

USOS Y LIMITACIONES DE LAS COLECCIONES BIOLÓGICAS PARA INVESTIGACIONES EN BIOLOGÍA MOLECULAR

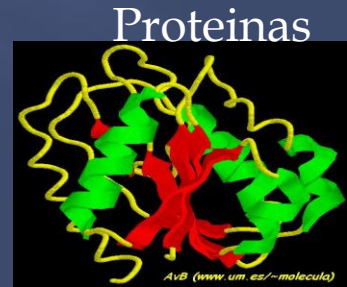
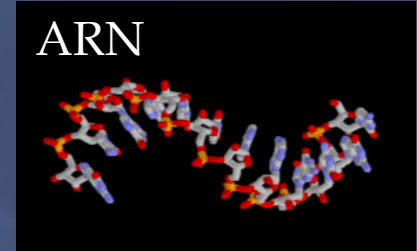
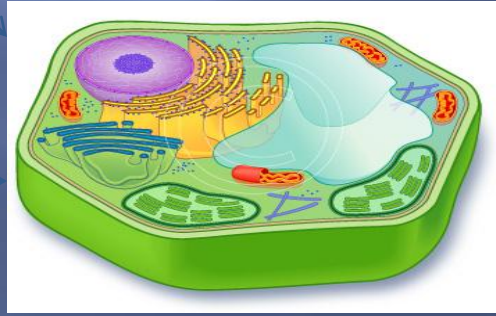
i3b: Colecciones biológicas 3.0
Octubre 2012

Mailyn Gonzalez
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Contenido

- ▣ Biología molecular: Definición y estudios de caso
- ▣ Colecciones biológicas y Colección de tejidos
- ▣ Usos y limitaciones de las colecciones en trabajos de biología molecular
- ▣ Códigos de Barras de ADN

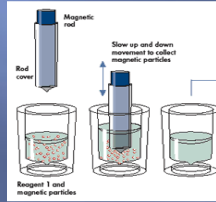
Biología molecular: Definición y estudios de caso



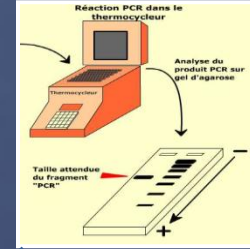
Proceso obtención de información genética



Extracción
ADN

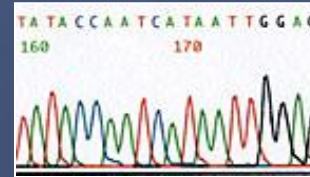


Amplificación
PCR



Secuenciación

sp1	A	C	T	G	A	A	T
sp2	A	C	T	G	T	A	T
sp3	A	C	C	G	T	A	T
sp4	A	C	T	G	G	A	T





DIY DNA

In this activity, you can:

- learn how to [extract DNA from a kiwi fruit](#) in your own kitchen and
- use a pineapple to [discover about enzymes](#).

Please follow any **safety instructions highlighted like this in red**.

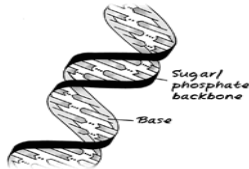
Extracting DNA from a kiwi fruit



DNA is the polymer of life, storing the information that makes all living things what they are, from us humans to the humble kiwi fruit. It is found in the cells of every living thing, including those kiwi fruit! (If you're curious about the term **polymer**, you can [find out more about polymers here](#).)

The DNA molecule has a fascinating double-helix structure, with two backbone strands joined by pairs of molecular groups called **bases**.

Have a look at the drawing to the right, which illustrates the basic structure of DNA. It is the order of the bases that store the information necessary to describe living things – you can think of the bases as a bit like the lines of a computer program.



It's difficult to imagine what a single DNA molecule looks like as it's so small. However, we can help you see a bunch of real DNA with an experiment carried out in your kitchen to extract the DNA from a kiwi fruit

Extracción de ADN



Figure 1.



Figure 2a.



Figure 2b.



3. Peel a kiwi fruit and chop finely. Using a fork, mash the kiwi fruit into a paste (Figure 3).
4. Put the kiwi paste into a small bowl and add 100ml of the salt-detergent mix from step 2. Sit this in a saucepan of hot (not boiling) water for 15 minutes (Figures 4a and b).

Figure 3.



Figure 4a.



Figure 4b.



Figure 5.



