Talia Karim- University of Colorado
Museum of Natural History
Fossil Insect Collaborative

- Seven institutions:
  - Dena Smith—lead PI

- Two partner institutions:
Fossil Insect Collaborative

The Plan:  ❂ Over four years
        ❂ Database ~500,000 specimens
        ❂ ~77,000 digital images
        ❂ Data sharing
        ❂ iDigPaleo development

Start Date July 2013
Fossil Insect Collaborative

Research Goals:

- Examine insect response to environmental change in deep time

- Examine evolutionary history of fossil insect groups and patterns of diversity in deep time
Fossil Insect Collaborative

Paleo Digitization Workshop - Yale, Fall 2013
Fossil Insect Collaborative
& TCN Year 1 Meeting-Yale, Fall 2013
Fossil Insect Collaborative

The Plan:
- Over four years
- Database ~500,000 specimens
- ~77,000 digital images
- Data sharing
- iDigPaleo development
- Georeferencing
- Publishing locality data
- Taxonomic authority files
- Metadata standards
Fossil Insect Collaborative

**Year 1:**

- ~94,323 specimens records
- ~10,500 digital images
- Data sharing
  - Institutional websearches
  - GBIF
  - iDigPaleo-beta testing
Social Media

Year 1:

• #FossilFriday
Social Media

Year 1:

• Interactions within TCN
  • Specimen IDs
Project Website

Year 1:

Fossil insects provide a unique deep-time record of ecological and evolutionary response to past environmental changes and therefore are invaluable for understanding the impacts of climate change on the current biodiversity crisis. Given current models of future climate change and the important role that insects play in human society (biodiversity, pests, pollination, vectors of disease) the ability to access these data and make predictions about future insect populations becomes even more urgent. The Fossil Insect Collaborative will make available all the major collections of fossil insect specimens in the United States by creating electronic specimen records consisting of digital images and associated collection data.

The digitized fossil insect collections will be made broadly accessible to the research community, K-12 education, government and industry, the general public, and the media through the project website and a central site integrating all the paleobiological Thematic Collections Networks called DiGInBio. Mobile apps and activities that allow a wide variety of users to experience and interact directly with the collections data will be developed. This award is made as part of the National Resource for Digitization of Biological Collections through the Advancing Digitization of Biological Collections program and all data resulting from this award will be available through the national resource (DiGInBio.org).

LATEST NEWS
Entomological Society of America 2014 Annual Meeting: Fossil Insect Symposium - Sep 04, 2014
Check out the symposium on Fossil Insects at the ESA meeting! Session starts at 8am on November 16th.

LATEST BLOG
Green River Digitization at the UCM - October 31, 2014
If you’ve been following the Fossil Insect Collaborative through social media or as a participant in the digitization project, chances are you’ve seen examples of the specimens being imaged at the University of Colorado Museum of Natural History (UCM). ...

UPCOMING EVENTS
Entomological Society of America Annual Meeting Portland, OR, United States
All Events >>
Project Website

Year 1:

Green River Digitization at the UCM

If you've been following the Fossil Insect Collaborative through social media or as a participant in the digitization project, chances are you've seen examples of the specimens being imaged at the University of Colorado Museum of Natural History (UCM). Since January, this has included a constant stream of compression fossils—largely flies, beetles, and weevils, among others. But how, exactly, did this seemingly endless source of fossil insects end up at the Museum? The answer lies in the ambition of one citizen scientist dedicated to the fossil insects of Colorado's Green River Formation.

From 2004-2011, David Kohls of Bartlett Mesa, CO single-handedly amassed thousands of fossil insects for the UCM. Specifically, he donated at least 150,000 individual specimens from 18 Green River localities, or 6,500 to 8,200 individual shale samples—trimmed and ready for accession—per field season during his active collecting years. Including previous donations to the Smithsonian. Trust, David estimates he has contributed at least 250,000 individual specimens to these museums since he began collecting in 1991. In contrast to many historic collections, the specimens he made were not produced by high-grading “prized” specimens, but by collecting every fossil found. As a result, these collections represent systematically acquired samples of fossil insect assemblages, making them suitable for paleoecological and taphonomic studies.

David Kohls at a Green River fossil locality. This fall, UCM insectologist Paleontology visited with him and shared news about progress made in imaging the fossils he collected.

