

# MorphoNet: A Solution for Managing Shared Image Data

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software...

# Cumulus 6.0

- proprietary ([www.canto.com](http://www.canto.com))
- includes XML metabridge for queries by XML applications
- ODBC compliant for alternate storage in Oracle or SQL.

The screenshot displays the Cumulus 6.0 software interface. At the top, there is a menu bar with options: Cumulus, File, Edit, View, Categories, Collections, Issues, Windows, and Help. Below the menu bar is a toolbar with various icons for file operations and navigation. The main window title is "Cumulus 6.0".

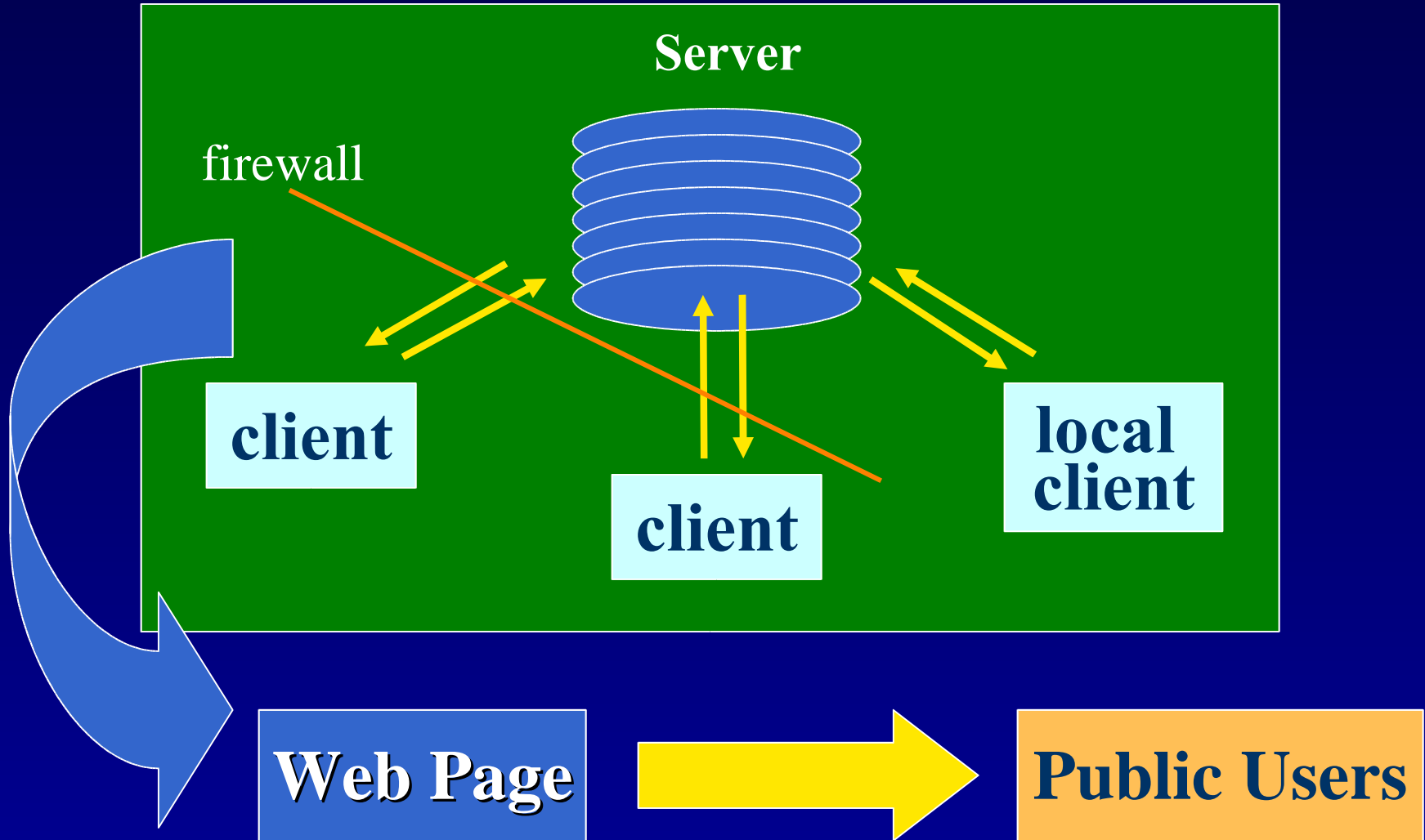
The interface shows a grid of insect images. The top status bar indicates "119 of 681 Categories" and "71 of 5571 Records (4 Selected)". The grid is organized into two rows and six columns. Each cell in the grid contains an image of an insect, a taxonomic classification, and a label for the image.