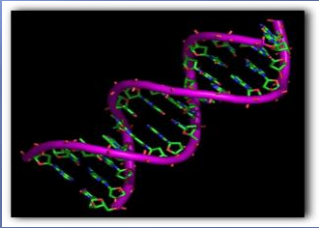
Figure 6.



Figure 7.



Biología molecular y colecciones



A T C G

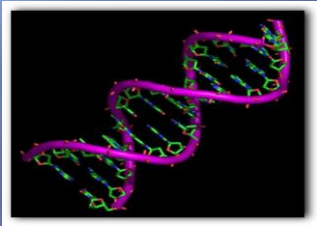
Filogenia

Filogeografía

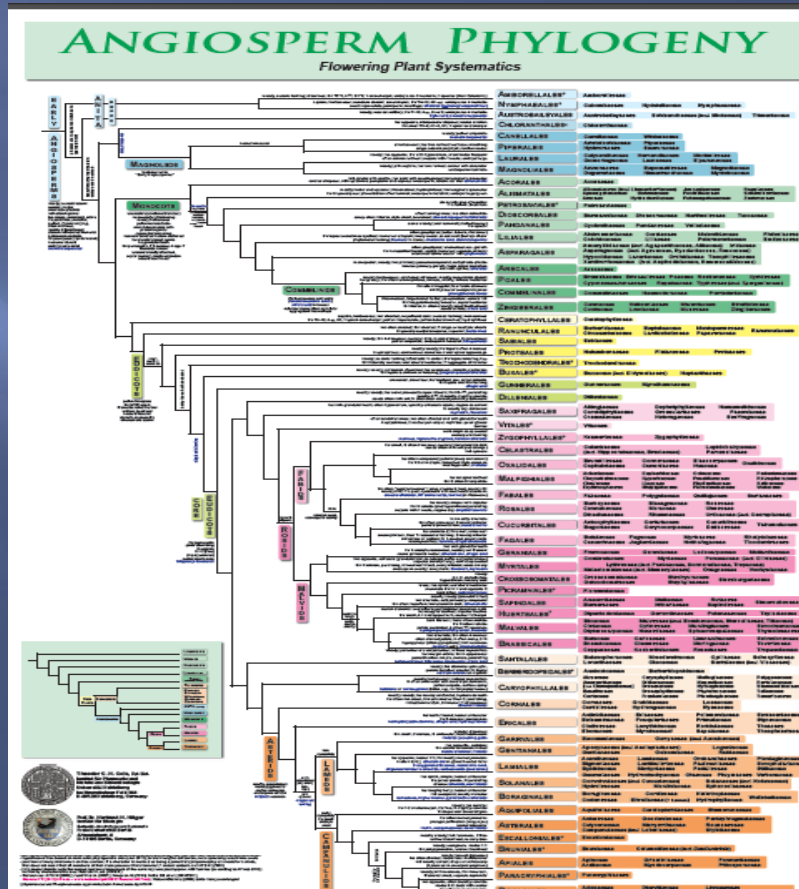
Genética de poblaciones

Identificación y
descubrimiento de especies

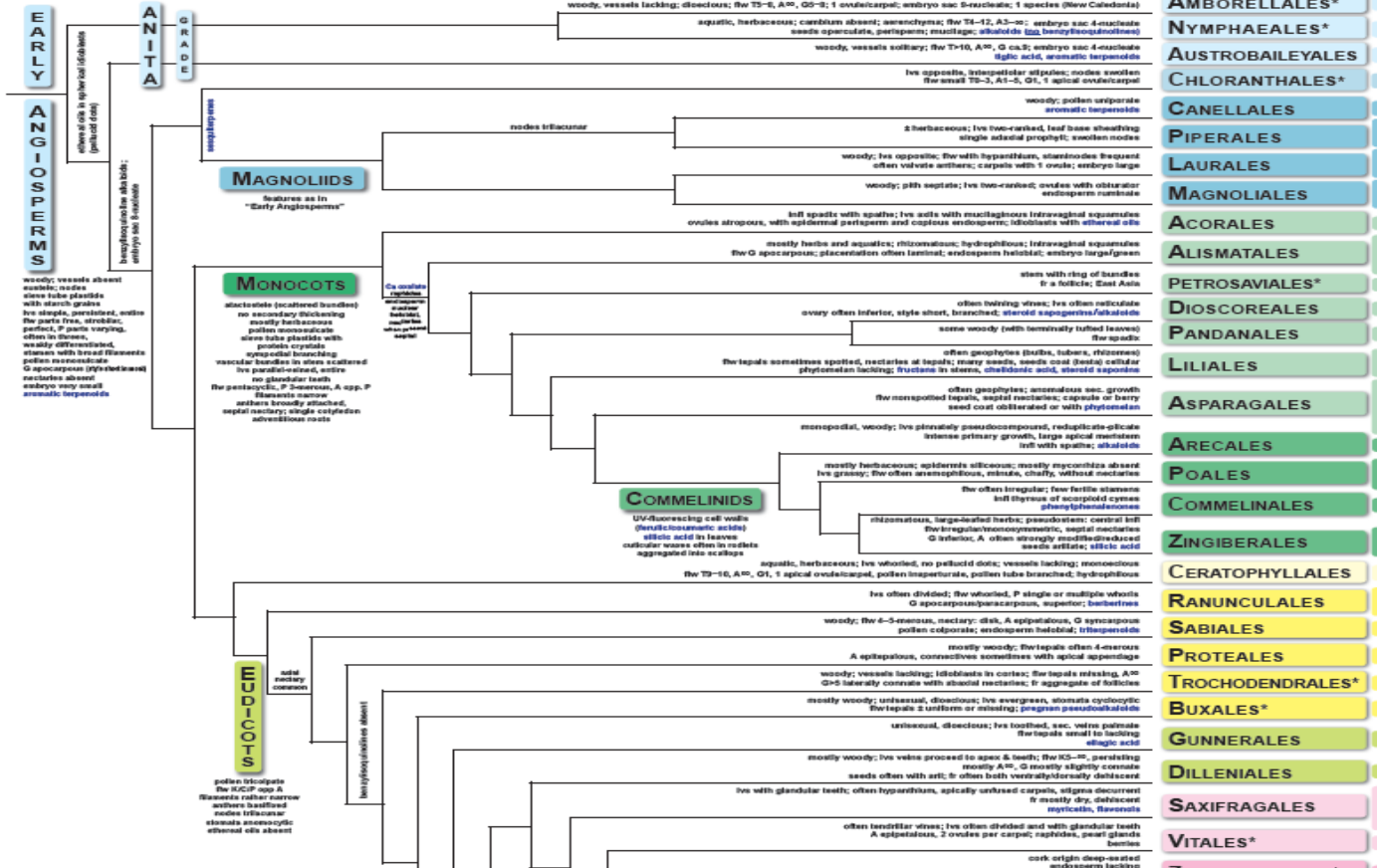
FILOGENIA



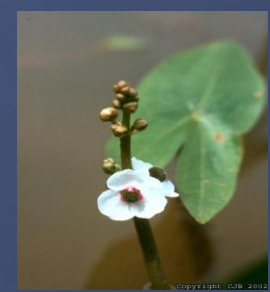
A T C G



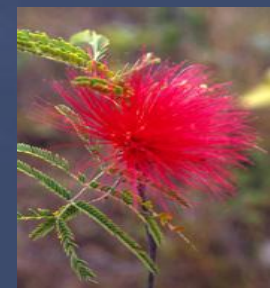
Flowering Plant Systematics



Copyright CJB 2002



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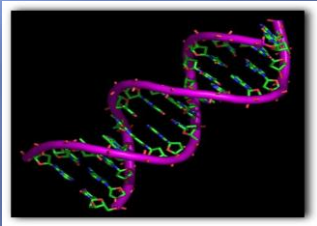


- AMBORELLALES*
- NYMPHAEALES*
- AUSTROBAILEALES
- CHLORANTHALES*
- CANELLALES
- PIPERALES
- LAURALES
- MAGNOLIALES
- ACORALES
- ALISMATALES
- PETROSAVIALES*
- DIOSCOREALES
- PANDANALES
- LILIALES
- ASPARAGALES
- ARECALES
- POALES
- COMMELINALES
- ZINGIBERALES
- CERATOPHYLLALES
- RANUNCULALES
- SABIALES
- PROTEALES
- TROCHODENDRALES*
- BUXALES*
- GUNNERALES
- DILLENIALES
- SAXIFRAGALES
- VITALES*