To say these collections keep UCM's Invertebrate Paleontology staff “busy” is an understatement. Students, faculty, and staff interact with Green River specimens on a daily basis through curation, digitization, and research. In turn, these collections have provided valuable career training for graduate and undergraduate students in geology, biology, environmental studies, anthropology, communications, and museum studies. Even a decade after David's first donation to the Museum, boxes of Green River fossils are still being unpacked and added to the curation and digitization queues. At a time when funding for field programs is limited, contributions such as David's to developing research-quality collections are truly invaluable. In recognition of his commitment to Green River paleontology and responsible fossil collecting, David received the Paleontological Society’s Merit Award in 2009.
Paleo Imaging Workshop

Year 1:

Paleo imaging workshop - Austin, April 2014
Specify for Paleo Workshop

Year 1:

Specify for Paleo Collections - Lawrence, May 2014
Fossil Insect Collaborative

Unexpected Outcomes-Year 1:

- Over 36,000 specimen records edited
  - Lots of data cleanup
- Equipment delays and lab moves
- iDigPaleo development moved up
Central portal for sharing Fossil Insect TCN data

Aggregate and send data to iDigBio

Education and outreach tools

Research tools

Potential to incorporate future Paleo TCNs
News

News Heading

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nunc faucibus nunc nisi, eu sollicitudin nibh pellentesque non.

Featured Fossils

[Images of fossils]
Making data and images of millions of insect specimens available on the web
Making data and images of millions of insect specimens available on the web
Insecta
CUMNH UCM 42979
University of Colorado Museum of Paleontology

TAXONOMY
Invertebrates > Arthropoda > Insecta

STRATIGRAPHY
Chronostratigraphy
Paleogene, Eocene M

Lithostratigraphy
Green River Formation, Parachute Creek?

LOCALITY
North America > USA > CO > Garfield > DON - Donnell Site
iDigPaleo Outreach

- Yale:
  - Evolutions
  - Teacher Training Workshop
Research

Ecological Patterns - Climate Change

- Dena Smith - CU Boulder

49 Ma
Middle Eocene
Research

Eocene-Oligocene Climate Change
Research

Eocene-Oligocene Climate Change
Research

Eocene-Oligocene Climate Change

MAT (°C)

Creede  2.5
Pitch Pinnacle  12
Florissant  12.7
Green River  18
Research

Diversity of Eocene Beetles from the Green River Formation

- Lindsay Walker- CU Museum Studies MS student
- Assessing community turnover with consideration for ecological preference

Green River cliffs (~49 Ma) in western Colorado
Research

Diversity of Eocene Beetles from the Green River Formation

Pros:
• Facilitates comparisons
• Enables measurements

Complications:
• Time-consuming
• Image management/logistics
• Image quality

Future considerations:
• High-res image retrieval
Research

*Electrotettix attenboroughi* Heads & Thomas

- Heads et al. (2014)-Zookeys
  - Pygmy grasshopper
  - Sanderson amber collection
  - ~150 pounds unprocessed
FOSSILS IN AMBER

INHS researchers name their newly-discovered fossilized grasshopper after David Attenborough, British naturalist and film maker.

**Electrotettix attenboroughi**
Heads & Thomas

**ETYMOLOGY**
The genus name *Electrotettix* was derived from a combination of Latin/Greek words:
exterum = amber
tettix = grasshopper

The specific epithet *attenboroughi* was chosen to honor Sir David Attenborough, British naturalist and film maker, in recognition of his many important contributions to natural history.

**18–20 million years old (Early Miocene)**
Discovered in amber from the La Toca region of the DOMINICAN REPUBLIC

**8 mm in length**

**SPECIES IMPORTANCE**
*Electrotettix attenboroughi* is a transitional fossil, a link between prehistoric ancestors and their modern day relatives. With its non-functional, vestigial wings, it represents an intermediate form between fully-winged, flying ancestors and their wingless (and thus flightless) modern relatives.

**WHAT IS AMBER?**
Amber is the fossilized resin of ancient trees. Most Dominican amber arose from an extinct, prehistoric tree in the legume (bean) family.

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**Approximately 1 in 10 Dominican amber pieces contain a fossil**

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Fossil Insect Collaborative

Fossil Insect Symposium

Wednesday 8am-noon

room B110-112
Fossil Insect Collaborative

Future Plans:

- Amber prep workshop
  - February 2015- AMNH

iDigPaleo:

- Assimilate more data
- Launch and test
Questions?