Category	Image	Classification	Label
Aphelinidae		Aphelinidae Cales noacki	mesosoma & metasoma
Aphelinidae		Aphelinidae Cales noacki	mesosoma
Aphelinidae		Aphelinidae Cales noacki	mesosoma
Aphelinidae		Aphelinidae Cales noacki	mesosoma
Aphelinidae		Aphelinidae Cales noacki	habitus
Aphelinidae		Aphelinidae Cales noacki	antenna
Aphelinidae		Aphelinidae Cales noacki	antenna
Aphelinidae		Aphelinidae Cales noacki	antenna
Aphelinidae		Aphelinidae Cales noacki	antenna
Aphelinidae		Aphelinidae Cales noacki	antenna
Aphelinidae		Aphelinidae Cales noacki	antenna

On the left side, there is a tree view showing the hierarchy of categories. The tree is expanded to show the following categories:

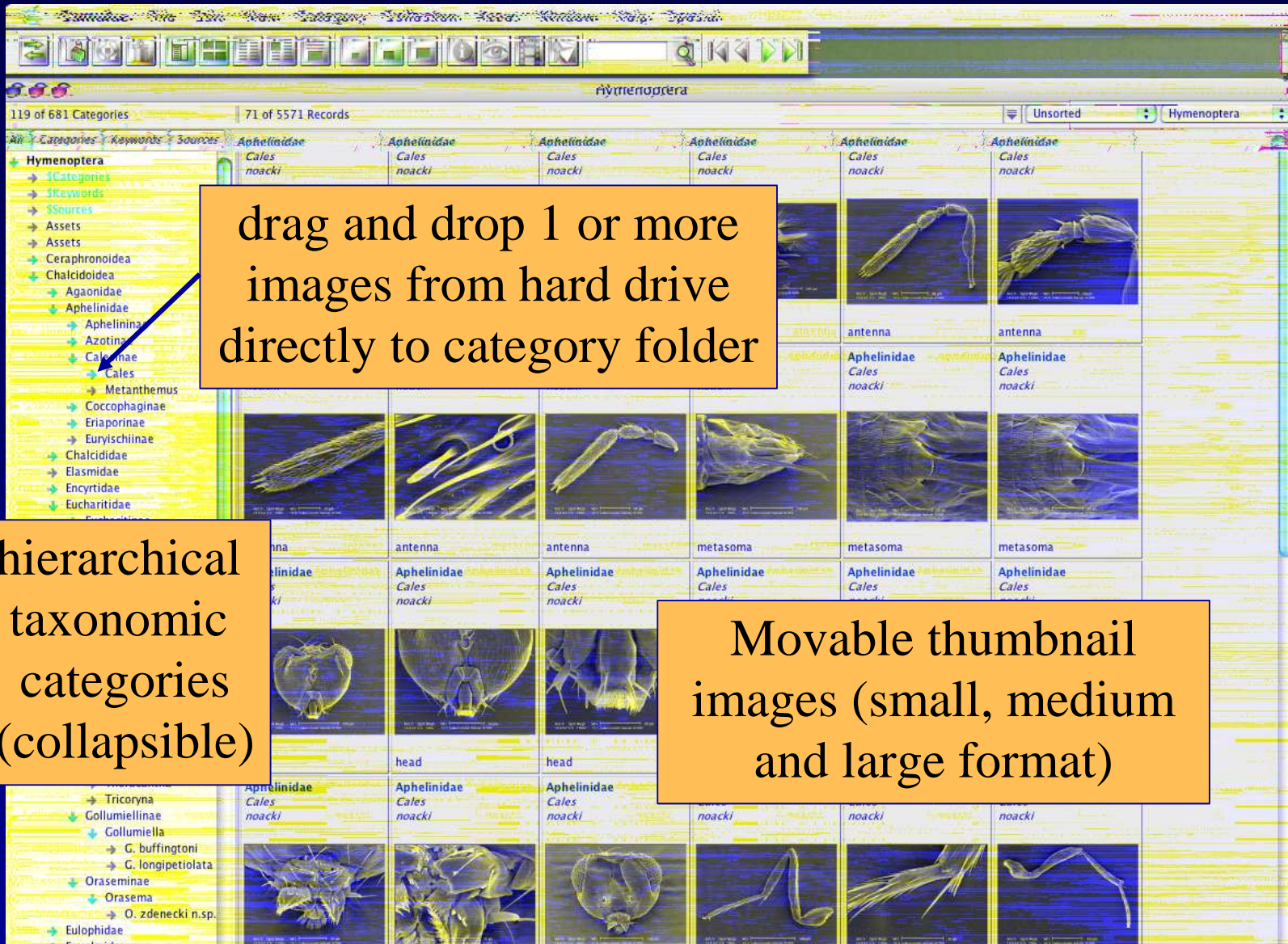
- Chalcidoidea
  - Agaonidae
  - Aphelinidae
    - Aphelininae
    - Azotinae
    - Calesinae
      - Cales
        - Metanthemus
    - Coccophaginae
    - Eriaporinae
    - Euryischiinae
  - Chalcididae
  - Elasmidae
  - Encyrtidae
  - Eucharitidae
    - Eucharitinae
      - Ancylotropus
      - Chalcura
      - Colocharis
      - Isomerala
      - Kapala
      - Lirata
      - Lophyrocera
      - Mateucharis
      - Obeza