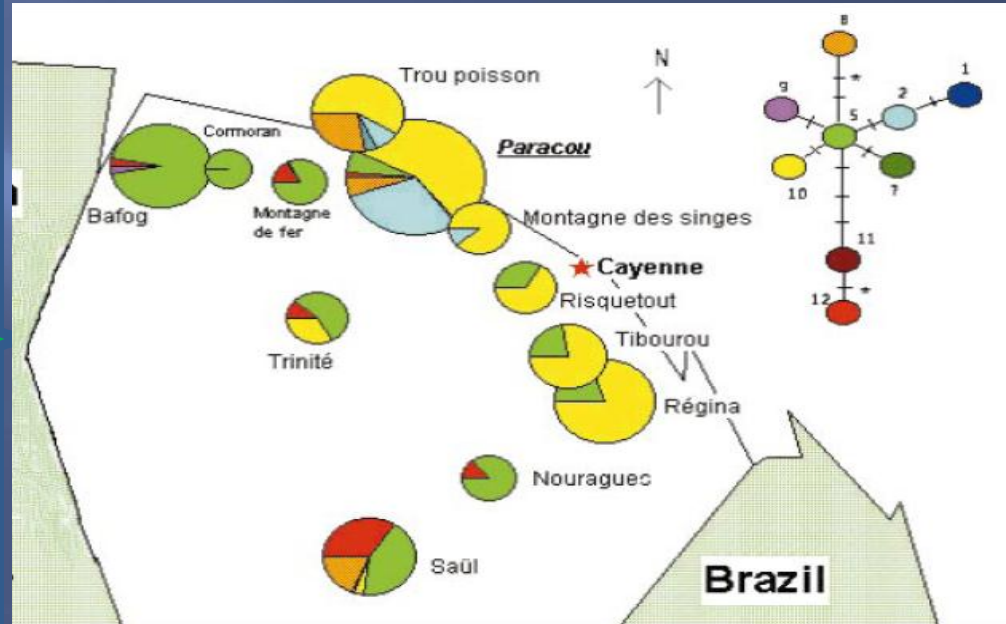
FILOGEOGRAFIA



Dycorinia guyanensis



A T C G

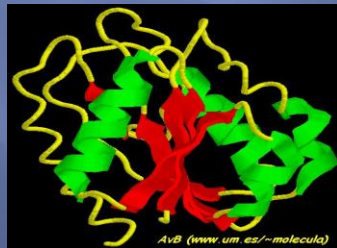


Caron et al. 2004

GENETICA DE POBLACIONES



Proteínas



Endangered Greater One-horned Rhinoceros Carry High Levels of Genetic Variation

ERIC DINERSTEIN*

Smithsonian/Nepal Terai Ecology Project
Conservation and Research Center
National Zoological Park
Front Royal, VA 22630, U.S.A.

GARY F. MCCRACKEN

Department of Zoology
Graduate Programs in Ecology and Ethology
University of Tennessee
Knoxville, TN 37996, U.S.

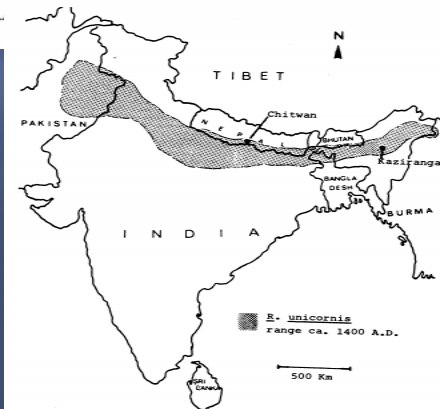
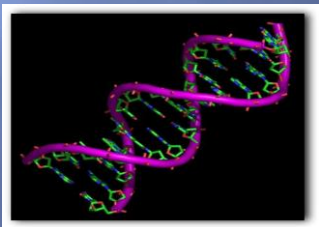


Figure 1. The geographic range of *Rhinoceros unicornis*, ca. 1400 A.D., with the locations of Royal Chitwan National Park and Kaziranga National Park indicated.

