Museum of Natural History - Invertebrate Zoology

Complete and sign this form, submit by fax (202-357-3043), or mail to Collection Manager - Invertebrate Zoology, Smithsonian Institution, P.O. Box 37012, Washington DC 20013-7012, or scan the form after signing it and submit via e-mail to: izloanrequest@si.edu

TYPE OR PRINT CLEARLY.

BORROWER NAME: (last name, first name) _____ **INSTITUTION NAME:** _____

FOR STUDY BY: (last name, first name) _____ (for students, the professor or advisor must request the material)

SHIPPING ADDRESS: (Include complete institution name, street or building address, city, country and postal code. NO P.O. BOXES)

BORROWER PHONE #: _____ **FAX #:** _____ **E-MAIL:** _____
(Include area code or country and city codes)

I would like to borrow the following specimens: (include Phylum, Order, Genus, Species, Type Status, catalog #, other)

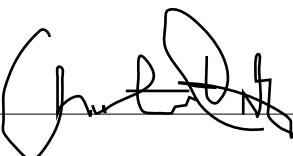
PURPOSE OF BORROW: for molecular analysis (including DNA); for examination; for identification; for exhibit (Check all that apply)

PROJECT TITLE: _____

GENERAL LOAN REQUIREMENTS

1. The "Sign & Return" copy of the invoice must be signed and dated upon receipt of the loaned material and promptly mailed to the Collection Manager. General and specific conditions of the loan are recorded on this invoice. Your signature is your commitment to follow all of the listed conditions.
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 - Returns of DRY type material must be made via Registered Air Mail or its equivalent.
 - Returns of ALL FLUID preserved material must follow ALL hazardous materials packing and labeling protocols.
 - Shipments within the United States must comply with Department of Transportation and USPS Pub. 52 requirements.
 - International shipments must use FedEx or similar carrier that complies with International Air Transport Association (IATA) regulations. Please do not use regular mail for International shipments.
4. Dissection, clearing and staining, preparing for LM, SEM or TEM examination or removal of tissue for molecular analysis is permitted only by prior arrangement, in writing, between the loan recipient and the responsible Curator. Any such preparations made must be returned with the parent specimen.
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I have read and agree to comply with these requirements.


(Signature)

06/09/09

(Date)

Ver. 8/05

06/19/09

Howdy:

I've initiated the transaction and will complete it NLT Tuesday.

Paul Greenhall, Museum Specialist
Department of Invertebrate Zoology Shipping Manager

Dear Christine,

Bureaucracy being what it is, the samples will likely be addressed to you, since you signed the loan request.

I'd be curious to know how the various analyses turn out. Should the pteropod work turn out to be promising, we should be able to get live animals, if you are interested. It would mean a boat ride about 25 miles offshore from Fort Pierce, Florida and bobbing around in the Gulf Stream for a few hours. Not for the faint of stomach.

Cheers,

Jerry

From: Harasewych, Jerry [<mailto:HARASEWYCH@si.edu>]
Sent: Wednesday, June 17, 2009 12:33 PM
To: Christine Ortiz
Cc: Greenhall, Paul
Subject:

Hi Christine,

I've selected the 2 specimens of *Torellia mirabilis* that are to be sent to you for destructive analysis, although I would hope that you will send us any remaining bits as vouchers for your study.

The smaller of the two specimens [USNM 1121915] was collected fairly recently, and was preserved in alcohol. I have obtained DNA sequences from this animal, so I know that formalin was not involved.

The other, larger specimen [USNM897475] was collected in 1986 and stored in alcohol. It may have been exposed to formalin briefly, but I have no way of telling for sure. I think formalin reacts with some of the amino acids, so an

analysis of the periostracum might be diagnostic if you are that determined to find out.

The animals have been removed from both specimens, but they are being sent to you in alcohol anyway.

As I may have mentioned, the periostracum is thick, but the shell is very thin. Drying the shells will often result in cracking, because the tension of drying periostracum [This also happens when shells of some endangered New Zealand land snails dry out. Sounds like a small explosion when they pop].

I am not sure what analyses you propose to run. It occurred to me that mechanical properties of the periostracum and shell may differ depending on whether the specimen is tested dry, wet with water, or wet with alcohol.