# MorphoNet





# Cumulus Client Interface



drag and drop 1 or more images from hard drive directly to category folder

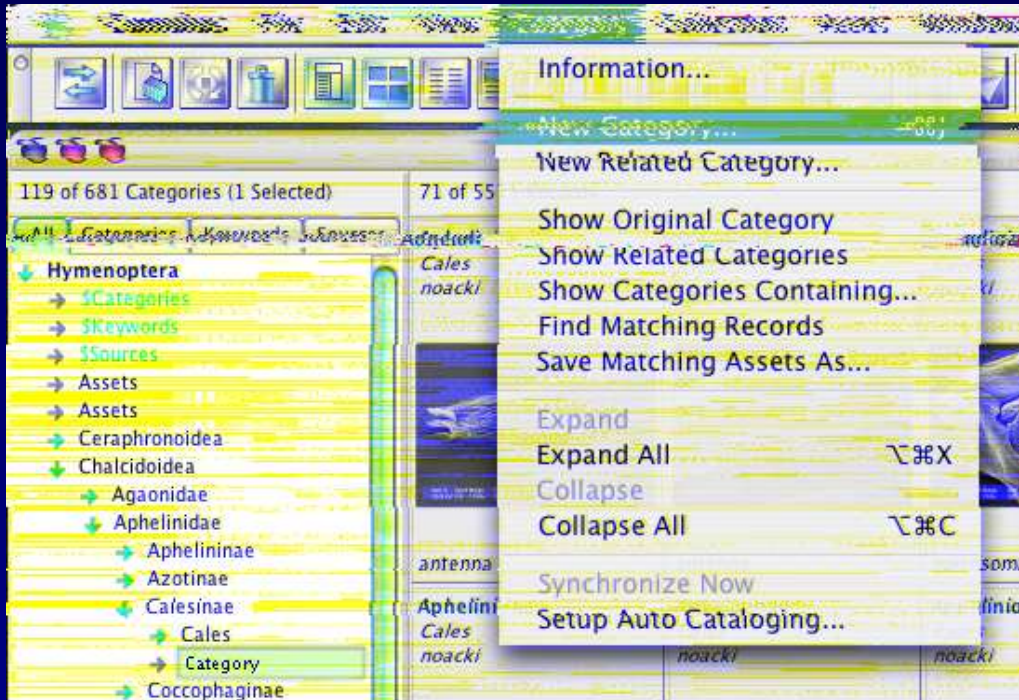
hierarchical taxonomic categories (collapsible)

Movable thumbnail images (small, medium and large format)