CODIGOS DE BARRAS DE ADN



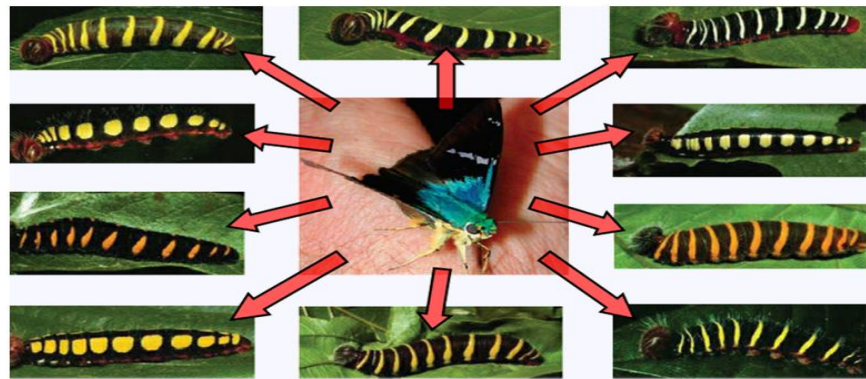
A T C G

Identificación y descubrimiento de especies

Ten species in one: DNA barcoding reveals cryptic species in the neotropical skipper butterfly *Astraptes fulgerator*

Paul D. N. Hebert^{1*}, Erin H. Penton^{2*}, John M. Burns³, Daniel H. Janzen³, and Winnie Hallwachs³

¹Department of Zoology, University of Guelph, Guelph, ON, Canada N1G 2W1; ²Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0127; and ³Department of Biology, University of Pennsylvania, Philadelphia, PA 19104



GENETICA DE LA CONSERVACION



REPÚBLICA DE COLOMBIA
MINISTERIO DE DEFENSA NACIONAL
POLICÍA NACIONAL DE COLOMBIA



Policia se incauta de babillas especie en via de extinción

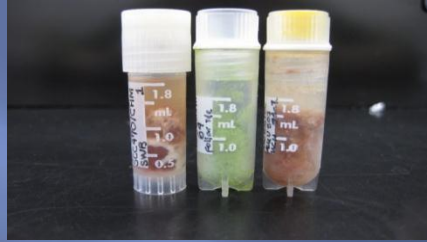


ANNP. 06-JUN-08. Caucasia, Antioquia.- Mediante labores de control fauna y flora silvestre realizadas en el municipio de Caucasia, fue inmovilizado un vehículo automóvil que transportaba 511 babillas, animal que es considerado en vía de extinción.

Colecciones biológicas



Coleccion de tejidos

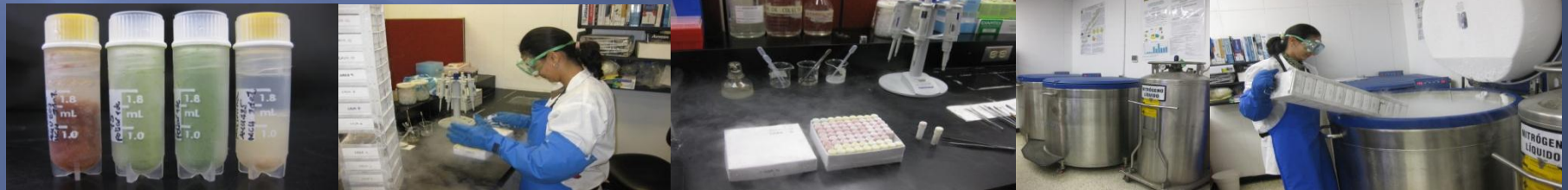


partes de los organismos
como contenidos
estomacales, esqueletos,
parásitos, sangre y tejidos

Disponer, en cualquier momento, de las muestras
en análisis o estudios genéticos,
epidemiológicos, toxicológicos, entre otros,
encaminados hacia la conservación de las
especies en su hábitat.

Colección de Tejidos y Laboratorio de Biología Molecular (IAvH)