At any rate, all the mollusk samples you asked for are now ready to go.

All the best,

Jerry

From: Harasewych, Jerry [mailto:HARASEWYCH@si.edu]

Sent: Wednesday, June 17, 2009 12:33 PM

To: Christine Ortiz

Cc: Greenhall, Paul

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At any rate, all the mollusk samples you asked for are now ready to go.

All the best,
Jerry

Hi Christine,

I received a copy of your request for specimens of mollusks for mechanical studies.

Torellia mirabilis is an Antarctic species in which the periostracum is far thicker than the calcified portions of the shell. In fact, the calcified portion is so thin as to be almost vestigial. We have several specimens, but most have been fixed in formalin and stored in alcohol. I can certainly find two specimens for your project, but have some concern that the preservation history may have altered the mechanical properties of the shell.

The species *Limacina helicina pacifica* Dall, 1871 and *Clio pyramidata* Linné, 1767 are both pelagic pteropods. They are part of the plankton when alive. The shells tend to be small (about 5 mm or less, very thin and translucent when alive). These shells sink to the bottom when the animals die, so are commonly collected in dredged samples. Most of our holdings of these species come from bottom samples. I have selected seven specimens of *Clio pyramidata* [USNM 286797 – from sta. 5527 (see

<http://invertebrates.si.edu/albatross/detail.cfm?vessel=albatross&seq=3944> for details) that span the range of translucence. The most translucent specimens match what is found in living specimens, the more opaque specimens have likely been dead for some time. I would be curious to know if your studies reveal differences in shell structure that correspond with opacity.

The species *Limacina helicina pacifica* Dall, 1871 are far less common in our collections. I have selected three specimens from USNM 216359, collected off Forrester Island, off Alaska for your studies.

If possible, I would appreciate the return of any unused specimens and any preparations or mounts that contain the specimens. This is especially true of the *Torellia* since the specimens being sent are also voucher specimens for DNA sequences.

All the best with your research,
Jerry

Cheryl,

Could you pull samples USNM 1121915 and USNM 1123546 of *Torellia mirabilis*. These are samples that were collected in 2006 and stored in 85% ethanol without prior formalin treatment. I will attempt to extract as much of the tissue as possible before sending the shell on for analysis. Samples USNM

897465 is likely formalin fixed, but contains 4 specimens. Same for sample USNM 896038, which contains 15+ specimens. Please select whichever of the last two has the most charismatic macrospecimen for photographic purposes. The samples of *Limacina helicina pacifica* Dall, 1871 and *Clio pyramidata* Linné, 1767 are in labeled vials on Paul's desk. They are ready to go.

Jerry

From: Bright, Cheryl

Sent: Wednesday, June 10, 2009 9:09 AM

To: Pawson, David; Lemaitre, Rafael; Hershler, Robert; Strong, Ellen; cortiz@MIT.EDU

Cc: Harasewych, Jerry

Subject: Loan Request: Destructive Analysis - Decapods, Echinoderms, Mollusks

Dear Dr. Ortiz,

I have forwarded your request to the departmental curators responsible for the oversight of the invertebrate families you are interested in. They will review your request for specific cataloged specimens for destructive analysis, and will contact you directly if additional information is required before a decision is made regarding your request.

Sincerely,
Cheryl

From: Christine Ortiz [mailto:cortiz@MIT.EDU]

Sent: Tuesday, June 09, 2009 11:56 AM

To: Bright, Cheryl; IZLOANREQUEST

Cc: Harasewych, Jerry

Subject: IZ Loan Request

Dear Collections Manager,

I would very much appreciate if you I would consider my IZ loan request, see attached for my application form. These samples are intended for planned studies in my research group as part of various doctoral thesis. A grant proposal is also attached which was recently funded on this topic and describes our work in detail. The proposed studies are not non-destructive and involve sectioning/microscopy and novel mechanical experiments. Our experiments have the capability to test very small amounts and obscure shapes of material and hence, can provide significant new scientific information. I had described this to Dr. Harasewych on a visit last year to the SI. I would be happy to answer any further questions via email or phone. Thank you for your consideration.

All the Best,

Christine Ortiz