## Catalog Contents

# Hierarchical (taxonomic) categories

- users can add categories
- administrator privileges





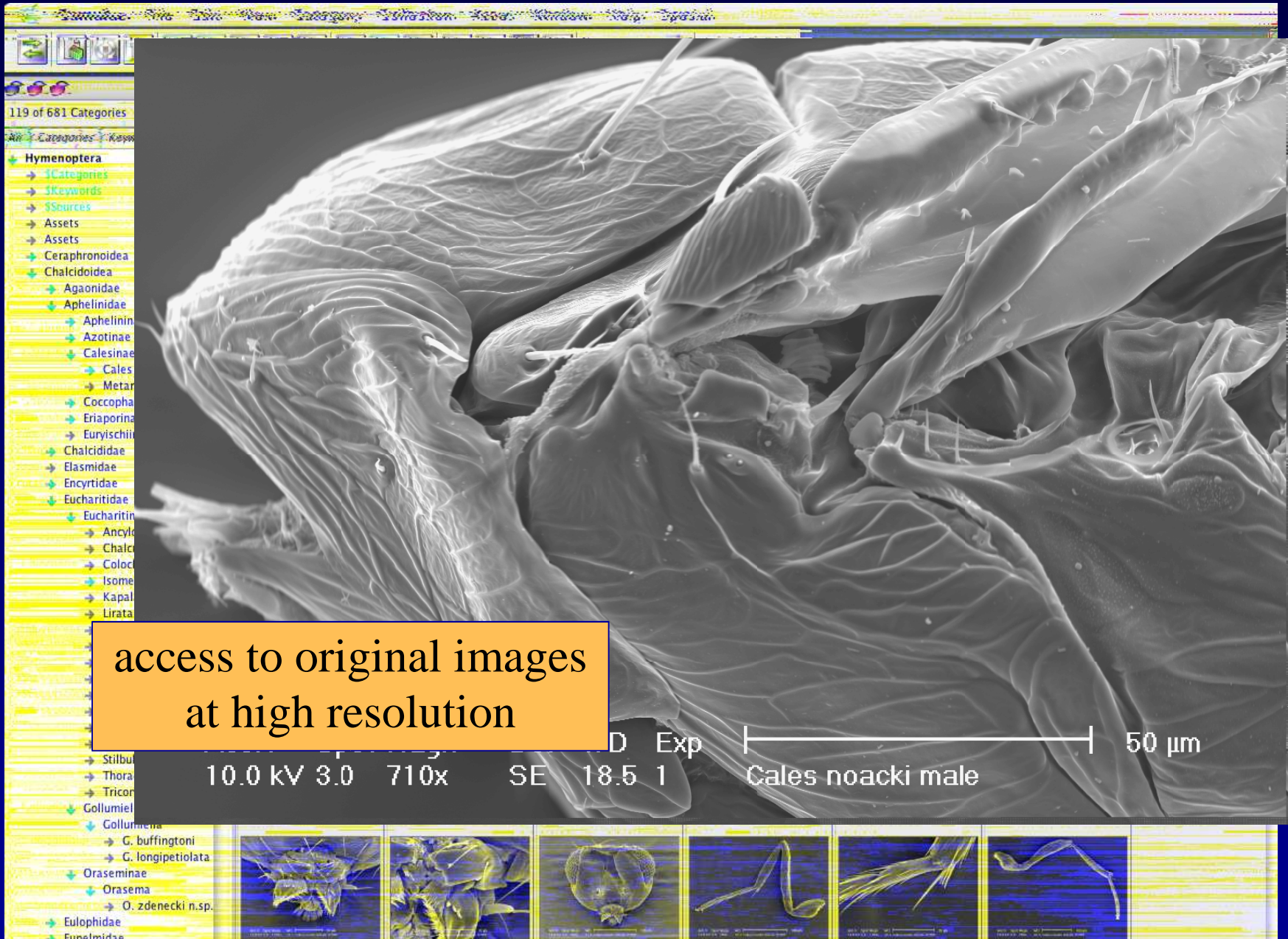
# Asset Information

The screenshot displays a software interface for managing digital assets. On the left, a tree view shows a hierarchy of taxonomic categories under 'Hymenoptera', with 'Chalcidoidea' and 'Aphelinidae' expanded. The main area is a form titled 'Information for Asset "CALEPM2.TIF" of "Hymenoptera"'. This form contains various fields for specimen data, including taxonomic classification, physical characteristics, and collection details. A green box highlights the form's content. To the right of the form, a grid of thumbnail images shows different views of the specimen, such as habitus, head, and appendages, with labels like 'habitus', 'head', and 'appendages'.

Field Name	Field Content
Superfamily	Chalcidoidea
Family	Aphelinidae
Subfamily	Calesinae
Genus	Cales
Species	noacki
Determined by	Heraty
Gender	Male
Stage	adult
Copyright Holder	J. Heraty
Web access?	yes
Source	UCR
Type status	non-type
Magnification	
Depository	UCRC
Preparation Method	SEM, coated
Voucher Code	D0604
Thumbnail	
Tagma	mesosoma
Body part (general) 1	mesopleuron
Body part (general) 2	mesoscutum
Viewing angle	lateral
Viewing angle modifier	no value
Body part (specific) 1	mesepimeron
Body part (specific) 2	mesepimeron
Body part (specific) 3	tegula
Structure 1	no value

- taxonomy (required; pick.)
- determined by...
- gender (picklist)
- stage (picklist)
- copyright holder
- web access (yes/no)
- source
- type status (picklist)
- magnification
- museum depository (picklist)
- preparation method (picklist)
- voucher code #
- tagma (primary; req.; pick.)
- body part (secondary; pick.)
- structural details (picklist)
- collecting locality
- notes





access to original images  
at high resolution

10.0 kV 3.0 710x SE 18.5 1 | 50 µm  
Cales noacki male



# Collections

- search functions for all categories (alas no global).