UN APORTE A LA CONSERVACIÓN DE LA BIODIVERSIDAD
COLOMBIANA

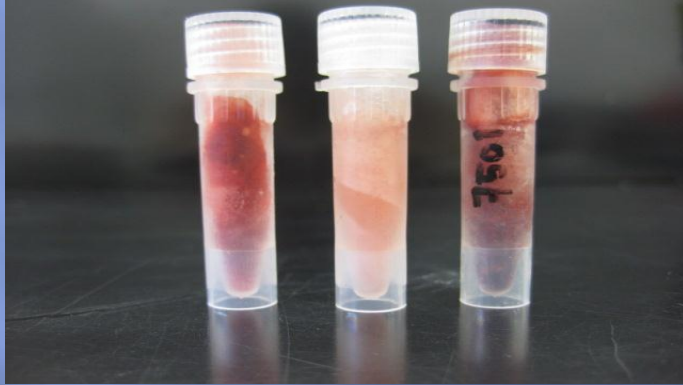


Como funciona

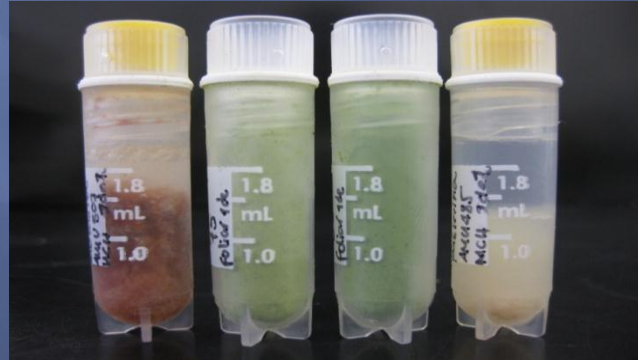
Recepción de las muestras



Recepción de las muestras



Almacenamiento de las muestras



DATOS DE COLECCIÓN

Para cada ejemplar es necesario anexar la siguiente información:

Datos obligatorios:

1. Espécimen

- 1.1. Nombre del colector principal
- 1.2. Nombre de la Institución
- 1.3. Fecha de colección
- 1.4. Numero de colección de campo (ej. consecutivo del colector)
- 1.5. Método de conservación y transporte (buffer, alcohol, hielo, silica gel, etc.)

2. Localización

- 2.1. Departamento
- 2.2. Municipio
- 2.3. Localidad

3. Identificación

- 3.1. Familia
- 3.2. Genero
- 3.3. Quien y cuando identifico el material

Datos opcionales:

1. Espécimen

- 1.1. Método de colección (Red, trampa, captura, etc.)
- 1.2. Partes conservadas (Hígado, tejido foliar, etc.)
- 1.3. Cantidad (en gr o ml)
- 1.4. Estado del material (bueno, regular, malo)
- 1.5. Colaboradores
- 1.6. Notas (disección, cadáver, uso de anestesia, etc.)

2. Localización

- | | |
|-----------------------------|--|
| 2.1. País | 2.5. Longitud geográfica |
| 2.2. Area natural protegida | 2.6. Hábitat |
| 2.3. Altura (o rango) | 2.7. Notas (descripción exacta del sitio, hospedero, etc.) |
| 2.4. Latitud geográfica | |

3. Identificación

- | | |
|--|---|
| 3.1. Especie | 3.5. Tipo de identificación (conocimiento, clave, etc.) |
| 3.2. Subespecie | |
| 3.3. Autor | 3.6. Estatus por confirmar (sc, cf, etc.) |
| 3.4. Nombres vernáculos (Origen, comunidad, significado) | 3.7. Notas |

4. Morfología y características

Ver a continuación formatos desarrollados para mamíferos y aves, para otros grupos biológicos quedan a criterio del investigador. Recuerde que el valor de las muestras esta directamente relacionado con la información asociada.

POLÍTICAS Y DIVULGACIÓN



DOCUMENTOS DE INTERCAMBIO

- Criterios de ingreso
- Modalidades de custodia
- Condiciones de acceso

PAGINA WEB

http://www.humboldt.org.co/iavh/servicios/coleccionesbiologicas/item/65-colecci%C3%B3n_de_tejidos

EJEMPLAR DE RESPALDO (VOUCHER)