The screenshot displays the Cumulus software interface. The main window shows a grid of records for the 'Hymenoptera' collection, with columns for 'Cales spenceri', 'Cales noacki', and 'Cales berryi n. sp.'. A search dialog box is open, titled 'Find Records in 'Hymenoptera''. The search criteria are: Genus contains Cales and Tagma is mesosoma. The search method is 'Search All Open Catalogs' and the results are shown in the 'Current Collection'. The dialog indicates that 22 records were found. The background shows a sidebar with a tree view of categories and a menu with options like 'New...', 'Open...', 'Save As...', 'Mail To...', 'Remove Catalog from Collection...', 'Find Records', 'Find All Records', 'Remove Record from Collection', 'Insert Condition', 'Append Condition', 'Delete Condition', and 'Slide Show'.



# Collections

- images can be moved, sorted and selected
- can be stored as **collections for export to users or internet**

The screenshot shows a web-based interface for managing biological specimen images. The title bar indicates the application is 'Hymenoptera'. The main window displays a grid of 12 images, arranged in two rows and six columns. Each image is a scanning electron micrograph (SEM) of a specimen, with a label below it. The labels are: 'mesosoma & metasoma', 'mesosoma', 'mesosoma', 'mesosoma', 'habitus', 'antenna' in the first row; and 'antenna', 'antenna', 'antenna', 'antenna', 'antenna', 'antenna' in the second row. The interface includes a menu bar at the top with options like 'File', 'Edit', 'View', 'Database', 'Collection', 'Access', 'Window', 'Help', and 'Special'. Below the menu bar is a toolbar with various icons for navigation and editing. On the left side, there is a sidebar with a tree view showing a hierarchy of categories: 'All', 'Categories', 'Keywords', and 'Sources'. Under 'Categories', there are several sub-categories, including 'Chalcidoidea', 'Agaonidae', 'Aphelinidae', 'Aphelininae', 'Azotinae', 'Calesinae', 'Cales', 'Metanthemus', 'Coccophaginae', 'Eriaporinae', 'Euryischiinae', 'Chalcididae', 'Elasmidae', 'Encyrtidae', 'Eucharitidae', 'Eucharitinae', 'Ancylostropus', 'Chalcura', 'Colocharis', 'Isomerla', 'Kapala', 'Lirata', 'Lophyrocera', 'Mateucharis', and 'Obeza'. The main window also shows '119 of 681 Categories' and '71 of 5571 Records (4 Selected)'. The status bar at the bottom right indicates 'Unsorted'.

Category	Image 1	Image 2	Image 3	Image 4	Image 5	Image 6
Aphelinidae <i>Cales noacki</i>						
mesosoma & metasoma	mesosoma	mesosoma	mesosoma	habitus	antenna	
Aphelinidae <i>Cales noacki</i>						
antenna	antenna	antenna	antenna	antenna	antenna	





# Cumulus Client Interface

The screenshot displays the Cumulus Client interface. The top menu bar includes File, Edit, View, Catalog, Category, Collection, Asset, Special, Window, and Help. The system tray shows the time as 10:28 AM and the application name as Cumulus Client.

The main window is titled "Hymenoptera" and shows "26 of 5357 Records, 1 selected". On the left, a tree view shows "30 of 652 Categories, 1 selected". The tree is expanded to show the following structure:

- Assets
- Assets
- Ceraphronoidea
- Chalcidoidea
- Cynipoidea
  - Cynipidae
  - Figitidae
    - Anacharitinae
    - Aspicerinae
      - Aspicera
        - scutellara**
      - Callaspidia
      - Charipinae
      - Emargininae
      - Eucoilinae
      - Figitinae
      - Pycnostigminae
      - Thrasorinae
    - Ibaliidae
    - Liopteridae
- Evanoidea
- fossils
- Ichneumonoidea
- Megaluroidea
- Mymarommatoidea
- Platygastroidea
- presto.uor.edu
- Proctotrupoidea
- Stephanoidea
- Trigonalyoidea

The main content area displays a grid of 27 specimen images, arranged in three rows of nine. Each image is labeled with "Figitidae" and "Aspicera scutellaris" followed by a specific body part:

- Row 1: head, head, head, head, head, head, antenna, antenna, antenna
- Row 2: mesosoma, mesosoma, mesosoma, mesosoma, mesosoma, mesosoma, metasoma, metasoma, metasoma
- Row 3: metasoma, metasoma, metasoma, metasoma, mesosoma, metasoma, metasoma, metasoma





# Cumulus Client Interface

File Edit Utilities Characters Taxa Display Windows Help 10:03 AM MacClade 4.06 PPC

ASCC11.TIF • 100%

ASCC15.TIF • 100%

Hymenoptera

ASCC14.TIF • 100%

ASCC12.TIF • 100%

Work.Matr.285+C01+morph+18506

Taxa	Characters	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	
38 LonchNM.284		0	0	1	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	?	0	0	?	0	?	0	0	0	1	
39 Melan.281		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
40 Melan.302		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
41 CallaR.059		0	0	0	?	2	0	2	?	?	?	?	?	?	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
42 CallaC.031		0	0	0	?	2	0	2	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
43 CallaNA.226		0	0	0	?	2	0	2	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
44 Aspicerca.424		0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	?	?	1	0	0	0	0	0	0	0	?	?
45 Anacoid.319		0	0	0	?	2	?	2	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
46 Omalas.381		0	0	0	1	2	?	2	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