Almacenamiento



Laboratorio

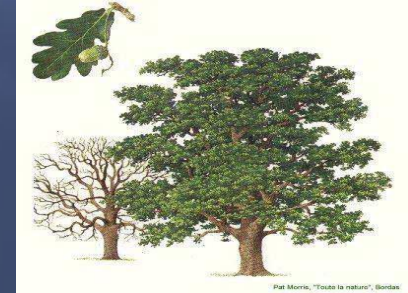


COMPOSICIÓN DE LA COLECCIÓN

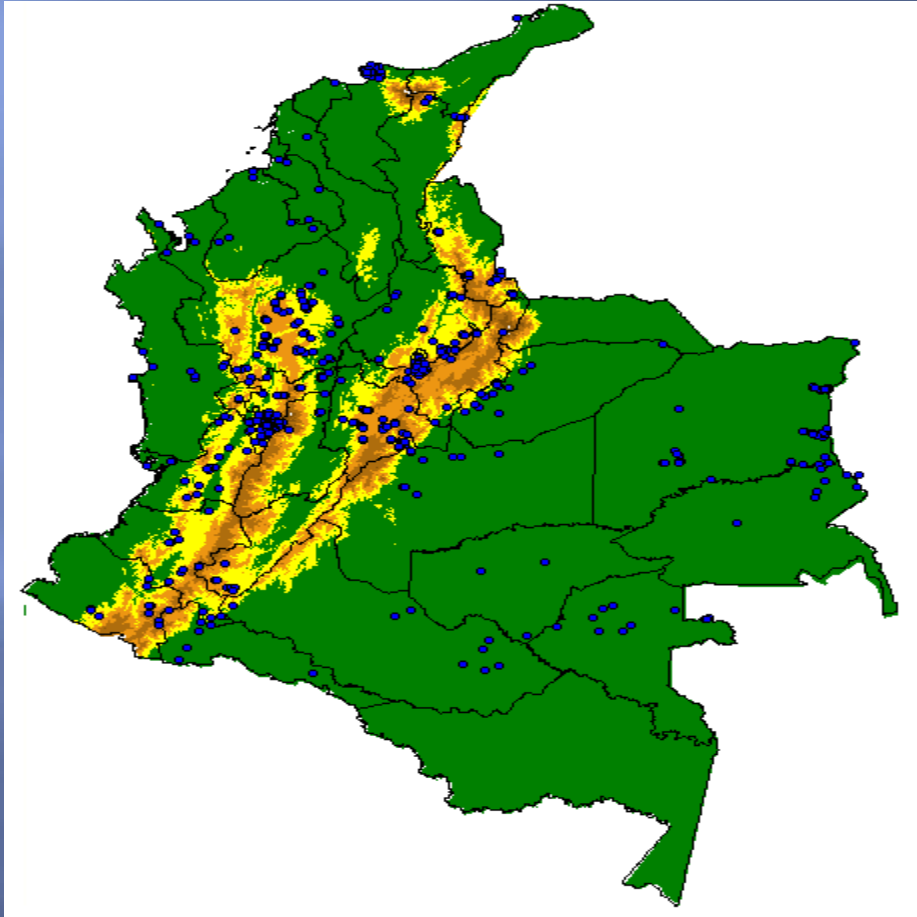


IAvH-CT 13657

Aves 6182,
Plantas 5904



REPRESENTATIVIDAD GEOGRAFICA



Toma de Tejidos

- En que preservar : grupo, tejido y objetivo
- Como manipular las muestras



Importante mantener siempre la conexión entre el tejido y el voucher.

PROCESAMIENTO

Almacenamiento

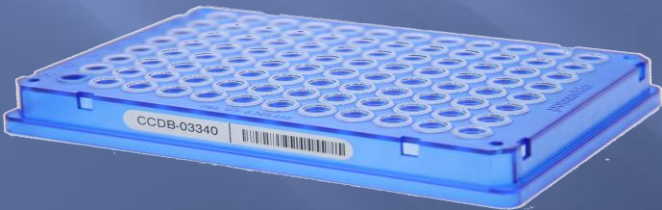
Preparación

Preservación
-Colección

Utilización molecular

Evento de Colecta

Preservación-Tejido



Limitaciones



ADN degradado → obtención de pequeños fragmentos

Protocolos especiales preservación del tejido

Protocolos especiales para obtención de la información

ADN antiguo → laboratorios especiales

GLOBAL GENOME BIODIVERSITY NETWORK

Global Genome Biodiversity Network



[Home»](#)

[Collaborators](#)

[Documents and
Presentations](#)

[Steering Committee](#)

[Task Forces »](#)

[Get Involved](#)

A Collaborative Effort to Cryo-preserve and Provide Access to Genomic Samples from Across the Tree of Life

The Global Genome Biodiversity Network (GGBN) is a global network of well-managed collections of genomic tissue samples from across the Tree of Life, benefiting society through biodiversity research, development and conservation. This network will foster collaborations among repositories of molecular biodiversity in order to ensure quality standards, improve best practices, secure interoperability, and harmonize exchange of material in accordance with national and international legislation and conventions.

Goals

- Provide genome-quality samples from across the Tree of Life for research, training, and product development, thereby contributing to the conservation of global genetic diversity for generations to come.
- Provide open access to a global data management system hosting the aggregated primary specimen data and metadata for all the member institutions.
- Develop standards for sharing DNA and tissues information.
- Develop best practices related to management and stewardship of genomic samples and their derivatives, including appropriate access and benefit sharing (ABS).
- Promote targeted preservation of genomic samples representing a synoptic sample of Life on Earth.
- Recruit partners with different regional and taxonomic focus, to preserve the global genetic diversity in a concerted effort.