T 44 C 1165

TreeViewPPC

# Goals of MorphoNet

- Provide 'clients' with standardized platform for image deposition that is reliable, stable and accessible.
- Provide a single reference database for morphological systematics via the internet
- Provide sufficient metadata and means of annotation for use of images



# Some caveats...

- Security
  - Surrounded by multiple firewalls (VPN portal access)
  - Need automated backup
- 10 clients maximum can be logged on at any time
- SPEED! - moved from 10 meg leg (huh?) to 100meg but still on a 6 year old server
  - [expectations of 3 GB leg on internet 2 by fall 2005]
- campus wants us on a separate server.
- Canto will not make changes that we need.

# Others....

MorphBank - Netscape

http://www.morphbank.com/

## MorphBank

2004-09-18 Home About Contribute Search MorphBank

### Welcome to MorphBank

MorphBank is a searchable data base of high-resolution images for phylogenetic and biodiversity research. MorphBank is both a virtual reference collection of animal organisms and a resource for comparative morphological study. Each image in the database is associated with fully searchable text information, and images can be downloaded in several different formats.

MorphBank is open to any systematist interested in storing high-quality digital images of organisms in a general-purpose searchable data base. See the 'Contribute' link above for more information on how you can upload images to MorphBank or have MorphBank mirrored to a local server near you. MorphBank currently contains about 6,000 images of different groups of organisms, mainly insects.

#### Copyright Policy

The images in MorphBank can be used for private or non-commercial purposes for free, provided that the source and the copyright holder are cited. Any commercial use requires consent from the copyright holder.

### New species

First description of species based on images appear in Zootaxa (volume 1187):

(Posted by: Frank Olf)

### Web Interf

(2003-02-24)  
As of February 2004, MorphBank is through a search interface built with MySQL.

(Posted by: Frank Olf)

### 1st MorphB

(2003-02-24)  
First paper based on MorphBank: apt. Cladistics 18: 1-10. Authored by Frank Olf and contributors, this is the first analysis using online relational database.

### Search Result

[Hits total: 37] [1 - 25] [26 - 37]

- [#2571] Hymenoptera/Fligittidae/Eucolla crassinerva  
Part: Head Sex/Form: Sexual:Female  
Viewing angle: Dorsal  
Dim: Not set  
[Info](#) [Img](#) [Tiff](#)
- [#2572] Hymenoptera/Fligittidae/Eucolla crassinerva  
Part: Head Sex/Form: Sexual:Female  
Viewing angle: Anterior  
Dim: Not set  
[Info](#) [Img](#) [Tiff](#)
- [#2573] Hymenoptera/Fligittidae/Eucolla crassinerva  
Part: Head Sex/Form: Sexual:Female  
Viewing angle: Posterior  
Dim: Not set  
[Info](#) [Img](#) [Tiff](#)

Partnership for Biodiversity Image and Data Exchange

VETENSKAPSRÅDET

Transferring data from www.morphbank.com...

## MorphBank

2004-09-18 Home About Contribute Search MorphBank

### Eucolla crassinerva - Accession # 2573

Submitted by: Not available  
Submission date: 2003-06-04  
Copyright holder:  
Copyright contact:  
Viewing angle: Dorsal  
Body part: Head  
Viewing angle: Posterior  
Technique: SEM  
Preparation: ammonia clearing, gold coated  
Magnification:  
Dimension (px):  
Resolution (px/inch):  
Download: [tiff \(1.18 MB\)](#)  
[img \(312.41 KB\)](#)



**Taxonomy**

- Phylum: Arthropoda
- Class: Insecta
- Order: Hymenoptera
- Family: Fligittidae
- Genus: Eucolla
- Species: crassinerva
- Form: Sexual:Female
- Stage: Adult

**Specimen data**

- Country:
- Collection locality:
- Collection dates:
- Specimen ID:
- Depository:





## About SID

SID was conceived by [Simon Rycroft](#) and [Vince Smith](#) as a general-purpose web repository. Key features of SID include:

- Web upload/download of images (supports multiple image formats)
- Bulk and single image annotation via web forms (permits quick, simple, and detailed annotation of images)
- Extensive browse and search options (includes advanced taxonomic search options)
- Web service facility (allows external websites to display images and annotations stored by SID)
- Web utility to label specific image features (displays optional labels overlaying an image, useful for highlighting key features)
- Taxonomy served and validated independently by the Glasgow Taxonomy Name Set (maintains integrity of the data and helps "future-proof" the taxonomy)
- Alias addresses for images by accession number (permits rapid citation of images in publications e.g. <http://darwin.zoology.gla.ac.uk>)
- Freeware - available for download from the "Host SID" link (allows anyone to set up the database and serve their own images)

### Screen shots

- Multiple image upload\* [1]
- Group images for bulk annotation\* [1]
- Bulk or individual image upload
- Label image features
- Administrator page
- Advanced search [1]

\* Requires registration to use

### History and Credits

Database and website design by [Simon Rycroft](#) and [Vince Smith](#) in Information Technology

### Software

The site uses an Apache web server and a multiple file upload applet



- Login
- Browse
- Search
- Web service
- About SID
- Host SID
- RSS



## Alcedoffula (ID# 1400)



- Login
- Browse
- Search
- Web service
- About SID
- Host SID
- RSS



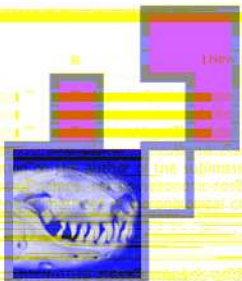
- Login
- Browse
- Search
- Web service
- About SID
- Host SID
- RSS

Actomithophilus uniseriatus Taken: Aug 02 40x Material from BNHM collection.	Actomithophilus uniseriatus Taken: Aug 02 100x Material from BNHM collection.	Actomithophilus uniseriatus Taken: Aug 02 100x Material from BNHM collection.	Actomithophilus uniseriatus Taken: Aug 02 100x Material from BNHM collection.	Actomithophilus uniseriatus Taken: Aug 02 100x Material from BNHM collection.	Actomithophilus uniseriatus Taken: Aug 02 100x Material from BNHM collection.
Actomithophilus uniseriatus Taken: Aug 02 100x Material from BNHM collection.	Actomithophilus uniseriatus Taken: Aug 02 100x Material from BNHM collection.	Actomithophilus uniseriatus Taken: Aug 02 40x Material from BNHM collection.	Alcedoffula Taken: May 97 960x Specimens from BMNH collect...	Alcedoffula Taken: May 97 480x Specimens from BMNH collect...	Alcedoffula Taken: May 97 960x Specimens from BMNH collect...



# MorphoBank

About the project Participate Explore the database



**What's New?**  
 Coming September 2004  
 New features including labelled images.

MorphoBank is an initiative supported by the National Science Foundation designed to use the web to manage comparative anatomical data for scientific research and education. The database catalogues images (including films and CT scans) and will soon allow contributors to label anatomical structures on the images. MorphoBank records information on the author of the submission, related publications, critical commentary and species names. For phylogenetic research, MorphoBank displays dynamic phylogenetic matrices of morphological characters with labelled homology statements. Information on MorphoBank is not to be used for commercial purposes.

Containing 23862 images and 3 matrices relating to 1927 species.



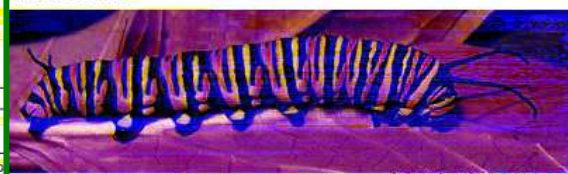
Search:

MorphoBank Version 1.0; © The MorphoBank Project, 2004

# MorphoBank

About the project Participate Explore the database

Back to search



<b>Taxonomy</b>	
Nymphalidae	[Family]
Danainae	[Subfamily]
Danaus plexippus	[Species]
<b>Metadata</b>	
	[anatomy, behavior or habit, collection date, collection locality, collector, creation date, geographic location, photo type, voucher #]

Danaus plexippus plexippus	lateral entire lateral entire	behavior or habit	08/06/1998 08/06/1998	Estacion San Cristobal, Alajuela, Costa Rica	Oswaldo Espinoza do Espinoza	10.8709700, 85.3914400	Kodachrome ASA 25	98-SRNP-7073
View zoomable image		habitat	[collection date]	[collection locality]	[collector]	[geographic location]	[photo type]	[voucher #]
<b>Submission information</b>		<b>Submission information</b>						
submitted on July 17, 2004 at 09:25:36		Submitted by Daniel Janzen						
Copyright		Copyright Daniel Janzen						