News & Updates



[2012 Meeting Report, Copenhagen](#)



[GGBN Newsletter, March 2012](#)

ESTUDIOS DE CASO



biology
letters

Biol. Lett. (2010) 6, 112–115
doi:10.1098/rsbl.2009.0545
Published online 23 September 2009

Evolutionary biology

DNA from a 100-year-old holotype confirms the validity of a potentially extinct hummingbird species

Jeremy J. Kirchman^{1,*}, Christopher C. Witt²,
Jimmy A. McGuire³ and Gary R. Graves⁴

¹New York State Museum, Albany, NY 12230, USA

²Department of Biology and Museum of Southwestern Biology,
University of New Mexico, Albuquerque, NM 87131, USA

³Museum of Vertebrate Zoology, University of California,
Berkeley, CA 94720, USA

⁴National Museum of Natural History, Smithsonian Institution,
PO Box 37012, Washington, DC 20013-7012, USA

*Author for correspondence (jkirchma@mail.nysed.gov).

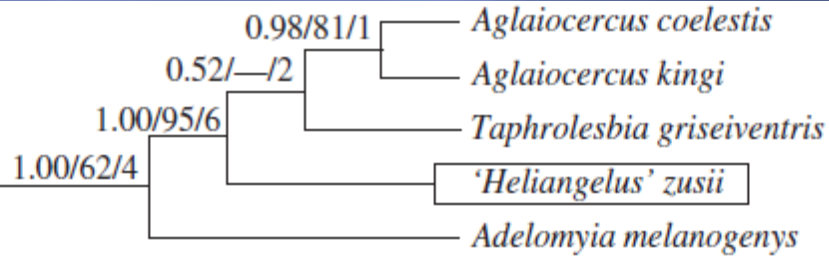


Colectado en 1909

Nombrado *Neolesbia nehrkorni* (hibrido)

1990 → *Heliangelus zusii*

Confirmación taxonómica



LA HISTORIA MIGRATORIA DEL BISONTE DE BERINGIA



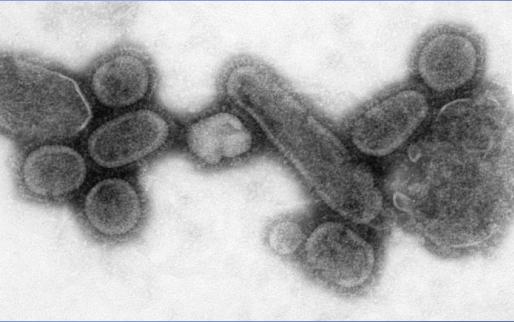
220 muestras, radiocarbono

The Value of Museum Collections for Research and Society

ANDREW V. SUAREZ and NEIL D. TSUTSUI

Andrew V. Suarez (avsuarez@life.uiuc.edu) is an assistant professor in the School of Integrative Biology, Departments of Animal Biology and Entomology, at the University of Illinois, Urbana, IL 61801.

Neil D. Tsutsui (tsutsui@uci.edu) is an assistant professor in the Department of Ecology and Evolutionary Biology, University of California, Irvine, CA 92697.



Influenza virus



The Ghost of Genetic Diversity Past: Historical DNA Analysis of the Greater Prairie Chicken

Juan L. Bouzat,^{1,*} Harris A. Lewin,² and Ken N. Paige³



Mercury concentrations in recent and ninety-year-old benthopelagic fish.

[Barber RT](#), [Vijayakumar A](#), [Cross FA](#)

Abstract

Several species of bottom-dwelling fish from 2500 meters with similar feeding habits had mercury concentrations that differed by an order of magnitude. Within one species there was a correlation between size and concentration, with the larger individuals having mercury concentrations as high as 0.8 part per million (wet weight). The mercury content of the water in the deep-ocean habitat of these fish appears not to determine the mercury content of a particular fish; species-specific factors and size do appear to determine this concentration. The species-specific variation between the recent fish also existed between the same two species in specimens collected 90 years ago from a depth of 2000 meters, and a 90-year-old specimen fit closely the size-concentration regression curve for nine recent individuals of the same species.

Oikos 17: 71–83. Copenhagen 1966

Mercury content in feathers of Swedish birds from the past 100 years

W. BERG¹, A. JOHNELS¹, B. SJÖSTRAND² and T. WESTERMARK³

Códigos de barras de ADN