http://digimorph.org/specimens/Schistocerca\_emarginatum/head/

Search



# DIGIMORPH

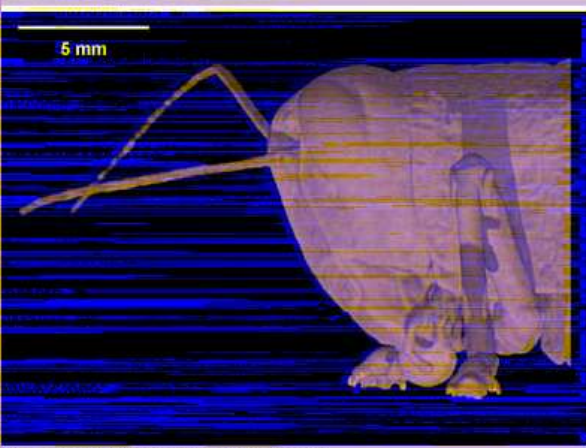
An NSF Digital Library at UT Austin

- DigiMorph**
- Home
- About DigiMorph
- DigiMorph Help
- Sponsors
- Links
- Recent Publications
- DigiMorph People
- Site Statistics
- Browse the Library by:**
- Scientific Names
- Common Names
- Cladogram
- What's New ?
- What's Popular?
- Learn More**
- DigiMorph Course
- X-ray CT
- 3-D Printing
- Popular Pages**
- Alligator
- Dinosaurs
- Tapirs
- Horned Lizards \*
- Elephant Bird Egg
- Bats!
- Primates
- House Mouse
- Platypus
- A Product of**
- UTCT
- UT Geosci
- CT
- TMMSH
- DigiMorph
- \* Expert
- Our N

Search for... Search

## Schistocerca emarginata, Grasshopper

DigiMorph Staff - The University of Texas at Austin



Texas Memorial Museum (uncatalogued)

whole | head

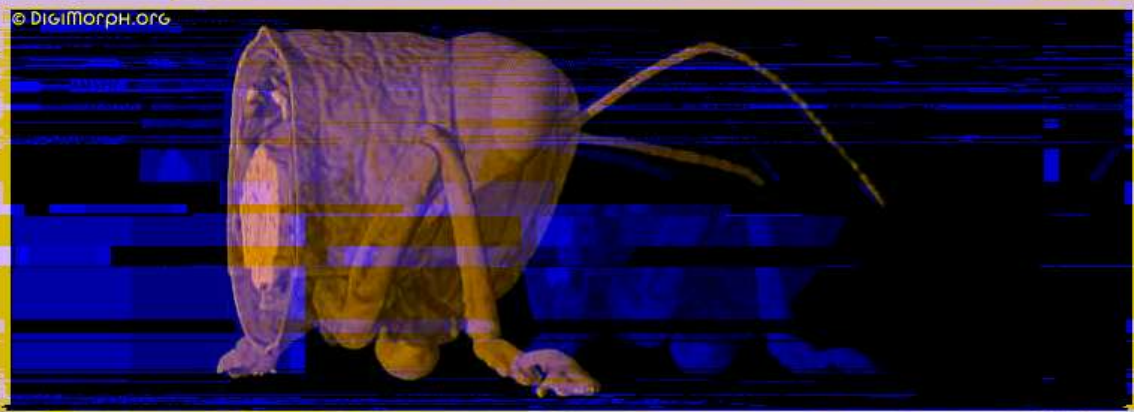
ITIS TNS Google

- Applet, Slices & 3D Models
- 3D Render
- Java Slice Viewer
- Skeleton
- inspeCTOR
- Roll - 10
- Slice Movies
- Pitch - 10
- Coronal - n/a
- Yaw - 10
- Horizontal - n/a
- With Sk
- Sagittal - n/a
- Roll - n
- Surface Models
- Pitch - 10
- STL - n/a
- Yaw - n
- 3D CT - n/a
- Dynami
- Coronal
- Horizon
- Sagittal



Image processing: Ms. A  
Publication Date: 27

- About the Species
- About this Specimen
- About the Scan
- Literature & Links
- Additional Imagery



# Future considerations....

## What will be the impacts of JPEG 2000?

- compression without loss of resolution (storage)
- permanent annotation of images by user  
(need for standardized annotation program [SEQUIN])
- can tag images for taxonomy, voucher deposition, and unique image tag number (register through GBIF?)
- images can be annotated subsequently and updated to original source
- should think of central mirrored depositories with 'pointers' from different databases (automatic incorporation of annotations)



# MorphoNet Acknowledgements

- NSF PEET 9978150 (Supplemental Grant)
- Mark Nicolay, Joel Nylander, Leo Schouest, and Larry McGrath (campus Computing and Communications).
- Image contributors: Heraty, Pinto and Hughes labs (UCR); Ratcliffe PEET group (University of Nebraska); Gibson and Huber (Canadian National Insect Collection); Schauff & Gates (Systematic Entomology Laboratory, Washington); Krogman (University of Hamburg); Schulmeister and Keller (American Museum of Natural History); Sharkey lab (University of Kentucky).